



Know what's below
811 before you dig

MULTI-FAMILY RESIDENTIAL DEVELOPMENT

"LEDGEWOOD DRIVE LLC"

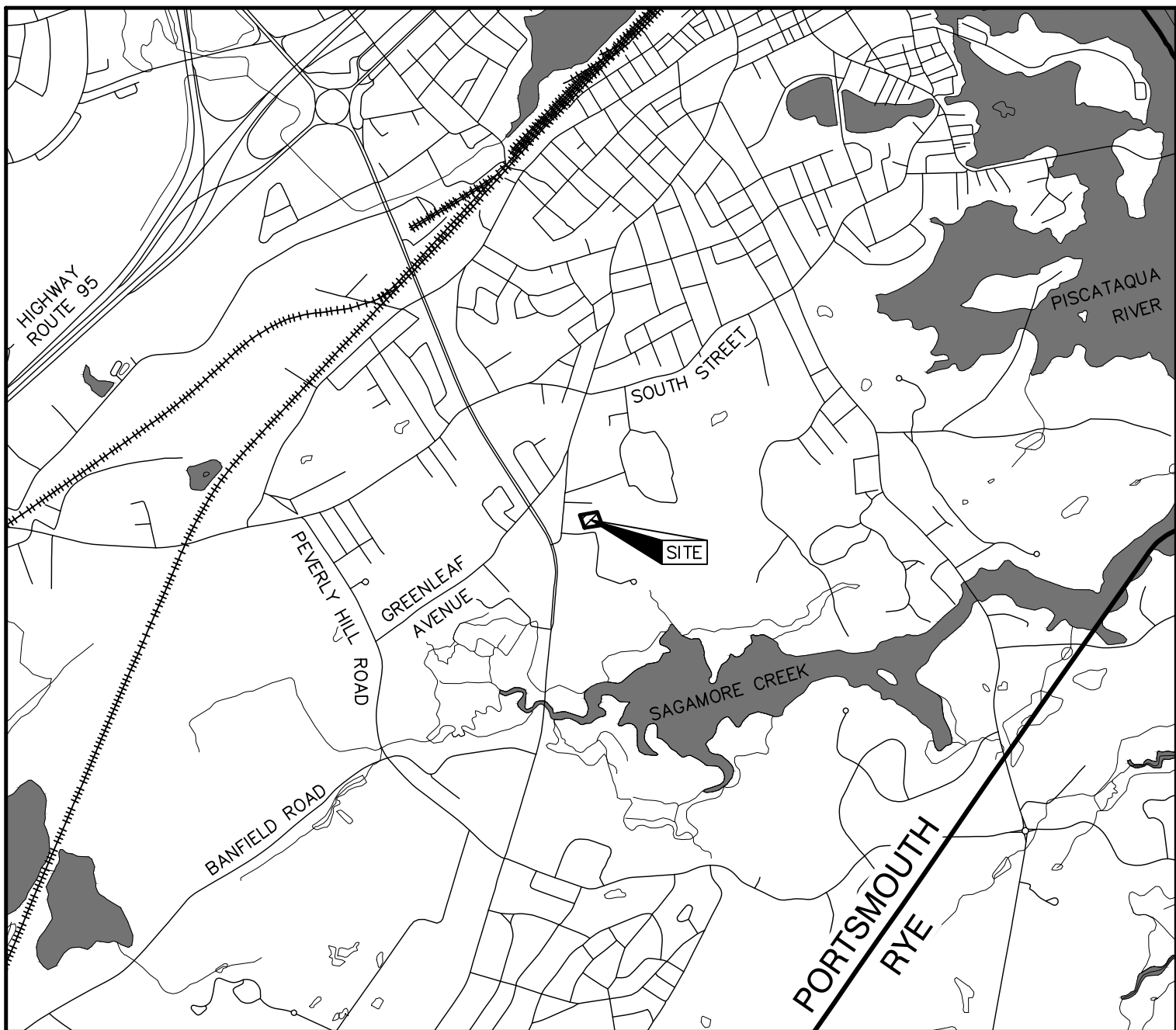
TAX MAP 229, LOT 6A

LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801

GENERAL LEGEND

EXISTING	PROPOSED

DESCRIPTION
PROPERTY LINES
SETBACK LINES
CENTERLINE
FRESHWATER WETLANDS LINE
TIDAL WETLANDS LINE
STREAM CHANNEL
TREE LINE
STONEWALL
BARBED WIRE
FENCE
STOCKADE FENCE
SOIL BOUNDARY
AQUIFER PROTECTION LINE
FLOOD PLAIN LINE
ZONELINE
EASEMENT
MAJOR CONTOUR
MINOR CONTOUR
EDGE OF PAVEMENT
VERTICAL GRANITE CURB
SLOPE GRANITE CURB
CAPE COD BERM
POURED CONCRETE CURB
SILT FENCE
DRAINAGE LINE
SEWER LINE
SEWER FORCE MAIN
GAS LINE
WATER LINE
WATER SERVICE
OVERHEAD ELECTRIC
UNDERGROUND ELECTRIC
GUARDRAIL
UNDERDRAIN
FIRE PROTECTION LINE
THRUST BLOCK
IRON PIPE/IRON ROD
DRILL HOLE
IRON ROD/DRILL HOLE
STONE/GRANITE BOUND
SPOT GRADE
PAVEMENT SPOT GRADE
CURB SPOT GRADE
BENCHMARK (TBM)
DOUBLE POST SIGN
SINGLE POST SIGN
WELL
TEST PIT
FAILED TEST PIT
MONITORING WELL
PERC TEST
PHOTO LOCATION
TREES AND BUSHES
UTILITY POLE
LIGHT POLES
DRAIN MANHOLE
SEWER MANHOLE
HYDRANT
WATER GATE
WATER SHUT OFF
REDUCER
SINGLE GRATE CATCH BASIN
DOUBLE GRATE CATCH BASIN
TRANSFORMER
CULVERT W/WINGWALLS
CULVERT W/FLARED END SECTION
CULVERT W/STRAIGHT HEADWALL
STONE CHECK DAM
DRAINAGE FLOW DIRECTION
4K SEPTIC AREA
WETLAND IMPACT
VEGETATED FILTER STRIP
RIPRAP
PAVEMENT HATCH
OPEN WATER
FRESHWATER WETLANDS
TIDAL WETLANDS
STABILIZED CONSTRUCTION ENTRANCE
CONCRETE
GRAVEL
SNOW STORAGE
RETAINING WALL



LOCUS MAP

SCALE 1" = 2000'

SHEET INDEX

CS	COVER SHEET
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C2	SITE PLAN
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C4	UTILITY PLAN
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L2	LANDSCAPING PLAN
T1	TRUCK TURNING PLAN
D1-D4	DETAIL SHEETS
E1-E2	EROSION AND SEDIMENT CONTROL DETAILS

CIVIL ENGINEER / SURVEYOR

JONES & BEACH ENGINEERS, INC.
100 DOMAIN DRIVE, SUITE 201
EXETER, NH 03833
(603) 772-4746
CONTACT: ERIK POULIN, P.E.
E-MAIL: EPOULIN@JONESANDBEACH.COM

WETLAND CONSULTANT

GOVE ENVIRONMENTAL SERVICES
8 CONTINENTAL DRIVE, UNIT H
EXETER, NH 03833-7507
(603) 778-0644
CONTACT: BRENDEN WALDEN

LANDSCAPE DESIGNER

LM LAND DESIGN, LLC
11 SOUTH ROAD
BRENTWOOD, NH 03833
(603) 770-7728
CONTACT: LISE MCNAUGHTON

WATER

CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS
WATER DIVISION
680 PEVERLY HILL ROAD
PORTSMOUTH, NH 03801
(603) 427-1530

SEWER

CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS
SEWER DIVISION
680 PEVERLY HILL ROAD
PORTSMOUTH, NH 03801
(603) 766-1421

LIGHTING DESIGN

EXPOSURE LIGHTING
501 ISLINGTON STREET, UNIT 1A
PORTSMOUTH, NH 03801
CONTACT: KEN SWEENEY

ELECTRIC

EVERSOURCE
1700 LAFAYETTE ROAD
PORTSMOUTH, NH 03801
(800) 662-7764

TELEPHONE

CONSOLIDATED COMMUNICATIONS
1575 GREENLAND ROAD
GREENLAND, NH 03840
(800) 427-5525

CABLE TV

COMCAST COMMUNICATION CORPORATION
334-B CALEF HIGHWAY
EPPING, NH 03042-2325
(603) 679-5695

PROJECT PARCEL
TOWN OF PORTSMOUTH
TAX MAP 229, LOT 6A

APPLICANT
LEDGEWOOD DRIVE LLC
ATTN. BEN MIDDLETON
10 MAIN STREET
NEWFIELDS, NH 03856

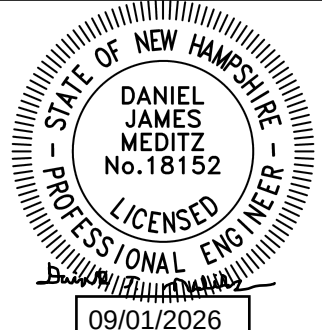
TOTAL LOT AREA
43,255 SQ. FT.
0.99 ACRES

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON

DATE

Design: DJM	Draft: TCR	Date: 01/08/26
Checked: EMP	Scale: AS NOTED	Project No.: 25071.2
Drawing Name: 25071.2-PLAN.dwg		
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.		



REV.	DATE	REVISION	BY
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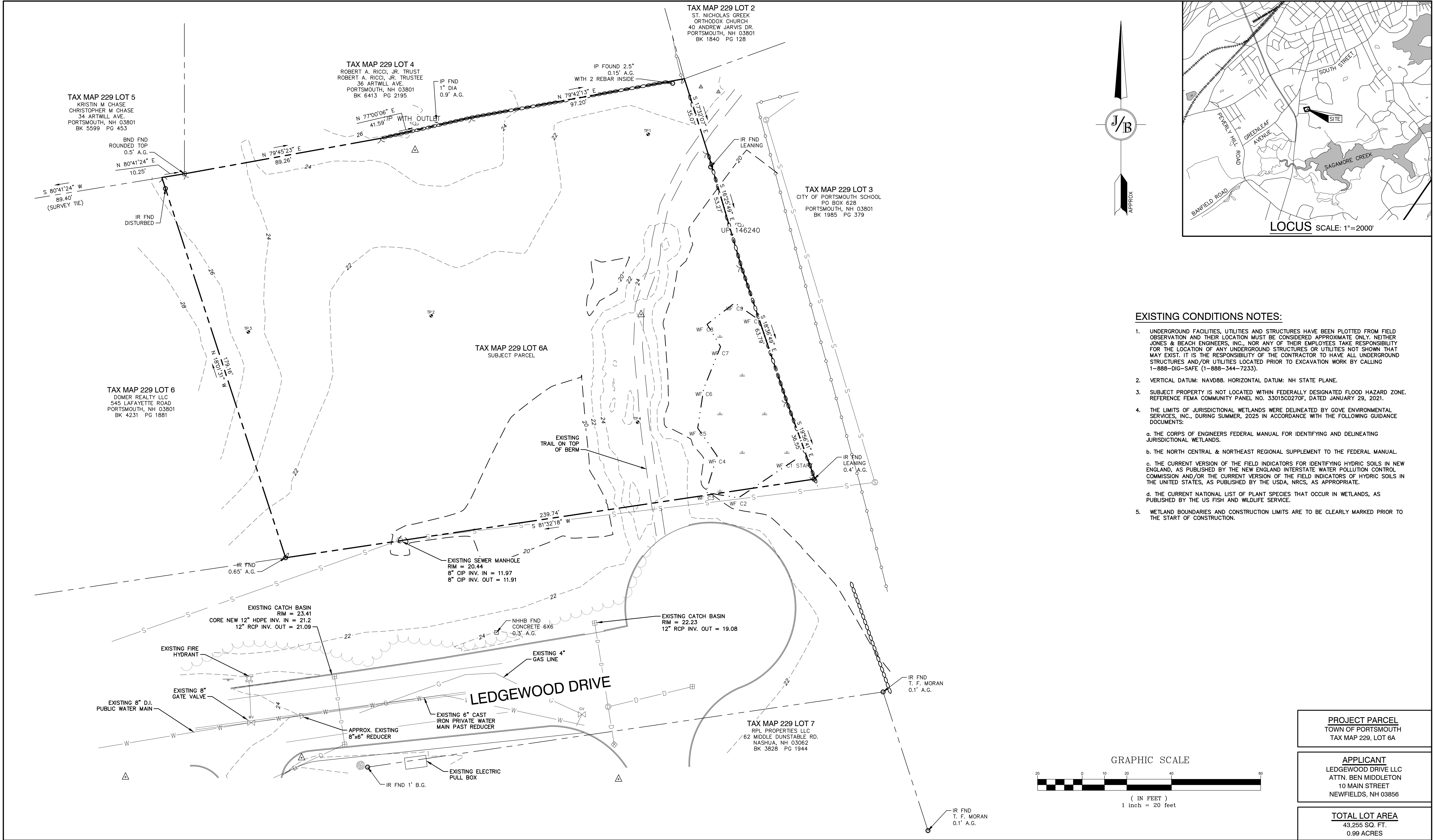
Civil Engineering Services

603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	COVER SHEET
Project:	LEDGEWOOD DRIVE LLC LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

DRAWING No.
CS
SHEET 1 OF 15 JBE PROJECT NO. 25071.2

LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
JBE # 25071.2 REVISION 0, 06/17/26



EXISTING CONDITIONS NOTES:

- UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER JONES & BEACH ENGINEERS, INC., NOR ANY OF THEIR EMPLOYEES TAKE RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND STRUCTURES OR UTILITIES NOT SHOWN THAT MAY EXIST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 1-888-DIG-SAFE (1-888-344-7233).
- VERTICAL DATUM: NAVD88. HORIZONTAL DATUM: NH STATE PLANE.
- SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 3301SC0270F, DATED JANUARY 29, 2021.
- THE LIMITS OF JURISDICTIONAL WETLANDS WERE DELINEATED BY GOVE ENVIRONMENTAL SERVICES, INC., DURING SUMMER, 2025 IN ACCORDANCE WITH THE FOLLOWING GUIDANCE DOCUMENTS:
 - THE CORPS OF ENGINEERS FEDERAL MANUAL FOR IDENTIFYING AND DELINEATING JURISDICTIONAL WETLANDS.
 - THE NORTH CENTRAL & NORTHEAST REGIONAL SUPPLEMENT TO THE FEDERAL MANUAL.
 - THE CURRENT VERSION OF THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, AS PUBLISHED BY THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION AND/OR THE CURRENT VERSION OF THE FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, AS PUBLISHED BY THE USDA, NRCS, AS APPROPRIATE.
 - THE CURRENT NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS, AS PUBLISHED BY THE US FISH AND WILDLIFE SERVICE.
- WETLAND BOUNDARIES AND CONSTRUCTION LIMITS ARE TO BE CLEARLY MARKED PRIOR TO THE START OF CONSTRUCTION.

PROJECT PARCEL
TOWN OF PORTSMOUTH
TAX MAP 229, LOT 6A

APPLICANT
LEDGEWOOD DRIVE LLC
ATTN. BEN MIDDLETON
10 MAIN STREET
NEWFIELDS, NH 03856

TOTAL LOT AREA
43,255 SQ. FT.
0.99 ACRES

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Civil Engineering Services

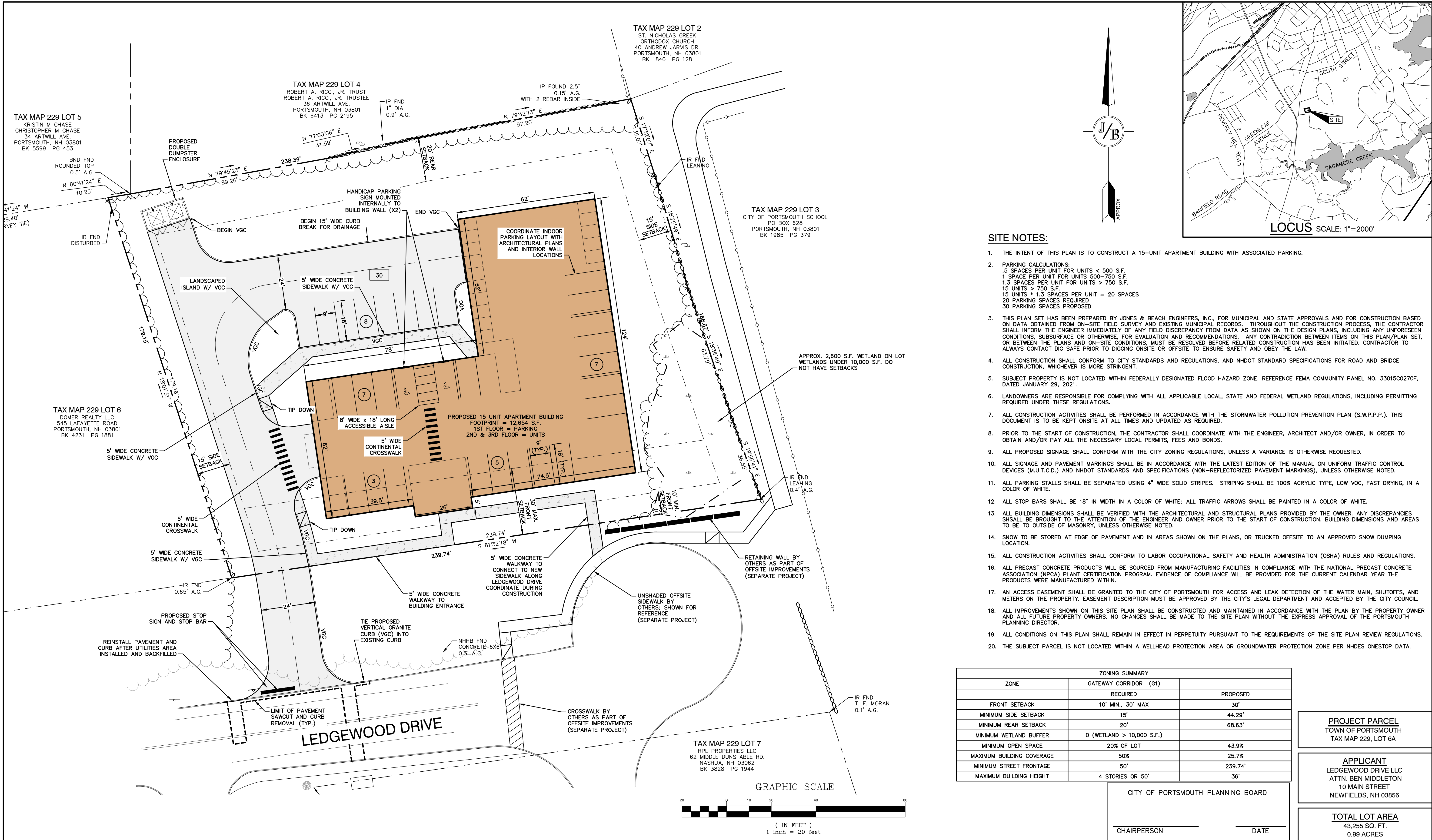
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EXISTING CONDITIONS PLAN
Project:	LEDGEWOOD DRIVE LLC LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

DRAWING No.

C1

SHEET 2 OF 15
JBE PROJECT NO. 25071.2



SITE NOTES:

- THE INTENT OF THIS PLAN IS TO CONSTRUCT A 15-UNIT APARTMENT BUILDING WITH ASSOCIATED PARKING.
- PARKING CALCULATIONS:
.5 SPACES PER UNIT FOR UNITS < 500 S.F.
1 SPACE PER UNIT FOR UNITS 500-750 S.F.
1.3 SPACES PER UNIT FOR UNITS > 750 S.F.
15 UNITS * 1.3 SPACES PER UNIT = 20 SPACES
20 PARKING SPACES REQUIRED
30 PARKING SPACES PROPOSED
- THIS PLAN SET HAS BEEN PREPARED BY JONES & BEACH ENGINEERS, INC., FOR MUNICIPAL AND STATE APPROVALS AND FOR CONSTRUCTION BASED ON DATA OBTAINED FROM ON-SITE FIELD SURVEY AND EXISTING MUNICIPAL RECORDS. THROUGHOUT THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF ANY FIELD DISCREPANCY FROM DATA AS SHOWN ON THE DESIGN PLANS, INCLUDING ANY UNFORESEEN CONDITIONS, SUBSURFACE OR OTHERWISE, FOR EVALUATION AND RECOMMENDATIONS. ANY CONTRADICTION BETWEEN ITEMS ON THIS PLAN/PLAN SET, OR BETWEEN THE PLANS AND ON-SITE CONDITIONS, MUST BE RESOLVED BEFORE RELATED CONSTRUCTION HAS BEEN INITIATED. CONTRACTOR TO ALWAYS CONTACT DIG SAFE PRIOR TO DIGGING ONSITE OR OFFSITE TO ENSURE SAFETY AND OBEY THE LAW.
- ALL CONSTRUCTION SHALL CONFORM TO CITY STANDARDS AND REGULATIONS, AND NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, WHICHEVER IS MORE STRINGENT.
- SUBJECT PROPERTY IS NOT LOCATED WITHIN FEDERALLY DESIGNATED FLOOD HAZARD ZONE. REFERENCE FEMA COMMUNITY PANEL NO. 33015C0270F, DATED JANUARY 29, 2021.
- LANDOWNERS ARE RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WETLAND REGULATIONS, INCLUDING PERMITTING REQUIRED UNDER THESE REGULATIONS.
- ALL CONSTRUCTION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN (S.W.P.P.P.). THIS DOCUMENT IS TO BE KEPT ONSITE AT ALL TIMES AND UPDATED AS REQUIRED.
- PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER, ARCHITECT AND/OR OWNER, IN ORDER TO OBTAIN AND/OR PAY ALL THE NECESSARY LOCAL PERMITS, FEES AND BONDS.
- ALL CONSTRUCTION SIGNAGE SHALL CONFORM WITH THE CITY ZONING REGULATIONS, UNLESS A VARIANCE IS OTHERWISE REQUESTED.
- ALL SIGNAGE AND PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) AND NHDOT STANDARDS AND SPECIFICATIONS (NON-REFLECTORIZED PAVEMENT MARKINGS), UNLESS OTHERWISE NOTED.
- ALL PARKING STALLS SHALL BE SEPARATED USING 4" WIDE SOLID STRIPES. STRIPING SHALL BE 100% ACRYLIC TYPE, LOW VOC, FAST DRYING, IN A COLOR OF WHITE.
- ALL STOP BARS SHALL BE 18" IN WIDTH IN A COLOR OF WHITE; ALL TRAFFIC ARROWS SHALL BE PAINTED IN A COLOR OF WHITE.
- ALL BUILDING DIMENSIONS SHALL BE VERIFIED WITH THE ARCHITECTURAL AND STRUCTURAL PLANS PROVIDED BY THE OWNER. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND OWNER PRIOR TO THE START OF CONSTRUCTION. BUILDING DIMENSIONS AND AREAS TO BE TO OUTSIDE OF MASONRY, UNLESS OTHERWISE NOTED.
- SNOW TO BE STORED AT EDGE OF PAVEMENT AND IN AREAS SHOWN ON THE PLANS, OR TRUCKED OFFSITE TO AN APPROVED SNOW DUMPING LOCATION.
- ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.
- ALL PRECAST CONCRETE PRODUCTS WILL BE SOURCED FROM MANUFACTURING FACILITIES IN COMPLIANCE WITH THE NATIONAL PRECAST CONCRETE ASSOCIATION (NPCA) PLANT CERTIFICATION PROGRAM. EVIDENCE OF COMPLIANCE WILL BE PROVIDED FOR THE CURRENT CALENDAR YEAR THE PRODUCTS WERE MANUFACTURED WITHIN.
- AN ACCESS EASEMENT SHALL BE GRANTED TO THE CITY OF PORTSMOUTH FOR ACCESS AND LEAK DETECTION OF THE WATER MAIN, SHUTOFFS, AND METERS ON THE PROPERTY. EASEMENT DESCRIPTION MUST BE APPROVED BY THE CITY'S LEGAL DEPARTMENT AND ACCEPTED BY THE CITY COUNCIL.
- 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 THE SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
- ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
- THE SUBJECT PARCEL IS NOT LOCATED WITHIN A WELLHEAD PROTECTION AREA OR GROUNDWATER PROTECTION ZONE PER NHDES ONESTOP DATA.

ZONING SUMMARY		
ZONE	GATEWAY CORRIDOR (G1)	
	REQUIRED	PROPOSED
FRONT SETBACK	10' MIN., 30' MAX	30'
MINIMUM SIDE SETBACK	15'	44.29'
MINIMUM REAR SETBACK	20'	68.63'
MINIMUM WETLAND BUFFER	0 (WETLAND > 10,000 S.F.)	
MINIMUM OPEN SPACE	20% OF LOT	43.9%
MAXIMUM BUILDING COVERAGE	50%	25.7%
MINIMUM STREET FRONTAGE	50'	239.74'
MAXIMUM BUILDING HEIGHT	4 STORIES OR 50'	36'

CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON

DATE

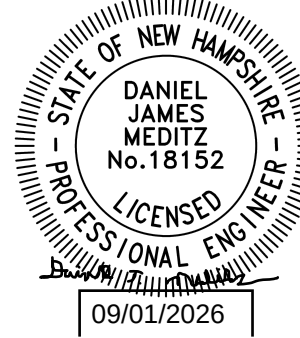
PROJECT PARCEL
TOWN OF PORTSMOUTH
TAX MAP 229, LOT 6A

APPLICANT
LEDGEWOOD DRIVE LLC
ATTN. BEN MIDDLETON
10 MAIN STREET
NEWFIELDS, NH 03856

TOTAL LOT AREA
43,255 SQ. FT.
0.99 ACRES

Design: DJM Draft: TCR Date: 01/08/26
Checked: EMP Scale: AS NOTED Project No.: 25071.2
Drawing Name: 25071.2-PLAN.dwg

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Exeter, NH 03833

Designed and Produced in NH
Civil Engineering Services
E-MAIL: JBE@JONESANDBEACH.COM

603-772-4746

Plan Name: SITE PLAN
MAP 229, LOT 6A

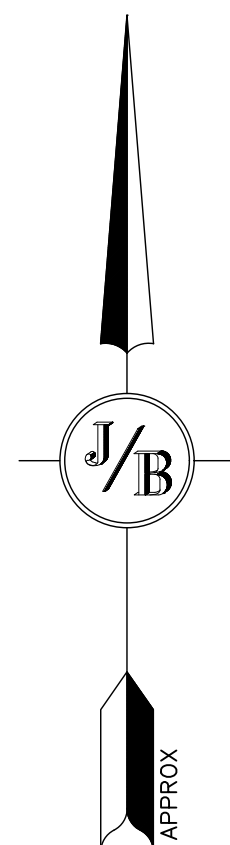
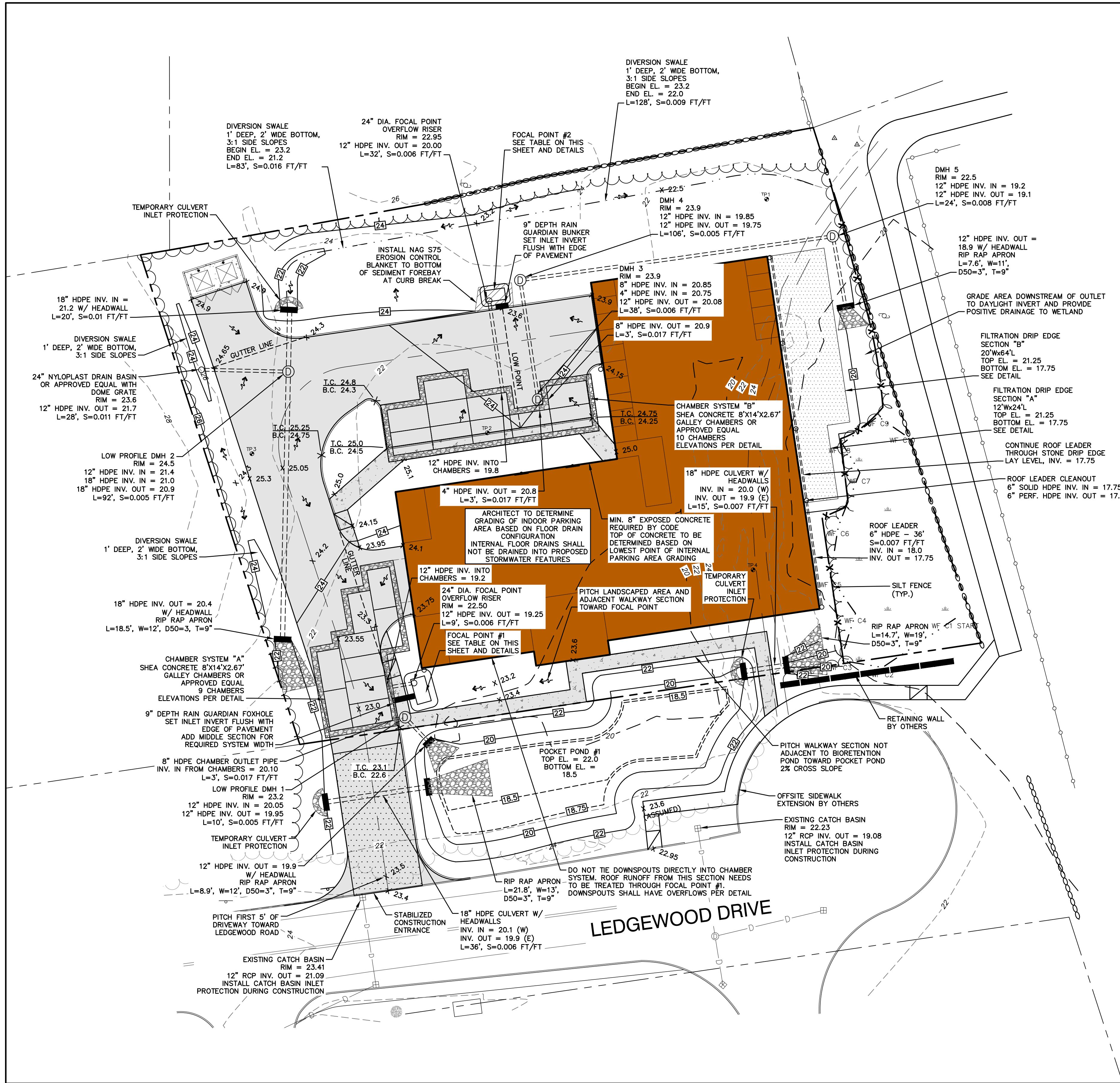
Project: LEDGEWOOD DRIVE LLC
LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801

Owner of Record: ST NICHOLAS GREEK ORTHODOX CHURCH
40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

DRAWING No.

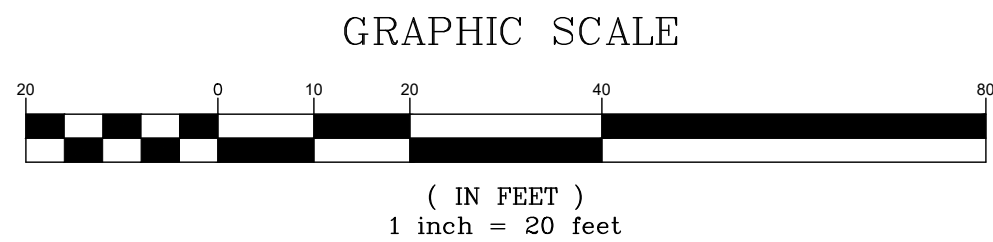
C2

SHEET 3 OF 15
JBE PROJECT NO. 25071.2



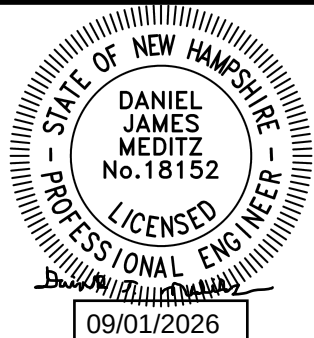
GRADING AND DRAINAGE NOTES:

- UNDERGROUND FACILITIES, UTILITIES AND STRUCTURES HAVE BEEN PLOTTED FROM FIELD OBSERVATION AND THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. NEITHER JONES & BEACH ENGINEERS, INC., NOR ANY OF THEIR EMPLOYEES TAKE RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND STRUCTURES AND/OR UTILITIES NOT SHOWN THAT MAY EXIST. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND STRUCTURES AND/OR UTILITIES LOCATED PRIOR TO EXCAVATION WORK BY CALLING 888-DIG-SAFE (888-344-7233).
- ALL BENCHMARKS AND TOPOGRAPHY SHALL BE FIELD VERIFIED BY THE CONTRACTOR.
- SITE GRADING SHALL NOT PROCEED UNTIL EROSION CONTROL MEASURES HAVE BEEN INSTALLED. SEE CONSTRUCTION SEQUENCE ON SHEET E1.
- PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR IS REQUIRED TO HAVE THE PROJECT'S LAND SURVEYOR STAKE OR FLAG CLEARING LIMITS. A MINIMUM OF 48 HOURS NOTICE IS REQUIRED.
- ALL ROOF DRAINS FROM BUILDING SHALL END 5' OUTSIDE THE BUILDING LIMITS AS SHOWN ON PLAN AND SHALL BE PROVIDED WITH A TEMPORARY PLUG AND WITNESS AT THE END. ALL EXTERIOR ROOF DOWNSPOUTS ARE TO BE INSTALLED WITH OVERFLOW DEVICES.
- ALL SWALES AND DETENTION PONDS ARE TO BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
- PROPOSED RIM ELEVATIONS OF DRAINAGE STRUCTURES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES.
- ALL SWALES AND ANY SLOPES GREATER THAN 3:1 SHALL BE STABILIZED WITH NORTH AMERICAN GREEN S150 EROSION CONTROL BLANKETS (OR AN EQUIVALENT APPROVED IN WRITING BY THE ENGINEER), UNLESS OTHERWISE SPECIFIED.
- ALL DRAINAGE AND SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS. CATCH BASINS SHALL HAVE 3' DEEP SUMPS WITH GREASE HOODS, UNLESS OTHERWISE NOTED.
- ALL DRAINAGE STRUCTURES SHALL BE PRECAST, UNLESS OTHERWISE SPECIFIED. SEE DETAIL SHEETS FOR DRAINAGE DETAILS.
- ALL DRAINAGE STRUCTURES AND STORMWATER PIPES SHALL MEET HEAVY DUTY TRAFFIC H20 LOADING AND SHALL BE INSTALLED ACCORDINGLY.
- IMMEDIATELY APPLY AND COMPACT STONE BASE FOR BUILDING PAD TO +/- 1/2" PRIOR TO EXCAVATING INTERIOR AND PERIMETER FOOTINGS.
- IN AREAS WHERE CONSTRUCTION IS PROPOSED ADJACENT TO ABUTTING PROPERTIES, THE CONTRACTOR SHALL INSTALL ORANGE CONSTRUCTION FENCING ALONG PROPERTY LINES IN ALL AREAS WHERE SILT FENCING IS NOT REQUIRED.
- ALL DRAINAGE PIPE SHALL BE NON-PERFORATED ADS N-12 OR APPROVED EQUAL, UNLESS OTHERWISE SPECIFIED.
- STONE INLET PROTECTION SHALL BE PLACED AT EXISTING CATCH BASINS. SEE DETAIL WITHIN THE DETAIL SHEETS.
- LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN RECEIVED BY ALL GOVERNING AUTHORITIES. THE GENERAL CONTRACTOR SHALL STRICTLY ADHERE TO THE EPA SWPPP DURING CONSTRUCTION OPERATIONS.
- ALL EXPOSED AREAS SHALL BE SEEDED AS SPECIFIED WITHIN 3 DAYS OF FINAL GRADING AND ANYTIME CONSTRUCTION STOPS FOR LONGER THAN 3 DAYS.
- MAINTAIN EROSION CONTROL MEASURES AFTER EACH RAIN EVENT OF 0.25" OR GREATER IN A 24 HOUR PERIOD AND AT LEAST ONCE A WEEK.
- THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE, AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE.
- CONSTRUCTION VEHICLES SHALL UTILIZE THE STABILIZED CONSTRUCTION ENTRANCE TO THE EXTENT POSSIBLE THROUGHOUT CONSTRUCTION.
- IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
- THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION.
- SEDIMENT SHALL BE REMOVED FROM ALL SEDIMENT BASINS BEFORE THEY ARE 25% FULL.
- ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
- ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED, IF DEEMED NECESSARY BY ON-SITE INSPECTION BY ENGINEER AND/OR REGULATORY OFFICIALS.
- SEE ALSO EROSION AND SEDIMENT CONTROL SPECIFICATIONS ON SHEETS E1-E2.



FOCAL POINT SCHEDULE						
FOCAL POINT	BOTTOM SIZE	SIDE SLOPES	BERM EL.	BOTTOM OF SURFACE PONDING	BOTTOM OF FILTER COURSE	R-TANK UNDERDRAIN INVERT
1	5' X 9'	3:1	22.75	22.00	20.25	19.25
2	4' X 7'	3:1	23.25	22.75	21.00	20.00

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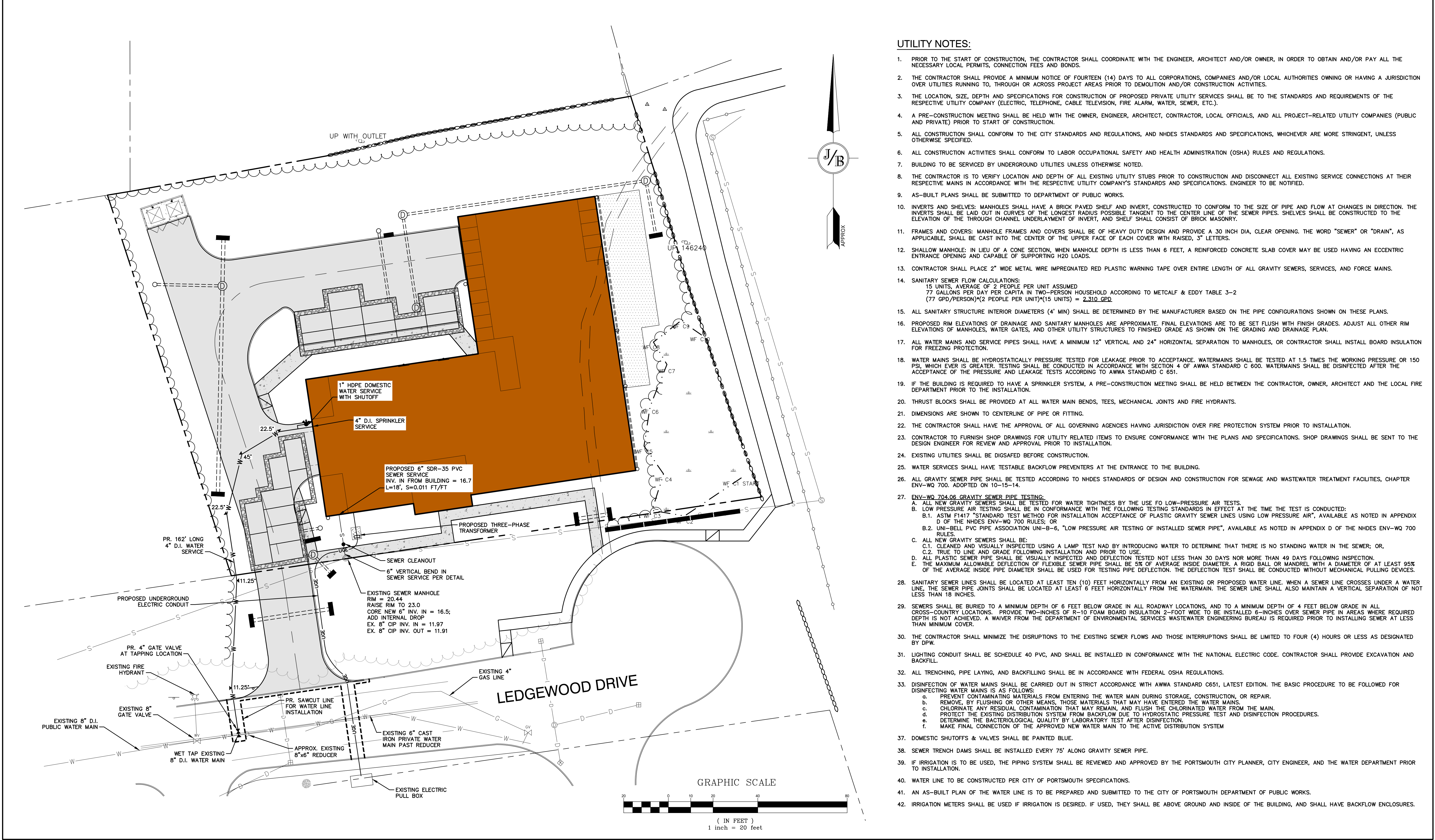
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Project:	LEDGEWOOD DRIVE LLC LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

DRAWING No.

C3

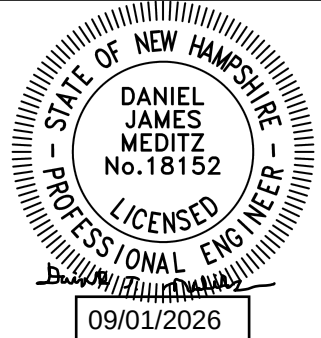
SHEET 4 OF 15
JBE PROJECT NO. 25071.2



UTILITY NOTES:

1. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER, ARCHITECT AND/OR OWNER, IN ORDER TO OBTAIN AND/OR PAY ALL THE NECESSARY LOCAL PERMITS, CONNECTION FEES AND BONDS.
2. THE CONTRACTOR SHALL PROVIDE A MINIMUM NOTICE OF FOURTEEN (14) DAYS TO ALL CORPORATIONS, COMPANIES AND/OR LOCAL AUTHORITIES OWNING OR HAVING A JURISDICTION OVER UTILITIES RUNNING TO, THROUGH OR ACROSS PROJECT AREAS PRIOR TO DEMOLITION AND/OR CONSTRUCTION ACTIVITIES.
3. THE LOCATION, SIZE, DEPTH AND SPECIFICATIONS FOR CONSTRUCTION OF PROPOSED PRIVATE UTILITY SERVICES SHALL BE TO THE STANDARDS AND REQUIREMENTS OF THE RESPECTIVE UTILITY COMPANY (ELECTRIC, TELEPHONE, CABLE TELEVISION, FIRE ALARM, WATER, SEWER, ETC.).
4. A PRE-CONSTRUCTION MEETING SHALL BE HELD WITH THE OWNER, ENGINEER, ARCHITECT, CONTRACTOR, LOCAL OFFICIALS, AND ALL PROJECT-RELATED UTILITY COMPANIES (PUBLIC AND PRIVATE) PRIOR TO START OF CONSTRUCTION.
5. ALL CONSTRUCTION SHALL CONFORM TO THE CITY STANDARDS AND REGULATIONS, AND NHDES STANDARDS AND SPECIFICATIONS, WHICHEVER ARE MORE STRINGENT, UNLESS OTHERWISE SPECIFIED.
6. ALL CONSTRUCTION ACTIVITIES SHALL CONFORM TO LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) RULES AND REGULATIONS.
7. BUILDING TO BE SERVICED BY UNDERGROUND UTILITIES UNLESS OTHERWISE NOTED.
8. THE CONTRACTOR IS TO VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITY STUBS PRIOR TO CONSTRUCTION AND DISCONNECT ALL EXISTING SERVICE CONNECTIONS AT THEIR RESPECTIVE MAINS IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANY'S STANDARDS AND SPECIFICATIONS. ENGINEER TO BE NOTIFIED.
9. AS-BUILT PLANS SHALL BE SUBMITTED TO DEPARTMENT OF PUBLIC WORKS.
10. 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 THROUGH CHANNEL UNDERLAYMENT OF INVERT, AND SHELF SHALL CONSIST OF BRICK MASONRY.
11. FRAMES AND COVERS: MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30 INCH DIA. CLEAR OPENING. THE WORD "SEWER" OR "DRAIN", AS APPLICABLE, SHALL BE CAST INTO THE CENTER OF THE UPPER FACE OF EACH COVER WITH RAISED, 3" LETTERS.
12. 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 H2O LOADS.
13. CONTRACTOR SHALL PLACE 2" WIDE METAL WIRE IMPREGNATED RED PLASTIC WARNING TAPE OVER ENTIRE LENGTH OF ALL GRAVITY SEWERS, SERVICES, AND FORCE MAINS.
14. SANITARY SEWER FLOW CALCULATIONS:
15 UNITS, AVERAGE OF 2 PEOPLE PER UNIT ASSUMED
77 GALLONS PER DAY PER CAPITA IN TWO-PERSON HOUSEHOLD ACCORDING TO METCALF & EDDY TABLE 3-2
 $(77 \text{ GPD/PERSON}) \times (2 \text{ PEOPLE PER UNIT}) \times (15 \text{ UNITS}) = 2,310 \text{ GPD}$
15. ALL SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS.
16. PROPOSED RIM ELEVATIONS OF DRAINAGE AND SANITARY MANHOLES ARE APPROXIMATE. FINAL ELEVATIONS ARE TO BE SET FLUSH WITH FINISH GRADES. ADJUST ALL OTHER RIM ELEVATIONS OF MANHOLES, WATER GATES, AND OTHER UTILITY STRUCTURES TO FINISHED GRADE AS SHOWN ON THE GRADING AND DRAINAGE PLAN.
17. ALL WATER MAINS AND SERVICE PIPES SHALL HAVE A MINIMUM 12" VERTICAL AND 24" HORIZONTAL SEPARATION TO MANHOLES, OR CONTRACTOR SHALL INSTALL BOARD INSULATION FOR FREEZING PROTECTION.
18. WATER MAINS SHALL BE HYDROSTATICALLY PRESSURE TESTED FOR LEAKAGE PRIOR TO ACCEPTANCE. WATERMAINS SHALL BE TESTED AT 1.5 TIMES THE WORKING PRESSURE OR 150 PSI, WHICH EVER IS GREATER. TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION 4 OF AWWA STANDARD C 600. WATERMAINS SHALL BE DISINFECTED AFTER THE ACCEPTANCE OF THE PRESSURE AND LEAKAGE TESTS ACCORDING TO AWWA STANDARD C 651.
19. IF THE BUILDING IS REQUIRED TO HAVE A SPRINKLER SYSTEM, A PRE-CONSTRUCTION MEETING SHALL BE HELD BETWEEN THE CONTRACTOR, OWNER, ARCHITECT AND THE LOCAL FIRE DEPARTMENT PRIOR TO THE INSTALLATION.
20. THRUST BLOCKS SHALL BE PROVIDED AT ALL WATER MAIN BENDS, TEES, MECHANICAL JOINTS AND FIRE HYDRANTS.
21. DIMENSIONS ARE SHOWN TO CENTERLINE OF PIPE OR FITTING.
22. THE CONTRACTOR SHALL HAVE THE APPROVAL OF ALL GOVERNING AGENCIES HAVING JURISDICTION OVER FIRE PROTECTION SYSTEM PRIOR TO INSTALLATION.
23. CONTRACTOR TO FURNISH SHOP DRAWINGS FOR UTILITY RELATED ITEMS TO ENSURE CONFORMANCE WITH THE PLANS AND SPECIFICATIONS. SHOP DRAWINGS SHALL BE SENT TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
24. EXISTING UTILITIES SHALL BE DIGSAFED BEFORE CONSTRUCTION.
25. WATER SERVICES SHALL HAVE TESTABLE BACKFLOW PREVENTERS AT THE ENTRANCE TO THE BUILDING.
26. ALL GRAVITY SEWER PIPE SHALL BE TESTED ACCORDING TO NHDES STANDARDS OF DESIGN AND CONSTRUCTION FOR SEWAGE AND WASTEWATER TREATMENT FACILITIES, CHAPTER ENV-WQ 700. ADOPTED ON 10-15-14.
27. ENV-WQ 704.06 GRAVITY SEWER PIPE TESTING:
A. ALL NEW GRAVITY SEWERS SHALL BE TESTED FOR WATER TIGHTNESS BY THE USE OF LOW-PRESSURE AIR TESTS.
B. LOW PRESSURE AIR TESTING SHALL BE IN CONFORMANCE WITH THE FOLLOWING TESTING STANDARDS IN EFFECT AT THE TIME THE TEST IS CONDUCTED:
B.1. ASTM F1417 "STANDARD TEST METHOD FOR INSTALLATION ACCEPTANCE OF PLASTIC GRAVITY SEWER LINES USING LOW PRESSURE AIR", AVAILABLE AS NOTED IN APPENDIX D OF THE NHDES ENV-WQ 700 RULES; OR
B.2. UNI-BELL PVC PIPE ASSOCIATION UNI-B-6, "LOW PRESSURE AIR TESTING OF INSTALLED SEWER PIPE", AVAILABLE AS NOTED IN APPENDIX D OF THE NHDES ENV-WQ 700 RULES.
C. ALL NEW GRAVITY SEWERS SHALL BE:
C.1. CLEANED AND VISUALLY INSPECTED USING A LAMP TEST NAD BY INTRODUCING WATER TO DETERMINE THAT THERE IS NO STANDING WATER IN THE SEWER; OR,
C.2. TRUE TO LINE AND GRADE FOLLOWING INSTALLATION AND PRIOR TO USE.
D. ALL PLASTIC SEWER PIPE SHALL BE VISUALLY INSPECTED AND DEFLECTION TESTED NOT LESS THAN 30 DAYS NOR MORE THAN 49 DAYS FOLLOWING INSPECTION.
E. THE MAXIMUM ALLOWABLE DEFLECTION OF FLEXIBLE SEWER PIPE SHALL BE 5% OF AVERAGE INSIDE DIAMETER. A RIGID BALL OR MANDREL WITH A DIAMETER OF AT LEAST 95% OF THE AVERAGE INSIDE PIPE DIAMETER SHALL BE USED FOR TESTING PIPE DEFLECTION. THE DEFLECTION TEST SHALL BE CONDUCTED WITHOUT MECHANICAL PULLING DEVICES.
28. SANITARY SEWER LINES SHALL BE LOCATED AT LEAST TEN (10) FEET HORIZONTALLY FROM AN EXISTING OR PROPOSED WATER LINE. WHEN A SEWER LINE CROSSES UNDER A WATER LINE, THE SEWER PIPE JOINTS SHALL BE LOCATED AT LEAST 6 FEET HORIZONTALLY FROM THE WATERMAIN. THE SEWER LINE SHALL ALSO MAINTAIN A VERTICAL SEPARATION OF NOT LESS THAN 18 INCHES.
29. SEWERS SHALL BE BURIED TO A MINIMUM DEPTH OF 6 FEET BELOW GRADE IN ALL ROADWAY LOCATIONS, AND TO A MINIMUM DEPTH OF 4 FEET BELOW GRADE IN ALL CROSS-COUNTRY LOCATIONS. PROVIDE TWO-INCHES OF R-10 FOAM BOARD INSULATION 2-FOOT WIDE TO BE INSTALLED 6-INCHES OVER SEWER PIPE IN AREAS WHERE REQUIRED DEPTH IS NOT ACHIEVED. A WAIVER FROM THE DEPARTMENT OF ENVIRONMENTAL SERVICES WASTEWATER ENGINEERING BUREAU IS REQUIRED PRIOR TO INSTALLING SEWER AT LESS THAN MINIMUM COVER.
30. THE CONTRACTOR SHALL MINIMIZE THE DISRUPTIONS TO THE EXISTING SEWER FLOWS AND THOSE INTERRUPTIONS SHALL BE LIMITED TO FOUR (4) HOURS OR LESS AS DESIGNATED BY DPW.
31. LIGHTING CONDUIT SHALL BE SCHEDULE 40 PVC, AND SHALL BE INSTALLED IN CONFORMANCE WITH THE NATIONAL ELECTRIC CODE. CONTRACTOR SHALL PROVIDE EXCAVATION AND BACKFILL.
32. ALL TRENCHING, PIPE LAYING, AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS.
33. DISINFECTION OF WATER MAINS SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH AWWA STANDARD C651, LATEST EDITION. THE BASIC PROCEDURE TO BE FOLLOWED FOR DISINFECTING WATER MAINS IS AS FOLLOWS:
a. PREVENT CONTAMINATING MATERIALS FROM ENTERING THE WATER MAIN DURING STORAGE, CONSTRUCTION, OR REPAIR.
b. REMOVE, BY FLUSHING OR OTHER MEANS, THOSE MATERIALS THAT MAY HAVE ENTERED THE WATER MAINS.
c. CHLORINATE ANY RESIDUAL CONTAMINATION THAT MAY REMAIN, AND FLUSH THE CHLORINATED WATER FROM THE MAIN.
d. PROTECT THE EXISTING DISTRIBUTION SYSTEM FROM BACKFLOW DUE TO HYDROSTATIC PRESSURE TEST AND DISINFECTION PROCEDURES.
e. DETERMINE THE BACTERIOLOGICAL QUALITY BY LABORATORY TEST AFTER DISINFECTION.
f. MAKE FINAL CONNECTION OF THE APPROVED NEW WATER MAIN TO THE ACTIVE DISTRIBUTION SYSTEM
37. DOMESTIC SHUTOFFS & VALVES SHALL BE PAINTED BLUE.
38. SEWER TRENCH DAMS SHALL BE INSTALLED EVERY 75' ALONG GRAVITY SEWER PIPE.
39. IF IRRIGATION IS TO BE USED, THE PIPING SYSTEM SHALL BE REVIEWED AND APPROVED BY THE PORTSMOUTH CITY PLANNER, CITY ENGINEER, AND THE WATER DEPARTMENT PRIOR TO INSTALLATION.
40. WATER LINE TO BE CONSTRUCTED PER CITY OF PORTSMOUTH SPECIFICATIONS.
41. AN AS-BUILT PLAN OF THE WATER LINE IS TO BE PREPARED AND SUBMITTED TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS.
42. IRRIGATION METERS SHALL BE USED IF IRRIGATION IS DESIRED. IF USED, THEY SHALL BE ABOVE GROUND AND INSIDE OF THE BUILDING, AND SHALL HAVE BACKFLOW ENCLOSURES.

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Jones & Beach Engineers, Inc.

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Civil Engineering Services

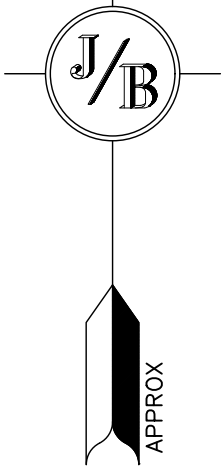
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	UTILITY PLAN
Project:	LEDGEWOOD DRIVE LLC LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

DRAWING No.

C4

SHEET 5 OF 15
JBE PROJECT NO. 25071.2

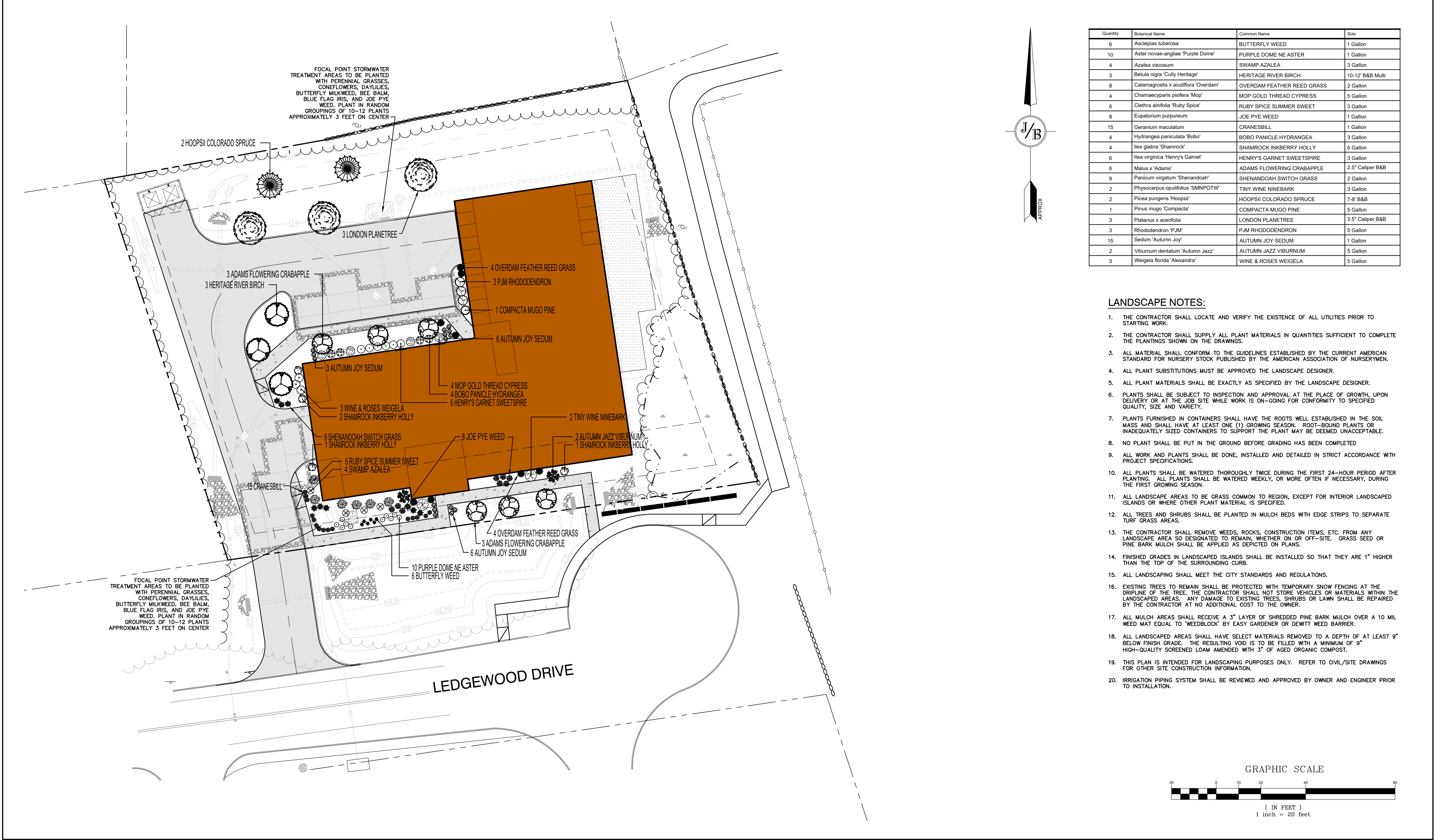


Luminaire Schedule					
Symbol	Qty	Label	Arrangement	Description	[MANUFAC]
	1	S3	Single	VALS-06L-3W-UNV-30K8-CXX-SA-IS / 4SQ B3 S11G15 S CXX AB 4BC	LSI INDUSTRIES, INC.
	1	S4	Single	VALS-06L-4W-UNV-30K8-CXX-SA / 4SQ B3 S11G15 S CXX AB 4BC	LSI INDUSTRIES, INC.
	4	W1	Single	P560052-020-30	PROGRESS
	1	W2	Single	XWS-LED-2L-SIL-FT-UNV-DIM-30-80CRI-CXX	LSI INDUSTRIES, INC.

DRAWING No.

L1

SHEET 6 OF 15
JBE PROJECT NO. 25071.2



Quantity	Botanical Name	Common Name	Size
6	Asclepias tuberosa	BUTTERFLY WEED	1 Gallon
10	Aster novae-angliae 'Purple Dome'	PURPLE DOME NE ASTER	1 Gallon
4	Azalea viscosum	SWAMP AZALEA	3 Gallon
3	Betula nigra 'Cully Heritage'	HERITAGE RIVER BIRCH	10-12' B&B Multi
8	Calamagrostis x acutiflora 'Overdam'	OVERDAM FEATHER REED GRASS	2 Gallon
4	Chamaecyparis pisifera 'Mop'	MOP GOLD THREAD CYPRESS	5 Gallon
6	Clethra alnifolia 'Ruby Spice'	RUBY SPICE SUMMER SWEET	3 Gallon
8	Eupatorium purpureum	JOE PYE WEED	1 Gallon
15	Geranium maculatum	CRANESBILL	1 Gallon
4	Hydrangea paniculata 'Bobo'	BOBO PANICLE HYDRANGEA	3 Gallon
4	Ilex glabra 'Shamrock'	SHAMROCK INKBERRY HOLLY	5 Gallon
6	Itea virginica 'Henry's Garnet'	HENRY'S GARNET SWEETSPIRE	3 Gallon
6	Malus x 'Adams'	ADAMS FLOWERING CRABAPPLE	2.5" Caliper B&B
9	Panicum virgatum 'Shenandoah'	SHENANDOAH SWITCH GRASS	2 Gallon
2	Physocarpus opulifolius 'SMNPOTW'	TINY WINE NINEBARK	3 Gallon
2	Picea pungens 'Hoopsii'	HOOPSII COLORADO SPRUCE	7-8' B&B
1	Pinus mugo 'Compacta'	COMPACTA MUGO PINE	5 Gallon
3	Platanus x acerifolia	LONDON PLANETREE	3.5" Caliper B&B
3	Rhododendron 'PJM'	PJM RHODODENDRON	5 Gallon
15	Sedum 'Autumn Joy'	AUTUMN JOY SEDUM	1 Gallon
2	Viburnum dentatum 'Autumn Jazz'	AUTUMN JAZZ VIBURNUM	5 Gallon
3	Weigela florida 'Alexandra'	WINE & ROSES WEIGELA	5 Gallon

LANDSCAPE NOTES:

1. THE CONTRACTOR SHALL LOCATE AND VERIFY THE EXISTENCE OF ALL UTILITIES PRIOR TO STARTING WORK.
2. THE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTINGS SHOWN ON THE DRAWINGS.
3. ALL MATERIAL SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE CURRENT AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
4. ALL PLANT SUBSTITUTIONS MUST BE APPROVED THE LANDSCAPE DESIGNER.
5. ALL PLANT MATERIALS SHALL BE EXACTLY AS SPECIFIED BY THE LANDSCAPE DESIGNER.
6. PLANTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL AT THE PLACE OF GROWTH, UPON DELIVERY OR AT THE JOB SITE WHILE WORK IS ON-GOING FOR CONFORMITY TO SPECIFIED QUALITY, SIZE AND VARIETY.
7. PLANTS FURNISHED IN CONTAINERS SHALL HAVE THE ROOTS WELL ESTABLISHED IN THE SOIL MASS AND SHALL HAVE AT LEAST ONE (1) GROWING SEASON. ROOT-BOUND PLANTS OR INADEQUATELY SIZED CONTAINERS TO SUPPORT THE PLANT MAY BE DEEMED UNACCEPTABLE.
8. NO PLANT SHALL BE PUT IN THE GROUND BEFORE GRADING HAS BEEN COMPLETED
9. ALL WORK AND PLANTS SHALL BE DONE, INSTALLED AND DETAILED IN STRICT ACCORDANCE WITH PROJECT SPECIFICATIONS.
10. ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24-HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL BE WATERED WEEKLY, OR MORE OFTEN IF NECESSARY, DURING THE FIRST GROWING SEASON.
11. ALL LANDSCAPE AREAS TO BE GRASS COMMON TO REGION, EXCEPT FOR INTERIOR LANDSCAPED ISLANDS OR WHERE OTHER PLANT MATERIAL IS SPECIFIED.
12. ALL TREES AND SHRUBS SHALL BE PLANTED IN MULCH BEDS WITH EDGE STRIPS TO SEPARATE TURF GRASS AREAS.
13. THE CONTRACTOR SHALL REMOVE WEEDS, ROCKS, CONSTRUCTION ITEMS, ETC. FROM ANY LANDSCAPE AREA SO DESIGNATED TO REMAIN, WHETHER ON OR OFF-SITE. GRASS SEED OR PINE BARK MULCH SHALL BE APPLIED AS DEPICTED ON PLANS.
14. FINISHED GRADES IN LANDSCAPED ISLANDS SHALL BE INSTALLED SO THAT THEY ARE 1" HIGHER THAN THE TOP OF THE SURROUNDING CURB.
15. ALL LANDSCAPING SHALL MEET THE CITY STANDARDS AND REGULATIONS.
16. EXISTING TREES TO REMAIN SHALL BE PROTECTED WITH TEMPORARY SNOW FENCING AT THE DRIFLINE OF THE TREE. THE CONTRACTOR SHALL NOT STORE VEHICLES OR MATERIALS WITHIN THE LANDSCAPED AREAS. ANY DAMAGE TO EXISTING TREES, SHRUBS OR LAWN SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
17. ALL MULCH AREAS SHALL RECEIVE A 3" LAYER OF SHREDDED PINE BARK MULCH OVER A 10 MIL WEED MAT EQUAL TO 'WEEDBLOCK' BY EASY GARDENER OR DEWITT WEED BARRIER.
18. ALL LANDSCAPED AREAS SHALL HAVE SELECT MATERIALS REMOVED TO A DEPTH OF AT LEAST 9" BELOW FINISH GRADE. THE RESULTING VOID IS TO BE FILLED WITH A MINIMUM OF 9" HIGH-QUALITY SCREENED LOAM AMENDED WITH 3" OF AGED ORGANIC COMPOST.
19. THIS PLAN IS INTENDED FOR LANDSCAPING PURPOSES ONLY. REFER TO CIVIL/SITE DRAWINGS FOR OTHER SITE CONSTRUCTION INFORMATION.
20. IRRIGATION PIPING SYSTEM SHALL BE REVIEWED AND APPROVED BY OWNER AND ENGINEER PRIOR TO INSTALLATION.

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Drawing Name: 25071.2-PLAN.dwg		
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Stratham, NH 03885

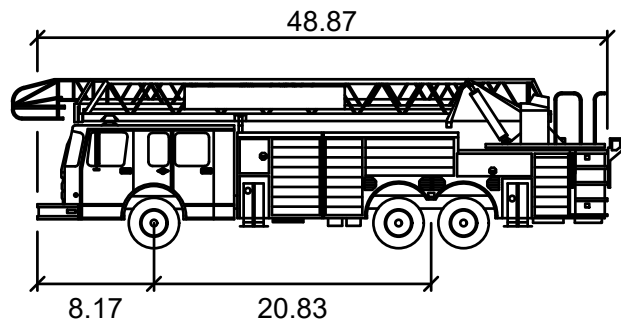
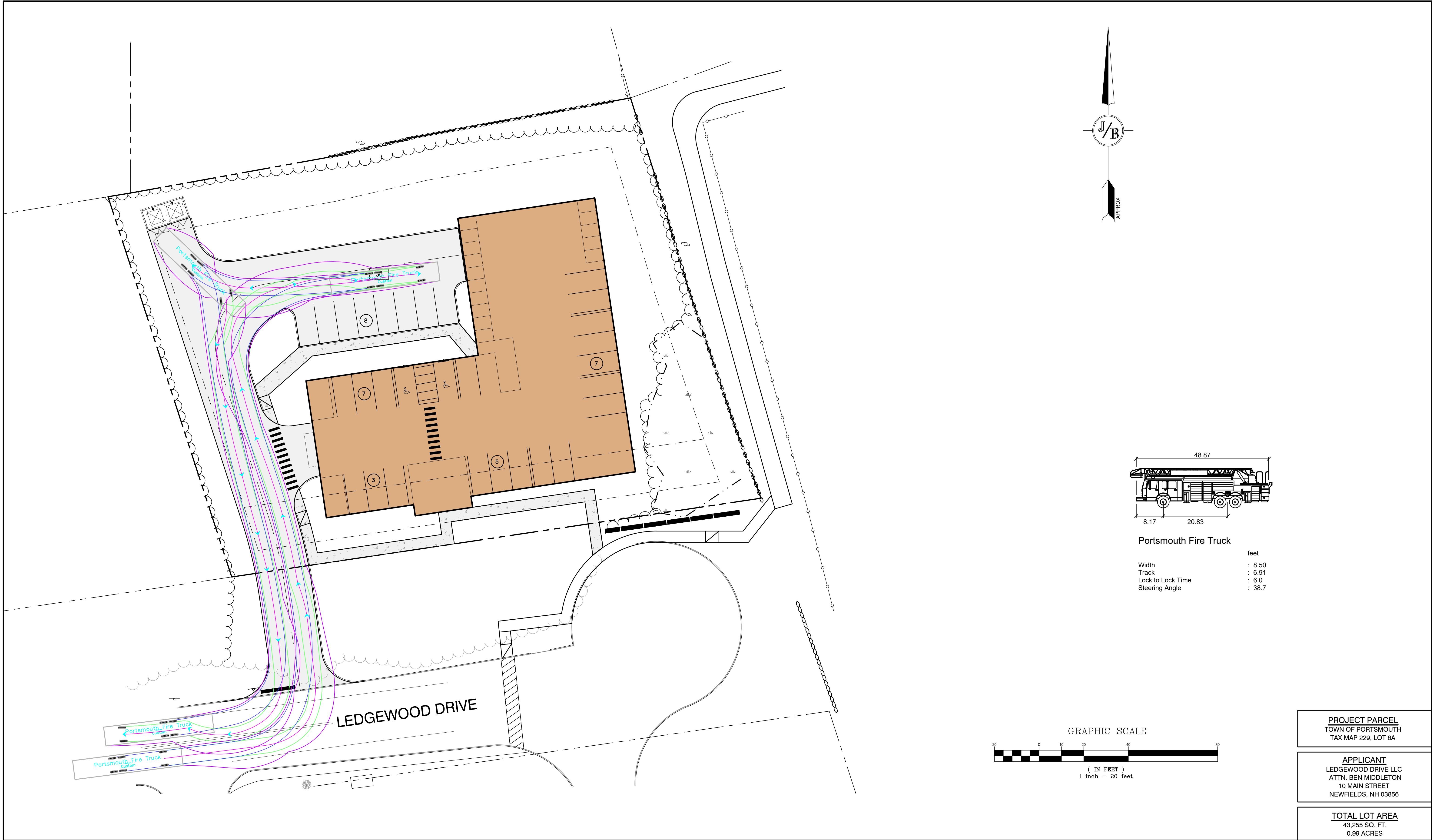
Civil Engineering Services

603-772-4746

E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	LANDSCAPE PLAN
Project:	LEDGEWOOD DRIVE LLC LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

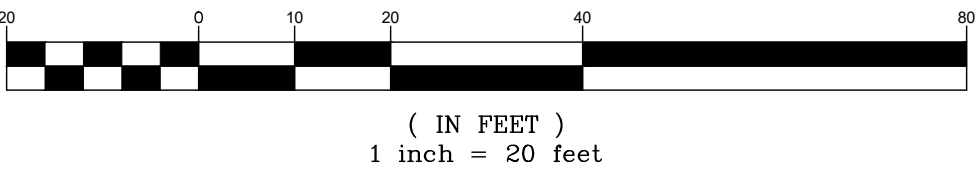
DRAWING No.
L1
SHEET 7 OF 15 JBE PROJECT NO. 25071.2



Portsmouth Fire Truck

	feet
Width	: 8.50
Track	: 6.91
Lock to Lock Time	: 6.0
Steering Angle	: 38.7

GRAPHIC SCALE

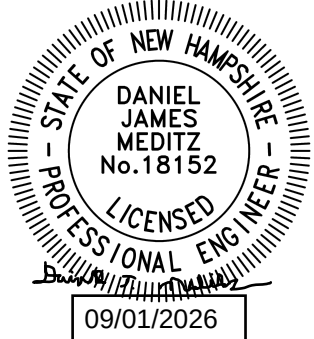


PROJECT PARCEL
TOWN OF PORTSMOUTH
TAX MAP 229, LOT 6A

APPLICANT
LEDGEWOOD DRIVE LLC
ATTN. BEN MIDDLETON
10 MAIN STREET
NEWFIELDS, NH 03856

TOTAL LOT AREA
43,255 SQ. FT.
0.99 ACRES

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Civil Engineering Services
E-MAIL: JBE@JONESANDBEACH.COM

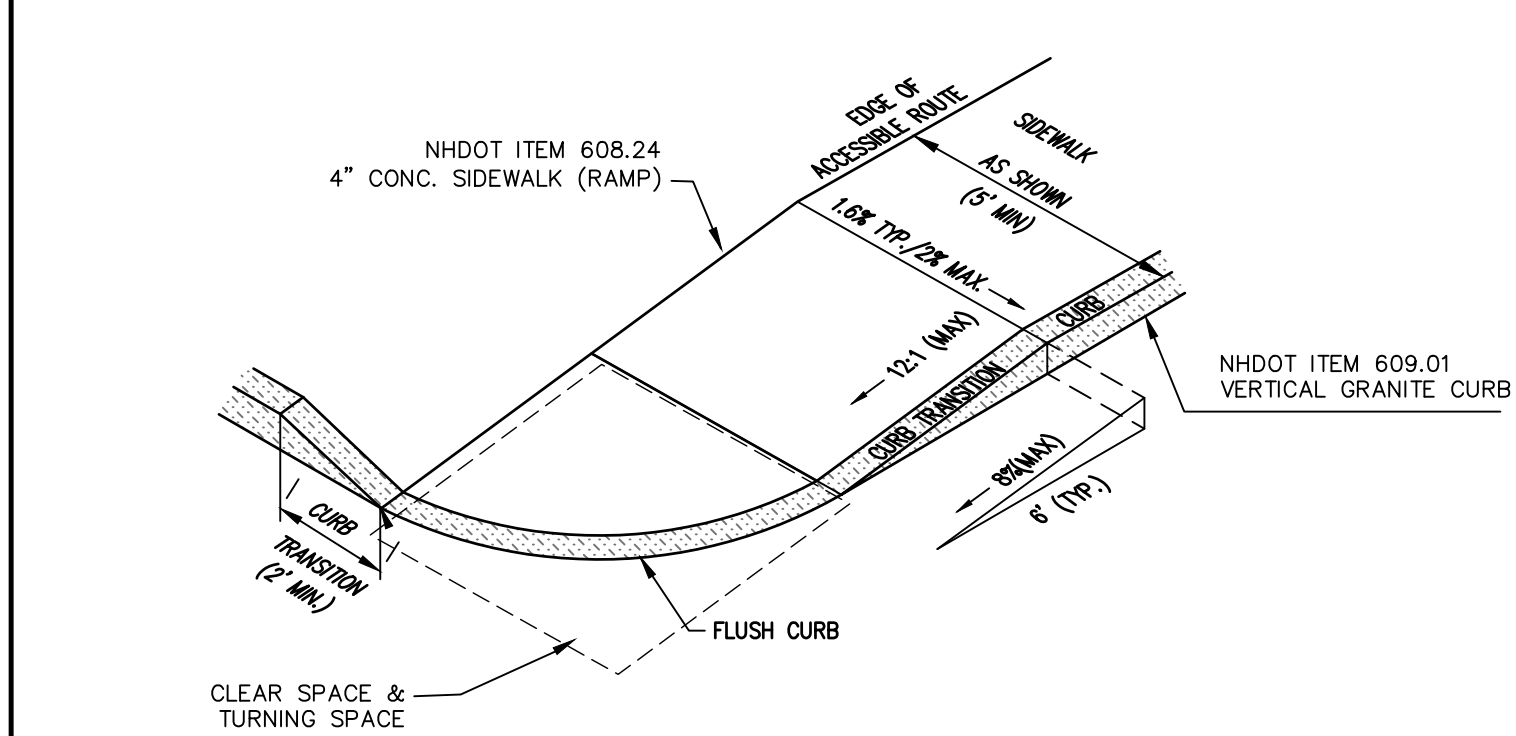
Designed and Produced in NH
603-772-4746

Plan Name:	TRUCK TURNING PLAN
Project:	LEDGEWOOD DRIVE LLC LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

DRAWING No.

T1

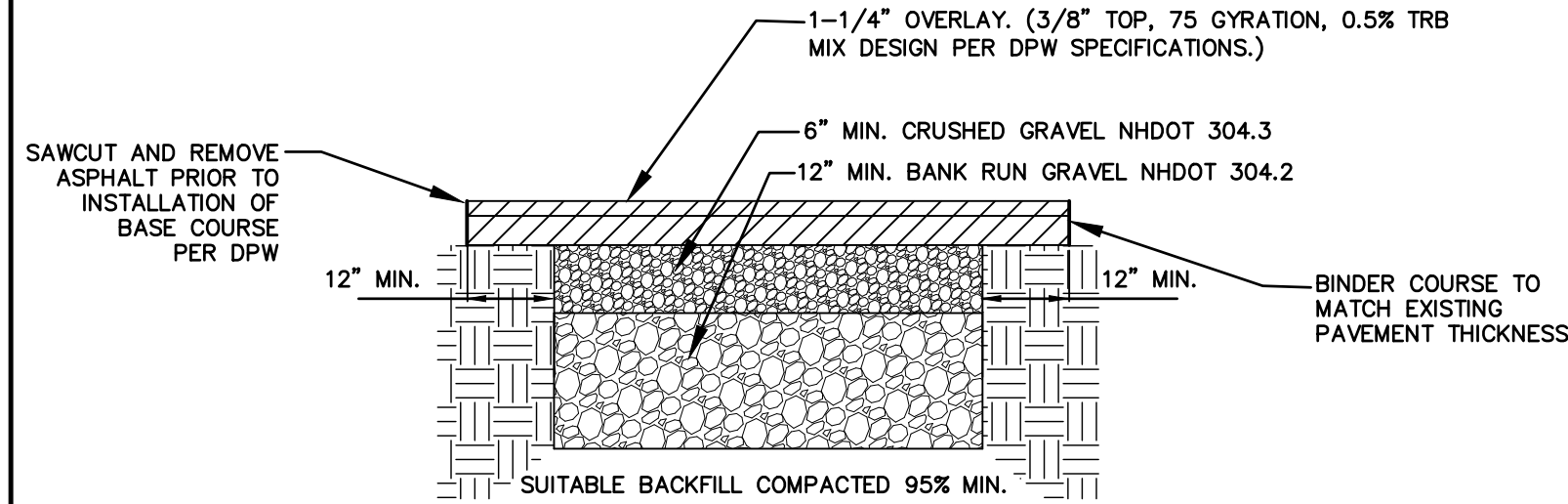
SHEET 8 OF 15
JBE PROJECT NO. 25071.2



- NOTES:
1. THE MAXIMUM ALLOWABLE CROSS SLOPE OF ACCESSIBLE ROUTE (SIDEWALK) AND CURB SHALL BE 1.5%.
 2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%.
 3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE (SIDEWALK) CURB RAMPS SHALL BE 8.3%.
 4. A MINIMUM OF 4 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (i.e., HYDRANTS, UTILITY POLES, TREE WELLS, SIGNS, ETC.).
 5. CURB TREATMENT VARIES, SEE PLANS FOR CURB TYPE.
 6. BASE OF RAMP SHALL BE GRADED TO PREVENT PONDING.
 7. SEE TYPICAL SECTION FOR RAMP CONSTRUCTION.
 8. WHERE A CHANGE IN DIRECTION IS REQUIRED TO UTILIZE A CURB RAMP, A TURNING SPACE SHALL BE PROVIDED AT THE BASE AND/OR THE TOP OF THE CURB RAMP. TURNING SPACES SHALL BE PERMITTED TO OVERLAP CLEAR SPACES.
 9. TURNING SPACE MAXIMUM CROSS SLOPE IS 2% IN ANY DIRECTION.
 10. BEYOND THE BOTTOM GRADE BREAK, A CLEAR SPACE OF 4'x4' MINIMUM SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN CROSSWALK, AND OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE, THE CLEAR SPACE MAY OVERLAP TURNING SPACES, DETECTABLE WARNING SURFACES AND DROP CURBS.

ACCESSIBLE CURB RAMP (NHDOT TYPE 1)

NOT TO SCALE



1. AFTER PROPER BACKFILLING AND COMPACTION, ADJACENT PAVEMENT MUST BE "SAW CUT" (STRAIGHT CUTS) A MINIMUM OF ONE FOOT (1') AROUND THE PERIMETER OF THE EXCAVATION. PAVEMENT MUST BE REMOVED.
2. INSTALL BASE COURSE LEAVING A REVEAL FOR SURFACE COURSE.
3. INSTALL SURFACE COURSE OF ASPHALT PAVING.
4. APPLY EMULSION SEALANT AT PERIMETER OF JOINT OVERLAPPING BASE COURSE. INSTALL WEARING COURSE OF ASPHALT TO GRADE. APPLY LIGHT SAND TO ABSORB EXCESS JOINT SEALANT.
5. GRAVEL COMPACTIONS TO MEET 95% MINIMUM.

TYPICAL PAVEMENT REPAIR DETAIL

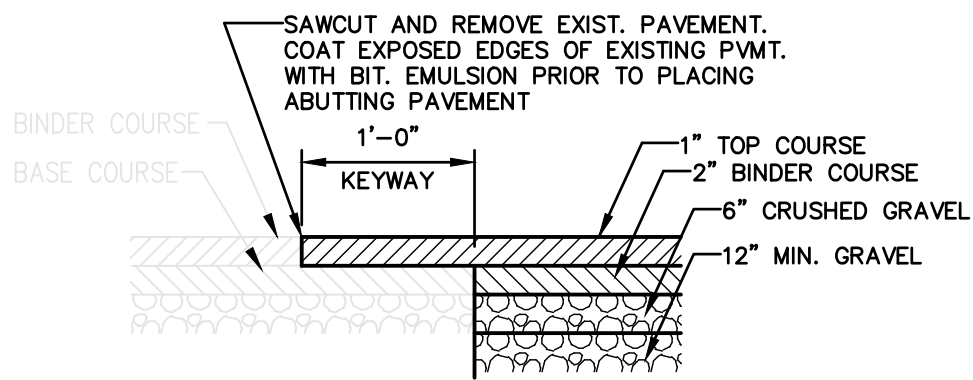
NOT TO SCALE



- NOTES:
1. ALL STOP BARS TO BE SOLID WHITE REFLECTIVE TRAFFIC PAINT AS PER DIMENSIONS ABOVE.

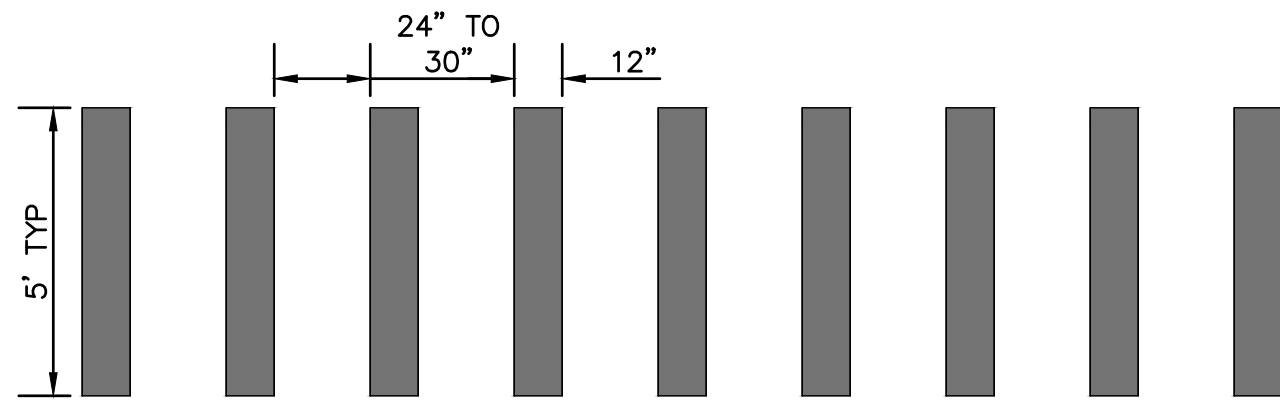
STOP BAR

NOT TO SCALE



KEYWAY DETAIL FOR CONNECTION TO EXISTING PAVEMENT

NOT TO SCALE

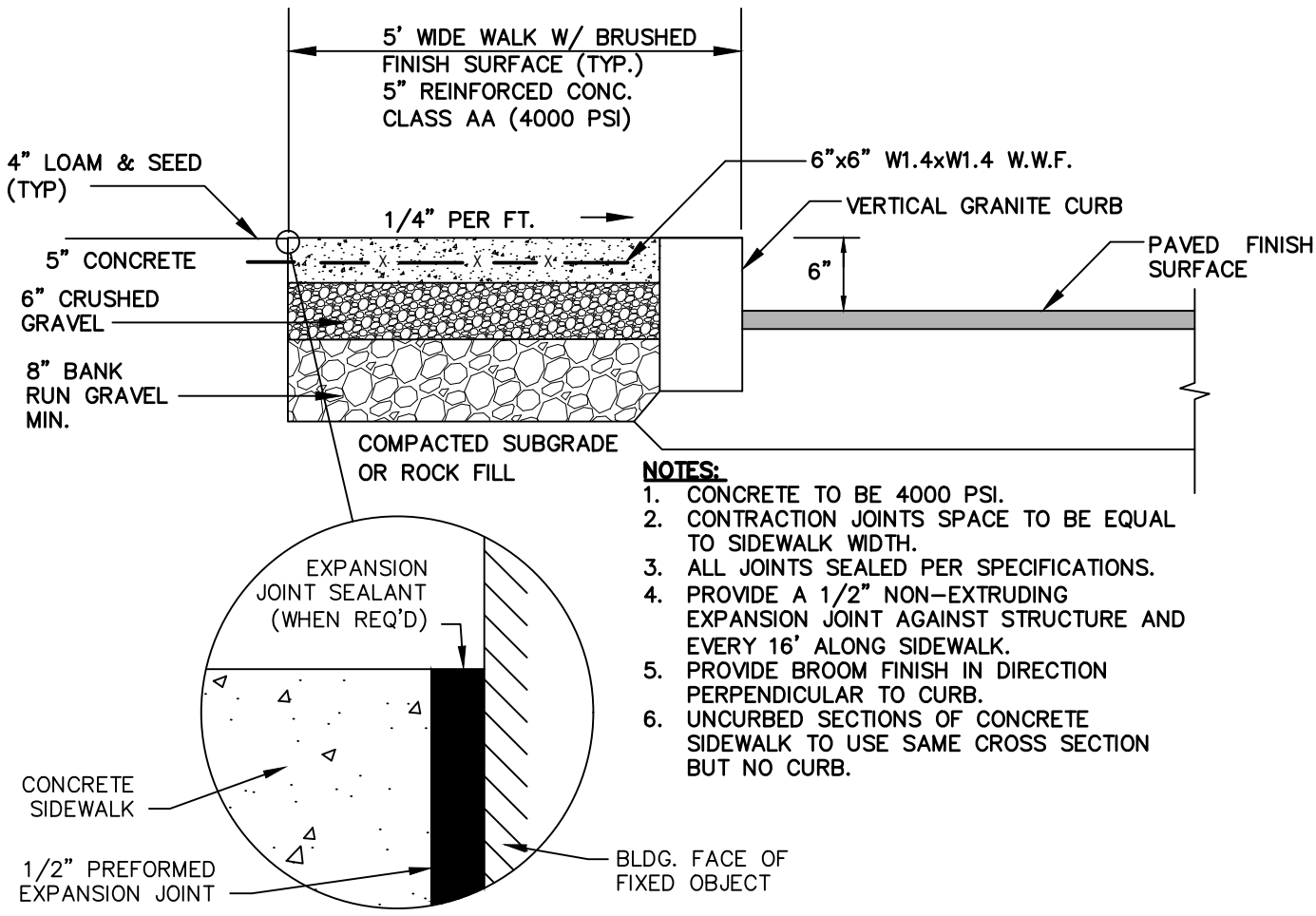


NOTES:

1. TRANSVERSE CROSSWALK LINES SHALL BE THERMOPLASTIC, NOT LESS THAN 6" WIDE AND NOT LESS THAN 6' APART.
2. SPACING FOR THE CONTINENTAL BLOCK MARKINGS SHALL BE UNIFORM FOR EACH INDIVIDUAL CROSSWALK BUT CAN BE MODIFIED FOR ONE CROSSWALK TO THE NEXT TO ELIMINATE A CROSSWALK MARKING DIRECTLY IN THE WHEELPATH.

NHDOT CONTINENTAL BLOCK MARKING DETAIL

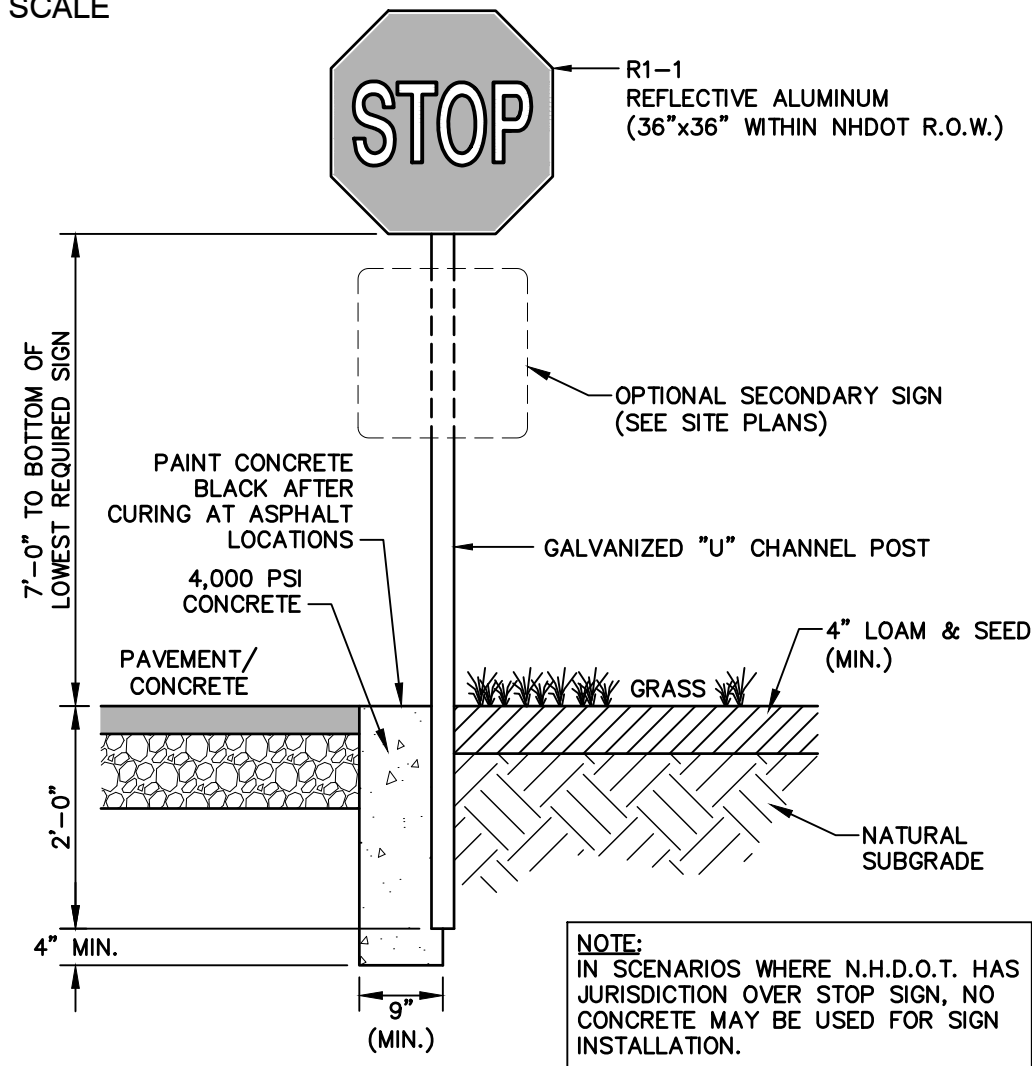
NOT TO SCALE



- NOTES:
1. CONCRETE TO BE 4000 PSI.
 2. CONTRACTION JOINTS SPACE TO BE EQUAL TO SIDEWALK WIDTH.
 3. ALL JOINTS SEALED PER SPECIFICATIONS. PROVIDE A 1/2" NON-EXTRUDING EXPANSION JOINT AGAINST STRUCTURE AND EVERY 16' ALONG SIDEWALK.
 4. PROVIDE BROOM FINISH IN DIRECTION PERPENDICULAR TO CURB.
 5. UNCURBED SECTIONS OF CONCRETE SIDEWALK TO USE SAME CROSS SECTION BUT NO CURB.

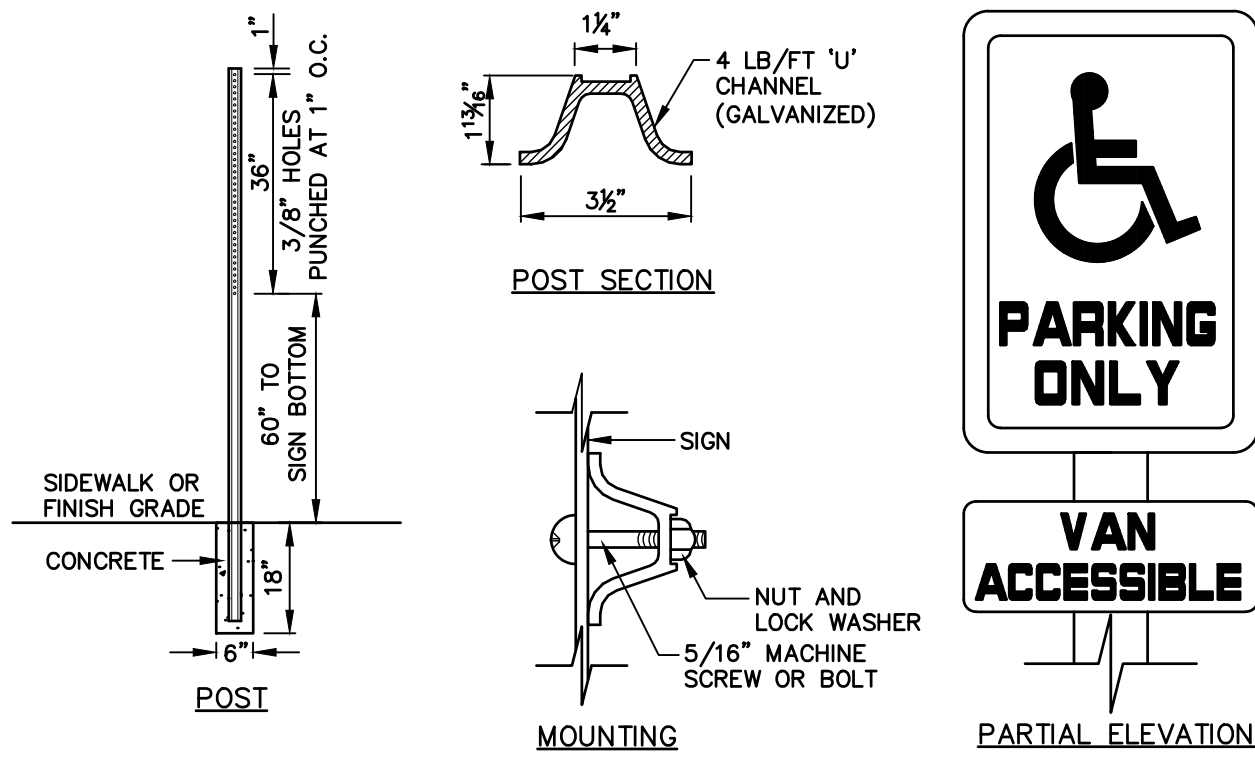
CONCRETE SIDEWALK W/ VERTICAL GRANITE CURB

NOT TO SCALE



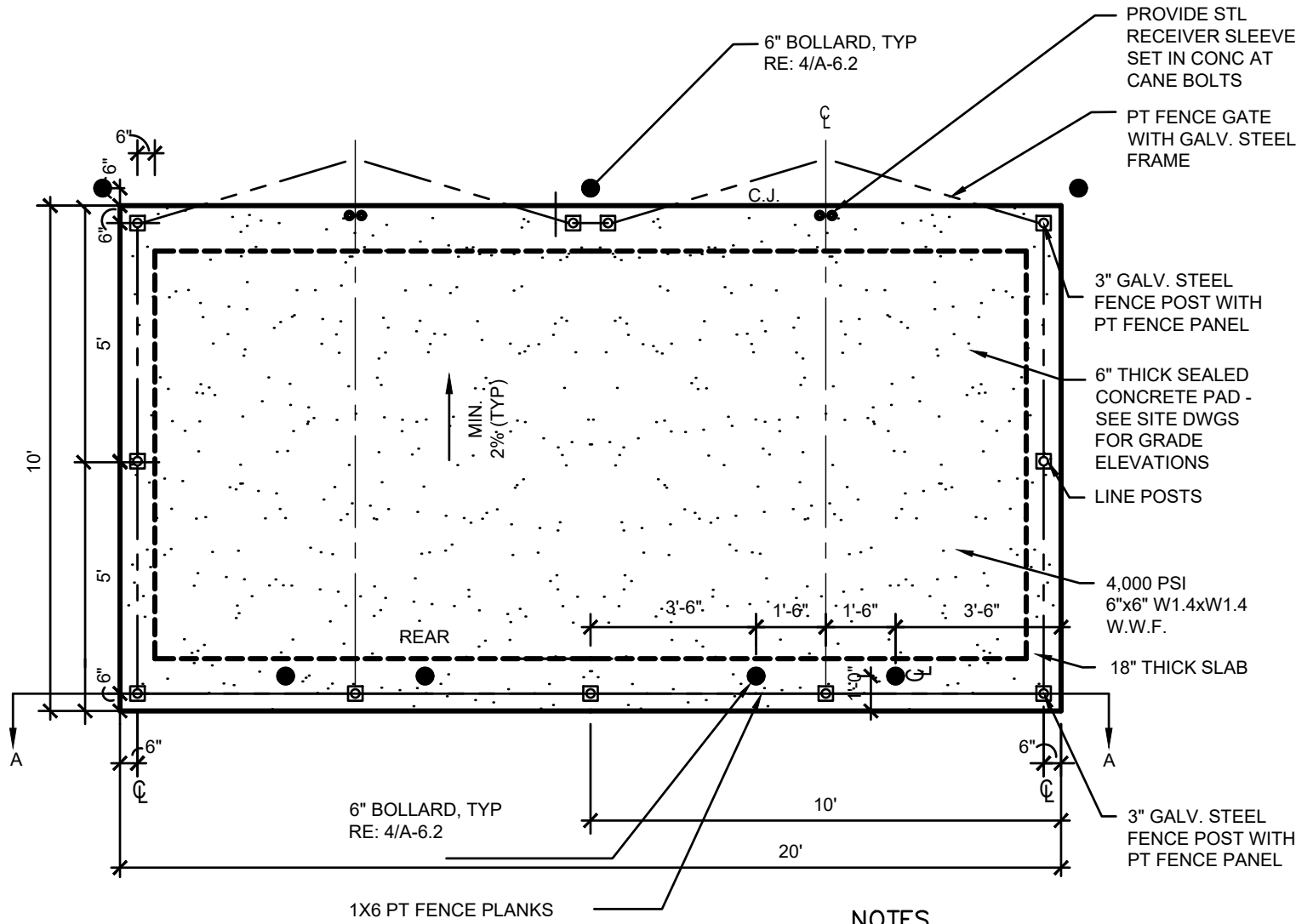
STOP SIGN (R1-1)

NOT TO SCALE



HANDICAP SIGN DETAILS

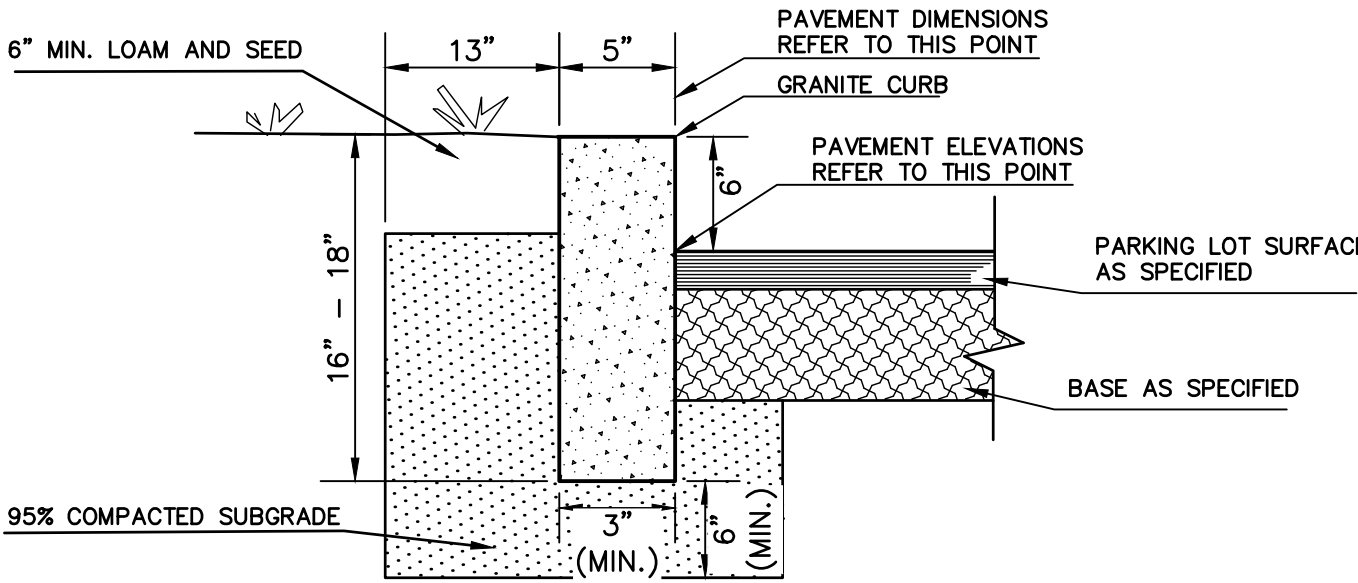
NOT TO SCALE



- NOTES:
1. ALL LUMBER TO BE PRESSURE TREATED.
 2. WOOD FENCE TO BE PAINTED OR STAINED TO MATCH BUILDING FOUNDATION.
 3. DUMPSTER SIZE VARIES, SEE SITE PLANS FOR SCREENING SIZE

DUMPSTER ENCLOSURE PLAN

NOT TO SCALE

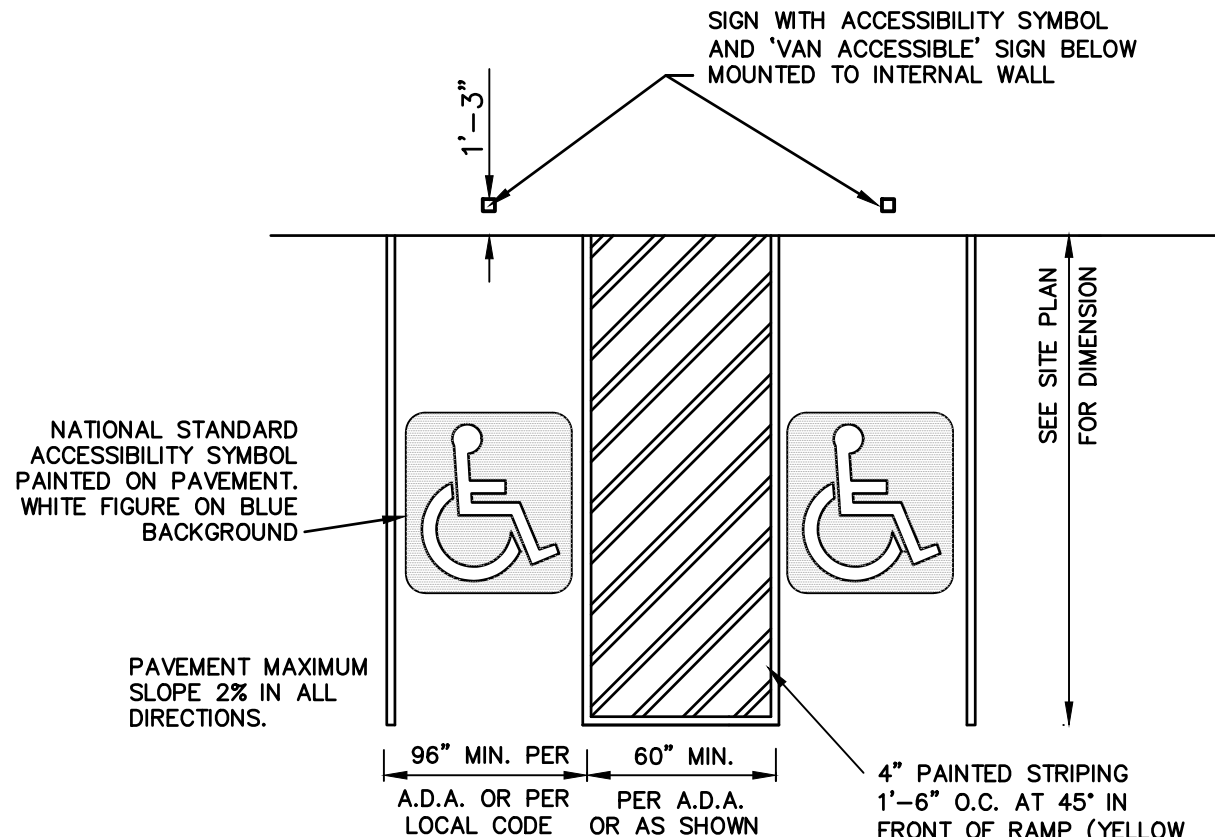


NOTES:

1. EDGING TO BE PLACED PRIOR TO PLACING TOP SURFACE COURSE.
2. JOINTS BETWEEN STONES SHALL BE MORTARED.

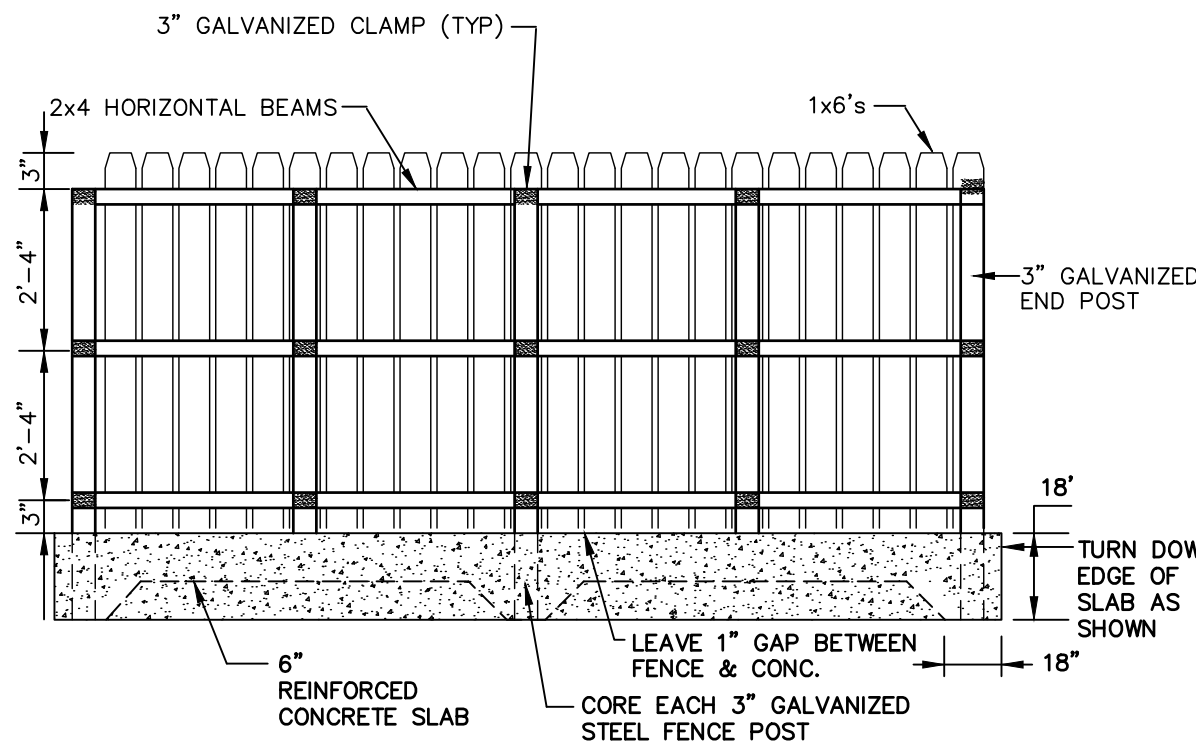
VERTICAL GRANITE CURB

NOT TO SCALE

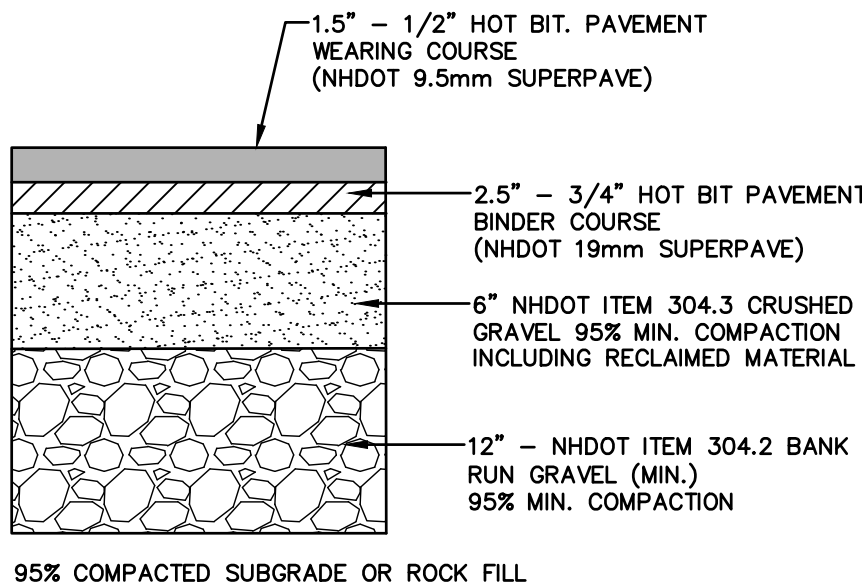


HANDICAP PARKING LAYOUT

NOT TO SCALE



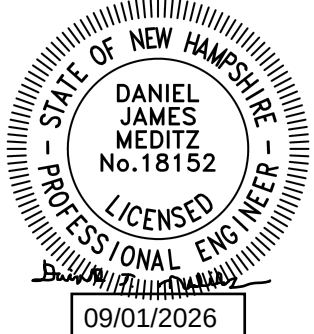
SECTION A-A



TYPICAL BITUMINOUS PAVEMENT

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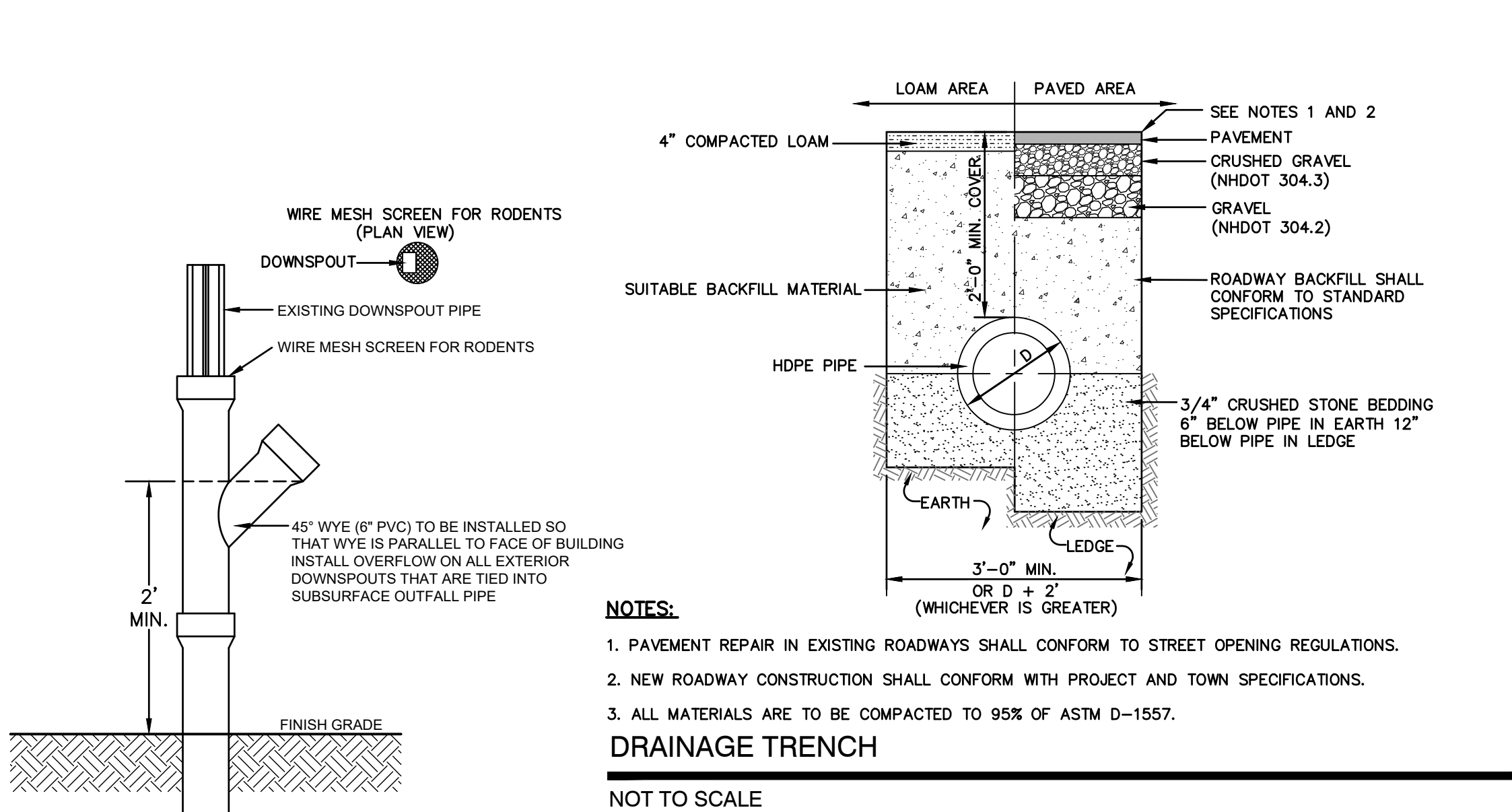
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	LEDGEWOOD DRIVE LLC LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

DRAWING No.

D1

SHEET 9 OF 15
JBE PROJECT NO. 25071.2



NOTES:

1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM WITH PROJECT AND TOWN SPECIFICATIONS.
3. ALL MATERIALS ARE TO BE COMPACTED TO 95% OF ASTM D-1557.

DRAINAGE TRENCH

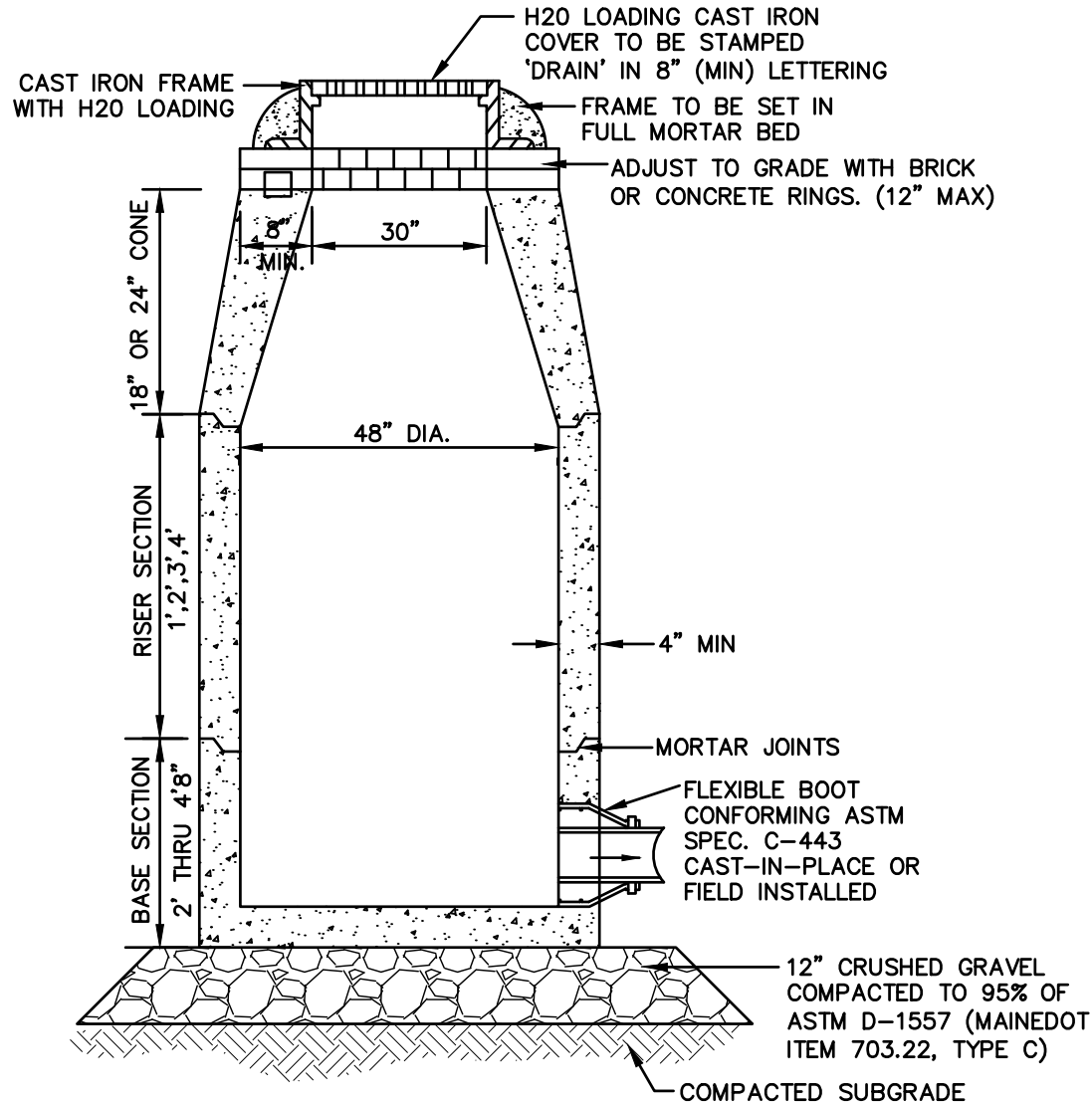
NOT TO SCALE

NOTE:

1. OVERFLOWS ARE TO BE INSTALLED ON EXTERIOR DOWNSPOUT LEADERS ONLY.

DOWNSPOUT OVERFLOW

NOT TO SCALE

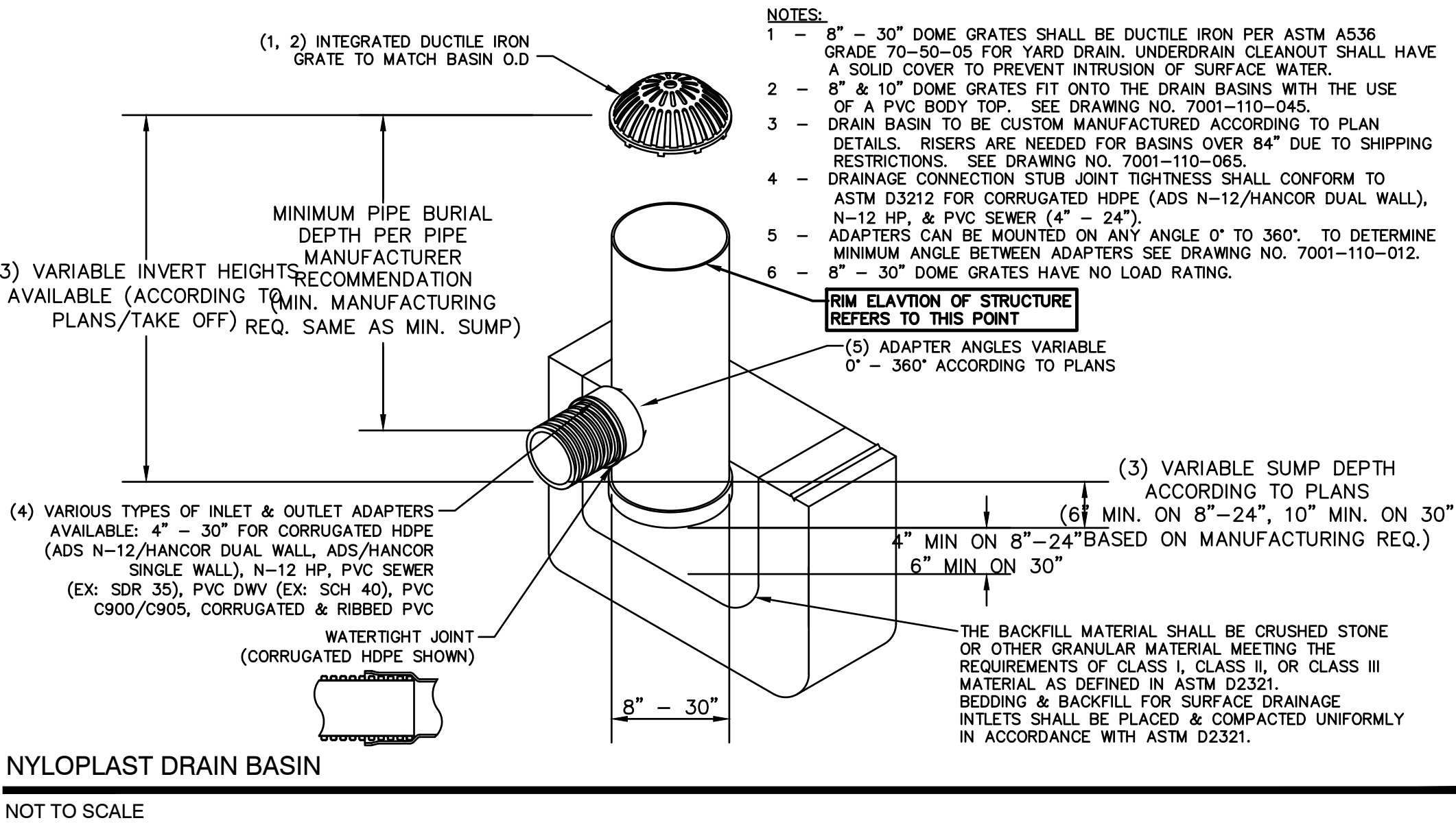


NOTES:

1. BASE SECTION SHALL BE MONOLITHIC WITH 48" INSIDE DIAMETER.
2. ALL SECTIONS SHALL BE DESIGNED FOR H2O LOADING.
3. CONCRETE SHALL BE COMPRESSIVE STRENGTH 4000 PSI, TYPE II CEMENT.
4. FRAMES AND GRATES SHALL BE HEAVY DUTY AND DESIGNED FOR H2O LOADING.
5. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS SO AS TO BE WATERTIGHT.
6. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.
7. ALL DRAIN MANHOLE FRAMES AND GRATES SHALL BE NEENAH R-1798 OR APPROVED EQUAL (30" DIA. TYPICAL).
8. STANDARD FRAME(S) AND GRATE(S) SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM, BUT NO MORE THAN 12"), OR PRECAST CONCRETE 'DONUTS'.

DRAIN MANHOLE (4' DIAM.)

NOT TO SCALE



NYLOPLAST DRAIN BASIN

NOT TO SCALE

NOTES:

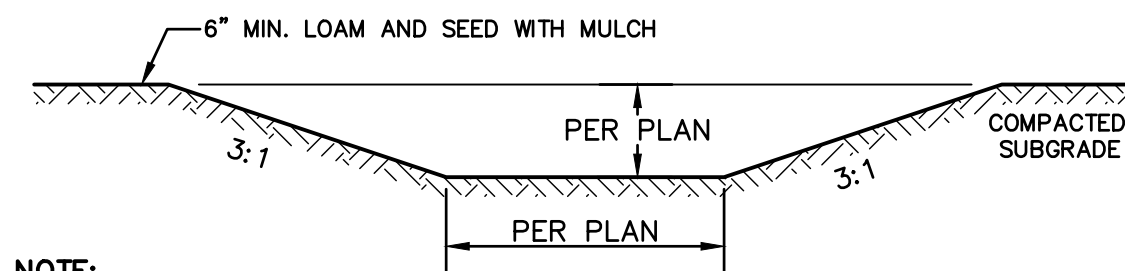
- 1 - 8" - 30" DOME GRATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05 FOR YARD DRAIN. UNDERDRAIN CLEANOUT SHALL HAVE A SOLID COVER TO PREVENT INTRUSION OF SURFACE WATER.
- 2 - 8" & 10" DOME GRATES FIT ONTO THE DRAIN BASINS WITH THE USE OF A PVC BODY TOP. SEE DRAWING NO. 7001-110-045.
- 3 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065.
- 4 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP, & PVC SEWER (4" - 24").
- 5 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.
- 6 - 8" - 30" DOME GRATES HAVE NO LOAD RATING.

MINIMUM PIPE BURIAL DEPTH PER PIPE MANUFACTURER RECOMMENDATION (MIN. MANUFACTURING REQ. SAME AS MIN. SUMP)

- (3) VARIABLE INVERT HEIGHTS AVAILABLE (ACCORDING TO PLANS/TAKE OFF)
- (4) VARIOUS TYPES OF INLET & OUTLET ADAPTERS AVAILABLE: 4" - 30" FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL, ADS/HANCOR SINGLE WALL), N-12 HP, PVC SEWER (EX: SDR 35), PVC DWV (EX: SCH 40), PVC C900/C905, CORRUGATED & RIBBED PVC

- (3) VARIABLE SUMP DEPTH ACCORDING TO PLANS
- (6) MIN. ON 8"-24", 10" MIN. ON 30"

THE BACKFILL MATERIAL SHALL BE CRUSHED STONE OR OTHER GRANULAR MATERIAL MEETING THE REQUIREMENTS OF CLASS I, CLASS II, OR CLASS III MATERIAL AS DEFINED IN ASTM D2321. BEDDING & BACKFILL FOR SURFACE DRAINAGE INTLETS SHALL BE PLACED & COMPACTED UNIFORMLY IN ACCORDANCE WITH ASTM D2321.

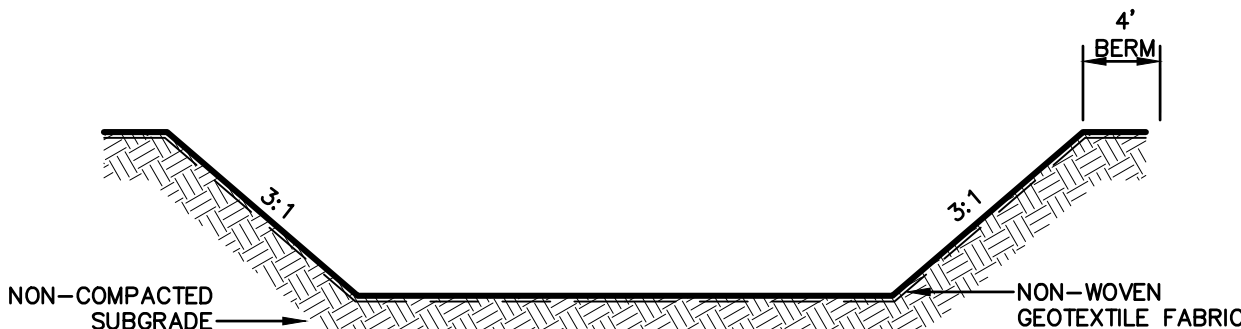


NOTE:

1. STABILIZE AREA PRIOR TO DIRECTING RUNOFF TO SWALE

VEGETATED SWALE

NOT TO SCALE

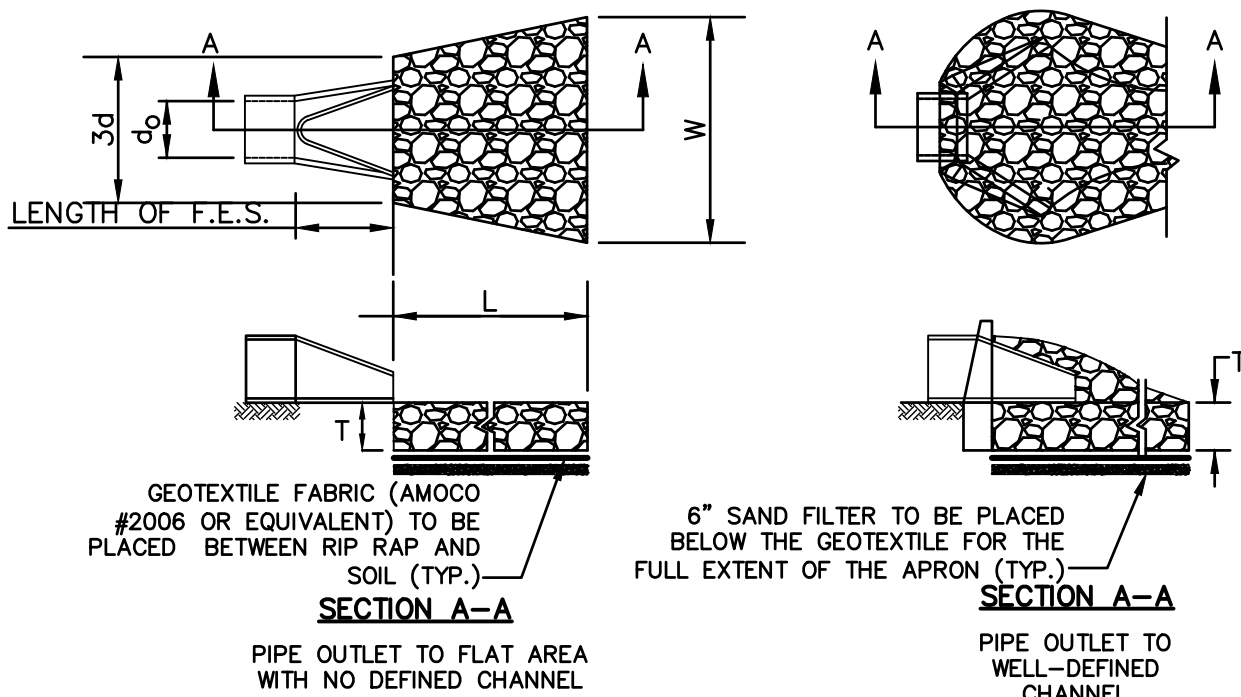


NOTES:

1. DO NOT DISCHARGE SEDIMENT LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUNOFF, WATER FROM EXCAVATIONS) TO POCKET POND.
2. DO NOT TRAFFIC EXPOSE SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATION WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE POND.
3. AFTER THE BASIN IS EXCAVATED TO THE FINAL DESIGN ELEVATION, THE FLOOR SHALL BE DEEPLY TILLED WITH A ROTARY TILLER OR DISC HARROW TO RESTORE INFILTRATION RATES, FOLLOWED BY A PASS WITH A LEVELING DRAG.
4. VEGETATION SHALL BE ESTABLISHED IMMEDIATELY.
5. DO NOT PLACE POND INTO SERVICE UNTIL THE CONTRIBUTING AREA HAS BEEN FULLY STABILIZED.
6. ANY FILL MATERIAL USED UNDER INFILTRATION PONDS SHALL BE FREE-DRAINING.
7. SUBGRADE MATERIAL SHALL BE FREE OF ORGANICS, SILTS, CLAY AND ROOTS.
8. IF THE POCKET POND DOES NOT DRAIN WITHIN 72-HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHALL ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE INFILTRATION FUNCTION, INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE SYSTEM.

POCKET INFILTRATION POND SECTION

NOT TO SCALE



SECTION A-A

PIPE OUTLET TO FLAT AREA WITH NO DEFINED CHANNEL

SECTION A-A

PIPE OUTLET TO WELL-DEFINED CHANNEL

TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES			
THICKNESS OF RIP RAP = 0.75 FEET			
d50 SIZE=	0.25 FEET	3 INCHES	
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO	
100%	5	6	
85%	4	5	
50%	3	5	
15%	1	2	

TABLE 7-24--RECOMMENDED RIP RAP GRADATION RANGES			
THICKNESS OF RIP RAP = 1.5 FEET			
d50 SIZE=	0.50 FEET	6 INCHES	
% OF WEIGHT SMALLER THAN THE GIVEN d50 SIZE	SIZE OF STONE (INCHES) FROM	TO	
100%	9	12	
85%	8	11	
50%	6	9	
15%	2	3	

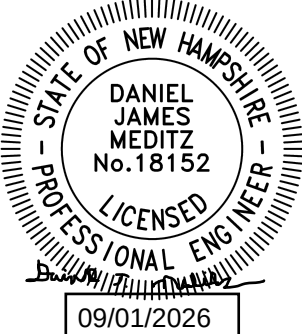
NOTES:

1. THE SUBGRADE FOR THE GEOTEXTILE FABRIC AND RIP RAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE RIP RAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIP. 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 REPAIRS OR 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.
5. OUTLETS TO A DEFINED CHANNEL SHALL HAVE 2:1 OR FLATTER SIDE SLOPES AND SHALL BEGIN AT THE TOP OF THE CULVERT AND TAPER DOWN TO THE CHANNEL BOTTOM THROUGH THE LENGTH OF THE APRON.
6. MAINTENANCE: THE OUTLET PROTECTION SHALL BE CHECKED AT LEAST ANNUALLY AND AFTER EVERY MAJOR STORM. IF THE RIP RAP HAS BEEN DISPLACED, UNDERMINED OR DAMAGED, IT SHALL BE REPAIRED IMMEDIATELY. THE CHANNEL IMMEDIATELY BELOW THE OUTLET SHALL BE CHECKED TO SEE THAT EROSION IS NOT OCCURRING. THE DOWNSTREAM CHANNEL SHALL 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 OUTLET PROTECTION.

RIP RAP OUTLET PROTECTION APRON

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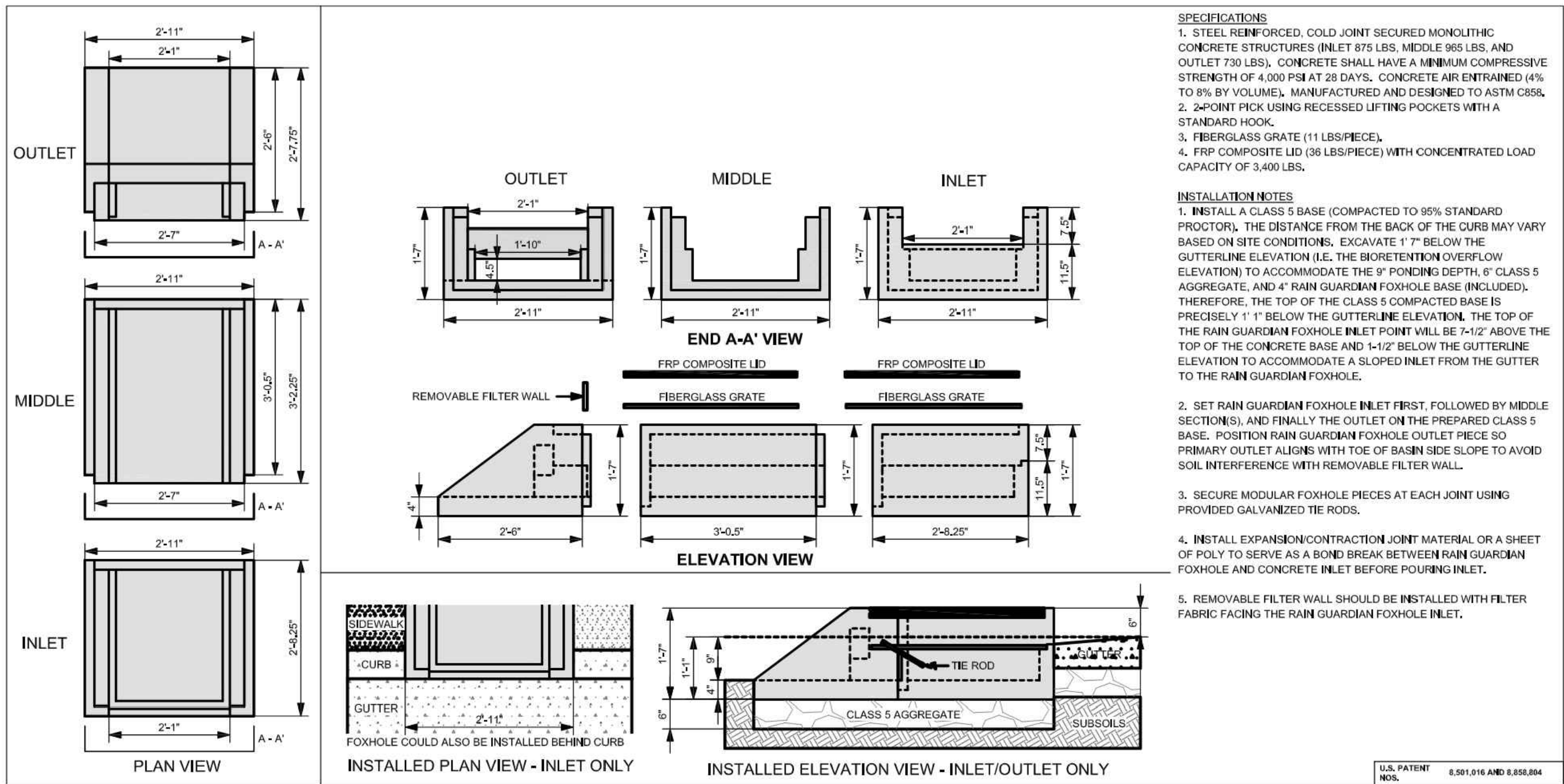
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	DETAIL SHEET
Project:	LEDGEWOOD DRIVE LLC LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

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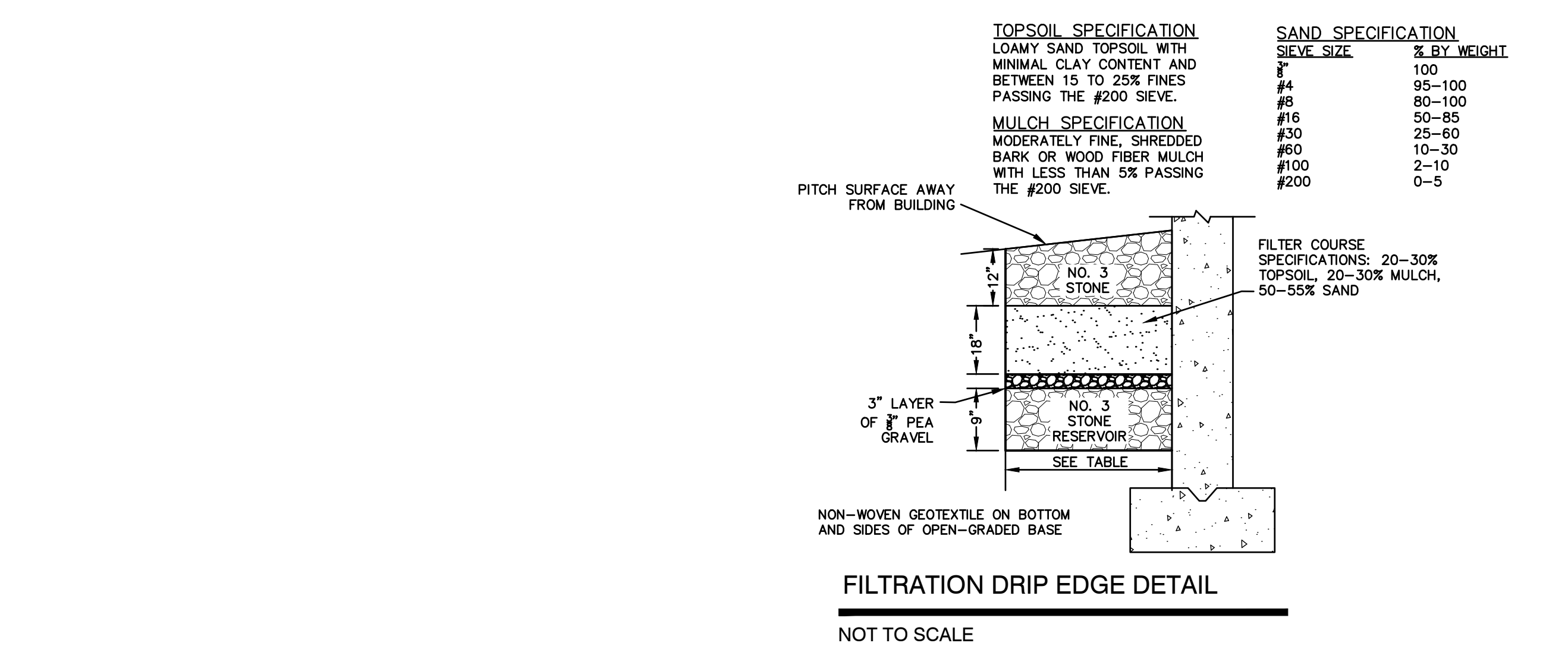
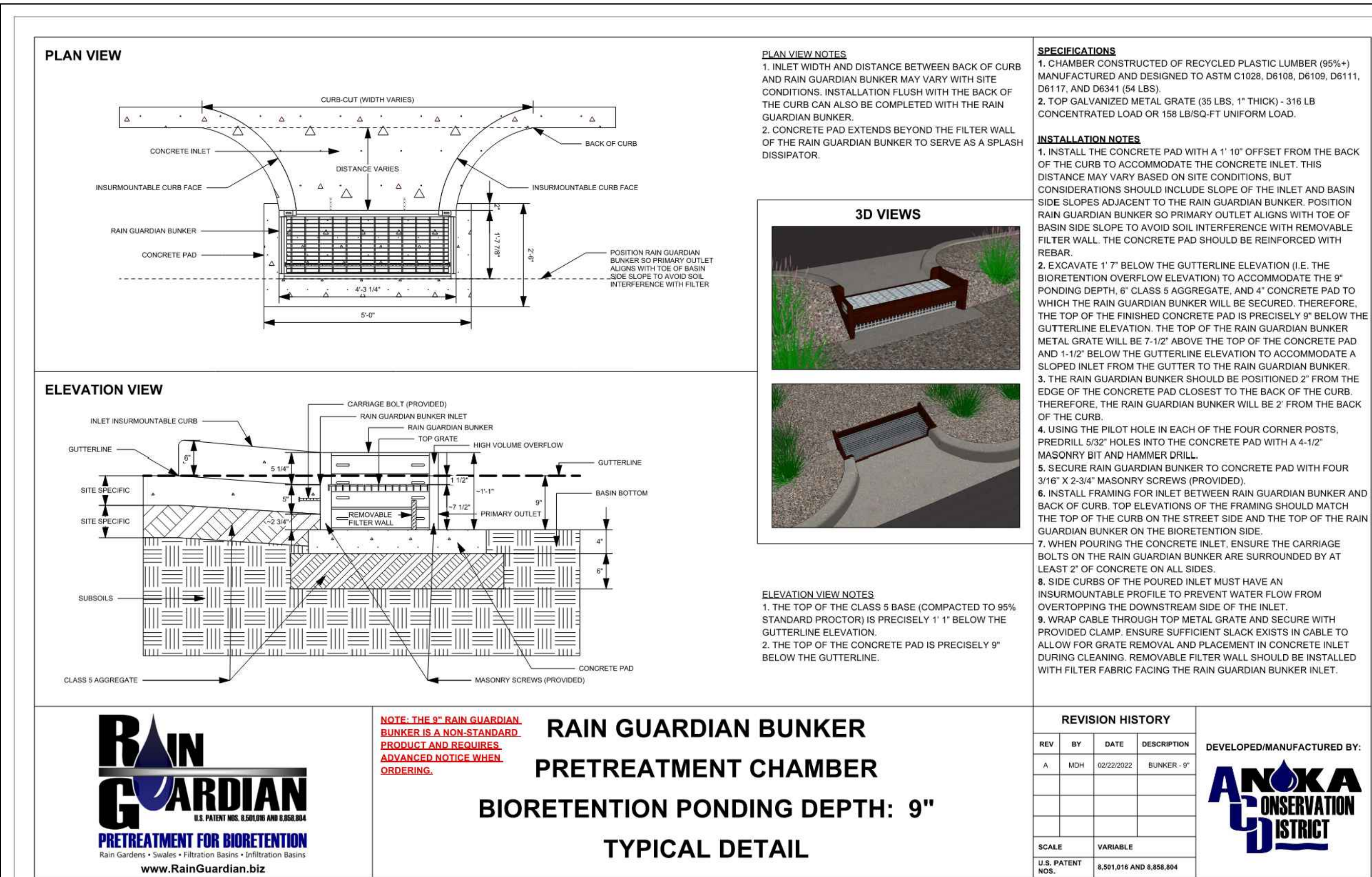
D3

SHEET 11 OF 15
JBE PROJECT NO. 25071.2



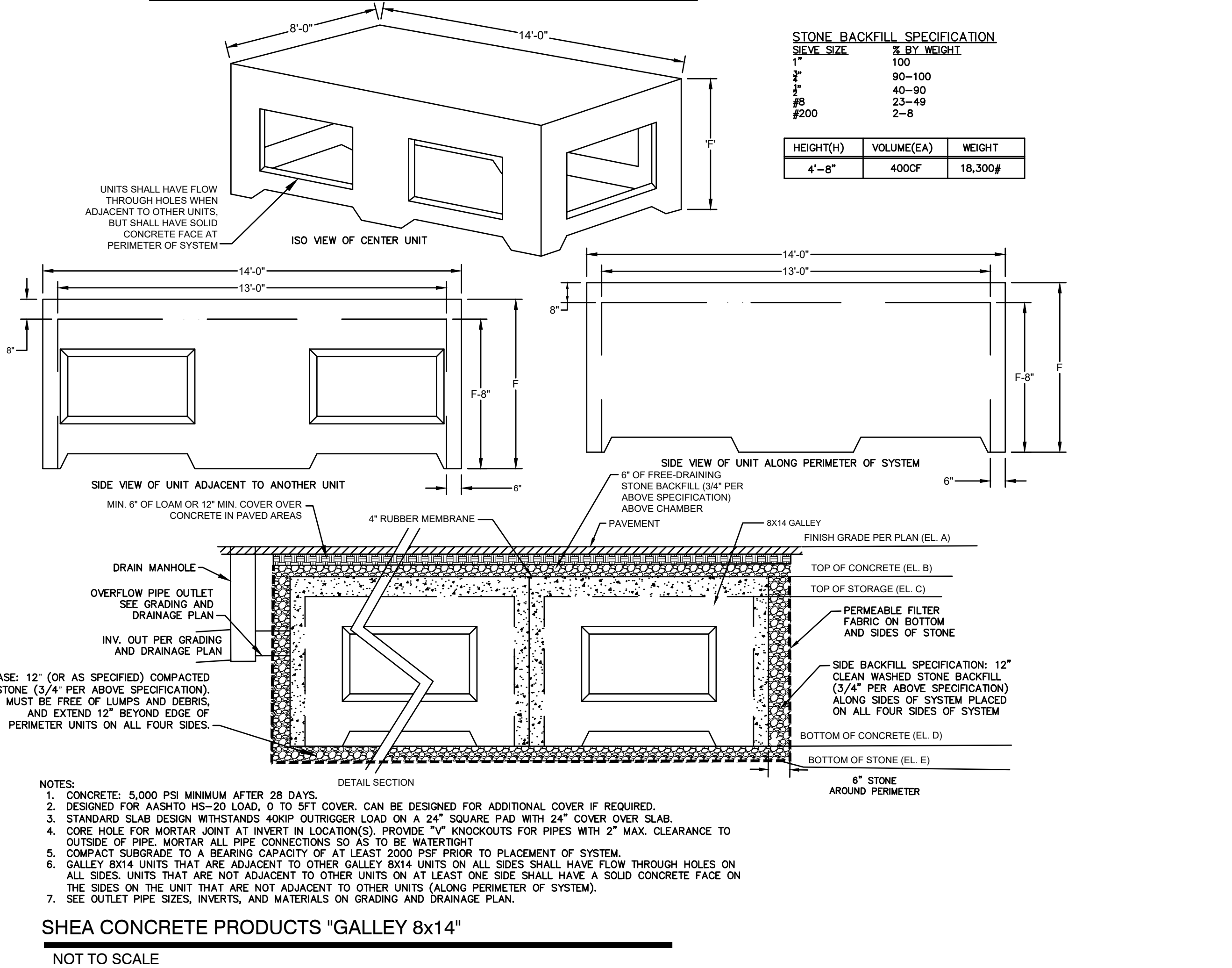
RAIN GARDIAN FOXHOLE MODULAR PRETREATMENT CHAMBER

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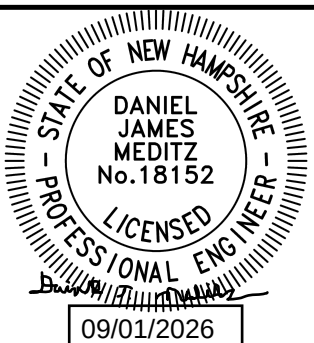


CONTRACTOR ORDER SCHEDULE						
	FLOW-THROUGH HOLES ON ALL SIDES	NO FLOW-THROUGH HOLES ON ONE 8' SIDE	NO FLOW-THROUGH HOLES ON TWO 14' SIDES	NO FLOW-THROUGH HOLES ON TWO 8' AND ONE 14' SIDE	NO FLOW-THROUGH HOLES ON ONE 14' AND ONE 8' SIDE	NO FLOW-THROUGH HOLES ON ONE 14' SIDE
SYSTEM A	1	2	0	2	4	0
SYSTEM B	1	0	1	2	4	1

ELEVATION SCHEDULE						
	EL. A	EL. B	EL. C	EL. D	EL. E	F (HEIGHT)
SYSTEM A	>22.87	21.87	21.20	19.20	18.20	2.67'
SYSTEM B	>23.27	22.27	21.60	19.60	18.60	2.67'



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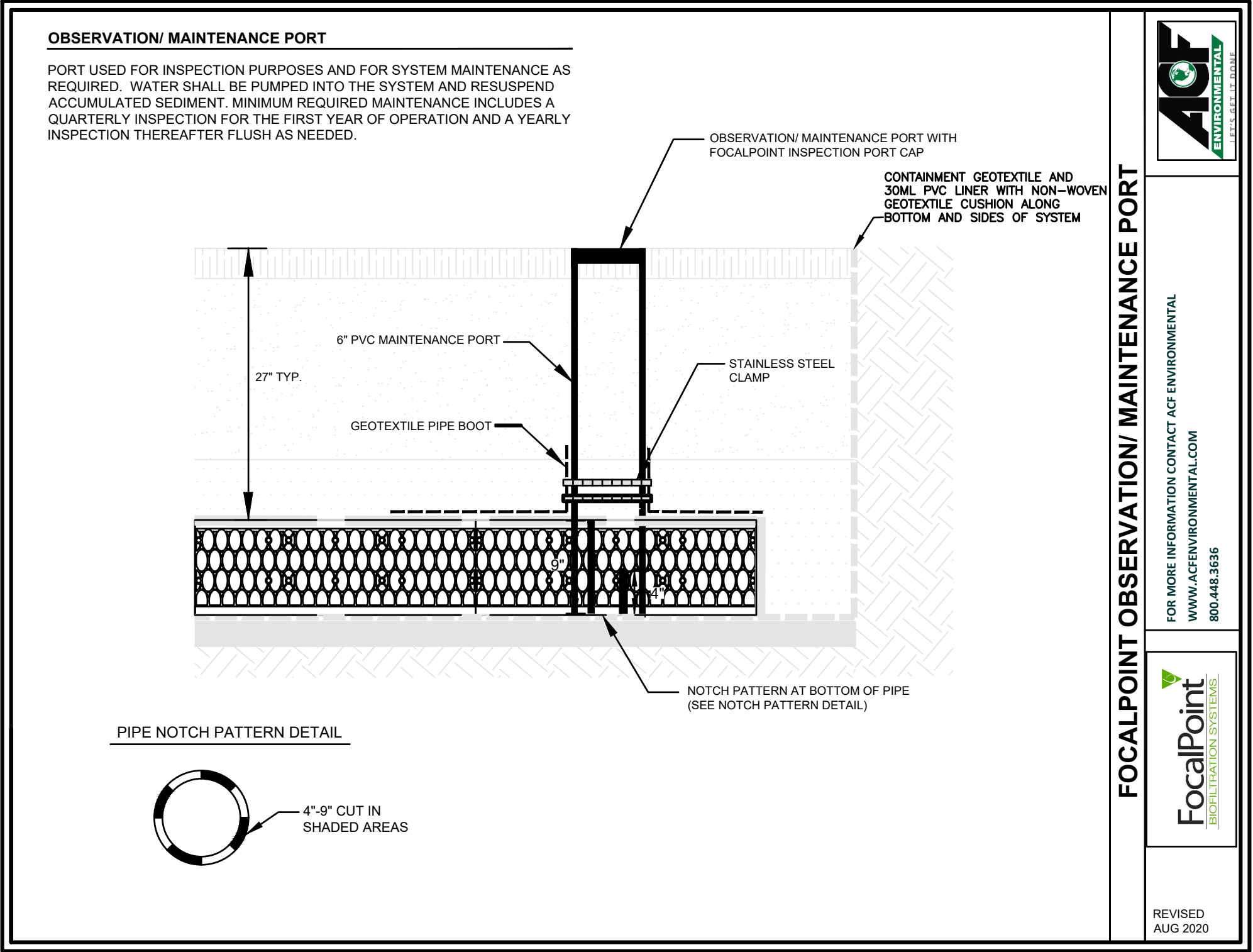
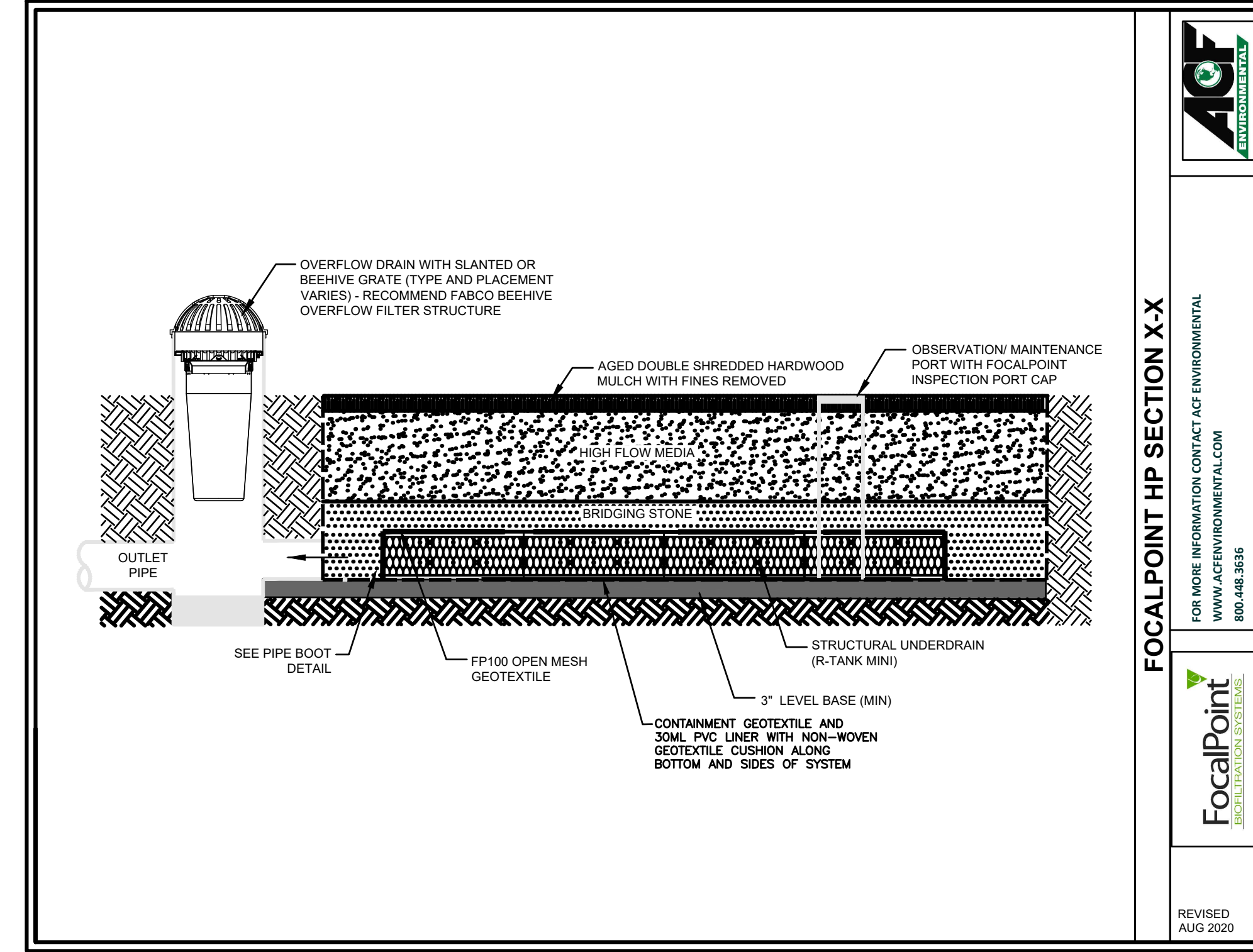
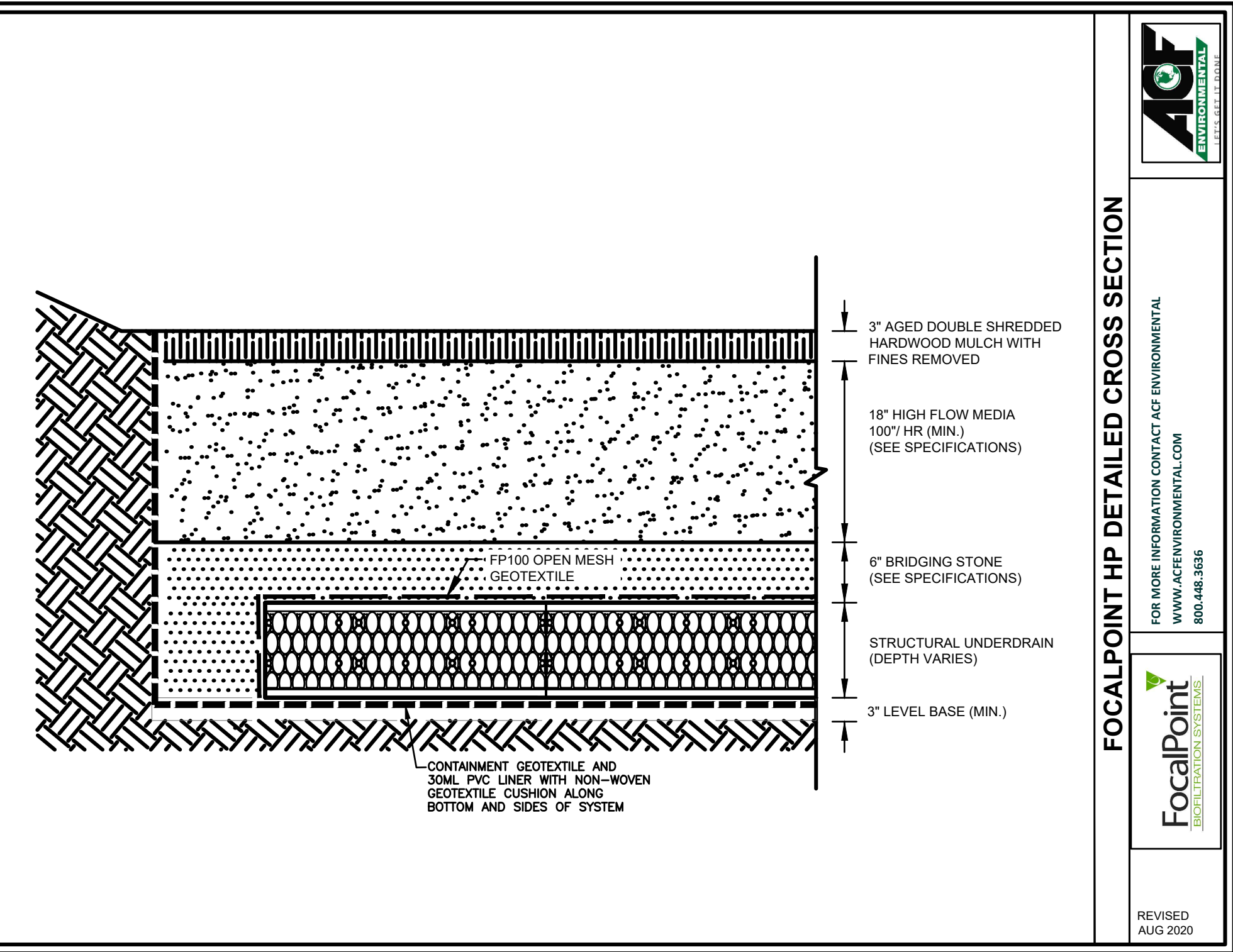
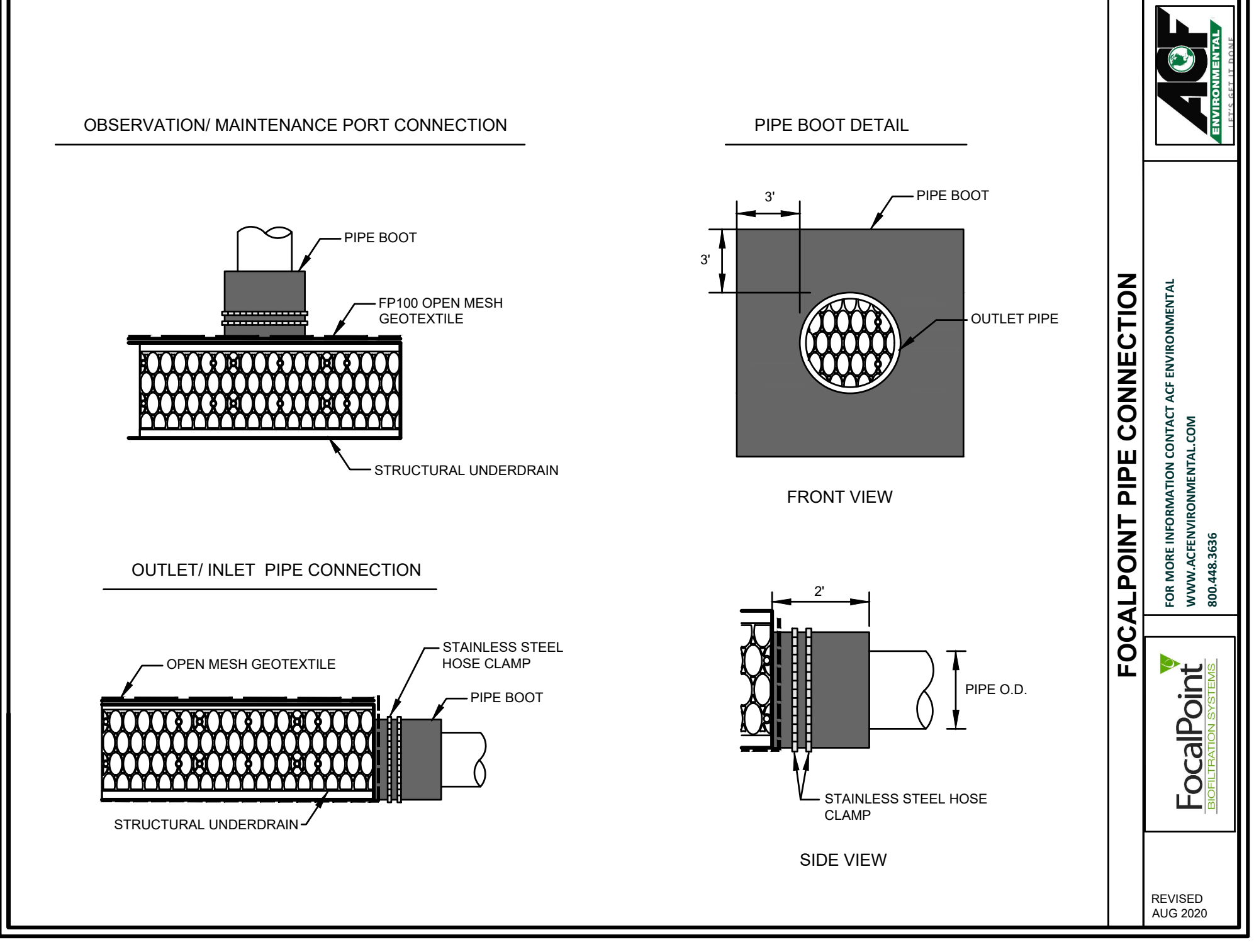
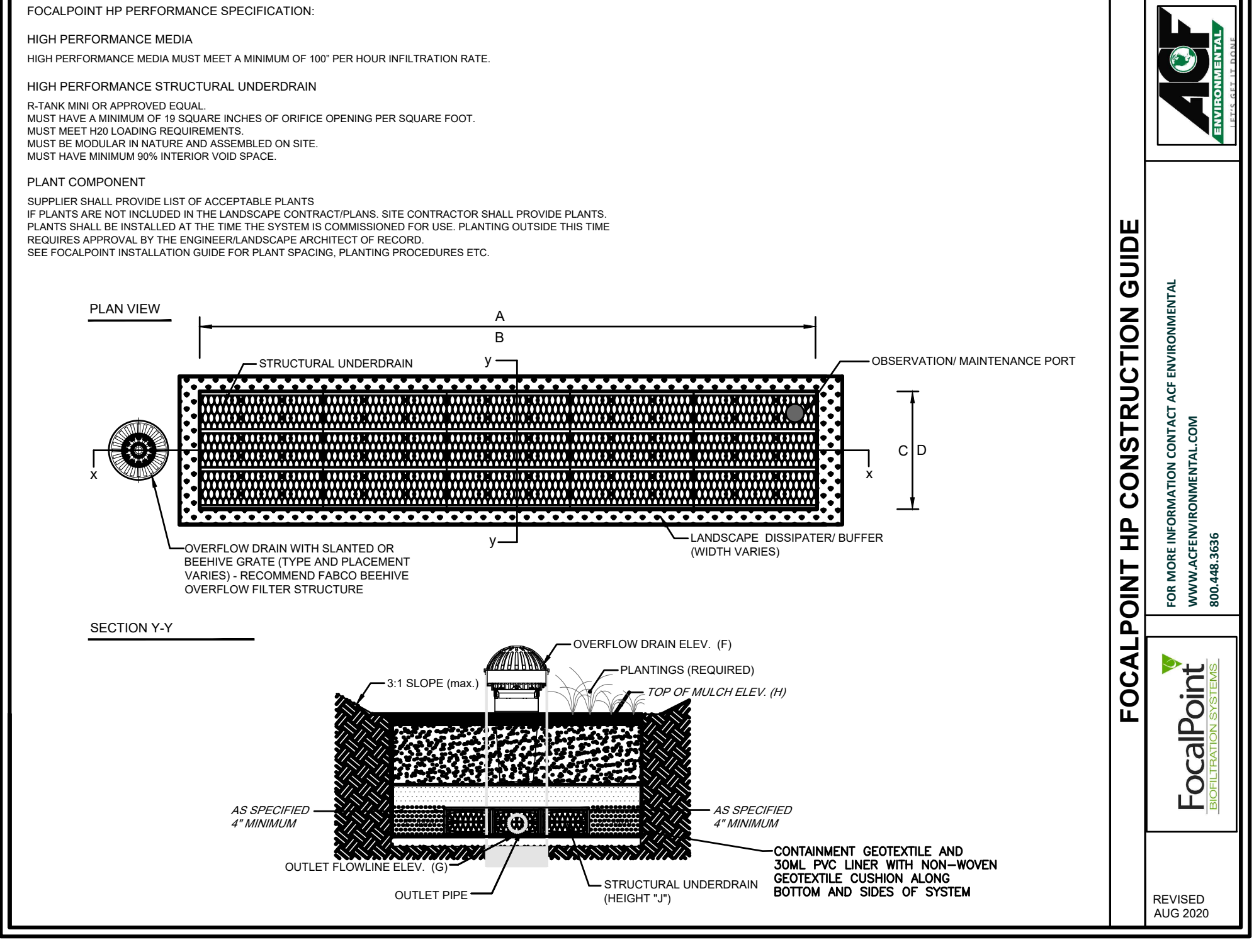
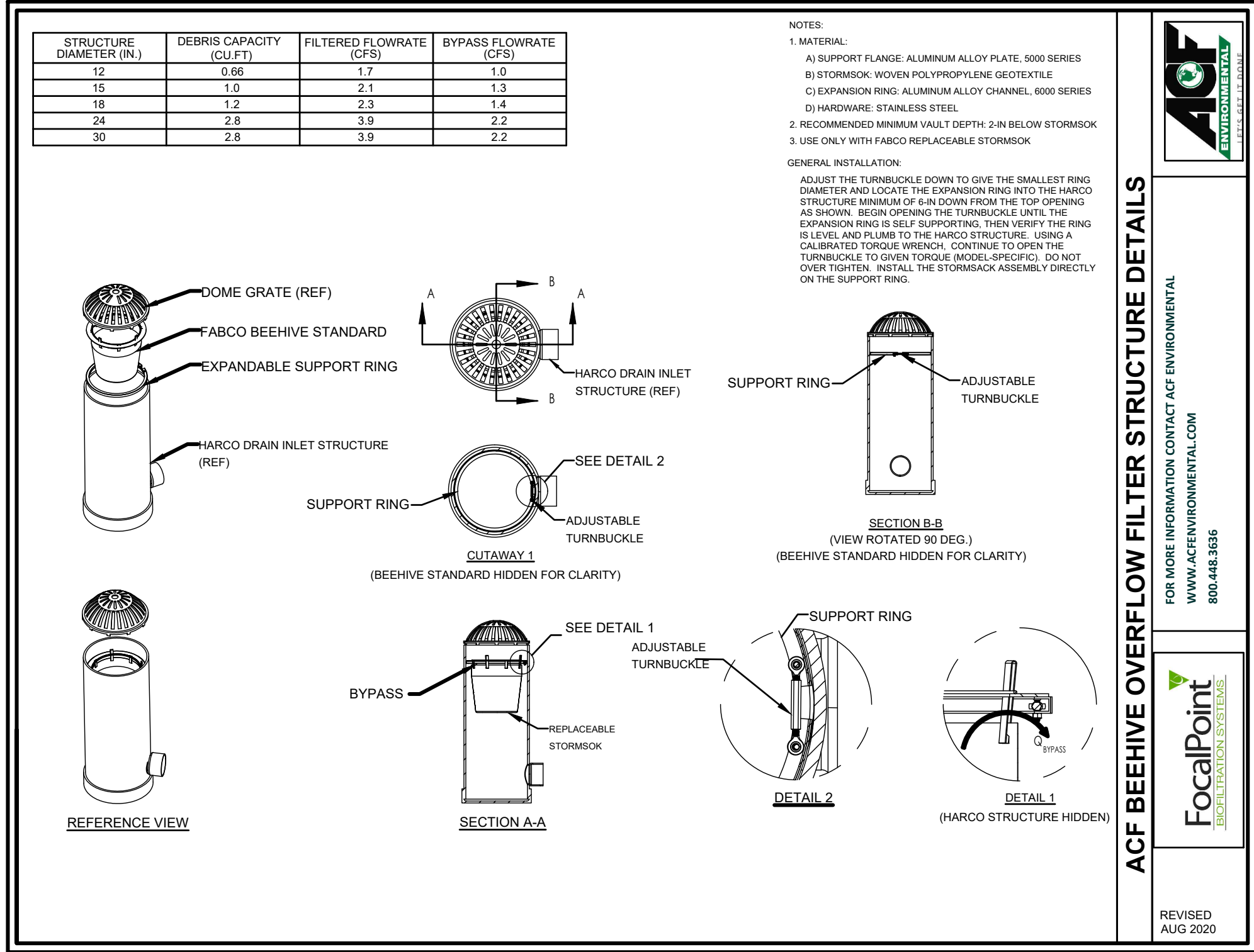
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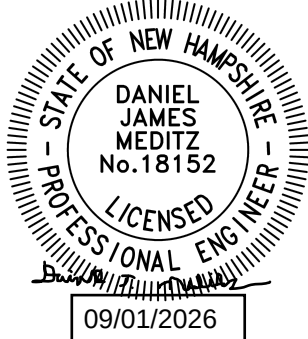
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Plan Name:	DETAIL SHEET
Project:	LEDGEWOOD DRIVE LLC LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

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SHEET 13 OF 15
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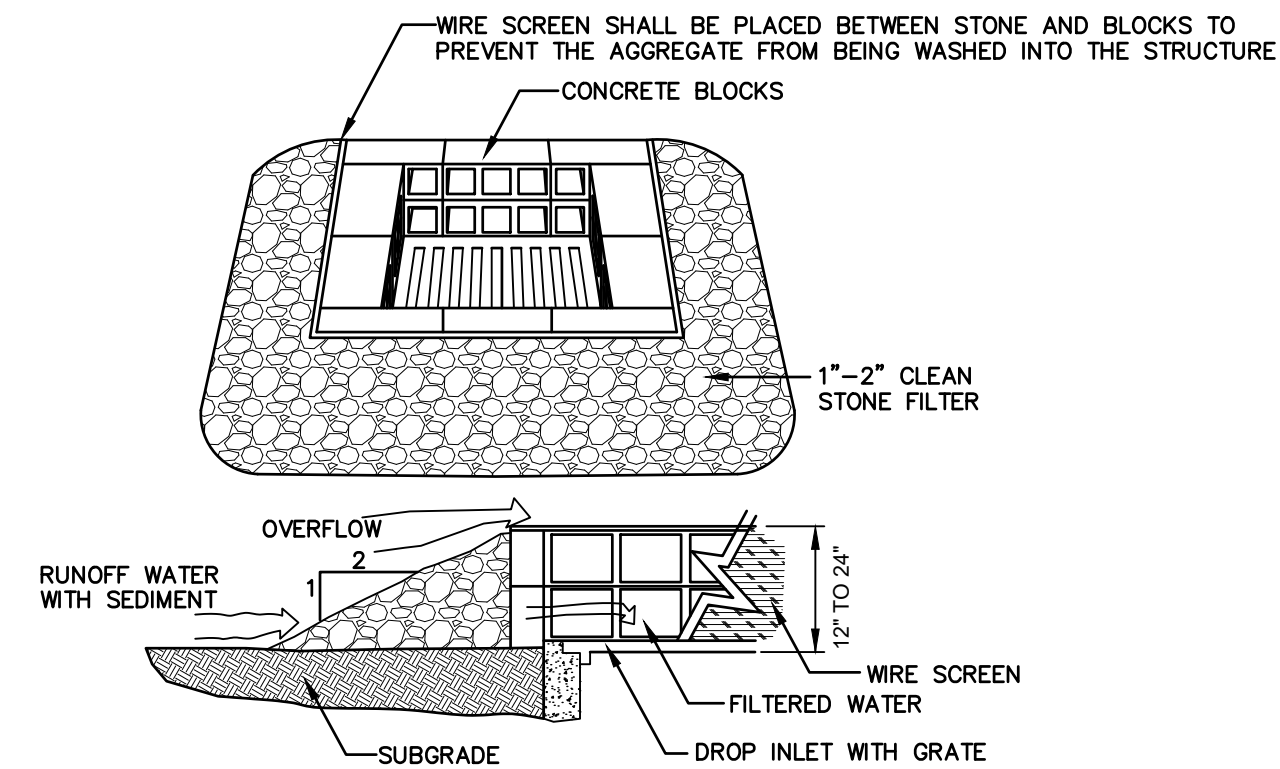
TEMPORARY EROSION CONTROL NOTES

1. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME. AT NO TIME SHALL AN AREA IN EXCESS OF 5 ACRES BE EXPOSED AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.
2. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND AT LOCATIONS AS REQUIRED, DIRECTED BY THE ENGINEER.
3. ALL DISTURBED AREAS (INCLUDING POND AREAS BELOW THE PROPOSED WATERLINE) SHALL BE RETURNED TO PROPOSED GRADES AND ELEVATIONS. DISTURBED AREAS SHALL BE LOAMED WITH A MINIMUM OF 6" OF SCREENED ORGANIC LOAM AND SEEDED WITH SEED MIXTURE 'C' AT A RATE NOT LESS THAN 1.10 POUNDS OF SEED PER 1,000 S.F. OF AREA (48 LBS. / ACRE).
4. SILT FENCES AND OTHER BARRIERS SHALL BE INSPECTED EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS OF A RAINFALL OF 0.5" OR GREATER. ALL DAMAGED AREAS SHALL BE REPAIRED, AND SEDIMENT DEPOSITS SHALL PERIODICALLY BE REMOVED AND DISPOSED OF.
5. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED AND THE AREA DISTURBED BY THE REMOVAL SMOOTHED AND RE-VEGETATED.
6. AREAS MUST BE SEEDED AND MULCHED OR OTHERWISE PERMANENTLY STABILIZED WITHIN 3 DAYS OF FINAL GRADING, OR TEMPORARILY STABILIZED WITHIN 14 DAYS OF THE INITIAL DISTURBANCE OF SOIL. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
7. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING NORTH AMERICAN GREEN S150 EROSION CONTROL BLANKETS (OR AN EQUIVALENT APPROVED IN WRITING BY THE ENGINEER) ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. 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.
8. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
9. AFTER OCTOBER 15th, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3" OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.
10. IN AREAS TO BE PAVED, "STABLE" MEANS THAT BASE COURSE GRAVELS MEETING THE REQUIREMENTS OF NHDOT STANDARD FOR ROAD AND BRIDGE CONSTRUCTION, 2016, ITEM 304.2 HAVE BEEN INSTALLED.

IN AREAS THAT WILL NOT BE PAVED, "STABLE MEANS THAT:

- a. A MINIMUM OF 85% VEGETATIVE COVER HAS BEEN ESTABLISHED IN A MANNER THAT IS EVENLY DISTRIBUTED OVER THE SITE, WITH NO LARGE AREAS OF BARE SOIL;
- b. A MINIMUM OF 3 INCHES OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED; OR
- c. EROSION CONTROL BLANKETS HAVE BEEN INSTALLED IN ACCORDANCE WITH ENV-WQ 1506.03.

11. FUGITIVE DUST CONTROL IS REQUIRED TO BE CONTROLLED IN ACCORDANCE WITH ENV-A 1000, AND THE PROJECT IS TO MEET THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO INVASIVE SPECIES.

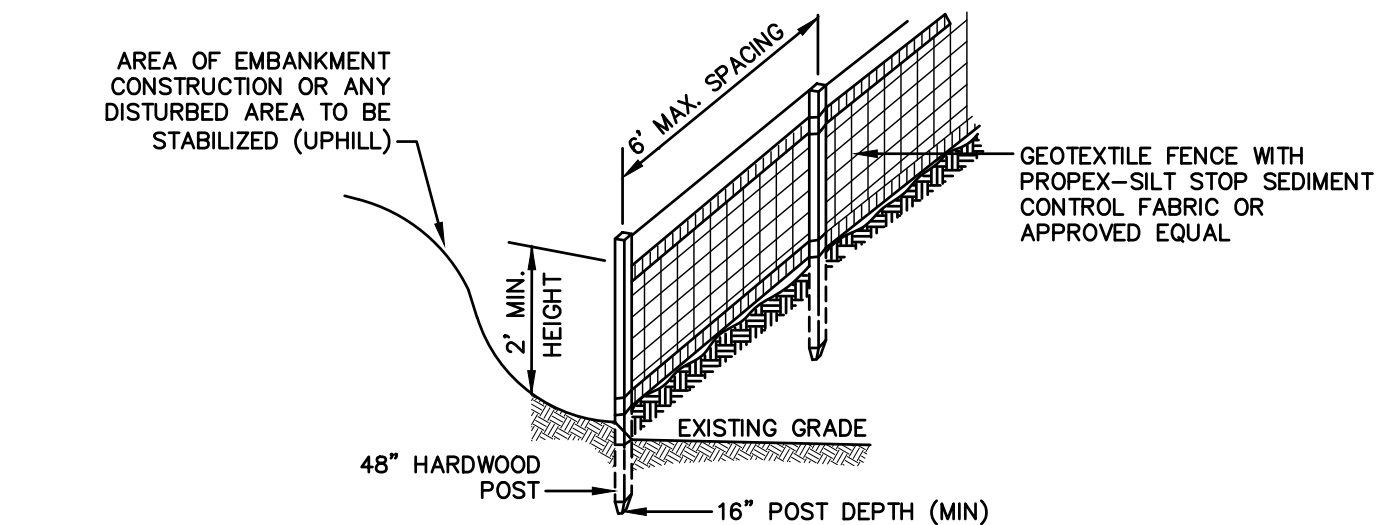


MAINTENANCE NOTE:

1. ALL STRUCTURES SHOULD BE INSPECTED AFTER EVERY RAINFALL AND REPAIRS MADE AS NECESSARY. SEDIMENT SHOULD BE REMOVED FROM TRAPPING DEVICES AFTER THE SEDIMENT HAS REACHED A MAXIMUM OF ONE HALF THE DEPTH OF THE TRAP. THE SEDIMENT SHOULD BE DISPOSED IN A SUITABLE UPLAND AREA AND PROTECTED FROM EROSION BY EITHER STRUCTURE OR VEGETATIVE MEANS. THE TEMPORARY TRAPS SHOULD BE REMOVED AND REPAIRED AS SOON AS THE CONTRIBUTING DRAINAGE AREA TO THE INLET HAS BEEN COMPLETELY STABILIZED.

TEMPORARY CATCH BASIN INLET PROTECTION
(Block and Gravel Drop Inlet Sediment Filter)

NOT TO SCALE

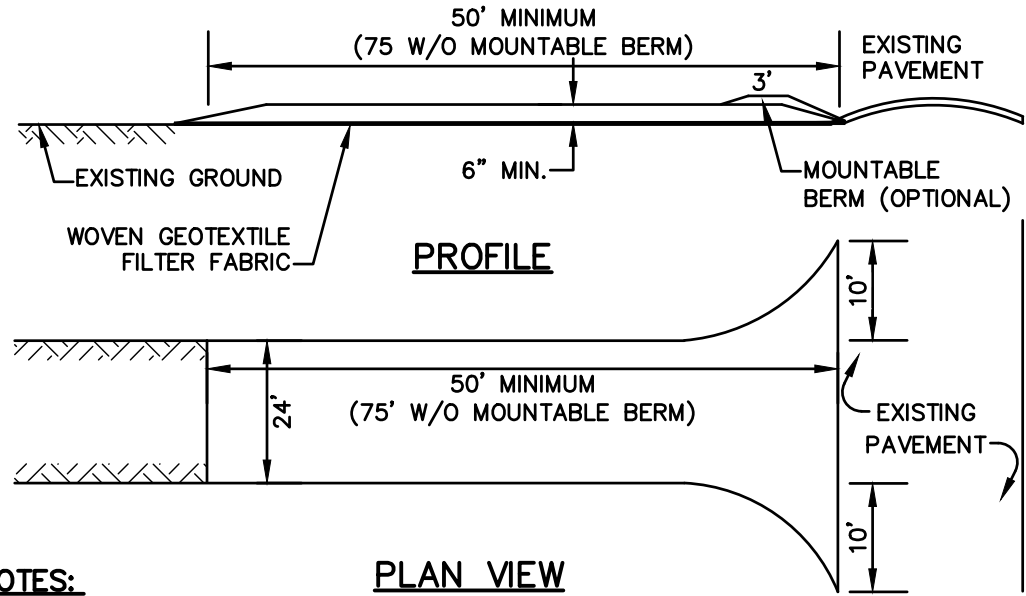


CONSTRUCTION SPECIFICATIONS:

1. WOVEN FABRIC FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. FILTER CLOTH SHALL BE FASTENED TO WOVEN WIRE EVERY 24" AT TOP, MID AND BOTTOM AND EMBEDDED IN THE GROUND A MINIMUM OF 8" AND THEN COVERED WITH SOIL.
2. THE FENCE POSTS SHALL BE A MINIMUM OF 48" LONG, SPACED A MAXIMUM 6' APART, AND DRIVEN A MINIMUM OF 16" INTO THE GROUND.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THE ENDS OF THE FABRIC SHALL BE OVERLAPPED 6", FOLDED AND STAPLED TO PREVENT SEDIMENT FROM BY-PASSING.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND SEDIMENT REMOVED AND PROPERLY DISPOSED OF WHEN IT IS 6" DEEP OR VISIBLE 'BULGES' DEVELOP IN THE SILT FENCE.
5. PLACE THE ENDS OF THE SILT FENCE UP CONTOUR TO PROVIDE FOR SEDIMENT STORAGE.
6. SILT FENCE SHALL REMAIN IN PLACE FOR 24 MONTHS.

SILT FENCE

NOT TO SCALE

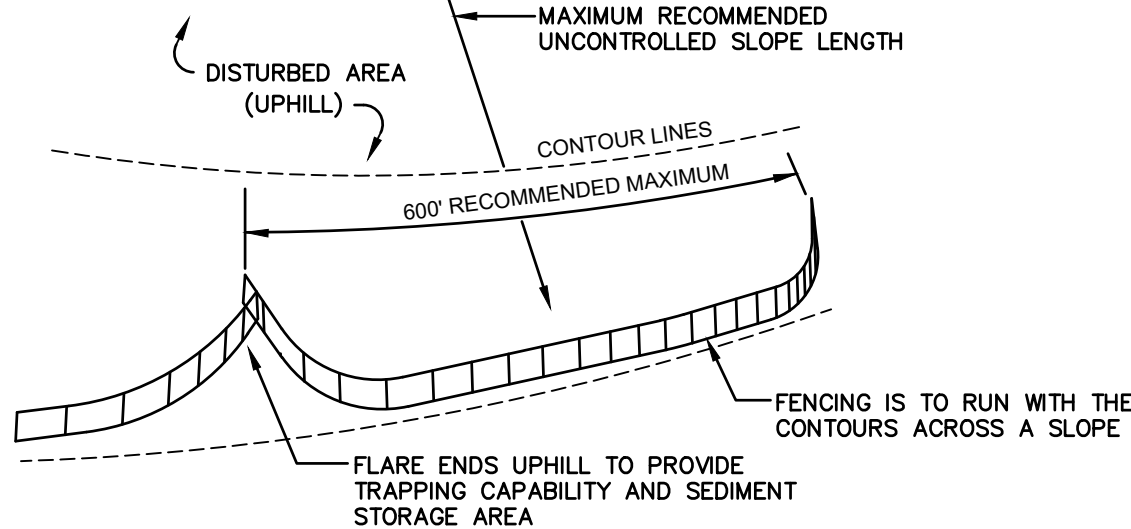


NOTES:

1. STONE FOR STABILIZED CONSTRUCTION ENTRANCE SHALL BE 3 INCH STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT.
2. THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 50 FEET, 75' WITHOUT A MOUNTABLE BERM, AND EXCEPT FOR A SINGLE RESIDENTIAL LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY.
3. THICKNESS OF THE STONE FOR THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 6 INCHES.
4. THE WIDTH OF THE ENTRANCE SHALL NOT BE LESS THAN THE FULL WIDTH OF THE ENTRANCE WHERE INGRESS OR EGRESS OCCURS, OR 10 FEET, WHICHEVER IS GREATER.
5. GEOTEXTILE FILTER FABRIC SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE. FILTER FABRIC IS NOT REQUIRED FOR A SINGLE FAMILY RESIDENTIAL LOT.
6. ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A STONE BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO THE PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO THE PUBLIC RIGHT-OF-WAY MUST BE REMOVED PROMPTLY.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE



7. SILT FENCES SHALL BE REMOVED WHEN NO LONGER NEEDED AND THE SEDIMENT COLLECTED SHALL BE DISPOSED AS DIRECTED BY THE ENGINEER. THE AREA DISTURBED BY THE REMOVAL SHALL BE SMOOTHED AND REVEGETATED.

MAINTENANCE:

1. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE DONE IMMEDIATELY.
2. IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE INSPECTED AFTER EVERY STORM EVENT. THE DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER.
4. SEDIMENT DEPOSITS THAT ARE REMOVED, OR LEFT IN PLACE AFTER THE FABRIC HAS BEEN REMOVED, SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

SEEDING SPECIFICATIONS

1. **GRADING AND SHAPING**
- A. SLOPES SHALL NOT BE STEEPER THAN 2:1 WITHOUT APPROPRIATE EROSION CONTROL MEASURES AS SPECIFIED ON THE PLANS (3:1 SLOPES OR FLATTER ARE PREFERRED).
- B. WHERE MOWING WILL BE DONE, 3:1 SLOPES OR FLATTER ARE RECOMMENDED.
2. **SEEDBED PREPARATION**
- A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.
- B. STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF ABOUT 4 INCHES TO PREPARE A SEEDBED AND FERTILIZER AND LIME MIXED INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.
3. **ESTABLISHING A STAND**
- A. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF SEEDING AND INCORPORATED INTO THE SOIL. TYPES 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, 2 TONS PER ACRE OR 100 LBS. PER 1,000 SQ.FT.
- NITROGEN(N), 50 LBS. PER ACRE OR 1.1 LBS. PER 1,000 SQ.FT.
- PHOSPHATE(P2O5), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
- POTASH(K2O), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ.FT.
- (NOTE: THIS IS THE EQUIVALENT OF 500 LBS. PER ACRE OF 10-20-20 FERTILIZER OR 1,000 LBS. PER ACRE OF 5-10-10.)
- B. SEED SHOULD BE SPREAD UNIFORMLY BY THE METHOD MOST APPROPRIATE FOR THE SITE. METHODS INCLUDE BROADCASTING, DRILLING AND HYDROSEEDING. WHERE BROADCASTING IS USED, COVER SEED WITH .25 INCH OF SOIL OR LESS, BY CULTIPACKING OR RAKING.
- C. REFER TO THE 'SEEDING GUIDE' AND 'SEEDING RATES' TABLES ON THIS SHEET FOR APPROPRIATE SEED MIXTURES AND RATES OF SEEDING. ALL LEGUMES (CROWNVEITCH, BIRDSFOOT, TREFLOI AND FLATPEA) MUST BE INOCULATED WITH THEIR SPECIFIC INOCULANT PRIOR TO THEIR INTRODUCTION TO THE SITE.
- D. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20th OR FROM AUGUST 10th TO SEPTEMBER 1st.
4. **MULCH**
- A. HAY, STRAW, OR OTHER MULCH, WHEN NEEDED, SHOULD BE APPLIED IMMEDIATELY AFTER SEEDING.
- B. MULCH WILL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE BEST MANAGEMENT PRACTICE FOR MULCHING. HAY OR STRAW MULCH SHALL BE PLACED AT A RATE OF 90 LBS PER 1000 S.F.
5. **MAINTENANCE TO ESTABLISH A STAND**
- A. PLANTED AREAS SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED GROWTH.
- B. FERTILIZATION NEEDS SHOULD BE DETERMINED BY ONSITE INSPECTIONS. SUPPLEMENTAL FERTILIZER IS USUALLY THE KEY TO FULLY COMPLETE THE ESTABLISHMENT OF THE STAND BECAUSE MOST PERENNIALS TAKE 2 TO 3 YEARS TO BECOME FULLY ESTABLISHED.
- C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, ANNUAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.

USE	SEEDING MIXTURE 1/	DROUGHTY	WELL DRAINED	MODERATELY WELL DRAINED	POORLY DRAINED
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	A	FAIR	GOOD	GOOD	FAIR
	B	POOR	GOOD	FAIR	FAIR
	C	POOR	GOOD	EXCELLENT	GOOD
	D	FAIR	EXCELLENT	EXCELLENT	POOR
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER.	A	GOOD	GOOD	GOOD	FAIR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES.	A	GOOD	GOOD	GOOD	FAIR
	B	GOOD	GOOD	FAIR	POOR
	C	GOOD	EXCELLENT	EXCELLENT	FAIR
PLAY AREAS AND ATHLETIC FIELDS. (TOPSOIL IS ESSENTIAL FOR GOOD TURF.)	E	FAIR	EXCELLENT	EXCELLENT	2/
	F	FAIR	EXCELLENT	EXCELLENT	2/
GRAVEL PIT, SEE NH-PM-24 IN APPENDIX FOR RECOMMENDATION REGARDING RECLAMATION OF SAND AND GRAVEL PITS.					
1/ REFER TO SEEDING MIXTURES AND RATES IN TABLE BELOW.					
2/ POORLY DRAINED SOILS ARE NOT DESIRABLE FOR USE AS PLAYING AREA AND ATHLETIC FIELDS.					

NOTE: TEMPORARY SEED MIX FOR STABILIZATION OF TURF SHALL BE WINTER RYE OR OATS AT A RATE OF 2.5 LBS. PER 1000 S.F. AND SHALL BE PLACED PRIOR TO OCTOBER 15th, IF PERMANENT SEEDING NOT YET COMPLETE.

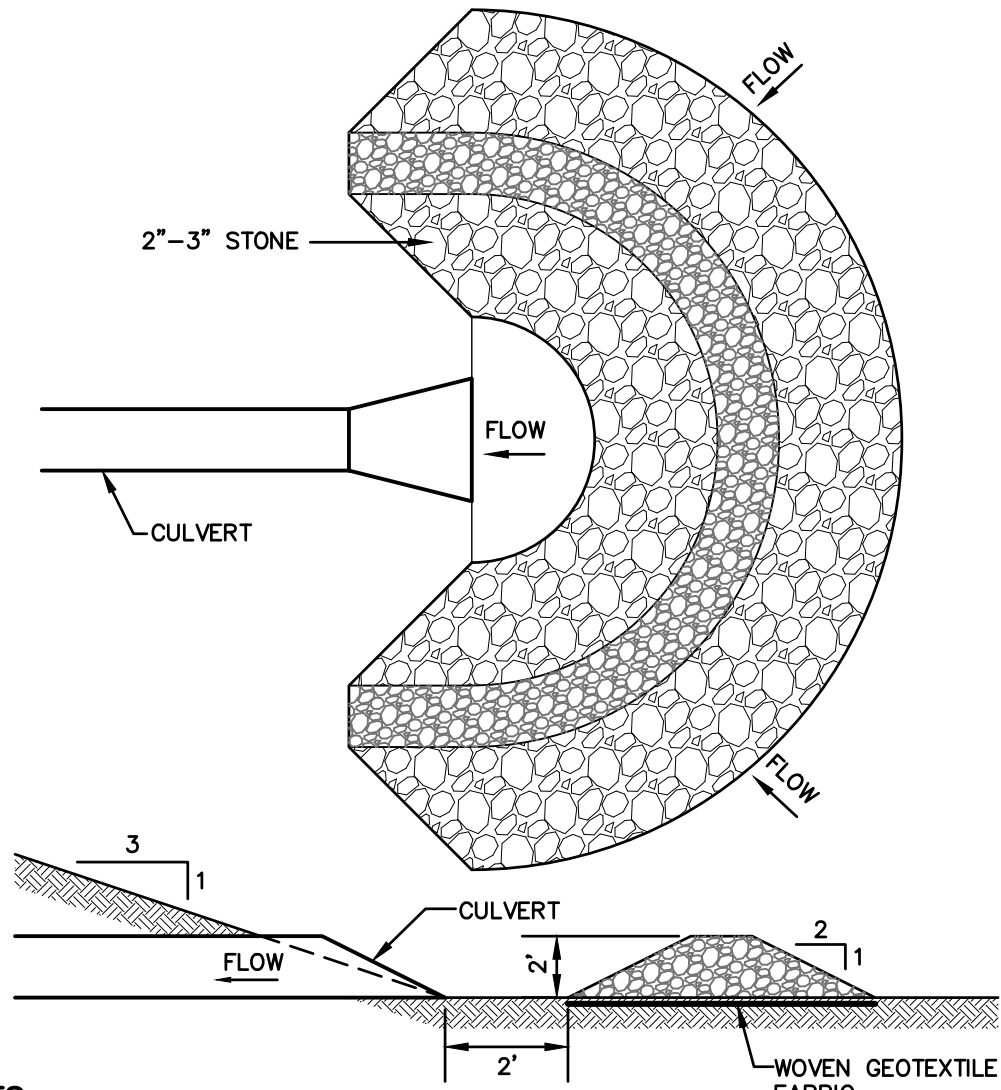
SEEDING GUIDE

MIXTURE	POUNDS PER ACRE	POUNDS PER 1,000 Sq. Ft.
A. TALL FESCUE CREEPING RED FESCUE RED TOP TOTAL	20 20 2 42	0.45 0.45 0.05 0.95
B. TALL FESCUE CREEPING RED FESCUE CROWN VETCH OR FLAT PEA TOTAL	15 10 15 30 40 OR 55	0.35 0.25 0.35 0.75 0.95 OR 1.35
C. TALL FESCUE CREEPING RED FESCUE BIRDS FOOT TREFLOI TOTAL	20 20 8 48	0.45 0.45 0.20 1.10
D. TALL FESCUE FLAT PEA TOTAL	20 30 50	0.45 0.75 1.20
E. CREEPING RED FESCUE 1/ KENTUCKY BLUEGRASS 1/ TOTAL	50 50 100	1.15 1.15 2.30
F. TALL FESCUE 1	150	3.60

*

1/ FOR HEAVY USE ATHLETIC FIELDS CONSULT THE UNIVERSITY OF NEW HAMPSHIRE COOPERATIVE EXTENSION TURF SPECIALIST FOR CURRENT VARIETIES AND SEEDING RATES.

SEEDING RATES



NOTES:

1. TEMPORARY CULVERT INLET PROTECTION CHECK DAMS SHALL BE CONSTRUCTED OF 2-3" STONE OVER WOVEN GEOTEXTILE FABRIC.
2. INLET PROTECTION MEASURES SHALL BE INSTALLED AT THE OPENINGS OF ALL EXISTING AND PROPOSED CULVERTS LOCATED BELOW (DOWNSTREAM) FROM AND WITHIN 100' OF THE PROJECT SITE.
3. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURE WHEN IT HAS ACCUMULATED TO ONE HALF THE ORIGINAL HEIGHT OF THE STRUCTURE.
4. STRUCTURES SHALL BE REMOVED WHEN THE SITE IS STABILIZED WITH VEGETATION AND THE CHANNEL SHALL BE SMOOTHED AND REVEGETATED.

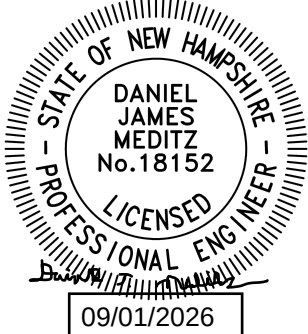
TEMPORARY CULVERT INLET PROTECTION CHECK DAM

NOT TO SCALE

CONSTRUCTION SEQUENCE

1. PRIOR TO THE START OF ANY ACTIVITY, IT IS THE RESPONSIBILITY OF THE SITE'S SITE DEVELOPER (OR OWNER) TO FILE A NOTICE OF INTENT (NOI) FORM WITH THE ENVIRONMENTAL PROTECTION AGENCY (EPA) IN ORDER TO GAIN COVERAGE UNDER THE NPDES GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES. A PRE CONSTRUCTION MEETING IS TO BE HELD WITH ALL DEPARTMENT HEADS PRIOR TO THE START OF CONSTRUCTION.
2. WETLAND BOUNDARIES ARE TO BE CLEARLY MARKED PRIOR TO THE START OF CONSTRUCTION.
3. CUT AND REMOVE TREES IN CONSTRUCTION AREA AS REQUIRED OR DIRECTED.
4. INSTALL SILT FENCING, HAY BALES AND CONSTRUCTION ENTRANCES PRIOR TO THE START OF CONSTRUCTION. THESE ARE TO BE MAINTAINED UNTIL THE FINAL PAVEMENT SURFACING AND LANDSCAPING AREAS ARE ESTABLISHED.
5. CLEAR, CUT, GRUB AND DISPOSE OF DEBRIS IN APPROVED FACILITIES. THIS INCLUDES ANY REQUIRED DEMOLITION OF EXISTING STRUCTURES, UTILITIES, ETC.
6. CONSTRUCT AND/OR INSTALL TEMPORARY OR PERMANENT SEDIMENT AND/OR DETENTION BASIN(S) AS REQUIRED. THESE FACILITIES SHALL BE INSTALLED AND STABILIZED PRIOR TO DIRECTING RUN-OFF TO THEM.
7. STRIP LOAM PER THE RECOMMENDATIONS OF THE PROJECT ENGINEER AND STOCKPILE EXCESS MATERIAL. STABILIZE STOCKPILE AS NECESSARY.
8. PERFORM PRELIMINARY SITE GRADING IN ACCORDANCE WITH THE PLANS, INCLUDING THE CONSTRUCTION OF ANY RETAINING WALLS AND SOUND WALLS.
9. PREPARE BUILDING PAD(S) TO ENABLE BUILDING CONSTRUCTION TO BEGIN.
10. INSTALL THE SEWER AND DRAINAGE SYSTEMS FIRST, THEN ANY OTHER UTILITIES IN ACCORDANCE WITH THE PLAN AND DETAILS. ANY CONFLICTS BETWEEN UTILITIES ARE TO BE RESOLVED WITH THE INVOLVEMENT AND APPROVAL OF THE ENGINEER.
11. ALL SWALES AND DRAINAGE STRUCTURES ARE TO BE CONSTRUCTED AND STABILIZED PRIOR TO HAVING RUN-OFF DIRECTED TO THEM.
12. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINAGE DITCHES, CHECK DAMS, SEDIMENT TRAPS, ETC., TO PREVENT EROSION ON THE SITE AND PREVENT ANY SILTATION OF ABUTTING SUBAREAS AND/OR PROPERTY.
13. PERFORM FINAL FINE GRADING, INCLUDING PLACEMENT OF 'SELECT' SUBGRADE MATERIALS.
14. PAVE ALL PARKING LOT AND DRIVEWAYS WITH INITIAL 'BASE COURSE'.
15. PERFORM ALL REMAINING SITE CONSTRUCTION (I.E. BUILDING, CURBING, UTILITY CONNECTIONS, ETC.).
16. LOAM AND SEED ALL DISTURBED AREAS AND INSTALL ANY REQUIRED SEDIMENT AND EROSION CONTROL FACILITIES (I.E. RIP RAP, EROSION CONTROL BLANKETS, ETC.).
17. FINISH PAVING PARKING LOT AND DRIVEWAYS WITH 'FINISH' COURSE.
18. PARKING LOT AND DRIVEWAYS SHALL BE STABILIZED (PER REQUIREMENTS OF NHDES ENV-WQ 1502.61) WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
19. ALL CUT AND FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
20. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
21. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER SEEDING AREAS HAVE BEEN 75%-85% ESTABLISHED AND SITE IMPROVEMENTS ARE COMPLETE. SMOOTH AND RE-VEGETATE ALL DISTURBED AREAS.
22. CLEAN SITE AND ALL DRAINAGE STRUCTURES, PIPES AND SUMPS OF ALL SILT AND DEBRIS.
23. INSTALL ALL PAINTED PAVEMENT MARKINGS AND SIGNAGE PER THE PLANS AND DETAILS.
24. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY QUARTER-INCH OF RAINFALL.
25. UPON COMPLETION OF CONSTRUCTION, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY ANY RELEVANT PERMITTING AGENCIES THAT THE CONSTRUCTION HAS BEEN FINISHED IN A SATISFACTORY MANNER.

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Drawing Name: 25071.2-PLAN.dwg		
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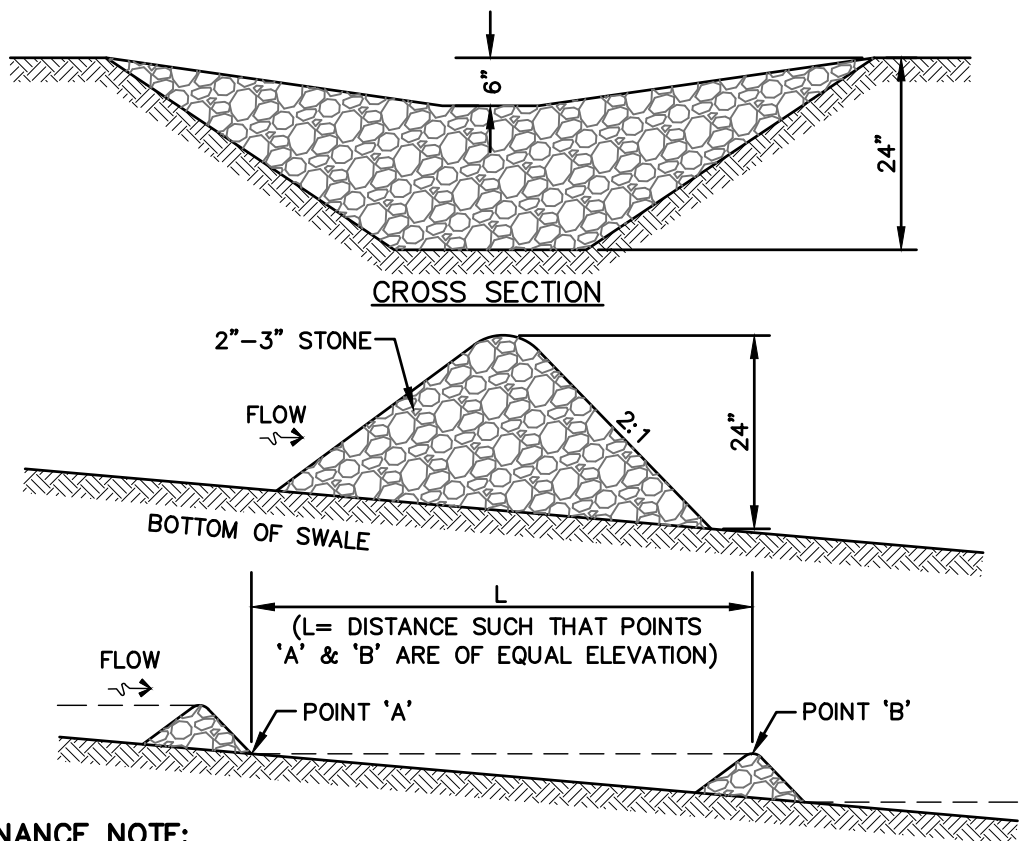


1	09/01/26	UPDATED TITLE BLOCK	DJM
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REV.	DATE	REVISION	BY

Designed and Produced in NH	
J/B Jones & Beach Engineers, Inc.	
100 Domain Dr. Suite 201 Exeter, NH 03833	Civil Engineering Services 603-772-4746 E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EROSION AND SEDIMENT CONTROL DETAILS
Project:	LEDGEWOOD DRIVE LLC LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

DRAWING No.
E1
SHEET 14 OF 15 JBE PROJECT NO. 25071.2

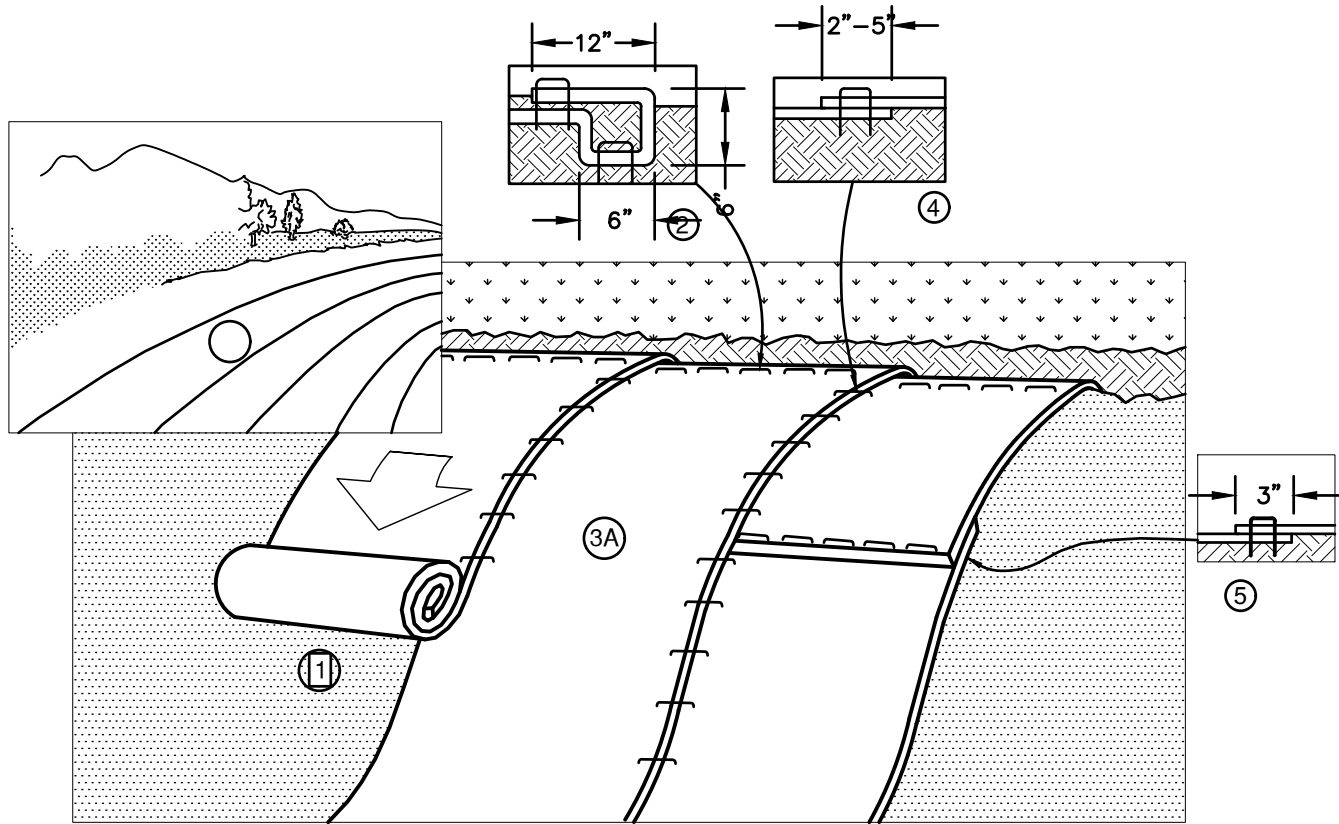


MAINTENANCE NOTE:

1. STONE CHECK DAMS SHOULD BE CHECKED AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. 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.

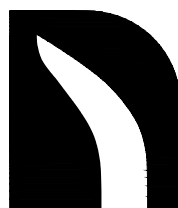
STONE CHECK DAM

NOT TO SCALE



NOTES:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
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. WHEN USING OPTIONAL DOT SYSTEM™, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
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 SPICED 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.

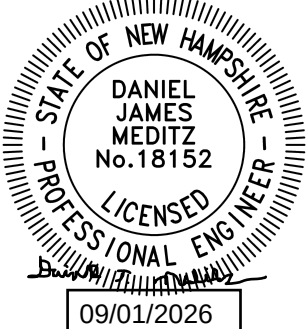


NORTH AMERICAN GREEN
14649 HIGHWAY 41 NORTH
EVANSVILLE, INDIANA 47725
1-800-772-2040

EROSION CONTROL BLANKET SLOPE INSTALLATION
(North American Green SC150BN)

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Checked: EMP	Scale: AS NOTED	Project No.: 25071.2
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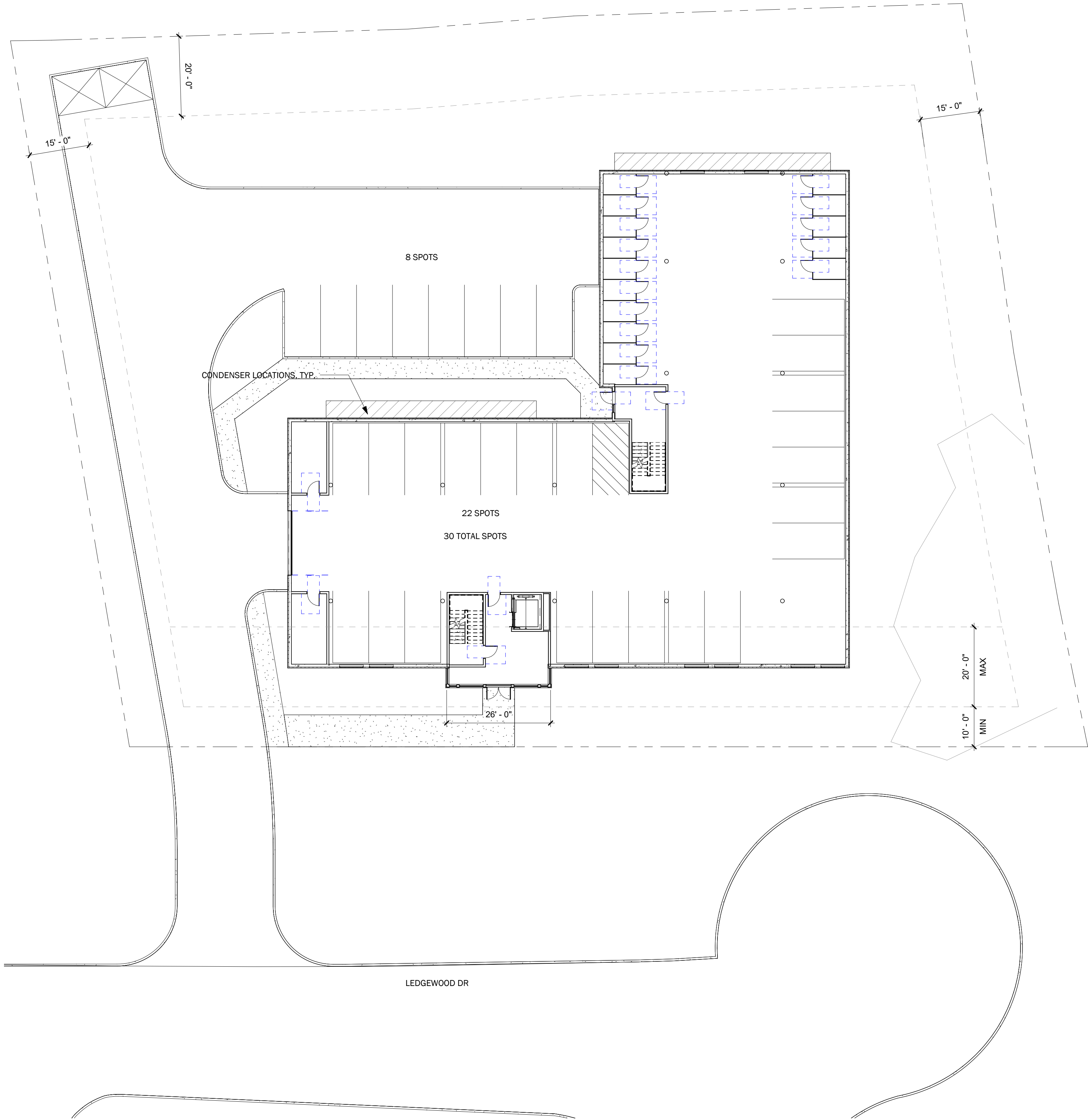


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DRAWING No.
E2
SHEET 15 OF 15 JBE PROJECT NO. 25071.2



1 01.1 - SITE SKETCH
1/16" = 1'-0"

LEDGEWOOD DR

PORTSMOUTH, NH

SCHEMATIC
DESIGN

LEDGEWOOD DRIVE
LLC

WINTER
HOLBEN
architecture + design

3 WALKER ST
KITTERY, MAINE 03904
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Drawn By:	HP/GL
Drawing Checked By:	BH
Drawing Scale:	1/16" = 1'-0"
Drawing Date:	08/27/2026
Project Number:	26061

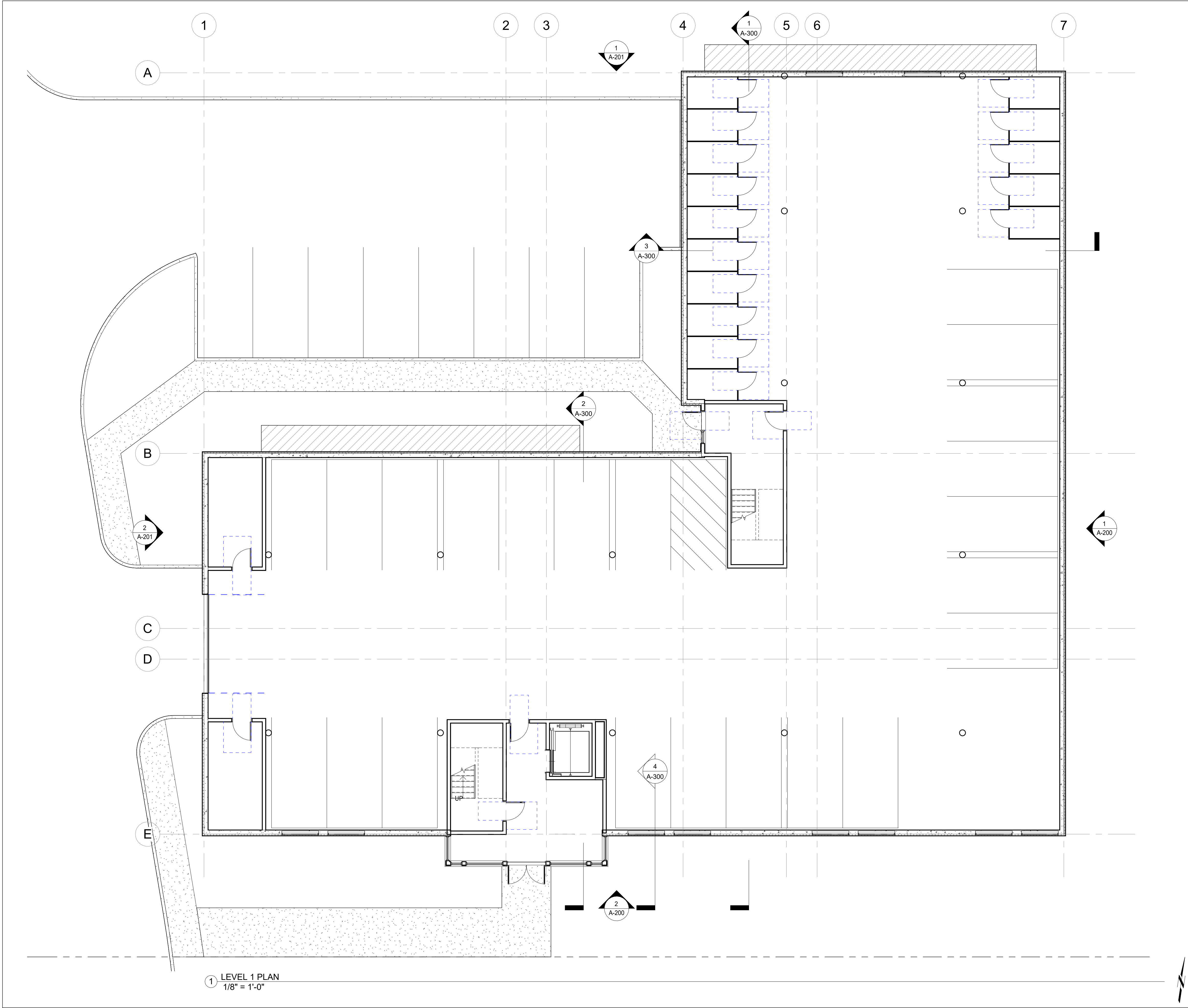
drawing revisions:		
No.	Description	Date

ARCHITECTURAL
SITE SKETCH

A-001

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1 LEVEL 1 PLAN
1/8" = 1'-0"

LEGEND - PLAN	
	NEW WALL
	WINDOW TAG
	DOOR TAG
	WALL TAG
	ALIGN
	KEYNOTE

- GENERAL NOTES - PLAN**
- A. ALL DIMENSIONS ARE TO FACE OF STUD U.N.O. DIMENSIONS INDICATED AS "CLEAR" SHALL MAINTAIN A CLEAR OPENING WIDTH FROM FACE OF FINISHES. DIMENSIONS TO EXISTING CONSTRUCTION ARE TO FACE OF FINISH UNLESS NOTED OTHERWISE.
 - B. SEE ELEVATIONS, SECTIONS, AND DETAILS FOR ADDITIONAL INFORMATION.
 - C. SEE ENLARGED PLANS AND INTERIOR ELEVATIONS FOR ADDITIONAL INFORMATION.
 - D. ALL INTERIOR PARTITIONS ARE TYPE NW1 U.N.O. ALL FURRED PARTITIONS ARE TYPE NF1 U.N.O. ALL CORRIDOR AND UNIT DEMISING WALLS ARE TYPE 30W1 U.N.O.
 - E. ALL EXTERIOR WALLS ARE TYPE E1 U.N.O.
 - F. ANY DISCREPANCIES IN THESE PLANS SHALL BE BROUGHT TO THE ARCHITECT'S ATTENTION IMMEDIATELY.
 - G. REFER TO MECHANICAL, ELECTRICAL, PLUMBING, AND FIRE PROTECTION DRAWINGS AND SPECIFICATIONS FOR FULL SCOPE OF WORK.
 - H. THE LOCATION OF DOOR OPENINGS NOT DIMENSIONED SHALL BE 6" FROM ADJACENT WALL (FACE OF FRAMING TO ROUGH OPENING).
 - I. PROVIDE BLOCKING BEHIND SURFACE APPLIED FIXTURES, TRIM, GRAB BARS, SHELVES, CHAIR RAILS, PICTURE RAILS, WOOD TRIM AND BASE, AND OTHER ACCESSORIES WHEN MOUNTED ON STUD WALLS.
 - J. WHERE WALLS OR INFILLS ABUT OR INTERSECT EXISTING WALLS, TAPE AND FINISH JOINTS AT INTERSECTIONS SMOOTH AND CONTINUOUS. USE METAL TRIM WHERE GYPSUM BOARD INTERSECTS OTHER MATERIALS.

KEYONES - PLAN	
NO.	DESCRIPTION

LEDGEWOOD DR

PORTSMOUTH, NH

SCHEMATIC DESIGN

LEDGEWOOD DRIVE LLC

WINTER HOLBEN
architecture + design

3 WALKER ST
KITTERY, MAINE 03904
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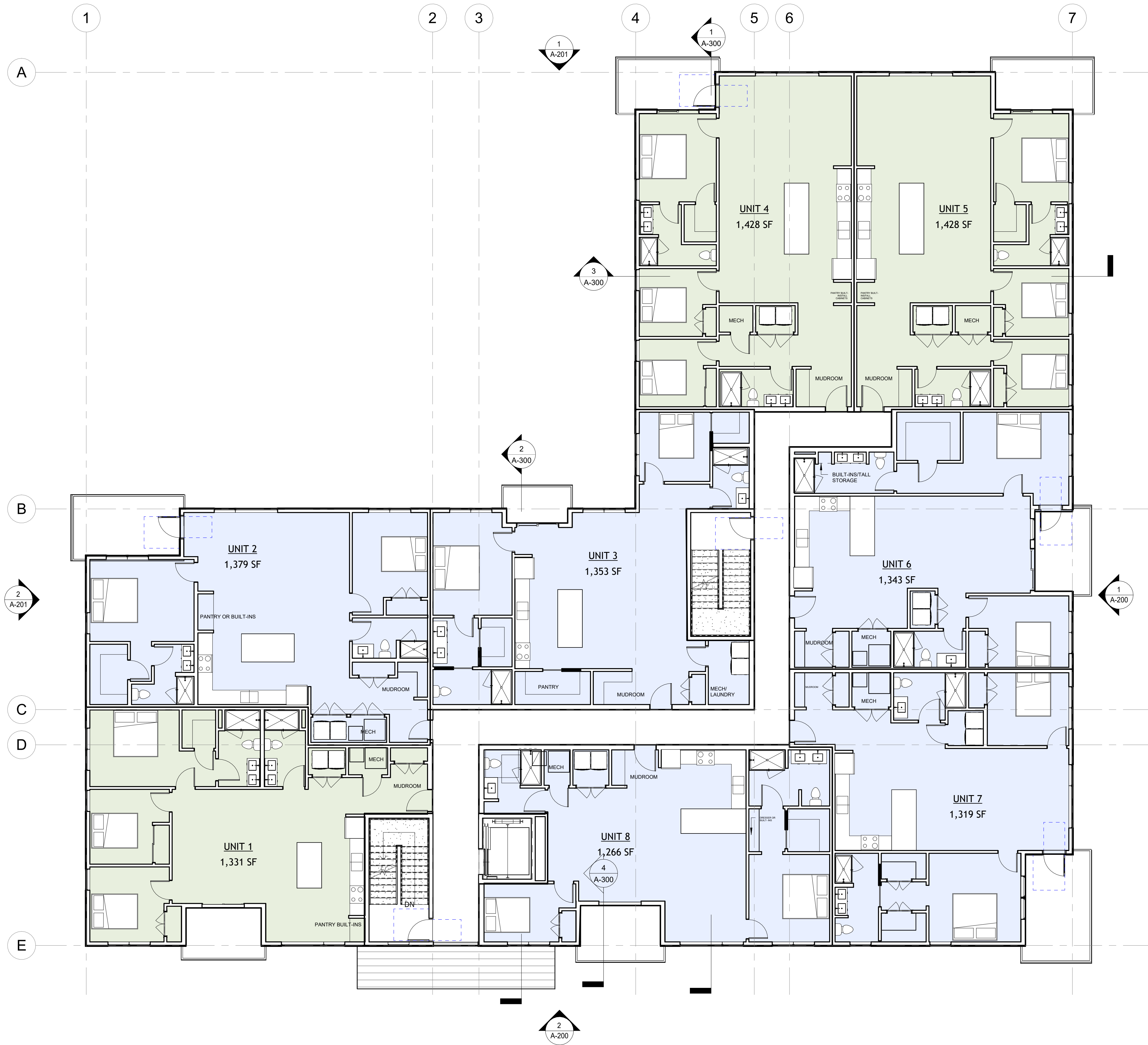
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LEVEL 1 PLAN

A-100

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1 LEVEL 2 UNIT PLANS
1/8" = 1'-0"

UNIT AREAS		
ROOM NAME	ROOM TYPE	AREA
1ST FLOOR		
UNIT 1	3 BED	1,331 SF
UNIT 2	2 BED	1,379 SF
UNIT 3	2 BED	1,353 SF
UNIT 4	3 BED	1,428 SF
UNIT 5	3 BED	1,428 SF
UNIT 6	2 BED	1,343 SF
UNIT 7	2 BED	1,319 SF
UNIT 8	2 BED	1,266 SF
8		10,846 SF
2ND FLOOR		
UNIT 9	3 BED	1,340 SF
UNIT 10	2 BED	1,372 SF
UNIT 11	2 BED	1,350 SF
UNIT 12	3 BED	1,568 SF
UNIT 13	3 BED	1,970 SF
UNIT 14	3 BED	1,878 SF
UNIT 15	2 BED	1,440 SF
7		10,917 SF
		21,763 SF

LEDGEWOOD DR

PORTSMOUTH, NH

SCHEMATIC
DESIGN

LEDGEWOOD DRIVE
LLC

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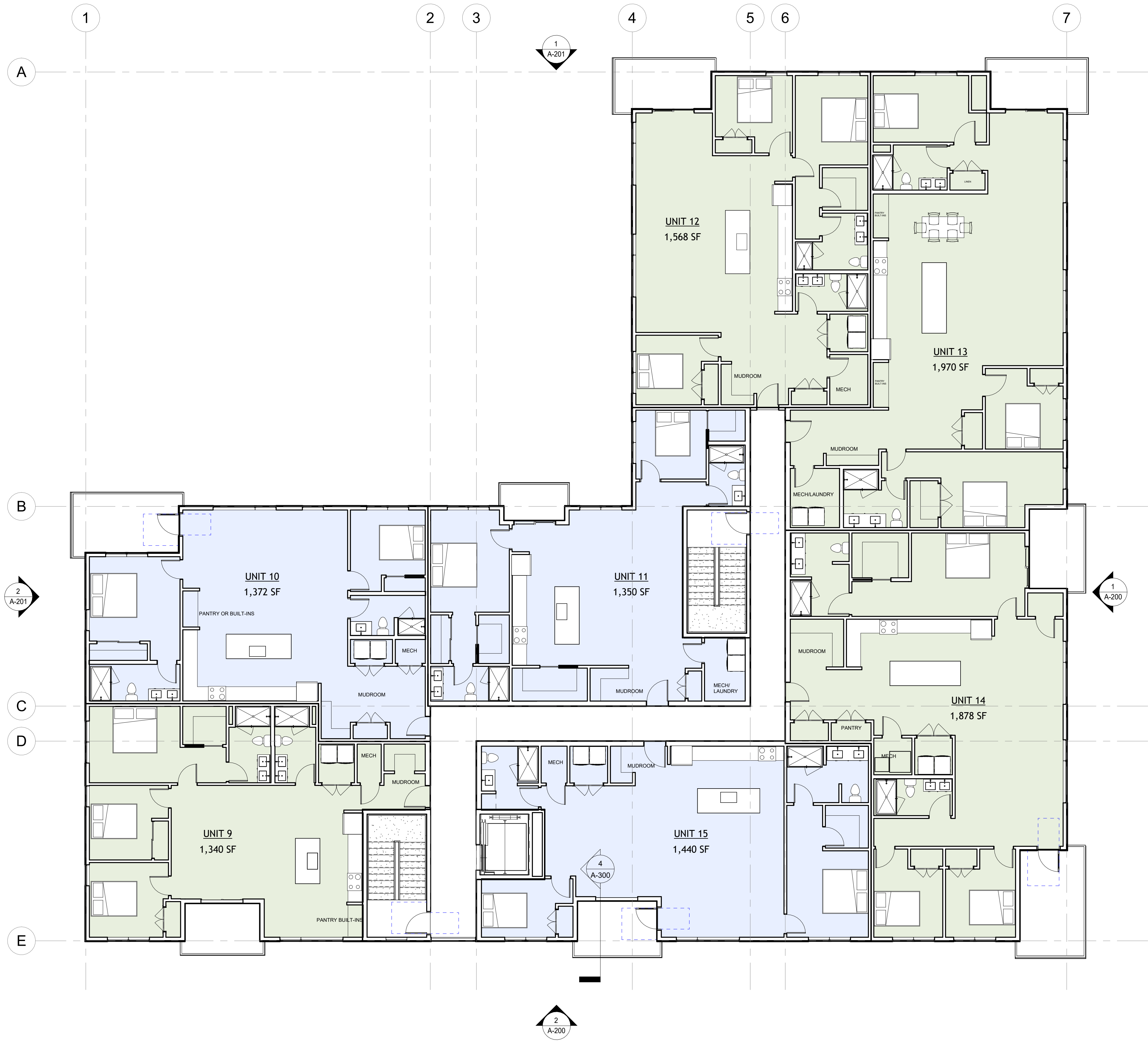
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No. Description Date

LEVEL 2 PLAN

A-101

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UNIT AREAS		
ROOM NAME	ROOM TYPE	AREA
1ST FLOOR		
UNIT 1	3 BED	1,331 SF
UNIT 2	2 BED	1,379 SF
UNIT 3	2 BED	1,353 SF
UNIT 4	3 BED	1,428 SF
UNIT 5	3 BED	1,428 SF
UNIT 6	2 BED	1,343 SF
UNIT 7	2 BED	1,319 SF
UNIT 8	2 BED	1,266 SF
8		10,846 SF
2ND FLOOR		
UNIT 9	3 BED	1,340 SF
UNIT 10	2 BED	1,372 SF
UNIT 11	2 BED	1,350 SF
UNIT 12	3 BED	1,568 SF
UNIT 13	3 BED	1,970 SF
UNIT 14	3 BED	1,878 SF
UNIT 15	2 BED	1,440 SF
7		10,917 SF
		21,763 SF

1 LEVEL 3 UNIT PLANS
1/8" = 1'-0"

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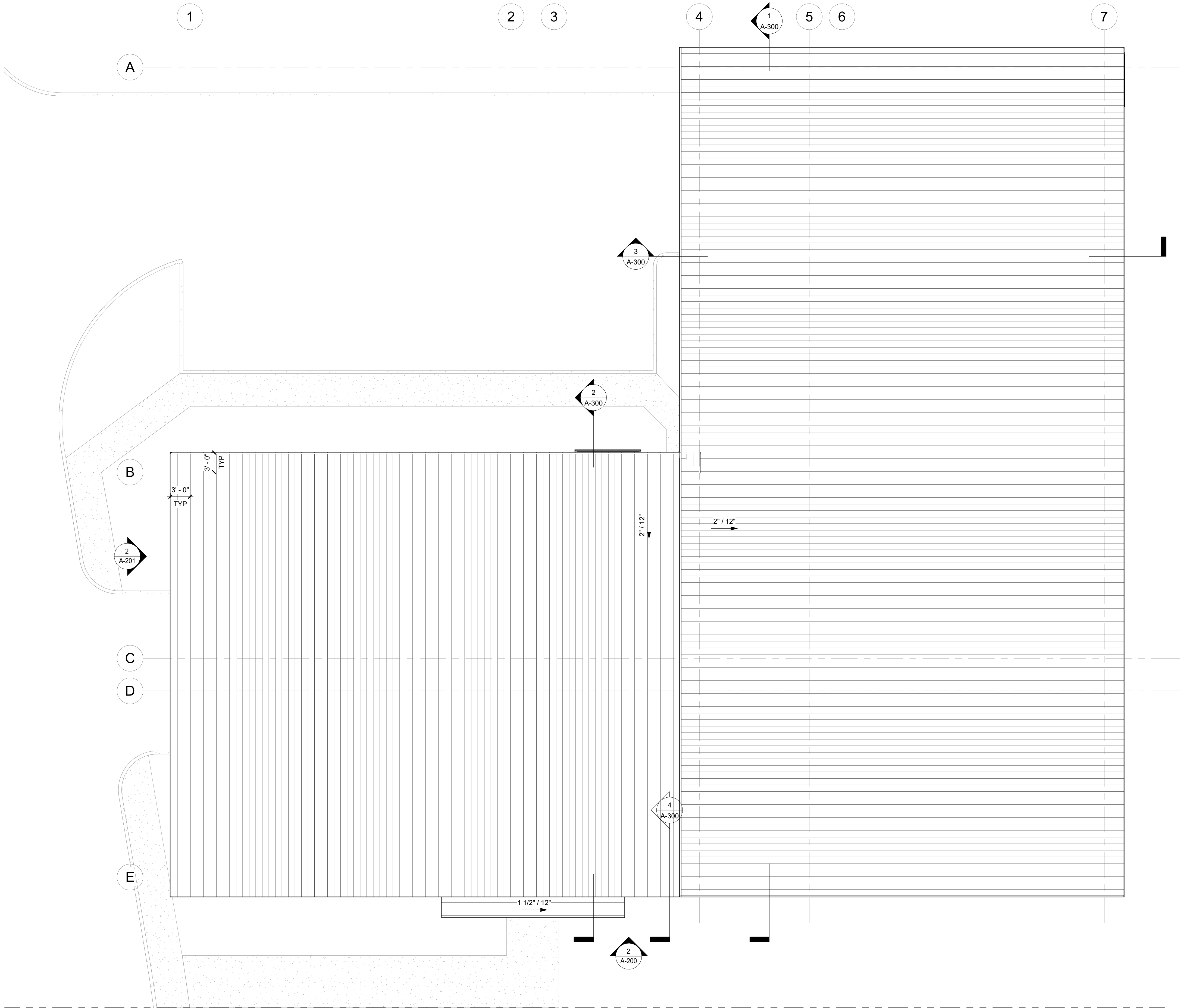
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LEVEL 3 PLAN

A-102

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05 - ROOF PLAN
1/8" = 1'-0"

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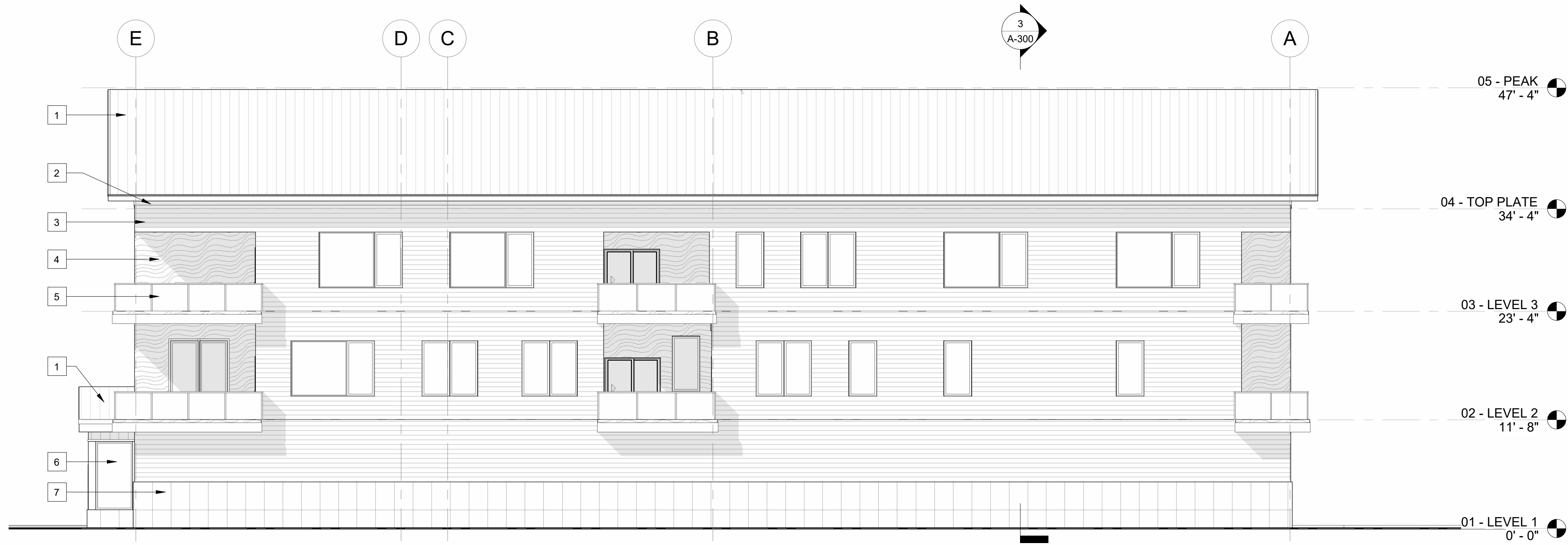
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No.	Description	Date

ROOF PLAN

A-103

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① EAST ELEVATION
1/8" = 1'-0"



② SOUTH ELEVATION
1/8" = 1'-0"

KEYNOTES - ELEVATIONS	
NO.	DESCRIPTIONS
1	STANDING SEAM ROOFING SYSTEM
2	1X12 COMPOSITE FRIEZE BOARD
3	6" EXPOSURE NICKEL GAP COMPOSITE SIDING W/ MITERED CORNERS
4	WOOD-LOOK COMPOSITE PANEL
5	GLASS RAILING SYSTEM - VIEWARIL BASIS OF DESIGN
6	CLAD WOOD WINDOWS/DOORS
7	T-CLEAR WALLGUARD CONCRETE-FACED INSULATION PANEL
8	COMPOSITE BOARD & BATTEN SIDING
9	WOOD-LOOK COMPOSITE SOFFIT

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No.	Description	Date

EXTERIOR
ELEVATIONS

A-200

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KEYNOTES - ELEVATIONS	
NO.	DESCRIPTIONS
1	STANDING SEAM ROOFING SYSTEM
2	1X12 COMPOSITE FRIEZE BOARD
3	6" EXPOSURE NICKEL GAP COMPOSITE SIDING W/ MITERED CORNERS
4	WOOD-LOOK COMPOSITE PANEL
5	GLASS RAILING SYSTEM - VIEWARIL BASIS OF DESIGN
6	CLAD WOOD WINDOWS/DOORS
7	T-CLEAR WALLGUARD CONCRETE-FACED INSULATION PANEL
8	COMPOSITE BOARD & BATTEN SIDING
9	WOOD-LOOK COMPOSITE SOFFIT



2 WEST ELEVATION
1/8" = 1'-0"



1 NORTH ELEVATION
1/8" = 1'-0"

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No.	Description	Date

EXTERIOR
ELEVATIONS

A-201

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① PERSPECTIVE 1

② PERSPECTIVE 2



③ PERSPECTIVE 3

④ PERSPECTIVE 4

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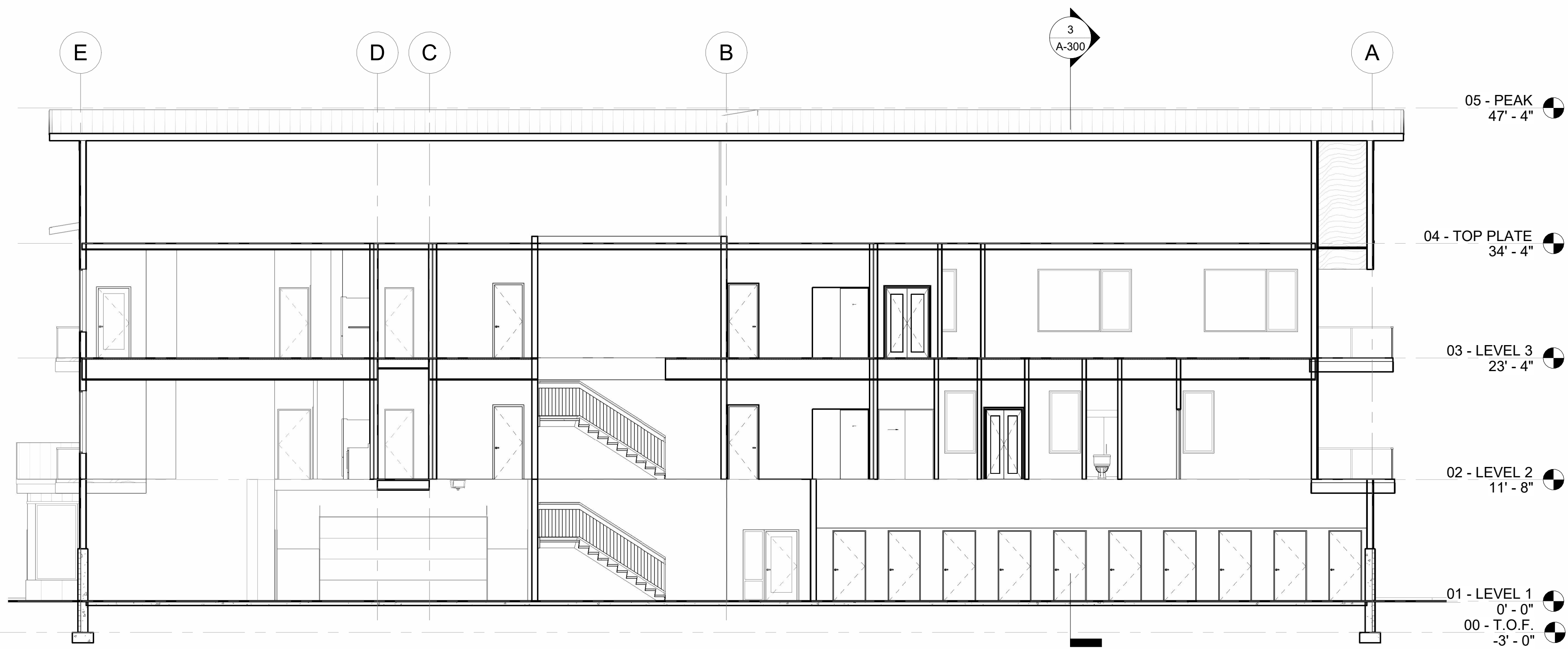
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Drawing Date:	08/27/2026
Project Number:	26061

drawing revisions:		
No.	Description	Date

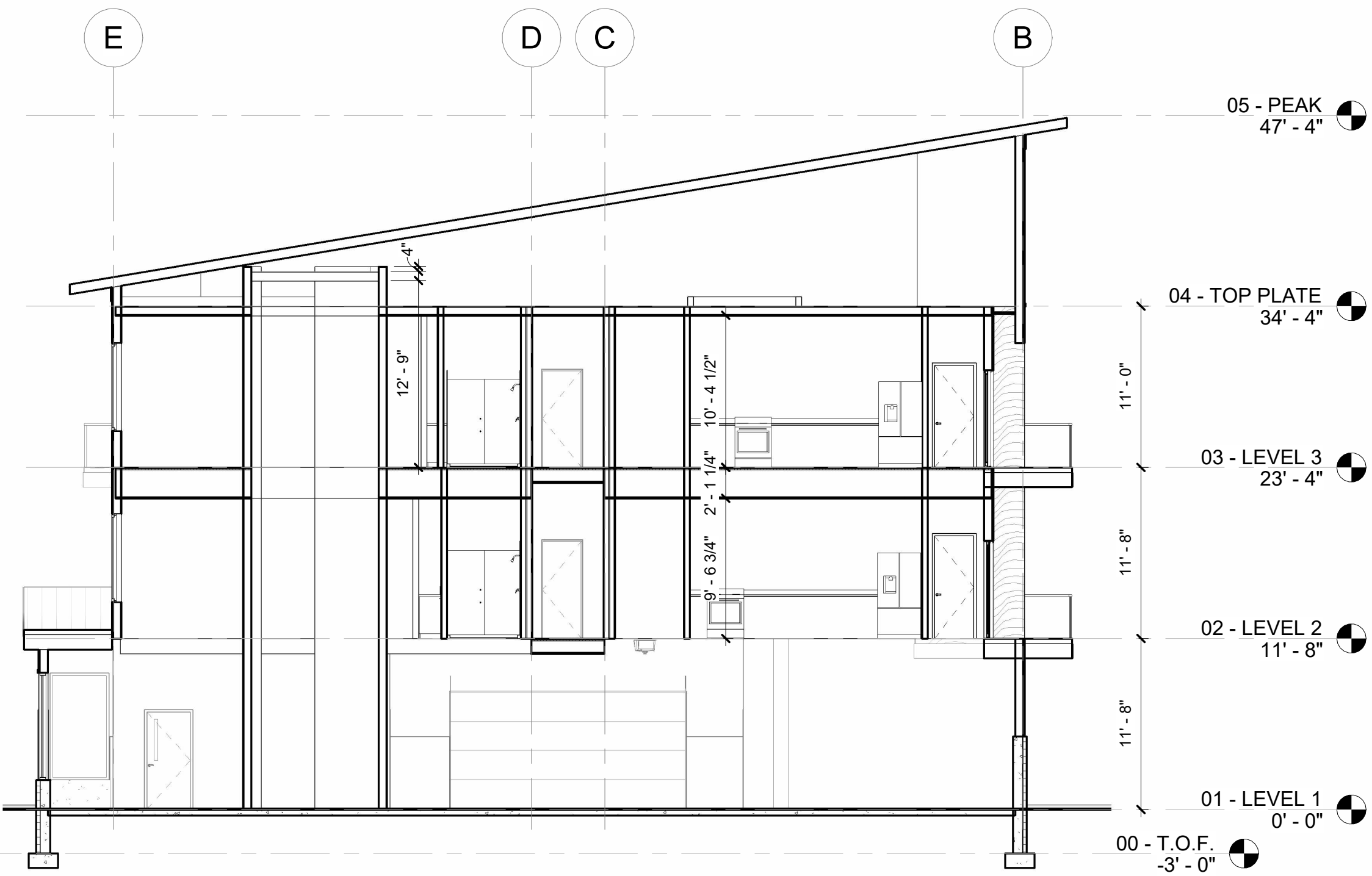
EXTERIOR
PERSPECTIVES

A-202

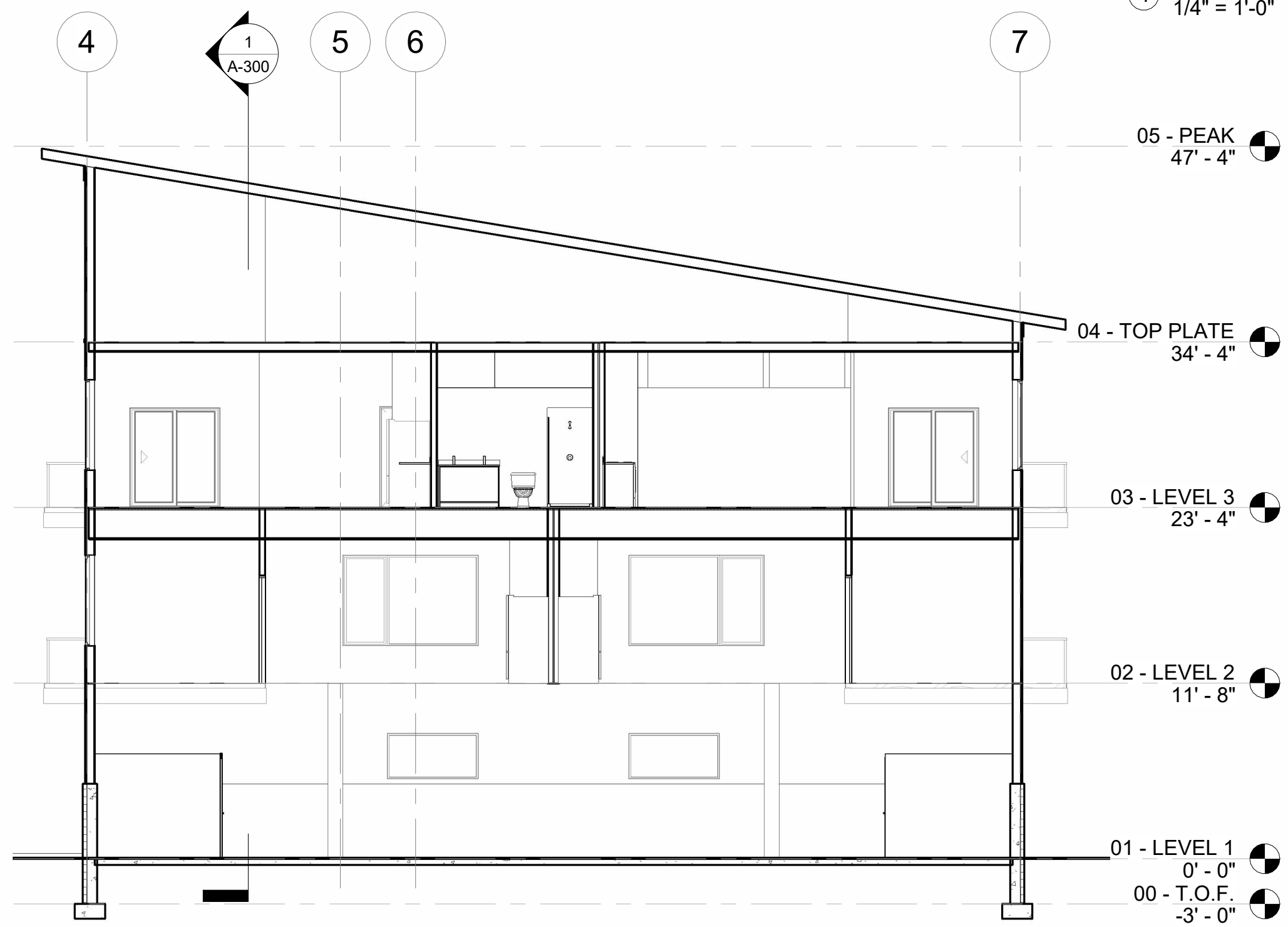
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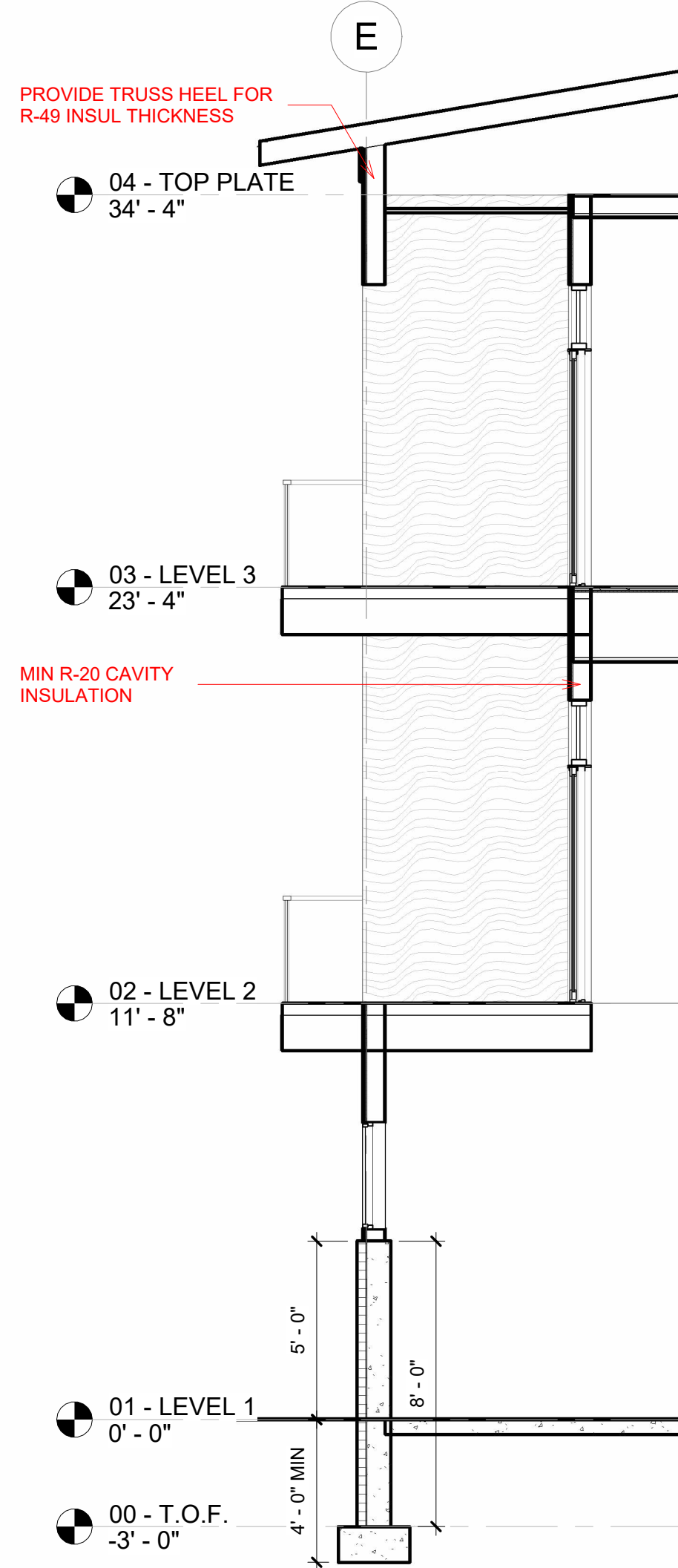
1 Section 1
1/8" = 1'-0"



2 Section 2
1/8" = 1'-0"



3 Section 3
1/8" = 1'-0"



4 Wall Section 1
1/4" = 1'-0"

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BUILDING
SECTIONS

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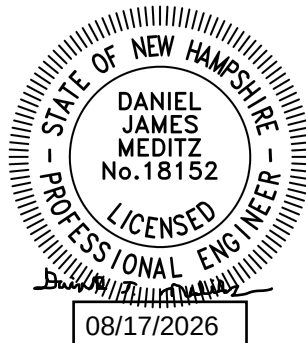
DRAINAGE ANALYSIS

SEDIMENT AND EROSION CONTROL PLAN

**“Martini Apartments”
Ledgewood Drive
Portsmouth, NH 03801
Tax Map 229, Lot 6A**

Prepared for:

**Martini Northern LLC
Attn. Ben Middleton
10 Main Street
Newfields, NH 03856**



**Prepared by:
Jones & Beach Engineers, Inc.
100 Domain Drive
Suite 201
Exeter, NH 03833
(603) 772-4746
August 6, 2026
JBE Project No. 25071.2**

EXECUTIVE SUMMARY

Martini Northern LLC proposes to construct an apartment building with associated indoor and outdoor parking, drainage, and utilities on the subject parcel with access from Ledgewood Drive in Portsmouth, NH. In the existing condition, the subject parcel is vacant and wooded, but surrounded by existing developed sites including a dentist's office to the west on abutting Tax Map 229, Lot 6, a residential subdivision immediately to the north, and the Portsmouth High School athletic field immediately to the east. This is important because the site receives significant offsite contributing watershed runoff from the north and west, and ultimately drains toward the east.

The intent of this analysis is to meet the requirements of Section 7 of the Portsmouth Site Plan Review Regulations, specifically as they relate to on-site stormwater management, and to mitigate the potential for adverse impacts to the subject parcel and downstream properties and water features resulting from the quality, quantity, and peak rate of runoff resulting from the proposed development as well as from upstream contributing watershed areas.

A drainage analysis of the subject parcel as well as offsite contributing watershed area was conducted for the purpose of estimating the peak rate and volume of stormwater runoff in the pre- and post-construction conditions, and to subsequently design adequate drainage structures so that the above-mentioned requirements could be met. Two models were compiled, one for this area in its existing (pre-construction) condition, and a second for the area in its proposed (post-construction) condition. A summary of the pre- and post-construction conditions peak rates of runoff toward the single analysis point, representing a wooded area just downstream of the subject parcel and adjacent to the Portsmouth High School ball field, in units of cubic feet per second (cfs) is as follows:

Analysis Point	2 Year		10 Year		25 Year		50 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	2.01	1.99	4.75	4.67	9.48	9.39	15.16	15.01
Analysis Point #2	0.31	0.35	0.51	0.56	0.67	0.72	0.81	0.88

A similar summary of the existing and proposed peak volumes in units of acre-feet is as follows:

Analysis Point	2 Year		10 Year		25 Year		50 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	0.188	0.178	0.571	0.561	0.989	0.972	1.424	1.395
Analysis Point #2	0.023	0.026	0.039	0.043	0.052	0.057	0.064	0.070

Per the above tables, the post-construction peak rate and volume of runoff is maintained or reduced toward Analysis Point 1 during the 2-, 10-, 25-, and 50-year 24-hour storms. The slight flow and volume increases toward Analysis Point 2 are due to the concurrent offsite sidewalk project by others and the 5' wide proposed paved apron in the right of way that is pitched toward Ledgewood Drive to keep road runoff off the site. The runoff resulting from the paved apron alone is negligible, and the increase toward Analysis Point 2 resulting from the offsite sidewalk project is outside of our control. Furthermore, runoff from all proposed impervious surfaces except for the aforementioned paved apron is treated post-construction, and the required pollutant removal thresholds have been met. The stormwater management system as designed meets all requirements of the City of Portsmouth stormwater regulations per Section 7 of the Site Plan Review Regulations.

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- 25 Year - 24 Hour Summary
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Appendix IX Stormwater Operations and Maintenance Manual

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1.0 RAINFALL CHARACTERISTICS

This drainage report includes an existing conditions analysis of the area involved in the proposed development, as well as a proposed condition, or post-construction analysis, of the same area. These analyses were accomplished using the USDA SCS TR-20 Method within the HydroCAD 10.20-6a Stormwater Modeling System. The curve numbers were developed using the SCS TR-55 Runoff Curve numbers for Urban Areas. A Type III SCS 24-hour rainfall distribution was utilized in analyzing the data for the 2 Year – 24 Hour (3.71"), 10 Year – 24 Hour (5.63"), 25 Year – 24 Hour (7.13"), and 50 Year – 24 Hour (8.54") storm events. This data was taken from the Extreme Precipitation Tables developed by the Northeast Regional Climate Center (NRCC), and the values have been increased by 15% due to the project being within the Coastal/Great Bay Region.

Post-construction peak rates and volumes of runoff will be equal to or less than pre-construction peak rates and volumes of runoff toward Analysis Point 1, stormwater runoff from proposed impervious surfaces will be treated as practicable, and required pollutant removal thresholds will be met, thereby minimizing any potential for a negative impact on abutting properties.

2.0 EXISTING CONDITIONS ANALYSIS

In the existing condition, the subject parcel is vacant and wooded, but surrounded by existing developed sites including a dentist's office to the west on abutting Tax Map 229, Lot 6, a residential subdivision immediately to the north, and the Portsmouth High School athletic field immediately to the east. This is important because the site receives significant offsite contributing watershed runoff from the north and west, which ultimately drains toward the east.

There are ultimately two analysis points toward which all runoff from the subject parcel and offsite contributing watershed areas as well as a stretch of Ledgewood Drive that was considered for the analysis, together referred to from this point forward as simply the "study area", drain.

Analysis point 1 (AP1) represents a small wetland pocket in the southeast corner of the subject parcel. Downstream of analysis point 1, runoff from the site flows on to the Portsmouth High School athletic field immediately to the east of the site. Therefore, it is very important that stormwater is not discharged from the site at a higher peak rate or volume post-construction as compared with the pre-construction condition so as to avoid discharging excessive water into the athletic field. Runoff from the entire subject parcel as well as offsite contributing watershed areas ultimately drains toward Analysis Point 1.

Analysis Point 2 (AP2) represents the outfall from the existing closed drainage system in Ledgewood Drive. Although runoff from the subject parcel itself does not drain toward Analysis Point 2, Analysis Point 2 has been analyzed as the proposed site driveway comes from a curb cut on Ledgewood Drive and therefore results in a slight modification to the watershed of Analysis Point 2 post-construction.

Existing on-site and offsite topography and drainage features in the area that drains through the site toward analysis point 1 divide the study area into three subcatchments. Subcatchment 3S represents the portion of the study area that drains directly toward AP1 without first passing through some sort of drainage feature.

Two existing drainage features were identified within the watershed of Analysis Point 1. The first, Pond 1P, is a shallow low area just to the east of the center of the subject parcel. Although this is only

a shallow area, there is a variable height berm with an existing trail on top just to the east of Pond 1P that stops water from overflowing directly toward Analysis Point 1. Near the northeast corner of the subject parcel there is a small opening in the berm that acts as an overflow and is modelled in the drainage calculations as a broad-crested rectangular weir outlet. Pondered water below this weir is modelled to directly infiltrate into the soil. Analysis Point 1 is modelled directly downstream of the broad crested rectangular weir outlet of Pond 1P in the existing conditions analysis.

The land within the study area from which runoff drains toward Pond 1P is modelled as Subcatchment 1S, which includes the bulk of the subject parcel as well as significant offsite contributing watershed area.

The second drainage feature, Pond 2P, appears to exist on the privately owned parcel that Legewood Drive passes through, right at the corner of Lafayette Road and Ledgewood Drive in front of the dentist office that is located on abutting Tax Map 229 Lot 6. Pond 2P has a culvert outlet, through which any water that overflows from the pond is discharged toward previously described Pond 1P, where it is further detained before ultimately infiltrating to groundwater or cresting over the existing berm break toward Analysis Point 1.

The land within the study area from which runoff drains toward Pond 2P is modelled as Subcatchment 2S, which includes the bulk of the existing dentist office site located at the corner of Lafayette Road and Ledgewood Drive and some of the Lafayette Road right of way and the privately-owned parcel that Ledgewood Drive passes through.

Two existing catch basins in Ledgewood Drive separate the watershed draining toward Analysis Point 2 into two subcatchments. The areas from which runoff drains toward catch basins 1 and 2, modelled as CB1 and CB2, respectively, are modelled as Subcatchments 4S and 5S.

NRCS Web Soil Survey was used to determine existing soil types on both the subject parcel itself and offsite contributing watershed areas within the study area. Through the use of this tool, it was determined that existing soil type that comprises the predominant majority of both the onsite and offsite components of the study area consists of the "Urban land – Canton complex" (SSSM symbol 799). While urban land complexes are typically not assigned a hydrologic soil group, one had to be assumed for the purposes of stormwater modelling. Due to the presence of Canton soils in the complex, it was assumed that the complex would behave similarly to Canton soils, which are classified as Hydrologic Soil Group B (HSG B) according to "Ksat Values for New Hampshire Soils," Special Publication No. 5 sponsored by the Society of Soil Scientists of Northern New England (SSSNNE). According to the same publication, Canton soils have a saturated hydraulic conductivity (Ksat) range of 2.0-6.0 inches per hour in the B horizon and a Ksat range of 6.0-20.0 inches per hour in the C horizon. The decision to model these study area as HSG B is further justified by the test pits that were performed on the subject parcel in 2025, indicating the presence of well-draining sandy loam and loamy sand components in the soil profile along with some sporadic silt loam or sandy clay loam inclusions in the periphery of the subject parcel, moderately deep seasonal high water tables, and no refusal observed to a depth of at least 50-70 inches.

A small part of the study area was shown by NRCS Web Soil Survey to consist of smoothed Udorthents and Urban land (SSSM symbols 299 and 699, respectively). While it is not possible to assign hydrologic soil groupings or saturated hydraulic conductivity ratings for these human-made soil descriptions, these areas were also modelled as HSG B as the great majority of the study area, which consists of the Urban land-Canton complex is modelled as HSG B due to the presence of Canton soils,

and the soil profile is assumed to be relatively consistent throughout the study area. Furthermore, infiltrating practices that are proposed are in the SSSM symbol 799 area, and the 299 and 699 areas are relatively small by comparison.

In accordance with standard engineering practice, the lowest published Ksat value provided for Canton soils (2.0 inches per hour) was divided by a factor of safety of two to determine the infiltration rate of 1.0 inches per hour to use for design due to the potential for sporadic inconsistencies in the soil profile.

3.0 PROPOSED CONDITIONS ANALYSIS

The construction of infrastructure associated with the proposed conservation subdivision as described in the executive summary divides the subject parcel into 11 subcatchments, all draining toward the same two analysis points as previously described. A stormwater management system consisting of two proprietary biofiltration systems with downstream chambers, as well as a filtration drip edge designed for roof runoff and a pocket pond in the right of way, has been designed to mimic pre-development hydrologic patterns in the post-construction condition, to ensure that there is no net increase in the peak flow or volume of runoff directed toward Analysis Point 1 resultant to the 2-, 10-, 25- or 50-year 24-hour storm events, and to meet the other stormwater design requirements for new developments per Section 7 of the Portsmouth Site Plan Review Regulations.

The existing berm that defines the low area modelled as Pond 1P in the existing conditions analysis is being removed for the proposed development. Due to this unique situation, a detention pond is proposed offsite in the private Ledgewood Drive parcel that has been designed to mimic the stormwater attenuation caused by the low area and berm that are being removed and built over. This detention pond is modelled as 1P in the post-construction analysis as it is intended to replicate pre-construction pond 1P, with the subcatchment from which runoff drains directly toward the proposed modelled as Subcatchment 1S.

Other than this, Subcatchments 2S-5S as well as Pond 2P and the two catch basins in Ledgewood Drive modelled as CB1 and CB2 are functionally the same as in the existing conditions analysis in terms of their hydrologic routing, but their outlines, areas, and surface covers have been altered due to the proposed development.

Subcatchment 6S represents the area from which runoff drains toward Focal Point 1, modelled as Pond 3P, in the post-construction condition. This subcatchment consists of the section of the proposed site driveway to the south of the high point, as well as the part the roof of the proposed building that is pitched such that runoff from it will drain via downspouts toward the Focal Point modelled as Pond 3P.

The "Focal Point" is a proprietary biofiltration system manufactured by Ferguson Waterworks that features a high-flow filter media so that it can be sized significantly smaller than a traditional bioretention system while still providing the same level of treatment. The proposed Focal Point modelled as Pond 3P will be lined and underdrained, and the runoff discharged from the underdrain and overflow structure of the Focal Point will drain through an outlet pipe toward a downstream subsurface chamber system modelled as Pond 4P.

Pond 4P is designed to infiltrate stormwater directed toward it to the extent practicable, and has been designed with an overflow pipe to gradually release any stormwater that cannot be infiltrated directly to groundwater. The overflow pipe of Pond 4P is proposed to drain any discharged stormwater into

Pond 1P for further flow and volume attenuation, and as previously described, any overflow from Pond 1P is discharged via a proposed culvert toward Analysis Point 1.

Subcatchment 7S represents the area from which runoff drains toward Focal Point 2, modelled as Pond 5P. The part of the proposed development site to the north of the high point of the proposed driveway as well as the proposed outdoor parking lot and adjacent landscaped area is graded to drain directly toward Focal Point 2 and is therefore represented in Subcatchment 7S. Additionally, a large part of the roof of the proposed apartment building is pitched toward downspouts that drain into land area that is graded such that runoff drains toward Focal Point 2, so this roof sector is additionally included within Subcatchment 7S.

Focal Point 2 (Pond 5P) is lined and underdrain, and includes an overflow mechanism, similarly to the design of Focal Point 1 (Pond 3P). The outflow from the Pond 5P, including any overflow as well as treated runoff from the underdrain, is routed via a drain pipe toward an underground chamber system modelled as Pond 6P. This chamber system is unlined and is intended to infiltrate runoff directed toward it to the extent practicable. All outflow from Pond 6P that is not infiltrated to groundwater is routed via a closed drainage system toward Analysis Point 1 at a lower rate and volume than in the existing condition.

Subcatchment 8S represents the easternmost part of the roof of the proposed building, to the east of the ridge of the section of the structure that is perpendicular to Ledgewood Drive. Runoff from Subcatchment 8S drains toward a filtration drip edge modelled as Pond 8P. The filtration drip edge is proposed adjacent to only part of the east face of the building roof so that wetland impacts can be avoided. However, several proposed downspouts along the east face of the proposed building will be connected to a roof leader that is proposed to drain into the filtration drip edge modelled as Pond 8P.

A "filtration drip edge" combines the filtration function of a bioretention pond with the infiltration function of a stone drip edge for improved water quality treatment, and so that the device can be designed closer to the water table due to site constraints. Filtration practices can be designed with a filter course as little as 1' above the seasonal high water table, while infiltration practices that rely on infiltration alone for water quality treatment require 3' separation from the bottom of stone to the seasonal high water table (or 4' in groundwater protection areas). Therefore, this device will have the dual benefit of providing enhanced treatment of runoff from the section of the roof directed to it as compared with a standard stone drip edge, and can be constructed in line with the existing grades and seasonal high water table elevations on site without causing a wetland impact.

Because the subject parcel happens to be situated at a point where it directly receives significant runoff from offsite watershed areas, diversion swales and culverts are proposed along the north and west edges of the subject parcel to keep runoff from offsite out of the stormwater management system for the proposed development itself.

Subcatchment 9S represents the contributing watershed area to a proposed diversion swale on the west end of the subject parcel to the north of the high point of the proposed driveway. This diversion swale is graded toward a low point, and a yard drain modelled as Pond YD is proposed at this low point. Subcatchment 9S is a sector of the same area from Subcatchment 1S in the pre-development model that is rerouted due to the proposed development.

Subcatchment 10S represents the contributing watershed area to a proposed diversion swale on the north end of the site that is graded to drain toward the east and ultimately into a proposed diversion

culvert that is modelled as Pond 9P. Subcatchment 10S is a sector of the same area from Subcatchment 1S in the pre-development model that is rerouted due to the proposed development.

The outlet pipe from the yard drain modelled as Pond YD and the diversion culvert modelled as Pond 9P both daylight into proposed drain manhole 2, modelled as DMH2. Downstream of the outlet pipe from DMH 2, runoff flows through another diversion swale modelled as Reach 2R toward a proposed culvert, modelled as Pond 10P, pitched toward the east and running underneath the beginning of the proposed site driveway.

The land area from which runoff drains directly toward the proposed driveway culvert modelled as Pond 10P is represented as Subcatchment 11S. Subcatchment 11S is a sector of the same area from Subcatchment 1S in the pre-development model that is rerouted due to the proposed development.

As a result of the implementation of this stormwater management system, peak flows and runoff volumes are reduced toward Analysis Point 1 during all analyzed storm events in the proposed condition as compared with the existing condition. The NHDES Alteration of Terrain Bureau allows an increase in runoff volume of up to 0.1 acre-feet during the 2-year 24-hour storm event. We are decreasing runoff volumes and therefore this would be approvable by the AOT Bureau if the project needed an AOT permit (which it does not as the area of disturbance is below 100,000 SF).

Furthermore, the project as designed exceeds the AOT Bureau's groundwater recharge volume requirement. A GRV worksheet is contained within the appendix of this report in order to illustrate this. Therefore, we have designed the drainage system to avoid adverse impacts to abutting infrastructure and the requirement per Section 7.1 of the Site Plan Review Regulations to "design practices to the maximum extent practical (MEP) to reduce stormwater runoff volumes, maintain predevelopment site hydrology, and protect water quality in receiving waters" is met, and low impact development (LID) devices such as biofiltration practices, subsurface detention systems, and a stone drip edge are used.

EPA Region 1 credits the same pollutant removal efficiencies for the Focal Point biofiltration system as for an enhanced biofiltration system with an internal storage reservoir. Specifically, this a 76% phosphorous load reduction and a 75% nitrogen load reduction are credited if the Focal Point biofiltration system has been designed for a 1" runoff from impervious areas, which has been done in accordance with the enclosed Focal Point design worksheet which includes the Focal Point design procedure that has been approved by NHDES. Direct infiltration practices that are designed per NHDES standards, such as but not limited to stone drip edges, feature a removal efficiency of nearly 100% for total suspended solids, total nitrogen, and total phosphorous according to the EPA performance curves included with the pollutant removal calculations in the appendix of this report. According to this document, filtration practices that are not underdrained and directly infiltrate treated runoff to groundwater can be counted as infiltration practices for the purpose of pollutant removal calculation, so the filtration drip edge is counted as an infiltration practice. Runoff from all proposed impervious surfaces is proposed to drain toward either a Focal Point or a filtration drip edge post-construction, with the exception of a small paved apron at the beginning of the proposed driveway that is pitched toward Ledgewood Drive. In effect, the required 80% TSS and 50% TN and TP pollutant removal thresholds will be met and exceeded. Pollutant removal calculations demonstrating this are included in the appendix of this report.

5.0 CONCLUSION

This proposed site development will have minimal adverse effect on abutting infrastructures, properties, and downstream wetlands by way of stormwater runoff or siltation. Appropriate steps will be taken to eliminate erosion and sedimentation; this will be accomplished through the of the above-described stormwater management system as well as temporary erosion control measures including but not limited to silt fence, a stabilized construction entrance, storm drain inlet protection, and temporary sediment traps during construction. Best Management Practices developed by the State of New Hampshire have been utilized in the design of this system and their application will be enforced throughout the construction process. Peak rates and volumes of runoff from the site will be reduced toward all analysis points during all analyzed storm events.

This project disturbs less than 100,000 S.F. and therefore does not require a NHDES Alteration of Terrain Permit.

Respectfully Submitted,
JONES & BEACH ENGINEERS, INC.

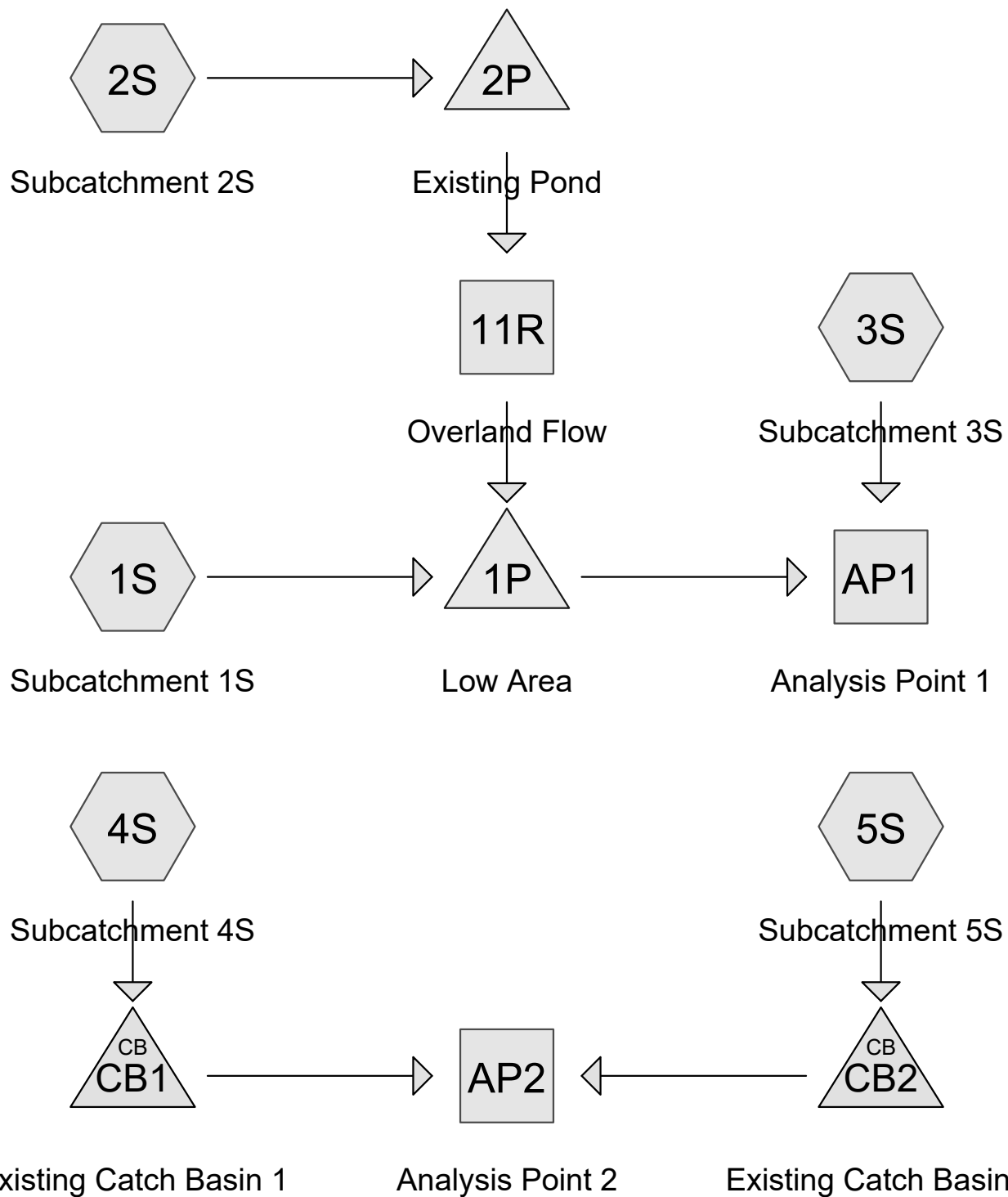


Daniel Meditz, P.E
Lead Design Engineer

APPENDIX I

EXISTING CONDITIONS DRAINAGE ANALYSIS

Summary 2 YEAR
Complete 10 YEAR
Summary 25 YEAR
Complete 50 YEAR



Routing Diagram for 25071.2-EXISTING

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.228	70	1/2 acre lots, 25% imp, HSG B (1S, 3S)
0.566	61	>75% Grass cover, Good, HSG B (1S, 2S, 4S, 5S)
0.086	48	Brush, Good, HSG B (2S)
0.177	98	Paved parking, HSG B (2S)
0.277	98	Paved roads w/curbs & sewers, HSG B (3S, 4S, 5S)
0.045	98	Roofs, HSG B (1S, 2S)
1.806	55	Woods, Good, HSG B (1S, 2S, 3S)
5.186	66	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
5.186	HSG B	1S, 2S, 3S, 4S, 5S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.186		TOTAL AREA

25071.2-EXISTING*Type III 24-hr 2-YR STORM Rainfall=3.71"*

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=112,469 sf 9.32% Impervious Runoff Depth=0.67"
Flow Length=421' Tc=15.9 min CN=61 Runoff=1.13 cfs 0.144 af

Subcatchment2S: Subcatchment2S Runoff Area=22,794 sf 37.44% Impervious Runoff Depth=1.26"
Tc=6.0 min CN=72 Runoff=0.73 cfs 0.055 af

Subcatchment3S: Subcatchment3S Runoff Area=86,121 sf 27.21% Impervious Runoff Depth=1.14"
Flow Length=612' Tc=11.7 min CN=70 Runoff=2.01 cfs 0.188 af

Subcatchment4S: Subcatchment4S Runoff Area=1,897 sf 76.96% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=89 Runoff=0.13 cfs 0.009 af

Subcatchment5S: Subcatchment5S Runoff Area=2,633 sf 80.71% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=91 Runoff=0.19 cfs 0.014 af

Reach 11R: Overland Flow Avg. Flow Depth=0.10' Max Vel=0.24 fps Inflow=0.36 cfs 0.034 af
n=0.070 L=80.0' S=0.0050 '/' Capacity=12.03 cfs Outflow=0.34 cfs 0.034 af

Reach AP1: Analysis Point 1 Inflow=2.01 cfs 0.188 af
Outflow=2.01 cfs 0.188 af

Reach AP2: Analysis Point 2 Inflow=0.31 cfs 0.023 af
Outflow=0.31 cfs 0.023 af

Pond 1P: Low Area Peak Elev=20.28' Storage=3,058 cf Inflow=1.45 cfs 0.178 af
Discarded=0.23 cfs 0.178 af Primary=0.00 cfs 0.000 af Outflow=0.23 cfs 0.178 af

Pond 2P: Existing Pond Peak Elev=21.31' Storage=436 cf Inflow=0.73 cfs 0.055 af
Discarded=0.05 cfs 0.021 af Primary=0.36 cfs 0.034 af Outflow=0.41 cfs 0.055 af

Pond CB1: Existing Catch Basin 1 Peak Elev=23.59' Inflow=0.13 cfs 0.009 af
12.0" Round Culvert n=0.012 L=28.0' S=0.0075 '/' Outflow=0.13 cfs 0.009 af

Pond CB2: Existing Catch Basin 2 Peak Elev=19.30' Inflow=0.19 cfs 0.014 af
12.0" Round Culvert n=0.012 L=36.0' S=0.0078 '/' Outflow=0.19 cfs 0.014 af

Total Runoff Area = 5.186 ac Runoff Volume = 0.410 af Average Runoff Depth = 0.95"
79.62% Pervious = 4.129 ac 20.38% Impervious = 1.057 ac

25071.2-EXISTING*Type III 24-hr 10-YR STORM Rainfall=5.63"*

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=112,469 sf 9.32% Impervious Runoff Depth=1.76"
Flow Length=421' Tc=15.9 min CN=61 Runoff=3.66 cfs 0.379 af

Subcatchment2S: Subcatchment2S Runoff Area=22,794 sf 37.44% Impervious Runoff Depth=2.69"
Tc=6.0 min CN=72 Runoff=1.62 cfs 0.117 af

Subcatchment3S: Subcatchment3S Runoff Area=86,121 sf 27.21% Impervious Runoff Depth=2.51"
Flow Length=612' Tc=11.7 min CN=70 Runoff=4.75 cfs 0.414 af

Subcatchment4S: Subcatchment4S Runoff Area=1,897 sf 76.96% Impervious Runoff Depth=4.38"
Tc=6.0 min CN=89 Runoff=0.21 cfs 0.016 af

Subcatchment5S: Subcatchment5S Runoff Area=2,633 sf 80.71% Impervious Runoff Depth=4.60"
Tc=6.0 min CN=91 Runoff=0.30 cfs 0.023 af

Reach 11R: Overland Flow Avg. Flow Depth=0.16' Max Vel=0.33 fps Inflow=0.99 cfs 0.086 af
n=0.070 L=80.0' S=0.0050 '/' Capacity=12.03 cfs Outflow=0.96 cfs 0.086 af

Reach AP1: Analysis Point 1 Inflow=4.75 cfs 0.571 af
Outflow=4.75 cfs 0.571 af

Reach AP2: Analysis Point 2 Inflow=0.51 cfs 0.039 af
Outflow=0.51 cfs 0.039 af

Pond 1P: Low Area Peak Elev=20.53' Storage=5,928 cf Inflow=4.61 cfs 0.465 af
Discarded=0.37 cfs 0.308 af Primary=2.20 cfs 0.157 af Outflow=2.57 cfs 0.465 af

Pond 2P: Existing Pond Peak Elev=21.54' Storage=831 cf Inflow=1.62 cfs 0.117 af
Discarded=0.06 cfs 0.031 af Primary=0.99 cfs 0.086 af Outflow=1.06 cfs 0.117 af

Pond CB1: Existing Catch Basin 1 Peak Elev=23.65' Inflow=0.21 cfs 0.016 af
12.0" Round Culvert n=0.012 L=28.0' S=0.0075 '/' Outflow=0.21 cfs 0.016 af

Pond CB2: Existing Catch Basin 2 Peak Elev=19.36' Inflow=0.30 cfs 0.023 af
12.0" Round Culvert n=0.012 L=36.0' S=0.0078 '/' Outflow=0.30 cfs 0.023 af

Total Runoff Area = 5.186 ac Runoff Volume = 0.950 af Average Runoff Depth = 2.20"
79.62% Pervious = 4.129 ac 20.38% Impervious = 1.057 ac

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 3.66 cfs @ 12.24 hrs, Volume= 0.379 af, Depth= 1.76"
 Routed to Pond 1P : Low Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
37,341	70	1/2 acre lots, 25% imp, HSG B
1,147	98	Roofs, HSG B
14,520	61	>75% Grass cover, Good, HSG B
59,461	55	Woods, Good, HSG B
112,469	61	Weighted Average
101,987		90.68% Pervious Area
10,482		9.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	15	0.1000	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 3.71"
7.2	35	0.0308	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
0.6	30	0.0308	0.88		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	25	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.1	92	0.0217	0.74		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	51	0.0392	0.99		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.3	99	0.0202	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.9	421	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 1.62 cfs @ 12.09 hrs, Volume= 0.117 af, Depth= 2.69"
 Routed to Pond 2P : Existing Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Area (sf)	CN	Description
7,719	98	Paved parking, HSG B
815	98	Roofs, HSG B
9,211	61	>75% Grass cover, Good, HSG B
1,310	55	Woods, Good, HSG B
3,739	48	Brush, Good, HSG B
22,794	72	Weighted Average
14,260		62.56% Pervious Area
8,534		37.44% Impervious Area

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

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 4.75 cfs @ 12.17 hrs, Volume= 0.414 af, Depth= 2.51"
 Routed to Reach AP1 : Analysis Point 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
17,892	55	Woods, Good, HSG B
8,500	98	Paved roads w/curbs & sewers, HSG B
59,729	70	1/2 acre lots, 25% imp, HSG B
86,121	70	Weighted Average
62,689		72.79% Pervious Area
23,432		27.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.0200	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.71"
0.7	55	0.0364	1.34		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	59	0.0476	1.53		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	208	0.0260	3.27		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	33	0.0303	1.22		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.3	86	0.0233	1.07		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	52	0.0385	0.98		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.4	69	0.0290	0.85		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.7	612	Total			

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af, Depth= 4.38"

Routed to Pond CB1 : Existing Catch Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
1,460	98	Paved roads w/curbs & sewers, HSG B
437	61	>75% Grass cover, Good, HSG B
1,897	89	Weighted Average
437		23.04% Pervious Area
1,460		76.96% Impervious Area

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

Summary for Subcatchment 5S: Subcatchment 5S

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af, Depth= 4.60"

Routed to Pond CB2 : Existing Catch Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
2,125	98	Paved roads w/curbs & sewers, HSG B
508	61	>75% Grass cover, Good, HSG B
2,633	91	Weighted Average
508		19.29% Pervious Area
2,125		80.71% Impervious Area

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

Summary for Reach 11R: Overland Flow

Inflow Area = 0.523 ac, 37.44% Impervious, Inflow Depth = 1.98" for 10-YR STORM event

Inflow = 0.99 cfs @ 12.20 hrs, Volume= 0.086 af

Outflow = 0.96 cfs @ 12.26 hrs, Volume= 0.086 af, Atten= 4%, Lag= 3.6 min

Routed to Pond 1P : Low Area

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Max. Velocity= 0.33 fps, Min. Travel Time= 4.0 min

Avg. Velocity = 0.10 fps, Avg. Travel Time= 14.0 min

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Peak Storage= 231 cf @ 12.26 hrs

Average Depth at Peak Storage= 0.16' , Surface Width= 27.87'

Bank-Full Depth= 0.50' Flow Area= 16.7 sf, Capacity= 12.03 cfs

50.00' x 0.50' deep Parabolic Channel, n= 0.070 Medium-dense brush, winter

Length= 80.0' Slope= 0.0050 '/'

Inlet Invert= 20.50', Outlet Invert= 20.10'



Summary for Reach AP1: Analysis Point 1

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

Inflow Area = 5.082 ac, 19.17% Impervious, Inflow Depth = 1.35" for 10-YR STORM event

Inflow = 4.75 cfs @ 12.17 hrs, Volume= 0.571 af

Outflow = 4.75 cfs @ 12.17 hrs, Volume= 0.571 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

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

Inflow Area = 0.104 ac, 79.14% Impervious, Inflow Depth = 4.50" for 10-YR STORM event

Inflow = 0.51 cfs @ 12.09 hrs, Volume= 0.039 af

Outflow = 0.51 cfs @ 12.09 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 1P: Low Area

[62] Hint: Exceeded Reach 11R OUTLET depth by 0.31' @ 12.65 hrs

Inflow Area = 3.105 ac, 14.06% Impervious, Inflow Depth = 1.80" for 10-YR STORM event

Inflow = 4.61 cfs @ 12.24 hrs, Volume= 0.465 af

Outflow = 2.57 cfs @ 12.56 hrs, Volume= 0.465 af, Atten= 44%, Lag= 19.2 min

Discarded = 0.37 cfs @ 12.56 hrs, Volume= 0.308 af

Primary = 2.20 cfs @ 12.56 hrs, Volume= 0.157 af

Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 20.53' @ 12.56 hrs Surf.Area= 14,054 sf Storage= 5,928 cf

Plug-Flow detention time= 147.0 min calculated for 0.465 af (100% of inflow)

Center-of-Mass det. time= 146.8 min (1,011.4 - 864.5)

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Volume	Invert	Avail.Storage	Storage Description									
#1	19.50'	26,604 cf	Custom Stage Data (Irregular) Listed below (Recalc)									
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)			Cum.Store (cubic-feet)			Wet.Area (sq-ft)			
19.50	1,371	213.0	0			0			1,371			
20.00	3,961	394.0	1,277			1,277			10,115			
20.50	14,054	688.0	4,246			5,523			35,431			
22.00	14,054	688.0	21,081			26,604			36,463			
Device	Routing	Invert	Outlet Devices									
#1	Primary	20.40'	20.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66									
			2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32									
#2	Discarded	19.50'	1.000 in/hr Exfiltration over Surface area									
			Conductivity to Groundwater Elevation = 16.67' Phase-In= 0.10'									

Discarded OutFlow Max=0.37 cfs @ 12.56 hrs HW=20.53' (Free Discharge)↑**2=Exfiltration** (Controls 0.37 cfs)**Primary OutFlow** Max=2.19 cfs @ 12.56 hrs HW=20.53' TW=0.00' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir**(Weir Controls 2.19 cfs @ 0.85 fps)**Summary for Pond 2P: Existing Pond**

Pond areas, elevations, and culvert parameters are assumed.

Inflow Area = 0.523 ac, 37.44% Impervious, Inflow Depth = 2.69" for 10-YR STORM event
 Inflow = 1.62 cfs @ 12.09 hrs, Volume= 0.117 af
 Outflow = 1.06 cfs @ 12.20 hrs, Volume= 0.117 af, Atten= 35%, Lag= 6.5 min
 Discarded = 0.06 cfs @ 12.20 hrs, Volume= 0.031 af
 Primary = 0.99 cfs @ 12.20 hrs, Volume= 0.086 af
 Routed to Reach 11R : Overland Flow

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 21.54' @ 12.20 hrs Surf.Area= 1,912 sf Storage= 831 cf

Plug-Flow detention time= 24.3 min calculated for 0.117 af (100% of inflow)

Center-of-Mass det. time= 23.9 min (860.4 - 836.6)

Volume	Invert	Avail.Storage	Storage Description			
#1	21.00'	1,882 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
21.00	1,209	140.0	0	0	1,209	
22.00	2,647	210.0	1,882	1,882	3,166	

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Device	Routing	Invert	Outlet Devices
#1	Discarded	21.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 20.00' Phase-In= 0.10'
#2	Primary	21.00'	15.0" Round Culvert L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 21.00' / 20.50' S= 0.0167 ' S= 0.0167 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Discarded OutFlow Max=0.06 cfs @ 12.20 hrs HW=21.54' (Free Discharge)↑**1=Exfiltration** (Controls 0.06 cfs)**Primary OutFlow** Max=0.99 cfs @ 12.20 hrs HW=21.54' TW=20.65' (Dynamic Tailwater)↑**2=Culvert** (Inlet Controls 0.99 cfs @ 1.97 fps)**Summary for Pond CB1: Existing Catch Basin 1**

End invert of pipe is assumed as inverts have not been measured on downstream structure

[58] Hint: Peaked 0.24' above defined flood level

Inflow Area = 0.044 ac, 76.96% Impervious, Inflow Depth = 4.38" for 10-YR STORM event
 Inflow = 0.21 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
 Routed to Reach AP2 : Analysis Point 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 23.65' @ 12.09 hrs

Flood Elev= 23.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	23.41'	12.0" Round Culvert L= 28.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 23.41' / 23.20' S= 0.0075 ' S= 0.0075 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.21 cfs @ 12.09 hrs HW=23.64' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.21 cfs @ 2.22 fps)**Summary for Pond CB2: Existing Catch Basin 2**

End invert of pipe is assumed as inverts have not been measured on downstream structure

Inflow Area = 0.060 ac, 80.71% Impervious, Inflow Depth = 4.60" for 10-YR STORM event
 Inflow = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af
 Outflow = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af
 Routed to Reach AP2 : Analysis Point 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

25071.2-EXISTING*Type III 24-hr 10-YR STORM Rainfall=5.63"*

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Peak Elev= 19.36' @ 12.09 hrs

Flood Elev= 22.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.08'	12.0" Round Culvert L= 36.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 19.08' / 18.80' S= 0.0078 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.29 cfs @ 12.09 hrs HW=19.36' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.29 cfs @ 2.49 fps)

25071.2-EXISTING*Type III 24-hr 25-YR STORM Rainfall=7.13"*

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=112,469 sf 9.32% Impervious Runoff Depth=2.80"
Flow Length=421' Tc=15.9 min CN=61 Runoff=6.04 cfs 0.602 af

Subcatchment2S: Subcatchment2S Runoff Area=22,794 sf 37.44% Impervious Runoff Depth=3.94"
Tc=6.0 min CN=72 Runoff=2.37 cfs 0.172 af

Subcatchment3S: Subcatchment3S Runoff Area=86,121 sf 27.21% Impervious Runoff Depth=3.73"
Flow Length=612' Tc=11.7 min CN=70 Runoff=7.11 cfs 0.614 af

Subcatchment4S: Subcatchment4S Runoff Area=1,897 sf 76.96% Impervious Runoff Depth=5.84"
Tc=6.0 min CN=89 Runoff=0.28 cfs 0.021 af

Subcatchment5S: Subcatchment5S Runoff Area=2,633 sf 80.71% Impervious Runoff Depth=6.07"
Tc=6.0 min CN=91 Runoff=0.39 cfs 0.031 af

Reach 11R: Overland Flow Avg. Flow Depth=0.19' Max Vel=0.38 fps Inflow=1.54 cfs 0.134 af
n=0.070 L=80.0' S=0.0050 '/' Capacity=12.03 cfs Outflow=1.49 cfs 0.134 af

Reach AP1: Analysis Point 1 Inflow=9.48 cfs 0.989 af
Outflow=9.48 cfs 0.989 af

Reach AP2: Analysis Point 2 Inflow=0.67 cfs 0.052 af
Outflow=0.67 cfs 0.052 af

Pond 1P: Low Area Peak Elev=20.63' Storage=7,348 cf Inflow=7.53 cfs 0.735 af
Discarded=0.38 cfs 0.360 af Primary=5.30 cfs 0.375 af Outflow=5.67 cfs 0.735 af

Pond 2P: Existing Pond Peak Elev=21.69' Storage=1,133 cf Inflow=2.37 cfs 0.172 af
Discarded=0.07 cfs 0.038 af Primary=1.54 cfs 0.134 af Outflow=1.61 cfs 0.172 af

Pond CB1: Existing Catch Basin 1 Peak Elev=23.68' Inflow=0.28 cfs 0.021 af
12.0" Round Culvert n=0.012 L=28.0' S=0.0075 '/' Outflow=0.28 cfs 0.021 af

Pond CB2: Existing Catch Basin 2 Peak Elev=19.40' Inflow=0.39 cfs 0.031 af
12.0" Round Culvert n=0.012 L=36.0' S=0.0078 '/' Outflow=0.39 cfs 0.031 af

Total Runoff Area = 5.186 ac Runoff Volume = 1.439 af Average Runoff Depth = 3.33"
79.62% Pervious = 4.129 ac 20.38% Impervious = 1.057 ac

25071.2-EXISTING*Type III 24-hr 50-YR STORM Rainfall=8.54"*

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S Runoff Area=112,469 sf 9.32% Impervious Runoff Depth=3.86"
Flow Length=421' Tc=15.9 min CN=61 Runoff=8.48 cfs 0.831 af

Subcatchment2S: Subcatchment2S Runoff Area=22,794 sf 37.44% Impervious Runoff Depth=5.17"
Tc=6.0 min CN=72 Runoff=3.10 cfs 0.226 af

Subcatchment3S: Subcatchment3S Runoff Area=86,121 sf 27.21% Impervious Runoff Depth=4.93"
Flow Length=612' Tc=11.7 min CN=70 Runoff=9.42 cfs 0.813 af

Subcatchment4S: Subcatchment4S Runoff Area=1,897 sf 76.96% Impervious Runoff Depth=7.22"
Tc=6.0 min CN=89 Runoff=0.34 cfs 0.026 af

Subcatchment5S: Subcatchment5S Runoff Area=2,633 sf 80.71% Impervious Runoff Depth=7.46"
Tc=6.0 min CN=91 Runoff=0.48 cfs 0.038 af

Reach 11R: Overland Flow Avg. Flow Depth=0.22' Max Vel=0.41 fps Inflow=2.05 cfs 0.182 af
n=0.070 L=80.0' S=0.0050 '/' Capacity=12.03 cfs Outflow=2.00 cfs 0.182 af

Reach AP1: Analysis Point 1 Inflow=15.16 cfs 1.424 af
Outflow=15.16 cfs 1.424 af

Reach AP2: Analysis Point 2 Inflow=0.81 cfs 0.064 af
Outflow=0.81 cfs 0.064 af

Pond 1P: Low Area Peak Elev=20.71' Storage=8,481 cf Inflow=10.48 cfs 1.013 af
Discarded=0.38 cfs 0.401 af Primary=8.54 cfs 0.612 af Outflow=8.93 cfs 1.013 af

Pond 2P: Existing Pond Peak Elev=21.81' Storage=1,418 cf Inflow=3.10 cfs 0.226 af
Discarded=0.08 cfs 0.044 af Primary=2.05 cfs 0.182 af Outflow=2.14 cfs 0.226 af

Pond CB1: Existing Catch Basin 1 Peak Elev=23.71' Inflow=0.34 cfs 0.026 af
12.0" Round Culvert n=0.012 L=28.0' S=0.0075 '/' Outflow=0.34 cfs 0.026 af

Pond CB2: Existing Catch Basin 2 Peak Elev=19.44' Inflow=0.48 cfs 0.038 af
12.0" Round Culvert n=0.012 L=36.0' S=0.0078 '/' Outflow=0.48 cfs 0.038 af

Total Runoff Area = 5.186 ac Runoff Volume = 1.933 af Average Runoff Depth = 4.47"
79.62% Pervious = 4.129 ac 20.38% Impervious = 1.057 ac

25071.2-EXISTING

Type III 24-hr 50-YR STORM Rainfall=8.54"

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Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 8.48 cfs @ 12.23 hrs, Volume= 0.831 af, Depth= 3.86"
 Routed to Pond 1P : Low Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
37,341	70	1/2 acre lots, 25% imp, HSG B
1,147	98	Roofs, HSG B
14,520	61	>75% Grass cover, Good, HSG B
59,461	55	Woods, Good, HSG B
112,469	61	Weighted Average
101,987		90.68% Pervious Area
10,482		9.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	15	0.1000	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 3.71"
7.2	35	0.0308	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
0.6	30	0.0308	0.88		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	25	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.1	92	0.0217	0.74		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	51	0.0392	0.99		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.3	99	0.0202	0.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
15.9	421	Total			

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 3.10 cfs @ 12.09 hrs, Volume= 0.226 af, Depth= 5.17"
 Routed to Pond 2P : Existing Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

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Type III 24-hr 50-YR STORM Rainfall=8.54"

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Area (sf)	CN	Description
7,719	98	Paved parking, HSG B
815	98	Roofs, HSG B
9,211	61	>75% Grass cover, Good, HSG B
1,310	55	Woods, Good, HSG B
3,739	48	Brush, Good, HSG B
22,794	72	Weighted Average
14,260		62.56% Pervious Area
8,534		37.44% Impervious Area

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

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 9.42 cfs @ 12.16 hrs, Volume= 0.813 af, Depth= 4.93"
 Routed to Reach AP1 : Analysis Point 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
17,892	55	Woods, Good, HSG B
8,500	98	Paved roads w/curbs & sewers, HSG B
59,729	70	1/2 acre lots, 25% imp, HSG B
86,121	70	Weighted Average
62,689		72.79% Pervious Area
23,432		27.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.0200	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.71"
0.7	55	0.0364	1.34		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	59	0.0476	1.53		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	208	0.0260	3.27		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	33	0.0303	1.22		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.3	86	0.0233	1.07		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	52	0.0385	0.98		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.4	69	0.0290	0.85		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.7	612	Total			

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Type III 24-hr 50-YR STORM Rainfall=8.54"

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Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 7.22"

Routed to Pond CB1 : Existing Catch Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
1,460	98	Paved roads w/curbs & sewers, HSG B
437	61	>75% Grass cover, Good, HSG B
1,897	89	Weighted Average
437		23.04% Pervious Area
1,460		76.96% Impervious Area

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

Summary for Subcatchment 5S: Subcatchment 5S

Runoff = 0.48 cfs @ 12.09 hrs, Volume= 0.038 af, Depth= 7.46"

Routed to Pond CB2 : Existing Catch Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
2,125	98	Paved roads w/curbs & sewers, HSG B
508	61	>75% Grass cover, Good, HSG B
2,633	91	Weighted Average
508		19.29% Pervious Area
2,125		80.71% Impervious Area

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

Summary for Reach 11R: Overland Flow

Inflow Area = 0.523 ac, 37.44% Impervious, Inflow Depth = 4.17" for 50-YR STORM event

Inflow = 2.05 cfs @ 12.18 hrs, Volume= 0.182 af

Outflow = 2.00 cfs @ 12.23 hrs, Volume= 0.182 af, Atten= 3%, Lag= 2.6 min

Routed to Pond 1P : Low Area

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Max. Velocity= 0.41 fps, Min. Travel Time= 3.2 min

Avg. Velocity = 0.11 fps, Avg. Travel Time= 11.6 min

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Type III 24-hr 50-YR STORM Rainfall=8.54"

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Peak Storage= 385 cf @ 12.23 hrs

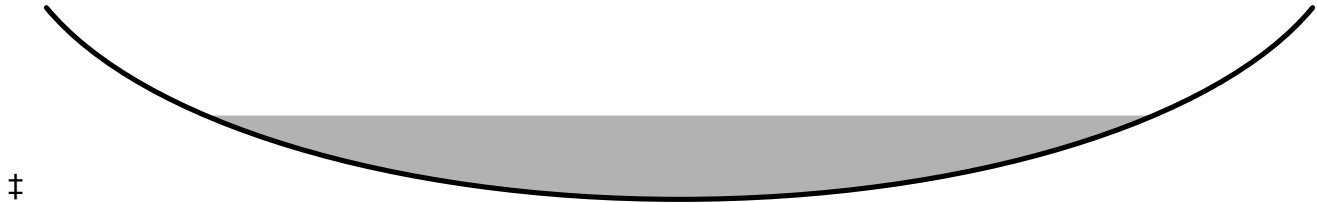
Average Depth at Peak Storage= 0.22' , Surface Width= 33.04'

Bank-Full Depth= 0.50' Flow Area= 16.7 sf, Capacity= 12.03 cfs

50.00' x 0.50' deep Parabolic Channel, n= 0.070 Medium-dense brush, winter

Length= 80.0' Slope= 0.0050 '/'

Inlet Invert= 20.50', Outlet Invert= 20.10'



Summary for Reach AP1: Analysis Point 1

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

Inflow Area = 5.082 ac, 19.17% Impervious, Inflow Depth = 3.36" for 50-YR STORM event

Inflow = 15.16 cfs @ 12.26 hrs, Volume= 1.424 af

Outflow = 15.16 cfs @ 12.26 hrs, Volume= 1.424 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

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

Inflow Area = 0.104 ac, 79.14% Impervious, Inflow Depth = 7.36" for 50-YR STORM event

Inflow = 0.81 cfs @ 12.09 hrs, Volume= 0.064 af

Outflow = 0.81 cfs @ 12.09 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 1P: Low Area

[63] Warning: Exceeded Reach 11R INLET depth by 0.01' @ 12.40 hrs

[64] Warning: Exceeded Reach 11R outlet bank by 0.11' @ 12.34 hrs

Inflow Area = 3.105 ac, 14.06% Impervious, Inflow Depth = 3.91" for 50-YR STORM event

Inflow = 10.48 cfs @ 12.23 hrs, Volume= 1.013 af

Outflow = 8.93 cfs @ 12.34 hrs, Volume= 1.013 af, Atten= 15%, Lag= 7.1 min

Discarded = 0.38 cfs @ 12.34 hrs, Volume= 0.401 af

Primary = 8.54 cfs @ 12.34 hrs, Volume= 0.612 af

Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 20.71' @ 12.34 hrs Surf.Area= 14,054 sf Storage= 8,481 cf

Plug-Flow detention time= 92.1 min calculated for 1.013 af (100% of inflow)

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Type III 24-hr 50-YR STORM Rainfall=8.54"

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Center-of-Mass det. time= 92.0 min (935.3 - 843.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	19.50'	26,604 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
19.50	1,371	213.0	0	0	1,371
20.00	3,961	394.0	1,277	1,277	10,115
20.50	14,054	688.0	4,246	5,523	35,431
22.00	14,054	688.0	21,081	26,604	36,463

Device	Routing	Invert	Outlet Devices											
#1	Primary	20.40'	20.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66											
			2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32											
#2	Discarded	19.50'	1.000 in/hr Exfiltration over Surface area											
			Conductivity to Groundwater Elevation = 16.67' Phase-In= 0.10'											

Discarded OutFlow Max=0.38 cfs @ 12.34 hrs HW=20.71' (Free Discharge)↑**2=Exfiltration** (Controls 0.38 cfs)**Primary OutFlow** Max=8.51 cfs @ 12.34 hrs HW=20.71' TW=0.00' (Dynamic Tailwater)↑**1=Broad-Crested Rectangular Weir**(Weir Controls 8.51 cfs @ 1.37 fps)**Summary for Pond 2P: Existing Pond**

Pond areas, elevations, and culvert parameters are assumed.

Inflow Area = 0.523 ac, 37.44% Impervious, Inflow Depth = 5.17" for 50-YR STORM event
 Inflow = 3.10 cfs @ 12.09 hrs, Volume= 0.226 af
 Outflow = 2.14 cfs @ 12.18 hrs, Volume= 0.226 af, Atten= 31%, Lag= 5.5 min
 Discarded = 0.08 cfs @ 12.18 hrs, Volume= 0.044 af
 Primary = 2.05 cfs @ 12.18 hrs, Volume= 0.182 af
 Routed to Reach 11R : Overland Flow

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 21.81' @ 12.18 hrs Surf.Area= 2,337 sf Storage= 1,418 cf

Plug-Flow detention time= 19.8 min calculated for 0.225 af (100% of inflow)

Center-of-Mass det. time= 19.9 min (837.8 - 817.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	21.00'	1,882 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	1,209	140.0	0	0	1,209
22.00	2,647	210.0	1,882	1,882	3,166

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Type III 24-hr 50-YR STORM Rainfall=8.54"

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Device	Routing	Invert	Outlet Devices
#1	Discarded	21.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 20.00' Phase-In= 0.10'
#2	Primary	21.00'	15.0" Round Culvert L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 21.00' / 20.50' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Discarded OutFlow Max=0.08 cfs @ 12.18 hrs HW=21.81' (Free Discharge)↑**1=Exfiltration** (Controls 0.08 cfs)**Primary OutFlow** Max=2.04 cfs @ 12.18 hrs HW=21.81' TW=20.71' (Dynamic Tailwater)↑**2=Culvert** (Inlet Controls 2.04 cfs @ 2.42 fps)**Summary for Pond CB1: Existing Catch Basin 1**

End invert of pipe is assumed as inverts have not been measured on downstream structure

[58] Hint: Peaked 0.30' above defined flood level

Inflow Area = 0.044 ac, 76.96% Impervious, Inflow Depth = 7.22" for 50-YR STORM event
 Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af
 Outflow = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af
 Routed to Reach AP2 : Analysis Point 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 23.71' @ 12.09 hrs

Flood Elev= 23.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	23.41'	12.0" Round Culvert L= 28.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 23.41' / 23.20' S= 0.0075 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.33 cfs @ 12.09 hrs HW=23.71' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.33 cfs @ 2.50 fps)**Summary for Pond CB2: Existing Catch Basin 2**

End invert of pipe is assumed as inverts have not been measured on downstream structure

Inflow Area = 0.060 ac, 80.71% Impervious, Inflow Depth = 7.46" for 50-YR STORM event
 Inflow = 0.48 cfs @ 12.09 hrs, Volume= 0.038 af
 Outflow = 0.48 cfs @ 12.09 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.48 cfs @ 12.09 hrs, Volume= 0.038 af
 Routed to Reach AP2 : Analysis Point 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

25071.2-EXISTING*Type III 24-hr 50-YR STORM Rainfall=8.54"*

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Peak Elev= 19.44' @ 12.09 hrs

Flood Elev= 22.23'

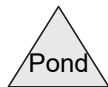
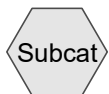
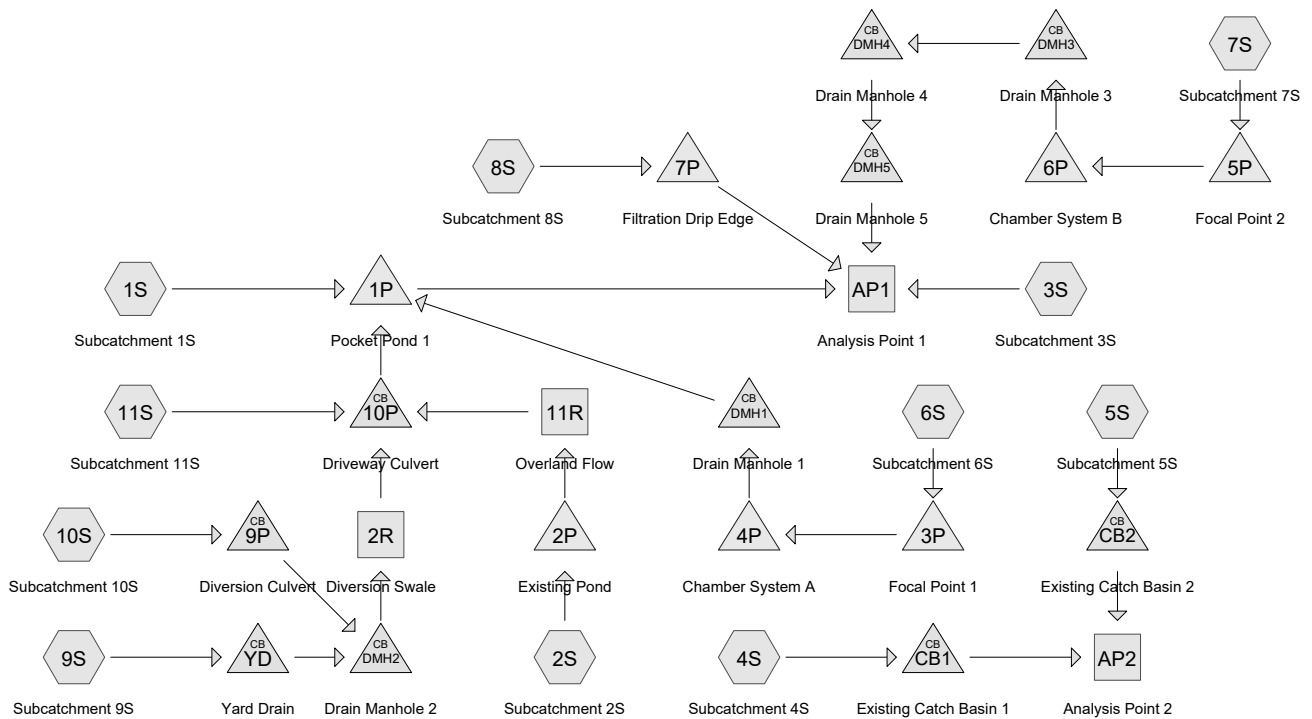
Device	Routing	Invert	Outlet Devices
#1	Primary	19.08'	12.0" Round Culvert L= 36.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 19.08' / 18.80' S= 0.0078 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.46 cfs @ 12.09 hrs HW=19.43' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.46 cfs @ 2.79 fps)

APPENDIX II

PROPOSED CONDITIONS DRAINAGE ANALYSIS

Summary 2 YEAR
Complete 10 YEAR
Summary 25 YEAR
Complete 50 YEAR



Routing Diagram for 25071.2-PROPOSED

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.228	70	1/2 acre lots, 25% imp, HSG B (3S, 10S)
0.898	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S, 4S, 5S, 6S, 7S, 9S, 10S, 11S)
0.086	48	Brush, Good, HSG B (2S)
0.432	98	Paved parking, HSG B (2S, 6S, 7S)
0.299	98	Paved roads w/curbs & sewers, HSG B (1S, 3S, 4S, 5S)
0.336	98	Roofs, HSG B (2S, 6S, 8S, 10S)
0.036	98	Water Surface, 0% imp, HSG B (8S)
0.873	55	Woods, Good, HSG B (2S, 3S, 9S, 10S, 11S)
5.186	72	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
5.186	HSG B	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.186		TOTAL AREA

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Type III 24-hr 2-YR STORM Rainfall=3.71"

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S	Runoff Area=6,767 sf 6.12% Impervious Runoff Depth=0.76" Tc=6.0 min CN=63 Runoff=0.11 cfs 0.010 af
Subcatchment2S: Subcatchment2S	Runoff Area=22,794 sf 37.44% Impervious Runoff Depth=1.26" Tc=6.0 min CN=72 Runoff=0.73 cfs 0.055 af
Subcatchment3S: Subcatchment3S	Runoff Area=81,585 sf 28.58% Impervious Runoff Depth=1.14" Flow Length=599' Tc=10.5 min CN=70 Runoff=1.99 cfs 0.178 af
Subcatchment4S: Subcatchment4S	Runoff Area=1,897 sf 80.02% Impervious Runoff Depth=2.74" Tc=6.0 min CN=91 Runoff=0.13 cfs 0.010 af
Subcatchment5S: Subcatchment5S	Runoff Area=2,929 sf 83.27% Impervious Runoff Depth=2.84" Tc=6.0 min CN=92 Runoff=0.21 cfs 0.016 af
Subcatchment6S: Subcatchment6S	Runoff Area=10,956 sf 88.57% Impervious Runoff Depth=3.04" Tc=6.0 min CN=94 Runoff=0.83 cfs 0.064 af
Subcatchment7S: Subcatchment7S	Runoff Area=7,753 sf 80.83% Impervious Runoff Depth=2.74" Tc=6.0 min CN=91 Runoff=0.55 cfs 0.041 af
Subcatchment8S: Subcatchment8S	Runoff Area=9,332 sf 83.20% Impervious Runoff Depth=3.48" Tc=6.0 min CN=98 Runoff=0.76 cfs 0.062 af
Subcatchment9S: Subcatchment9S	Runoff Area=3,563 sf 0.00% Impervious Runoff Depth=0.50" Flow Length=79' Tc=8.0 min CN=57 Runoff=0.03 cfs 0.003 af
Subcatchment10S: Subcatchment10S	Runoff Area=66,680 sf 16.11% Impervious Runoff Depth=0.92" Flow Length=284' Tc=12.5 min CN=66 Runoff=1.15 cfs 0.117 af
Subcatchment11S: Subcatchment11S	Runoff Area=11,665 sf 0.00% Impervious Runoff Depth=0.50" Flow Length=120' Tc=8.0 min CN=57 Runoff=0.09 cfs 0.011 af
Reach 2R: Diversion Swale	Avg. Flow Depth=0.31' Max Vel=1.31 fps Inflow=1.18 cfs 0.120 af n=0.030 L=60.0' S=0.0050 '/' Capacity=12.47 cfs Outflow=1.18 cfs 0.120 af
Reach 11R: Overland Flow	Avg. Flow Depth=0.09' Max Vel=0.26 fps Inflow=0.36 cfs 0.034 af n=0.070 L=66.0' S=0.0061 '/' Capacity=13.24 cfs Outflow=0.35 cfs 0.034 af
Reach AP1: Analysis Point 1	Inflow=1.99 cfs 0.178 af Outflow=1.99 cfs 0.178 af
Reach AP2: Analysis Point 2	Inflow=0.35 cfs 0.026 af Outflow=0.35 cfs 0.026 af
Pond 1P: Pocket Pond 1	Peak Elev=19.84' Storage=3,447 cf Inflow=1.76 cfs 0.189 af Discarded=0.28 cfs 0.189 af Primary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.189 af

25071.2-PROPOSED*Type III 24-hr 2-YR STORM Rainfall=3.71"*

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Pond 2P: Existing Pond	Peak Elev=21.31' Storage=436 cf Inflow=0.73 cfs 0.055 af Discarded=0.05 cfs 0.021 af Primary=0.36 cfs 0.034 af Outflow=0.41 cfs 0.055 af
Pond 3P: Focal Point 1	Peak Elev=22.58' Storage=81 cf Inflow=0.83 cfs 0.064 af Outflow=0.97 cfs 0.064 af
Pond 4P: Chamber System A	Peak Elev=20.39' Storage=0.025 af Inflow=0.97 cfs 0.064 af Discarded=0.05 cfs 0.050 af Primary=0.24 cfs 0.014 af Outflow=0.29 cfs 0.064 af
Pond 5P: Focal Point 2	Peak Elev=23.00' Storage=36 cf Inflow=0.55 cfs 0.041 af Outflow=0.57 cfs 0.041 af
Pond 6P: Chamber System B	Peak Elev=20.42' Storage=0.019 af Inflow=0.57 cfs 0.041 af Discarded=0.05 cfs 0.041 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.041 af
Pond 7P: Filtration Drip Edge	Peak Elev=20.77' Storage=976 cf Inflow=0.76 cfs 0.062 af Discarded=0.28 cfs 0.051 af Primary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.051 af
Pond 9P: Diversion Culvert	Peak Elev=21.75' Inflow=1.15 cfs 0.117 af 18.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/ Outflow=1.15 cfs 0.117 af
Pond 10P: Driveway Culvert	Peak Elev=20.76' Inflow=1.56 cfs 0.166 af 18.0" Round Culvert n=0.013 L=36.0' S=0.0056 '/ Outflow=1.56 cfs 0.166 af
Pond CB1: Existing Catch Basin 1	Peak Elev=23.60' Inflow=0.13 cfs 0.010 af 12.0" Round Culvert n=0.012 L=28.0' S=0.0075 '/ Outflow=0.13 cfs 0.010 af
Pond CB2: Existing Catch Basin 2	Peak Elev=19.31' Inflow=0.21 cfs 0.016 af 12.0" Round Culvert n=0.012 L=36.0' S=0.0078 '/ Outflow=0.21 cfs 0.016 af
Pond DMH1: Drain Manhole 1	Peak Elev=20.25' Inflow=0.24 cfs 0.014 af 12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/ Outflow=0.24 cfs 0.014 af
Pond DMH2: Drain Manhole 2	Peak Elev=21.46' Inflow=1.18 cfs 0.120 af 18.0" Round Culvert n=0.013 L=92.0' S=0.0054 '/ Outflow=1.18 cfs 0.120 af
Pond DMH3: Drain Manhole 3	Peak Elev=20.08' Inflow=0.00 cfs 0.000 af 12.0" Round Culvert n=0.013 L=38.0' S=0.0061 '/ Outflow=0.00 cfs 0.000 af
Pond DMH4: Drain Manhole 4	Peak Elev=19.75' Inflow=0.00 cfs 0.000 af 12.0" Round Culvert n=0.013 L=106.0' S=0.0052 '/ Outflow=0.00 cfs 0.000 af
Pond DMH5: Drain Manhole 5	Peak Elev=19.10' Inflow=0.00 cfs 0.000 af 12.0" Round Culvert n=0.013 L=24.0' S=0.0083 '/ Outflow=0.00 cfs 0.000 af
Pond YD: Yard Drain	Peak Elev=21.78' Inflow=0.03 cfs 0.003 af 12.0" Round Culvert n=0.013 L=28.0' S=0.0107 '/ Outflow=0.03 cfs 0.003 af

Total Runoff Area = 5.186 ac Runoff Volume = 0.567 af Average Runoff Depth = 1.31"
68.71% Pervious = 3.563 ac 31.29% Impervious = 1.623 ac

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S	Runoff Area=6,767 sf 6.12% Impervious Runoff Depth=1.92" Tc=6.0 min CN=63 Runoff=0.33 cfs 0.025 af
Subcatchment2S: Subcatchment2S	Runoff Area=22,794 sf 37.44% Impervious Runoff Depth=2.69" Tc=6.0 min CN=72 Runoff=1.62 cfs 0.117 af
Subcatchment3S: Subcatchment3S	Runoff Area=81,585 sf 28.58% Impervious Runoff Depth=2.51" Flow Length=599' Tc=10.5 min CN=70 Runoff=4.66 cfs 0.392 af
Subcatchment4S: Subcatchment4S	Runoff Area=1,897 sf 80.02% Impervious Runoff Depth=4.60" Tc=6.0 min CN=91 Runoff=0.22 cfs 0.017 af
Subcatchment5S: Subcatchment5S	Runoff Area=2,929 sf 83.27% Impervious Runoff Depth=4.71" Tc=6.0 min CN=92 Runoff=0.34 cfs 0.026 af
Subcatchment6S: Subcatchment6S	Runoff Area=10,956 sf 88.57% Impervious Runoff Depth=4.93" Tc=6.0 min CN=94 Runoff=1.31 cfs 0.103 af
Subcatchment7S: Subcatchment7S	Runoff Area=7,753 sf 80.83% Impervious Runoff Depth=4.60" Tc=6.0 min CN=91 Runoff=0.89 cfs 0.068 af
Subcatchment8S: Subcatchment8S	Runoff Area=9,332 sf 83.20% Impervious Runoff Depth=5.39" Tc=6.0 min CN=98 Runoff=1.15 cfs 0.096 af
Subcatchment9S: Subcatchment9S	Runoff Area=3,563 sf 0.00% Impervious Runoff Depth=1.46" Flow Length=79' Tc=8.0 min CN=57 Runoff=0.11 cfs 0.010 af
Subcatchment10S: Subcatchment10S	Runoff Area=66,680 sf 16.11% Impervious Runoff Depth=2.17" Flow Length=284' Tc=12.5 min CN=66 Runoff=3.03 cfs 0.277 af
Subcatchment11S: Subcatchment11S	Runoff Area=11,665 sf 0.00% Impervious Runoff Depth=1.46" Flow Length=120' Tc=8.0 min CN=57 Runoff=0.37 cfs 0.032 af
Reach 2R: Diversion Swale	Avg. Flow Depth=0.51' Max Vel=1.73 fps Inflow=3.13 cfs 0.287 af n=0.030 L=60.0' S=0.0050 '/' Capacity=12.47 cfs Outflow=3.13 cfs 0.287 af
Reach 11R: Overland Flow	Avg. Flow Depth=0.15' Max Vel=0.36 fps Inflow=0.99 cfs 0.086 af n=0.070 L=66.0' S=0.0061 '/' Capacity=13.24 cfs Outflow=0.97 cfs 0.086 af
Reach AP1: Analysis Point 1	Inflow=4.67 cfs 0.561 af Outflow=4.67 cfs 0.561 af
Reach AP2: Analysis Point 2	Inflow=0.56 cfs 0.043 af Outflow=0.56 cfs 0.043 af
Pond 1P: Pocket Pond 1	Peak Elev=20.74' Storage=6,635 cf Inflow=5.36 cfs 0.471 af Discarded=0.45 cfs 0.311 af Primary=1.87 cfs 0.160 af Outflow=2.32 cfs 0.471 af

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Pond 2P: Existing Pond	Peak Elev=21.54' Storage=831 cf Inflow=1.62 cfs 0.117 af Discarded=0.06 cfs 0.031 af Primary=0.99 cfs 0.086 af Outflow=1.06 cfs 0.117 af
Pond 3P: Focal Point 1	Peak Elev=22.61' Storage=84 cf Inflow=1.31 cfs 0.103 af Outflow=1.31 cfs 0.103 af
Pond 4P: Chamber System A	Peak Elev=20.76' Storage=0.032 af Inflow=1.31 cfs 0.103 af Discarded=0.06 cfs 0.062 af Primary=0.78 cfs 0.041 af Outflow=0.84 cfs 0.103 af
Pond 5P: Focal Point 2	Peak Elev=23.04' Storage=38 cf Inflow=0.89 cfs 0.068 af Outflow=0.89 cfs 0.068 af
Pond 6P: Chamber System B	Peak Elev=20.98' Storage=0.032 af Inflow=0.89 cfs 0.068 af Discarded=0.06 cfs 0.063 af Primary=0.07 cfs 0.005 af Outflow=0.13 cfs 0.068 af
Pond 7P: Filtration Drip Edge	Peak Elev=21.25' Storage=1,274 cf Inflow=1.15 cfs 0.096 af Discarded=0.32 cfs 0.082 af Primary=0.28 cfs 0.003 af Outflow=0.60 cfs 0.085 af
Pond 9P: Diversion Culvert	Peak Elev=22.21' Inflow=3.03 cfs 0.277 af 18.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=3.03 cfs 0.277 af
Pond 10P: Driveway Culvert	Peak Elev=21.30' Inflow=4.38 cfs 0.405 af 18.0" Round Culvert n=0.013 L=36.0' S=0.0056 '/' Outflow=4.38 cfs 0.405 af
Pond CB1: Existing Catch Basin 1	Peak Elev=23.65' Inflow=0.22 cfs 0.017 af 12.0" Round Culvert n=0.012 L=28.0' S=0.0075 '/' Outflow=0.22 cfs 0.017 af
Pond CB2: Existing Catch Basin 2	Peak Elev=19.38' Inflow=0.34 cfs 0.026 af 12.0" Round Culvert n=0.012 L=36.0' S=0.0078 '/' Outflow=0.34 cfs 0.026 af
Pond DMH1: Drain Manhole 1	Peak Elev=20.75' Inflow=0.78 cfs 0.041 af 12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/' Outflow=0.78 cfs 0.041 af
Pond DMH2: Drain Manhole 2	Peak Elev=21.88' Inflow=3.13 cfs 0.287 af 18.0" Round Culvert n=0.013 L=92.0' S=0.0054 '/' Outflow=3.13 cfs 0.287 af
Pond DMH3: Drain Manhole 3	Peak Elev=20.23' Inflow=0.07 cfs 0.005 af 12.0" Round Culvert n=0.013 L=38.0' S=0.0061 '/' Outflow=0.07 cfs 0.005 af
Pond DMH4: Drain Manhole 4	Peak Elev=19.90' Inflow=0.07 cfs 0.005 af 12.0" Round Culvert n=0.013 L=106.0' S=0.0052 '/' Outflow=0.07 cfs 0.005 af
Pond DMH5: Drain Manhole 5	Peak Elev=19.24' Inflow=0.07 cfs 0.005 af 12.0" Round Culvert n=0.013 L=24.0' S=0.0083 '/' Outflow=0.07 cfs 0.005 af
Pond YD: Yard Drain	Peak Elev=21.95' Inflow=0.11 cfs 0.010 af 12.0" Round Culvert n=0.013 L=28.0' S=0.0107 '/' Outflow=0.11 cfs 0.010 af

Total Runoff Area = 5.186 ac Runoff Volume = 1.165 af Average Runoff Depth = 2.70"
68.71% Pervious = 3.563 ac 31.29% Impervious = 1.623 ac

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 0.33 cfs @ 12.10 hrs, Volume= 0.025 af, Depth= 1.92"
 Routed to Pond 1P : Pocket Pond 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
6,353	61	>75% Grass cover, Good, HSG B
414	98	Paved roads w/curbs & sewers, HSG B
6,767	63	Weighted Average
6,353		93.88% Pervious Area
414		6.12% Impervious Area

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

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 1.62 cfs @ 12.09 hrs, Volume= 0.117 af, Depth= 2.69"
 Routed to Pond 2P : Existing Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
7,719	98	Paved parking, HSG B
815	98	Roofs, HSG B
9,211	61	>75% Grass cover, Good, HSG B
1,310	55	Woods, Good, HSG B
3,739	48	Brush, Good, HSG B
22,794	72	Weighted Average
14,260		62.56% Pervious Area
8,534		37.44% Impervious Area

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

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 4.66 cfs @ 12.15 hrs, Volume= 0.392 af, Depth= 2.51"
 Routed to Reach AP1 : Analysis Point 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Area (sf)	CN	Description
12,370	55	Woods, Good, HSG B
8,649	98	Paved roads w/curbs & sewers, HSG B
58,674	70	1/2 acre lots, 25% imp, HSG B
1,892	61	>75% Grass cover, Good, HSG B
81,585	70	Weighted Average
58,268		71.42% Pervious Area
23,318		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.0200	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.71"
0.7	55	0.0364	1.34		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	59	0.0476	1.53		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	208	0.0260	3.27		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	33	0.0303	1.22		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.3	86	0.0233	1.07		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	50	0.0385	0.98		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	58	0.0090	3.35	16.73	Trap/Vee/Rect Channel Flow, Diversion Swale Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.030 Earth, grassed & winding
10.5	599	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 4.60"
Routed to Pond CB1 : Existing Catch Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
1,518	98	Paved roads w/curbs & sewers, HSG B
379	61	>75% Grass cover, Good, HSG B
1,897	91	Weighted Average
379		19.98% Pervious Area
1,518		80.02% Impervious Area

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

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Summary for Subcatchment 5S: Subcatchment 5S

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 4.71"
 Routed to Pond CB2 : Existing Catch Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
2,439	98	Paved roads w/curbs & sewers, HSG B
490	61	>75% Grass cover, Good, HSG B
2,929	92	Weighted Average
490		16.73% Pervious Area
2,439		83.27% Impervious Area

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

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 1.31 cfs @ 12.09 hrs, Volume= 0.103 af, Depth= 4.93"
 Routed to Pond 3P : Focal Point 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
4,814	98	Paved parking, HSG B
1,252	61	>75% Grass cover, Good, HSG B
4,890	98	Roofs, HSG B
10,956	94	Weighted Average
1,252		11.43% Pervious Area
9,704		88.57% Impervious Area

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

Summary for Subcatchment 7S: Subcatchment 7S

Runoff = 0.89 cfs @ 12.09 hrs, Volume= 0.068 af, Depth= 4.60"
 Routed to Pond 5P : Focal Point 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Area (sf)	CN	Description
6,267	98	Paved parking, HSG B
1,486	61	>75% Grass cover, Good, HSG B
7,753	91	Weighted Average
1,486		19.17% Pervious Area
6,267		80.83% Impervious Area

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

Summary for Subcatchment 8S: Subcatchment 8S

Runoff = 1.15 cfs @ 12.09 hrs, Volume= 0.096 af, Depth= 5.39"
 Routed to Pond 7P : Filtration Drip Edge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
7,764	98	Roofs, HSG B
1,568	98	Water Surface, 0% imp, HSG B
9,332	98	Weighted Average
1,568		16.80% Pervious Area
7,764		83.20% Impervious Area

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

Summary for Subcatchment 9S: Subcatchment 9S

Runoff = 0.11 cfs @ 12.13 hrs, Volume= 0.010 af, Depth= 1.46"
 Routed to Pond YD : Yard Drain

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
2,652	55	Woods, Good, HSG B
911	61	>75% Grass cover, Good, HSG B
3,563	57	Weighted Average
3,563		100.00% Pervious Area

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	14	0.0500	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
3.3	28	0.1429	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
1.6	8	0.0714	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
0.1	6	0.0714	1.87		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	23	0.0100	3.53	17.63	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.030 Earth, grassed & winding
8.0	79	Total			

Summary for Subcatchment 10S: Subcatchment 10S

Intent of final Tc segment is to demonstrate adequacy of provided diversion swale dimensions.

Runoff = 3.03 cfs @ 12.18 hrs, Volume= 0.277 af, Depth= 2.17"
 Routed to Pond 9P : Diversion Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
14,284	55	Woods, Good, HSG B
1,147	98	Roofs, HSG B
38,372	70	1/2 acre lots, 25% imp, HSG B
12,877	61	>75% Grass cover, Good, HSG B
66,680	66	Weighted Average
55,940		83.89% Pervious Area
10,740		16.11% Impervious Area

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	15	0.1000	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 3.71"
7.2	35	0.0308	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
0.6	30	0.0308	0.88		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	25	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.1	92	0.0217	0.74		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	51	0.0392	0.99		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	11	0.0270	0.82		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	16	0.0270	1.15		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	9	0.0160	4.46	22.30	Trap/Vee/Rect Channel Flow, Diversion Swale Segment Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.030 Earth, grassed & winding
12.5	284	Total			

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 0.37 cfs @ 12.13 hrs, Volume= 0.032 af, Depth= 1.46"
Routed to Pond 10P : Driveway Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR STORM Rainfall=5.63"

Area (sf)	CN	Description
7,405	55	Woods, Good, HSG B
4,260	61	>75% Grass cover, Good, HSG B
11,665	57	Weighted Average
11,665		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	15	0.0667	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
2.5	22	0.1818	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
1.9	13	0.1176	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
0.4	38	0.1176	1.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.5	32	0.0469	1.08		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.0	120	Total			

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Summary for Reach 2R: Diversion Swale

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.613 ac, 15.29% Impervious, Inflow Depth = 2.13" for 10-YR STORM event
Inflow = 3.13 cfs @ 12.18 hrs, Volume= 0.287 af
Outflow = 3.13 cfs @ 12.19 hrs, Volume= 0.287 af, Atten= 0%, Lag= 0.5 min
Routed to Pond 10P : Driveway Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.73 fps, Min. Travel Time= 0.6 min
Avg. Velocity= 0.65 fps, Avg. Travel Time= 1.5 min

Peak Storage= 109 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.51' , Surface Width= 5.08'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 12.47 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 ' / ' Top Width= 8.00'
Length= 60.0' Slope= 0.0050 ' / '
Inlet Invert= 20.40', Outlet Invert= 20.10'



Summary for Reach 11R: Overland Flow

Inflow Area = 0.523 ac, 37.44% Impervious, Inflow Depth = 1.98" for 10-YR STORM event
Inflow = 0.99 cfs @ 12.20 hrs, Volume= 0.086 af
Outflow = 0.97 cfs @ 12.25 hrs, Volume= 0.086 af, Atten= 2%, Lag= 2.7 min
Routed to Pond 10P : Driveway Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.36 fps, Min. Travel Time= 3.1 min
Avg. Velocity= 0.10 fps, Avg. Travel Time= 10.6 min

Peak Storage= 180 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.15' , Surface Width= 27.35'
Bank-Full Depth= 0.50' Flow Area= 16.7 sf, Capacity= 13.24 cfs

50.00' x 0.50' deep Parabolic Channel, n= 0.070 Medium-dense brush, winter
Length= 66.0' Slope= 0.0061 ' / '
Inlet Invert= 20.50', Outlet Invert= 20.10'

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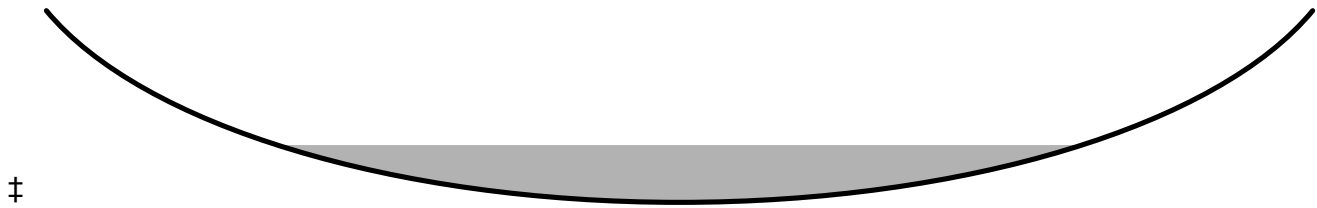
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**Summary for Reach AP1: Analysis Point 1**

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

Inflow Area = 5.076 ac, 30.19% Impervious, Inflow Depth = 1.33" for 10-YR STORM event
 Inflow = 4.67 cfs @ 12.16 hrs, Volume= 0.561 af
 Outflow = 4.67 cfs @ 12.16 hrs, Volume= 0.561 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

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

Inflow Area = 0.111 ac, 81.99% Impervious, Inflow Depth = 4.66" for 10-YR STORM event
 Inflow = 0.56 cfs @ 12.09 hrs, Volume= 0.043 af
 Outflow = 0.56 cfs @ 12.09 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 1P: Pocket Pond 1

[80] Warning: Exceeded Pond DMH1 by 0.03' @ 16.95 hrs (0.00 cfs 0.000 af)

Inflow Area = 2.810 ac, 24.01% Impervious, Inflow Depth = 2.01" for 10-YR STORM event
 Inflow = 5.36 cfs @ 12.19 hrs, Volume= 0.471 af
 Outflow = 2.32 cfs @ 12.55 hrs, Volume= 0.471 af, Atten= 57%, Lag= 21.8 min
 Discarded = 0.45 cfs @ 12.55 hrs, Volume= 0.311 af
 Primary = 1.87 cfs @ 12.55 hrs, Volume= 0.160 af

Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 20.74' @ 12.55 hrs Surf.Area= 3,924 sf Storage= 6,635 cf

Plug-Flow detention time= 129.1 min calculated for 0.471 af (100% of inflow)

Center-of-Mass det. time= 128.9 min (975.2 - 846.3)

Volume	Invert	Avail.Storage	Storage Description
#1	18.50'	12,310 cf	Custom Stage Data (Irregular) Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
18.50	1,715	240.0	0	0	1,715
18.75	2,281	255.0	498	498	2,309
20.00	3,293	284.0	3,464	3,962	3,598
22.00	5,122	324.0	8,348	12,310	5,626

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	18.0" Round Culvert L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.90' S= 0.0067 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Discarded	18.50'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 18.17' Phase-In= 0.10'

Discarded OutFlow Max=0.45 cfs @ 12.55 hrs HW=20.74' (Free Discharge)↑**2=Exfiltration** (Controls 0.45 cfs)**Primary OutFlow** Max=1.87 cfs @ 12.55 hrs HW=20.74' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 1.87 cfs @ 3.14 fps)**Summary for Pond 2P: Existing Pond**

Pond areas, elevations, and culvert parameters are assumed.

Inflow Area =	0.523 ac, 37.44% Impervious, Inflow Depth = 2.69" for 10-YR STORM event
Inflow =	1.62 cfs @ 12.09 hrs, Volume= 0.117 af
Outflow =	1.06 cfs @ 12.20 hrs, Volume= 0.117 af, Atten= 35%, Lag= 6.5 min
Discarded =	0.06 cfs @ 12.20 hrs, Volume= 0.031 af
Primary =	0.99 cfs @ 12.20 hrs, Volume= 0.086 af
Routed to Reach 11R : Overland Flow	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 21.54' @ 12.20 hrs Surf.Area= 1,912 sf Storage= 831 cf

Plug-Flow detention time= 24.3 min calculated for 0.117 af (100% of inflow)

Center-of-Mass det. time= 23.9 min (860.4 - 836.6)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	1,882 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	1,209	140.0	0	0	1,209
22.00	2,647	210.0	1,882	1,882	3,166

Device	Routing	Invert	Outlet Devices
#1	Discarded	21.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 20.00' Phase-In= 0.10'
#2	Primary	21.00'	15.0" Round Culvert L= 30.0' CPP, projecting, no headwall, Ke= 0.900

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Inlet / Outlet Invert= 21.00' / 20.50' S= 0.0167 '/' Cc= 0.900
 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Discarded OutFlow Max=0.06 cfs @ 12.20 hrs HW=21.54' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=0.99 cfs @ 12.20 hrs HW=21.54' TW=20.65' (Dynamic Tailwater)

↑ **2=Culvert** (Inlet Controls 0.99 cfs @ 1.97 fps)

Summary for Pond 3P: Focal Point 1

Inflow Area = 0.252 ac, 88.57% Impervious, Inflow Depth = 4.93" for 10-YR STORM event

Inflow = 1.31 cfs @ 12.09 hrs, Volume= 0.103 af

Outflow = 1.31 cfs @ 12.09 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.2 min

Primary = 1.31 cfs @ 12.09 hrs, Volume= 0.103 af

Routed to Pond 4P : Chamber System A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 22.61' @ 12.09 hrs Surf.Area= 237 sf Storage= 84 cf

Plug-Flow detention time= 1.2 min calculated for 0.103 af (100% of inflow)

Center-of-Mass det. time= 1.2 min (771.4 - 770.2)

Volume	Invert	Avail.Storage	Storage Description
#1	19.75'	37 cf	5.00'W x 9.00'L x 2.25'H Focal Point Area 1 Z=1.0 187 cf Overall x 20.0% Voids
#2	22.00'	63 cf	Surface Bowl (Prismatic) Listed below (Recalc)
		100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
22.00	45	0	0
22.75	123	63	63

Device	Routing	Invert	Outlet Devices
#1	Primary	19.25'	12.0" Round Culvert L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.25' / 19.20' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	19.75'	100.000 in/hr Exfiltration over Surface area Phase-In= 0.10'
#3	Device 1	19.25'	6.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	22.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.28 cfs @ 12.09 hrs HW=22.61' TW=20.55' (Dynamic Tailwater)

↑ **1=Culvert** (Passes 1.28 cfs of 4.28 cfs potential flow)

↑ **3=Orifice/Grate** (Passes 0.55 cfs of 1.73 cfs potential flow)

↑ **2=Exfiltration** (Exfiltration Controls 0.55 cfs)

↑ **4=Orifice/Grate** (Weir Controls 0.73 cfs @ 1.08 fps)

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Summary for Pond 4P: Chamber System A

Inflow Area = 0.252 ac, 88.57% Impervious, Inflow Depth = 4.93" for 10-YR STORM event
 Inflow = 1.31 cfs @ 12.09 hrs, Volume= 0.103 af
 Outflow = 0.84 cfs @ 12.17 hrs, Volume= 0.103 af, Atten= 36%, Lag= 5.0 min
 Discarded = 0.06 cfs @ 12.53 hrs, Volume= 0.062 af
 Primary = 0.78 cfs @ 12.17 hrs, Volume= 0.041 af
 Routed to Pond DMH1 : Drain Manhole 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 20.76' @ 12.53 hrs Surf.Area= 0.023 ac Storage= 0.032 af

Plug-Flow detention time= 143.0 min calculated for 0.103 af (100% of inflow)
 Center-of-Mass det. time= 143.2 min (914.6 - 771.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	19.20'	0.000 af	24.00'W x 42.00'L x 2.67'H Field A 0.062 af Overall - 0.062 af Embedded = 0.000 af x 40.0% Voids
#2A	19.20'	0.041 af	Shea Leaching Chamber 8x14x2.7x 9 Inside #1 Inside= 84.0"W x 24.0"H => 15.38 sf x 13.00'L = 200.0 cf Outside= 96.0"W x 32.0"H => 21.36 sf x 14.00'L = 299.0 cf 9 Chambers in 3 Rows
		0.041 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	20.10'	12.0" Round Culvert L= 3.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.10' / 20.05' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Discarded	19.20'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 18.17' Phase-In= 0.10'

Discarded OutFlow Max=0.06 cfs @ 12.53 hrs HW=20.76' (Free Discharge)↑**2=Exfiltration** (Controls 0.06 cfs)**Primary OutFlow** Max=0.72 cfs @ 12.17 hrs HW=20.68' TW=20.52' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 0.72 cfs @ 1.52 fps)**Summary for Pond 5P: Focal Point 2**

Inflow Area = 0.178 ac, 80.83% Impervious, Inflow Depth = 4.60" for 10-YR STORM event
 Inflow = 0.89 cfs @ 12.09 hrs, Volume= 0.068 af
 Outflow = 0.89 cfs @ 12.09 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.89 cfs @ 12.09 hrs, Volume= 0.068 af
 Routed to Pond 6P : Chamber System B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

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Peak Elev= 23.04' @ 12.09 hrs Surf.Area= 149 sf Storage= 38 cf

Plug-Flow detention time= 0.8 min calculated for 0.068 af (100% of inflow)

Center-of-Mass det. time= 0.8 min (783.9 - 783.0)

Volume	Invert	Avail.Storage	Storage Description
#1	20.50'	27 cf	4.00'W x 7.00'L x 2.25'H Focal Point Area 1 Z=1.0 134 cf Overall x 20.0% Voids
#2	22.75'	24 cf	Surface Bowl (Prismatic) Listed below (Recalc)
		51 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
22.75	28	0	0
23.25	68	24	24

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	12.0" Round Culvert L= 32.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.00' / 19.80' S= 0.0062 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	20.50'	100.000 in/hr Exfiltration over Surface area Phase-In= 0.10'
#3	Device 1	20.00'	6.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	22.95'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.87 cfs @ 12.09 hrs HW=23.04' TW=20.39' (Dynamic Tailwater)

1=Culvert (Passes 0.87 cfs of 4.76 cfs potential flow)
 3=Orifice/Grate (Passes 0.34 cfs of 1.95 cfs potential flow)
 2=Exfiltration (Exfiltration Controls 0.34 cfs)
 4=Orifice/Grate (Weir Controls 0.53 cfs @ 0.96 fps)

Summary for Pond 6P: Chamber System B

Inflow Area = 0.178 ac, 80.83% Impervious, Inflow Depth = 4.60" for 10-YR STORM event
 Inflow = 0.89 cfs @ 12.09 hrs, Volume= 0.068 af
 Outflow = 0.13 cfs @ 12.66 hrs, Volume= 0.068 af, Atten= 85%, Lag= 34.2 min
 Discarded = 0.06 cfs @ 12.66 hrs, Volume= 0.063 af
 Primary = 0.07 cfs @ 12.66 hrs, Volume= 0.005 af
 Routed to Pond DMH3 : Drain Manhole 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 20.98' @ 12.66 hrs Surf.Area= 0.026 ac Storage= 0.032 af

Plug-Flow detention time= 231.9 min calculated for 0.068 af (100% of inflow)

Center-of-Mass det. time= 231.5 min (1,015.4 - 783.9)

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Volume	Invert	Avail.Storage	Storage Description
#1A	19.60'	0.000 af	16.00'W x 70.00'L x 2.67'H Field A 0.069 af Overall - 0.069 af Embedded = 0.000 af x 40.0% Voids
#2A	19.60'	0.046 af	Shea Leaching Chamber 8x14x2.7x 10 Inside #1 Inside= 84.0"W x 24.0"H => 15.38 sf x 13.00'L = 200.0 cf Outside= 96.0"W x 32.0"H => 21.36 sf x 14.00'L = 299.0 cf 10 Chambers in 2 Rows
		0.046 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	20.80'	4.0" Round Culvert L= 3.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.80' / 20.75' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Primary	20.90'	8.0" Round Culvert L= 3.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.90' / 20.85' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Discarded	19.60'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 18.57' Phase-In= 0.10'

Discarded OutFlow Max=0.06 cfs @ 12.66 hrs HW=20.98' (Free Discharge)↑ **3=Exfiltration** (Controls 0.06 cfs)**Primary OutFlow** Max=0.07 cfs @ 12.66 hrs HW=20.98' TW=20.23' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 0.05 cfs @ 1.59 fps)↑ **2=Culvert** (Inlet Controls 0.02 cfs @ 0.75 fps)**Summary for Pond 7P: Filtration Drip Edge**

Actual drip edge consists of 20'Wx64'L section and 12'Wx24'L section

20*64+12*24 = 1,568 sf

1568/16 = 98

16'Wx98'L effective dimensions for modeling purposes

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=79)

Inflow Area = 0.214 ac, 83.20% Impervious, Inflow Depth = 5.39" for 10-YR STORM event
 Inflow = 1.15 cfs @ 12.09 hrs, Volume= 0.096 af
 Outflow = 0.60 cfs @ 12.25 hrs, Volume= 0.085 af, Atten= 48%, Lag= 9.9 min
 Discarded = 0.32 cfs @ 12.20 hrs, Volume= 0.082 af
 Primary = 0.28 cfs @ 12.25 hrs, Volume= 0.003 af
 Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 21.25' @ 12.20 hrs Surf.Area= 4,704 sf Storage= 1,274 cf

Plug-Flow detention time= 121.0 min calculated for 0.085 af (89% of inflow)

Center-of-Mass det. time= 66.1 min (812.2 - 746.1)

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Volume	Invert	Avail.Storage	Storage Description
#1	20.25'	627 cf	16.00'W x 98.00'L x 1.00'H Prismaoid 1,568 cf Overall x 40.0% Voids
#2	18.75'	118 cf	16.00'W x 98.00'L x 1.50'H Prismaoid 2,352 cf Overall x 5.0% Voids
#3	18.50'	59 cf	16.00'W x 98.00'L x 0.25'H Prismaoid 392 cf Overall x 15.0% Voids
#4	17.75'	470 cf	16.00'W x 98.00'L x 0.75'H Prismaoid Impervious 1,176 cf Overall x 40.0% Voids
		1,274 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	21.25'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	18.50'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 17.67' Phase-In= 0.10'

Discarded OutFlow Max=0.32 cfs @ 12.20 hrs HW=21.25' (Free Discharge)↑**1=Exfiltration** (Controls 0.32 cfs)**Primary OutFlow** Max=0.00 cfs @ 12.25 hrs HW=21.25' TW=0.00' (Dynamic Tailwater)**Summary for Pond 9P: Diversion Culvert**

Inflow Area = 1.531 ac, 16.11% Impervious, Inflow Depth = 2.17" for 10-YR STORM event
 Inflow = 3.03 cfs @ 12.18 hrs, Volume= 0.277 af
 Outflow = 3.03 cfs @ 12.18 hrs, Volume= 0.277 af, Atten= 0%, Lag= 0.0 min
 Primary = 3.03 cfs @ 12.18 hrs, Volume= 0.277 af
 Routed to Pond DMH2 : Drain Manhole 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 22.21' @ 12.18 hrs

Flood Elev= 23.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	21.20'	18.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.20' / 21.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.99 cfs @ 12.18 hrs HW=22.20' TW=21.87' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 2.99 cfs @ 3.38 fps)**Summary for Pond 10P: Driveway Culvert**

[63] Warning: Exceeded Reach 2R INLET depth by 0.39' @ 12.20 hrs

[64] Warning: Exceeded Reach 2R outlet bank by 0.20' @ 12.20 hrs

[63] Warning: Exceeded Reach 11R INLET depth by 0.65' @ 12.20 hrs

[64] Warning: Exceeded Reach 11R outlet bank by 0.70' @ 12.20 hrs

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Inflow Area = 2.404 ac, 18.41% Impervious, Inflow Depth = 2.02" for 10-YR STORM event
 Inflow = 4.38 cfs @ 12.20 hrs, Volume= 0.405 af
 Outflow = 4.38 cfs @ 12.20 hrs, Volume= 0.405 af, Atten= 0%, Lag= 0.0 min
 Primary = 4.38 cfs @ 12.20 hrs, Volume= 0.405 af
 Routed to Pond 1P : Pocket Pond 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 21.30' @ 12.20 hrs
 Flood Elev= 22.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.10'	18.0" Round Culvert L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.10' / 19.90' S= 0.0056 ' / S= 0.0056 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.36 cfs @ 12.20 hrs HW=21.30' TW=19.98' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 4.36 cfs @ 3.94 fps)

Summary for Pond CB1: Existing Catch Basin 1

End invert of pipe is assumed as inverts have not been measured on downstream structure

[58] Hint: Peaked 0.24' above defined flood level

Inflow Area = 0.044 ac, 80.02% Impervious, Inflow Depth = 4.60" for 10-YR STORM event
 Inflow = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af
 Outflow = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.22 cfs @ 12.09 hrs, Volume= 0.017 af
 Routed to Reach AP2 : Analysis Point 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 23.65' @ 12.09 hrs
 Flood Elev= 23.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	23.41'	12.0" Round Culvert L= 28.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 23.41' / 23.20' S= 0.0075 ' / S= 0.0075 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.21 cfs @ 12.09 hrs HW=23.65' TW=0.00' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 0.21 cfs @ 2.24 fps)

Summary for Pond CB2: Existing Catch Basin 2

End invert of pipe is assumed as inverts have not been measured on downstream structure

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Type III 24-hr 10-YR STORM Rainfall=5.63"

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Inflow Area = 0.067 ac, 83.27% Impervious, Inflow Depth = 4.71" for 10-YR STORM event
 Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af
 Outflow = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af
 Routed to Reach AP2 : Analysis Point 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 19.38' @ 12.09 hrs
 Flood Elev= 22.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.08'	12.0" Round Culvert L= 36.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 19.08' / 18.80' S= 0.0078 ' / S= 0.0078 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.33 cfs @ 12.09 hrs HW=19.38' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 0.33 cfs @ 2.57 fps)

Summary for Pond DMH1: Drain Manhole 1

Inflow Area = 0.252 ac, 88.57% Impervious, Inflow Depth = 1.97" for 10-YR STORM event
 Inflow = 0.78 cfs @ 12.17 hrs, Volume= 0.041 af
 Outflow = 0.78 cfs @ 12.17 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.78 cfs @ 12.17 hrs, Volume= 0.041 af
 Routed to Pond 1P : Pocket Pond 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 20.75' @ 12.55 hrs
 Flood Elev= 23.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.95'	12.0" Round Culvert L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.95' / 19.90' S= 0.0050 ' / S= 0.0050 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.17 hrs HW=20.52' TW=19.86' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 0.76 cfs @ 2.35 fps)

Summary for Pond DMH2: Drain Manhole 2

Inflow Area = 1.613 ac, 15.29% Impervious, Inflow Depth = 2.13" for 10-YR STORM event
 Inflow = 3.13 cfs @ 12.18 hrs, Volume= 0.287 af
 Outflow = 3.13 cfs @ 12.18 hrs, Volume= 0.287 af, Atten= 0%, Lag= 0.0 min
 Primary = 3.13 cfs @ 12.18 hrs, Volume= 0.287 af
 Routed to Reach 2R : Diversion Swale

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

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Peak Elev= 21.88' @ 12.18 hrs

Flood Elev= 24.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.90'	18.0" Round Culvert L= 92.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.90' / 20.40' S= 0.0054 ' / S= 0.0054 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.09 cfs @ 12.18 hrs HW=21.87' TW=20.91' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 3.09 cfs @ 3.63 fps)**Summary for Pond DMH3: Drain Manhole 3**

Inflow Area = 0.178 ac, 80.83% Impervious, Inflow Depth = 0.35" for 10-YR STORM event
Inflow = 0.07 cfs @ 12.66 hrs, Volume= 0.005 af
Outflow = 0.07 cfs @ 12.66 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min
Primary = 0.07 cfs @ 12.66 hrs, Volume= 0.005 af
Routed to Pond DMH4 : Drain Manhole 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 20.23' @ 12.66 hrs

Flood Elev= 23.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.08'	12.0" Round Culvert L= 38.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.08' / 19.85' S= 0.0061 ' / S= 0.0061 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.07 cfs @ 12.66 hrs HW=20.23' TW=19.90' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.07 cfs @ 1.44 fps)**Summary for Pond DMH4: Drain Manhole 4**

Inflow Area = 0.178 ac, 80.83% Impervious, Inflow Depth = 0.35" for 10-YR STORM event
Inflow = 0.07 cfs @ 12.66 hrs, Volume= 0.005 af
Outflow = 0.07 cfs @ 12.66 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min
Primary = 0.07 cfs @ 12.66 hrs, Volume= 0.005 af
Routed to Pond DMH5 : Drain Manhole 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 19.90' @ 12.66 hrs

Flood Elev= 23.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.75'	12.0" Round Culvert L= 106.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.75' / 19.20' S= 0.0052 ' / S= 0.0052 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

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Primary OutFlow Max=0.07 cfs @ 12.66 hrs HW=19.90' TW=19.24' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.07 cfs @ 1.40 fps)**Summary for Pond DMH5: Drain Manhole 5**

Inflow Area = 0.178 ac, 80.83% Impervious, Inflow Depth = 0.35" for 10-YR STORM event

Inflow = 0.07 cfs @ 12.66 hrs, Volume= 0.005 af

Outflow = 0.07 cfs @ 12.66 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Primary = 0.07 cfs @ 12.66 hrs, Volume= 0.005 af

Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 19.24' @ 12.66 hrs

Flood Elev= 22.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.10'	12.0" Round Culvert L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.10' / 18.90' S= 0.0083 ' / S= 0.0083 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.07 cfs @ 12.66 hrs HW=19.24' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 0.07 cfs @ 1.01 fps)**Summary for Pond YD: Yard Drain**

Inflow Area = 0.082 ac, 0.00% Impervious, Inflow Depth = 1.46" for 10-YR STORM event

Inflow = 0.11 cfs @ 12.13 hrs, Volume= 0.010 af

Outflow = 0.11 cfs @ 12.13 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Primary = 0.11 cfs @ 12.13 hrs, Volume= 0.010 af

Routed to Pond DMH2 : Drain Manhole 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 21.95' @ 12.17 hrs

Flood Elev= 23.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	21.70'	12.0" Round Culvert L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.70' / 21.40' S= 0.0107 ' / S= 0.0107 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.11 cfs @ 12.13 hrs HW=21.93' TW=21.82' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 0.11 cfs @ 1.26 fps)

25071.2-PROPOSED*Type III 24-hr 25-YR STORM Rainfall=7.13"*

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S	Runoff Area=6,767 sf 6.12% Impervious Runoff Depth=3.00" Tc=6.0 min CN=63 Runoff=0.53 cfs 0.039 af
Subcatchment2S: Subcatchment2S	Runoff Area=22,794 sf 37.44% Impervious Runoff Depth=3.94" Tc=6.0 min CN=72 Runoff=2.37 cfs 0.172 af
Subcatchment3S: Subcatchment3S	Runoff Area=81,585 sf 28.58% Impervious Runoff Depth=3.73" Flow Length=599' Tc=10.5 min CN=70 Runoff=6.97 cfs 0.582 af
Subcatchment4S: Subcatchment4S	Runoff Area=1,897 sf 80.02% Impervious Runoff Depth=6.07" Tc=6.0 min CN=91 Runoff=0.28 cfs 0.022 af
Subcatchment5S: Subcatchment5S	Runoff Area=2,929 sf 83.27% Impervious Runoff Depth=6.18" Tc=6.0 min CN=92 Runoff=0.44 cfs 0.035 af
Subcatchment6S: Subcatchment6S	Runoff Area=10,956 sf 88.57% Impervious Runoff Depth=6.42" Tc=6.0 min CN=94 Runoff=1.68 cfs 0.135 af
Subcatchment7S: Subcatchment7S	Runoff Area=7,753 sf 80.83% Impervious Runoff Depth=6.07" Tc=6.0 min CN=91 Runoff=1.16 cfs 0.090 af
Subcatchment8S: Subcatchment8S	Runoff Area=9,332 sf 83.20% Impervious Runoff Depth=6.89" Tc=6.0 min CN=98 Runoff=1.46 cfs 0.123 af
Subcatchment9S: Subcatchment9S	Runoff Area=3,563 sf 0.00% Impervious Runoff Depth=2.40" Flow Length=79' Tc=8.0 min CN=57 Runoff=0.20 cfs 0.016 af
Subcatchment10S: Subcatchment10S	Runoff Area=66,680 sf 16.11% Impervious Runoff Depth=3.31" Flow Length=284' Tc=12.5 min CN=66 Runoff=4.71 cfs 0.422 af
Subcatchment11S: Subcatchment11S	Runoff Area=11,665 sf 0.00% Impervious Runoff Depth=2.40" Flow Length=120' Tc=8.0 min CN=57 Runoff=0.66 cfs 0.054 af
Reach 2R: Diversion Swale	Avg. Flow Depth=0.64' Max Vel=1.95 fps Inflow=4.88 cfs 0.438 af n=0.030 L=60.0' S=0.0050 '/' Capacity=12.47 cfs Outflow=4.89 cfs 0.438 af
Reach 11R: Overland Flow	Avg. Flow Depth=0.18' Max Vel=0.41 fps Inflow=1.54 cfs 0.134 af n=0.070 L=66.0' S=0.0061 '/' Capacity=13.24 cfs Outflow=1.52 cfs 0.134 af
Reach AP1: Analysis Point 1	Inflow=9.39 cfs 0.972 af Outflow=9.39 cfs 0.972 af
Reach AP2: Analysis Point 2	Inflow=0.72 cfs 0.057 af Outflow=0.72 cfs 0.057 af
Pond 1P: Pocket Pond 1	Peak Elev=21.20' Storage=8,527 cf Inflow=8.15 cfs 0.729 af Discarded=0.54 cfs 0.371 af Primary=4.26 cfs 0.358 af Outflow=4.80 cfs 0.729 af

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Pond 2P: Existing Pond	Peak Elev=21.69' Storage=1,133 cf Inflow=2.37 cfs 0.172 af Discarded=0.07 cfs 0.038 af Primary=1.54 cfs 0.134 af Outflow=1.61 cfs 0.172 af
Pond 3P: Focal Point 1	Peak Elev=22.64' Storage=88 cf Inflow=1.68 cfs 0.135 af Outflow=1.68 cfs 0.135 af
Pond 4P: Chamber System A	Peak Elev=21.24' Storage=0.041 af Inflow=1.68 cfs 0.135 af Discarded=0.07 cfs 0.070 af Primary=1.06 cfs 0.064 af Outflow=1.12 cfs 0.135 af
Pond 5P: Focal Point 2	Peak Elev=23.07' Storage=40 cf Inflow=1.16 cfs 0.090 af Outflow=1.16 cfs 0.090 af
Pond 6P: Chamber System B	Peak Elev=21.17' Storage=0.036 af Inflow=1.16 cfs 0.090 af Discarded=0.07 cfs 0.070 af Primary=0.31 cfs 0.020 af Outflow=0.38 cfs 0.090 af
Pond 7P: Filtration Drip Edge	Peak Elev=21.25' Storage=1,274 cf Inflow=1.46 cfs 0.123 af Discarded=0.32 cfs 0.099 af Primary=0.99 cfs 0.013 af Outflow=1.32 cfs 0.112 af
Pond 9P: Diversion Culvert	Peak Elev=22.57' Inflow=4.71 cfs 0.422 af 18.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/ Outflow=4.71 cfs 0.422 af
Pond 10P: Driveway Culvert	Peak Elev=21.75' Inflow=6.91 cfs 0.625 af 18.0" Round Culvert n=0.013 L=36.0' S=0.0056 '/ Outflow=6.91 cfs 0.625 af
Pond CB1: Existing Catch Basin 1	Peak Elev=23.69' Inflow=0.28 cfs 0.022 af 12.0" Round Culvert n=0.012 L=28.0' S=0.0075 '/ Outflow=0.28 cfs 0.022 af
Pond CB2: Existing Catch Basin 2	Peak Elev=19.42' Inflow=0.44 cfs 0.035 af 12.0" Round Culvert n=0.012 L=36.0' S=0.0078 '/ Outflow=0.44 cfs 0.035 af
Pond DMH1: Drain Manhole 1	Peak Elev=21.22' Inflow=1.06 cfs 0.064 af 12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/ Outflow=1.06 cfs 0.064 af
Pond DMH2: Drain Manhole 2	Peak Elev=22.20' Inflow=4.88 cfs 0.438 af 18.0" Round Culvert n=0.013 L=92.0' S=0.0054 '/ Outflow=4.88 cfs 0.438 af
Pond DMH3: Drain Manhole 3	Peak Elev=20.40' Inflow=0.31 cfs 0.020 af 12.0" Round Culvert n=0.013 L=38.0' S=0.0061 '/ Outflow=0.31 cfs 0.020 af
Pond DMH4: Drain Manhole 4	Peak Elev=20.07' Inflow=0.31 cfs 0.020 af 12.0" Round Culvert n=0.013 L=106.0' S=0.0052 '/ Outflow=0.31 cfs 0.020 af
Pond DMH5: Drain Manhole 5	Peak Elev=19.41' Inflow=0.31 cfs 0.020 af 12.0" Round Culvert n=0.013 L=24.0' S=0.0083 '/ Outflow=0.31 cfs 0.020 af
Pond YD: Yard Drain	Peak Elev=22.22' Inflow=0.20 cfs 0.016 af 12.0" Round Culvert n=0.013 L=28.0' S=0.0107 '/ Outflow=0.20 cfs 0.016 af

Total Runoff Area = 5.186 ac Runoff Volume = 1.688 af Average Runoff Depth = 3.91"
68.71% Pervious = 3.563 ac 31.29% Impervious = 1.623 ac

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Subcatchment1S	Runoff Area=6,767 sf 6.12% Impervious Runoff Depth=4.10" Tc=6.0 min CN=63 Runoff=0.73 cfs 0.053 af
Subcatchment2S: Subcatchment2S	Runoff Area=22,794 sf 37.44% Impervious Runoff Depth=5.17" Tc=6.0 min CN=72 Runoff=3.10 cfs 0.226 af
Subcatchment3S: Subcatchment3S	Runoff Area=81,585 sf 28.58% Impervious Runoff Depth=4.93" Flow Length=599' Tc=10.5 min CN=70 Runoff=9.23 cfs 0.770 af
Subcatchment4S: Subcatchment4S	Runoff Area=1,897 sf 80.02% Impervious Runoff Depth=7.46" Tc=6.0 min CN=91 Runoff=0.34 cfs 0.027 af
Subcatchment5S: Subcatchment5S	Runoff Area=2,929 sf 83.27% Impervious Runoff Depth=7.58" Tc=6.0 min CN=92 Runoff=0.53 cfs 0.042 af
Subcatchment6S: Subcatchment6S	Runoff Area=10,956 sf 88.57% Impervious Runoff Depth=7.82" Tc=6.0 min CN=94 Runoff=2.03 cfs 0.164 af
Subcatchment7S: Subcatchment7S	Runoff Area=7,753 sf 80.83% Impervious Runoff Depth=7.46" Tc=6.0 min CN=91 Runoff=1.40 cfs 0.111 af
Subcatchment8S: Subcatchment8S	Runoff Area=9,332 sf 83.20% Impervious Runoff Depth=8.30" Tc=6.0 min CN=98 Runoff=1.75 cfs 0.148 af
Subcatchment9S: Subcatchment9S	Runoff Area=3,563 sf 0.00% Impervious Runoff Depth=3.39" Flow Length=79' Tc=8.0 min CN=57 Runoff=0.29 cfs 0.023 af
Subcatchment10S: Subcatchment10S	Runoff Area=66,680 sf 16.11% Impervious Runoff Depth=4.45" Flow Length=284' Tc=12.5 min CN=66 Runoff=6.38 cfs 0.568 af
Subcatchment11S: Subcatchment11S	Runoff Area=11,665 sf 0.00% Impervious Runoff Depth=3.39" Flow Length=120' Tc=8.0 min CN=57 Runoff=0.96 cfs 0.076 af
Reach 2R: Diversion Swale	Avg. Flow Depth=0.74' Max Vel=2.11 fps Inflow=6.68 cfs 0.591 af n=0.030 L=60.0' S=0.0050 '/' Capacity=12.47 cfs Outflow=6.64 cfs 0.591 af
Reach 11R: Overland Flow	Avg. Flow Depth=0.21' Max Vel=0.45 fps Inflow=2.05 cfs 0.182 af n=0.070 L=66.0' S=0.0061 '/' Capacity=13.24 cfs Outflow=2.03 cfs 0.182 af
Reach AP1: Analysis Point 1	Inflow=15.01 cfs 1.395 af Outflow=15.01 cfs 1.395 af
Reach AP2: Analysis Point 2	Inflow=0.88 cfs 0.070 af Outflow=0.88 cfs 0.070 af
Pond 1P: Pocket Pond 1	Peak Elev=21.64' Storage=10,515 cf Inflow=11.40 cfs 0.989 af Discarded=0.63 cfs 0.420 af Primary=6.78 cfs 0.568 af Outflow=7.41 cfs 0.989 af

25071.2-PROPOSED*Type III 24-hr 50-YR STORM Rainfall=8.54"*

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Pond 2P: Existing Pond	Peak Elev=21.81' Storage=1,418 cf Inflow=3.10 cfs 0.226 af Discarded=0.08 cfs 0.044 af Primary=2.05 cfs 0.182 af Outflow=2.14 cfs 0.226 af
Pond 3P: Focal Point 1	Peak Elev=22.67' Storage=91 cf Inflow=2.03 cfs 0.164 af Outflow=2.02 cfs 0.164 af
Pond 4P: Chamber System A	Peak Elev=21.86' Storage=0.041 af Inflow=2.02 cfs 0.164 af Discarded=0.08 cfs 0.077 af Primary=1.46 cfs 0.087 af Outflow=1.55 cfs 0.164 af
Pond 5P: Focal Point 2	Peak Elev=23.09' Storage=41 cf Inflow=1.40 cfs 0.111 af Outflow=1.41 cfs 0.111 af
Pond 6P: Chamber System B	Peak Elev=21.34' Storage=0.040 af Inflow=1.41 cfs 0.111 af Discarded=0.07 cfs 0.076 af Primary=0.58 cfs 0.034 af Outflow=0.65 cfs 0.111 af
Pond 7P: Filtration Drip Edge	Peak Elev=21.25' Storage=1,274 cf Inflow=1.75 cfs 0.148 af Discarded=0.32 cfs 0.115 af Primary=1.47 cfs 0.022 af Outflow=1.79 cfs 0.137 af
Pond 9P: Diversion Culvert	Peak Elev=23.20' Inflow=6.38 cfs 0.568 af 18.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/ Outflow=6.38 cfs 0.568 af
Pond 10P: Driveway Culvert	Peak Elev=22.59' Inflow=9.43 cfs 0.849 af 18.0" Round Culvert n=0.013 L=36.0' S=0.0056 '/ Outflow=9.43 cfs 0.849 af
Pond CB1: Existing Catch Basin 1	Peak Elev=23.72' Inflow=0.34 cfs 0.027 af 12.0" Round Culvert n=0.012 L=28.0' S=0.0075 '/ Outflow=0.34 cfs 0.027 af
Pond CB2: Existing Catch Basin 2	Peak Elev=19.46' Inflow=0.53 cfs 0.042 af 12.0" Round Culvert n=0.012 L=36.0' S=0.0078 '/ Outflow=0.53 cfs 0.042 af
Pond DMH1: Drain Manhole 1	Peak Elev=21.74' Inflow=1.46 cfs 0.087 af 12.0" Round Culvert n=0.013 L=10.0' S=0.0050 '/ Outflow=1.46 cfs 0.087 af
Pond DMH2: Drain Manhole 2	Peak Elev=22.64' Inflow=6.68 cfs 0.591 af 18.0" Round Culvert n=0.013 L=92.0' S=0.0054 '/ Outflow=6.68 cfs 0.591 af
Pond DMH3: Drain Manhole 3	Peak Elev=20.54' Inflow=0.58 cfs 0.034 af 12.0" Round Culvert n=0.013 L=38.0' S=0.0061 '/ Outflow=0.58 cfs 0.034 af
Pond DMH4: Drain Manhole 4	Peak Elev=20.20' Inflow=0.58 cfs 0.034 af 12.0" Round Culvert n=0.013 L=106.0' S=0.0052 '/ Outflow=0.58 cfs 0.034 af
Pond DMH5: Drain Manhole 5	Peak Elev=19.54' Inflow=0.58 cfs 0.034 af 12.0" Round Culvert n=0.013 L=24.0' S=0.0083 '/ Outflow=0.58 cfs 0.034 af
Pond YD: Yard Drain	Peak Elev=22.64' Inflow=0.29 cfs 0.023 af 12.0" Round Culvert n=0.013 L=28.0' S=0.0107 '/ Outflow=0.29 cfs 0.023 af

Total Runoff Area = 5.186 ac Runoff Volume = 2.208 af Average Runoff Depth = 5.11"
68.71% Pervious = 3.563 ac 31.29% Impervious = 1.623 ac

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Summary for Subcatchment 1S: Subcatchment 1S

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.053 af, Depth= 4.10"
 Routed to Pond 1P : Pocket Pond 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
6,353	61	>75% Grass cover, Good, HSG B
414	98	Paved roads w/curbs & sewers, HSG B
6,767	63	Weighted Average
6,353		93.88% Pervious Area
414		6.12% Impervious Area

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

Summary for Subcatchment 2S: Subcatchment 2S

Runoff = 3.10 cfs @ 12.09 hrs, Volume= 0.226 af, Depth= 5.17"
 Routed to Pond 2P : Existing Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
7,719	98	Paved parking, HSG B
815	98	Roofs, HSG B
9,211	61	>75% Grass cover, Good, HSG B
1,310	55	Woods, Good, HSG B
3,739	48	Brush, Good, HSG B
22,794	72	Weighted Average
14,260		62.56% Pervious Area
8,534		37.44% Impervious Area

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

Summary for Subcatchment 3S: Subcatchment 3S

Runoff = 9.23 cfs @ 12.15 hrs, Volume= 0.770 af, Depth= 4.93"
 Routed to Reach AP1 : Analysis Point 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
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Area (sf)	CN	Description
12,370	55	Woods, Good, HSG B
8,649	98	Paved roads w/curbs & sewers, HSG B
58,674	70	1/2 acre lots, 25% imp, HSG B
1,892	61	>75% Grass cover, Good, HSG B
81,585	70	Weighted Average
58,268		71.42% Pervious Area
23,318		28.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.0200	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.71"
0.7	55	0.0364	1.34		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.6	59	0.0476	1.53		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.1	208	0.0260	3.27		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	33	0.0303	1.22		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.3	86	0.0233	1.07		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.8	50	0.0385	0.98		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	58	0.0090	3.35	16.73	Trap/Vee/Rect Channel Flow, Diversion Swale Bot.W=2.00' D=1.00' Z= 3.0 ' / Top.W=8.00' n= 0.030 Earth, grassed & winding
10.5	599	Total			

Summary for Subcatchment 4S: Subcatchment 4S

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.027 af, Depth= 7.46"
 Routed to Pond CB1 : Existing Catch Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
1,518	98	Paved roads w/curbs & sewers, HSG B
379	61	>75% Grass cover, Good, HSG B
1,897	91	Weighted Average
379		19.98% Pervious Area
1,518		80.02% Impervious Area

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

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Summary for Subcatchment 5S: Subcatchment 5S

Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.042 af, Depth= 7.58"
 Routed to Pond CB2 : Existing Catch Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
2,439	98	Paved roads w/curbs & sewers, HSG B
490	61	>75% Grass cover, Good, HSG B
2,929	92	Weighted Average
490		16.73% Pervious Area
2,439		83.27% Impervious Area

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

Summary for Subcatchment 6S: Subcatchment 6S

Runoff = 2.03 cfs @ 12.09 hrs, Volume= 0.164 af, Depth= 7.82"
 Routed to Pond 3P : Focal Point 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
4,814	98	Paved parking, HSG B
1,252	61	>75% Grass cover, Good, HSG B
4,890	98	Roofs, HSG B
10,956	94	Weighted Average
1,252		11.43% Pervious Area
9,704		88.57% Impervious Area

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

Summary for Subcatchment 7S: Subcatchment 7S

Runoff = 1.40 cfs @ 12.09 hrs, Volume= 0.111 af, Depth= 7.46"
 Routed to Pond 5P : Focal Point 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

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Area (sf)	CN	Description
6,267	98	Paved parking, HSG B
1,486	61	>75% Grass cover, Good, HSG B
7,753	91	Weighted Average
1,486		19.17% Pervious Area
6,267		80.83% Impervious Area

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

Summary for Subcatchment 8S: Subcatchment 8S

Runoff = 1.75 cfs @ 12.09 hrs, Volume= 0.148 af, Depth= 8.30"
 Routed to Pond 7P : Filtration Drip Edge

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
7,764	98	Roofs, HSG B
1,568	98	Water Surface, 0% imp, HSG B
9,332	98	Weighted Average
1,568		16.80% Pervious Area
7,764		83.20% Impervious Area

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

Summary for Subcatchment 9S: Subcatchment 9S

Runoff = 0.29 cfs @ 12.12 hrs, Volume= 0.023 af, Depth= 3.39"
 Routed to Pond YD : Yard Drain

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
2,652	55	Woods, Good, HSG B
911	61	>75% Grass cover, Good, HSG B
3,563	57	Weighted Average
3,563		100.00% Pervious Area

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Type III 24-hr 50-YR STORM Rainfall=8.54"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	14	0.0500	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
3.3	28	0.1429	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
1.6	8	0.0714	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
0.1	6	0.0714	1.87		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	23	0.0100	3.53	17.63	Trap/Vee/Rect Channel Flow, Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.030 Earth, grassed & winding
8.0	79	Total			

Summary for Subcatchment 10S: Subcatchment 10S

Intent of final Tc segment is to demonstrate adequacy of provided diversion swale dimensions.

Runoff = 6.38 cfs @ 12.18 hrs, Volume= 0.568 af, Depth= 4.45"
 Routed to Pond 9P : Diversion Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
14,284	55	Woods, Good, HSG B
1,147	98	Roofs, HSG B
38,372	70	1/2 acre lots, 25% imp, HSG B
12,877	61	>75% Grass cover, Good, HSG B
66,680	66	Weighted Average
55,940		83.89% Pervious Area
10,740		16.11% Impervious Area

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Type III 24-hr 50-YR STORM Rainfall=8.54"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	15	0.1000	0.24		Sheet Flow, Grass: Short n= 0.150 P2= 3.71"
7.2	35	0.0308	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
0.6	30	0.0308	0.88		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	25	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
2.1	92	0.0217	0.74		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.9	51	0.0392	0.99		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	11	0.0270	0.82		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	16	0.0270	1.15		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	9	0.0160	4.46	22.30	Trap/Vee/Rect Channel Flow, Diversion Swale Segment Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.030 Earth, grassed & winding
12.5	284	Total			

Summary for Subcatchment 11S: Subcatchment 11S

Runoff = 0.96 cfs @ 12.12 hrs, Volume= 0.076 af, Depth= 3.39"
Routed to Pond 10P : Driveway Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-YR STORM Rainfall=8.54"

Area (sf)	CN	Description
7,405	55	Woods, Good, HSG B
4,260	61	>75% Grass cover, Good, HSG B
11,665	57	Weighted Average
11,665		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	15	0.0667	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
2.5	22	0.1818	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
1.9	13	0.1176	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.71"
0.4	38	0.1176	1.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.5	32	0.0469	1.08		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
8.0	120	Total			

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Summary for Reach 2R: Diversion Swale

Inflow Area = 1.613 ac, 15.29% Impervious, Inflow Depth = 4.40" for 50-YR STORM event
Inflow = 6.68 cfs @ 12.17 hrs, Volume= 0.591 af
Outflow = 6.64 cfs @ 12.18 hrs, Volume= 0.591 af, Atten= 1%, Lag= 0.5 min
Routed to Pond 10P : Driveway Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.11 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.78 fps, Avg. Travel Time= 1.3 min

Peak Storage= 188 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.74' , Surface Width= 6.46'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 12.47 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 ' / ' Top Width= 8.00'
Length= 60.0' Slope= 0.0050 ' / '
Inlet Invert= 20.40', Outlet Invert= 20.10'



Summary for Reach 11R: Overland Flow

Inflow Area = 0.523 ac, 37.44% Impervious, Inflow Depth = 4.17" for 50-YR STORM event
Inflow = 2.05 cfs @ 12.18 hrs, Volume= 0.182 af
Outflow = 2.03 cfs @ 12.22 hrs, Volume= 0.182 af, Atten= 1%, Lag= 2.1 min
Routed to Pond 10P : Driveway Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.45 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 8.8 min

Peak Storage= 301 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.21' , Surface Width= 32.45'
Bank-Full Depth= 0.50' Flow Area= 16.7 sf, Capacity= 13.24 cfs

50.00' x 0.50' deep Parabolic Channel, n= 0.070 Medium-dense brush, winter
Length= 66.0' Slope= 0.0061 ' / '
Inlet Invert= 20.50', Outlet Invert= 20.10'



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Summary for Reach AP1: Analysis Point 1

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

Inflow Area = 5.076 ac, 30.19% Impervious, Inflow Depth = 3.30" for 50-YR STORM event
 Inflow = 15.01 cfs @ 12.19 hrs, Volume= 1.395 af
 Outflow = 15.01 cfs @ 12.19 hrs, Volume= 1.395 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Summary for Reach AP2: Analysis Point 2

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

Inflow Area = 0.111 ac, 81.99% Impervious, Inflow Depth = 7.53" for 50-YR STORM event
 Inflow = 0.88 cfs @ 12.09 hrs, Volume= 0.070 af
 Outflow = 0.88 cfs @ 12.09 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 1P: Pocket Pond 1

[80] Warning: Exceeded Pond DMH1 by 0.07' @ 18.80 hrs (0.01 cfs 0.001 af)

Inflow Area = 2.810 ac, 24.01% Impervious, Inflow Depth = 4.22" for 50-YR STORM event
 Inflow = 11.40 cfs @ 12.18 hrs, Volume= 0.989 af
 Outflow = 7.41 cfs @ 12.36 hrs, Volume= 0.989 af, Atten= 35%, Lag= 11.0 min
 Discarded = 0.63 cfs @ 12.36 hrs, Volume= 0.420 af
 Primary = 6.78 cfs @ 12.36 hrs, Volume= 0.568 af

Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 21.64' @ 12.36 hrs Surf.Area= 4,760 sf Storage= 10,515 cf

Plug-Flow detention time= 87.7 min calculated for 0.988 af (100% of inflow)

Center-of-Mass det. time= 87.9 min (916.4 - 828.6)

Volume	Invert	Avail.Storage	Storage Description		
#1	18.50'	12,310 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
18.50	1,715	240.0	0	0	1,715
18.75	2,281	255.0	498	498	2,309
20.00	3,293	284.0	3,464	3,962	3,598
22.00	5,122	324.0	8,348	12,310	5,626

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	18.0" Round Culvert L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.00' / 19.90' S= 0.0067 ' / Cc= 0.900

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#2 Discarded 18.50' n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
1.000 in/hr Exfiltration over Surface area
 Conductivity to Groundwater Elevation = 18.17' Phase-In= 0.10'

Discarded OutFlow Max=0.63 cfs @ 12.36 hrs HW=21.63' (Free Discharge)
 ↑ **2=Exfiltration** (Controls 0.63 cfs)

Primary OutFlow Max=6.76 cfs @ 12.36 hrs HW=21.63' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Culvert** (Barrel Controls 6.76 cfs @ 4.37 fps)

Summary for Pond 2P: Existing Pond

Pond areas, elevations, and culvert parameters are assumed.

Inflow Area = 0.523 ac, 37.44% Impervious, Inflow Depth = 5.17" for 50-YR STORM event
 Inflow = 3.10 cfs @ 12.09 hrs, Volume= 0.226 af
 Outflow = 2.14 cfs @ 12.18 hrs, Volume= 0.226 af, Atten= 31%, Lag= 5.5 min
 Discarded = 0.08 cfs @ 12.18 hrs, Volume= 0.044 af
 Primary = 2.05 cfs @ 12.18 hrs, Volume= 0.182 af
 Routed to Reach 11R : Overland Flow

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 21.81' @ 12.18 hrs Surf.Area= 2,337 sf Storage= 1,418 cf

Plug-Flow detention time= 19.8 min calculated for 0.225 af (100% of inflow)
 Center-of-Mass det. time= 19.9 min (837.8 - 817.8)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	1,882 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
21.00	1,209	140.0	0	0	1,209
22.00	2,647	210.0	1,882	1,882	3,166

Device	Routing	Invert	Outlet Devices
#1	Discarded	21.00'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 20.00' Phase-In= 0.10'
#2	Primary	21.00'	15.0" Round Culvert L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 21.00' / 20.50' S= 0.0167 ' S= 0.0167 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Discarded OutFlow Max=0.08 cfs @ 12.18 hrs HW=21.81' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=2.04 cfs @ 12.18 hrs HW=21.81' TW=20.71' (Dynamic Tailwater)
 ↑ **2=Culvert** (Inlet Controls 2.04 cfs @ 2.42 fps)

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Summary for Pond 3P: Focal Point 1

Inflow Area = 0.252 ac, 88.57% Impervious, Inflow Depth = 7.82" for 50-YR STORM event
 Inflow = 2.03 cfs @ 12.09 hrs, Volume= 0.164 af
 Outflow = 2.02 cfs @ 12.09 hrs, Volume= 0.164 af, Atten= 0%, Lag= 0.1 min
 Primary = 2.02 cfs @ 12.09 hrs, Volume= 0.164 af
 Routed to Pond 4P : Chamber System A

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 22.67' @ 12.09 hrs Surf.Area= 243 sf Storage= 91 cf

Plug-Flow detention time= 1.2 min calculated for 0.164 af (100% of inflow)
 Center-of-Mass det. time= 1.2 min (761.0 - 759.9)

Volume	Invert	Avail.Storage	Storage Description
#1	19.75'	37 cf	5.00'W x 9.00'L x 2.25'H Focal Point Area 1 Z=1.0 187 cf Overall x 20.0% Voids
#2	22.00'	63 cf	Surface Bowl (Prismatic) Listed below (Recalc)
		100 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
22.00	45	0	0
22.75	123	63	63

Device	Routing	Invert	Outlet Devices
#1	Primary	19.25'	12.0" Round Culvert L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.25' / 19.20' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	19.75'	100.000 in/hr Exfiltration over Surface area Phase-In= 0.10'
#3	Device 1	19.25'	6.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	22.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.98 cfs @ 12.09 hrs HW=22.67' TW=20.99' (Dynamic Tailwater)

1=Culvert (Passes 1.98 cfs of 3.87 cfs potential flow)
 3=Orifice/Grate (Passes 0.56 cfs of 1.56 cfs potential flow)
 2=Exfiltration (Exfiltration Controls 0.56 cfs)
 4=Orifice/Grate (Weir Controls 1.41 cfs @ 1.34 fps)

Summary for Pond 4P: Chamber System A

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=4)

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Inflow Area = 0.252 ac, 88.57% Impervious, Inflow Depth = 7.82" for 50-YR STORM event
 Inflow = 2.02 cfs @ 12.09 hrs, Volume= 0.164 af
 Outflow = 1.55 cfs @ 12.18 hrs, Volume= 0.164 af, Atten= 24%, Lag= 5.7 min
 Discarded = 0.08 cfs @ 12.30 hrs, Volume= 0.077 af
 Primary = 1.46 cfs @ 12.18 hrs, Volume= 0.087 af
 Routed to Pond DMH1 : Drain Manhole 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 21.86' @ 12.30 hrs Surf.Area= 0.023 ac Storage= 0.041 af

Plug-Flow detention time= 122.2 min calculated for 0.164 af (100% of inflow)
 Center-of-Mass det. time= 122.4 min (883.4 - 761.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	19.20'	0.000 af	24.00'W x 42.00'L x 2.67'H Field A 0.062 af Overall - 0.062 af Embedded = 0.000 af x 40.0% Voids
#2A	19.20'	0.041 af	Shea Leaching Chamber 8x14x2.7x 9 Inside #1 Inside= 84.0"W x 24.0"H => 15.38 sf x 13.00'L = 200.0 cf Outside= 96.0"W x 32.0"H => 21.36 sf x 14.00'L = 299.0 cf 9 Chambers in 3 Rows
		0.041 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	20.10'	12.0" Round Culvert L= 3.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.10' / 20.05' S= 0.0167 ' S= 0.0167 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Discarded	19.20'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 18.17' Phase-In= 0.10'

Discarded OutFlow Max=0.08 cfs @ 12.30 hrs HW=21.85' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=1.37 cfs @ 12.18 hrs HW=21.70' TW=21.49' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 1.37 cfs @ 1.74 fps)

Summary for Pond 5P: Focal Point 2

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 0.178 ac, 80.83% Impervious, Inflow Depth = 7.46" for 50-YR STORM event
 Inflow = 1.40 cfs @ 12.09 hrs, Volume= 0.111 af
 Outflow = 1.41 cfs @ 12.09 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.1 min
 Primary = 1.41 cfs @ 12.09 hrs, Volume= 0.111 af
 Routed to Pond 6P : Chamber System B

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

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Peak Elev= 23.09' @ 12.09 hrs Surf.Area= 153 sf Storage= 41 cf

Plug-Flow detention time= 0.8 min calculated for 0.111 af (100% of inflow)

Center-of-Mass det. time= 0.8 min (771.5 - 770.8)

Volume	Invert	Avail.Storage	Storage Description
#1	20.50'	27 cf	4.00'W x 7.00'L x 2.25'H Focal Point Area 1 Z=1.0 134 cf Overall x 20.0% Voids
#2	22.75'	24 cf	Surface Bowl (Prismatic) Listed below (Recalc)
		51 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
22.75	28	0	0
23.25	68	24	24

Device	Routing	Invert	Outlet Devices
#1	Primary	20.00'	12.0" Round Culvert L= 32.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.00' / 19.80' S= 0.0062 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 3	20.50'	100.000 in/hr Exfiltration over Surface area Phase-In= 0.10'
#3	Device 1	20.00'	6.0" W x 6.0" H Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	22.95'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.38 cfs @ 12.09 hrs HW=23.09' TW=21.04' (Dynamic Tailwater)

1=Culvert (Passes 1.38 cfs of 4.27 cfs potential flow)
 3=Orifice/Grate (Passes 0.35 cfs of 1.72 cfs potential flow)
 2=Exfiltration (Exfiltration Controls 0.35 cfs)
 4=Orifice/Grate (Weir Controls 1.02 cfs @ 1.20 fps)

Summary for Pond 6P: Chamber System B

Inflow Area = 0.178 ac, 80.83% Impervious, Inflow Depth = 7.46" for 50-YR STORM event
 Inflow = 1.41 cfs @ 12.09 hrs, Volume= 0.111 af
 Outflow = 0.65 cfs @ 12.26 hrs, Volume= 0.111 af, Atten= 54%, Lag= 10.5 min
 Discarded = 0.07 cfs @ 12.26 hrs, Volume= 0.076 af
 Primary = 0.58 cfs @ 12.26 hrs, Volume= 0.034 af
 Routed to Pond DMH3 : Drain Manhole 3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 21.34' @ 12.26 hrs Surf.Area= 0.026 ac Storage= 0.040 af

Plug-Flow detention time= 182.1 min calculated for 0.111 af (100% of inflow)

Center-of-Mass det. time= 182.3 min (953.8 - 771.5)

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Volume	Invert	Avail.Storage	Storage Description
#1A	19.60'	0.000 af	16.00'W x 70.00'L x 2.67'H Field A 0.069 af Overall - 0.069 af Embedded = 0.000 af x 40.0% Voids
#2A	19.60'	0.046 af	Shea Leaching Chamber 8x14x2.7x 10 Inside #1 Inside= 84.0"W x 24.0"H => 15.38 sf x 13.00'L = 200.0 cf Outside= 96.0"W x 32.0"H => 21.36 sf x 14.00'L = 299.0 cf 10 Chambers in 2 Rows
		0.046 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	20.80'	4.0" Round Culvert L= 3.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.80' / 20.75' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Primary	20.90'	8.0" Round Culvert L= 3.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.90' / 20.85' S= 0.0167 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Discarded	19.60'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 18.57' Phase-In= 0.10'

Discarded OutFlow Max=0.07 cfs @ 12.26 hrs HW=21.34' (Free Discharge)↑**3=Exfiltration** (Controls 0.07 cfs)**Primary OutFlow** Max=0.58 cfs @ 12.26 hrs HW=21.34' TW=20.54' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 0.20 cfs @ 2.31 fps)↑**2=Culvert** (Barrel Controls 0.38 cfs @ 2.23 fps)**Summary for Pond 7P: Filtration Drip Edge**

Actual drip edge consists of 20'Wx64'L section and 12'Wx24'L section

20*64+12*24 = 1,568 sf

1568/16 = 98

16'Wx98'L effective dimensions for modeling purposes

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=4)

Inflow Area = 0.214 ac, 83.20% Impervious, Inflow Depth = 8.30" for 50-YR STORM event
 Inflow = 1.75 cfs @ 12.09 hrs, Volume= 0.148 af
 Outflow = 1.79 cfs @ 12.12 hrs, Volume= 0.137 af, Atten= 0%, Lag= 2.0 min
 Discarded = 0.32 cfs @ 12.05 hrs, Volume= 0.115 af
 Primary = 1.47 cfs @ 12.12 hrs, Volume= 0.022 af
 Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 21.25' @ 12.05 hrs Surf.Area= 4,704 sf Storage= 1,274 cf

Plug-Flow detention time= 92.8 min calculated for 0.137 af (93% of inflow)

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Center-of-Mass det. time= 53.2 min (793.6 - 740.4)

Volume	Invert	Avail.Storage	Storage Description
#1	20.25'	627 cf	16.00'W x 98.00'L x 1.00'H Prisma 1,568 cf Overall x 40.0% Voids
#2	18.75'	118 cf	16.00'W x 98.00'L x 1.50'H Prisma 2,352 cf Overall x 5.0% Voids
#3	18.50'	59 cf	16.00'W x 98.00'L x 0.25'H Prisma 392 cf Overall x 15.0% Voids
#4	17.75'	470 cf	16.00'W x 98.00'L x 0.75'H Prisma Impervious 1,176 cf Overall x 40.0% Voids
		1,274 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#0	Primary	21.25'	Automatic Storage Overflow (Discharged without head)
#1	Discarded	18.50'	1.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 17.67' Phase-In= 0.10'

Discarded OutFlow Max=0.32 cfs @ 12.05 hrs HW=21.25' (Free Discharge)↑**1=Exfiltration** (Controls 0.32 cfs)**Primary OutFlow** Max=0.00 cfs @ 12.12 hrs HW=21.25' TW=0.00' (Dynamic Tailwater)**Summary for Pond 9P: Diversion Culvert**

Inflow Area = 1.531 ac, 16.11% Impervious, Inflow Depth = 4.45" for 50-YR STORM event
 Inflow = 6.38 cfs @ 12.18 hrs, Volume= 0.568 af
 Outflow = 6.38 cfs @ 12.18 hrs, Volume= 0.568 af, Atten= 0%, Lag= 0.0 min
 Primary = 6.38 cfs @ 12.18 hrs, Volume= 0.568 af
 Routed to Pond DMH2 : Drain Manhole 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 23.20' @ 12.17 hrs

Flood Elev= 23.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	21.20'	18.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.20' / 21.00' S= 0.0100 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.29 cfs @ 12.18 hrs HW=23.15' TW=22.60' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 6.29 cfs @ 3.56 fps)**Summary for Pond 10P: Driveway Culvert**

[63] Warning: Exceeded Reach 2R INLET depth by 1.43' @ 12.20 hrs

[64] Warning: Exceeded Reach 2R outlet bank by 1.49' @ 12.22 hrs

[63] Warning: Exceeded Reach 11R INLET depth by 1.86' @ 12.20 hrs

[64] Warning: Exceeded Reach 11R outlet bank by 1.99' @ 12.22 hrs

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Inflow Area = 2.404 ac, 18.41% Impervious, Inflow Depth = 4.24" for 50-YR STORM event
 Inflow = 9.43 cfs @ 12.18 hrs, Volume= 0.849 af
 Outflow = 9.43 cfs @ 12.18 hrs, Volume= 0.849 af, Atten= 0%, Lag= 0.0 min
 Primary = 9.43 cfs @ 12.18 hrs, Volume= 0.849 af
 Routed to Pond 1P : Pocket Pond 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 22.59' @ 12.22 hrs
 Flood Elev= 22.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.10'	18.0" Round Culvert L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 20.10' / 19.90' S= 0.0056 ' S= 0.0056 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=9.35 cfs @ 12.18 hrs HW=22.47' TW=21.27' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 9.35 cfs @ 5.29 fps)

Summary for Pond CB1: Existing Catch Basin 1

End invert of pipe is assumed as inverts have not been measured on downstream structure

[58] Hint: Peaked 0.31' above defined flood level

Inflow Area = 0.044 ac, 80.02% Impervious, Inflow Depth = 7.46" for 50-YR STORM event
 Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.027 af
 Outflow = 0.34 cfs @ 12.09 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.34 cfs @ 12.09 hrs, Volume= 0.027 af
 Routed to Reach AP2 : Analysis Point 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 23.72' @ 12.09 hrs
 Flood Elev= 23.41'

Device	Routing	Invert	Outlet Devices
#1	Primary	23.41'	12.0" Round Culvert L= 28.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 23.41' / 23.20' S= 0.0075 ' S= 0.0075 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.33 cfs @ 12.09 hrs HW=23.71' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 0.33 cfs @ 2.51 fps)

Summary for Pond CB2: Existing Catch Basin 2

End invert of pipe is assumed as inverts have not been measured on downstream structure

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Inflow Area = 0.067 ac, 83.27% Impervious, Inflow Depth = 7.58" for 50-YR STORM event
 Inflow = 0.53 cfs @ 12.09 hrs, Volume= 0.042 af
 Outflow = 0.53 cfs @ 12.09 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.53 cfs @ 12.09 hrs, Volume= 0.042 af
 Routed to Reach AP2 : Analysis Point 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 19.46' @ 12.09 hrs
 Flood Elev= 22.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.08'	12.0" Round Culvert L= 36.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 19.08' / 18.80' S= 0.0078 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.52 cfs @ 12.09 hrs HW=19.46' TW=0.00' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 0.52 cfs @ 2.87 fps)

Summary for Pond DMH1: Drain Manhole 1

[80] Warning: Exceeded Pond 4P by 0.09' @ 12.65 hrs (0.91 cfs 0.004 af)

Inflow Area = 0.252 ac, 88.57% Impervious, Inflow Depth = 4.14" for 50-YR STORM event
 Inflow = 1.46 cfs @ 12.18 hrs, Volume= 0.087 af
 Outflow = 1.46 cfs @ 12.18 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.46 cfs @ 12.18 hrs, Volume= 0.087 af
 Routed to Pond 1P : Pocket Pond 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 21.74' @ 12.31 hrs
 Flood Elev= 23.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.95'	12.0" Round Culvert L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.95' / 19.90' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.18 hrs HW=21.49' TW=21.28' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 1.36 cfs @ 1.73 fps)

Summary for Pond DMH2: Drain Manhole 2

Inflow Area = 1.613 ac, 15.29% Impervious, Inflow Depth = 4.40" for 50-YR STORM event
 Inflow = 6.68 cfs @ 12.17 hrs, Volume= 0.591 af
 Outflow = 6.68 cfs @ 12.17 hrs, Volume= 0.591 af, Atten= 0%, Lag= 0.0 min
 Primary = 6.68 cfs @ 12.17 hrs, Volume= 0.591 af
 Routed to Reach 2R : Diversion Swale

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

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Peak Elev= 22.64' @ 12.17 hrs

Flood Elev= 24.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.90'	18.0" Round Culvert L= 92.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.90' / 20.40' S= 0.0054 ' / S= 0.0054 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.55 cfs @ 12.17 hrs HW=22.60' TW=21.14' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 6.55 cfs @ 3.71 fps)**Summary for Pond DMH3: Drain Manhole 3**

Inflow Area = 0.178 ac, 80.83% Impervious, Inflow Depth = 2.31" for 50-YR STORM event
Inflow = 0.58 cfs @ 12.26 hrs, Volume= 0.034 af
Outflow = 0.58 cfs @ 12.26 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Primary = 0.58 cfs @ 12.26 hrs, Volume= 0.034 af
Routed to Pond DMH4 : Drain Manhole 4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 20.54' @ 12.26 hrs

Flood Elev= 23.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	20.08'	12.0" Round Culvert L= 38.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 20.08' / 19.85' S= 0.0061 ' / S= 0.0061 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.58 cfs @ 12.26 hrs HW=20.54' TW=20.20' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 0.58 cfs @ 2.45 fps)**Summary for Pond DMH4: Drain Manhole 4**

Inflow Area = 0.178 ac, 80.83% Impervious, Inflow Depth = 2.31" for 50-YR STORM event
Inflow = 0.58 cfs @ 12.26 hrs, Volume= 0.034 af
Outflow = 0.58 cfs @ 12.26 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Primary = 0.58 cfs @ 12.26 hrs, Volume= 0.034 af
Routed to Pond DMH5 : Drain Manhole 5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 20.20' @ 12.26 hrs

Flood Elev= 23.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.75'	12.0" Round Culvert L= 106.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.75' / 19.20' S= 0.0052 ' / S= 0.0052 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

25071.2-PROPOSED

Type III 24-hr 50-YR STORM Rainfall=8.54"

Prepared by Jones & Beach Engineers Inc

Printed 8/17/2026

HydroCAD® 10.20-6a s/n 00762 © 2024 HydroCAD Software Solutions LLC

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Primary OutFlow Max=0.58 cfs @ 12.26 hrs HW=20.20' TW=19.54' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 0.58 cfs @ 2.50 fps)**Summary for Pond DMH5: Drain Manhole 5**

Inflow Area = 0.178 ac, 80.83% Impervious, Inflow Depth = 2.31" for 50-YR STORM event

Inflow = 0.58 cfs @ 12.26 hrs, Volume= 0.034 af

Outflow = 0.58 cfs @ 12.26 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Primary = 0.58 cfs @ 12.26 hrs, Volume= 0.034 af

Routed to Reach AP1 : Analysis Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 19.54' @ 12.26 hrs

Flood Elev= 22.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.10'	12.0" Round Culvert L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 19.10' / 18.90' S= 0.0083 ' / S= 0.0083 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.58 cfs @ 12.26 hrs HW=19.54' TW=0.00' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 0.58 cfs @ 2.57 fps)**Summary for Pond YD: Yard Drain**

Inflow Area = 0.082 ac, 0.00% Impervious, Inflow Depth = 3.39" for 50-YR STORM event

Inflow = 0.29 cfs @ 12.12 hrs, Volume= 0.023 af

Outflow = 0.29 cfs @ 12.12 hrs, Volume= 0.023 af, Atten= 0%, Lag= 0.0 min

Primary = 0.29 cfs @ 12.12 hrs, Volume= 0.023 af

Routed to Pond DMH2 : Drain Manhole 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 22.64' @ 12.17 hrs

Flood Elev= 23.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	21.70'	12.0" Round Culvert L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.70' / 21.40' S= 0.0107 ' / S= 0.0107 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.31 cfs @ 12.12 hrs HW=22.46' TW=22.44' (Dynamic Tailwater)↑**1=Culvert** (Outlet Controls 0.31 cfs @ 0.67 fps)

APPENDIX III

Test Pit Logs

**TEST PITS
FOR
LEDGEWOOD DRIVE
PORTSMOUTH, NEW HAMPSHIRE
JULY 31, 2025
JBE Project No. 25071**

Performed by: Anthony Jones, Jones & Beach Engineers, Inc., SSD #1900

Test Pit #1

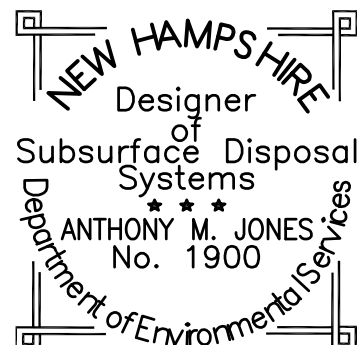
0"- 28"	10YR 3/3	dark brown fine sandy loam granular, friable many roots
28" – 38"	2.5Y 5/4	light olive brown fine sandy loam granular, friable common roots
38" – 58"	10YR 4/6	dark yellowish brown loamy sand massive, friable Many, distinct redox

SHWT = 38"

Roots: 38"

No H₂O observed

No Refusal observed



Test Pit #2

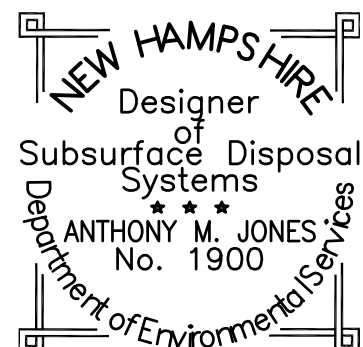
0"- 18"	10YR 4/2	dark grayish brown fine sandy loam granular, friable common roots
18" - 34"	10YR 3/6	dark yellowish brown loamy sand massive, friable common roots
34" - 62"	2.5Y 5/2	grayish brown loamy sand massive, friable Common, distinct redox

SHWT = 34"
Roots: 34"
No H₂O observed
No Refusal observed

Test Pit #3

0"- 6"	10YR 4/2	dark grayish brown fine sandy loam granular, friable common roots
6" - 20"	2.5Y 6/4	light yellowish brown fine sandy loam angular blocky, friable few roots
20" - 50"	2.5Y 6/3	light yellowish brown sandy clay loam angular blocky, very firm Many, distinct redox

SHWT = 20"
Roots: 26"
No H₂O observed
Refusal observed at: 50"



Test Pit #4

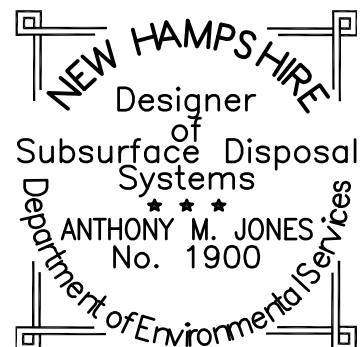
0"- 48"	10YR 4/3	brown fine sandy loam granular, friable common roots
48" – 56"	2.5Y 6/3	light yellowish brown silt loam blocky, friable common roots
56" – 70"	2.5Y 6/4	light yellowish brown silt loam blocky, friable Many, distinct redox

SHWT = 56"

Roots: 58"

No H₂O observed

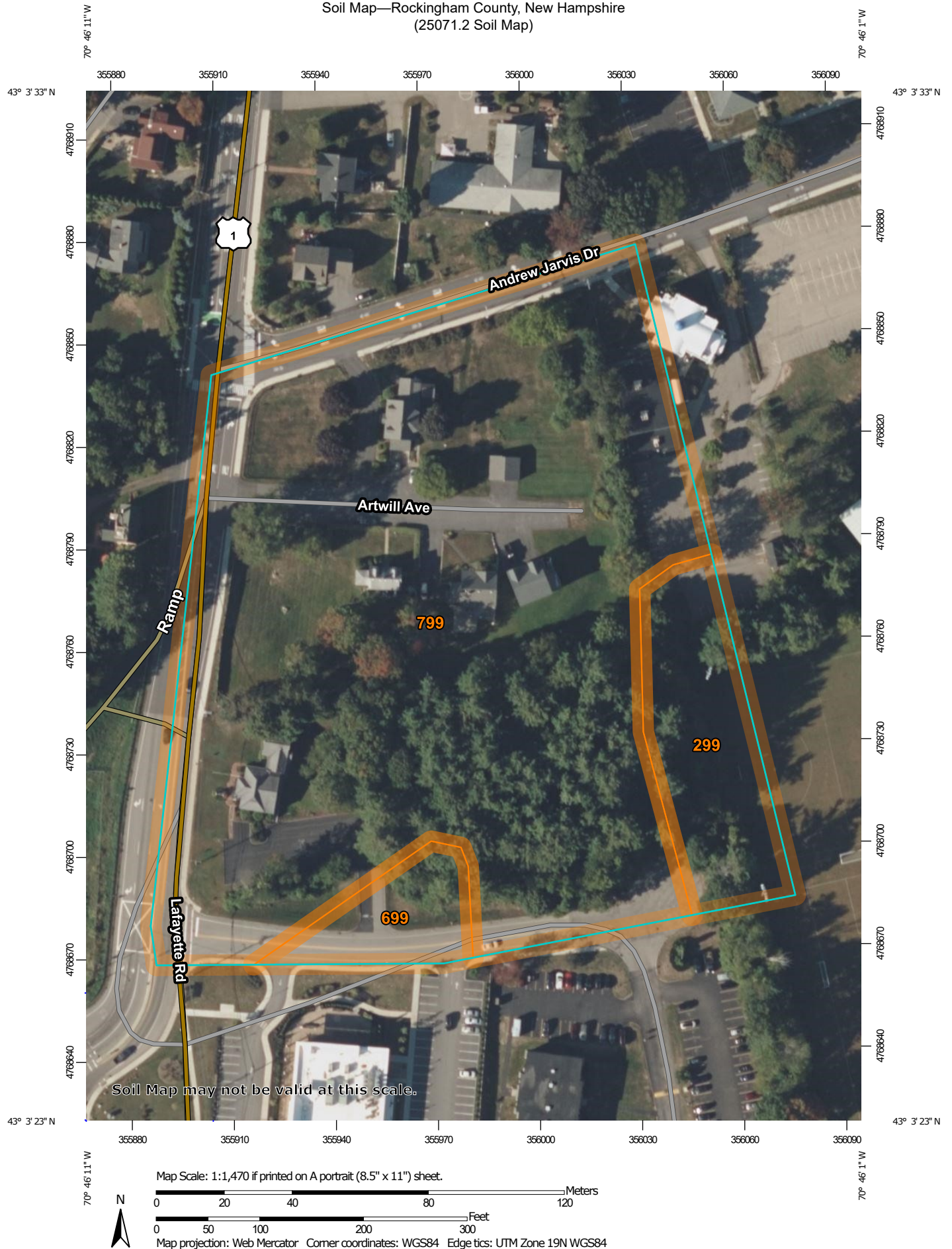
No Refusal observed



APPENDIX IV

NRCS Soil Map

Soil Map—Rockingham County, New Hampshire
(25071.2 Soil Map)



Soil Map—Rockingham County, New Hampshire
(25071.2 Soil Map)

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 28, Sep 9, 2025

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
299	Udorthents, smoothed	0.7	9.9%
699	Urban land	0.3	4.4%
799	Urban land-Canton complex, 3 to 15 percent slopes	6.3	85.7%
Totals for Area of Interest		7.4	100.0%

APPENDIX V

Extreme Precipitation Estimates

An Interactive Web Tool for Extreme Precipitation Analysis

Documentation

Northeast Region

Powered by  **ACORN**
Northeast Regional
Climate Center

Northeast Regional Climate Center (NRCC)

Natural Resources Conservation Service (NRCS)



Cornell University



Contact: precip@cornell.edu

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point	
Smoothing	Yes
State	
Location	
Latitude	43.057 degrees North
Longitude	70.768 degrees West
Elevation	0 feet
Date/Time	Fri Jun 26 2026 14:28:08 GMT-0400 (Eastern Daylight Time)

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	0.70	0.98	1.21	1.57	2.04	2.67	2.93	1yr	2.36	2.82	3.23	3.96	4.57	1yr
2yr	0.32	0.50	0.62	0.82	1.02	1.30	2yr	0.88	1.18	1.52	1.94	2.50	3.22	3.58	2yr	2.85	3.45	3.95	4.70	5.35	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	4.08	4.60	5yr	3.61	4.42	5.06	5.96	6.73	5yr
10yr	0.41	0.65	0.82	1.12	1.45	1.89	10yr	1.25	1.73	2.24	2.90	3.76	4.89	5.55	10yr	4.33	5.34	6.11	7.14	8.01	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	6.20	7.13	25yr	5.49	6.86	7.85	9.07	10.10	25yr
50yr	0.54	0.86	1.10	1.54	2.08	2.76	50yr	1.79	2.53	3.30	4.34	5.68	7.42	8.62	50yr	6.57	8.29	9.48	10.87	12.03	50yr
100yr	0.60	0.97	1.25	1.78	2.42	3.27	100yr	2.09	2.99	3.92	5.18	6.80	8.90	10.43	100yr	7.87	10.03	11.46	13.04	14.35	100yr
200yr	0.68	1.10	1.43	2.05	2.83	3.85	200yr	2.45	3.53	4.63	6.15	8.12	10.66	12.61	200yr	9.44	12.13	13.85	15.64	17.11	200yr
500yr	0.80	1.32	1.72	2.49	3.49	4.78	500yr	3.01	4.39	5.79	7.74	10.27	13.55	16.22	500yr	11.99	15.60	17.81	19.91	21.61	500yr

x 1.15
3.71
5.63
7.13
8.54

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	0.72	0.88	1yr	0.63	0.87	0.92	1.33	1.68	2.25	2.53	1yr	1.99	2.43	2.88	3.18	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	3.07	3.47	2yr	2.72	3.34	3.84	4.57	5.10	2yr
5yr	0.35	0.54	0.67	0.92	1.17	1.40	5yr	1.01	1.37	1.61	2.12	2.73	3.81	4.22	5yr	3.37	4.06	4.74	5.57	6.28	5yr
10yr	0.39	0.59	0.74	1.03	1.33	1.60	10yr	1.15	1.57	1.81	2.39	3.06	4.40	4.90	10yr	3.89	4.71	5.49	6.46	7.24	10yr
25yr	0.44	0.67	0.83	1.19	1.57	1.90	25yr	1.35	1.86	2.10	2.75	3.53	4.75	5.95	25yr	4.20	5.72	6.72	7.87	8.75	25yr
50yr	0.48	0.74	0.92	1.32	1.77	2.17	50yr	1.53	2.12	2.35	3.07	3.93	5.37	6.88	50yr	4.75	6.61	7.83	9.14	10.11	50yr
100yr	0.54	0.81	1.02	1.47	2.02	2.47	100yr	1.74	2.42	2.63	3.41	4.35	6.04	7.95	100yr	5.35	7.65	9.12	10.64	11.68	100yr
200yr	0.60	0.90	1.14	1.64	2.29	2.82	200yr	1.98	2.76	2.94	3.77	4.79	6.78	9.19	200yr	6.00	8.84	10.63	12.40	13.51	200yr
500yr	0.69	1.03	1.32	1.92	2.73	3.37	500yr	2.36	3.30	3.42	4.30	5.45	7.90	11.13	500yr	7.00	10.70	13.00	15.20	16.37	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	1.09	1yr	0.77	1.06	1.26	1.74	2.20	2.99	3.17	1yr	2.65	3.05	3.60	4.39	5.06	1yr
2yr	0.34	0.52	0.64	0.87	1.07	1.27	2yr	0.92	1.24	1.48	1.96	2.51	3.44	3.71	2yr	3.04	3.57	4.10	4.85	5.65	2yr
5yr	0.40	0.62	0.77	1.05	1.34	1.62	5yr	1.15	1.59	1.88	2.53	3.25	4.36	4.97	5yr	3.85	4.78	5.40	6.39	7.17	5yr
10yr	0.47	0.72	0.89	1.25	1.61	1.98	10yr	1.39	1.93	2.28	3.11	3.95	5.36	6.21	10yr	4.74	5.97	6.82	7.85	8.77	10yr
25yr	0.58	0.88	1.09	1.56	2.05	2.57	25yr	1.77	2.52	2.95	4.07	5.15	7.80	8.34	25yr	6.90	8.02	9.13	10.35	11.42	25yr
50yr	0.67	1.02	1.27	1.83	2.47	3.13	50yr	2.13	3.06	3.60	5.00	6.31	9.76	10.44	50yr	8.64	10.04	11.41	12.73	13.97	50yr
100yr	0.79	1.20	1.50	2.16	2.97	3.82	100yr	2.56	3.73	4.37	6.15	7.75	12.21	13.07	100yr	10.81	12.57	14.24	15.70	17.09	100yr
200yr	0.93	1.39	1.76	2.55	3.56	4.66	200yr	3.07	4.56	5.34	7.58	9.52	15.32	16.38	200yr	13.56	15.75	17.81	19.34	20.91	200yr
500yr	1.15	1.71	2.20	3.20	4.54	6.05	500yr	3.92	5.92	6.93	10.02	12.53	20.69	22.08	500yr	18.31	21.23	23.93	25.48	27.32	500yr

APPENDIX VI

Rip Rap Calculations

RIP RAP CALCULATIONS

"Martini Apartments"
Ledgewood Drive
Portsmouth, NH 03801

Jones & Beach Engineers, Inc.

100 Domain Drive, Suite 201
Exeter, NH 03833
17-Aug-26

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire*.
Aprons are sized for the 25-Year storm event.

TAILWATER < HALF THE D_o

$$L_a = (1.8 \times Q) / D_o^{3/2} + (7 \times D_o)$$

$$W = L_a + (3 \times D_o) \text{ or defined channel width}$$

$$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_o)$$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T _w	Discharge (C.F.S.) Q	Diameter of Pipe D _o	Length of Rip Rap L _a (feet)	Width of Rip Rap W (feet)	d ₅₀ -Median Stone Rip Rap d50 (feet)
DMH 1 (12" HDPE)	0.48	1.06	1	8.9	12	0.05
1P (18" HDPE)	0.75	4.26	1.5	14.7	19	0.12
DMH 5 (12" HDPE)	0.21	0.31	1	7.6	11	0.02

TAILWATER > HALF THE D_o

$$L_a = (3.0 \times Q) / D_o^{3/2} + (7 \times D_o)$$

$$W = (0.4 \times L_a) + (3 \times D_o) \text{ or defined channel width}$$

$$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_o)$$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T _w	Discharge (C.F.S.) Q	Diameter of Pipe D _o	Length of Rip Rap L _a (feet)	Width of Rip Rap W (feet)	d ₅₀ -Median Stone Rip Rap d50 (feet)
10P (18" HDPE)	1.1	6.91	1.5	21.8	13	0.16
DMH 2 (18" HDPE)	0.86	4.88	1.5	18.5	12	0.13

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d ₅₀ Size =	0.25	Feet	3	Inches
% of Weight Smaller	Size of Stone (Inches)			
Than the Given d ₅₀ Size		From		To
100%		5		6
85%		4		5
50%		3		5
15%		1		2

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d ₅₀ Size =	0.5	Feet	6	Inches
% of Weight Smaller	Size of Stone (Inches)			
Than the Given d ₅₀ Size		From		To
100%		9		12
85%		8		11
50%		6		9
15%		2		3

APPENDIX VII

BMP Worksheets

GROUNDWATER RECHARGE VOLUME (GRV)
(Env-Wq 1504.12)

	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.57	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.25 inches		Rd = Weighted groundwater recharge depth	
0.142 ac-in		GRV = AI * Rd	
515 cf		GRV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
← Y/N		Is a stage-storage table attached showing that the GRV can be stored below the lowest invert of the outlet structure (if applicable)? Multiple stormwater control measures may be used to meet the GRV requirements.	

Provide calculations/discussion below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

907 cf stored below outlet invert in chamber system A

1,344 cf stored below outlet invert in chamber system B

1,274 cf stored in filtration drip edge

907+1344+1274 = 3,525 cf total GRV provided >> 515 cf GRV required

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

GENERAL CALCULATIONS - WQV and WQF (optional worksheet)

This worksheet may be useful when designing a BMP that does not fit into one of the specific worksheets already provided (such as for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

0.25	ac	A = Area draining to the practice
0.22	ac	A _i = Impervious area draining to the practice
0.89	decimal	I = Percent impervious area draining to the practice, in decimal form
0.85	unitless	R _v = Runoff coefficient = 0.05 + (0.9 x I)
0.21	ac-in	WQV = 1" x R _v x A
775	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = Amount of rainfall. For WQF in NH, P = 1".
0.85	inches	Q = Water quality depth. $Q = WQV/A$
99	unitless	CN = Unit peak discharge curve number. $CN = 1000 / (10 + 5P + 10Q - 10 * [Q^2 + 1.25 * Q * P]^{0.5})$
0.1	inches	S = Potential maximum retention. $S = (1000/CN) - 10$
0.029	inches	Ia = Initial abstraction. Ia = 0.2S
6.0	minutes	T _c = Time of Concentration
700.0	cfs/mi ² /in	q _u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III.
0.233	cfs	WQF = q _u x WQV. Conversion: to convert "cfs/mi ² /in * ac-in" to "cfs" multiply by 1mi ² /640ac.

Designer's Notes:

For design of Focal Point 1 (Pond 3P) in conjunction with Focal Point design worksheet.

FOCALPOINT

NEW HAMPSHIRE AOT PROJECTS

1. Determine FocalPoint bed area (minimum 174 sf/acre of impervious area - ex: 0.2 acres = 35 sf)

See step 2 to determine if minimum size is appropriate.

- Tributary impervious area: = 0.223 ac (A)
- Tributary pervious area: = 0.029 ac (B)
- Minimum FocalPoint bed area required: $= ((A \times 1.0) + (B \times 0.4)) \times 174$ = 40.8 sf
- FocalPoint bed area provided: = 45 sf
- Dimensions of proposed FocalPoint: = 9 ft x 5 ft

2. Model a Type II & III 24-hr rainfall event that generates the water quality volume to demonstrate that the entire storm volume is treated prior to activation of the overflow (typically set at 6 - 12 in above the mulch). Note: a 1.2 - 1.3 in rainfall event usually generates 1.0 in of runoff.

Contact ACF for a sample HydroCAD node.

- Water quality volume (WQv) goal: = 775 ft³
- Type II & III 24-hr rainfall depth to generate WQv: = 1.49 in
- Temporary storage depth provided: = 6.0 in
(typically 6 - 12 in)
- Temporary storage volume provided at above depth: = 73 ft³
- Peak ponding depth from Type III 24-hr storm event: = 0 in

3. Size the Harco PVC domed overflow riser.

Note: ACF recommends installation of a Fabco domed overflow filter kit for overflow protection.

- Domed overflow riser diameter: = 24 in
- Rim elevation of overflow riser: = 22.50
(typically 6 - 12 in above mulch surface)
- 6 in invert in elevation from FocalPoint: = 19.25
(typically 3 ft below mulch surface)
- 12 in invert out elevation: = 19.25

4. Flood control - peak flow attenuation of major storms

The treated flow and bypass flow can be routed to a detention system such as an open pond or a subsurface solution like an expanded R-Tank system. (contact ACF for additional information on designing expanded R-Tank systems)

5. Prepare a landscape plan for the FocalPoint bed area



6. Design review and installation oversight by manufacturer's representative

- The design has been reviewed by ACF Environmental ☐
- Engineer will coordinate installation inspection with ACF Environmental ☒

DESIGNING WITH FOCALPOINT IN NEW HAMPSHIRE

The New Hampshire Department of Environmental Services has approved the FocalPoint (High Performance Modular Biofiltration System) for use on AoT site development projects in the State of New Hampshire.

SIZING CRITERIA SUMMARY

- The surface area of the media within FocalPoint must be a minimum of 174 sf per 1.0 acre of impervious area (26 sf per 0.15 acres). The thickness of the media is to be no less than 1.5 ft (18 in).
- The system must be modelled in HydroCAD (or similar TR-55 modeling software) to demonstrate that the entire volume of a 1.22 in Type II or III 24-hr storm is treated prior to activation of the bypass/overflow (typically set at 6 - 12 in above the mulch surface). Note: A 1.22 in rainfall event typically generates 1.0 in of runoff.
- The R-Tank modular underdrain can be expanded beyond the footprint of the FocalPoint media bed for expanded infiltration and peak flow attenuation/detention post treatment.

FOCALPOINT SYSTEMS:



FOCALPOINT ACCESSORIES:



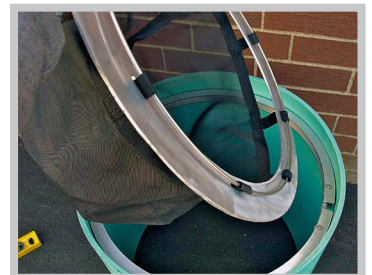
Pretreatment - Rain Guardian Turret



Pretreatment - Rain Guardian Foxhole



Pretreatment - PreTx



Bypass protection - Domed overflow with filter insert

For additional information please visit: www.acfenvironmental.com

Contact Rob Woodman - Senior Stormwater Engineer
Cell: 207.272.4431 | Email: rwoodman@acfenv.com

INFILTRATION PRACTICE CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Chamber System A (Pond 4P)**

Enter the type of infiltration practice (such as basin, trench) and the node name in the drainage analysis, if applicable.

		Have you reviewed Env-Wq 1508.07(a) to ensure that infiltration is allowed?	← yes
0.25	ac	A = Area draining to the practice	
0.22	ac	A _i = Impervious area draining to the practice	
0.89	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.85	unitless	R _v = Runoff coefficient = 0.05 + (0.9 x I)	
0.21	ac-in	WQV = 1" x R _v x A	
775	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
194	cf	25% x WQV (check calc for sediment forebay volume)	
N/A		Method of pretreatment? (not required for clean or roof runoff)	
	cf	V _{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
907	cf	V = Volume ¹ (attach a stage-storage table)	≥ WQV
1,008	sf	A _{SA} = Surface area of the bottom of the pond	
1.00	iph	K _{sat} _{DESIGN} = Design infiltration rate ²	
9.2	hours	T _{DRAIN} = Drain time = V / (A _{SA} * I _{DESIGN})	≤ 72-hrs
19.20	feet	E _{BTM} = Elevation of the bottom of the basin	
18.17	feet	E _{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
16.17	feet	E _{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.03	feet	D _{SHWT} = Separation from SHWT	≥ * ³
3.0	feet	D _{ROCK} = Separation from bedrock	≥ * ³
	ft	D _{amend} = Depth of amended soil, if applicable due high infiltration rate	≥ 24"
	ft	D _T = Depth of trench, if trench proposed	4 - 10 ft
	Yes/No	If a trench or underground system is proposed, has observation well been provided?	← yes
		If a trench is proposed, does material meet Env-Wq 1508.07(k)(2) requirements. ⁴	← yes
	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← yes
	:1	If a basin is proposed, pond side slopes.	≥ 3:1
20.76	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
21.86	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
21.87	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench? ⁵	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

- Volume below the lowest invert of the outlet structure and excludes forebay volume
- K_{sat}_{DESIGN} includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
- 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
- Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
- If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Runoff is already treated through focal point. WQV calculation is irrelevant.

No stage storage table is attached. 14'*8'*9 = 1008 sf

Outlet 0.9' above pond bottom, so 1008 sf * 0.9 ft = 907 cf

Any storage above top of 2' high chamber opening is within side stone

GENERAL CALCULATIONS - WQV and WQF (optional worksheet)

This worksheet may be useful when designing a BMP that does not fit into one of the specific worksheets already provided (such as for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

0.18	ac	A = Area draining to the practice
0.14	ac	A _i = Impervious area draining to the practice
0.81	decimal	I = Percent impervious area draining to the practice, in decimal form
0.78	unitless	R _v = Runoff coefficient = 0.05 + (0.9 x I)
0.14	ac-in	WQV = 1" x R _v x A
502	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = Amount of rainfall. For WQF in NH, P = 1".
0.78	inches	Q = Water quality depth. $Q = WQV/A$
98	unitless	CN = Unit peak discharge curve number. $CN = 1000 / (10 + 5P + 10Q - 10 * [Q^2 + 1.25 * Q * P]^{0.5})$
0.2	inches	S = Potential maximum retention. $S = (1000 / CN) - 10$
0.044	inches	Ia = Initial abstraction. Ia = 0.2S
6.0	minutes	T _c = Time of Concentration
700.0	cfs/mi ² /in	q _u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III.
0.151	cfs	WQF = q _u x WQV. Conversion: to convert "cfs/mi ² /in * ac-in" to "cfs" multiply by 1mi ² /640ac.

Designer's Notes:

For design of Focal Point 2 (Pond 5P) in conjunction with Focal Point design worksheet.

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

FOCALPOINT

NEW HAMPSHIRE AOT PROJECTS

1. Determine FocalPoint bed area (minimum 174 sf/acre of impervious area - ex: 0.2 acres = 35 sf)

See step 2 to determine if minimum size is appropriate.

- Tributary impervious area: = 0.144 ac (A)
- Tributary pervious area: = 0.034 ac (B)
- Minimum FocalPoint bed area required: $= ((A \times 1.0) + (B \times 0.4)) \times 174$ = 27.4 sf
- FocalPoint bed area provided: = 28 sf
- Dimensions of proposed FocalPoint: = 4 ft x 7 ft

2. Model a Type II & III 24-hr rainfall event that generates the water quality volume to demonstrate that the entire storm volume is treated prior to activation of the overflow (typically set at 6 - 12 in above the mulch). Note: a 1.2 - 1.3 in rainfall event usually generates 1.0 in of runoff.

Contact ACF for a sample HydroCAD node.

- Water quality volume (WQv) goal: = 502 ft³
- Type II & III 24-hr rainfall depth to generate WQv: = 1.57 in
- Temporary storage depth provided: = 2.4 in
(typically 6 - 12 in)
- Temporary storage volume provided at above depth: = 34 ft³
- Peak ponding depth from Type III 24-hr storm event: = 0 in

3. Size the Harco PVC domed overflow riser.

Note: ACF recommends installation of a Fabco domed overflow filter kit for overflow protection.

- Domed overflow riser diameter: = 24 in
- Rim elevation of overflow riser: = 22.95
(typically 6 - 12 in above mulch surface)
- 6 in invert in elevation from FocalPoint: = 20.00
(typically 3 ft below mulch surface)
- 12 in invert out elevation: = 20.00

4. Flood control - peak flow attenuation of major storms

The treated flow and bypass flow can be routed to a detention system such as an open pond or a subsurface solution like an expanded R-Tank system. (contact ACF for additional information on designing expanded R-Tank systems)

5. Prepare a landscape plan for the FocalPoint bed area



6. Design review and installation oversight by manufacturer's representative

- The design has been reviewed by ACF Environmental ☒
- Engineer will coordinate installation inspection with ACF Environmental ☒

DESIGNING WITH FOCALPOINT IN NEW HAMPSHIRE

The New Hampshire Department of Environmental Services has approved the FocalPoint (High Performance Modular Biofiltration System) for use on AoT site development projects in the State of New Hampshire.

SIZING CRITERIA SUMMARY

- The surface area of the media within FocalPoint must be a minimum of 174 sf per 1.0 acre of impervious area (26 sf per 0.15 acres). The thickness of the media is to be no less than 1.5 ft (18 in).
- The system must be modelled in HydroCAD (or similar TR-55 modeling software) to demonstrate that the entire volume of a 1.22 in Type II or III 24-hr storm is treated prior to activation of the bypass/overflow (typically set at 6 - 12 in above the mulch surface). Note: A 1.22 in rainfall event typically generates 1.0 in of runoff.
- The R-Tank modular underdrain can be expanded beyond the footprint of the FocalPoint media bed for expanded infiltration and peak flow attenuation/detention post treatment.

FOCALPOINT SYSTEMS:



FOCALPOINT ACCESSORIES:



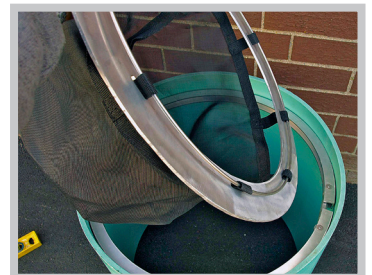
Pretreatment - Rain Guardian Turret



Pretreatment - Rain Guardian Foxhole



Pretreatment - PreTx



Bypass protection - Domed overflow with filter insert

For additional information please visit: www.acfenvironmental.com

Contact Rob Woodman - Senior Stormwater Engineer
Cell: 207.272.4431 | Email: rwoodman@acfenv.com

INFILTRATION PRACTICE CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Chamber System B (Pond 6P)**

Enter the type of infiltration practice (such as basin, trench) and the node name in the drainage analysis, if applicable.

		Have you reviewed Env-Wq 1508.07(a) to ensure that infiltration is allowed?	← yes
0.18	ac	A = Area draining to the practice	
0.14	ac	A _i = Impervious area draining to the practice	
0.81	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.78	unitless	R _v = Runoff coefficient = 0.05 + (0.9 x I)	
0.14	ac-in	WQV = 1" x R _v x A	
502	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
126	cf	25% x WQV (check calc for sediment forebay volume)	
N/A		Method of pretreatment? (not required for clean or roof runoff)	
	cf	V _{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
1,344	cf	V = Volume ¹ (attach a stage-storage table)	≥ WQV
1,120	sf	A _{SA} = Surface area of the bottom of the pond	
1.00	iph	K _{sat} _{DESIGN} = Design infiltration rate ²	
5.4	hours	T _{DRAIN} = Drain time = V / (A _{SA} * I _{DESIGN})	≤ 72-hrs
19.60	feet	E _{BTM} = Elevation of the bottom of the basin	
18.57	feet	E _{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
16.90	feet	E _{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.03	feet	D _{SHWT} = Separation from SHWT	≥ * ³
2.7	feet	D _{ROCK} = Separation from bedrock	≥ * ³
	ft	D _{amend} = Depth of amended soil, if applicable due high infiltration rate	≥ 24"
	ft	D _T = Depth of trench, if trench proposed	4 - 10 ft
	Yes/No	If a trench or underground system is proposed, has observation well been provided?	← yes
		If a trench is proposed, does material meet Env-Wq 1508.07(k)(2) requirements. ⁴	← yes
	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← yes
	:1	If a basin is proposed, pond side slopes.	≥ 3:1
20.98	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
21.34	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
22.27	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench? ⁵	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

- Volume below the lowest invert of the outlet structure and excludes forebay volume
- K_{sat}_{DESIGN} includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
- 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
- Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
- If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Runoff is already treated through focal point. WQV calculation is irrelevant.

No stage storage table is attached. 14'*8'*10 = 1120 sf

Outlet 1.2' above pond bottom, so 1120 sf * 1.2 ft = 1,344 cf

Any storage above top of 2' high chamber opening is within side stone

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.08)

Type/Node Name: _____

Filtration Drip Edge / Pond 8P

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.08(a).	
0.21	ac	A = Area draining to the practice	
0.18	ac	A _i = Impervious area draining to the practice	
0.83	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.80	unitless	R _v = Runoff coefficient = 0.05 + (0.9 x I)	
0.17	ac-in	WQV = 1" x R _v x A	
621	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
155	cf	25% x WQV (check calc for sediment forebay volume)	
465	cf	75% x WQV (check calc for surface sand filter volume)	
N/A		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V _{SED} = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
Calculate time to drain if system IS NOT underdrained:			
1,568	sf	A _{SA} = Surface area of the practice	
1.00	iph	K _{sat} _{DESIGN} = Design infiltration rate ¹	
		If K _{sat} (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
N/A	Yes/No	(Use the calculations below)	
4.7	hours	T _{DRAIN} = Drain time = V / (A _{SA} * I _{DESIGN})	≤ 72-hrs
Calculate time to drain if system IS underdrained:			
	ft	E _{WQV} = Elevation of WQV (attach stage-storage table)	
	cfs	Q _{WQV} = Discharge at the E _{WQV} (attach stage-discharge table)	
-	hours	T _{DRAIN} = Drain time = 2WQV/Q _{WQV}	≤ 72-hrs
18.75	feet	E _{FC} = Elevation of the bottom of the filter course material ²	
	feet	E _{UD} = Invert elevation of the underdrain (UD), if applicable	
17.67	feet	E _{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
15.67	feet	E _{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
18.75	feet	D _{FC to UD} = Depth to UD from the bottom of the filter course	≥ 1'
3.08	feet	D _{FC to ROCK} = Depth to bedrock from the bottom of the filter course	≥ 1'
1.08	feet	D _{FC to SHWT} = Depth to SHWT from the bottom of the filter course	≥ 1'
21.25	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
21.25	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
1,274	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		Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet		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	
	: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.	mod. 304.1 (see spec)

1. Rate of the limiting layer (either the filter course or the underlying soil). K_{sat_design} includes factor of safety. 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 structure, 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:

Natural elevation of 20.5 assumed prior to installation of berm. Conservative assumptions:

Using test pit 2 to determine 34" depth to water table and test pit 1 for 58" depth to bottom of test pit

$$20.5 - (34''/12'') = 17.67 \text{ SHWT}$$
$$20.5 - (58''/12'') = 15.67 \text{ "Bedrock" (bottom of test pit, bedrock not observed)}$$
$$20' \times 64' + 12' \times 24' = 1.568 \text{ sf surface area}$$
$$1,568 \text{ sf} * (1' * 0.4 + 1.5' * 0.05 + 0.25' * 0.15 + 0.75' * 0.4) = 1,274 \text{ cf storage volume}$$

No stage storage table needed

APPENDIX VIII

Pollutant Removal Calculations



REGION 1

BOSTON, MA 02109

Dated by Signature

MEMORANDUM

SUBJECT: FocalPoint Crediting Direction

FROM: Damien Houlihan, Stormwater Permits Section
Water Division

TO: Robert J. Woodman
Director - Engineering and Green Stormwater Infrastructure
Ferguson Waterworks

On June 7, 2021, Ferguson Waterworks (Ferguson) submitted a request to EPA Region 1 regarding the use of the FocalPoint biofiltration system (also known also as the High Performance Modular Biofiltration System, hereinafter "FocalPoint biofiltration system"). Based on the review of documents submitted by Ferguson, EPA Region 1 finds that entities wishing to deploy the FocalPoint biofiltration system may calculate phosphorus and nitrogen reductions under the 2016 Massachusetts Municipal Separate Storm Sewer Permit (MA MS4 Permit) and the 2017 New Hampshire Municipal Separate Storm Sewer Permit (NH MS4 Permit) using the performance quantification for Enhanced Biofiltration found on Table 3-20 and Figure 3-15 of Attachment 3 to Appendix F of the MA MS4 permit and Table 3-20 and Figure 3-15 of Attachment 3 to Appendix F of the NH MS4 permit (also attached to this document for reference) provided the following standard FocalPoint design requirements and other conditions are met:

1. Ferguson's FocalPoint biofiltration systems are to be designed with pretreatment to remove coarse sediment and debris before they reach and prematurely close the filter bed. Pretreatment measures must be designed to dissipate velocities and spread water out over a 2 to 4 ft width.
2. Ferguson's FocalPoint biofiltration systems are to be designed with a minimum and maximum surface ponding depths of 3 inches and 18 inches, respectively.
3. Ferguson's FocalPoint biofiltration systems are to be separated or otherwise isolated from the groundwater table to ensure that groundwater does not inundate the filter bed either using an impermeable liner or physical separation.
4. Ferguson's FocalPoint biofiltration systems are to be designed such that the system bed area is sized to be a minimum of 174 square feet per acre of tributary area. Stormwater modelling software shall be used to demonstrate that the runoff volume goal is treated prior to bypass.
5. System maintenance of Ferguson's FocalPoint biofiltration systems should occur once every 6 months, at a minimum, and filter media and pretreatment measures shall be replaced such that the performance of the systems are maintained as originally designed.

6. Stormwater quality monitoring must be used to ensure system performance has not declined over time. EPA recommends this monitoring commence once the filter bed media reaches two (2) years in age to ensure system performance has not declined. All monitoring data must be submitted to EPA by the entity claiming pollution reduction credit for the FocalPoint biofiltration system and filter media shall be replaced if monitoring data shows a decline in performance from original design.

This pollution reduction crediting of the FocalPoint biofiltration system is consistent with the Alternative Methods request process contained in Attachment 3 to Appendix F in the MA MS4 Permit and Attachment 3 to Appendix F of the NH MS4 Permit and may be used unless EPA Region 1 requires an alternative pollution reduction crediting methodology based on new or additional modeling of high-flow-rate filtering systems in a future NPDES permit. All stormwater quality monitoring data shall be submitted to EPA consistent with the requirements of the MA MS4 Permit or the NH MS4 Permit.

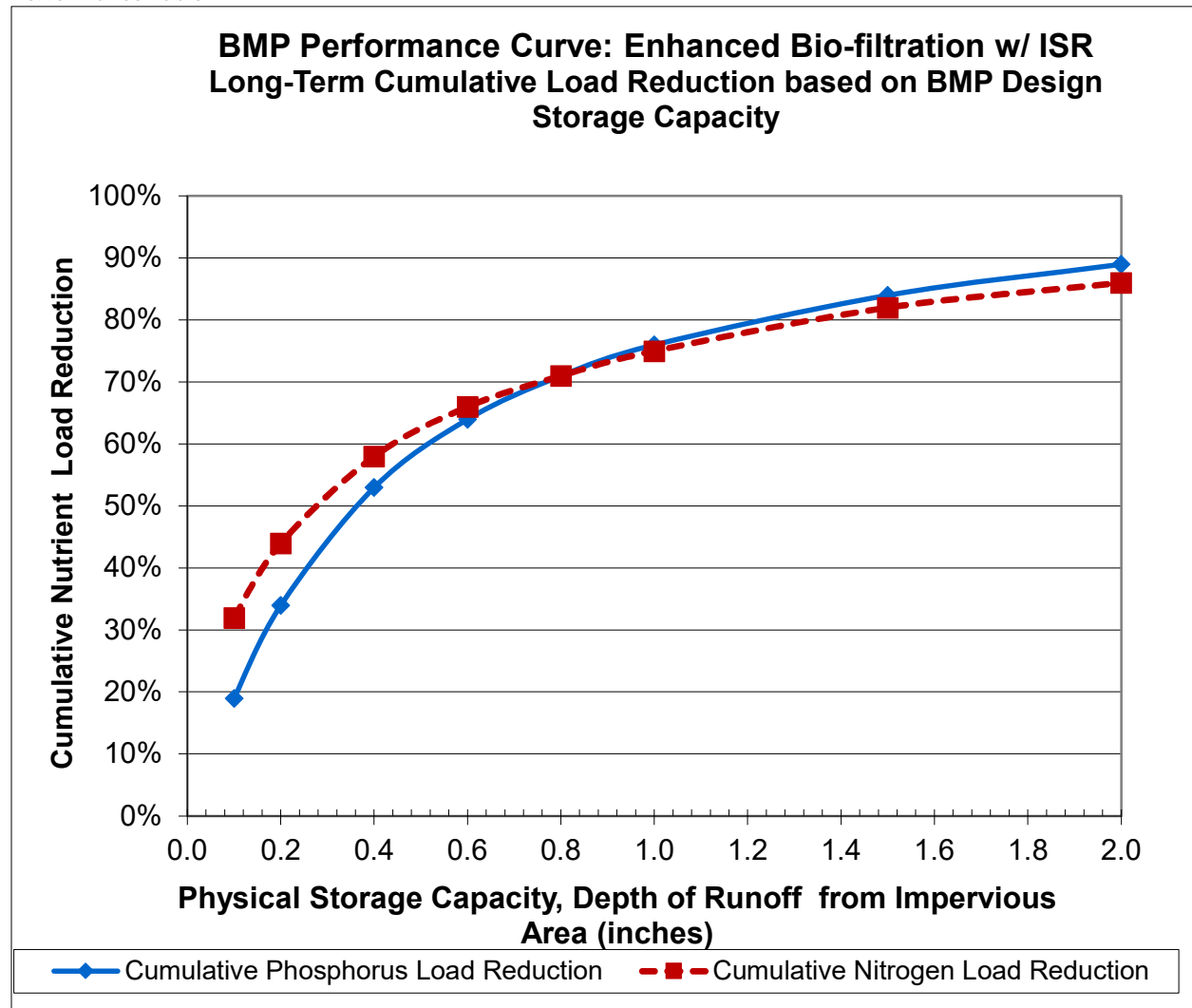
Table 3- 20: Enhanced Bio-filtration* with Internal Storage Reservoir (ISR) BMP Performance Table

Enhanced Bio-filtration* w/ ISR BMP Performance Table: Long-Term Phosphorus & Nitrogen Load Reduction								
BMP Capacity: Depth of Runoff from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Cumulative Phosphorus Load Reduction	19%	34%	53%	64%	71%	76%	84%	89%
Cumulative Nitrogen Load Reduction	32%	44%	58%	66%	71%	75%	82%	86%

***Filter media augmented with phosphorus sorbing materials to enhance phosphorus removal.**

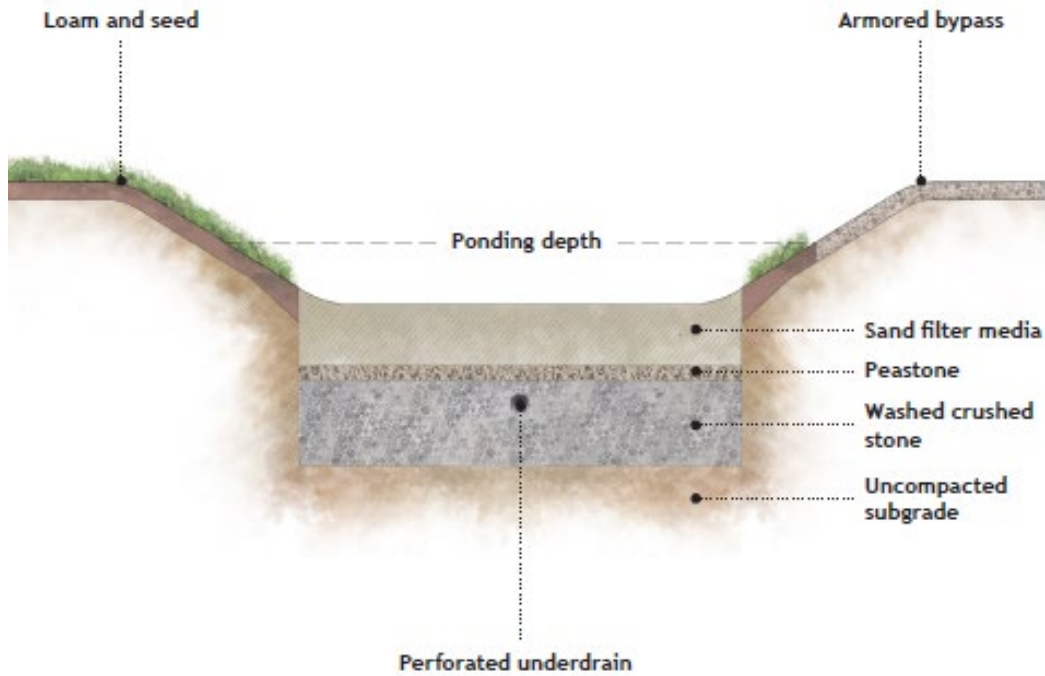
JBE added note: 90% TSS removal assumed due to infiltration system directly downstream

Figure 3-15: BMP Performance Curve: Enhanced Bio-filtration with Internal Storage Reservoir (ISR) BMP Performance Table



Infiltration Basin is an impoundment designed to temporarily retain stormwater runoff, allowing all or a portion of the water to infiltrate into the soil and is designed to completely drain between storm events. Surface infiltration basins should be designed with an outlet structure to pass peak flows during a range of storm events and an emergency spillway to pass peak flows around the embankment during extreme storm events. Water quality treatment is provided by stormwater runoff pollutants binding to soil particles beneath the basin as water infiltrates. Biological and chemical processes occurring in the soil also contribute to the breakdown of pollutants.

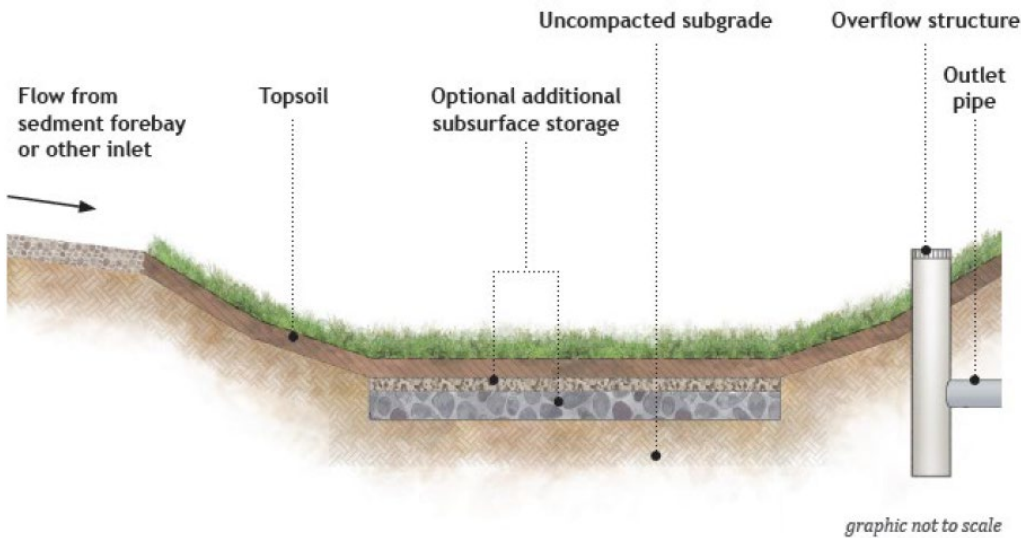
Sample Design



New England Stormwater Retrofit Manual (2022)

Infiltration Basin

Profile



New England Stormwater Retrofit Manual (2022)

Pollutant Export Rate by Land Use¹

Source Category by Land Use	Land Surface Cover	P Load Export Rate (lbs/acre/year)	N Load Export Rate (lbs/acre/year)
Commercial (COM) and Industrial (IND)	Directly connected impervious	1.78	15.0
Multi-Family (MFR) and High-Density Residential (HDR)	Directly connected impervious	2.32	14.1
Medium-Density Residential (MDR)	Directly connected impervious	1.96	14.1
Low-Density Residential (LDR) - "Rural"	Directly connected impervious	1.52	14.1

General Equations

Parameter	Equation
Physical Storage Capacity	Depth of Runoff x Drainage Area
Cost	Design Storage Volume x Unit Cost x Adjustment Factor ²
Yearly Pollutant Removal	Pollutant Load Export Rate x Drainage Area x Efficiency

Cost (2026)^{2,3}

Unit Cost (\$/ft ³) ⁴	Annual Maintenance Hours (hrs)
8.11	Not Assessed

¹ 2016 Massachusetts MS4 General Permit, Appendix F, Attachment 3, Table 3-1 (for phosphorus) and Table 3-2 (for nitrogen)

² EPA Memorandum "Methodology for developing cost estimates for Opti-Tool." February 20, 2016. scholars.unh.edu

³ Converted from 2010 to January 2026 dollars using U.S. Department of Labor Bureau of Labor Statistics' Consumer Price Index Inflation Calculator. bls.gov/data/inflation_calculator.htm

⁴ The unit cost provided, design storage volume of the SCM, and a user-determined multiplier (adjustment factor) that accounts for SCM-specific factors can be used to appropriately calibrate the total SCM cost. See further discussion on page 4 of this document.

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SCM Performance Tables for Soil Infiltration Rate: Infiltration Basin

		Load Reduction (%)					
Infiltration Rate (in/hr)	Depth of Runoff from Impervious Area (inches)	Volume	Phosphorus	Nitrogen	TSS	Zinc	Bacteria
0.52	0.1	20	37	57	60	59	29
	0.2	36	56	75	78	77	48
	0.4	58	79	90	92	91	75
	0.6	73	90	96	96	96	88
	0.8	83	95	98	98	98	94
	1.0	89	97	99	99	99	97
	1.5	96	99	100	100	100	100
	2.0	98	100	100	100	100	100
For filtration drip edge (Pond 8P) 1.02	0.1	25	42	60	59	58	33
	0.2	42	62	77	78	77	54
	0.4	66	85	92	92	91	81
	0.6	80	94	97	97	96	92
	0.8	88	97	99	99	98	97
	1.0	93	99	99	99	99	99
	1.5	97	100	100	100	100	100
	2.0	99	100	100	100	100	100
2.41	0.1	33	51	64	59	58	40
	0.2	54	73	82	79	78	65
	0.4	79	92	95	93	93	91
	0.6	90	97	98	98	97	98
	0.8	95	99	99	99	99	100
	1.0	97	100	100	100	100	100
	1.5	100	100	100	100	100	100
	2.0	100	100	100	100	100	100
8.27	0.1	55	71	76	61	60	59
	0.2	78	90	92	82	81	88
	0.4	94	99	99	95	95	99
	0.6	98	100	100	99	99	100
	0.8	99	100	100	100	100	100
	1.0	100	100	100	100	100	100
	1.5	100	100	100	100	100	100
	2.0	100	100	100	100	100	100

POLLUTANT REMOVAL CALCULATIONS

BMP	Focal Point 1 (3P)	Focal Point 2 (5P)	Filter Drip Edge (7P)	Nothing	Total	Required
Acres Impervious	0.223	0.144	0.178	0.023	0.568	
TSS Removal (%)	90%	90%	99%	98%	93%	80%
TN Removal (%)	75%	75%	99%	51%	82%	50%
TP Removal (%)	76%	76%	99%	62%	83%	50%

Existing offsite impervious within watersheds is excluded from calculation.

Pollutant removal efficiencies are per annotated EPA Performance curves enclosed with these calculations

TSS removal of 99% provided exceeds 80% requirement

TN removal of 82% provided exceeds 50% requirement

TP removal of 85% provided exceeds 50% requirement

APPENDIX IX

Stormwater Operations and Maintenance Manual

STORMWATER MANAGEMENT OPERATIONS AND MAINTENANCE MANUAL

**“Martini Apartments”
Ledgewood Drive
Portsmouth, NH 03801
Tax Map 229, Lot 6A**

Prepared for:

**Martini Northern LLC
Attn. Ben Middleton
10 Main Street
Newfields, NH 03856**

**Prepared by:
Jones & Beach Engineers, Inc.
100 Domain Drive
Suite 201
Exeter, NH 03833
(603) 772-4746
August 17, 2026
JBE Project No. 25071.2**



Inspection and Maintenance of Facilities and Property

A. Maintenance of Common Facilities or Property

1. The Landowner, future owners and assigns are responsible to perform the maintenance obligations themselves or hire a qualified professional to review the site on an annual basis for maintenance and certification of the stormwater system. The Landowner, future owners and assigns shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form and shall submit an Operations and Maintenance report on a yearly basis to the Portsmouth Planning Department.

B. General Inspection and Maintenance Requirements

1. Permanent stormwater and sediment and erosion control facilities to be maintained on the site include, but are not limited to, the following:
 - a. Driveway and Parking Lot
 - b. Vegetation and landscaping
 - c. Focal Points
 - d. Rain Guardian
 - e. Yard Drain
 - f. Chamber Systems
 - g. Drain Manhole
 - h. Filtration Drip Edge
 - i. Culverts and Roof Drains
 - j. Rip-Rap Outlet Protection Aprons
2. Maintenance of permanent measures shall follow the following schedule:
 - a. Normal winter driveway & parking lot maintenance including plowing and snow removal. Road sweeping at the end of every winter, preferably before the start of the spring rain season.
 - b. **Annual inspection** of the site for erosion, destabilization, settling, and sloughing. Any needed repairs are to be conducted immediately. **Annual inspection** of site's vegetation and landscaping. Any areas that are bare shall be reseeded and mulched with hay or, if the case is extreme, loamed and seeded or sodded to ensure adequate vegetative cover. Landscape specimens shall be replaced in kind, if they are found to be dead or dying.
 - c. Focal Points: See enclosed inspection and maintenance guidance document.
 - d. Rain Guardians: See enclosed inspection and maintenance guidance document.
 - e. **Annual inspection** of yard drains to determine if they need to be cleaned. Yard drains are to be cleaned if the depth of deposits is greater than one-half the depth from the basin bottom to the invert of the lowest pipe or opening into or out of the basin. If a yard drain significantly exceeds the one-half depth standard during the inspection, then it shall be cleaned more frequently. If woody debris or trash accumulates in the yard drain, then it shall be cleaned on a weekly basis. The yard drain can be cleaned either manually or by specially designed equipment including, but not limited to, bucket loaders and vacuum

pumps. Before any materials can be disposed, it is necessary to perform a detailed chemical analysis to determine if the materials meet the EPA criteria for hazardous waste. This will help determine how the materials shall be stored, treated, and disposed. Grease hoods are to be wiped clean and the rags disposed of properly. Debris obscuring the grate inlet shall also be removed.

- f. Chamber system: Once annually, open the inspection ports and visually inspect the condition of the stone base. If more than 6" of sediment is observed, plug the outlet and flush the system thoroughly. Pump water into system until at least 1" of standing water covers the system bottom. Repeat at both inspection ports and pump out back-flush water. Capture sediment-laden water for proper disposal according to local state, and EPA regulation. Additionally, vacuum all adjacent manhole structures.

- g. **Annual inspection** of drain manholes to determine if they need to be cleaned. Manholes shall be cleaned of any material upon inspection. Manholes can be cleaned either manually or by specially designed equipment including, but not limited to, bucket loaders and vacuum pumps. Before any materials can be disposed, it is necessary to perform a detailed chemical analysis to determine if the materials meet the EPA criteria for hazardous waste. This will help determine how the materials shall be stored, treated, and disposed.

- h. Filtration drip edge:

The following course of action will help assure that the filtration drip edge is maintained to preserve its effectiveness.

In the spring and fall, visually inspect the area around the edges and repair any erosion. Use small stones to stabilize erosion along drainage paths. Inspect stone area to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock shall be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation shall not be allowed to become established in stone areas, and/or any debris removed from the void spaces between the stones

- i. **Inspection** of culvert inlets and outlets **including any roof drain outfalls** at least **once every three months** during the rainy season (March to November). Any debris is to be removed and disposed of properly.
- j. Rock riprap shall be **inspected annually** in order to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock shall be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation must not be allowed to become established in riprap areas, and/or any debris removed from the void spaces between the rocks. Remove any excessive vegetation that grows in the voids of the stone. If the riprap is adjacent to a stream or other waterbody, the water shall be kept clear of obstructions, debris, and sediment deposits.

See attached sample forms as a guideline.

Any inquiries in regards to the design, function, and/or maintenance of any one of the above-mentioned facilities or tasks shall be directed to the project engineer:

Jones & Beach Engineers, Inc.
100 Domain Drive, Suite 201
Exeter, NH 03833

T#: (603) 772-4746

Commitment to maintenance requirements

I agree to complete and/or observe all of the required maintenance practices and their respective schedules as outlined above.

Signature

Print Name

Title

Date



Annual Operations and Maintenance Report

The Landowner, future owners and assigns are responsible to perform the maintenance obligations themselves or hire a qualified professional to review the site on an annual basis for maintenance and certification of the stormwater system. The Landowner, future owners and assigns shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form and shall submit an Operations and Maintenance report on a yearly basis to the Portsmouth Planning Department.

- a. Driveway and Parking Lot
- b. Vegetation and landscaping
- c. Focal Points
- d. Rain Guardian
- e. Yard Drain
- f. Chamber Systems
- g. Drain Manhole
- h. Filtration Drip Edge
- i. Culverts and Roof Drains
- j. Rip-Rap Outlet Protection Aprons

Area	Date of Inspection	Who Inspected	Findings of Inspector
Driveway and Parking Lot			
Vegetation and Landscaping			
Focal Point #1			
Focal Point #2			



Rain Guardian #1			
Rain Guardian #2			
Yard Drain			
Chamber System #1			
Chamber System #2			
Drain Manhole #1			
Drain Manhole #2			
Drain Manhole #3			

Drain Manhole #4			
Drain Manhole #5			
Filtration Drip Edge			
Culvert Inlet #1			
Culvert Inlet #2			
Culvert Inlet #3			
Culvert Outlet #1 w/ rip rap outlet protection apron			

Culvert Outlet #2 w/ rip rap outlet protection apron			
Culvert Outlet #3 w/ rip rap outlet protection apron			
Culvert Outlet #4 w/ rip rap outlet protection apron			
Culvert Outlet #5 w/ rip rap outlet protection apron			
Roof Drains			
Other (please note):			
Other (please note):			



FocalPoint

BIOFILTRATION SYSTEMS

HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS)

Operations & Maintenance



GENERAL DESCRIPTION

The following general specifications describe the general operations and maintenance requirements for the FocalPoint® High Performance Modular Biofiltration System (HPMBS). The system utilizes physical, chemical and biological mechanisms of a soil, plant and microbe complex to remove pollutants typically found in urban stormwater runoff. The treatment system is a fully equipped, modular, constructed in place system designed to treat contaminated runoff.

Stormwater enters the FocalPoint® HPMBS, is filtered by the High Flow Biofiltration Media and passes through to the underdrain/storage system where the treated water is detained, retained or infiltrated to sub-soils, prior to discharge to the storm sewer system of any remaining flow.

Higher flows bypass the FocalPoint® HPMBS via a downstream inlet or other overflow conveyance. Maintenance is a simple, inexpensive and safe operation that does not require confined space entry, pumping or vacuum equipment, or specialized tools. Properly trained landscape personnel can effectively maintain FocalPoint® HPMBS by following instructions in this manual.



BASIC OPERATIONS

FocalPoint® is a modular, high performance biofiltration system that often works in tandem with other integrated management practices (IMP). Contaminated stormwater runoff enters the biofiltration bed through a conveyance swale, planter box, or directly through a curb cut or false inlet. Energy is dissipated by a rock or vegetative dissipation device and is absorbed by a 3-inch layer of aged, double shredded hardwood mulch, with fines removed, (when specified) on the surface of the biofiltration media.

As the water passes through the mulch layer, most of the larger sediment particles and heavy metals are removed through sedimentation and chemical reactions with the organic material in the mulch. Water passes through the biofiltration media where the finer particles are removed and numerous chemical reactions take place to immobilize and capture pollutants in the soil media.

The cleansed water passes into the underdrain/storage system and remaining flows are directed to a storm sewer system or other appropriate discharge point. Once the pollutants are in the soil, bacteria begin to break down and metabolize the materials and the plants begin to uptake and metabolize the pollutants. Some pollutants such as heavy metals, which are chemically bound to organic particles in the mulch, are released over time as the organic matter decomposes to release the metals to the feeder roots of the plants and the cells of the bacteria in the soil where they remain and are recycled. Other pollutants such as phosphorus are chemically bound to the soil particles and released slowly back to the plants and bacteria and used in their metabolic processes. Nitrogen goes through a variety of very complex biochemical processes where it can ultimately end up in the plant/bacteria biomass, turned to nitrogen gas or dissolves back into the water column as nitrates depending on soil temperature, pH and the availability of oxygen. The pollutants ultimately are retained in the mulch, soil and biomass with some passing out of the system into the air or back into the water.

DESIGN AND INSTALLATION

Each project presents different scopes for the use of FocalPoint® HPMBS. To ensure the safe and specified function of this stormwater BMP, Convergent Water Technologies and/or its Value Added Resellers (VAR) review each application before supply. Information and design assistance is available to the design engineer during the planning process. Correct FocalPoint® sizing is essential to optimum performance. The engineer shall submit calculations for approval by the local jurisdiction when required. The contractor and/or VAR is responsible for the correct installation of FocalPoint® HPMBS units as described in approved plans. A comprehensive installation manual is available at www.convergentwater.com.





MAINTENANCE

Why Maintain?

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated in your property's permitting process as a legally binding BMP maintenance agreement. Other reasons for maintenance include:

- Avoid legal challenges from your jurisdiction's maintenance enforcement program.
- Prolong the lifespan of your FocalPoint® HPMBS.
- Avoid costly repairs.
- Help reduce pollutant loads leaving your property.

Simple maintenance of the FocalPoint® HPMBS is required to continue effective pollutant removal from stormwater runoff before any discharge into downstream waters. This procedure will also extend the longevity of the living biofiltration system. The unit will recycle and accumulate pollutants within the biomass, but may also be subjected to other materials entering the surface of the system. This may include trash, silt and leaves etc. which will be contained above the mulch and/or biofiltration media layer. Too much silt may inhibit the FocalPoint's® HPMBS flow rate, which is a primary reason for system maintenance. Removal of accumulated silt/sediment and/or replacement of the mulch layer (when specified), is an important activity that prevents over accumulation of such silt/sediment.

When to Maintain?

Convergent Water Technologies and/or its VAR includes a 1-year maintenance plan with each system purchased. Annual included maintenance consists of two (2) scheduled maintenance visits. Additional maintenance may be necessary depending on sediment and trash loading (by Owner or at additional cost). The start of the maintenance plan begins when the system is activated for full operation. Full operation is defined as when the site is appropriately stabilized, the unit is installed and activated (by VAR), i.e., when mulch (if specified) and plantings are added.

Activation should be avoided until the site is fully stabilized (full landscaping, grass cover, final paving and street sweeping completed). Maintenance visits are scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands. The fall visit helps the system by removing excessive leaf litter.

A first inspection to determine if maintenance is necessary should be performed at least twice annually after storm events of greater than (1) one inch total depth (subject to regional climate). Please refer to the maintenance checklist for specific conditions that indicate if maintenance is necessary.

It has been found that in regions which receive between 30-50 inches of annual rainfall, (2) two visits are generally required. Regions with less rainfall often only require (1) one visit per annum. Varying land uses can affect maintenance frequency.



Some sites may be subjected to extreme sediment or trash loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the VAR/Maintenance contractor and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the VAR/Maintenance contractor of any damage to the plant(s), which constitute(s) an integral part of the biofiltration technology. Owners should also advise other landscape or maintenance contractors to leave all maintenance of the FocalPoint® HPMBs to the VAR/Maintenance contractor (i.e. no pruning or fertilizing).

EXCLUSION OF SERVICES

It is the responsibility of the owner to provide adequate irrigation when necessary to the plant(s) in the FocalPoint® HPMBs.

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the VAR/Maintenance contractor maintenance contract. Should a major contamination event occur, the Owner must block off the outlet pipe of the FocalPoint® (where the cleaned runoff drains to, such as drop-inlet) and block off the point where water enters of the FocalPoint® HPMBs. The VAR/Maintenance contractor should be informed immediately.

MAINTENANCE VISIT SUMMARY

Each maintenance visit consists of the following simple tasks (detailed instructions below).

1. Inspection of FocalPoint® HPMBs and surrounding area
2. Removal of debris, trash and mulch
3. Mulch replacement
4. Plant health evaluation (including measurements) and pruning or replacement as necessary
5. Clean area around FocalPoint® HPMBs
6. Complete paperwork, including date stamped photos of the tasks listed above.

MAINTENANCE TOOLS, SAFETY EQUIPMENT AND SUPPLIES

Ideal tools include: camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of trash is unknown, high visibility clothing and barricades when working in close proximity to traffic and also safety hats and shoes.



Inspection of FocalPoint® HPMBS and surrounding area

Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example in this document) the following:

☐ Standing Water	yes no	☐ Damage to HPMBS System to Overflow conveyance	yes no
☐ Is Bypass Inlet Clear?	yes no		yes no

Removal of Silt / Sediment / Clay

Dig out silt (if any) and mulch and remove trash & foreign items.

☐ Silt / Clay Found?	yes no	☐ Leaves?	yes no
☐ Cups / Bags Found?	yes no	☐ Volume of material removed _____	(volume or weight)

Removal of debris, trash and mulch

After removal of mulch and debris, measure distance from the top of the FocalPoint® HPMBS engineered media soil to the flow line elevation of the adjacent overflow conveyance. If this distance is greater than that specified on the plans (typ. 6" - 12"), add media (not top soil or other) to recharge to the distance specified.

☐ Distance to media surface to flow line of overflow conveyance (inches) _____
☐ # of Buckets of Media Added _____

Mulch Replacement

Most maintenance visits require only replacement mulch (if utilized) which must be, aged, double shredded hardwood mulch with fines removed. For smaller projects, one cubic foot of mulch will cover four square feet of biofiltration bed, and for larger projects, one cubic yard of mulch will cover 108 square feet of biofiltration bed. Some visits may require additional FocalPoint® HPMBS engineered soil media available from the VAR/Contractor.

- ☐ Add double shredded, aged hardwood mulch which has been screened to remove fines, evenly across the entire biofiltration media bed to a depth of 3".
- ☐ Clean accumulated sediment from energy dissipation system at the inlet to the FocalPoint® HPMBS to allow for entry of trash during a storm event.

Plant health evaluation and pruning or replacement as necessary

Examine the plant's health and replace if dead or dying.
Prune as necessary to encourage growth in the correct directions

☐ Height above Grate (feet) _____	☐ Health	alive dead
☐ Width at Widest point (feet) _____	☐ Damage to Plant	yes no

Clean area around FocalPoint® HPMBS

- ☐ Clean area around unit and remove all refuse to be disposed of appropriately.

Complete paperwork

- ☐ Deliver Maintenance Report and photographs as appropriate.
- ☐ Some jurisdictions may require submission of maintenance reports in accordance with approvals.
- ☐ It is the responsibility of the Owner to comply with local regulations.



FocalPoint Warranty

Seller warrants goods sold hereunder against defects in materials and workmanship only, for a period of (1) year from date the Seller activates the system into service. Seller makes no other warranties, express or implied.

Seller's liability hereunder shall be conditioned upon the Buyer's installation, maintenance, and service of the goods in strict compliance with the written instructions and specifications provided by the Seller. Any deviation from Seller's instructions and specifications or any abuse or neglect shall void warranties.

In the event of any claim upon Seller's warranty, the burden shall be upon the Buyer to prove strict compliance with all instructions and specifications provided by the Seller.

Seller's liability hereunder shall be limited only to the cost or replacement of the goods. Buyer agrees that Seller shall not be liable for any consequential losses arising from the purchase, installation, and/or use of the goods.



Maintenance Checklist

<i>Element</i>	<i>Problem</i>	<i>What To Check</i>	<i>Should Exist</i>	<i>Action</i>
<i>Inlet</i>	Excessive sediment or trash accumulation	Accumulation of sediment or trash impair free flow of water into FocalPoint	Inlet free of obstructions allowing free flow into FocalPoint System	Sediments or trash should be removed
<i>Mulch Cover</i>	Trash and floatable debris accumulation	Excessive trash or debris accumulation.	Minimal trash or other debris on mulch cover	Trash and debris should be removed and mulch cover raked level. Ensure that bark nugget
<i>Mulch Cover</i>	Ponding of water on mulch cover	Ponding in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils	Stormwater should drain freely and evenly over mulch cover.	Contact VAR for advice.
<i>Plants</i>	Plants not growing, or in poor condition	Soil/mulch too wet, evidence of spill. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free.	Contact VAR for advice.
<i>Plants</i>	Plant growth excessive	Plants should be appropriate to the species and location of FocalPoint		Trim/prune plants in accordance with typical landscaping and



PRETREATMENT FOR BIORETENTION

Rain Gardens • Swales • Filtration Basins • Infiltration Basins



TURRET



FOXHOLE



BUNKER

Maintenance Guide

Rain Guardian pretreatment chambers simplify bioretention maintenance by collecting sand, leaves, grass clippings, and other debris in an easy to clean, confined location. Regularly maintaining the Rain Guardian sustains its functionality by maximizing storage and filtration capacities. Maintenance frequency is variable and depends on many factors such as rainfall frequency, drainage area size and land use type, and season of the year. The general cleaning process is similar for all Rain Guardian models (i.e. Bunker, Foxhole, and Turret).

Following rain events, inspect the pretreatment chamber for debris on the top grate, within the chamber, and on the vertical, drop-in filter wall. The maintenance steps described below should be completed if areas of the top grate are clogged, the chamber is >75% full, or the vertical filter wall is clogged. Maintenance should be completed when stormwater has completely drained from the bioretention practice. The filter wall allows the chamber to dry between rain events, which further simplifies maintenance by ensuring removed debris is largely dry. Ensure all debris collected during cleaning of the chamber is completely removed from the site and properly disposed of according to local environmental rules. Once cleaning is complete, reinstall the filter wall with filter fabric facing the inside of the chamber and replace the top grate. For the Foxhole, reinstall the top lid, including optional lid anchor screws if equipped.



Clear Debris from Top Grate

- Foxhole only—remove top lid, including optional lid anchor screws if equipped
- Leaf litter and garbage commonly accumulate on the top grate
- Simply remove and dispose of debris by hand or with a shovel prior to removing top grate



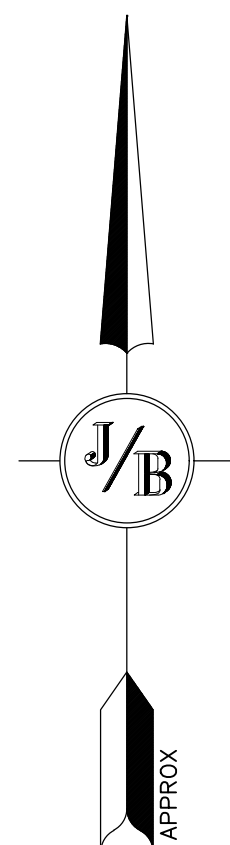
Remove Debris from Inside Chamber

- Remove top grate and place on paved inlet to avoid damage to nearby plants
- Remove and dispose of accumulated debris within chamber using a shovel



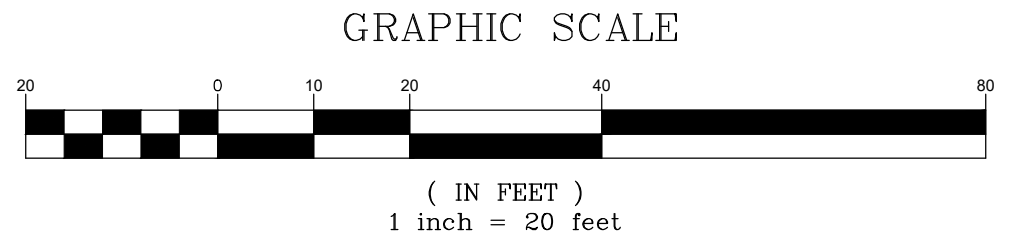
Clean Filter Wall

- Remove drop-in filter by lifting vertically
- Clean filter wall with a stiff bristled broom or rinse clean with pressurized water



NOTES:

1. THIS PLAN IS NOT FOR CONSTRUCTION. THE INTENT OF THIS PLAN IS TO GUIDE ONGOING STORMWATER SYSTEM INSPECTIONS AND MAINTENANCE ACTIVITIES. CONTRACTOR TO REFER TO APPROVED PLAN SET.



PROJECT PARCEL
TOWN OF PORTSMOUTH
TAX MAP 229, LOT 6A

APPLICANT
MARTINI NORTHERN LLC
ATTN. BEN MIDDLETON
10 MAIN STREET
NEWFIELDS, NH 03856

TOTAL LOT AREA
43,255 SQ. FT.
0.99 ACRES

Design: DJM	Draft: TCR	Date: 01/08/26
Checked: EMP	Scale: AS NOTED	Project No.: 25071.2
Drawing Name: 25071.2-PLAN.dwg		
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.		

0	08/17/26	ISSUED FOR REVIEW	DJM
REV.	DATE	REVISION	BY

J/B

Designed and Produced in NH

Jones & Beach Engineers, Inc.

100 Domain Dr.
Suite 201
Exeter, NH 03833

Civil Engineering Services

603-772-4746

E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	OPERATIONS AND MAINTENANCE PLAN
Project:	"MARTINI APARTMENTS" LEDGEWOOD DRIVE, PORTSMOUTH, NH 03801
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

DRAWING No.

O&M

SHEET 1 OF 1
JBE PROJECT NO. 25071.2

APPENDIX X

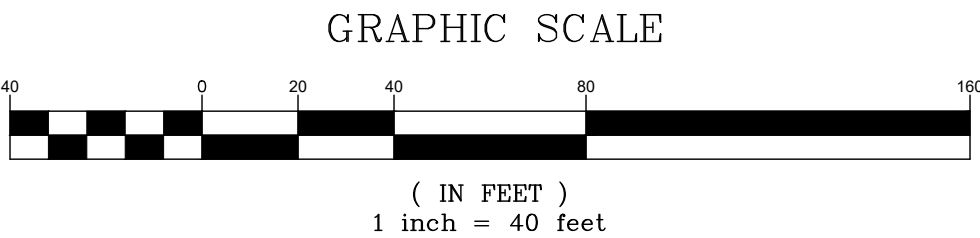
Pre- and Post-Construction Watershed Plans



OFFSITE TOPOGRAPHY SHOWN HEREON IS FROM NH GRANIT LIDAR EXCEPT FOR STRETCH OF LEDGEWOOD DRIVE IN FRONT OF SUBJECT PARCEL. NH GRANIT LIDAR TOPOGRAPHY WAS USED LOOSELY TO GENERATE EXISTING WATERSHED BOUNDARIES AND FLOW PATHS IN CONJUNCTION WITH FIELD EVIDENCE THAT IN SOME CASES CONTRADICTS LIDAR TOPOGRAPHY WHICH MAY NOT TAKE INTO ACCOUNT FINE GRADING OF DEVELOPED AREAS, RETAINING WALLS, AND CURB LINES.

LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT
- REACH
- POND
- TC PATH
- WETLANDS
- HISS SOILS
- FLOW ARROW

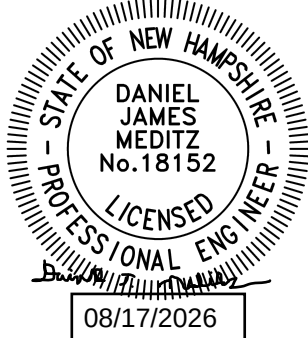


PROJECT PARCEL
TOWN OF PORTSMOUTH
TAX MAP 229, LOT 6A

APPLICANT
MARTINI NORTHERN LLC
ATTN. BEN MIDDLETON
10 MAIN STREET
NEWFIELDS, NH 03856

TOTAL LOT AREA
43,255 SQ. FT.
0.99 ACRES

Design: DJM	Draft: TCR	Date: 07/28/26
Checked: EMP	Scale: AS NOTED	Project No.: 25071.2
Drawing Name: 25071.2-WATERSHED.dwg		
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.		



REV.	DATE	REVISION	BY
0	08/17/26	ISSUED FOR REVIEW	DJM

J/B Jones & Beach Engineers, Inc.
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885
Civil Engineering Services
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EXISTING WATERSHED PLAN
Project:	MARTINI APARTMENTS LEDGEWOOD DRIVE, PORTSMOUTH, NH
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

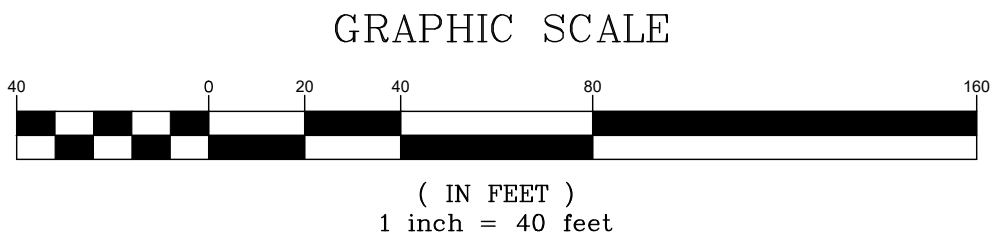
DRAWING No.
W1
SHEET 1 OF 2
JBE PROJECT NO. 25071.2



OFFSITE TOPOGRAPHY SHOWN HEREON IS FROM NH GRANIT LIDAR EXCEPT FOR STRETCH OF LEDGEWOOD DRIVE IN FRONT OF SUBJECT PARCEL. NH GRANIT LIDAR TOPOGRAPHY WAS USED LOOSELY TO GENERATE EXISTING WATERSHED BOUNDARIES AND FLOW PATHS IN CONJUNCTION WITH FIELD EVIDENCE THAT IN SOME CASES CONTRADICTS LIDAR TOPOGRAPHY WHICH MAY NOT TAKE INTO ACCOUNT FINE GRADING OF DEVELOPED AREAS, RETAINING WALLS, AND CURB LINES.

LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT
- REACH
- POND
- TC PATH
- WETLANDS
- HISS SOILS
- FLOW ARROW

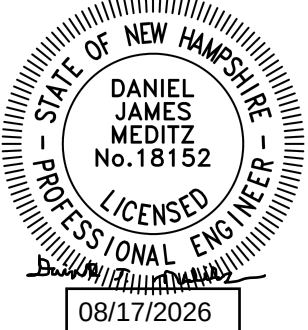


PROJECT PARCEL
TOWN OF PORTSMOUTH
TAX MAP 229, LOT 6A

APPLICANT
MARTINI NORTHERN LLC
ATTN. BEN MIDDLETON
10 MAIN STREET
NEWFIELDS, NH 03856

TOTAL LOT AREA
43,255 SQ. FT.
0.99 ACRES

Design: DJM Draft: TCR Date: 07/28/26
Checked: EMP Scale: AS NOTED Project No.: 25071.2
Drawing Name: 25071.2-WATERSHED.dwg
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.



REV.	DATE	REVISION	BY
0	08/17/26	ISSUED FOR REVIEW	DJM

J/B Jones & Beach Engineers, Inc.
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885
Civil Engineering Services
E-MAIL: JBE@JONESANDBEACH.COM
603-772-4746

Plan Name:	PROPOSED WATERSHED PLAN
Project:	MARTINI APARTMENTS LEDGEWOOD DRIVE, PORTSMOUTH, NH
Owner of Record:	ST NICHOLAS GREEK ORTHODOX CHURCH 40 ANDREW JARVIS DRIVE, PORTSMOUTH, NH 03801

DRAWING No.
W2
SHEET 2 OF 2
JBE PROJECT NO. 25071.2

TRAFFIC IMPACT STATEMENT

ITE TRIP GENERATION ESTIMATES

**“Martini Apartments”
Ledgewood Drive
Portsmouth, NH 03801
Tax Map 229, Lot 6A**

Prepared for:

**Martini Northern LLC
Attn. Ben Middleton
10 Main Street
Newfields, NH 03856**

**Prepared by:
Jones & Beach Engineers, Inc.
100 Domain Drive
Suite 201
Exeter, NH 03833
(603) 772-4746
August 17, 2026
JBE Project No. 25071.2**

EXECUTIVE SUMMARY

Martini Northern LLC proposes to construct a 15-unit apartment building on a 0.99-acre parcel of land located on Ledgewood Drive in Portsmouth, NH. The subject parcel is vacant in the existing condition.

The proposed use for the lot was assumed to be “Multifamily Housing (Low Rise)” (Land Use Code 220, defined by the ITE Manual as “A residential building with two or three floors (levels) of residences.” The ITE Manual provides different estimates for such uses that are and aren’t close to rail transit. There is not rail transit available within walking distance of the proposed unit.

Trip generation estimates for the full day on a typical weekday, Saturday, and Sunday were calculated for the existing and proposed scenarios, as were trip generation estimates for the Peak Hour of Generator on a weekday, Saturday, and Sunday. For weekdays, the peak hour data was further broken down into peak hour AM and peak hour PM, corresponding with typical morning and evening commutes, and data for the Peak Hour on an Adjacent Street was also available.

Per-dwelling unit trip generation estimates for each of the aforementioned scenarios are included in the appendix, with a range of data presented. The Average Rate value for each scenario for the proposed use was used for this analysis. In the following table, the multifamily housing average rate estimates have been multiplied by fifteen (15) to arrive at the trip generation estimate for the proposed use.

Average Estimate			
	Full Day (Trips/Day)	Peak Hour Generator (Trips/Hour)	Peak Hour Adjacent Street (Trips/Hour)
Weekday	93.2		
Saturday	68.3	7.4	
Sunday	58.0	5.4	
Weekday AM		7.1	6.2
Weekday PM		9.3	7.8

CONCLUSION

Based on the above table, under normal circumstances this development would generate **93** additional trips on a weekday, **68** additional trips on a Saturday, and **58** additional trips on a Sunday. Peak hour estimates vary but in general they all show an increase of **5-9** additional trips during the peak hour of the generator and the same number of additional trips during the peak hour of adjacent street under normal circumstances. Ledgewood Drive directly feeds into Route 1, which receives moderate traffic in the existing condition. The existing Winchester Place Apartments further down along Ledgewood also dwarf the intended use of the subject parcel. It is unlikely that this development alone will substantially impact the existing traffic on Route 1 or 1A, or on Ledgewood Drive.

Respectfully submitted,
JONES & BEACH ENGINEERS, INC.

A handwritten signature in blue ink that reads "Daniel Meditz". The signature is written in a cursive, flowing style.

Daniel Meditz, P.E.
Lead Design Engineer

Trip generation estimates used for this analysis were taken from the Trip Generation Manual, 12th Edition, published by the Institute of Traffic Engineers in August 2025.

Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

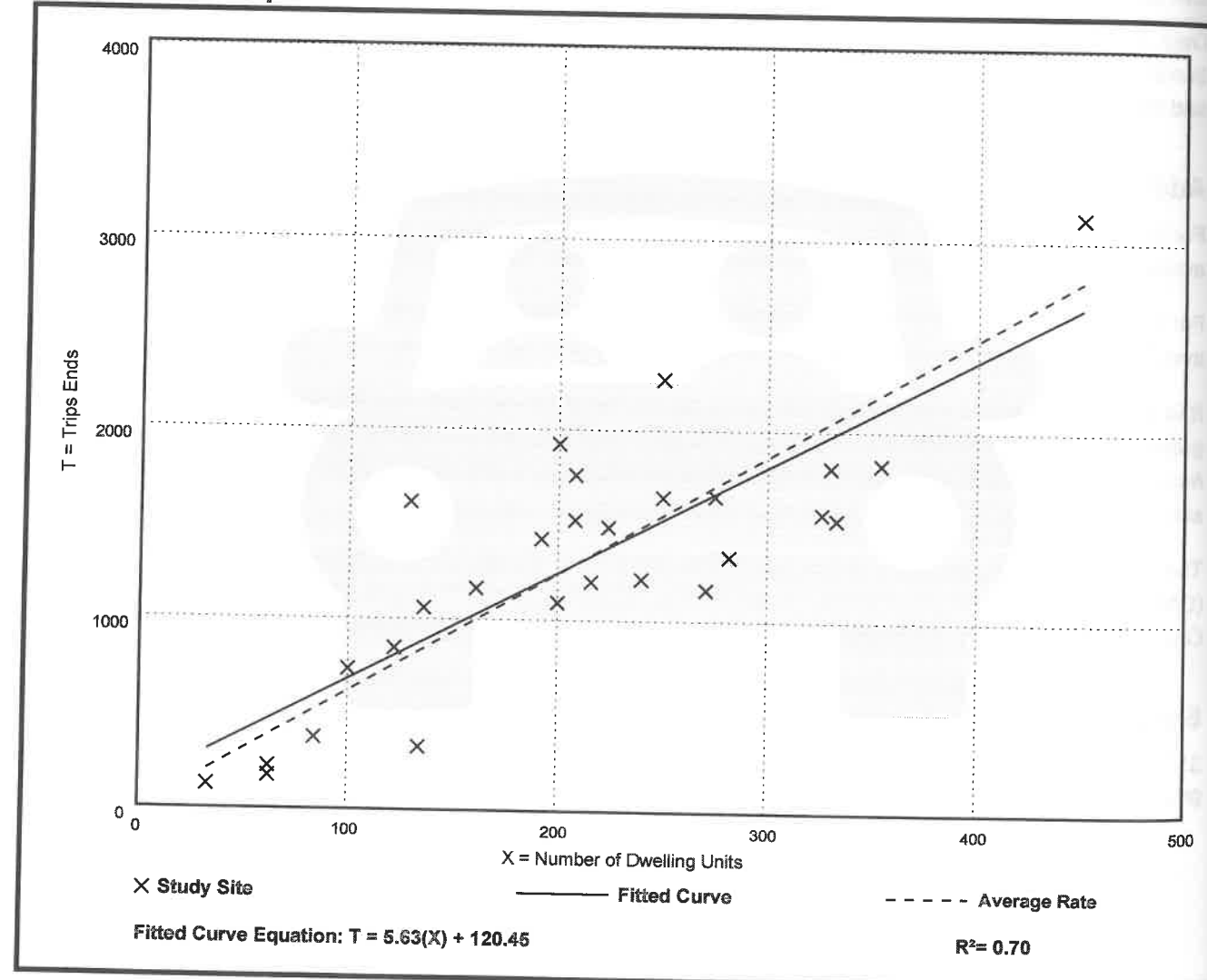
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 28
Avg. Num. of Dwelling Units: 208
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.21	2.46 - 12.50	1.87

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

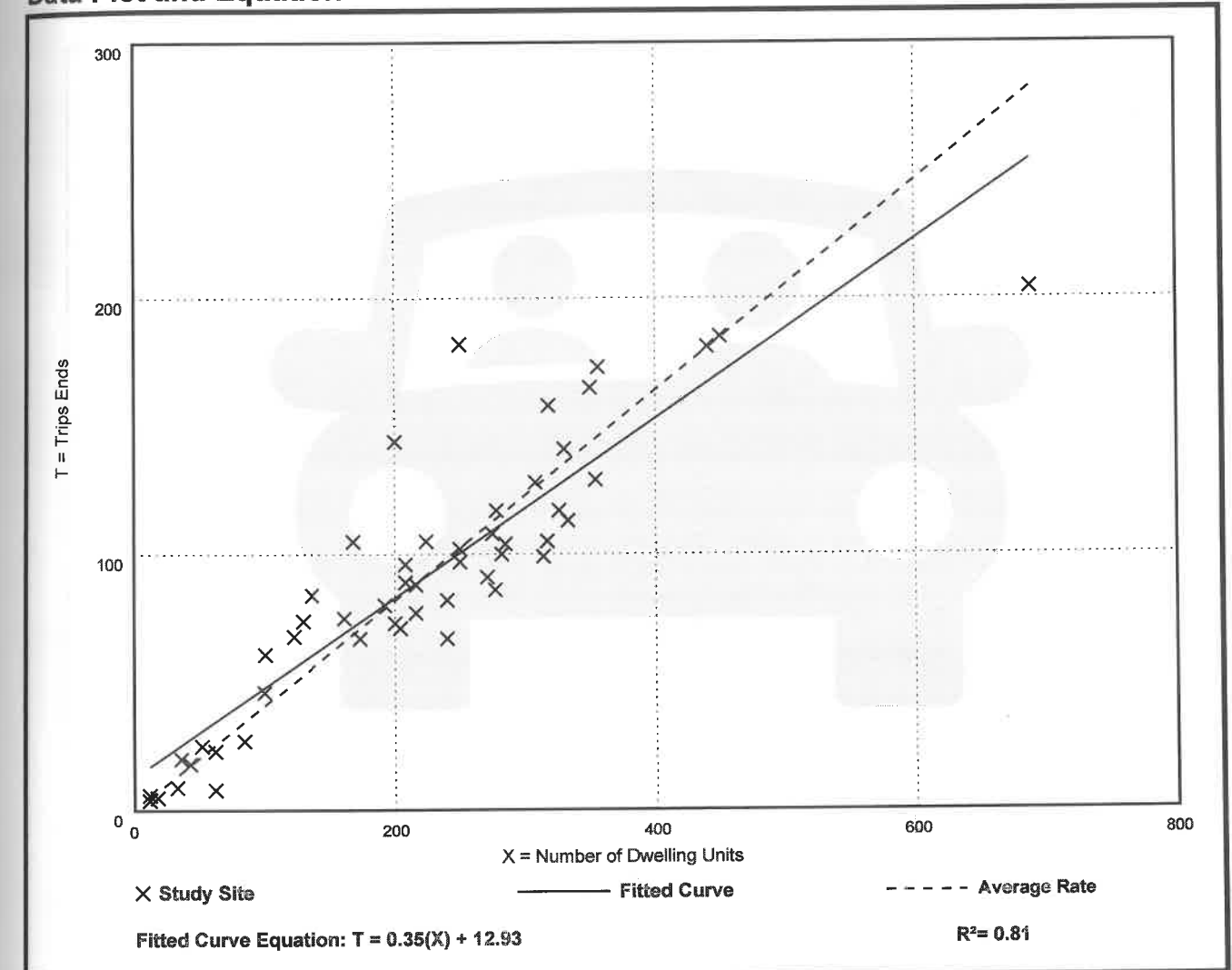
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban
Number of Studies: 51
Avg. Num. of Dwelling Units: 219
Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.41	0.13 - 0.73	0.10

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 61

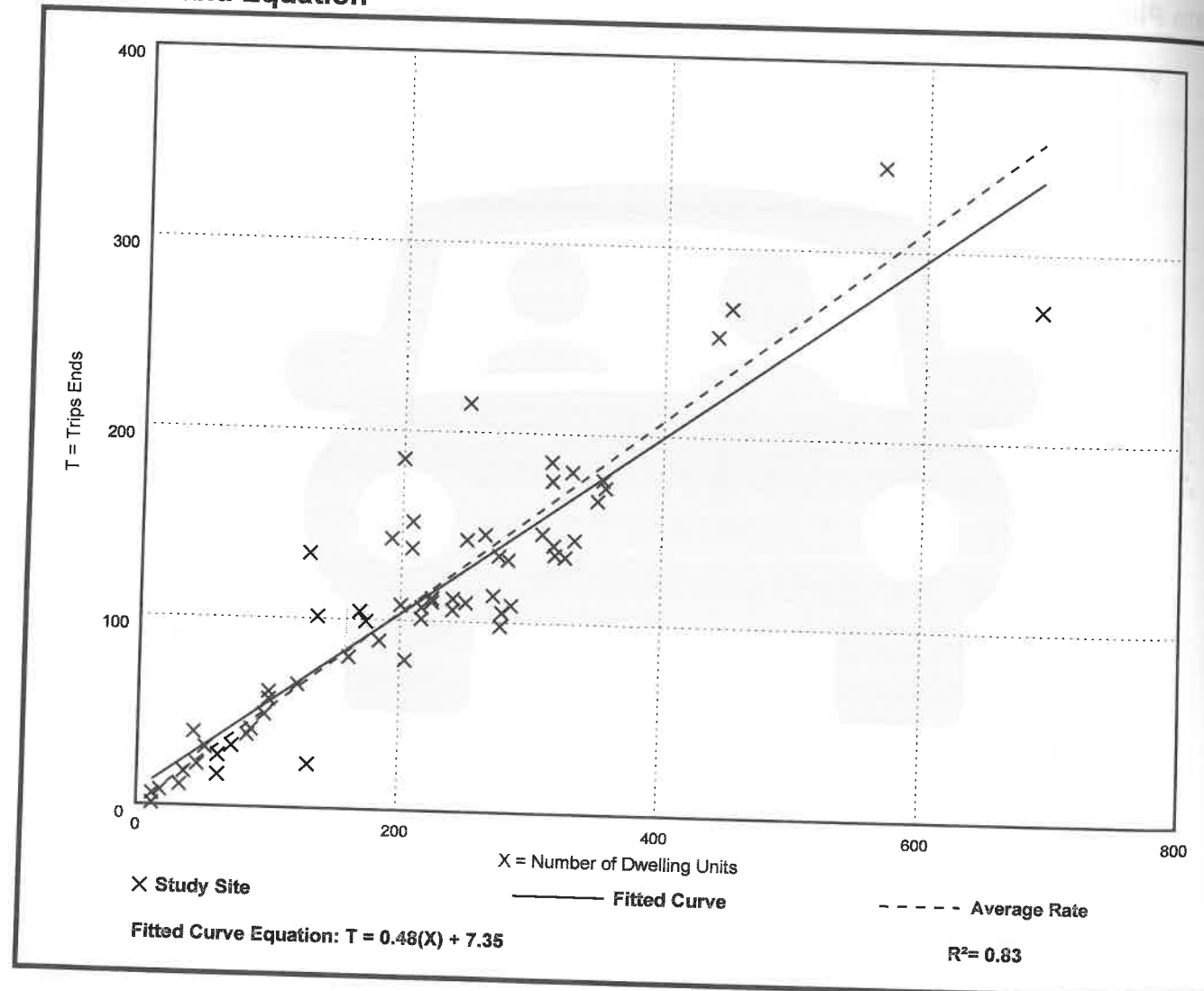
Avg. Num. of Dwelling Units: 215

Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.52	0.08 - 1.04	0.13

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 25

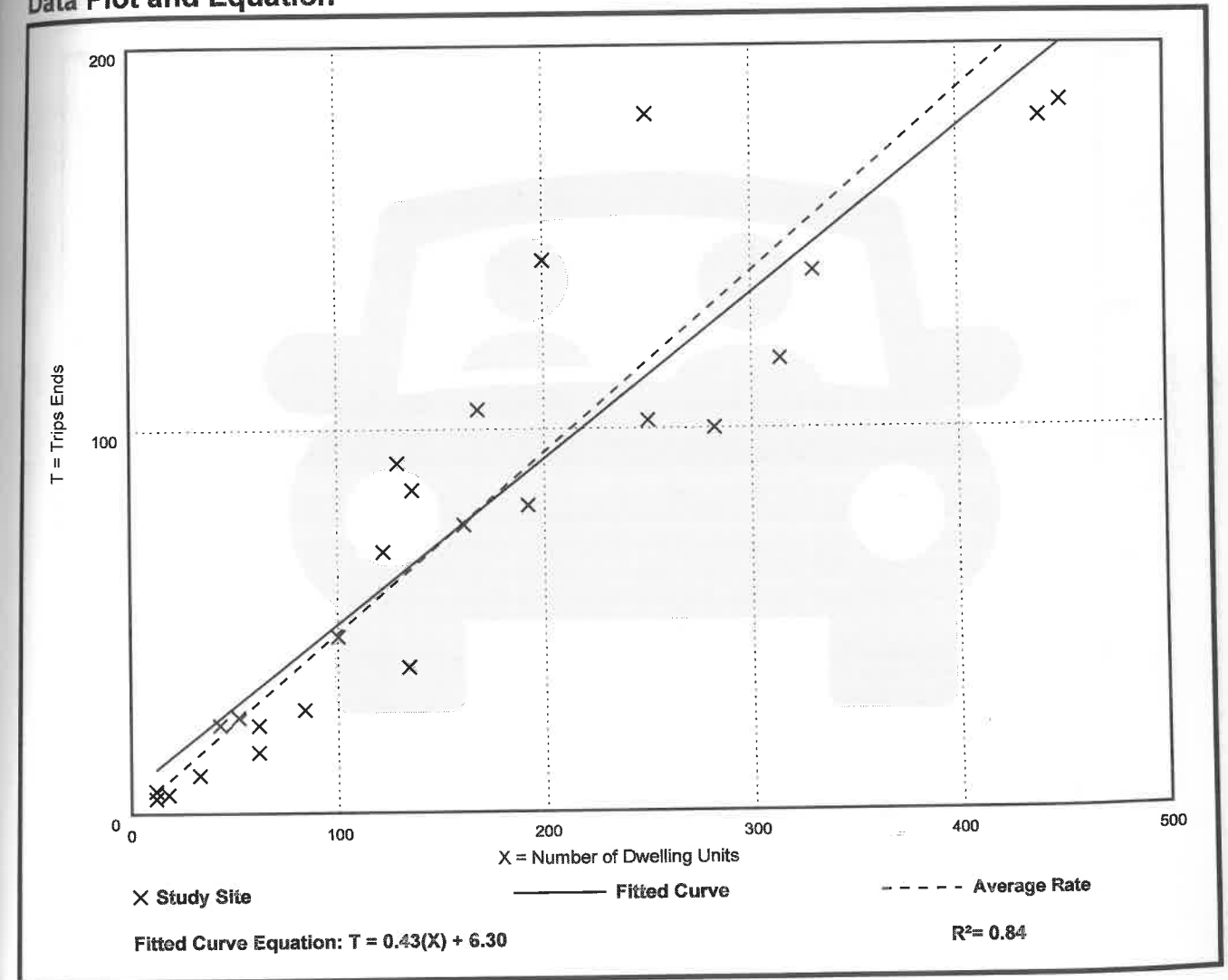
Avg. Num. of Dwelling Units: 161

Directional Distribution: 27% entering, 73% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.47	0.26 - 0.73	0.13

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

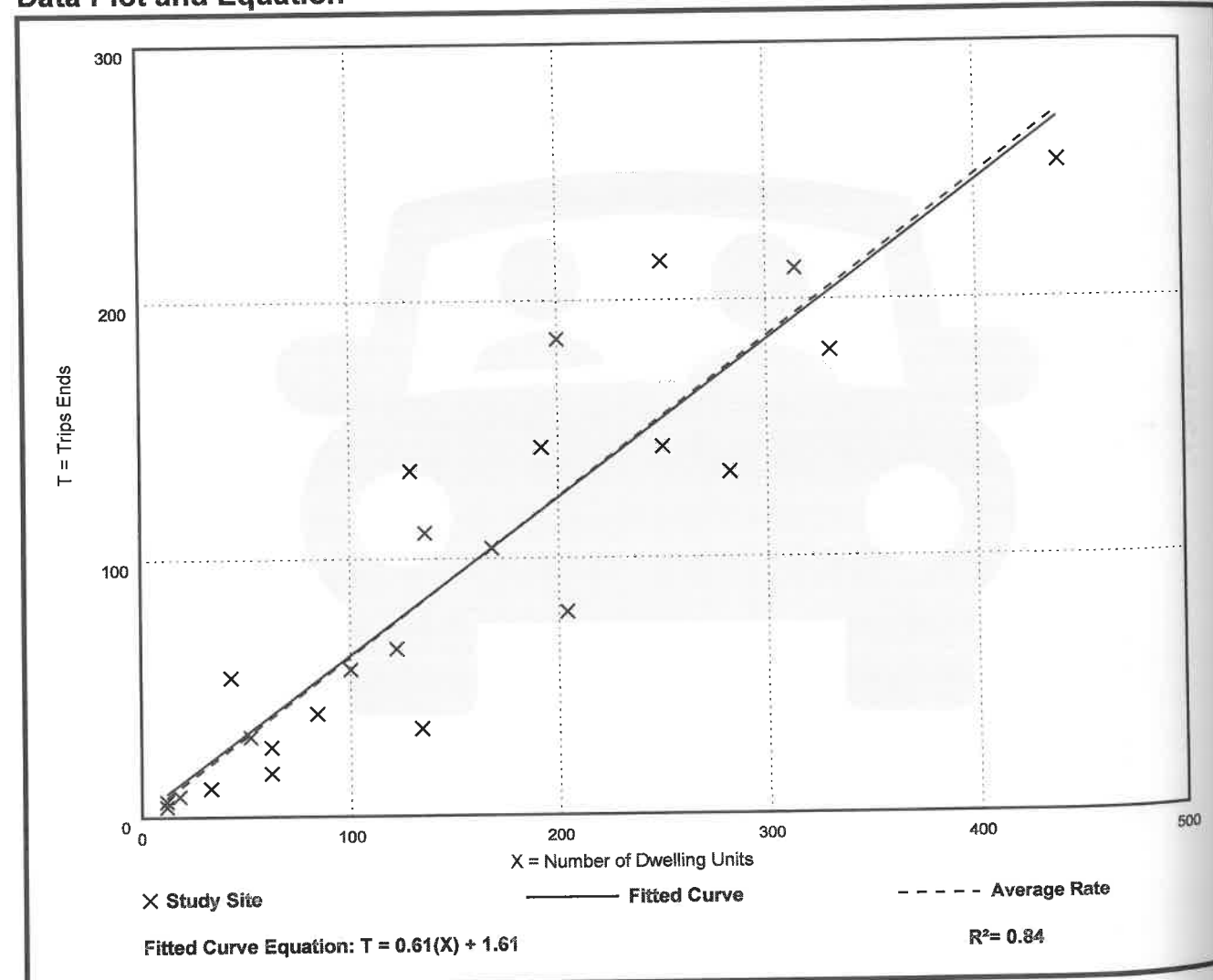
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 24
Avg. Num. of Dwelling Units: 151
Directional Distribution: 60% entering, 40% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.62	0.25 - 1.26	0.20

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Saturday

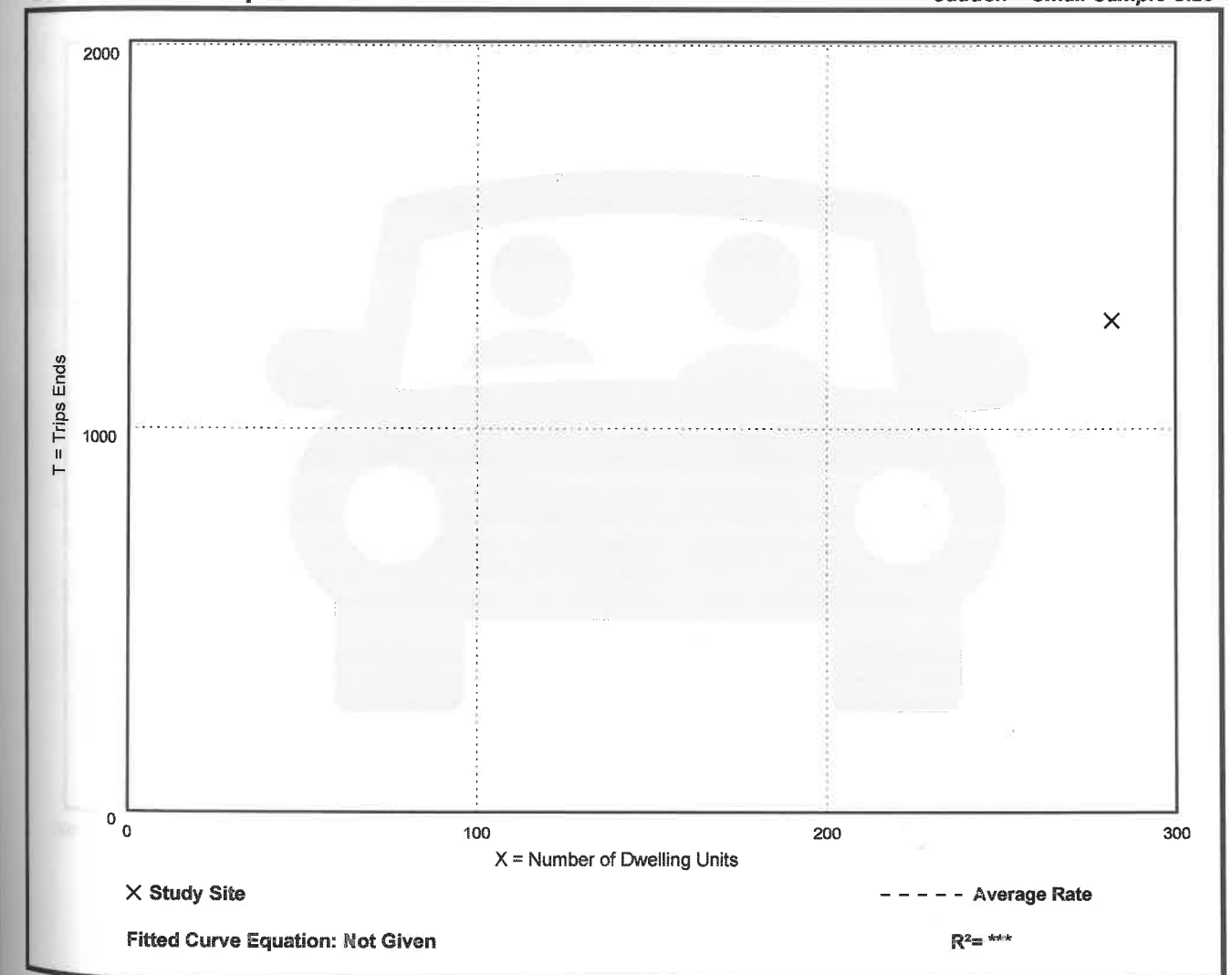
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Dwelling Units: 282
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.55	4.55 - 4.55	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Saturday, Peak Hour of Generator

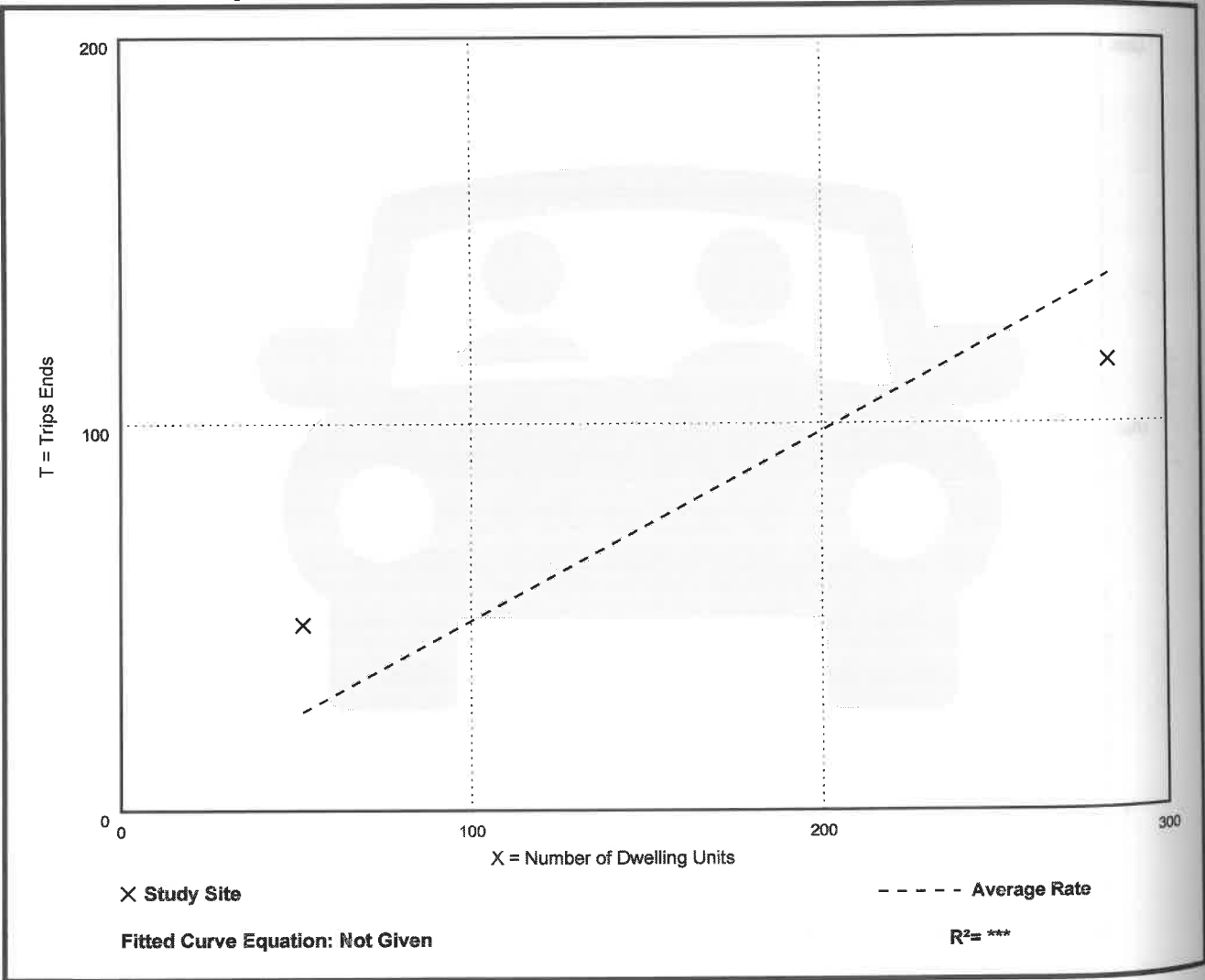
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. Num. of Dwelling Units: 167
Directional Distribution: 38% entering, 62% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.49	0.41 - 0.92	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Sunday

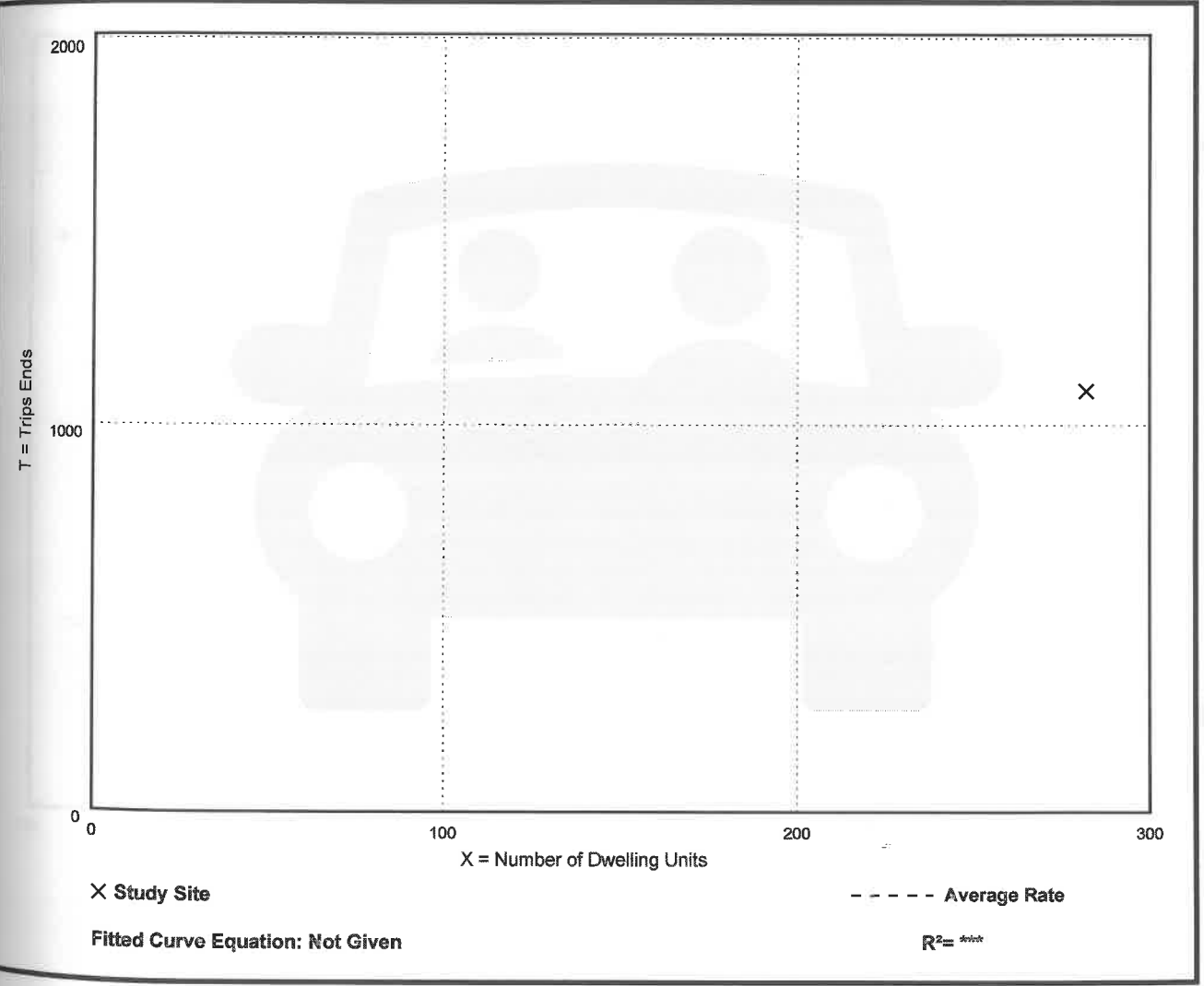
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Dwelling Units: 282
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.86	3.86 - 3.86	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Sunday, Peak Hour of Generator

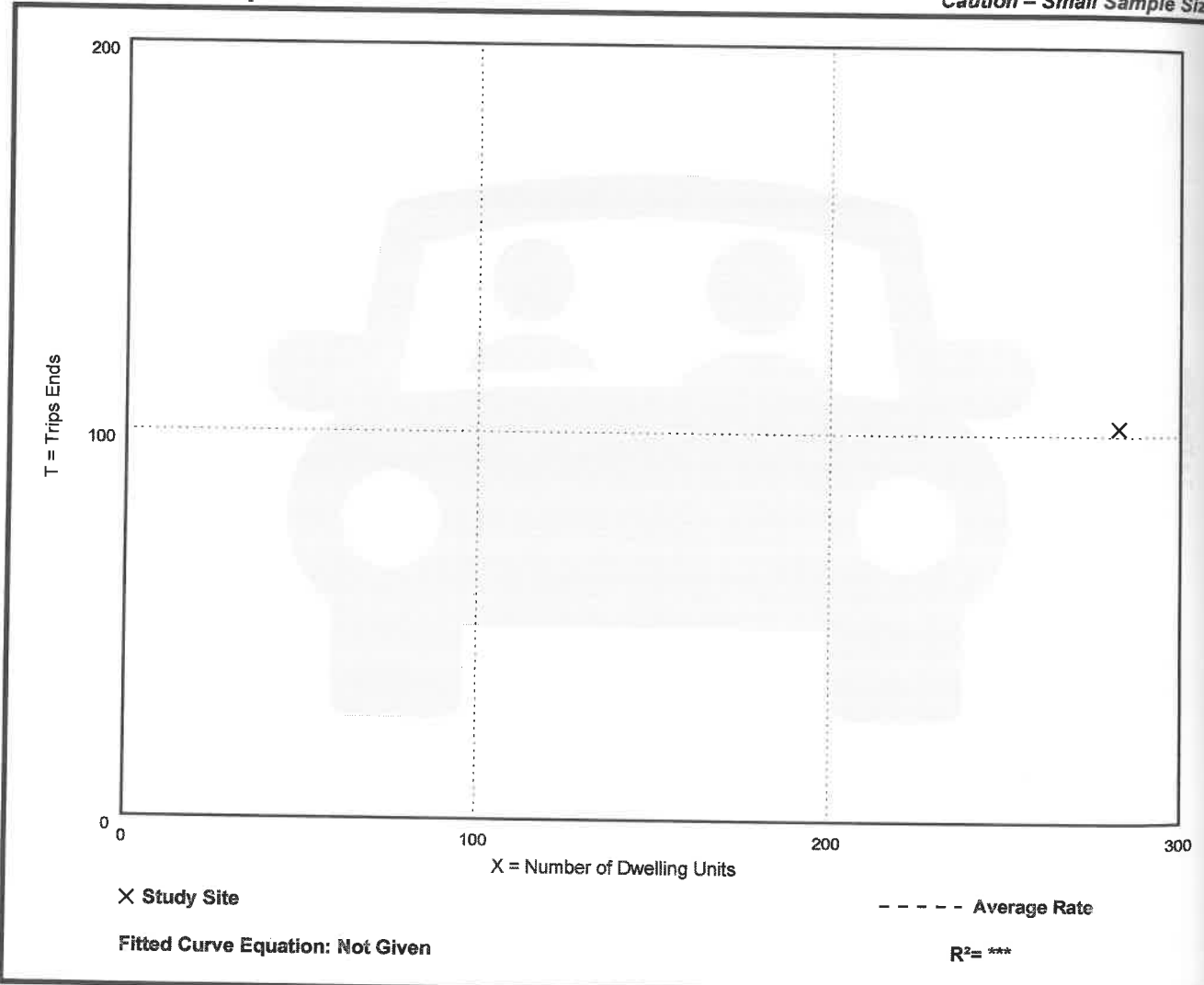
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Dwelling Units: 282
Directional Distribution: Not Available

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.36 - 0.36	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Residents
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Residents: 177
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Resident

Average Rate	Range of Rates	Standard Deviation
1.86	1.86 - 1.86	***

Data Plot and Equation

Caution – Small Sample Size

