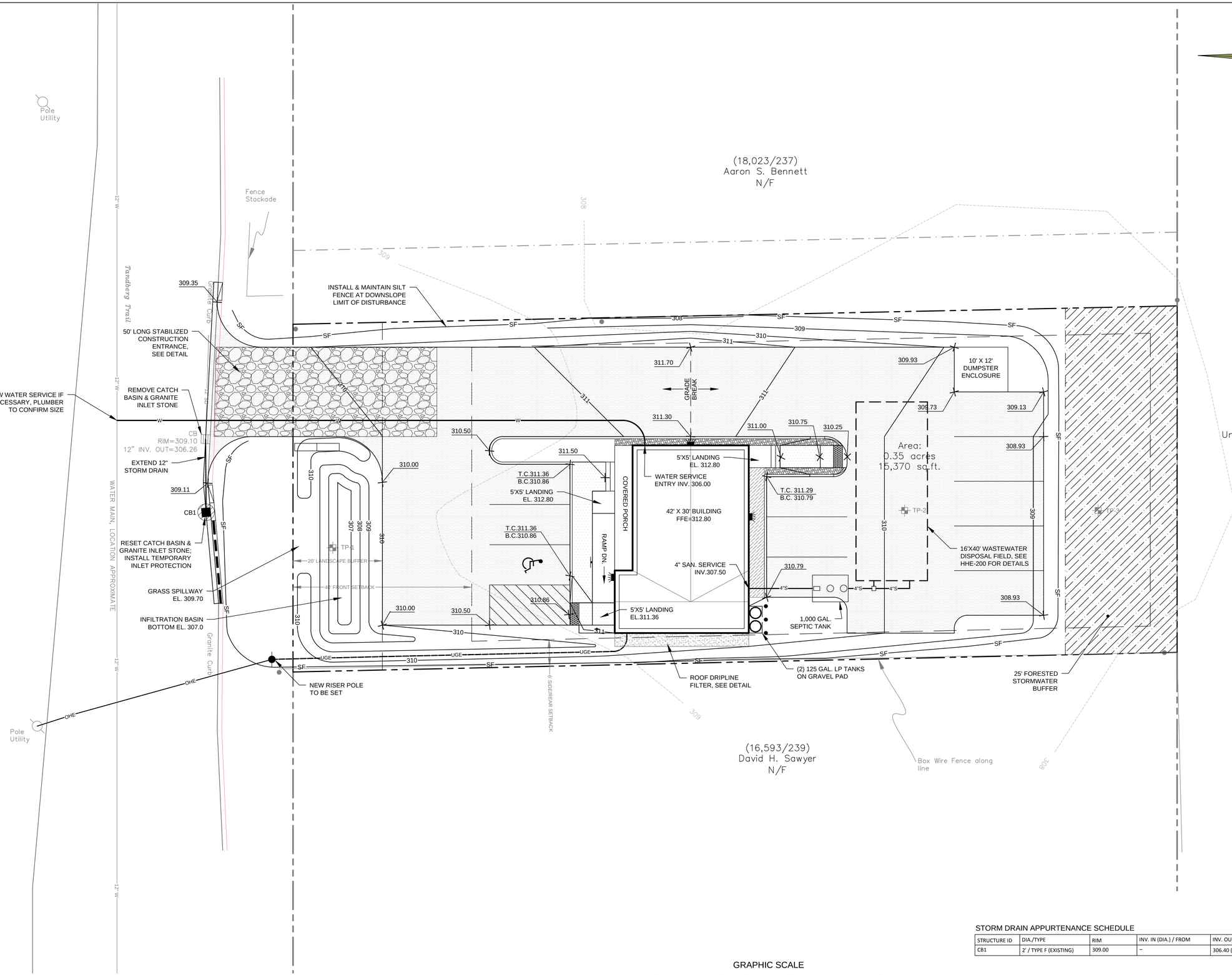

PRELIMINARY - NOT FOR CONSTRUCTION

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

STORM DRAIN APPURTENANCE SCHEDULE

STRUCTURE ID	DIA./TYPE	RIM	INV. IN (DIA.) / FROM	INV. OUT (DIA.) / TO
CB1	2' / TYPE F (EXISTING)	309.00	–	306.40 (12") / EAST

GRID NORTH

STATE OF MAINE
MICHAEL E. TADEMA-WIELANDT
NO. 12079
LICENSED
PROFESSIONAL ENGINEER

P.E.: MICHAEL E. TADEMA-WIELANDT

NO.	DATE	REVISIONS	APP'D BY
3	8-31-16	REVISED POND GRADING PER ENGINEERING REVIEW COMMENTS	MTW
2	8-30-16	REVISED PER PEER REVIEW COMMENTS	MTW
1	8-10-16	SUBMITTED TO TOWN OF WINDHAM FOR SITE PLAN APPROVAL	MTW

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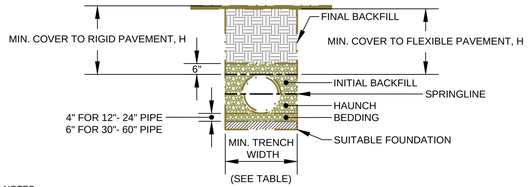
Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
LANDING REAL ESTATE OFFICE
79 TANDBERG TRAIL, WINDHAM, MAINE
GRADING, DRAINAGE & UTILITY PLAN

PREPARED FOR
ROBIE BUILDERS
472 ROOSEVELT TRAIL
WINDHAM, MAINE 04062

DATE:	3-3-2016
SCALE:	1"=10'
DESIGNED:	MTW
JOB NO:	1565
FILE: 1607-GRADING.DWG	
SHEET	C-4.0



NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION

2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.

3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.

4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-900mm).

5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.

6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" OF COVER FOR 54"-60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

RECOMMENDED MINIMUM TRENCH WIDTHS

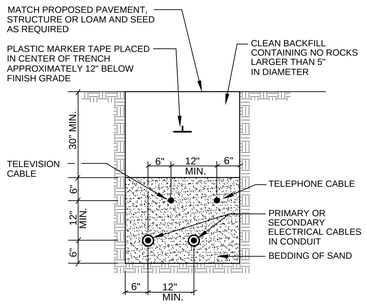
PIPE DIAM.	MIN. TRENCH WIDTH
4"	21"
6"	23"
8"	26"
10"	28"
12"	30"
15"	34"
18"	39"
24"	48"
30"	56"
36"	64"
42"	72"
48"	80"
54"	88"
60"	96"

MINIMUM RECOMMENDED COVER BASED ON VECHICLE LOADING CONDITIONS

	SURFACE LIVE LOADING CONDITION	
PIPE DIAM.	H-25	HEAVY CONSTRUCTION (75T AXLE LOAD) *
12" - 48"	12"	48"
54" - 60"	24"	60"

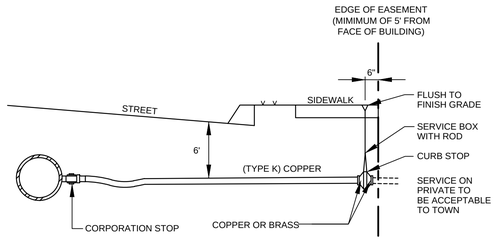
* VEHICLES IN EXCESS OF 75T MAY REQUIRE ADDITIONAL COVER

TYPICAL TRENCH DETAIL
NOT TO SCALE

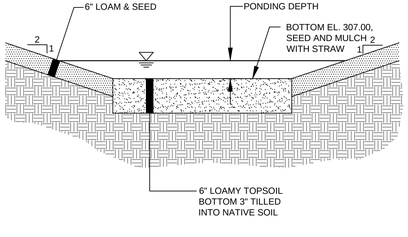


CABLES TO BE ENCASED IN SCHEDULE 40 PVC CONDUIT WHEN RUN BENEATH PAVED AREAS.

TYPICAL UNDERGROUND CABLE INSTALLATION
NOT TO SCALE



TYPICAL WATER SERVICE CONNECTION
NOT TO SCALE



GENERAL NOTES:
1. TEST PIT TP1 WAS CONDUCTED WITHIN THE FOOTPRINT OF THE PROPOSED BIORETENTION FILTER. THE TEST PIT WAS EXCAVATED TO A DEPTH OF 48". NO EVIDENCE OF SEASONAL HIGH GROUNDWATER WAS FOUND.

TEST PIT DATA				
TEST PIT	APPROX. EXISTING GROUND EL.	DEPTH TO EVIDENCE OF SEASONAL HIGH GROUNDWATER	SEASONAL HIGH GROUNDWATER ELEV.	BOTTOM OF INFILTRATION BASIN
TP1	308.50	>48"	<304.50	307.00

MATERIAL SPECIFICATION NOTES:
1. LOAMY TOPSOIL LAYER SHALL BE A NON-CLAYEY (<2% CLAY CONTENT), LOAMY TOPSOIL SUCH AS USDA LOAMY SAND TOPSOIL WITH 5-8% HUMIFIED ORGANIC MATTER. TOPSOIL FROM THE SITE MAY BE APPROPRIATE BUT MUST BE TESTED FOR ORGANIC CONTENT AND CLAY CONTENT (HYDROMETER TEST). THE SOIL MUST BE SCREENED, LOOSE, FRIABLE, AND SHALL BE FREE FROM ADMIXTURES OF SUBSOIL, REFUSE, STONES (GREATER THAN 2 INCHES IN DIAMETER), CLOGS, ROOT AND OTHER UNDESIRABLE FOREIGN MATTER.

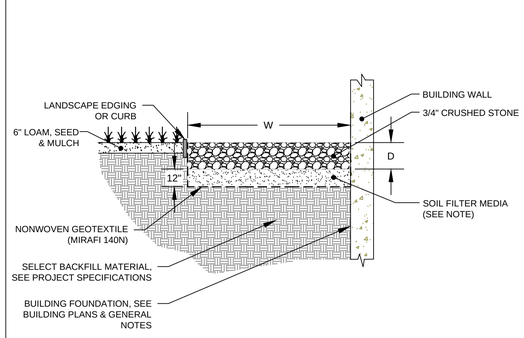
2. TOPSOIL SHALL BE TILLED INTO THE NATIVE SAND AND GRAVEL SOILS TO A DEPTH OF 3".

CONSTRUCTION PHASE NOTES:
1. CONSTRUCTION SEQUENCE: THE TOPSOIL AND SEED MUST NOT BE INSTALLED UNTIL THE AREA THAT DRAINS TO THE FILTER HAS BEEN PERMANENTLY STABILIZED WITH PAVEMENT OR OTHER STRUCTURE, 90% VEGETATION COVER, OR OTHER PERMANENT STABILIZATION UNLESS THE RUNOFF FROM THE CONTRIBUTING DRAINAGE AREA IS DIVERTED AROUND THE BASIN UNTIL STABILIZATION IS COMPLETED.

2. FILL PLACEMENT: LIMIT FILL COMPACTION TO THE WORK NECESSARY TO UNIFORMLY SPREAD THE FILL WITHIN THE STRUCTURE. DO NOT DRIVE ROLLERS OR OTHER EQUIPMENT OVER THE FILL TO COMPACT IT.

3. ALL THE MATERIAL USED FOR THE CONSTRUCTION OF THE INFILTRATION BASIN MUST BE CONFIRMED AS SUITABLE BY THE DESIGN ENGINEER. TESTING MUST BE DONE BY A CERTIFIED LABORATORY TO SHOW THAT THEY ARE PASSING SPECIFICATIONS.

INFILTRATION BASIN DETAILS AND NOTES
NOT TO SCALE



DRIP EDGE LOCATION	WIDTH (W)	DEPTH (D)
EAST SIDE OF BUILDING	36"	9"

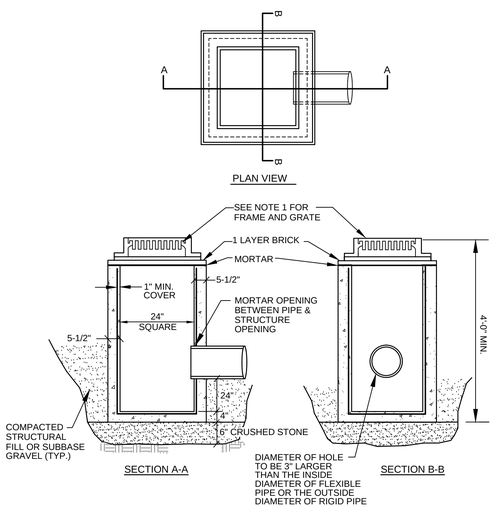
GENERAL NOTES:
1. THE BACKFILL FOR THE FOUNDATION MAY BE USED AS THE FILTER MEDIA AS LONG AS THE MATERIAL IS A MINERAL SOIL WITH BETWEEN 4% & 7% FINES (PASSING #200 SIEVE).

2. CONTRACTOR RESPONSIBLE FOR INSTALLING FOUNDATION DRAIN IN ACCORDANCE WITH RECOMMENDATION FROM GEOTECHNICAL ENGINEER

3. FOUNDATION WATERPROOFING IS THE RESPONSIBILITY OF THE CONTRACTOR

CONSTRUCTION INSPECTION NOTES:
1. INSPECTIONS BY A PROFESSIONAL ENGINEER SHALL CONSIST OF WEEKLY VISITS TO THE SITE TO INSPECT CONSTRUCTION FROM INITIAL GROUND DISTURBANCE TO FINAL STABILIZATION OF THE FILTER.

ROOF DRIPLINE FILTER BED
NOT TO SCALE



NOTES:
1. FRAME SHALL BE FOR 24" SQUARE GRATE - LEBARON TYPE "F" SQUARE FRAME (LF 245) 4 FLANGE OR ETHERIDGE SQUARE FRAME S24G. GRATE SHALL BE 24"x24" CAST IRON.

2. ENTIRE CATCH BASIN WITH EXCEPTION OF LEVELING BRICK FRAME AND GRATE TO BE PRECAST AS SINGLE PORTLAND CEMENT CONCRETE UNIT.

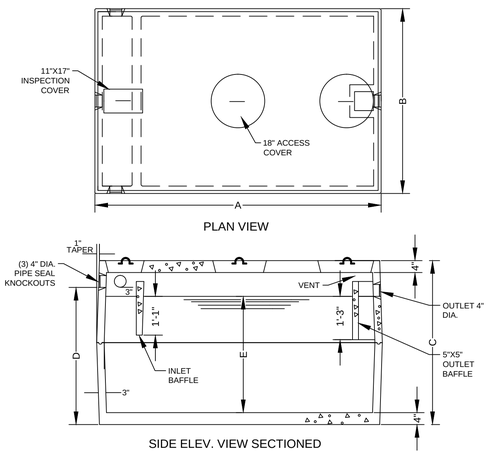
TYP. TYPE "F" CATCH BASIN
NOT TO SCALE

DATA CHART

ITEM NO. STD.	ITEM NO. HD.	GALLON CAPACITY	A	B	C	D	E	APPROX. WEIGHT
RST 0750-LB	RST 0750-LB-HD	750	8'-0"	6'-0"	4'-0"	3'-1"	2'-10"	7,100 LBS.
RST 1000	RST 1000-HD	1,000	8'-0"	6'-0"	4'-7"	3'-10"	3'-7"	8,100 LBS.
RST 1000-LB	RST 1000-LB-HD	1,000	10'-6"	6'-4"	4'-0"	3'-1"	2'-10"	8,100 LBS.
RST 1250	RST 1250-HD	1,250	8'-0"	6'-0"	5'-5"	4'-8"	4'-8"	8,800 LBS.
RST 1500	RST 1500-HD	1,500	8'-0"	6'-0"	6'-3"	5'-6"	5'-3"	9,200 LBS.
RST 2000	RST 2000-HD	2,000	10'-6"	6'-4"	6'-2"	5'-3"	5'-0"	11,200 LBS.

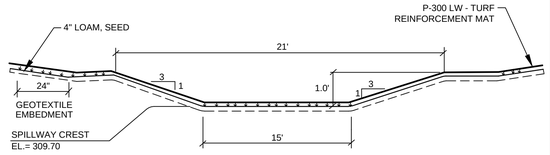
THIS PROJECT

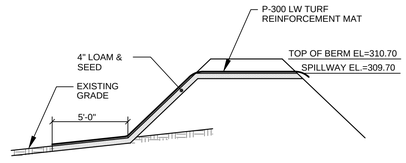
* NOTE: FOR HEAVY-DUTY TANKS (HD), ADD 6" TO DIMENSIONS IN COLUMN C AND 3" TO THOSE IN COLUMN D.



NOTES
1) CONCRETE: 4,000 PSI @ 28 DAYS.
2) CEMENT: PORTLAND TYPE III PER ASTM C150
3) REINFORCING: 6X6X10WWM OR FIBERS
4) DESIGN LOADING: H-10
5) CONSTRUCTION JOINTS: SEALED W/BUTYL SEAL
6) HEAVY-DUTY TANK TOPS: REINFORCED W/ 5/8" REBAR @ 12" O.C. EACH WAY

RESIDENTIAL SEPTIC TANK
NOT TO SCALE





EMBANKMENT CONSTRUCTION
1. CONSTRUCTION OF COMMON BORROW MATERIAL MEETING M.D.O.T. SPECIFICATION 703.
2. PLACE BORROW MATERIAL IN 12" LIFTS COMPACTED TO 95% OF MAXIMUM DRY DENSITY.
3. INSTALL RIPRAP AND EROSION CONTROL MESH WHERE SPECIFIED ON PLANS
4. LOAM, SEED, AND STABILIZE IN ACCORDANCE WITH SEDIMENTATION AND EROSION CONTROL PLAN.

TURF SPILLWAY DETAIL
NOT TO SCALE

STATE OF MAINE
MICHAEL E. TADEMA-WIELANDT
No. 12104
LICENSED PROFESSIONAL ENGINEER
Michael E Wielandt

P.E.: MICHAEL E. TADEMA-WIELANDT

NO.	DATE	REVISIONS	APP'D BY
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UTILITY & DRAINAGE DETAILS

PREPARED FOR
ROBIE BUILDERS
472 ROOSEVELT TRAIL
WINDHAM, MAINE 04062

DATE:	3-3-2016
SCALE:	1"=10'
DESIGNED:	MTW
JOB NO:	1565
FILE:	1607-DETAIL.DWG

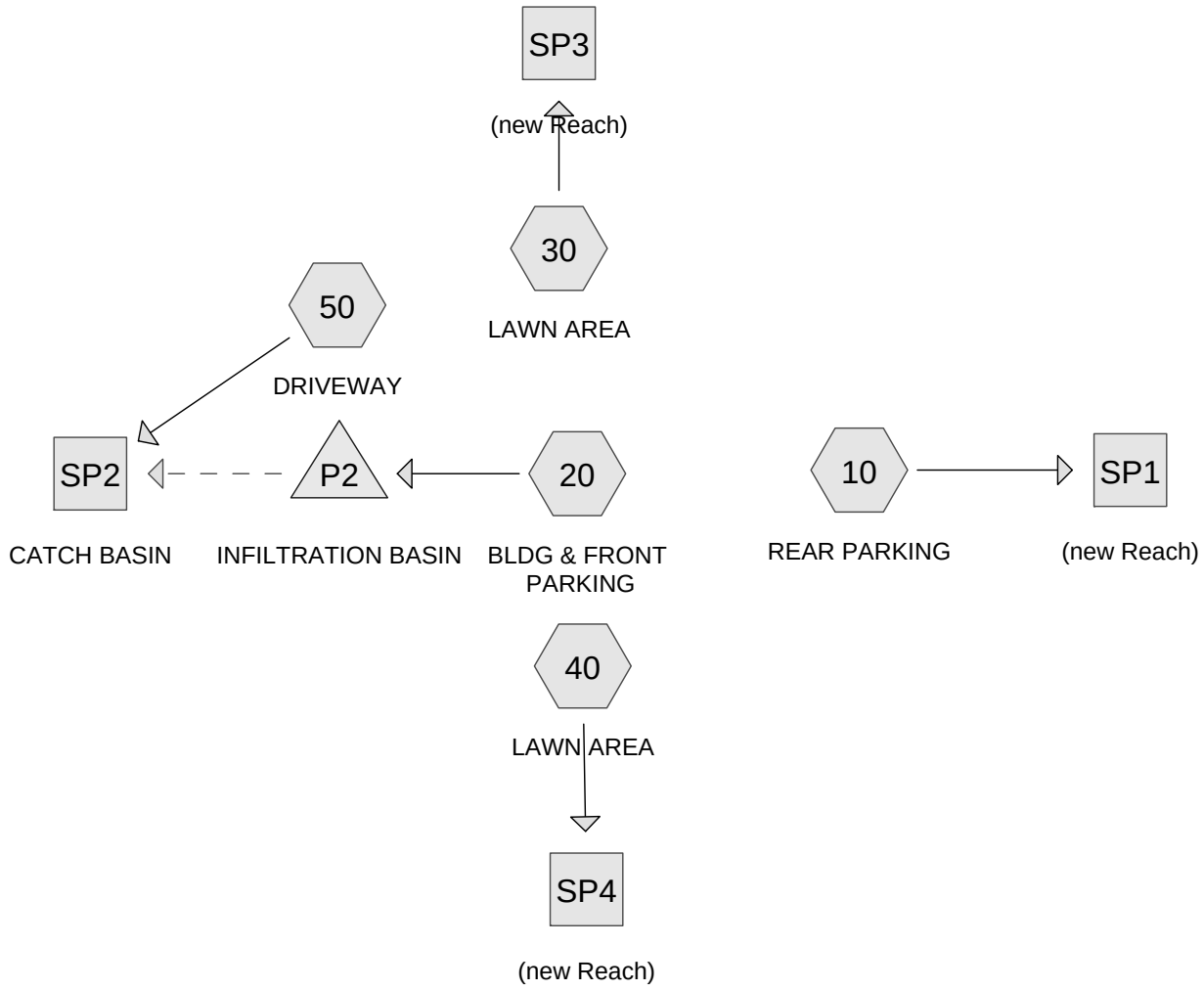
SHEET C-5.1

INFILTRATION BASIN DESIGN

Total Tributary Area:	5,975	SF	
Impervious Area:	4,091	SF	
Landscape Area:	1,884	SF	
Required Storage Volume:	404	CF	1" x Imp. Area + 0.4" x LS Area

STAGE STORAGE

ELEVATION	AREA (SF)	INCREMENTAL VOLUME (CF)	TOTAL VOLUME (CF)	
307	100	0	0	<-- Surface of Basin
308	245	173	173	
309	440	343	515	
309.7	713	404	919	<-- Outlet Elevation
310	830	231	1150	



Subcat Reach Pond Link

Drainage Diagram for 1607-POST
Prepared by Terradyn Consultants, Printed 8/31/2016

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10: REAR PARKING Runoff Area=7,264 sf 62.36% Impervious Runoff Depth>0.88"
Flow Length=92' Tc=15.2 min CN=74 Runoff=0.13 cfs 0.012 af

Subcatchment 20: BLDG & FRONT Runoff Area=5,975 sf 68.47% Impervious Runoff Depth>1.16"
Flow Length=55' Slope=0.0250 '/' Tc=5.0 min CN=79 Runoff=0.20 cfs 0.013 af

Subcatchment 30: LAWN AREA Runoff Area=1,207 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 40: LAWN AREA Runoff Area=786 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 50: DRIVEWAY Runoff Area=1,510 sf 70.66% Impervious Runoff Depth>1.29"
Flow Length=74' Tc=5.0 min CN=81 Runoff=0.06 cfs 0.004 af

Reach SP1: (new Reach) Inflow=0.13 cfs 0.012 af
Outflow=0.13 cfs 0.012 af

Reach SP2: CATCH BASIN Inflow=0.06 cfs 0.004 af
Outflow=0.06 cfs 0.004 af

Reach SP3: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach SP4: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond P2: INFILTRATION BASIN Peak Elev=308.36' Storage=272 cf Inflow=0.20 cfs 0.013 af
Discarded=0.02 cfs 0.011 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.011 af

Summary for Subcatchment 10: REAR PARKING

Runoff = 0.13 cfs @ 12.23 hrs, Volume= 0.012 af, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
4,530	98	Paved parking, HSG A
797	39	>75% Grass cover, Good, HSG A
1,937	32	Woods/grass comb., Good, HSG A
7,264	74	Weighted Average
2,734		37.64% Pervious Area
4,530		62.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	62	0.0300	1.45		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
14.5	30	0.0050	0.03		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 3.10"
15.2	92	Total			

Summary for Subcatchment 20: BLDG & FRONT PARKING

Runoff = 0.20 cfs @ 12.08 hrs, Volume= 0.013 af, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
4,091	98	Paved parking, HSG A
1,884	39	>75% Grass cover, Good, HSG A
5,975	79	Weighted Average
1,884		31.53% Pervious Area
4,091		68.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	55	0.0250	1.31		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	55	Total			

Summary for Subcatchment 30: LAWN AREA

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
1,207	39	>75% Grass cover, Good, HSG A
1,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 40: LAWN AREA

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
786	39	>75% Grass cover, Good, HSG A
786		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 50: DRIVEWAY

Runoff = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
1,067	98	Paved parking, HSG A
443	39	>75% Grass cover, Good, HSG A
1,510	81	Weighted Average
443		29.34% Pervious Area
1,067		70.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	28	0.0250	1.15		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
0.3	46	0.0200	2.87		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	74	Total			

Summary for Reach SP1: (new Reach)

Inflow Area = 0.167 ac, 62.36% Impervious, Inflow Depth > 0.88" for 2-YR event
Inflow = 0.13 cfs @ 12.23 hrs, Volume= 0.012 af
Outflow = 0.13 cfs @ 12.23 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: CATCH BASIN

Inflow Area = 0.035 ac, 70.66% Impervious, Inflow Depth > 1.29" for 2-YR event
Inflow = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP3: (new Reach)

Inflow Area = 0.028 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP4: (new Reach)

Inflow Area = 0.018 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P2: INFILTRATION BASIN

Inflow Area = 0.137 ac, 68.47% Impervious, Inflow Depth > 1.16" for 2-YR event
Inflow = 0.20 cfs @ 12.08 hrs, Volume= 0.013 af
Outflow = 0.02 cfs @ 13.53 hrs, Volume= 0.011 af, Atten= 91%, Lag= 86.9 min
Discarded = 0.02 cfs @ 13.53 hrs, Volume= 0.011 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 308.36' @ 13.53 hrs Surf.Area= 314 sf Storage= 272 cf

Plug-Flow detention time= 175.6 min calculated for 0.011 af (80% of inflow)
Center-of-Mass det. time= 123.2 min (929.9 - 806.7)

Volume	Invert	Avail.Storage	Storage Description
#1	307.00'	1,150 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
307.00	100	0	0
308.00	245	173	173
309.00	440	343	515
310.00	830	635	1,150

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Secondary	309.70'	**15.0' long x 5.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.02 cfs @ 13.53 hrs HW=308.36' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=307.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10: REAR PARKING Runoff Area=7,264 sf 62.36% Impervious Runoff Depth>1.89"
Flow Length=92' Tc=15.2 min CN=74 Runoff=0.30 cfs 0.026 af

Subcatchment 20: BLDG & FRONT Runoff Area=5,975 sf 68.47% Impervious Runoff Depth>2.29"
Flow Length=55' Slope=0.0250 '/' Tc=5.0 min CN=79 Runoff=0.40 cfs 0.026 af

Subcatchment 30: LAWN AREA Runoff Area=1,207 sf 0.00% Impervious Runoff Depth>0.10"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 40: LAWN AREA Runoff Area=786 sf 0.00% Impervious Runoff Depth>0.10"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 50: DRIVEWAY Runoff Area=1,510 sf 70.66% Impervious Runoff Depth>2.46"
Flow Length=74' Tc=5.0 min CN=81 Runoff=0.11 cfs 0.007 af

Reach SP1: (new Reach) Inflow=0.30 cfs 0.026 af
Outflow=0.30 cfs 0.026 af

Reach SP2: CATCH BASIN Inflow=0.11 cfs 0.007 af
Outflow=0.11 cfs 0.007 af

Reach SP3: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach SP4: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond P2: INFILTRATION BASIN Peak Elev=309.19' Storage=604 cf Inflow=0.40 cfs 0.026 af
Discarded=0.03 cfs 0.018 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.018 af

Summary for Subcatchment 10: REAR PARKING

Runoff = 0.30 cfs @ 12.22 hrs, Volume= 0.026 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
4,530	98	Paved parking, HSG A
797	39	>75% Grass cover, Good, HSG A
1,937	32	Woods/grass comb., Good, HSG A
7,264	74	Weighted Average
2,734		37.64% Pervious Area
4,530		62.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	62	0.0300	1.45		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
14.5	30	0.0050	0.03		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 3.10"
15.2	92	Total			

Summary for Subcatchment 20: BLDG & FRONT PARKING

Runoff = 0.40 cfs @ 12.08 hrs, Volume= 0.026 af, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
4,091	98	Paved parking, HSG A
1,884	39	>75% Grass cover, Good, HSG A
5,975	79	Weighted Average
1,884		31.53% Pervious Area
4,091		68.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	55	0.0250	1.31		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	55	Total			

Summary for Subcatchment 30: LAWN AREA

Runoff = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
1,207	39	>75% Grass cover, Good, HSG A
1,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 40: LAWN AREA

Runoff = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
786	39	>75% Grass cover, Good, HSG A
786		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 50: DRIVEWAY

Runoff = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
1,067	98	Paved parking, HSG A
443	39	>75% Grass cover, Good, HSG A
1,510	81	Weighted Average
443		29.34% Pervious Area
1,067		70.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	28	0.0250	1.15		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
0.3	46	0.0200	2.87		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	74	Total			

Summary for Reach SP1: (new Reach)

Inflow Area = 0.167 ac, 62.36% Impervious, Inflow Depth > 1.89" for 10-YR event
Inflow = 0.30 cfs @ 12.22 hrs, Volume= 0.026 af
Outflow = 0.30 cfs @ 12.22 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: CATCH BASIN

Inflow Area = 0.035 ac, 70.66% Impervious, Inflow Depth > 2.46" for 10-YR event
Inflow = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af
Outflow = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP3: (new Reach)

Inflow Area = 0.028 ac, 0.00% Impervious, Inflow Depth > 0.10" for 10-YR event
Inflow = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP4: (new Reach)

Inflow Area = 0.018 ac, 0.00% Impervious, Inflow Depth > 0.10" for 10-YR event
Inflow = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P2: INFILTRATION BASIN

Inflow Area = 0.137 ac, 68.47% Impervious, Inflow Depth > 2.29" for 10-YR event
Inflow = 0.40 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.03 cfs @ 13.74 hrs, Volume= 0.018 af, Atten= 93%, Lag= 99.7 min
Discarded = 0.03 cfs @ 13.74 hrs, Volume= 0.018 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 309.19' @ 13.74 hrs Surf.Area= 513 sf Storage= 604 cf

Plug-Flow detention time= 200.4 min calculated for 0.018 af (69% of inflow)
Center-of-Mass det. time= 132.0 min (923.4 - 791.4)

Volume	Invert	Avail.Storage	Storage Description
#1	307.00'	1,150 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
307.00	100	0	0
308.00	245	173	173
309.00	440	343	515
310.00	830	635	1,150

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Secondary	309.70'	**15.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.03 cfs @ 13.74 hrs HW=309.19' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=307.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10: REAR PARKING Runoff Area=7,264 sf 62.36% Impervious Runoff Depth>2.80"
Flow Length=92' Tc=15.2 min CN=74 Runoff=0.44 cfs 0.039 af

Subcatchment 20: BLDG & FRONT Runoff Area=5,975 sf 68.47% Impervious Runoff Depth>3.28"
Flow Length=55' Slope=0.0250 '/' Tc=5.0 min CN=79 Runoff=0.56 cfs 0.037 af

Subcatchment 30: LAWN AREA Runoff Area=1,207 sf 0.00% Impervious Runoff Depth>0.32"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.001 af

Subcatchment 40: LAWN AREA Runoff Area=786 sf 0.00% Impervious Runoff Depth>0.32"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 50: DRIVEWAY Runoff Area=1,510 sf 70.66% Impervious Runoff Depth>3.47"
Flow Length=74' Tc=5.0 min CN=81 Runoff=0.15 cfs 0.010 af

Reach SP1: (new Reach) Inflow=0.44 cfs 0.039 af
Outflow=0.44 cfs 0.039 af

Reach SP2: CATCH BASIN Inflow=0.15 cfs 0.010 af
Outflow=0.15 cfs 0.010 af

Reach SP3: (new Reach) Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Reach SP4: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond P2: INFILTRATION BASIN Peak Elev=309.67' Storage=896 cf Inflow=0.56 cfs 0.037 af
Discarded=0.04 cfs 0.025 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.025 af

Summary for Subcatchment 10: REAR PARKING

Runoff = 0.44 cfs @ 12.21 hrs, Volume= 0.039 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
4,530	98	Paved parking, HSG A
797	39	>75% Grass cover, Good, HSG A
1,937	32	Woods/grass comb., Good, HSG A
7,264	74	Weighted Average
2,734		37.64% Pervious Area
4,530		62.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	62	0.0300	1.45		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
14.5	30	0.0050	0.03		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 3.10"
15.2	92	Total			

Summary for Subcatchment 20: BLDG & FRONT PARKING

Runoff = 0.56 cfs @ 12.08 hrs, Volume= 0.037 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
4,091	98	Paved parking, HSG A
1,884	39	>75% Grass cover, Good, HSG A
5,975	79	Weighted Average
1,884		31.53% Pervious Area
4,091		68.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	55	0.0250	1.31		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	55	Total			

Summary for Subcatchment 30: LAWN AREA

Runoff = 0.00 cfs @ 12.35 hrs, Volume= 0.001 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
1,207	39	>75% Grass cover, Good, HSG A
1,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 40: LAWN AREA

Runoff = 0.00 cfs @ 12.35 hrs, Volume= 0.000 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
786	39	>75% Grass cover, Good, HSG A
786		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 50: DRIVEWAY

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af, Depth> 3.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
1,067	98	Paved parking, HSG A
443	39	>75% Grass cover, Good, HSG A
1,510	81	Weighted Average
443		29.34% Pervious Area
1,067		70.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	28	0.0250	1.15		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
0.3	46	0.0200	2.87		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	74	Total			

Summary for Reach SP1: (new Reach)

Inflow Area = 0.167 ac, 62.36% Impervious, Inflow Depth > 2.80" for 25-YR event
Inflow = 0.44 cfs @ 12.21 hrs, Volume= 0.039 af
Outflow = 0.44 cfs @ 12.21 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: CATCH BASIN

Inflow Area = 0.035 ac, 70.66% Impervious, Inflow Depth > 3.47" for 25-YR event
Inflow = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af
Outflow = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP3: (new Reach)

Inflow Area = 0.028 ac, 0.00% Impervious, Inflow Depth > 0.32" for 25-YR event
Inflow = 0.00 cfs @ 12.35 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 12.35 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP4: (new Reach)

Inflow Area = 0.018 ac, 0.00% Impervious, Inflow Depth > 0.32" for 25-YR event
Inflow = 0.00 cfs @ 12.35 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 12.35 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P2: INFILTRATION BASIN

Inflow Area = 0.137 ac, 68.47% Impervious, Inflow Depth > 3.28" for 25-YR event
Inflow = 0.56 cfs @ 12.08 hrs, Volume= 0.037 af
Outflow = 0.04 cfs @ 13.71 hrs, Volume= 0.025 af, Atten= 93%, Lag= 98.1 min
Discarded = 0.04 cfs @ 13.71 hrs, Volume= 0.025 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 309.67' @ 13.71 hrs Surf.Area= 701 sf Storage= 896 cf

Plug-Flow detention time= 205.4 min calculated for 0.025 af (67% of inflow)
Center-of-Mass det. time= 135.3 min (918.5 - 783.2)

Volume	Invert	Avail.Storage	Storage Description
#1	307.00'	1,150 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
307.00	100	0	0
308.00	245	173	173
309.00	440	343	515
310.00	830	635	1,150

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Secondary	309.70'	**15.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.04 cfs @ 13.71 hrs HW=309.67' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=307.00' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)