BELANGER ENGINEERING
CONSULTING ENGINEERS

April 28, 2023
Ms. Julie Erdman, Planning Department
Town of Topsham
100 Main Street
Topsham, Maine 04086

RE: Final Plan Review Application
Park Drive Residences Project
100 Park Drive, Topsham, Maine
Tax Map R-5, Lots 21D-18 & 21D-19
Tom Saucier Response 1

Dear Ms. Erdman;

Enclosed please find the written responses to Tom Saucier's Peer Review memo dated April 12, 2023.

Per your request Site Design Associates has undertaken a review of the plans and documentation submitted in support of a site plan application for the referenced project. Our review was based on plans and the application materials for the project received March 23. Based on our review we offer the following comments for your, the planning board's, and the applicant's consideration:

A. General

1. *Given the proximity to a residential zone, should the lighting plan be peer reviewed?*

The intent of the lighting design is to provide adequate lighting for the parking areas and provide lighting inside the center courtyard areas. The lighting of the parking lot areas will have cut-off luminaires and will meet min. standards at the property line. We also intend to install some bollard style lighting along the interior courtyard and walk ways. We have asked the lighting contractor to adjust the plans so they meet the Ordinance standards. See updated plans.

2. *The drawings are difficult to interpret. It seems that there are two sets of topographic information on the drawings, which we assume includes the preliminary mapping and the field survey data. This should be clarified and existing contours labelled.*

We have turned off the Lidar base mapping data and show the topographic survey data picked up by Little River Surveying for the property. We have labeled pre and post contours as suggested.

3. *The configuration of the existing stormwater facility is unclear. The Belanger plans show piping that is not shown on the topographic survey by Little River. Clarification of the configuration is required. Are record drawings available? When was it constructed?*

The existing filter pond has a 12" perforated underdrain pipe installed at the pond bottom. The 12" underdrain pipes are labeled EUDPOND and EUDPOND2. The survey plan and details show the underdrain invert connecting into the Park Drive catch basin (ECB217). See updated pond site plan and section with the as-built conditions.

The pond also has a secondary outlet control structure located on the north side of the pond. This catch basin outlets across Merryman Drive. See ECB216. The survey plan shows the structure with a TG of 113.8. The calculations were updated to reflect the as-built structure conditions.

The pond is a underdrained filter basin and was intended to handle the sites quality and quantity standards. According to the DEP orders, the filter pond was designed to remove 69% TSS for the 0.4" runoff from 2.38 acres of new impervious area. The pond achieved a removal rate of 63% for the site as a whole which exceeded the 54% removal rate required by the sliding scale TSS standards. The plans were approved by Maine DEP in 2006. The pond was constructed after that. See details of existing pond attached.

This pond and roof driplines proposed captures and treats 96% of the site impervious area and 85% of the site developed areas which meets the general standard requirements. The filter pond is an effective treatment device and will continue to filter stormwater water as intended.

4. *The existing conditions plan shows a catch basin 45 ft northerly of CB200, but this is not shown on the design drawings.*

We have added the catch basin noted. See ECB407.

B. Drawings

1. *Drawing C2 – Site Development Plan Plan*

   a. *We seem to recall a discussion with the applicant about possibly turning the parking bay southerly of the apartments 180 degrees to minimize backing of vehicles into the main access aisle from Park Drive.*

We have revised the island and parking to minimize backing on the main isle. The peer review consultant indicated that parking along one side would be o.k. We shifted the islands

to the Goodwill side of the main access isle to Park Drive. We also turned the Goodwill parking 90 degrees so the spaces run parallel with the access drive to avoid back into the isle. In addition, the parking on the Apartment side has an extra 10' of isle space to use for backing. This layout allows the developer keep the current entrance location and configuration.

b. *The elevations, sizes and configuration of ESD1 and ECB1 should be provided.*

We re-labeled this basin ECB216. The Rim of the existing structure is 113.8. ESD216 is a 12" culvert with an invert out of 110.2. Note the catch basin was modeled with the as-built conditions in the pre and post calcs.

c. *Why are some structures in the Structure and Pipe Tables showing no sump? All proposed structures should be provided with a minimum 3 ft sump.*

We have fixed the structure tables as we intended 2' sumps in the basins which is pretty standard. Five (5) structures are located within the interior quad areas and drains small areas. The two (2) basins in the parking lot also drain small areas. The existing structures have 2' sumps. We do not agree that 3' sumps are necessary in this case. We have the adjusted the plans to require 2' sumps based on your comments.

d. *What is the "JPOND" referenced on the drawing?*

J is for a pipe junction like a tee, elbow, 90" bend, etc.. In this case JPond is a Tee connecting EUDPOND and EUDPOND2 to the outlet ESDPOND that drains to ECB217. We have renamed this pipe tee JP1.

e. *Some of the existing elevations shown conflict with the data shown on the Structure and Pipe Tables and should be reconciled.*

We have updated the tables to match the survey data received.

f. *The invert locations should be shown on the plan for EUDPOND and EUDPOND2.*

The inverts have been updated and shown on the tables. In this case these two pipes drain to a tee (JP1) which drains to the Storm drain (ECB217) in Park Drive. The pipes are existing to remain.

g. *There are two ESD300's in the tables.*

The pipes have been re-numbered and the tables updated.

h. *What are the proposed finished floor elevations for the buildings?*

We have set the finished floor at Elevation 120.6 for 2 buildings closes to the pond (1 and 2). Buildings 3 and 4 are set 1' higher at 121.6. The plans have been labeled.

i. *More spot grades are required, including at the walks, high points, accessible parking spaces, around the buildings, and at the dumpster enclosures.*

We have added spot grades as suggested.

j. *Clarification of the note "Grade to drain new impervious and developed area to pond" should be provided. Also, in areas where grade to drain is noted, specific grades should be shown.*

We added additional grading detail and clarifications as suggested.

k. *The slope of the sidewalk from Merryman Way into the site exceeds ADA requirements.*

We have adjusted the grading so the walkway slope meets ADA standards.

l. *Details, materials, and elevations for the walls adjacent to the pond should be specified, rather than simply calling for a block or boulder wall.*

We have added grading, spot grades, and call out for the boulder wall.

m. *Entrance radii, walk drive, and parking dimensions should be shown.*

We have added parking and layout dimensions as required.

n. *Call for saw cuts and butt joints where existing pavement meets new pavement in the right of way.*

We have added the call outs for sawcuts in the right of way as suggested.

o. *Stop signs should be shown at the site exits.*

We have shown stop signs at the two exits.

p. *Clarification of the note "Install new sidewalk and curb over existing paved areas" should be provided.*

The intent was to keep the new sidewalk and paved area over previously paved areas. We have clarified the drawings. The new sidewalk and curbing is shown.

q. *The invert out for SMH 102 is higher than the invert in.*

The sewer inverts were corrected.

r. *No info is provided for SMH103.*

The data for SMH 103 is in the charts.

s. *Are there existing stubs for the water service to building 2?*

Yes there are water lines that are stubbed on the east side of the pond. We will cut and extend services to the front of the building as required. The second building in phase 1 will require an 8" main extension from Park Drive.

t. *Based on the elevations shown, there will be minimal cover over the sewer service under the stormwater basin.*

The sewer line was dropped at SMH103 to match the existing invert and slope. The invert into the street manhole enters at 108.1. The pipe crosses the pond and leaves SMH103 at 108.5. The invert at the pond is 108.3. The top of pipe is elevation 109.0. The pipe is approximately 4' below the bottom of pond elevation at 113.0. Sheet C6A shows the approximately sewer pipe crossing under the pond underdrain pipe.

u. *The proposed sign is shown in Park Drive right of way, and the existing sign for Goodwill is also shown in the right of way.*

The ownership deeds include sign easements located in the right of way. See ownership deeds attached. Book 2874 Page 308.

v. *A ramp will be required in the new sidewalk on the southerly side of the Park Drive entrance.*

We have shown the ramp on both sides of the Park Drive entrance. The walkway tipdown will include a detectable warning. We have noted this on the plans.

w. *Curbing materials should be specified on and off site.*

New Curbing will be concrete slipform. The new entrance radius off Merryman will be granite curb on the curve radius. All other areas shall be concrete slipform curbing.

x. *Is all new pavement proposed as full depth construction?*

The intent is to utilize the existing paved areas to the extent feasible. We have shown new pavement matching up to existing pavement. New pavement is intended to drain toward the pavement so it can drain to the existing catch basins located in the parking lot. There will be some re-grading and paving at the front entrance locations so the pavement elevations can be raised to match the door and walkways.

y. *The drip edge filters and foundation drains should be shown, along with the proposed outlets for the drains.*

The roof driplines and foundations drains are shown. We have included an outlet for each building. The foundations drains will drain into a catch basin near the buildings.

2. *Drawing C2A – Site Development Plan – Phase 1*

   a. *See previous comments as applicable.*

o.k.

   b. *A stand-alone grading plan for Phase 1 should be provided.*

o.k. Phase 1 grading is provided.

   c. *Should sidewalk construction along Park Drive be included in Phase 1?*

Yes. The sidewalk will be completed in phase 1.

   d. *More detail should be provided on how building 2 will connect with the existing sewer. It seems the sewer should also match the future alignment.*

It was discussed with the sewer board. We will cut and cap the existing service line as required to install the new line. A new 8" SDR 35 main will be extended from the existing SMH in Park Drive. The new line will extend under the pond and will tie into new sewer manholes SMH's 102 and 103.

   e. *The plan shows the curbing, parking, and walks easterly of building 3 to be include in Phase 1. It seems this will need to be excavated in the future to install the water service.*

Phase 1 includes the construction of buildings 2 and 3. Building 2 will be built first and will connect to existing water services. A new sewer line will be installed to serve building 2. The curbing and parking will be completed to support buildings 2 and 3. When building 3 is to be built, the new 8" water main will be extended along with service stubs for buildings 1 and 4. The phasing plans have been updated.

3. *Drawing C3 and C4 – Grading and Utility Plans*

   a. *See previous comments as applicable.*

o.k.

   b. *Will there be roof drains for the utility areas on the rooves?*

Yes there will be roof drains in the flat roof portion. The drain will have a down spout and will discharge to the drip edge for treatment and storage.

4. *L-1 Landscape Plan*

   a. *This plan should be coordinated with the utility plan. There appears to be conflicts between plantings and utilities in some areas.*

Mitchell Rasor adjusted the planting locations and added appropriate notations to avoid utilities. See updated plan.

   b. *What are the dashed circles easterly of Park Drive?*

The dashed circles are existing trees to remain as noted on the plan

   c. *The proposed bus top will require tipdowns, ramps, and tactile warnings.*

The bus stop is a suggested location to support the apartment residents but is not part of this project to install. The bus stop will comply with ADA regulations. We have added a 10'X10' paved location that the developer agrees to install. We show a simple paved area for a bus stop bench and Kiosk (by others) for seating. We have sloped the paved area at 2% toward the road. We would expect pedestrians to use the existing sidewalk tip downs at the entrance about 25' away.

   d. *Will Hickory trees survive in a 5.5 ft wide island ion the parking lot southerly of the apartments?*

The islands have been redesigned and are now 10' wide, which is sufficient for the trees.

   e. *Is there a phasing proposal for the landscaping?*

Side and rear buffer plantings to be installed in Phase 1. Landscaping within the site to be coordinated and installed with the completion of each phase.

5. *Photometric Plan*

   a. *The plan shows 0.0 footcandles between the buildings. Reference should be made to Topsham code chapters 175-9 and 225-60.8 for lighting requirements.*

The lighting plans have been updated to reflect 175-9 and 225-60.8 standards for your review.

6. *Details*

   a. *A typical section for the public sidewalk should be provided.*

o.k. See sheet C10.

b. *The plans reflect a 3 ft wide drip edge filter. The overhang is close to 2 ft from the building. We suggest a width of 4 ft would be more appropriate.*

The 2' overhang should drip onto the 3' wide drip edge which has been added to the plans.

c. *Catch basin details should reflect a minimum 3 ft sump.*

We are adding two new catch basins in the parking areas. One in back and One in front. Both capture relatively small paved areas. Most of the structures being used for this project are existing with 2' sumps. The two new basins have been updated to include 2' sumps. Sumps have been added to the 5 interior field inlets located in lawn areas. We don't agree 3' sumps should be required in this case.

d. *The detail for the concrete transition curb should not be used in the public right of way.*

o.k. we have removed the detail. We intend to use the Typical Tipdown Curb Installation Detail to provide a thickened slab below base pavement.

e. *The I and M plan for during construction on drawing C11 should define the storm which requires an inspection as 0.5 inches in 24 hours.*

We updated the note to reflect that 0.5 inches rainfall in 24 hours require an inspection.

C. Stormwater Management

a. A separate stand-alone document for the Post Construction Inspection and Maintenance Plan should be provided. Have inspections of the soil filter occurred as required by the permits? Separate forms should be provided for each BMP. The storm event triggering a wet weather inspection should be included (1" in 24 hours). The requirements of chapter 500, Appendix B.2. should be incorporated. The 5-year recertification would be to the town, not the DEP.

We have provided a stand-alone document for the post construction inspection and maintenance requirements as suggested. We have noted the 1" rainfall in 24 hours triggers an inspection. We have added Chapter 500 Appendix B.2. language in the plan. Separate forms are provided for each BMP. We are not aware of any logs or inspection reports but can try and track something down. When the DEP permit was updated in 2015, DEP inspected the pond. The DEP Department Orders completed in 2015, states that the pond was inspected and found to be in good working order.

The pond was allowed to be maintained and continue to provide treatment for the project. Recall the pond was designed to support a 25K building and parking at the site.

b. *See Topsham code sections 225-34. (2)(b) and (c) for easement and maintenance agreement requirements.*

See draft Stormwater Management system maintenance agreement.

c. *Based on the topography, it appears that portions of SC 8, 50, 57, and 58 will be tributary to the existing stormwater pond, rather than be routed around it as shown.*

Pond 6P models the existing pond on site. SC 8 and 58 drains to Reach 80R which connected to Pond 13P which is the existing culvert crossing the entrance drive and discharges into the pond (pond 6P). We re-directed this to the storm drains in the parking lot as suggested but both structures drain to the pond. The change did not result in any increases in flows.

d. *Reach 5R should be shown.*

Reach 5R models the ravine located across Park Drive. We have labeled this on the plans.

e. *How is the general standard being met? The pond is modelled as a detention basin. Again, more information on the existing pond would clarify this.*

The project has been designed to capture a minimum of 95% impervious area and 80% developed area as required to meet the general standard. Some areas cannot be practically captured. The General Standard calculations are included on the post plans and at the end of this narrative in the report. The project will capture 96% of the project impervious area and 85% of the developed area to meet the General Standards after development is complete.

The pond is filter basin which is an effective treatment device. We have provided an updated plan view and section of the pond along with as-built conditions. We also provided the original detail submitted for the pond in 2005-2006 for reference only. The pond was found to be in working order by Maine DEP. See DEP orders we provided previously.

The original pond was designed to handle the sites quality and quantity standards. According to the DEP orders, the filter pond was designed to remove 69% TSS for the 0.4" runoff from 2.38 acres of new impervious area. The pond achieved a removal rate of 63% for the site as a whole which exceeded the 54% removal rate required by the sliding scale TSS standards.

The existing pond has volumes that exceed the previous minimum requirements for the sliding scale TSS standards approved with the project in 2006.

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Park Drive Residences Grassed Underdrained Soil Filter Pond Design Criteria - Hydrocad Pond 6P - Original Pond Size 69% Sliding Scale TSS					
	acres	s.f.			
Impervious Area Draining to Pond	2.38	103672.8			
Lawn Area draining to Pond	0.55	23958			
Total Area	**2.93**	Acres			
69% Sliding Scale TSS Minimum Treatment Volume	0.4" X Impervious Area + 0.4" X Lawn			**4212**	c.f.
Pond Storage Volume Provided				**7105**	✓

Park Drive Residences Grassed Underdrained Soil Filter Pond Design Criteria - Hydrocad Pond 6P				
	acres	s.f.		
Impervious Area Draining to Pond	2.19	95396.4		
Lawn Area draining to Pond	0.55	23958		
Total Area	**2.74**	Acres		
95% Minimum Treatment Volume	1" X Impervious Area + 0.4" X Lawn		**8709**	c.f.
69% Sliding Scale TSS Minimum Treatment Volume	0.4" X Impervious Area + 0.4" X Lawn		**3939**	c.f.
Pond Storage Volume Provided			**7105**	

The post development plan has a chart summarizing the capture ratios required to meet the General Standard. Further the pond was originally designed to treatment more impervious area than the current project creates. The paved impervious area draining to the pond is less than previously treated. We have supplemented pond treatment and storage by installing roof dripline bmp's for the apartment buildings.

f. *The pond 6P pre-development model includes a 4-inch diameter orifice at elevation 115.5, while the rim of the structure is at 113.8.*

We have removed the orifice. The original calculations modeled the design pond orifices and outlets which reflected a 115.5 top of grate. The survey data located the top of grate and invert information and found the grate to be at 113.8 with no 4" orifice. As a result, we updated the pond structure outlet data. The same outlet was modeled in the pre and post conditions. The storms were re-run for the 2, 10, and 25 year storms. The pond and outlets handled the flows as required. Further the spillway has the ability to convey the 25 year storm without flooding. We will re-build part of the pond berm near the Park Drive Entrance to re-establish the top of berm at 116.5 which will allow the spillway to work as intended at elevation 115.3.

g. *Where is the 10 x 10 weir utilized in the model located?*

There is a spillway located on the survey topographic plan. We will add fill to raise the pond berm to 116.5 so the spillway can be utilized as designed.

h. *There is an issue with the existing and proposed pond modeling. Based on the topographic survey data, which shows the minimum elevation of 115 for the pond embankment, both models appear to indicate the pond will overtop during the 25 and 100 year storm events, and limited freeboard will be available at other storms. This should be reviewed.*

The original design modeled the top of pond berm at elevation 117. The spillway was designed at elevation 116. The existing conditions indicate the berm may overflow near the Park Drive entrance at elevation 115.0+/-. It is noted that there are two (2) contour elevation 115's which suggest the top of berm was higher than 115.0 (approximately 115.1). The spillway shown on the survey plan has spot elevations of 115.1. We ran the calculations again with the spillway breaching at elevation 115.3 in both the pre and post development condition. The results are attached. In order for the spillway to work effectively, we will expand the berm up to elevation 116.5 to allow the spillway to work as intended.

i. *Why are the post development peak elevations and rates of runoff less than the existing rates at Pond 100, the 24" culvert under Topsham Fair Mall Road?*

The pond was designed to treat the paved and building areas. The pond treats less paved area than it did previously. Further each new building has a roof dripline which provides additional storage and treatment. The apartment project has less impact. We would not expect peak flows to change enough to impact the down stream culvert. We have updated the results of the hydrocad calculations. The updated pre and post summaries are below.

FLOODING STANDARD RESULTS Pond 1P			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	
2 YEAR	7.52	7.62	0.10
10 YEAR	14.86	14.9	0.04
25 YEAR	19.08	18.43	-0.65
50 YEAR	22.92	22.79	-0.13
100 YEAR	27.15	27.18	0.03

Pre Pond 1P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	95.51
10 YEAR	96.65
25 YEAR	97.65
100 YEAR	100.27

Post Pond 1P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	95.52
10 YEAR	96.66
25 YEAR	97.48
100 YEAR	100.28

The results above are related the existing culvert crossing Park Drive on the northerly side of Merryman Way. The pond outlet drains to this culvert. As the results show we have a 0.1 cfs difference in the post calculation. This is a 1% increase which is generally considered negligible. The peak elevation changes are shown above. The peak elevation is 0.01' over the existing pre development peak flow.

FLOODING STANDARD RESULTS Pond 6P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE
2 YEAR	6.47	6.39	-0.08
10 YEAR	7.24	7.27	0.03
25 YEAR	9.4	7.76	-1.64
50 YEAR	15.6	11.21	-4.39
100 YEAR	23.95	14.58	-9.37

Pre Pond 6P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	114.27
10 YEAR	114.67
25 YEAR	115.06
100 YEAR	115.26

Post Pond 6P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	114.26
10 YEAR	114.71
25 YEAR	115.32
100 YEAR	115.7

The results are less than the pre development peak flows at the pond.

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FLOODING STANDARD RESULTS Pond 100P			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	
2 YEAR	21.94	22	0.06
10 YEAR	30.3	30.31	0.01
25 YEAR	36.24	36.17	-0.07
50 YEAR	40.55	40.49	-0.06
100 YEAR	43.68	43.6	-0.08

Pre Pond 100P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	75.2
10 YEAR	77.11
25 YEAR	78.84
100 YEAR	81.44

Post Pond 100P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	75.2
10 YEAR	77.11
25 YEAR	78.82
100 YEAR	81.41

The results indicate minor .06 cfs increase in the 2 year event which is negligible in the large ravine. The peak elevations did not change.

j. *A treatment plan for the site should be provided.*

A treatment plan is attached. See sheet WQ1.

k. *Is the impervious area associated with the potential future 20 parking spaces included in the general standard analysis?*

The potential future parking spaces was included in the General Standard and impervious area analysis. The future impervious area will drain to the pond for treatment.

Thanks for your help. It is appreciated. Should you have questions, please call.

Very truly yours,

Christopher S. Belanger, P.E.
Enclosures

cc: Dan Catlin, Owner

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Site Design Associates
Consulting Engineering and Land Planning

April 12, 2023

Julie Erdman
Director of Planning and Code Enforcement
Town of Topsham
Via email

RE: Park Drive Residences
Peer Review

Dear Julie;

Per your request Site Design Associates has undertaken a review of the plans and documentation submitted in support of a site plan application for the referenced project.

Our review was based on plans and the application materials for the project received March 23.

Based on our review we offer the following comments for your, the planning board's, and the applicant's consideration:

A. General

1. Given the proximity to a residential zone, should the lighting plan be peer reviewed?
2. The drawings are difficult to interpret. It seems that there are two sets of topographic information on the drawings, which we assume includes the preliminary mapping and the field survey data. This should be clarified and existing contours labelled.
3. The configuration of the existing stormwater facility is unclear. The Belanger plans show piping that is not shown on the topographic survey by Little River. Clarification of the configuration is required. Are record drawings available? When was it constructed?
4. The existing conditions plan shows a catch basin 45 ft northerly of CB200, but this is not shown on the design drawings.

B. Drawings

1. Drawing C2 – Site Development Plan Plan

    a. We seem to recall a discussion with the applicant about possibly turning the parking bay southerly of the apartments 180 degrees to minimize backing of vehicles into the main access aisle from Park Drive.
    b. The elevations, sizes and configuration of ESD1 and ECB1 should be provided.

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c. Why are some structures in the Structure and Pipe Tables showing no sump? All proposed structures should be provided with a minimum 3 ft sump.
d. What is the "JPOND" referenced on the drawing?
e. Some of the existing elevations shown conflict with the data shown on the Structure and Pipe Tables and should be reconciled.
f. The invert locations should be shown on the plan for EUDPOND and EUDPOND2.
g. There are two ESD300's in the tables.
h. What are the proposed finished floor elevations for the buildings?
i. More spot grades are required, including at the walks, high points, accessible parking spaces, around the buildings, and at the dumpster enclosures.
j. Clarification of the note "Grade to drain new impervious and developed area to pond" should be provided. Also, in areas where grade to drain is noted, specific grades should be shown.
k. The slope of the sidewalk from Merryman Way into the site exceeds ADA requirements.
l. Details, materials, and elevations for the walls adjacent to the pond should be specified, rather than simply calling for a block or boulder wall.
m. Entrance radii, walk drive, and parking dimensions should be shown.
n. Call for saw cuts and butt joints where existing pavement meets new pavement in the right of way.
o. Stop signs should be shown at the site exits.
p. Clarification of the note "Install new sidewalk and curb over existing paved areas" should be provided.
q. The invert out for SMH 102 is higher than the invert in.
r. No info is provided for SMH103.
s. Are there existing stubs for the water service to building 2?
t. Based on the elevations shown, there will be minimal cover over the sewer service under the stormwater basin.
u. The proposed sign is shown in Park Drive right of way, and the existing sign for Goodwill is also shown in the right of way.
v. A ramp will be required in the new sidewalk on the southerly side of the Park Drive entrance.
w. Curbing materials should be specified on and off site.
x. Is all new pavement proposed as full depth construction?
y. The drip edge filters and foundation drains should be shown, along with the proposed outlets for the drains.

2. Drawing C2A – Site Development Plan – Phase 1

a. See previous comments as applicable.
b. A stand-alone grading plan for Phase 1 should be provided.
c. Should sidewalk construction along Park Drive be included in Phase 1?

d. More detail should be provided on how building 2 will connect with the existing sewer. It seems the sewer should also match the future alignment.
e. The plan shows the curbing, parking, and walks easterly of building 3 to be include in Phase 1. It seems this will need to be excavated in the future to install the water service.

3. Drawing C3 and C4 – Grading and Utility Plans

a. See previous comments as applicable.
b. Will there be roof drains for the utility areas on the rooves?

4. L-1 Landscape Plan

a. This plan should be coordinated with the utility plan. There appears to be conflicts between plantings and utilities in some areas.
b. What are the dashed circles easterly of Park Drive?
c. The proposed bus top will require tipdowns, ramps, and tactile warnings.
d. Will Hickory trees survive in a 5.5 ft wide island ion the parking lot southerly of the apartments?
e. Is there a phasing proposal for the landscaping?

5. Photometric Plan

a. The plan shows 0.0 footcandles between the buildings. Reference should be made to Topsham code chapters 175-9 and 225-60.8 for lighting requirements.

6. Details

a. A typical section for the public sidewalk should be provided.
b. The plans reflect a 3 ft wide drip edge filter. The overhang is close to 2 ft from the building. We suggest a width of 4 ft would be more appropriate.
c. Catch basin details should reflect a minimum 3 ft sump.
d. The detail for the concrete transition curb should not be used in the public right of way.
e. The I and M plan for during construction on drawing C11 should define the storm which requires an inspection as 0.5 inches in 24 hours.

C. Stormwater Management

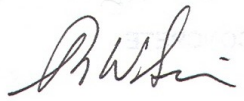
a. A separate stand-alone document for the Post Construction Inspection and Maintenance Plan should be provided. Have inspections of the soil filter occurred as required by the permits? Separate forms should be provided for each BMP. The storm event triggering a wet weather inspection should

be included (1" in 24 hours). The requirements of chapter 500, Appendix B.2. should be incorporated. The 5-year recertification would be to the town, not the DEP.

b. See Topsham code sections 225-34. (2)(b) and (c) for easement and maintenance agreement requirements.
c. Based on the topography, it appears that portions of SC 8, 50, 57, and 58 will be tributary to the existing stormwater pond, rather than be routed around it as shown.
d. Reach 5R should be shown.
e. How is the general standard being met? The pond is modelled as a detention basin. Again, more information on the existing pond would clarify this.
f. The pond 6P pre-development model includes a 4-inch diameter orifice at elevation 115.5, while the rim of the structure is at 113.8.
g. Where is the 10 x 10 weir utilized in the model located?
h. There is an issue with the existing and proposed pond modeling. Based on the topographic survey data, which shows the minimum elevation of 115 for the pond embankment, both models appear to indicate the pond will overtop during the 25 and 100 year storm events, and limited freeboard will be available at other storms. This should be reviewed.
i. Why are the post development peak elevations and rates of runoff less than the existing rates at Pond 100, the 24" culvert under Topsham Fair Mall Road?
j. A treatment plan for the site should be provided.
k. Is the impervious area associated with the potential future 20 parking spaces included in the general standard analysis?

If you have any questions, or require additional information, please do not hesitate to contact me.

Sincerely,
Site Design Associates



Tom Saucier, P.E.
President

cbelanger@roadrunner.com

From: Julie Erdman <jerdman@topshammaine.com>
Sent: Thursday, April 13, 2023 10:52 AM
To: cbelanger@roadrunner.com
Cc: Dan Catlin
Subject: Park Drive
Attachments: Pages from 2023 0321 192 Park Drive Residences Plan Set (all plans) (2).pdf; Tom Saucier Comments 04-12-23.pdf

Chris,

There are a few issues with the Park Drive plans that will hamper approval tonight.

Tom Saucier just got back to me with his comments last night and they are attached. The major ones are: the modeling for the stormwater pond shows that it will overflow; the sidewalk is not included in phase I of development (Planning Board may very well want to see that); and concerns have not been addressed regarding the entrance on Park Drive.

I also checked in with Tom Errico yesterday regarding the Park Drive entrance. He said "The current site plan has not addressed my concern about the entrance and the introduction of several turning movements and parking maneuvers near Park Drive. One option I would accept would be to close the driveway to the apartment complex and install a long island and have the apartment parking spaces accessed from the south [see attached]. I would also like to see the truck turning templates." Tom is in Presque Isle today and I plan to talk with him this afternoon to get a little more feedback.

Planning Board can begin review of the project tonight, but it sounds like it will need to be tabled to the next meeting to have all these items addressed. Originally, we were planning on holding only a workshop on the Recode on the 27th but our approach to that is evolving and I believe we can get this on the agenda.

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DEPARTMENT OF EI
STATE HOUSE STATION
DEPAI

CURT NEUFELD
SITELINES, P.A.
FAX # 207-725-1114
FROM L. KELLEY MAINE DEP LAND

797-9
2/8/06

IN THE MATTER OF

LOT 12, LLC	) SITE LOCATION OF DEVELOPMENT ACT
Topsham, Sagadahoc County	)
TOPSHAM FAIR MALL EXPANSION-LOTS 11&12	)
L-7554-23-AQ-C (approval)	) CONDITION COMPLIANCE

Pursuant to the provisions of 38 M.R.S.A. Sections 481 et seq., the Department of Environmental Protection has considered the application of Lot 12, LLC with the supportive data, agency review comments, and other related materials on file and finds the following facts:

1. In Department Order #L-7554-23-AE-A, dated November 6, 2001, the Department approved an expansion of the Topsham Fair Mall consisting of 13 commercial/retail lots on 114.53 acres. In Department Order #7554-31-AH-N, dated November 6, 2001, the Department approved 1.45 acres of freshwater wetland impacts under the Natural Resources Protection Act. This approval included stream impacts associated with construction of Topsham Fair Mall Road Extension and Park Drive and established natural resource buffers. The development is located on Topsham Fair Mall Road in the Town of Topsham.

2. Special Condition #5 of Department Order #L-7554-23-AE-A reads as follows: "Prior to development of lots 1, 3-7, and 9-13, the owner/developer of such lot shall submit for review and approval complete plans for stormwater runoff control and erosion and sedimentation control".

3. In response to Special Condition #5, the applicant submitted stormwater management and erosion control details for a 25,000 square foot retail/office building; 74,900 square feet of parking and access drives, and a 9,600 square foot equipment storage building on Lots 11 and 12.. Combined lot area of Lots 11 and 12 is 6.25 acres.

   The applicant proposes to install an underdrained soil filter basin on the west edge of the site and a small stormwater detention area at the southeast corner of the site to provide runoff storage for slow release. In addition, the applicant will install a restrictor plate in the existing road culvert under Park Drive north of the development. The Department's Division of Watershed Management (DWM) reviewed the proposed plans and commented that these measures will control peak flow rates off the parcel for 2-year storm events or smaller, but will result in increases for the 10-year and 25-year storms. The applicant requested that these increases be allowed and submitted evidence that expected peak velocity and flow rate increases will not significantly affect the stream channel or downstream properties. DWM considered the applicant's request. Because changes in stream morphology generally occur as a result of smaller more frequent storms rather than infrequent larger storms, DWM concurred that additional detention of runoff on the site is not necessary.

   The project will result in 2.59 acres of new impervious area which will discharge directly to a small brook north and east of the site. The proposed underdrained filter basin is designed to remove 69% TSS for the first 0.4-inch of runoff from 2.38 acres of the new impervious area.

This achieves a removal rate of 63% for the site as a whole, which exceeds the 54% removal rate required by the Sliding Scale TSS standard.

The applicant submitted a Permit-by-Rule (PBR#39574) for construction of the emergency outfall for the proposed detention pond within 75 feet of the stream.

4. Special Condition #6 of Department Order #L-7554-23-AE-A reads as follows: "The applicant shall convey Lots 1 through 13 with a deed covenant or lease term that requires a portion of all stormwater (rooftops) be infiltrated into the ground where possible to supplement base flows within the two on-site streams". This condition addresses concerns outlined in Finding 6 "Wildlife and Fisheries" of the Department Order regarding thermal impacts from the development in addition to impacts on stream base flows.

The applicant responded that shallow bedrock and anticipated high groundwater levels after excavation make infiltration impractical on the site. Instead, the stormwater management system includes an underdrained filter basin. The stormwater management plans were reviewed by and revised in response to comments from DWM. DWM commented that the proposed system can provide channel protection, runoff cooling, and pollutant removal comparable to infiltration.

5. Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

Based on the Department's review, the Department finds that the plans and information satisfactorily addresses the requirements of Special Conditions #5 and #6 as they relate to Lots 11 and 12.

Based on the above, the Department concludes that Lot 12, LLC has complied with Special Conditions #5 and #6 of Department Order #L-7554-23-AE-A as they relate to Lots 11 and 12.

DONE AND DATED AT AUGUSTA, MAINE, THIS 7TH DAY OF FEBRUARY, 2006.

By: _____
DAVID P. LITTELL, COMMISSIONER

Date of initial receipt of application October 31, 2005
Date application accepted for processing November 22, 2005

Date filed with Board of Environmental Protection
KH/ATS56470/L7554AQC

FILED
FEB - 8 2006
BOARD OF ENVIRONMENTAL PROT.
STATE OF MAINE

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE HOUSE STATION 17 AUGUSTA, MAINE 04333

DEPARTMENT ORDER
IN THE MATTER OF

LOT 12, LLC	) SITE LOCATION OF DEVELOPMENT ACT
Topsham, Sagadahoc County	)
TOPSHAM FAIR MAIL EXPANSION-LOTS 11&12	) MINOR REVISION
L-7554-23-AQ-C (approval)	) FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S.A. Sections 481 et seq., the Department of Environmental Protection has considered the application of LOT 12, LLC with the supportive data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROJECT DESCRIPTION:

A. History: In Department Order #L-7554-23-AE-A, dated November 6, 2001, the Department approved an expansion of the Topsham Fair Mall consisting of 13 commercial/retail lots on 114.53 acres. In Department Order #L-7554-31-AH-N, dated November 6, 2001, the Department approved 1.45 acres of freshwater wetland impacts and stream impacts under the Natural Resources Protection Act. In Department Order #L-7554-23-AQ-C, the Department approved stormwater management and erosion control details for development of a 25,000 square foot retail/office building, 74,900 square feet of parking and access drives, and a 9,600 square foot building for equipment storage on Lots 11 and 12. The development is located on Park Drive in the Town of Topsham.

B. Summary: The applicant proposes to increase the footprint of the smaller building to 12,460 square feet and add a canopy covering for the unloading area. The applicant also proposes to eliminate 17 parking spaces associated with the larger building. The proposed changes are shown on a plan entitled, "Amended Final Site Development Plan," prepared by Sitelines P.A. and dated July 11, 2006.

2. STORMWATER MANAGEMENT:

The proposed site plan revisions will result in a net reduction in impervious area of 520 square feet. A drainage pipe originally proposed to convey surface water from undeveloped area upgradient of the development to a drainageway on the southern property boundary will be replaced with a culvert. The culvert will encroach into a 35 foot buffer to the drainage swale established in Department Order #L-7554-23-AE-A. The area will be stabilized and vegetation will be restored to pre-construction conditions upon completion of culvert installation. No other changes to the stormwater management system are proposed. Department staff visited the project site and observed that the buffer area currently consists of meadow and shrub vegetation and determined that the

proposed culvert installation will not significantly affect the integrity of the buffer or the stability of the drainage swale.

Based on its review of the application, the Department finds the requested minor revision to be in accordance with all relevant Departmental standards. All other findings of fact, conclusions and conditions remain as approved in Department Order #L-7554-23-AE-A, and subsequent orders.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S.A. Sections 481 et seq.:

A. The applicant has provided adequate evidence of financial capacity and technical ability to develop the project in a manner consistent with state environmental standards.

B. The applicant has made adequate provision for fitting the development harmoniously into the existing natural environment and the development will not adversely affect existing uses, scenic character, air quality, water quality or other natural resources in the municipality or in neighboring municipalities.

C. The proposed development will be built on soil types which are suitable to the nature of the undertaking and will not cause unreasonable erosion of soil or sediment nor inhibit the natural transfer of soil.

D. The proposed development meets the standards for storm water management in Section 420-D and the standard for erosion and sedimentation control in Section 420-C.

E. The proposed development will not pose an unreasonable risk that a discharge to a significant groundwater aquifer will occur.

F. The applicant has made adequate provision of utilities, including water supplies, sewerage facilities, solid waste disposal and roadways required for the development and the development will not have an unreasonable adverse effect on the existing or proposed utilities and roadways in the municipality or area served by those services.

G. The activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties nor create an unreasonable flood hazard to any structure.

THEREFORE, the Department APPROVES the application of Lot 12, LLC to modify the site plan for Lots 11 and 12 as described above, SUBJECT TO THE FOLLOWING CONDITIONS and all applicable standards and regulations:

1. The Standard Conditions of Approval, a copy attached.

2. In addition to any specific erosion control measures described in this or previous orders, the applicant shall take all necessary actions to ensure that its activities or those of its agents do not result in noticeable erosion of soils or fugitive dust emissions on the site during the construction and operation of the project covered by this approval.

3. Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

4. All other Findings of Fact, Conclusions and Conditions remain as approved in Department Order #L-7554-23-AE-A, and subsequent orders, and are incorporated herein.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DONE AND DATED AT AUGUSTA, MAINE, THIS 15TH DAY OF December, 2006.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

By: _____
DAVID P. LITTELL, COMMISSIONER

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES...

Date of initial receipt of application September 11, 2006
Date of application acceptance October 2, 2006

Date filed with Board of Environmental Protection
KH/ATS60650/L7554AXM

FILED
DEC 18 2006
BOARD OF ENVIRONMENTAL PROT.
STATE OF MAINE

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

AVERY T. DAY
ACTING COMMISSIONER

January 2016

Park Drive, Lot 12, LLC
Attn: Dan Catlin
100 Silver St
Portland, ME 04101

RE: Site Location of Development Act Application, Topsham, DEP #L-7554-23-BR-M

Dear Mr. Catlin:

Please find enclosed a signed copy of your Department of Environmental Protection land use permit. You will note that the permit includes a description of your project, findings of fact that relate to the approval criteria the Department used in evaluating your project, and conditions that are based on those findings and the particulars of your project. Please take several moments to read your permit carefully, paying particular attention to the conditions of the approval. The Department reviews every application thoroughly and strives to formulate reasonable conditions of approval within the context of the Department's environmental laws. You will also find attached some materials that describe the Department's appeal procedures for your information.

If you have any questions about the permit or thoughts on how the Department processed this application please get in touch with me directly. I can be reached at (207) 446-6117 or at andrea.lapointe@maine.gov.

Sincerely,

Andrea M. Lapointe

Andrea M. Lapointe, Project Manager
Bureau of Land Resources

pc: File

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143

web site: www.maine.gov/dep

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION AUGUSTA, MAINE 04333-0017

DEPARTMENT ORDER

IN THE MATTER OF

PARK DRIVE, LOT 12, LLC	) SITE LOCATION OF DEVELOPMENT ACT
Topsham, Sagadahoc County	)
LOT 12 MODIFICATION	) MINOR REVISION
L-7554-23-BR-M (approval)	) FINDINGS OF FACT AND ORDER

Pursuant to the provisions of 38 M.R.S.A. §§ 481 et seq., the Department of Environmental Protection has considered the application of PARK DRIVE, LOT 12, LLC with the supporting data, agency review comments, and other related materials on file and FINDS THE FOLLOWING FACTS:

1. PROJECT DESCRIPTION:

A. History: In Department Order #L-7554-23-AE-A, dated November 6, 2001, the Department approved an expansion of the Topsham Fair Mall consisting of 13 commercial/retail lots on 114.53 acres, which includes Lot 12. In Department Order #L-7554-31-AH-N, dated November 6, 2001, the Department approved 1.45 acres of freshwater wetland impacts to Lots 11 and 12 under the Natural Resources Protection Act. This approval included stream impacts associated with the construction of Park Drive and the reduction of established natural resource buffers. In Department Order #L-7554-23-AQ-C, dated February 7, 2006, the Department approved plans for erosion and sedimentation control and stormwater runoff control, which included a soil filter detention pond for the existing Goodwill retail store on Lot 11 and a planned 25,000 square foot retail/office building (Park Drive Professional Building) with 74,900 square feet of parking and access drives located on Lot 12. In Department Order #L-7554-23-AX-M, dated December 15, 2006, the Department approved the elimination of 17 parking spaces on Lot 12.

B. Summary: The applicant proposes to decrease the size of the previously approved Park Drive Professional Building from 25,000 square feet to 17,812 square feet. The number of parking spaces will increase from 108 spaces to 144 spaces. All of the runoff from Lot 12 will be directed to an existing soil filter detention pond. As a result of the proposed changes, the total amount of impervious area will decrease from 2.38 acres to 1.93 acres. The proposed project details are shown on a plan entitled, "Site Development Details, C5," prepared by Sitelines, PA with a latest revision date of October 26, 2015. The development is located at 100 Park Drive in the Town of Topsham.

C. Current Use of Site: Lot 12 is currently maintained as a building pad site. An access drive completely surrounds the pad site. A soil filter detention pond and a series of catch basins were constructed on site and are functioning as intended.

2. FINDING:

The proposed project will drain to the existing soil filter detention pond predominantly through a series of existing catch basins. Staff in the Division of Environmental Assessment reviewed the proposed project and determined that the project meets the requirements of Chapter 500.

The proposed project is a minor change and will not significantly affect any other issues identified during previous Department reviews of the project site.

Based on its review of the application, the Department finds the requested minor revision to be in accordance with all relevant Departmental standards. All other findings of fact, conclusions and conditions remain as approved in Department Order #L-7554-23-AE-A and subsequent Orders.

BASED on the above findings of fact, and subject to the conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S.A. §§ 481 et seq.:

A. The applicant has provided adequate evidence of financial capacity and technical ability to develop the project in a manner consistent with state environmental standards.

B. The applicant has made adequate provision for fitting the development harmoniously into the existing natural environment and the development will not adversely affect existing uses, scenic character, air quality, water quality or other natural resources in the municipality or in neighboring municipalities.

C. The proposed development will be built on soil types which are suitable to the nature of the undertaking and will not cause unreasonable erosion of soil or sediment nor inhibit the natural transfer of soil.

D. The proposed development meets the standards for storm water management in Section 420-D and the standard for erosion and sedimentation control in Section 420-C.

E. The proposed development will not pose an unreasonable risk that a discharge to a significant groundwater aquifer will occur.

F. The applicant has made adequate provision of utilities, including water supplies, sewerage facilities and solid waste disposal required for the development and the development will not have an unreasonable adverse effect on the existing or proposed utilities in the municipality or area served by those services.

G. The activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties nor create an unreasonable flood hazard to any structure.

THEREFORE, the Department APPROVES the application of PARK DRIVE, LOT 12, LLC to decrease the building size and add parking spaces as described in Finding 1, SUBJECT TO THE FOLLOWING CONDITIONS and all applicable standards and regulations:

1. The Standard Conditions of Approval, a copy attached.

2. In addition to any specific erosion control measures described in this or previous orders, the applicant shall take all necessary actions to ensure that its activities or those of its agents do not result in noticeable erosion of soils or fugitive dust emissions on the site during the construction and operation of the project covered by this approval.

3. Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

4. All other Findings of Fact, Conclusions and Conditions remain as approved in Department Order #L-7554-23-AE-A, and subsequent Orders, and are incorporated herein.

THIS APPROVAL DOES NOT CONSTITUTE OR SUBSTITUTE FOR ANY OTHER REQUIRED STATE, FEDERAL OR LOCAL APPROVALS NOR DOES IT VERIFY COMPLIANCE WITH ANY APPLICABLE SHORELAND ZONING ORDINANCES.

DONE AND DATED IN AUGUSTA, MAINE, THIS 12TH DAY OF JANUARY, 2016.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: _____
For: Avery T. Day, Acting Commissioner

Filed
JAN 12 2016
State of Maine
Board of Environmental Protection

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES.

AL/L7554BRM/ATS#79872

TOPSHAM FAIR MALL EXPANSION
LOTS 11 & 12

STORMWATER MANAGEMENT PLAN

INTRODUCTION

Lot 12, LLC (hereafter referred to as Applicant), is proposing to construct a 25,000 s.f. retail/office building on Lots 11 and 12 (approximately 6.25 acres) in the Topsham Fair Mall in Topsham (see Figure 1). The site is located in the Mixed Use Commercial (MUC) Zoning District in which retail and commercial enterprises are permitted. The parcel is bordered on the north and south sides by undeveloped lots and on the east side by residential property. As part of the application, the Applicant is also permitting a 9,600 s.f. building to be located on the same site, and built at a later time. The lot will be accessed via two site entrances from Park Drive (see Site Plan for details).

The subject parcel is lower than the residential lots to the east, slightly elevated above the lots to the north and south. Runoff is currently conveyed off-site either to a stream to the north, Park Drive to the west and a stream to the south. The soils in the vicinity are known to be highly permeable (hydrologic soils group A), and much of the runoff from the site infiltrates into the ground, typically in a matter of hours. It is proposed that a the runoff generated from impervious surfaces on site be captured, treated and conveyed to the municipal stormwater system on Park Drive.

There are no man-made or natural lakes on or abutting the site. There are no known areas that are prone to flooding on or adjacent to the site.

The proposed parking, equipment storage and other paved surfaces will create approximately 78,400 s. f. of impervious area. The buildings will create an additional impervious area of 34,600 s.f., for a total of approximately 113,000 s.f. (2.59± acres) of new impervious area. The lot will be served by public water and sewer systems.

This study is intended to assess the changes in the stormwater water runoff rates and volume due to the proposed development of the Applicant's lot.

STUDY METHODOLOGY

In this study, the National Resources Conservation Service Urban Hydrology for Small Watersheds, Technical Release 55 (SCS-TR55) was utilized to model the surface water drainage patterns for existing and proposed drainage conditions. HydroCAD Stormwater Modeling System software (Version 7.10) was used for the SCS-TR55 calculations. The results of the HydroCAD model were used to size the infiltration basin. Modeling was conducted using 24-hour rainfall amounts for the 2, 10, and 25-year storm events (3.0, 4.6 and 5.4 inches, respectively for Sagadahoc County).

A stormwater model for the vicinity of the Topsham Fair Mall has previously been created and approved by the Town of Topsham and the DEP. This model was modified to account for the impact on drainage resulting from the proposed development. By updating the model for the entire area, the overall impacts to the receiving streams can be considered. The subcatchment(s) and other model elements modified are described in detail below.

Site specific topographical data was collected via on-the-ground survey. Hydrologic boundaries were generated using the topographic mapping and the drainage patterns were verified by a site reconnaissance visit.

The following assumptions were applied to the analysis. Undeveloped land cover was typically assumed to be Forest: Light Undergrowth or Woodland for time-of-concentration calculations in wooded areas, and Grass Cover in proposed open areas. Five (5) minutes was the minimum time-of-concentration used for analysis.

Surficial soils located on the site were obtained from the soils analysis conducted for the Topsham Fair Mall project. Upper watershed areas were obtained from the Sagadahoc County medium intensity soil survey. Soil types found in the project area include:

Table 1: Soil Types in the Study Area

Soils Series	Symbol(s)	Hydrologic Group (HSG) *
Adams	AdB, AdE	A

*Hydrologic Soils Group taken from SCS TR-55 Manual

For the hydrology analysis of the existing site, hydrologic soils group (HSG) A was used for all calculations.

The project area is located in Zone X (Areas Outside of 500 year Flood Plain) of the Flood Insurance Rate Maps (FIRMs) for the Town of Topsham. The project area is located on Panel 16 of 20 (Community Panels 230112 0016 B, Effective, October 16, 1987). An excerpt of the applicable FIRM is included in this report.

OFF-SITE WATERSHEDS

As noted, the hydrologic analysis of the Topsham Fair Mall, including the lots that make up the proposed development site, was conducted in 2003 as part of the Post Development Drainage Plan for the Topsham Fair Mall. That analysis was updated to model existing conditions on the site. Subcatchment numbers used herein are carried forward from that analysis.

There is a large upgradient area that will drain through the project site. This area is incorporated into the analysis.

SUBCATCHMENTS

Pre-Development Conditions

The Applicant's site was modeled as two subcatchments which encompass both of the lots that make up the area to be developed, as well as the area to the east that is upgradient of the site. The northern subcatchment (Subarea 117) drains to a drainageway along the northern property boundary for Lot 12. The southern subcatchment (Subarea 120) drains to a channel along the southern edge of Lot 11 (see drawing DR1).

Due to the high permeability of the soils up gradient of the site, the peak rate of runoff is relatively low; below 3.0 cubic feet per second (cfs) during the 25-year storm event.

Post-Development Conditions

Under post-development conditions, the two pre-development subcatchments are reduced in size as a result of grading for the development and some additional subcatchments were created to account for the building, parking areas and associated grading (see Drawing DR2A & DR2B for details).

Subcatchment 300 will include the larger of the proposed buildings and the majority of the pavement. Runoff in this subcatchment will sheet to catch basins in the parking area, which will convey the runoff to a filtration basin located at the front of the site along Park Drive (Pond 118). Runoff from the roof area of the larger building will be included with the runoff from the parking area. Runoff from the smaller building will be discharged immediately behind the building to infiltrate (see subcatchment 304 below).

Runoff from the larger building and pavement areas will be treated in an underdrained filtration basin. The runoff will percolate through a filter layer of permeable soil to an underdrain pipe that will convey the runoff to the municipal stormwater collection system on Park Drive. An overflow structure will be installed to route excess runoff to the drainageway that runs to the north of the site (Pond 110). An emergency spillway at the top of the pond will route stormwater down Park Drive to the municipal stormwater system, should the water level reach the top of the pond. The pond is designed to hold approximately 110% of the 25-year storm runoff.

Subcatchments 301 and 302 include the areas of the parking lot and site entrance from Park Drive that because of grading constraints will bypass the detention pond and convey runoff directly to the municipal stormwater system on Park Drive. Both of these areas are small and will contribute little runoff to the municipal stormwater system (approximately 1.6 cfs during the 25-year storm event).

Subcatchment 303 is comprised of the area to the east and north of the parking area, and includes areas to be graded for development of the site. Also included are areas within the buffer zone and outside the property boundaries of the site that will contribute runoff to the site. Runoff from this area will flow into a swale that will run along the eastern and northern perimeter of the parking area, then to a culvert that runs beneath Park Drive to the north of the site (Pond 110).

Subcatchment 304 is comprised of the area to the east and south of the parking area, and also includes areas to be graded for development of the site. This subcatchment will include areas within the buffer zone and outside the property boundaries of the site that will contribute runoff to the site, as well as rooftop runoff from the 9,600 s.f. building. Runoff from this area will flow into a swale that will run along the eastern and southern perimeter of the parking area, then to a culvert that runs beneath Park Drive to the south of the site (Pond 121).

Results

A comparison of pre- and post-development peak stormwater runoff rates at the analysis points is presented in Table 2. The analysis points represent flows at the apparent collection areas at the low elevations on the parcel. Pond 110 represents the culvert that runs beneath Park Drive to the north of the site. Pond 121 represents the culvert that runs beneath Park

Drive to the south of the site. Pond 103 represents the municipal stormdrain system on Park Drive. Peak runoff rates were estimated for the 2, 10, and 25-year, 24-hour storm events.

Table 2: Peak Stormwater Runoff Rates (cfs)

Analysis Point	Pre-Development			Post-Development		
	2-yr	10-yr	25-yr	2-yr	10-yr	25-yr
110 - Road Culvert	0.01	0.83	2.94	0.35	4.16	6.50
121- Road Culvert	0.00	0.17	0.69	0.01	0.50	1.47
103 – Road Detention	0.05	0.41	0.67	0.54	0.88	1.03

The runoff from the vast majority of impervious area will drain via the subsurface drainage system to the underdrained filtration basin or to the wooded buffer, which will reduce the corresponding increase in runoff on the Applicant's parcel. The anticipated ponding depths in the proposed infiltration basin will vary from approximately 1.5 feet during the 2-year event to 1.97 feet during the 25-year event, and will drain in approximately 24 hours. Although runoff flow rates increase substantially in the two road culverts, especially in the 10 and 25-year storm events, the ravines that form the streams where these culverts are located are as much as twenty feet deep in some locations and can more than adequately accommodate the flows generated. Also, flow velocities are low enough to preclude erosion of the stream bed. The increase in flows will have a minimal effect on the municipal storm water system.

BEST MANAGEMENT PRACTICES

Stabilized construction entrance(s), silt fence or silt sock sediment barrier, erosion control blanket and/or erosion control mix, riprap outlet control, seeding, and mulching practices will be used in accordance with the Maine Department of Environmental Best Management Practices (BMP) manual during construction and until a stabilized condition exists.

CONCLUSION

The majority of stormwater runoff from the proposed retail/office building and associated impervious area will be routed to an underdrained filtration basin or to existing wooded areas, which will control all runoff and prevent any impact to adjacent properties or existing drainage systems. The permeable soils on-site and upgradient of the site will infiltrate the runoff from the site within 24-hours for most rainfall events. The use of established best management practices (BMPs) will reduce or eliminate any sediment leaving the site.

MAINTENANCE OF DRAINAGE FACILITIES

The Contractor will be responsible for maintaining the drainage improvements until the project is complete. After the project is complete, the Applicant will be responsible for maintaining the swales, detention basins and outlet structures as shown on the plan. Notwithstanding any other schedule noted below, general inspections should be conducted monthly during wet weather conditions from March to November.

Inspection and Maintenance Plan

Ditches, Swales, and Riprap Aprons

Open swales and ditches shall be inspected on a monthly basis or after a major rainfall event to assure that debris and/or sediments do not reduce the effectiveness of the system. Debris shall be removed at that time. Any sign of erosion or blockage shall be immediately repaired to assure a vigorous growth of vegetation for the stability of the structure and proper function. Maintenance shall include, but not be limited to, mowing, trimming and removal of vegetation in the ditches as required to prevent vegetation from blocking or diverting storm flows, replacement of riprap channel lining to prevent scour of the channel invert, removing vegetation and debris from the culverts.

Vegetated ditches should be mowed at least monthly during the growing season. Larger brush or trees must not be allowed to become established in the channel. Any areas where the vegetation fails will be subject to erosion and should be reseeded and mulched immediately.

Riprap ditches and aprons where stone is displaced should have the stone replaced and chinked to assure stability. With time, additional riprap may be added. Vegetation growing through riprap should be removed on an annual basis.

Paved Surfaces

Accumulations of winter sand along impervious areas shall be cleared at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along the edge of paved areas may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader.

Catch Basins

Catch basins, and any other field inlet throughout the collection system, shall be inspected on a monthly basis to assure that the inlet entry point is clear of debris and will allow the intended water entry. At that time, these will be cleared as necessary.

On an annual basis, when the sediment level within the catch basin is within 3 inches of the outlet pipe invert, the catch basins sump shall be cleaned of all accumulated sentiment. The removed material must be disposed of in accordance with the Maine Solid Waste Disposal Rules.

Drainage Pipe

Piped drainage systems shall be inspected in spring and late fall, and after heavy rains to remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at

the outlet, and within the conduit; and to repair any erosion damage at the conduit inlet and outlet. Sediment should be removed when its level exceeds 20% of the pipe diameter. Hydraulic flushing or any mechanical means may accomplish sediment removal. Care shall be taken to contain the sediment at the pipe outlet.

Filtration Basin

Sediment Removal: The grass buffer area vegetation should be inspected at least once per year, preferably in the spring. Debris and sediment build-up should be removed from the buffer when noticeable accumulation has occurred.

Vegetation Maintenance: Grass should be mowed on a regular basis so that grass height does not exceed 6 inches. Any erosion rills, gullies, or bare spots on the filter area's side slopes and floor should be seeded or sodded to re-establish the turf cover.

Restoring Infiltrative Capacity: The surface of the soil filter may clog with fine sediments over time. Maintenance of good grass cover should minimize this; however, if runoff ponded in the basin does not drain within 48 hours, rototilling of the top of the soil bed may be required to re-establish the soil's filtration capacity.

EASEMENT AGREEMENT

Know All Men by these Presents, that this Easement Agreement is made between the Inhabitants of the Town of Topsham, a municipal corporation located at Topsham, in the County of Sagadahoc, State of Maine, and Park Drive, Lot 12, LLC, a Maine corporation located at Portland, in the County of Cumberland, State of Maine, for the limited and sole purpose of granting Park Drive, Lot 12, LLC a signage and maintenance easement within certain designated areas within the Town's right of way for the Topsham Fair Mall Road and Park Drive.

WITNESSETH

WHEREAS, the Town of Topsham owns certain rights of way containing the Topsham Fair Mall Road and Park Drive, which are used as primary means of access to parcels within the Topsham Fair Mall and Topsham Fair Mall Expansion; and

WHEREAS, the Town of Topsham agrees to permit Park Drive, Lot 12, LLC to place and maintain directory signs within certain designated areas within the boundaries of the Topsham Fair Mall Road and Park Drive, which areas are more particularly bounded and described herein and shown on "Sign Easement Area" sketches attached hereto; and

WHEREAS, the Town of Topsham and Park Drive, Lot 12, LLC (parties) desire and intend to set forth their respective rights and responsibilities regarding the signage and maintenance easement.

NOW, THEREFORE, for and in consideration of one dollar and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereby covenant and agree as follows:

1. Grantor hereby grants Park Drive, Lot 12, LLC an exclusive right and easement to install and maintain signs within the "Signage Easement Areas" described herein and to install underground electric wire to the sign. Said signage and electrical wiring shall comply at all times with any and all applicable federal, state and Town laws, regulations, building codes, permits and ordinances.

2. Grantor hereby Grants to Park Drive, Lot 12, LLC, and their designated employees, agents and contractors, an easement for the purpose of ingress, egress and passage of vehicles and pedestrians in, on, over and across the Topsham Fair Mall Road and Park Drive rights of way to the signage area in order to install, maintain and repair the designated signage.

3. Park Drive, Lot 12, LLC aggress that it shall keep said signage and signage areas in good repair, and that the Town shall not be responsible for any costs of any kind relating to the installation, maintenance, repair, and/or removal of said signage.

4. Park Drive, Lot 12, LLC agrees that it shall promptly repair, restore and/or replace any damage of any nature to the Topsham Fair Mall Road and Park Drive rights of way and the signage area caused by Park Drive, Lot 12, LLC and/or their designated employees, agents, contractors, while installing, utilizing, maintaining, repairing and/or removing said signage and easement, and that the Town shall not be responsible for any costs of any kind associated with such damage caused by Park Drive, Lot 12, LLC and or their designated employees, agents, and contractors.

5. Park Drive, Lot 12, LLC agrees that said signage will not be relocated or moved from the designated "Sign Easements Areas" without the express prior written approval of the Town. The Town and Park Drive, Lot 12, LLC agree that in the event that the layout of the Topsham Fair Mall Road and Park Drive rights of way changes and the signage can no longer be used by Park Drive, Lot 12, LLC, the parties will mutually agree upon a new location for said signage, and the parties shall execute and record the appropriate documents to memorialize the new location.

6. Park Drive, Lot 12, LLC agrees that, with the exception of routine maintenance and repair, said signage shall not be modified or increased in size or height without the express prior written approval of the Town, and that any such modification shall fully comply at all times with any and all applicable federal, state and Town laws, regulations, building codes, permits and ordinances.

7. Park Drive, Lot 12, LLC agrees to indemnify and hold the Town, including its officials, officers, employees, agents and contractors, harmless for any and all costs and liabilities that shall or may arise from (a) the Town's grant of this easement, (b) Park Drive, Lot 12, LLC's obligations and responsibilities under this agreement, (c) any injury, damages, claim or lawsuit of any nature brought by any third party against the Town resulting from Park Drive, Lot 12, LLC's installation, use, repair and maintenance of the signage and signage areas, (d) the existence and location of the signage and the signage areas, or (e) any damages or costs incurred that are the result of normal activities of the Town in maintaining its roads, sidewalks or infrastructure, or snowplowing/removal activities.

8. This easement shall be for the benefit of the Park Drive, Lot 12, LLC (Grantee), and may be transferred or assigned. This agreement shall remain in effect for a period of twenty (20) years from the date of the recording of this executed Agreement at the Registry of Deeds, but shall automatically renew for periods of five (5) years, unless the Town terminates the easement in writing to the Grantee at least sixty (60) days prior to the expiration date.

9. This Agreement shall be construed in accordance with the laws of the State of Maine, constitutes the entire Agreement between the parties, and extinguishes any prior written or oral agreements and/or understandings between the parties

concerning the placement of signage within the Topsham Fair Mall Road and Park Drive rights of way.

10. This Agreement may be amended or modified only by a declaration in writing, executed and acknowledged by both parties to the Agreement.

Sign Easement Area 1

A certain lot or parcel of land situated on the southeasterly side of Park Drive in the Town of Topsham, County of Sagadahoc, State of Maine, being more particularly described as follows:

Beginning at a point on the southeasterly sideline of Park Drive that is located 368.6' northerly, as measured along said sideline of Park Drive, of the southwesterly most corner of Lot 11, as shown on a plan entitled "Topsham Fair Mall Retail Expansion Subdivision Plan – Sheet 1 and Sheet 2, TOP, L.L.C., Property, Topsham Fair Mall, Konover Development Corporation, Farmington, Connecticut", prepared by Sitelines, P.A., 8 Cumberland Street, Brunswick, Maine 04011, dated October 29, 2000, revised through November 16, 2001, and recorded in the Sagadahoc County Registry of Deeds in Plan Book 37, Pages 19 and 20;

Thence, N 71°24'59" W, a distance of 16.5' to an angle point;

Thence, N 18°58'06" E, a distance of 10.0' to an angle point;

Thence, S 71°24'59" S, a distance of 16.5' to a point on the southeasterly sideline of said Park Drive;

Thence, in a generally southwesterly direction along a 1435.0' radius curve that is concave to the northwest, a distance of 10.0' to the point of beginning.

Containing 165 square feet, more or less.

Sign Easement Area 2

A certain lot or parcel of land situated on the southeasterly side of Park Drive in the Town of Topsham, County of Sagadahoc, State of Maine, being more particularly described as follows:

Beginning at a point on the southeasterly sideline of Park Drive that is located 216.65' northerly, as measured along said sideline of Park Drive, of the southwesterly most corner of Lot 11, as shown on said plan of "Topsham Fair Mall Retail Expansion Subdivision Plan ";

Thence, N 64°58'52" W, a distance of 16.5' to an angle point;

Thence, N 25°02'04" E, a distance of 10.0' to an angle point;

Thence, S 64°58'52" S, a distance of 16.5' to a point on the southeasterly sideline of said Park Drive;

Thence, in a generally southwesterly direction along a 1435.0' radius curve that is concave to the northwest, a distance of 10.0' to the point of beginning.

Containing 165 square feet, more or less.

Sign Easement Area 3

A certain lot or parcel of land situated on the northeasterly side of the Topsham Fair Mall in the Town of Topsham, County of Sagadahoc, State of Maine, being more particularly described as follows:

Beginning at a point on the northeasterly sideline of the Topsham Fair Mall Road, which point is located 7.0' northerly, as measured along a 25.0' radius curve that is concave to the northeast, from an iron pin marking the intersection of the filet of the southwesterly sideline of Park Drive with the northeasterly sideline of the Topsham Fair Mall Road;

Thence, S 43°55'01" W, a distance of 24.0' to an angle point;

Thence, N 46°04'59" W a distance of 10.0' to an angle point;

Thence, N 43°55'01" E, a distance of 29.6' to a point on the filet of the southwesterly sideline of said Park Drive;

Thence, in a generally southeasterly direction along a 25.0' radius curve that is concave to the northeast, a distance of 11.6' to the point of beginning.

Containing 263 square feet, more or less.

Sign Easement Area 4

A certain lot or parcel of land situated on the southeasterly side of the Topsham Fair Mall in the Town of Topsham, County of Sagadahoc, State of Maine, being more particularly described as follows:

Beginning at a point on the southeasterly sideline of Topsham Fair Mall Road that is located N 60°40'04" E, a distance of 36.3', as measured along said sideline of Topsham Fair Mall Road, from the southwesterly most corner of Lot L-2, as shown on a plan entitled "Second Amended Revised Final Plan, Topsham Fair Mall for Topsham Fair Realty Trust and Bruce L. Allen", dated August 26, 1996 by Sebago Technics, recorded at the Sagadahoc County Registry of Deeds in Book 32, Page 50;

Thence, N 29°19'56" W, a distance of 28.5' to an angle point;

Thence, N 60°40'04" E, a distance of 10.0' to an angle point;

Thence, S 29°19'56" E, a distance of 28.5' to a point on the southeasterly sideline of said Topsham Fair Mall Road;

Thence, S 60°40'04" W, a distance of 10.0' to the point of beginning.

Containing 285 square feet, more or less.

IN WITNESS WHEREOF, the parties hereto have caused this Easement Agreement to be executed and sealed this ____ day of October, 2006

GRANTOR

TOWN OF TOPSHAM

Grantor Signature: _____

Printed: Wesley Thames

Title: Public Works Director

Witness: _____

Printed: Ruth A Lyons

State of Maine
County of Sagadahoc

Dated: 10/18/06

The above-named (Grantor) personally appeared before me this 18th day of October, 2006 and acknowledged the foregoing instrument to be his free act and deed.

_____
Rose M. Woodd
Notary Public/Attorney at Law
Printed Name: Rose M. Woodd
My Commission Expires: 6/4/2011

GRANTEE

PARK DRIVE, LOT 12, LLC

Grantor Signature: Daniel M. Call

Printed: Daniel M. Call

Title: MANAGER

Witness: [signature]

Printed: Edward A Caron SR

State of Maine
County of Sagadahoc

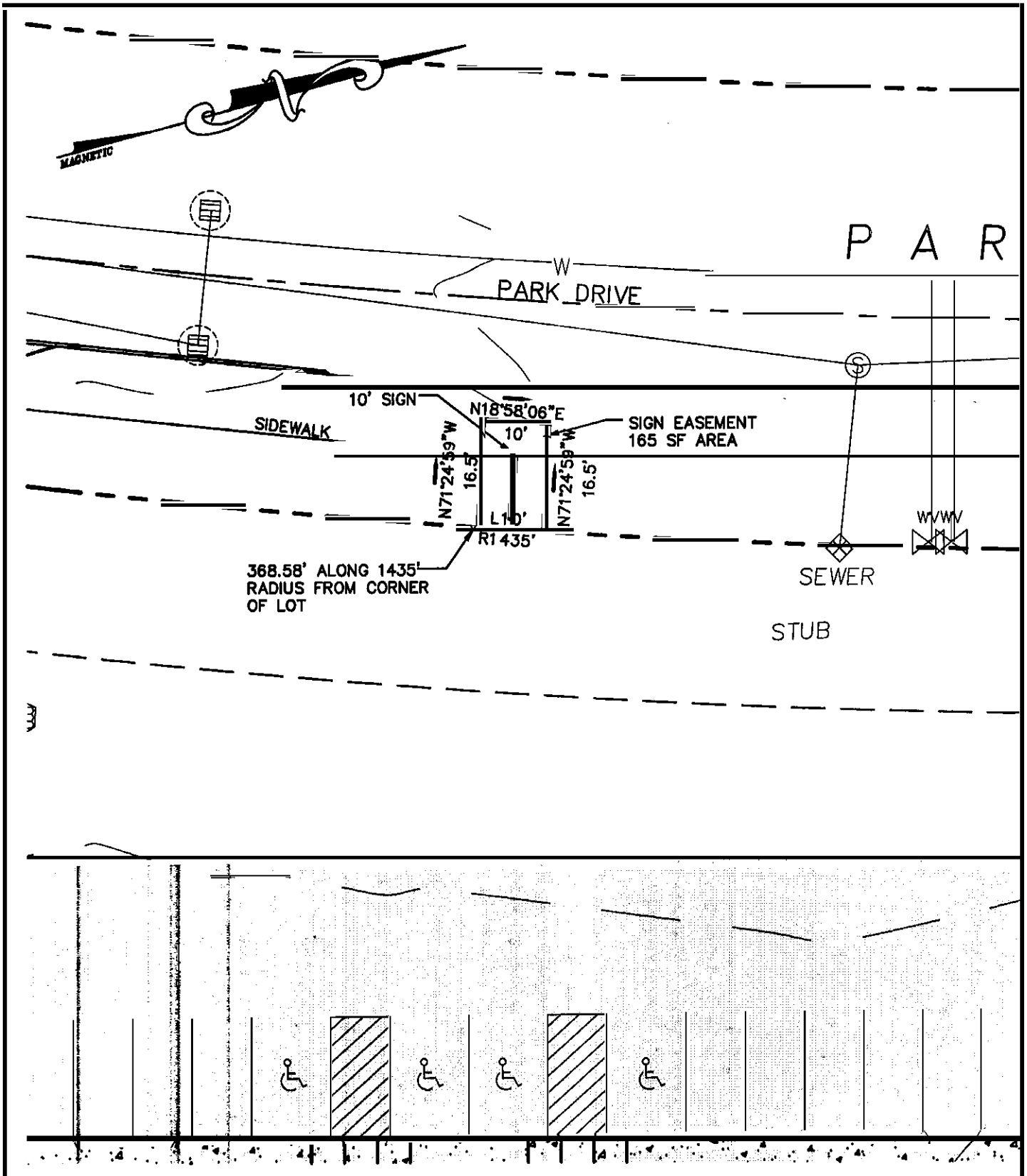
Dated: 10/19/06

The above-named (Grantor) personally appeared before me this 19th day of October, 2006 and acknowledged the foregoing instrument to be his free act and deed.

Rose M. Woodd

Notary Public/Attorney at Law
Printed Name: Rose M. Woodd
My Commission Expires:

Rose M. Woodd
Notary Public, Maine
My Commission Expires June 4, 2011

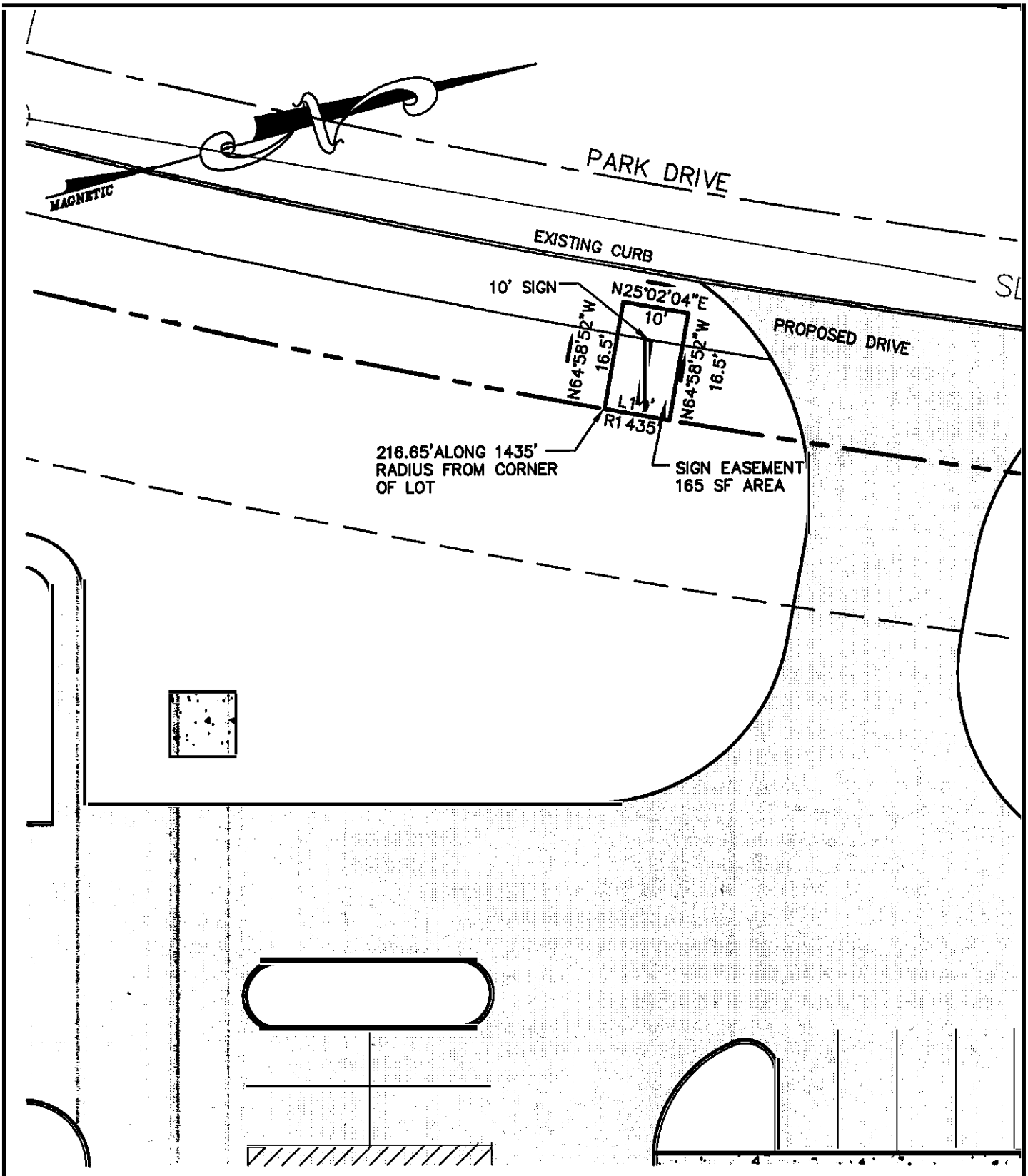


SHEET: 1 OF 1

SITELINES
ENGINEERS PLANNERS
8 CUMBERLAND ST. BRUNSWICK, ME 04011
(207) 725-1200 FAX 725-1114

SIGN EASEMENT AREA 1
LOTS 11 AND 12
LOT 12, PARK DRIVE LLC
TOPSHAM FAIR MALL EXPANSION

DATE: 10-02-06
SCALE: 1"=20'
JOB: 797
FILE: 797Final

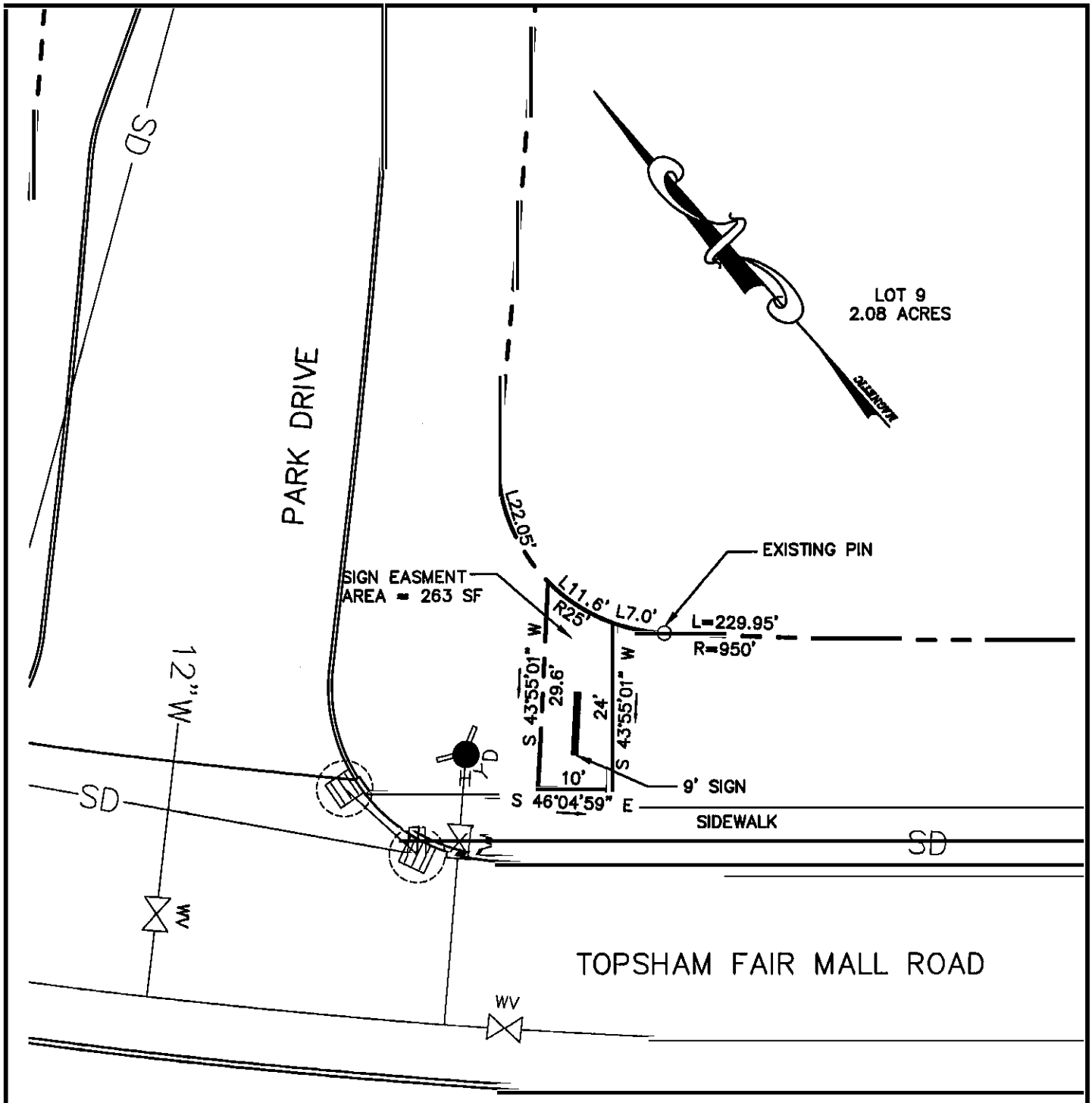


SHEET: 1 OF 1

SITELINES
ENGINEERS PLANNERS
8 CUMBERLAND ST. BRUNSWICK, ME 04011
(207) 725-1200 FAX 725-1114

SIGN EASEMENT AREA 2
LOTS 11 AND 12
LOT 12, PARK DRIVE LLC
TOPSHAM FAIR MALL EXPANSION

DATE: 10-02-06
SCALE: 1"=20'
JOB: 797
FILE: 797Final

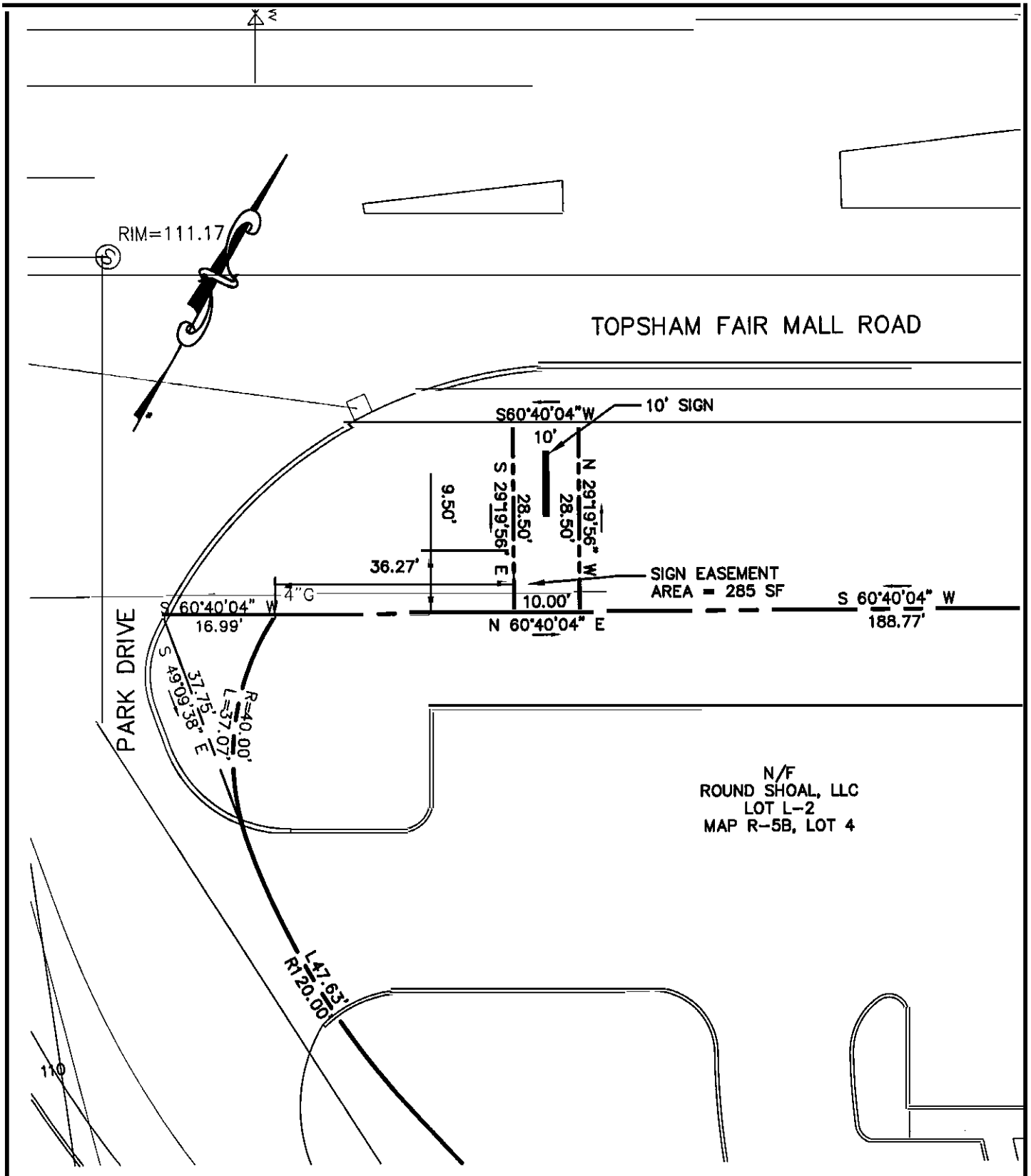


SHEET: 1 OF 1

SITELINES
ENGINEERS PLANNERS
8 CUMBERLAND ST. BRUNSWICK, ME 04011
(207) 725-1200 FAX 725-1114

SIGN EASEMENT AREA 3
LOT 9
LOT 12, PARK DRIVE LLC
TOPSHAM FAIR MALL EXPANSION

DATE: 10-02-06
SCALE: 1"=20'
JOB: 797
FILE: 797_9_Sign_Ease



SHEET: 1 OF 1

SITELINES
ENGINEERS PLANNERS
8 CUMBERLAND ST. BRUNSWICK, ME 04011
(207) 725-1200 FAX 725-1114

SIGN EASEMENT AREA 4
LOTS G AND H
LOT 12, PARK DRIVE LLC
TOPSHAM FAIR MALL

DATE: 10-02-06
SCALE: 1"=20'
JOB: 797
FILE: 740Base_2005

SAGADAHOC COUNTY
Barbara J. Trott

Stormwater Narrative – Park Drive Residences
80 Unit Residential Apartment Project
Park Drive, Topsham, Maine

Belanger Engineering is preparing a Stormwater report for the proposed Park Drive Residences project located Merryman Way and Park Drives in Topsham. The project parcel is approximately 5.10 acres in size. The site is located on the east side of Park Drive and is located adjacent to the Goodwill Retail Store along Park Drive. The property is owned by Dan Catlin under the entity Park Drive Lot 12 LLC. and is shown on Town Tax Map R5 Lots 21D-18 and 21D-19. The developer proposes to create 80 residential apartment units together with utilities to support them. The two parcels Lot 11 and Lot 12 are part of the Topsham Fair Mall Subdivision Project. Maine DEP approved the original expansion in 2006. (See Order #L-7554-23-AQ-C). A couple of minor revisions also occurred at this site.

The parcels are located behind the existing residential lots along Forest Glen Way and adjacent to existing commercial development along Park Drive. The parcels have frontage on Park Drive and Merryman Way. The parcels are currently substantially developed with buildings and pavement that support an existing Goodwill retail store as well as a 25,000 s.f. future retail building that was never constructed. All the utilities and parking associated for this building has been constructed. The existing conditions site currently supports 2.38 acres of Impervious Area and 3.61 acres of developed area.

The proposed re-development project is located over existing previously approved impervious and developed areas. The developer proposes to construct four (4) - 60'X75', 4 story, 20 unit, apartment buildings. The project will utilize existing pavement and parking limits constructed for the previous building to the extent feasible. Catch basins, storm drains, and outlets will be used to support drainage for the new project. The storm drains currently outlet to an existing filter pond located along Park Drive. The project existing and proposed paved areas will continue to drain to this pond for treatment.

EXISTING IMPERVIOUS AREA: PRE DEVELOPMENT

EXISTING IMPERVIOUS AREA:	68,787 S.F. = 1.58 ACRES
EXISTING BUILDING (GOODWILL) TO REMAIN:	13,812 S.F. = 0.32 ACRES
APPROVED FUTURE BUILDING:	21,073 S.F. = 0.57 ACRES
TOTAL IMPERVIOUS:	103,672 S.F. = 2.38 ACRES
EXISTING DEVELOPED AREA:	157,252 S.F. = 3.61 ACRES

PROPOSED IMPERVIOUS AREA: POST DEVELOPMENT

EXISTING IMPERVIOUS AREA TO REMAIN:	24,079 S.F. =	0.55 ACRES
EXISTING BUILDING (GOODWILL) TO REMAIN:	13,812 S.F. =	0.32 ACRES
PROPOSED PAVED AREAS:	62,742 S.F. =	1.44 ACRES
PROPOSED BUILDINGS (4 - 60'X75') =	18,000 S.F. =	0.41 ACRES
TOTAL IMPERVIOUS AREA:	118,633 S.F. = 2.72 ACRES	
PROPOSED DEVELOPED AREA:	179,467 S.F. = 4.12 ACRES	

NET CHANGE IN IMPERVIOUS AREA: 118,633 S.F. – 103,672 S.F. = 14,961 S.F. = +0.34 ACRES.

Based on discussion with staff, we have added upper watershed development areas and included them in the enclosed Hyrdocad calculations to measure quantity results for the watersheds culvert crossing Park Drive and Topsham Fair Mall Road. The watershed drains to an existing 24" culvert crossing Topsham Fair Mall Road. The hydrocad model includes these areas for quantity control calculations and measures the results. See Flooding Standard below.

The Town of Topsham has delegated review authority over stormwater projects. This project triggers a condition compliance review by Maine DEP with the addition of 0.34 acres of additional impervious area and 0.14 acres of developed area. It is our understanding that Tom Saucier will provide a review on behalf of the Town and DEP for this project. We are submitting the appropriate minor revision and condition compliance application as required. To provide quality treatment for the site we anticipate using the existing filter pond that was sized to treat the development. In addition, we will install roof driplines along the new apartment buildings to supplement existing pond treatment.

DEP Jurisdiction: The proposed project includes the re-development of an approved plan. The new project replaces a previously approved 25,000 s.f. building. The new project creates 0.14 acres of developed area and the creation of 0.34 acres of impervious area. The original project created 2.38 acres of impervious area and 3.61 acres of developed area. After development the sites will support 2.72 acres of impervious area and 4.12 acres of development on Lots 11 and 12. The project does trigger the Site Law due to the Topsham Fair Mall subdivision expansion. The project is not located within the urban impaired stream watershed. The urban impaired stream standards are not required for this project. The project is not located within a lake or severely blooming lake watershed. As a result, the Basic Standards, General Standards, and Flooding standards apply to this project as it applies to DEP thresholds.

Basic Standards
1. Erosion and sedimentation control plan – See Appendix A of Chapter 500 Rules
2. Inspection and Maintenance Plan – See Appendix A and B of Chapter 500 Rules
3. Housekeeping – See Appendix C of the Chapter 500 Rules

General Standards
1. Narrative
2. Drainage Plans
3. Calculations
4. Details, designs, and specifications for Underdrained grass filters and Wet Ponds.

Flooding Standards
1. Stormwater Management System must detain, retain, or result in infiltration of stormwater for the 2, 10, 25 storms such that the peak flows do not exceed "pre-development" conditions.

Existing Conditions

The existing lot is 5.10 acres in size and is currently fully developed. The site currently supports the Goodwill Retail Store and a future pad site located on Lot 12. All the utilities, infrastructure and parking has been installed to support the 25,000 s.f. building. This area is being redeveloped with the proposed apartment project. The site drains in a generally westerly direction across the property to the existing filter pond built to serve the development. This property drains toward the Topsham Fair Mall Road and an existing 24" culvert draining the wetland and stream below Park Drive (off site). The property drains toward off site small streams via existing storm drains adjacent to Park Drive.

Proposed Conditions

The developer proposes to create 80 residential units, in 4 buildings, together with parking and utilities to support them. The project will be constructed in Phases. The developer's plan is to build the two buildings adjacent to Merryman Way first (Buildings 2 and 3). The parking and utilities will be completed and improvements along Merry Way will be completed. The existing entrance and parking around Goodwill will remain the same for this phase. Once the developer is ready, the last two building will be built in the later phases. At this point the existing Park Drive entrance will be shifted and re-aligned to provide truck circulation as well as parking for Goodwill and the Apartments project. The proposed project includes the development of 0.14 acres of new developed area and the creation of 0.34 acres of road impervious area.

Project Location: The project is located off Merryman Way and Park Drives, in Topsham, Maine.
Surface water on or abutting the site: No wetlands exist within the development area. Stormwater from the site flows into an existing filter pond constructed to support the development. Stormwater drains toward Park Drive and Topsham Fair Mall Road. Eventually Stormwater discharges into the Androscoggin River.
Alterations to Land Cover: The drainage study is conducted on the watersheds 46.91 acres. The existing ground cover, prior to November 2005 is 0% impervious, 0% Lawn, 100% woods and meadow. The existing ground cover will result in approximately: 48% impervious, 24% lawn, and 28% woods.
Downstream ponds and Lakes: Stormwater from the site flows into the street which discharges to a small stream downstream, and then flows to the Androscoggin River. Enclosed is a U.S.G.S. Map showing the site location.
Historic Flooding: The site are not located in the Flood Zone.
Alterations to natural drainage ways: Natural drainage ways will not be altered as a result of the proposed development. Culverts will be installed to maintain current drainage flow patterns.

General Standard Calculations:

The project is required to treat the site impervious and developed area. Two BMP's are being utilized to treat impervious and developed areas as far as practical. An existing filter pond is located on site and will provide treatment for the project. In addition, roof driplines will be created around each new building to provide roof treatment and storage. Certain areas cannot practically receive treatment.

The treatment area summary and general standard calculations are attached and are shown on the stormwater post plans. As described in the attached calculations, the existing project captures 95% of the projects impervious area and 83% of the projects developed areas. The proposed project provides treatment for 96% of the site impervious area and 85% of the site developed area. As stated, the front entrance drains directly onto Park Drive and is not captured and treated by the pond. As requested, we have added a catch basin (CB1) to capture as much pavement as possible in this area. In addition, the Goodwill building loading dock, drains to the pond for treatment. Approximately 0.12 acres cannot be practically captured.

The project as developed meets or exceeds the General Standards as outlined in the Chapter 500 stormwater rules.

Proposed BMP's: Silt fence is shown at the bottom of all slopes, hay bale barriers at the top of slopes and in ditches are provided. Other BMP's proposed for this project are described below.

Under drained Filter Pond – Pond 6P

One (1) filter has been constructed on site to support the project. The filter pond has been sized to store 0.4" X the impervious area to utilize the TSS sliding scale capture thresholds. In this case the pond was sized for the previously approved area (2.38 acres) and was designed to remove 69% TSS. Overall the project had a removal rate of 63% which exceeds the 54% removal rate required by the sliding scale TSS standards. An emergency outlet control structure has been installed in the pond to provide emergency overflow. An earth emergency spillway is installed for an overflow to Park Drive when breached. The filter underdrain outlets into a separate catch basin in Park Drive. The pond captures enough area to meet the 95% capture threshold (96%) but the pond volumes are less than the 1" volume current standards. However, the pond treats less impervious area than originally designed. The DEP orders provided indicate the pond was inspected in 2015 and the pond was working as intended. The pond will continue to provide effective treatment of stormwater as intended.

Park Drive Residences					
Grassed Underdrained Soil Filter Pond Design Criteria - Hydrocad Pond 6P - Original Pond Size 69% Sliding Scale TSS					
	acres	s.f.			
Impervious Area Draining to Pond	2.38	103672.8			
Lawn Area draining to Pond	0.55	23958			
Total Area	**2.93**	Acres			
69% Sliding Scale TSS Minimum Treatment Volume	0.4" X Impervious Area + 0.4" X Lawn			**4212**	c.f.
Pond Storage Volume Provided				**7105**	✓

Park Drive Residences					
Grassed Underdrained Soil Filter Pond Design Criteria - Hydrocad Pond 6P					
	acres	s.f.			
Impervious Area Draining to Pond	2.19	95396.4			
Lawn Area draining to Pond	0.55	23958			
Total Area	**2.74**	Acres			
General Standard 95% Minimum Treatment Volume	1" X Impervious Area + 0.4" X Lawn			**8709**	c.f.
69% Sliding Scale TSS Minimum Treatment Volume	0.4" X Impervious Area + 0.4" X Lawn			**3939**	c.f.
Pond Storage Volume Provided				**7105**	✓

Roof Driplines – Apartment Building Roofs

Roof driplines will capture roof areas and drain them through foundation backfill and discharge to footing drains. The roof dripline will be 3' wide and 1.5' deep and will be installed in roof drainage areas. Once treated, 4" drain pipes will outlet into the pond or site catch basin. The roof driplines will store 1" X roof areas utilizing 40% voids. Four Apartment buildings will have roof driplines and footing drains.

Flooding Standard

Modeling assumptions: The flooding standard is required with this development because the Town of Topsham requires the project meet the pre-developed peak flows for the 2, 10, & 25 year storms and the project is part of a DEP site law permit. We have modeled the pond area to demonstrate that the outlets have the required storage volume capacity and that they will pass the 25 year storm event without flooding the pond embankments. The "HydroCad" computer program was used to determine the peak storm water runoff for the pre- and post-development conditions. HydroCad is a storm water modeling system, which utilizes the TR-20 method developed by the Soil Conservation Service (SCS).

The design assumptions used for this project are:

Design storm: 24 hour, Type III rainfall distribution.

Rainfall: 24 hour precipitation values from U.S. Weather Bureau Technical Release No. 40:
2 year storm = 3.2 inches
10 year storm = 4.6 inches
25 year storm = 5.7 inches
100 year storm = 7.8 inches

Site specific parameters for the project are listed below:

Soils: Soils information to determine the hydrologic soil group for the site, are derived from the Soil Survey of Sagadahoc County by the United States Department of Agriculture Soil Conservation Service. The soils and hydrologic group are listed below:

Soil Classification	Hydrologic Group
Adams – AaC, AaB	"A"
Buxton – BuC2	"C"
Hollis - HrC	"C/D"
Elmwood - EmB	"C"
Walpole - Wa	"C"
Ninigret – NgB	"B"

Ground Cover:

Pre-& Post Development: The watershed ground cover is modeled as woods, grass, and impervious.

Cover Description	Curve Number:
Impervious	98
Woods	30-70
Lawn	74

PRE- & POST-DEVELOPMENT HYDROLOGIC RESULTS

FLOODING STANDARD RESULTS Pond 6P			
Storm	PRE	POST	DIFFERENCE
	C.F.S.	C.F.S.	
2 YEAR	6.47	6.39	-0.08
10 YEAR	7.24	7.27	0.03
25 YEAR	9.4	7.76	-1.64
50 YEAR	15.6	11.21	-4.39
100 YEAR	23.95	14.58	-9.37

Pre Pond 6P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	114.27
10 YEAR	114.67
25 YEAR	115.06
100 YEAR	115.26

Post Pond 6P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	114.26
10 YEAR	114.71
25 YEAR	115.32
100 YEAR	115.7

Pond 6P is the existing filter pond located adjacent to Park Drive. The site improvements drain to this pond for treatment and storage. The pond outlets to the street which is the point where the site crosses the property line. As shown above, this outlet meets the pre development peak flows for the 2 and 25 year storms as required. This outlet crosses Merryman Way and Outlets to Pond 1P shown below.

FLOODING STANDARD RESULTS Pond 1P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE
2 YEAR	7.52	7.62	0.10
10 YEAR	14.86	14.9	0.04
25 YEAR	19.08	18.43	-0.65
50 YEAR	22.92	22.79	-0.13
100 YEAR	27.15	27.18	0.03

Pre Pond 1P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	95.51
10 YEAR	96.65
25 YEAR	97.65
100 YEAR	100.27

Post Pond 1P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	95.52
10 YEAR	96.66
25 YEAR	97.48
100 YEAR	100.28

Pond 1P is the existing 24” culvert that crosses Park Drive. The 2 year flow shows a minor 0.10 cfs increase (less than 1% increase) which is considered negligible in the calculations. The peak elevations for the pre and post conditions did not change significantly at this culvert location. This outlet crosses Park Drive and Outlets to Pond 100P shown below.

FLOODING STANDARD RESULTS Pond 100P			
Storm	PRE C.F.S.	POST C.F.S.	DIFFERENCE
2 YEAR	21.94	22	0.06
10 YEAR	30.3	30.31	0.01
25 YEAR	36.24	36.17	-0.07
50 YEAR	40.55	40.49	-0.06
100 YEAR	43.68	43.6	-0.08

Pre Pond 100P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	75.2
10 YEAR	77.11
25 YEAR	78.84
100 YEAR	81.44

Post Pond 100P Summary	
Storm	Flood Elevation (ft.)
2 YEAR	75.2
10 YEAR	77.11
25 YEAR	78.82
100 YEAR	81.41

Pond 100P is located off site downstream of Park Drive. Pond 100P is an existing 24" culvert passing under Topsham Fair Mall Road. As shown above, this outlet meets the pre development peak flows for the 25 and 100 year storms which exceeds the standard. The 2 year even shows a minor .06 cfs increase which is less than 1% and considered insignificant. The peak elevations at the culvert inlet did not change. The pre and post development plans show the 100 year flooding area. This project has minimal impact on flooding behind the existing culvert at Topsham Fair Mall Road. Peak flooding during the 100 year event is contained within the adjacent ravine areas. The culvert temporarily may back flood but we expect it to drain within 24 hours. This project meets the pre development peak flows as required by the Town and DEP standards.

Conclusions and Recommendations:

Basic Standards

The Basic Standards will be met with the proposed erosion control plans and stabilization details provided. Site development will follow best management practices. The site is currently substantially developed. Silt fence or erosion control mix will be installed downslope of developed areas as required. The existing will be maintained and is stable. We submit that the Basic Standards are being met for this development.

Flooding Standards

The above analysis points are located where the project crosses the property line and points of interest where flows converge downstream. Peak flows have been reduced through the development of One (1) treatment pond which serve both water quality and quantity control. In addition, each apartment building will have a roof dripline for stormwater treatment and storage. The 10, 25, and 100 year storms meet the pre-development peak flow as required. The 2 year flow shows a minor .10 cfs increase (less than 1% increase) which is considered negligible in the calculations. The peak elevations for the pre and post conditions did not change at this culvert location. The proposed structures have the capacity to control flow from the 100 year storm which exceeds the Flooding Standard and Town of Topsham control requirements. As a result, the project does not significantly impact downstream structures or properties. We submit that the Flooding Standard has been met or exceeded with this development.

General Standards

The project is being constructed in Phases and has been designed to capture a minimum of 95% impervious area and 80% developed area as required in the Chapter 500 rules. Some areas cannot be practically captured. The General Standard calculations are included at the end of this report. The project will capture 96% of the project impervious area and 85% of the developed area to meet the General Standards after development is complete. Some areas as noted cannot be practically be treated but have captured enough to meet the minimum standards. Portions of the existing Park Drive entrance cannot be practically captured within the storm drain system and delivered to a pond for treatment. We have added CB1 to capture additional area as suggested by the Town review engineer. The Goodwill loading dock drains to the pond for treatment. Only 0.12 acres of impervious area does not get treated. The pond and roof driplines capture and treats 2.64 acres of imperious area.

The existing filter pond was sized with the previous sliding scale TSS rules prior to the rule change in 2005. The pond was designed to handle the sites quality and quantity standards. According to the DEP orders, the filter pond was designed to remove 69% TSS for the 0.4" runoff from 2.38 acres of new impervious area. The pond achieved a removal rate of 63% for the site as a whole which exceeded the 54% removal rate required by the sliding scale TSS standards.

The existing pond has volumes that exceed the minimum requirements for the sliding scale TSS standards approved with the project in 2006. DEP reviewed the pond in 2015 and found it to be working as intended. The treatment pond has been constructed and is working properly. The pond met the appropriate standards at the time for a larger treatment area. Maine DEP found the pond to be in good working order when the project submitted a minor revision for the project in 2015 after the rules change. The proposed changes reduce the impervious area being treated by the pond. In addition, a roof dripline has been added at each apartment building to provide treatment of the new buildings. It is noted, that 6333 s.f. pavement will be removed and replaced with new buildings. The pond is treating less pavement and impervious area. Roof dripline BMP's has been added to provide building roof treatment. We believe the project exceeds the minimum General Standard requirements. We submit the existing pond has the capacity and ability to provide effective stormwater treatment for this project.

We submit that the project meets the Basic, General, and Flooding standards as required by Maine DEP and the Flooding standard as required by the Town of Topsham Zoning. No further treatment is required for this development.

Maintenance:

PART 1: RESPONSIBILITY FOR MAINTENANCE

Park Drive, Lot 12, LLC (Dan Catlin - Developer) will be responsible for maintenance of the stormwater system. An agreement for maintenance has been completed with Goodwill Retail Facility on Lot 11.

PART 2: INSPECTIONS – During Construction and Post Construction

- Detention Facilities: Under drained grass filters (1 pond)
  - Embankment inspection and maintenance
  - Spillway maintenance
  - Sediment removal and disposal

- Ditches, Swales, or other open stormwater channels
  - Embankment inspection and maintenance
  - Channel inspection
  - Sediment removal and disposal

- Culverts, catch basins, stormwater control structures
  - Embankment inspection and maintenance
  - Inlet and Outlet inspection
  - Debris removal and disposal

- Roof Dripline Filter BMP Maintenance
  - Sediment removal and disposal
  - Filter and Underdrain replacement
  - Debris removal and disposal
  - Stone Dripline Replacement
  - Foundation Sealant
  - Foundation Backfill

The owners' representative will inspect the filter/detention/wet ponds, swales, channels, stormwater structures to determine if the soil blockage or impaired capacity to pass flow exists. Inspections will be performed on a monthly basis from March to November and quarterly during the remainder of the year. A record of inspections and maintenance or corrective measures shall be kept by the owner (see part 4). Note the road system drainage is maintained by the Town. Maintenance by the developer will be limited to Pond Maintenance and filter restoration and site stabilization. The ponds will not be maintained by the Town.

PART 3: MAINTENANCE AND CLEANING

The owner will regularly inspect for sediment accumulation, obstructions, debris, and other potential causes for operational difficulty in the conveyance and detention system as described in Part 2. Immediate action shall be taken to remedy detrimental obstructions. This may include pond sediment removal and filter replacement to allow filtration to resume.

Cleaning out of catch basins, culvert cleaning, and other means necessary to ensure the stormwater system is maintained. Maintenance tasks completed shall be recorded on the Log sheet and presented to DEP when requested.

- Under drained filter maintenance one (1) pond proposed for Goodwill and Apartment Development:
  - Soil Filter Inspection
  - Soil Filter replacement
  - Sediment removal and disposal
  - Mowing
  - Harvesting and Weeding

The owner will regularly inspect the soil filter after every major storm event in the first few months to ensure proper function. There after the filter should be inspected bi-annually to ensure that it is draining within 24 hours. The top several inches of the filter shall be replaced with fresh material when water ponds on the surface of the bed for more than 72 hours. Sediment shall be removed from the filter bed annually. The bed shall be hand raked and re-seeded as necessary. The removed sediment shall be hauled off site and disposed of in a stabilized area. Mowing of the filter area shall be limited to 2 times per year to maintain grass heights to less than 12". Weeding and pruning of growth within the filter zone will be completed as necessary.

- Detention Facilities: (One (1) pond is proposed to serve quantity treatment)

A mandatory scheduled maintenance will be performed every four weeks for a period of One hundred and twenty (120) days and will begin after satisfactory completion and acceptance of landscape construction. Ongoing maintenance will be required as necessary.

- Road Areas:

No roads are being developed with this project.

PART 4: RECORD KEEPING

The owner will maintain inspection records, with recordings of condition of basins, and pipes and annotation of substantial precipitation events or mitigating circumstances in the intervening time for trending to develop the anticipated preventive maintenance schedule.

PART 5: MAINTENANCE CONTRACT

Should proprietary devices be utilized, a maintenance contract will be established with the manufacturer for regular maintenance and cleaning of the device. None are being proposed for the Goodwill and Apartment development.

PART 6: RE-CERTIFICATION

The owner shall submit a certification to the Town of Topsham within three months of the expiration of each five year interval from the date of issuance of the permit. The owner shall submit the maintenance log which identifies inspections completed, erosion problems found, when corrective action was taken, and who completed the work. The certification will include a statement indicating that the stormwater system is working and is being maintained in working condition in accordance with the permit requirements.

Maintenance Log Sheet
Park Drive Residences Residential Development

Name	Maintenance Task Completed	Date

Housekeeping: Reference Appendix C of Chapter 500 Rules – Updated 2023

1. **Spill prevention.** Controls must be used to prevent pollutants from construction and waste materials stored on site to enter stormwater, which includes storage practices to minimize exposure of the materials to stormwater. The site contractor or operator must develop, and implement as necessary, appropriate spill prevention, containment, and response planning measures.

   NOTE: Any spill or release of toxic or hazardous substances must be reported to the Department. For oil spills, call 1-800-482-0777 which is available 24 hours a day. For spills of toxic or hazardous material, call 1-800-452-4664 which is available 24 hours a day. For more information, visit the Department's website at : http://www.maine.gov/dep/spills/emergspillresp/

2. **Groundwater protection.** During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials. Any project proposing infiltration of stormwater must provide adequate pre-treatment of stormwater prior to discharge of stormwater to the infiltration area, or provide for treatment within the infiltration area, in order to prevent the accumulation of fines, reduction in infiltration rate, and consequent flooding and destabilization.

   See Appendix D for license by rule standards for infiltration of stormwater.

   NOTE: Lack of appropriate pollutant removal best management practices (BMPs) may result in violations of the groundwater quality standard established by 38 M.R.S.A. §465-C(1).

3. **Fugitive sediment and dust.** Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control, but other water additives may be considered as needed. A stabilized construction entrance (SCE) should be included to minimize tracking of mud and sediment. If off-site tracking occurs, public roads should be swept immediately and no less than once a week and prior to significant storm events. Operations during dry months, that experience fugitive dust problems, should wet down unpaved access roads once a week or more frequently as needed with a water additive to suppress fugitive sediment and dust.

   NOTE: Dewatering a stream without a permit from the Department may violate state water quality standards and the *Natural Resources Protection Act*.

4. **Debris and other materials.** Minimize the exposure of construction debris, building and landscaping materials, trash, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials to precipitation and stormwater runoff. These materials must be prevented from becoming a pollutant source.

   NOTE: To prevent these materials from becoming a source of pollutants, construction and post-construction activities related to a project may be required to comply with applicable provision of rules related to solid, universal, and hazardous waste, including, but not limited to, the Maine solid waste and hazardous waste management rules; Maine hazardous waste management rules; Maine oil conveyance and storage rules; and Maine pesticide requirements.

5. **Excavation de-watering.** Excavation de-watering is the removal of water from trenches, foundations, coffer dams, ponds, and other areas within the construction area that retain water after excavation. In most cases the collected water is heavily silted and hinders correct and safe construction practices. The collected water removed from the ponded area, either through gravity or pumping, must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved by the Department.

   NOTE: Dewatering controls are discussed in the "Maine Erosion and Sediment Control BMPs, Maine Department of Environmental Protection."

6. **Authorized Non-stormwater discharges.** Identify and prevent contamination by non-stormwater discharges. Where allowed non-stormwater discharges exist, they must be identified and steps should be taken to ensure the implementation of appropriate pollution prevention measures for the non-stormwater component(s) of the discharge. Authorized non-stormwater discharges are:

   (a) Discharges from firefighting activity;

   (b) Fire hydrant flushings;

   (c) Vehicle washwater if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage and transmission washing is prohibited);

   (d) Dust control runoff in accordance with permit conditions and Appendix (C)(3);

   (e) Routine external building washdown, not including surface paint removal, that does not involve detergents;

   (f) Pavement washwater (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used;

   (g) Uncontaminated air conditioning or compressor condensate;

   (h) Uncontaminated groundwater or spring water;

   (i) Foundation or footer drain-water where flows are not contaminated;

   (j) Uncontaminated excavation dewatering (see requirements in Appendix C(5));

   (k) Potable water sources including waterline flushings; and

   (l) Landscape irrigation.

7. **Unauthorized non-stormwater discharges .** The Department's approval under this Chapter does not authorize a discharge that is mixed with a source of non-stormwater, other than those discharges in compliance with Appendix C (6). Specifically, the Department's approval does not authorize discharges of the following:

   (a) Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds or other construction materials;

   (b) Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance;

   (c) Soaps, solvents, or detergents used in vehicle and equipment washing; and

   (d) Toxic or hazardous substances from a spill or other release.

(8) Additional requirements. Additional requirements may be applied on a site-specific basis. Stormwater pollution shall be prevented.

Summary for Subcatchment 6S: GOODWILL SITE AREA

Runoff = 8.81 cfs @ 12.01 hrs, Volume= 0.542 af, Depth> 2.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.20"

	Area (ac)	CN	Description
*	2.230	98	ON SITE IMPERVIOUS
*	0.510	74	ON SITE LAWN
*	0.070	74	OFF SITE LAWN
*	0.000	98	ON SITE BUILDING (SEE 9S) 0.41 AC
	2.810	93	Weighted Average
	0.580		20.64% Pervious Area
	2.230		79.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	46	0.0200	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"

Summary for Pond 1P: 24" CULVERT AT PARK DRIVE

Inflow Area = 13.250 ac, 38.57% Impervious, Inflow Depth > 1.09" for 2 YEAR event
Inflow = 7.58 cfs @ 12.10 hrs, Volume= 1.199 af
Outflow = 7.62 cfs @ 12.12 hrs, Volume= 1.194 af, Atten= 0%, Lag= 1.1 min
Primary = 7.62 cfs @ 12.12 hrs, Volume= 1.194 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 95.52' @ 12.12 hrs Surf.Area= 658 sf Storage= 916 cf

Plug-Flow detention time= 3.8 min calculated for 1.190 af (99% of inflow)
Center-of-Mass det. time= 2.3 min (841.4 - 839.1)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	105,871 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	500	0	0
96.00	708	1,208	1,208
98.00	1,037	1,745	2,953
100.00	3,501	4,538	7,491
105.00	9,197	31,745	39,236
110.00	17,457	66,635	105,871

Device	Routing	Invert	Outlet Devices
#1	Primary	94.10'	**24.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.10' / 92.70' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.45 cfs @ 12.12 hrs HW=95.50' (Free Discharge)
└**1=Culvert** (Inlet Controls 7.45 cfs @ 3.18 fps)

Summary for Pond 6P: EXISTING FILTER POND - GOOD WILL SITE

Inflow Area = 5.780 ac, 50.87% Impervious, Inflow Depth > 1.46" for 2 YEAR event
Inflow = 9.09 cfs @ 12.01 hrs, Volume= 0.703 af
Outflow = 6.39 cfs @ 12.08 hrs, Volume= 0.537 af, Atten= 30%, Lag= 4.3 min
Primary = 6.39 cfs @ 12.08 hrs, Volume= 0.537 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 114.26' @ 12.08 hrs Surf.Area= 5,570 sf Storage= 9,462 cf

Plug-Flow detention time= 109.2 min calculated for 0.537 af (76% of inflow)
Center-of-Mass det. time= 48.0 min (824.3 - 776.3)

Volume	Invert	Avail.Storage	Storage Description
#1	111.00'	31,022 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.00	584	0	0
112.00	1,633	1,109	1,109
113.00	3,561	2,597	3,706
114.00	5,131	4,346	8,052
115.00	6,795	5,963	14,015
116.00	8,446	7,621	21,635
117.00	10,327	9,387	31,022

Device	Routing	Invert	Outlet Devices
#1	Primary	110.20'	**12.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 110.20' / 108.60' S= 0.0127 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	113.80'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	115.30'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=6.37 cfs @ 12.08 hrs HW=114.26' (Free Discharge)
└**1=Culvert** (Passes 6.37 cfs of 6.94 cfs potential flow)
└**2=Orifice/Grate** (Weir Controls 6.37 cfs @ 2.21 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 9P: 4 APARTMENT DRIPLINES

Inflow Area = 0.410 ac,100.00% Impervious, Inflow Depth > 2.77" for 2 YEAR event
Inflow = 1.46 cfs @ 12.00 hrs, Volume= 0.095 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 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= 118.32' @ 20.00 hrs Surf.Area= 3,780 sf Storage= 4,128 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	115.80'	2,954 cf	**3.00'W x 105.00'L x 6.00'H Prismatoid** x 4 7,560 cf Overall - 176 cf Embedded = 7,384 cf x 40.0% Voids
#2	115.80'	176 cf	**6.0" Round Pipe Storage** x 4 Inside #1 L= 224.0' S= 0.0050 '/'
		3,130 cf	x 3.00 = 9,389 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir X 4.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=115.80' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 100P: 24" CULVERT AT TOPSHAM FAIR MALL ROAD

Inflow Area = 46.920 ac, 28.43% Impervious, Inflow Depth > 1.14" for 2 YEAR event
Inflow = 32.70 cfs @ 12.37 hrs, Volume= 4.443 af
Outflow = 22.00 cfs @ 12.74 hrs, Volume= 4.311 af, Atten= 33%, Lag= 22.2 min
Primary = 22.00 cfs @ 12.74 hrs, Volume= 4.311 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 75.22' @ 12.74 hrs Surf.Area= 16,090 sf Storage= 33,524 cf

Plug-Flow detention time= 29.2 min calculated for 4.297 af (97% of inflow)
Center-of-Mass det. time= 19.1 min (853.6 - 834.5)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	885,614 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	3,381	0	0
75.00	15,000	27,572	27,572
80.00	40,318	138,295	165,867
85.00	69,683	275,003	440,869
90.00	108,215	444,745	885,614

Device	Routing	Invert	Outlet Devices
#1	Primary	72.10'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 72.10' / 70.00' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=22.00 cfs @ 12.74 hrs HW=75.21' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 22.00 cfs @ 7.00 fps)

Summary for Subcatchment 6S: GOODWILL SITE AREA

Runoff = 13.38 cfs @ 12.01 hrs, Volume= 0.843 af, Depth> 3.60"

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

	Area (ac)	CN	Description
*	2.230	98	ON SITE IMPERVIOUS
*	0.510	74	ON SITE LAWN
*	0.070	74	OFF SITE LAWN
*	0.000	98	ON SITE BUILDING (SEE 9S) 0.41 AC
	2.810	93	Weighted Average
	0.580		20.64% Pervious Area
	2.230		79.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	46	0.0200	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"

Summary for Pond 1P: 24" CULVERT AT PARK DRIVE

Inflow Area = 13.250 ac, 38.57% Impervious, Inflow Depth > 2.10" for 10 YEAR event
Inflow = 14.95 cfs @ 12.51 hrs, Volume= 2.323 af
Outflow = 14.90 cfs @ 12.56 hrs, Volume= 2.316 af, Atten= 0%, Lag= 3.1 min
Primary = 14.90 cfs @ 12.56 hrs, Volume= 2.316 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 96.66' @ 12.56 hrs Surf.Area= 816 sf Storage= 1,781 cf

Plug-Flow detention time= 3.0 min calculated for 2.316 af (100% of inflow)
Center-of-Mass det. time= 1.9 min (824.0 - 822.1)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	105,871 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	500	0	0
96.00	708	1,208	1,208
98.00	1,037	1,745	2,953
100.00	3,501	4,538	7,491
105.00	9,197	31,745	39,236
110.00	17,457	66,635	105,871

Device	Routing	Invert	Outlet Devices
#1	Primary	94.10'	**24.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.10' / 92.70' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=14.89 cfs @ 12.56 hrs HW=96.66' (Free Discharge)
└**1=Culvert** (Inlet Controls 14.89 cfs @ 4.74 fps)

Summary for Pond 6P: EXISTING FILTER POND - GOOD WILL SITE

Inflow Area = 5.780 ac, 50.87% Impervious, Inflow Depth > 2.44" for 10 YEAR event
Inflow = 14.24 cfs @ 12.01 hrs, Volume= 1.175 af
Outflow = 7.27 cfs @ 12.17 hrs, Volume= 1.007 af, Atten= 49%, Lag= 9.3 min
Primary = 7.27 cfs @ 12.17 hrs, Volume= 1.007 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 114.71' @ 12.17 hrs Surf.Area= 6,319 sf Storage= 12,140 cf

Plug-Flow detention time= 81.6 min calculated for 1.004 af (85% of inflow)
Center-of-Mass det. time= 38.6 min (808.0 - 769.4)

Volume	Invert	Avail.Storage	Storage Description
#1	111.00'	31,022 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.00	584	0	0
112.00	1,633	1,109	1,109
113.00	3,561	2,597	3,706
114.00	5,131	4,346	8,052
115.00	6,795	5,963	14,015
116.00	8,446	7,621	21,635
117.00	10,327	9,387	31,022

Device	Routing	Invert	Outlet Devices
#1	Primary	110.20'	**12.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 110.20' / 108.60' S= 0.0127 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	113.80'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	115.30'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.27 cfs @ 12.17 hrs HW=114.71' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.27 cfs @ 9.26 fps)
└**2=Orifice/Grate** (Passes 7.27 cfs of 14.45 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 9P: 4 APARTMENT DRIPLINES

Inflow Area = 0.410 ac,100.00% Impervious, Inflow Depth > 4.05" for 10 YEAR event
Inflow = 2.11 cfs @ 12.00 hrs, Volume= 0.139 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 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= 119.58' @ 20.00 hrs Surf.Area= 3,780 sf Storage= 6,033 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	115.80'	2,954 cf	**3.00'W x 105.00'L x 6.00'H Prismatoid** x 4 7,560 cf Overall - 176 cf Embedded = 7,384 cf x 40.0% Voids
#2	115.80'	176 cf	**6.0" Round Pipe Storage** x 4 Inside #1 L= 224.0' S= 0.0050 '/'
		3,130 cf	x 3.00 = 9,389 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir X 4.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=115.80' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 100P: 24" CULVERT AT TOPSHAM FAIR MALL ROAD

Inflow Area = 46.920 ac, 28.43% Impervious, Inflow Depth > 2.14" for 10 YEAR event
Inflow = 58.37 cfs @ 12.37 hrs, Volume= 8.370 af
Outflow = 30.31 cfs @ 12.97 hrs, Volume= 8.206 af, Atten= 48%, Lag= 36.4 min
Primary = 30.31 cfs @ 12.97 hrs, Volume= 8.206 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 77.11' @ 12.97 hrs Surf.Area= 25,706 sf Storage= 86,051 cf

Plug-Flow detention time= 35.3 min calculated for 8.178 af (98% of inflow)
Center-of-Mass det. time= 28.3 min (847.9 - 819.7)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	885,614 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	3,381	0	0
75.00	15,000	27,572	27,572
80.00	40,318	138,295	165,867
85.00	69,683	275,003	440,869
90.00	108,215	444,745	885,614

Device	Routing	Invert	Outlet Devices
#1	Primary	72.10'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 72.10' / 70.00' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=30.30 cfs @ 12.97 hrs HW=77.11' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 30.30 cfs @ 9.65 fps)

Summary for Subcatchment 6S: GOODWILL SITE AREA

Runoff = 16.93 cfs @ 12.01 hrs, Volume= 1.081 af, Depth> 4.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.70"

	Area (ac)	CN	Description
*	2.230	98	ON SITE IMPERVIOUS
*	0.510	74	ON SITE LAWN
*	0.070	74	OFF SITE LAWN
*	0.000	98	ON SITE BUILDING (SEE 9S) 0.41 AC
	2.810	93	Weighted Average
	0.580		20.64% Pervious Area
	2.230		79.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	46	0.0200	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"

Summary for Pond 1P: 24" CULVERT AT PARK DRIVE

Inflow Area = 13.250 ac, 38.57% Impervious, Inflow Depth > 2.96" for 25 YEAR event
Inflow = 18.51 cfs @ 12.51 hrs, Volume= 3.266 af
Outflow = 18.43 cfs @ 12.57 hrs, Volume= 3.259 af, Atten= 0%, Lag= 3.3 min
Primary = 18.43 cfs @ 12.57 hrs, Volume= 3.259 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 97.48' @ 12.57 hrs Surf.Area= 952 sf Storage= 2,501 cf

Plug-Flow detention time= 2.8 min calculated for 3.259 af (100% of inflow)
Center-of-Mass det. time= 2.0 min (818.2 - 816.2)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	105,871 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	500	0	0
96.00	708	1,208	1,208
98.00	1,037	1,745	2,953
100.00	3,501	4,538	7,491
105.00	9,197	31,745	39,236
110.00	17,457	66,635	105,871

Device	Routing	Invert	Outlet Devices
#1	Primary	94.10'	**24.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.10' / 92.70' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=18.42 cfs @ 12.57 hrs HW=97.48' (Free Discharge)
└**1=Culvert** (Inlet Controls 18.42 cfs @ 5.86 fps)

Summary for Pond 6P: EXISTING FILTER POND - GOOD WILL SITE

Inflow Area = 5.780 ac, 50.87% Impervious, Inflow Depth > 3.25" for 25 YEAR event
Inflow = 18.33 cfs @ 12.01 hrs, Volume= 1.565 af
Outflow = 7.76 cfs @ 12.40 hrs, Volume= 1.396 af, Atten= 58%, Lag= 23.6 min
Primary = 7.76 cfs @ 12.40 hrs, Volume= 1.396 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 115.32' @ 12.40 hrs Surf.Area= 7,322 sf Storage= 16,266 cf

Plug-Flow detention time= 71.9 min calculated for 1.391 af (89% of inflow)
Center-of-Mass det. time= 36.9 min (802.7 - 765.8)

Volume	Invert	Avail.Storage	Storage Description
#1	111.00'	31,022 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.00	584	0	0
112.00	1,633	1,109	1,109
113.00	3,561	2,597	3,706
114.00	5,131	4,346	8,052
115.00	6,795	5,963	14,015
116.00	8,446	7,621	21,635
117.00	10,327	9,387	31,022

Device	Routing	Invert	Outlet Devices
#1	Primary	110.20'	**12.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 110.20' / 108.60' S= 0.0127 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	113.80'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	115.30'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.75 cfs @ 12.40 hrs HW=115.32' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.69 cfs @ 9.79 fps)
└**2=Orifice/Grate** (Passes 7.69 cfs of 18.64 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.06 cfs @ 0.34 fps)

Summary for Pond 9P: 4 APARTMENT DRIPLINES

Inflow Area = 0.410 ac,100.00% Impervious, Inflow Depth > 5.06" for 25 YEAR event
Inflow = 2.62 cfs @ 12.00 hrs, Volume= 0.173 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 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= 120.57' @ 20.00 hrs Surf.Area= 3,780 sf Storage= 7,523 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	115.80'	2,954 cf	**3.00'W x 105.00'L x 6.00'H Prismatoid** x 4 7,560 cf Overall - 176 cf Embedded = 7,384 cf x 40.0% Voids
#2	115.80'	176 cf	**6.0" Round Pipe Storage** x 4 Inside #1 L= 224.0' S= 0.0050 '/'
		3,130 cf	x 3.00 = 9,389 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir X 4.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=115.80' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 100P: 24" CULVERT AT TOPSHAM FAIR MALL ROAD

Inflow Area = 46.920 ac, 28.43% Impervious, Inflow Depth > 2.99" for 25 YEAR event
Inflow = 75.99 cfs @ 12.37 hrs, Volume= 11.700 af
Outflow = 36.17 cfs @ 13.14 hrs, Volume= 11.513 af, Atten= 52%, Lag= 46.4 min
Primary = 36.17 cfs @ 13.14 hrs, Volume= 11.513 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 78.82' @ 13.14 hrs Surf.Area= 34,330 sf Storage= 133,159 cf

Plug-Flow detention time= 42.3 min calculated for 11.475 af (98% of inflow)
Center-of-Mass det. time= 36.4 min (849.4 - 812.9)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	885,614 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	3,381	0	0
75.00	15,000	27,572	27,572
80.00	40,318	138,295	165,867
85.00	69,683	275,003	440,869
90.00	108,215	444,745	885,614

Device	Routing	Invert	Outlet Devices
#1	Primary	72.10'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 72.10' / 70.00' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=36.17 cfs @ 13.14 hrs HW=78.82' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 36.17 cfs @ 11.51 fps)

Summary for Subcatchment 6S: GOODWILL SITE AREA

Runoff = 23.66 cfs @ 12.01 hrs, Volume= 1.535 af, Depth> 6.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=7.80"

	Area (ac)	CN	Description
*	2.230	98	ON SITE IMPERVIOUS
*	0.510	74	ON SITE LAWN
*	0.070	74	OFF SITE LAWN
*	0.000	98	ON SITE BUILDING (SEE 9S) 0.41 AC
	2.810	93	Weighted Average
	0.580		20.64% Pervious Area
	2.230		79.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	46	0.0200	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"

Summary for Pond 1P: 24" CULVERT AT PARK DRIVE

Inflow Area = 13.250 ac, 38.57% Impervious, Inflow Depth > 4.71" for 100 YEAR event
Inflow = 29.80 cfs @ 12.46 hrs, Volume= 5.204 af
Outflow = 27.18 cfs @ 12.62 hrs, Volume= 5.196 af, Atten= 9%, Lag= 9.8 min
Primary = 27.18 cfs @ 12.62 hrs, Volume= 5.196 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.28' @ 12.62 hrs Surf.Area= 3,821 sf Storage= 9,274 cf

Plug-Flow detention time= 3.4 min calculated for 5.178 af (100% of inflow)
Center-of-Mass det. time= 2.8 min (810.1 - 807.3)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	105,871 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	500	0	0
96.00	708	1,208	1,208
98.00	1,037	1,745	2,953
100.00	3,501	4,538	7,491
105.00	9,197	31,745	39,236
110.00	17,457	66,635	105,871

Device	Routing	Invert	Outlet Devices
#1	Primary	94.10'	**24.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.10' / 92.70' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=27.17 cfs @ 12.62 hrs HW=100.28' (Free Discharge)
└**1=Culvert** (Inlet Controls 27.17 cfs @ 8.65 fps)

Summary for Pond 6P: EXISTING FILTER POND - GOOD WILL SITE

Inflow Area = 5.780 ac, 50.87% Impervious, Inflow Depth > 4.96" for 100 YEAR event
Inflow = 26.21 cfs @ 12.01 hrs, Volume= 2.391 af
Outflow = 14.58 cfs @ 12.17 hrs, Volume= 2.219 af, Atten= 44%, Lag= 9.3 min
Primary = 14.58 cfs @ 12.17 hrs, Volume= 2.219 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 115.70' @ 12.15 hrs Surf.Area= 7,957 sf Storage= 19,207 cf

Plug-Flow detention time= 56.9 min calculated for 2.219 af (93% of inflow)
Center-of-Mass det. time= 30.8 min (795.5 - 764.6)

Volume	Invert	Avail.Storage	Storage Description
#1	111.00'	31,022 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.00	584	0	0
112.00	1,633	1,109	1,109
113.00	3,561	2,597	3,706
114.00	5,131	4,346	8,052
115.00	6,795	5,963	14,015
116.00	8,446	7,621	21,635
117.00	10,327	9,387	31,022

Device	Routing	Invert	Outlet Devices
#1	Primary	110.20'	**12.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 110.20' / 108.60' S= 0.0127 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	113.80'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	115.30'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=14.49 cfs @ 12.17 hrs HW=115.70' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.94 cfs @ 10.12 fps)
└**2=Orifice/Grate** (Passes 7.94 cfs of 20.87 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 6.54 cfs @ 1.63 fps)

Summary for Pond 9P: 4 APARTMENT DRIPLINES

Inflow Area = 0.410 ac,100.00% Impervious, Inflow Depth > 6.96" for 100 YEAR event
Inflow = 3.59 cfs @ 12.00 hrs, Volume= 0.238 af
Outflow = 0.25 cfs @ 13.01 hrs, Volume= 0.057 af, Atten= 93%, Lag= 60.2 min
Primary = 0.25 cfs @ 13.01 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 120.81' @ 13.00 hrs Surf.Area= 3,780 sf Storage= 7,895 cf

Plug-Flow detention time= 374.6 min calculated for 0.057 af (24% of inflow)
Center-of-Mass det. time= 194.9 min (923.8 - 728.9)

Volume	Invert	Avail.Storage	Storage Description
#1	115.80'	2,954 cf	**3.00'W x 105.00'L x 6.00'H Prismatoid** x 4 7,560 cf Overall - 176 cf Embedded = 7,384 cf x 40.0% Voids
#2	115.80'	176 cf	**6.0" Round Pipe Storage** x 4 Inside #1 L= 224.0' S= 0.0050 '/'
		3,130 cf	x 3.00 = 9,389 cf Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir X 4.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.13 cfs @ 13.01 hrs HW=120.81' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.13 cfs @ 0.28 fps)

Summary for Pond 100P: 24" CULVERT AT TOPSHAM FAIR MALL ROAD

Inflow Area = 46.920 ac, 28.43% Impervious, Inflow Depth > 4.74" for 100 YEAR event
Inflow = 111.30 cfs @ 12.36 hrs, Volume= 18.515 af
Outflow = 43.60 cfs @ 13.39 hrs, Volume= 18.293 af, Atten= 61%, Lag= 62.2 min
Primary = 43.60 cfs @ 13.39 hrs, Volume= 18.293 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 81.41' @ 13.39 hrs Surf.Area= 48,589 sf Storage= 243,327 cf

Plug-Flow detention time= 59.3 min calculated for 18.232 af (98% of inflow)
Center-of-Mass det. time= 54.7 min (858.3 - 803.6)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	885,614 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	3,381	0	0
75.00	15,000	27,572	27,572
80.00	40,318	138,295	165,867
85.00	69,683	275,003	440,869
90.00	108,215	444,745	885,614

Device	Routing	Invert	Outlet Devices
#1	Primary	72.10'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 72.10' / 70.00' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=43.60 cfs @ 13.39 hrs HW=81.41' (Free Discharge)
↑**1=Culvert** (Inlet Controls 43.60 cfs @ 13.88 fps)

Summary for Subcatchment 6S: GOODWILL SITE AREA

Runoff = 8.74 cfs @ 12.01 hrs, Volume= 0.544 af, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.20"

	Area (ac)	CN	Description
*	2.260	98	ON SITE IMPERVIOUS
*	0.380	74	ON SITE LAWN
*	0.070	74	OFF SITE LAWN
	2.710	94	Weighted Average
	0.450		16.61% Pervious Area
	2.260		83.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	46	0.0200	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"

Summary for Pond 1P: 24" CULVERT AT PARK DRIVE

Inflow Area = 12.930 ac, 36.58% Impervious, Inflow Depth > 1.09" for 2 YEAR event
Inflow = 7.50 cfs @ 12.09 hrs, Volume= 1.177 af
Outflow = 7.52 cfs @ 12.12 hrs, Volume= 1.171 af, Atten= 0%, Lag= 1.3 min
Primary = 7.52 cfs @ 12.12 hrs, Volume= 1.171 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 95.51' @ 12.12 hrs Surf.Area= 657 sf Storage= 910 cf

Plug-Flow detention time= 3.9 min calculated for 1.171 af (100% of inflow)
Center-of-Mass det. time= 2.3 min (839.1 - 836.8)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	105,871 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	500	0	0
96.00	708	1,208	1,208
98.00	1,037	1,745	2,953
100.00	3,501	4,538	7,491
105.00	9,197	31,745	39,236
110.00	17,457	66,635	105,871

Device	Routing	Invert	Outlet Devices
#1	Primary	94.10'	**24.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.10' / 92.70' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=7.38 cfs @ 12.12 hrs HW=95.49' (Free Discharge)
└**1=Culvert** (Inlet Controls 7.38 cfs @ 3.17 fps)

Summary for Pond 6P: EXISTING FILTER POND - GOOD WILL SITE

Inflow Area = 5.460 ac, 46.89% Impervious, Inflow Depth > 1.49" for 2 YEAR event
Inflow = 8.90 cfs @ 12.01 hrs, Volume= 0.680 af
Outflow = 6.47 cfs @ 12.07 hrs, Volume= 0.514 af, Atten= 27%, Lag= 3.9 min
Primary = 6.47 cfs @ 12.07 hrs, Volume= 0.514 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 114.27' @ 12.07 hrs Surf.Area= 5,575 sf Storage= 9,482 cf

Plug-Flow detention time= 110.3 min calculated for 0.514 af (76% of inflow)
Center-of-Mass det. time= 50.3 min (818.3 - 768.0)

Volume	Invert	Avail.Storage	Storage Description
#1	111.00'	31,021 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.00	584	0	0
112.00	1,633	1,109	1,109
113.00	3,561	2,597	3,706
114.00	5,130	4,346	8,051
115.00	6,795	5,963	14,014
116.00	8,446	7,621	21,634
117.00	10,327	9,387	31,021

Device	Routing	Invert	Outlet Devices
#1	Primary	110.20'	**12.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 110.20' / 108.60' S= 0.0127 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	113.80'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	115.00'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=6.32 cfs @ 12.07 hrs HW=114.26' (Free Discharge)
└**1=Culvert** (Passes 6.32 cfs of 6.94 cfs potential flow)
└**2=Orifice/Grate** (Weir Controls 6.32 cfs @ 2.21 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 100P: 24" CULVERT AT TOPSHAM FAIR MALL ROAD

Inflow Area = 46.920 ac, 27.62% Impervious, Inflow Depth > 1.13" for 2 YEAR event
Inflow = 32.19 cfs @ 12.38 hrs, Volume= 4.415 af
Outflow = 21.94 cfs @ 12.75 hrs, Volume= 4.285 af, Atten= 32%, Lag= 22.3 min
Primary = 21.94 cfs @ 12.75 hrs, Volume= 4.285 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 75.20' @ 12.75 hrs Surf.Area= 16,031 sf Storage= 33,203 cf

Plug-Flow detention time= 29.3 min calculated for 4.285 af (97% of inflow)
Center-of-Mass det. time= 19.1 min (853.4 - 834.3)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	885,614 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	3,381	0	0
75.00	15,000	27,572	27,572
80.00	40,318	138,295	165,867
85.00	69,683	275,003	440,869
90.00	108,215	444,745	885,614

Device	Routing	Invert	Outlet Devices
#1	Primary	72.10'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 72.10' / 70.00' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=21.94 cfs @ 12.75 hrs HW=75.20' (Free Discharge)
1=Culvert (Inlet Controls 21.94 cfs @ 6.98 fps)

Summary for Subcatchment 6S: GOODWILL SITE AREA

Runoff = 13.12 cfs @ 12.01 hrs, Volume= 0.835 af, Depth> 3.70"

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

	Area (ac)	CN	Description
*	2.260	98	ON SITE IMPERVIOUS
*	0.380	74	ON SITE LAWN
*	0.070	74	OFF SITE LAWN
	2.710	94	Weighted Average
	0.450		16.61% Pervious Area
	2.260		83.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	46	0.0200	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"

Summary for Pond 1P: 24" CULVERT AT PARK DRIVE

Inflow Area = 12.930 ac, 36.58% Impervious, Inflow Depth > 2.13" for 10 YEAR event
Inflow = 14.91 cfs @ 12.51 hrs, Volume= 2.298 af
Outflow = 14.86 cfs @ 12.54 hrs, Volume= 2.292 af, Atten= 0%, Lag= 2.1 min
Primary = 14.86 cfs @ 12.54 hrs, Volume= 2.292 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 96.65' @ 12.54 hrs Surf.Area= 815 sf Storage= 1,775 cf

Plug-Flow detention time= 3.0 min calculated for 2.284 af (99% of inflow)
Center-of-Mass det. time= 2.0 min (822.9 - 820.9)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	105,871 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	500	0	0
96.00	708	1,208	1,208
98.00	1,037	1,745	2,953
100.00	3,501	4,538	7,491
105.00	9,197	31,745	39,236
110.00	17,457	66,635	105,871

Device	Routing	Invert	Outlet Devices
#1	Primary	94.10'	**24.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.10' / 92.70' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=14.86 cfs @ 12.54 hrs HW=96.65' (Free Discharge)
└**1=Culvert** (Inlet Controls 14.86 cfs @ 4.73 fps)

Summary for Pond 6P: EXISTING FILTER POND - GOOD WILL SITE

Inflow Area = 5.460 ac, 46.89% Impervious, Inflow Depth > 2.53" for 10 YEAR event
Inflow = 13.80 cfs @ 12.01 hrs, Volume= 1.150 af
Outflow = 7.24 cfs @ 12.15 hrs, Volume= 0.983 af, Atten= 48%, Lag= 8.4 min
Primary = 7.24 cfs @ 12.15 hrs, Volume= 0.983 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 114.67' @ 12.15 hrs Surf.Area= 6,240 sf Storage= 11,842 cf

Plug-Flow detention time= 82.5 min calculated for 0.979 af (85% of inflow)
Center-of-Mass det. time= 39.9 min (804.9 - 765.0)

Volume	Invert	Avail.Storage	Storage Description
#1	111.00'	31,021 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.00	584	0	0
112.00	1,633	1,109	1,109
113.00	3,561	2,597	3,706
114.00	5,130	4,346	8,051
115.00	6,795	5,963	14,014
116.00	8,446	7,621	21,634
117.00	10,327	9,387	31,021

Device	Routing	Invert	Outlet Devices
#1	Primary	110.20'	**12.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 110.20' / 108.60' S= 0.0127 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	113.80'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	115.00'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.24 cfs @ 12.15 hrs HW=114.67' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.24 cfs @ 9.22 fps)
└**2=Orifice/Grate** (Passes 7.24 cfs of 14.08 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 100P: 24" CULVERT AT TOPSHAM FAIR MALL ROAD

Inflow Area = 46.920 ac, 27.62% Impervious, Inflow Depth > 2.14" for 10 YEAR event
Inflow = 58.43 cfs @ 12.37 hrs, Volume= 8.356 af
Outflow = 30.30 cfs @ 12.98 hrs, Volume= 8.192 af, Atten= 48%, Lag= 36.5 min
Primary = 30.30 cfs @ 12.98 hrs, Volume= 8.192 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 77.11' @ 12.98 hrs Surf.Area= 25,701 sf Storage= 86,024 cf

Plug-Flow detention time= 35.3 min calculated for 8.192 af (98% of inflow)
Center-of-Mass det. time= 28.3 min (848.0 - 819.7)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	885,614 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	3,381	0	0
75.00	15,000	27,572	27,572
80.00	40,318	138,295	165,867
85.00	69,683	275,003	440,869
90.00	108,215	444,745	885,614

Device	Routing	Invert	Outlet Devices
#1	Primary	72.10'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 72.10' / 70.00' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=30.30 cfs @ 12.98 hrs HW=77.11' (Free Discharge)
1=Culvert (Inlet Controls 30.30 cfs @ 9.64 fps)

Summary for Subcatchment 6S: GOODWILL SITE AREA

Runoff = 16.53 cfs @ 12.01 hrs, Volume= 1.064 af, Depth> 4.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.70"

	Area (ac)	CN	Description
*	2.260	98	ON SITE IMPERVIOUS
*	0.380	74	ON SITE LAWN
*	0.070	74	OFF SITE LAWN
	2.710	94	Weighted Average
	0.450		16.61% Pervious Area
	2.260		83.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	46	0.0200	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"

Summary for Pond 1P: 24" CULVERT AT PARK DRIVE

Inflow Area = 12.930 ac, 36.58% Impervious, Inflow Depth > 3.01" for 25 YEAR event
Inflow = 19.42 cfs @ 12.34 hrs, Volume= 3.241 af
Outflow = 19.08 cfs @ 12.41 hrs, Volume= 3.234 af, Atten= 2%, Lag= 4.0 min
Primary = 19.08 cfs @ 12.41 hrs, Volume= 3.234 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 97.65' @ 12.41 hrs Surf.Area= 980 sf Storage= 2,650 cf

Plug-Flow detention time= 2.8 min calculated for 3.234 af (100% of inflow)
Center-of-Mass det. time= 2.0 min (817.0 - 815.0)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	105,871 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	500	0	0
96.00	708	1,208	1,208
98.00	1,037	1,745	2,953
100.00	3,501	4,538	7,491
105.00	9,197	31,745	39,236
110.00	17,457	66,635	105,871

Device	Routing	Invert	Outlet Devices
#1	Primary	94.10'	**24.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.10' / 92.70' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=19.06 cfs @ 12.41 hrs HW=97.65' (Free Discharge)
└**1=Culvert** (Inlet Controls 19.06 cfs @ 6.07 fps)

Summary for Pond 6P: EXISTING FILTER POND - GOOD WILL SITE

Inflow Area = 5.460 ac, 46.89% Impervious, Inflow Depth > 3.38" for 25 YEAR event
Inflow = 17.88 cfs @ 12.01 hrs, Volume= 1.539 af
Outflow = 9.40 cfs @ 12.25 hrs, Volume= 1.370 af, Atten= 47%, Lag= 14.4 min
Primary = 9.40 cfs @ 12.25 hrs, Volume= 1.370 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 115.06' @ 12.25 hrs Surf.Area= 6,890 sf Storage= 14,405 cf

Plug-Flow detention time= 72.0 min calculated for 1.370 af (89% of inflow)
Center-of-Mass det. time= 36.6 min (799.6 - 763.0)

Volume	Invert	Avail.Storage	Storage Description
#1	111.00'	31,021 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.00	584	0	0
112.00	1,633	1,109	1,109
113.00	3,561	2,597	3,706
114.00	5,130	4,346	8,051
115.00	6,795	5,963	14,014
116.00	8,446	7,621	21,634
117.00	10,327	9,387	31,021

Device	Routing	Invert	Outlet Devices
#1	Primary	110.20'	**12.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 110.20' / 108.60' S= 0.0127 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	113.80'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	115.00'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=9.22 cfs @ 12.25 hrs HW=115.06' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.51 cfs @ 9.57 fps)
└**2=Orifice/Grate** (Passes 7.51 cfs of 16.96 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 1.71 cfs @ 0.60 fps)

Summary for Pond 100P: 24" CULVERT AT TOPSHAM FAIR MALL ROAD

Inflow Area = 46.920 ac, 27.62% Impervious, Inflow Depth > 2.99" for 25 YEAR event
Inflow = 77.75 cfs @ 12.37 hrs, Volume= 11.702 af
Outflow = 36.24 cfs @ 13.11 hrs, Volume= 11.516 af, Atten= 53%, Lag= 44.5 min
Primary = 36.24 cfs @ 13.11 hrs, Volume= 11.516 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 78.84' @ 13.11 hrs Surf.Area= 34,441 sf Storage= 133,766 cf

Plug-Flow detention time= 42.4 min calculated for 11.478 af (98% of inflow)
Center-of-Mass det. time= 36.6 min (849.5 - 813.0)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	885,614 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	3,381	0	0
75.00	15,000	27,572	27,572
80.00	40,318	138,295	165,867
85.00	69,683	275,003	440,869
90.00	108,215	444,745	885,614

Device	Routing	Invert	Outlet Devices
#1	Primary	72.10'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 72.10' / 70.00' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=36.24 cfs @ 13.11 hrs HW=78.84' (Free Discharge)
1=Culvert (Inlet Controls 36.24 cfs @ 11.53 fps)

Summary for Subcatchment 6S: GOODWILL SITE AREA

Runoff = 22.98 cfs @ 12.01 hrs, Volume= 1.502 af, Depth> 6.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=7.80"

	Area (ac)	CN	Description
*	2.260	98	ON SITE IMPERVIOUS
*	0.380	74	ON SITE LAWN
*	0.070	74	OFF SITE LAWN
	2.710	94	Weighted Average
	0.450		16.61% Pervious Area
	2.260		83.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	46	0.0200	1.18		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"

Summary for Pond 1P: 24" CULVERT AT PARK DRIVE

Inflow Area = 12.930 ac, 36.58% Impervious, Inflow Depth > 4.76" for 100 YEAR event
Inflow = 31.99 cfs @ 12.07 hrs, Volume= 5.124 af
Outflow = 27.15 cfs @ 12.58 hrs, Volume= 5.115 af, Atten= 15%, Lag= 30.6 min
Primary = 27.15 cfs @ 12.58 hrs, Volume= 5.115 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.27' @ 12.58 hrs Surf.Area= 3,808 sf Storage= 9,204 cf

Plug-Flow detention time= 3.5 min calculated for 5.098 af (100% of inflow)
Center-of-Mass det. time= 2.9 min (807.8 - 804.9)

Volume	Invert	Avail.Storage	Storage Description
#1	94.00'	105,871 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.00	500	0	0
96.00	708	1,208	1,208
98.00	1,037	1,745	2,953
100.00	3,501	4,538	7,491
105.00	9,197	31,745	39,236
110.00	17,457	66,635	105,871

Device	Routing	Invert	Outlet Devices
#1	Primary	94.10'	**24.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.10' / 92.70' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=27.14 cfs @ 12.58 hrs HW=100.27' (Free Discharge)
└**1=Culvert** (Inlet Controls 27.14 cfs @ 8.64 fps)

Summary for Pond 6P: EXISTING FILTER POND - GOOD WILL SITE

Inflow Area = 5.460 ac, 46.89% Impervious, Inflow Depth > 5.08" for 100 YEAR event
Inflow = 25.54 cfs @ 12.01 hrs, Volume= 2.309 af
Outflow = 23.95 cfs @ 12.06 hrs, Volume= 2.138 af, Atten= 6%, Lag= 3.1 min
Primary = 23.95 cfs @ 12.06 hrs, Volume= 2.138 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 115.26' @ 12.06 hrs Surf.Area= 7,224 sf Storage= 15,834 cf

Plug-Flow detention time= 55.1 min calculated for 2.131 af (92% of inflow)
Center-of-Mass det. time= 29.3 min (789.1 - 759.8)

Volume	Invert	Avail.Storage	Storage Description
#1	111.00'	31,021 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
111.00	584	0	0
112.00	1,633	1,109	1,109
113.00	3,561	2,597	3,706
114.00	5,130	4,346	8,051
115.00	6,795	5,963	14,014
116.00	8,446	7,621	21,634
117.00	10,327	9,387	31,021

Device	Routing	Invert	Outlet Devices
#1	Primary	110.20'	**12.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 110.20' / 108.60' S= 0.0127 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	113.80'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	115.00'	**50.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=22.18 cfs @ 12.06 hrs HW=115.24' (Free Discharge)
└**1=Culvert** (Barrel Controls 7.64 cfs @ 9.72 fps)
└**2=Orifice/Grate** (Passes 7.64 cfs of 18.14 cfs potential flow)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 14.54 cfs @ 1.22 fps)

Summary for Pond 100P: 24" CULVERT AT TOPSHAM FAIR MALL ROAD

Inflow Area = 46.920 ac, 27.62% Impervious, Inflow Depth > 4.73" for 100 YEAR event
Inflow = 112.47 cfs @ 12.35 hrs, Volume= 18.501 af
Outflow = 43.68 cfs @ 13.34 hrs, Volume= 18.280 af, Atten= 61%, Lag= 59.2 min
Primary = 43.68 cfs @ 13.34 hrs, Volume= 18.280 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 81.44' @ 13.34 hrs Surf.Area= 48,765 sf Storage= 244,970 cf

Plug-Flow detention time= 59.5 min calculated for 18.280 af (99% of inflow)
Center-of-Mass det. time= 55.0 min (858.2 - 803.2)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	885,614 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
72.00	3,381	0	0
75.00	15,000	27,572	27,572
80.00	40,318	138,295	165,867
85.00	69,683	275,003	440,869
90.00	108,215	444,745	885,614

Device	Routing	Invert	Outlet Devices
#1	Primary	72.10'	**24.0" Round Culvert** L= 70.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 72.10' / 70.00' S= 0.0300 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=43.68 cfs @ 13.34 hrs HW=81.44' (Free Discharge)
1=Culvert (Inlet Controls 43.68 cfs @ 13.90 fps)