



Memorandum

To: Bassett Creek Watershed Management Commission (BCWMC)
From: Barr Engineering Co.
Subject: Item 5A: Four Seasons Mall Redevelopment (BCWMC #2019-25) and Water Quality Project (2013 CIP NL-2) – Plymouth, MN
BCWMC April 16, 2020 Meeting Agenda
Date: April 9, 2020
Project: 23270051 2019 2201

5A Four Seasons Mall Redevelopment (BCWMC #2019-25) and Water Quality Project (2013 CIP NL-2) – Plymouth, MN

Summary:

Proposed Work: Redevelopment of the Four Seasons Mall site, above-and-beyond stormwater quality improvements, and wetland restoration

Basis for Review at Commission Meeting: Cut and fill in the floodplain; 90% CIP review

Impervious Surface Area: Decrease 2.07 acres

Recommendations:

1. Conditional Approval of Four Seasons Mall Redevelopment Project (BCWMC #2019-25)
2. Conditional Approval of 90% Plans for Water Quality Project (2013 CIP NL-2)
3. Authorize BCWMC Engineer to provide administrative approval of BCWMC CIP project components after final plans have been revised and comments have been addressed.

Background

At their September 2013 meeting, the BCWMC conditionally approved 90% plans for the Four Seasons Mall Area Water Quality Project (near Hwy 169 and Rockford Road in Plymouth) that included restoration of a channel upstream of the mall and creation of a stormwater pond. The project was not built due to residents' concerns with tree loss.

At their August 2016 meeting, the Commission received a presentation on the stormwater management components of a redevelopment project (named Agora) on the Four Seasons Mall site. At the time, the Commission was asked to consider providing funding (in the ballpark of \$500,000) toward stormwater management features that would go "above and beyond" pollutant removal requirements for the redevelopment. The Commission moved forward with exploring a partnership with Rock Hill Management through an agreement with the City of Plymouth and directed Commission staff to continue to gather and assess additional information for further consideration including technical and legal issues.

At their December 2016 meeting, the Commission received a presentation on four alternatives for possible stormwater management features for the redevelopment. The Commission provided conditional

approval to provide funds from the BCWMC CIP budget as a financial contribution towards Alternative 4, which would have removed an estimated 109 pounds of phosphorus above and beyond the BCWMC's requirements at the Agora development in Plymouth. Conditions of the approval included:

1. CIP project review – i.e., review at 50% and 90% plan stages.
2. Prior to the BCWMC formalizing a financial commitment, the developer must provide final drawings (i.e. final construction plans for the entire project including the wetland restoration) and supporting information (final pollutant removals and other information to confirm pollutant removal estimates) to the BCWMC Engineer for review and Commission approval. BCWMC's final financial commitment will be based on the final pollutant removal estimates.
3. Prior to formalizing a financial agreement, the BCWMC will enter into an agreement with the City of Plymouth for construction and funding of the project. Concurrently, the developer will need to enter into an agreement with the City of Plymouth regarding construction of the project and allowing construction of the wetland restoration portion of the project.
4. The BCWMC must obtain BWSR approval to substitute this new CIP project for the original Four Seasons Mall Area Water Quality Project.
5. The developer must obtain all required local, state, and federal permits for the project.
6. The developer must submit the application, fee, drawings and supporting information for the Agora redevelopment site to the BCWMC Engineer for separate review as part of the BCWMC project review program.

At its January 2017 meeting, the Commission directed the administrator and legal counsel to develop an agreement with Rock Hill Management for the Commission's consideration and on January 30, 2017, the developer's consultant submitted the Agora project for BCWMC review.

At its February 2017 meeting, the Commission conditionally approved the Agora development project as part of the BCWMC project review program. The Commission also approved an agreement with Rock Hill Management, which required that the CIP project remove at least 100 pounds of total phosphorus (TP) above-and-beyond the BCWMC requirements for the Agora development project. The Commission also approved a separate agreement with the City of Plymouth to allow the developer access to a city-owned parcel to construct the wetland restoration project and to ensure ongoing maintenance of the CIP project components. The agreements were executed later in February 2017. The BCWMC Engineer coordinated with the applicant, on behalf of the Commission, from January 2017 through August 2017, and the applicant sufficiently addressed 13 of the 19 comments from the conditional approval for the Agora project.

At its August 2017 meeting, the Commission conditionally approved 90% design CIP plans for the Agora project. However, at their April 2018 meeting, Plymouth Commissioner James Prom informed the Commission that the Agora project had fallen through due, in part, to a change in market demand for some of the intended uses.

General Project Information

In February 2019, Dominion Development and Acquisition, LLC (Dominium) and its engineer (Loucks) informed the BCWMC Administrator and Engineer of the redevelopment plans for the Four Seasons Mall site. On November 15, 2019, Dominion and Loucks submitted a BCWMC application, plans, and a stormwater management report for review. At the December 2019 BCWMC meeting, the applicant presented an introduction to the proposed project to the Commission. Leading up to and following the December 2019 BCWMC meeting, the BCWMC Engineer has worked with Dominion and Loucks regarding the amount of the above-and-beyond water quality treatment to be provided by the project. The BCWMC did not take any action at the December 2019 meeting.

The proposed redevelopment project is located in the Northwood Lake subwatershed in the southwest quadrant of the TH 169 and Rockford Road interchange. The proposed project includes demolition and redevelopment of the entire parcel from a commercial strip mall to a commercial, public, and multiple-residential development, and a wetland restoration resulting in 16.6 acres of grading (disturbance). The proposed project creates 9.86 acres of fully reconstructed impervious surfaces, which results in a decrease of 2.07 acres of impervious surfaces, from 11.93 acres (existing) to 9.86 acres (proposed). Portions of the proposed project will result in a change of land use and zoning from commercial to multifamily residential or public.

This memorandum summarizes the review of the redevelopment aspects of the proposed project, including: floodplain management, wetland management, rate control requirements, erosion and sediment control requirements, water quality requirements, and above-and-beyond water quality improvements (the CIP project components).

Floodplain

The proposed project includes work in the Bassett Creek 1% (base flood elevation, 100-year) floodplain. The October 2019 BCWMC Requirements for Improvements and Development Proposals (Requirements) document states that *projects within the floodplain must maintain no net loss in floodplain storage and no increase in flood level at any point along the trunk system* (managed to at least a precision of 0.00 feet). The 1% (base flood elevation, 100-year) floodplain elevation of the North Branch of Bassett Creek (North Branch) in this reach is 893.1 feet NAVD88.

The proposed project will result in a net increase in floodplain storage of approximately 3.83 acre-feet (6,186 cubic yards) and does not result in an increase in flood level at any point along the trunk system.

The Requirements document also states that *minimum building elevations (lowest) floor of new and redeveloped structures, including parking ramps/garages, must be at least 2.0 feet above the 100-year flood level*. All structures on the site, including the tuck-under garages are at least 2.0 feet above the 100-year flood level.

Wetlands

The City of Plymouth is the local government unit (LGU) responsible for administering the Wetland Conservation Act; therefore, BCWMC wetland review is not required.

Rate Control

The October 2019 BCWMC Requirements document states that projects that create more than one (1) acre of new or fully reconstructed impervious area *must manage stormwater such that peak flow rates leaving the site are equal to or less than the existing rate leaving the site for the 2-, 10-, and 100-year events, based on Atlas 14 precipitation amounts and using a nested 24-hour rainfall distribution.*

Under existing conditions, stormwater runoff leaves the site in three directions: surface flow north and east to the North Branch, surface flow west to Lancaster Lane North, and surface flow and storm sewer flow to an existing wetland to the south of the development property. The North Branch, which runs along the north and east edge of the site with intermittent flows, and storm sewer in Lancaster Lane, also discharge into the wetland to the south of the development property.

The proposed stormwater management system includes an underground filtration system and a series of ponds to provide rate control, including: Pond WP, Basin 1P, Pond 2P, and Underground Filtration System 3P on the north end of the site; and Pond NP at the south end of the site. The underground filtration system and ponds on the north end of the site outlet to the North Branch. Pond NP on the south end of the site outlets through a control structure to the wetland to the south of the development property. The proposed project also includes a diversion of low flows from the North Branch into Pond NP to provide water quality treatment, as part of the Four Seasons Mall Area Water Quality project (BCWMC CIP NL-2).

Table 1 and Table 2 summarize the existing conditions peak discharge rates and proposed conditions peak discharge rates, respectively, from the project area to the existing wetland to the south of the development property.

Table 1: Existing Conditions Peak Discharge Rates (From the Proposed Project Site Only)

Existing Conditions Subwatershed	Area	2-Year Peak	10-Year Peak Rate	100-Year Peak Rate
	(acres)	(cfs)	(cfs)	(cfs)
To Creek (from site)	6.52	19.01	30.42	55.87
To Lancaster Lane (from site)	1.56	3.44	6.12	12.33
To Wetland (direct from site)	9.22	28.85	45.05	80.87
Total – To Wetland (from site) ^{1,2}	17.30	51.30	81.60	149.06

¹ Total peak discharge rates may not be a direct sum of the peak discharge rates of inflows due to the timing of the peak discharge rates for each inflow.

² Additional flow and runoff is directed to the existing wetland from the North Branch (from the larger off-site watershed) and other direct tributary drainage areas, which are not quantified in this table.

Table 2: Proposed Conditions Peak Discharge Rates (From the Proposed Project Site Only)

Proposed Conditions Subwatershed/BMP	Area	2-Year Peak	10-Year Peak Rate	100-Year Peak Rate
	(acres)	(cfs)	(cfs)	(cfs)
To Creek (from site) ¹	7.11	7.37	14.96	36.57
To Lancaster Lane (from site)	1.61	4.14	6.93	13.25
To Wetland (direct from site)	0.17	0.36	0.67	1.38
To Wetland (from Pond NP)	15.57	8.32	14.61	28.66
To Wetland (from Creek)	N/A	0.00	0.00	0.00
Total – To Wetland (from site) ^{2,3}	17.34	9.67	16.95	34.07

¹ Runoff from this subwatershed is routed to the North Branch. As part of the proposed project, low flows from the North Branch are diverted onto the proposed project site for water quality treatment in Pond NP: South.

² Total peak discharge rates may not be a direct sum of the peak discharge rates of inflows due to the timing of the peak discharge rates for each inflow.

³ Additional runoff is directed to the wetland from the North Branch (from the larger off-site watershed) and other direct tributary drainage area, which is not quantified in this table.

Table 1 and 2 show that the stormwater management system for the proposed redevelopment project meets the BCWMC requirement for rate control.

Water Quality

As discussed in the Background section above, the Commission conditionally approved a financial contribution towards a previous submittal for redevelopment of the Four Seasons Mall site for providing stormwater treatment, specifically TP removal “above and beyond” BCWMC requirements. The BCWMC Engineer revised the BCWMC P8 model between August 2017 and April 2018 to better align with monitoring data provided by Three Rivers Park District. As shown in Table 3, the current BCWMC P8 model shows significantly higher phosphorus loadings to the wetland upstream of Highway 169 than the 2017 BCWMC P8 model, which was used to establish the above-and-beyond water quality treatment goal for the agreement for BCWMC CIP funding reimbursement. As a result, 100 pounds of annual TP removal achieves a lower percent of TP removal when evaluated with the current BCWMC P8 model.

Table 3: Above and Beyond Water Quality Treatment Goals for BCWMC CIP Funding Reimbursement

	2017 BCWMC P8 Model	2019 BCWMC P8 Model
TP Loading (lb/year)	283.3	484.8
TP Removal Goal (lb/year) For BCWMC CIP Funding	100.0	100.0
TP Removal Goal (%) For BCWMC CIP Funding	35.3%	20.6%

The BCWMC Requirements document states that projects on sites without restrictions that create one or more acres of new and/or fully reconstructed impervious surfaces shall capture and retain on-site 1.1 inches of runoff from the new and/or fully reconstructed impervious surfaces. If the applicant is unable to achieve the performance goals due to site restrictions, flexible treatment options must be used following the BCWMC design sequence flow chart.

The proposed redevelopment project creates 9.86 acres of fully reconstructed impervious area. Flexible Treatment Option (FTO) #2 was selected for the proposed project due to the presence of tight clay soils that are not conducive to infiltration. FTO #2 requires that the project provide 60% removal of total phosphorus (TP). To meet the BCWMC’s 60% TP removal goal, the proposed redevelopment project must remove 12.6 pounds of TP per year. Any treatment in addition to this amount is considered above-and-beyond treatment.

The proposed BMPs on the development site will treat stormwater from the site and off-site areas with a filtration basin, an underground filtration system, two smaller stormwater ponds, and a large stormwater pond with an iron-enhanced sand filter (IESF) bench. Table 4 summarizes the estimated annual TP loading and removals on the development site, not including the wetland restoration. Two values are listed in a number of cells, the first is what was provided by the applicant, and the second, shown in parentheses, was calculated by Barr based on the comments and requested revisions to the water quality modeling listed in the recommendations section.

Table 4: Proposed Water Quality Treatment and Pollutant Removals for the Development Site

Device	TP Loading (lbs/year) ³	TP Removal (lbs/year) ³	TP Removal (%) ³
Northwest Pond (WP) ¹	10.1	6.3 (4.8)	62.9 (47.6)
North Basin (1P) ¹	1.1	0.9 (0.7)	88.3 (62.8)
Northeast Pond (2P) ¹	4.4	1.9	43.8
Underground Filtration (3P) ¹	3.2	3.1 (2.2)	96.9 (68.3)
South Pond Forebay (FB)	200.0 (202.9)	4.2	2.1
South Pond with Iron-Enhanced Sand Filtration Bench (NP)	197.0 (200)	34.0 (17.8)	17.3 (9.0)
TOTAL^{1,2}	207.7	50.4 (31.6)	24.3 (15.2)

¹ Runoff from this BMP is routed to the North Branch. As part of the proposed project, low flows from the North Branch are diverted onto the proposed project site for water quality treatment in the South Pond Forebay and South Pond with Iron-Enhanced Sand Filtration Bench.

² Total loading may not be a direct sum of the individual BMPs due to the routing of outflow from one BMP to another.

³ Values in parentheses independently computed by Barr.

The proposed project will also involve restoration of the existing wetland to the south of the development site. The wetland restoration is solely part of the overall BCWMC CIP project (NL-2), for which there will be a proposed agreement between the developer and the BCWMC, as discussed in the Background section. The assumed water quality treatment potential and TP removal efficiency for the wetland restoration is generally based on guidance from the Minnesota Stormwater Manual rather than water quality modeling. Table 5 summarizes the annual TP loading and removals for the wetland restoration.

Table 5: Proposed Water Quality Treatment and Pollutant Removals for the Wetland Restoration

Device	TP Loading (lbs/year) ³	TP Removal (lbs/year) ³	TP Removal (%) ³
Wetland (From South Pond: NP)	163.2 (182.1)	7.2 (7.3)	4
Wetland (From West and Direct)	190.7	73.2 (75.1)	38
TOTAL¹	353.9 (372.8)	80.4 (82.4)	22.5 (22.1)

¹ TP removal efficiency for the wetland restoration is generally based on guidance from the Minnesota Stormwater Manual.

Table 6 summarizes the estimated annual above-and-beyond TP removals. Two values are listed in a number of cells, the first is what was provided by the applicant, and the second, shown in parentheses, was calculated by Barr based on the comments and requested revisions to the water quality modeling listed in the recommendations section.

Table 6: Above-and-Beyond Total Phosphorus Removal

Water Quality Components	TP (lbs/year) ²
TP Removal Provided at Redevelopment Project	+ 50.4 (31.6)
TP Removal Provided at Wetland Restoration	+ 80.4 (82.4)
Summation of TP Removal Provided by Project	+ 130.9 (114.0)
TP Removal Required for Redevelopment Project	- 12.6
TP Removal Provided by Wetland in Existing Conditions ¹	- 0
Subtotal of TP Removals to be Subtracted to Obtain Above-and-Beyond TP Removal	- 12.6
Total Above-and-Beyond TP Removal Provided	118.3 (101.4)

¹ Monitoring data obtained by the BCWMC Engineer suggests that the wetland may be exporting, rather than capturing, TP. The TP removal provided by the wetland in existing conditions was estimated as zero.

² Values in parentheses independently computed by Barr.

Erosion and Sediment Control

The proposed project results in more than 10,000 square feet of land disturbance; therefore, the proposed project must meet the BCWMC erosion and sediment control requirements. Proposed temporary erosion and sediment control features include rock construction entrances, silt fence, and storm drain inlet protection. Permanent erosion and sediment control features include erosion control blanket and stabilization with sod or seed and mulch.

Recommendations

Authorize BCWMC Engineer to provide administrative approval of BCWMC CIP project components after final plans have been revised and comments have been addressed.

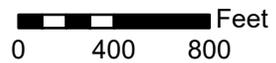
Conditional Approval of Four Seasons Mall Redevelopment Project (BCWMC #2019-25) and 90% Plans for Water Quality Project (2013 CIP NL-2) based on the following comments:

1. The P8 model(s) must be revised as follows to demonstrate that the proposed project meets BCWMC water quality requirements and the above-and-beyond water quality treatment requirement per the draft agreement for CIP funding reimbursement:
 - a. The overflow elevation for device *NB-CRSP-4S* must be revised to match the plans (elev. 889.75).
 - b. The infiltration outlet for device *NB-07* must be removed as the wetland is designed with a normal water level.
 - c. The infiltration outlet for device *NB-WP-4S* must be routed to *NB-CRSP-4S* to match the routing for the drain tile in the plans.
 - d. Clarify, and revise as necessary, why the particle removal scale factor for the following devices was modified from 1 to something else:
 - i. Device *NB-1P-4S* (modified to 0.1)
 - ii. Device *NB-3P-4s* (modified to 0.1)
 - iii. Device *NB-NP-4S* (modified to 4.2)

- e. The filtration efficiencies in the submitted P8 model are 100% pollutant removal for particulate phosphorus and 90% removal for dissolved phosphorus. The filtration efficiencies must be modified to values appropriate for filtration. The Minnesota Stormwater Manual indicates 85% removal of particulate phosphorus and, if enhancements are used to removal dissolved phosphorus, 40-60% removal of dissolved phosphorus.
2. The proposed conditions HydroCAD models must be revised as follows to demonstrate that the proposed project meets BCWMC rate control requirements:
 - a. Pond 1P, the elevation of device #4 (EOF) must be revised to match the plans.
 - b. Pond 2P, the diameter of outlet device #3 (culvert) must be revised to match the plans.
 - c. For Pond 6P, the normal (or starting) water level must be included.
 - d. For Pond 6P, the diameter of outlet device #1 (culvert) must be revised to match the plans.
 - e. For Pond NP, the length of outlet device #2 (weir) must be revised to match the plans.
 - f. For Pond NP, the diameter of outlet device #4 (drain tile) must be revised to match the plans. The discharge multiplier for the device should also be revised to 2 to account for both drain tile outlets.
 - g. For Pond WLD, the normal (or starting) water level for the wetland must be included.
 - h. For Pond WP, the elevation of outlet devices #3 (weir) must be revised to match the plans.
3. As noted the by the City of Plymouth, the sand filter design may not be realistic and may require modification. The rate control and water quality modeling must be revised accordingly if the iron-enhanced sand filtration bench is modified.
4. Portions of the proposed grading do not appear to tie into the existing grades at the edge of the project. The grading plan should be clarified and revised as necessary.
5. The application to the BCWMC is for full development of the site and the above-and-beyond water quality treatment. If the development and/or any stormwater features construction will be phased, this must be clarified on the plans or in a supplemental exhibit.
6. A maintenance plan and/or agreement must be established between the owner and the City for the proposed stormwater BMPs. We understand this is being developed.
7. It is highly recommended that a chloride management plan be developed for the project site. We understand this is being developed.
8. Revised drawings (paper copy and final electronic files), modified supporting information (P8 model, HydroCAD model, references, etc.), and itemized responses to the review comments must be provided to the BCWMC Engineer for final review and approval.



-  Project Location
-  Municipality
-  BCWMC
-  Legal Boundary
-  Major Subwatershed
-  Bassett Creek



FOUR SEASONS MALL REDEVELOPMENT (BCWMC #2019-25) AND WATER QUALITY PROJECT (2013 CIP NL-2) Plymouth, MN

LOCATION MAP

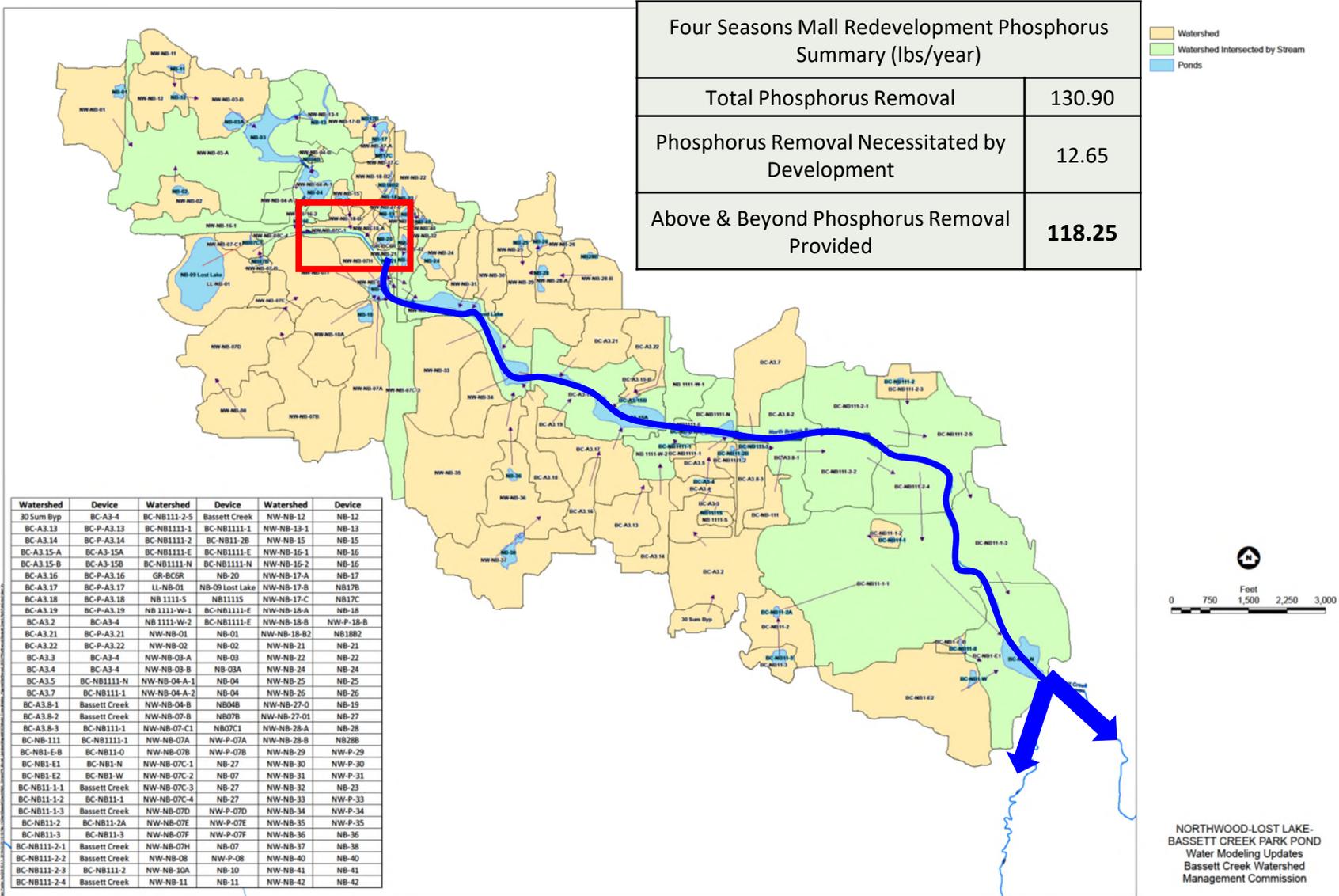
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Four Seasons Mall Redevelopment Stormwater Narrative

1. Storm Pond with filtration bench – A pond on the north end, west of the retail designed with an excavated dead storage to provide sedimentation settlement and a sand filter to filter live storage within 48 hours. Together providing rate control to downstream waters. Primary and overflow outlets drain to the creek along the north side of the property.
2. Storm Pond and Forebay with enhanced filtration bench – Located on the south side before the wetland, these excavated areas are designed to provide sedimentation settlement and rate control released downstream. The forebay acts as pretreatment, receiving the runoff first and providing initial treatment of the stormwater. The storm pond then receives the stormwater for additional treatment and rate control to downstream receiving waters. An iron enhanced sand filter bench, located along the south side, has been added for additional phosphorus removal. All live storage is designed to draw down within 48 hours. The primary and overflow outlets drain to the wetland.
3. Wetland Restoration – The wetland, located on the south side of the property, will be restored and enhanced to provide stormwater treatment. By enhancing the wetland to function properly with proper vegetation, water storage, increased flow path and animal habitat, a higher level of stormwater treatment is achieved. Bassett Creek, whatever isn't directed to the storm pond and forebay, will outlet directly to the wetland and flow through to the outlet. The wetland piped outlet under Highway 169 and overflow over Highway 169 are directed to Northwood Lake.

FOUR SEASONS MALL REDEVELOPMENT

PHOSPHORUS



NORTHWOOD-LOST LAKE-
BASSETT CREEK PARK POND
Water Modeling Updates
Bassett Creek Watershed
Management Commission