



## Memorandum

**To:** Bassett Creek Watershed Management Commission  
**From:** Barr Engineering Co.  
**Subject:** Item 6Ai – Agora Development – Plymouth, MN  
BCWMC February 16, 2017 Meeting Agenda  
**Date:** February 8, 2017  
**Project:** 23270051 2017 2108

### 6Ai Agora Development–Plymouth, MN BCWMC 2017-01

#### Summary:

**Proposed Work:** Redevelopment of the Four Seasons Mall site in Plymouth, MN.

**Basis for Commission Review:** Work within the floodplain

**Impervious Surface Area:** Increase 0.13 acres

**Recommendation:** Conditional Approval

#### General Background & Comments

At their meeting in September 2013, 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 meeting in August 2016, 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. At its August meeting, 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 following action was taken at the December meeting: The Commission provided conditional approval to provide funds from the BCWMC CIP budget as a financial contribution towards Alternative 4, which will remove an estimated 109 pounds of phosphorus above and beyond the BCWMC's requirements at the Agora development (old Four Seasons Mall site) in Plymouth. Conditions of the approval included:

1. CIP project review – i.e., review at 50% and 90% plan stages.

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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 meeting, the Commission directed the administrator and legal counsel to develop an agreement with Rock Hill Management for the Commission's consideration (see agenda item 6Aii).

On January 30, 2017, the developer's consultant submitted the Agora project for BCWMC review. This submittal addresses item 6 from the conditional approval from the December 2016 meeting. At this time items from conditions 1 – 5 have not been met. This review summary addresses the development requirements on the Agora site only, not the components for the BCWMC cost share for the above and beyond treatment. The proposed project includes full demolition and reconstruction of the Four Seasons Mall site. Redevelopment will include nine (9) individual buildings, parking, drives, stormwater features, and other development commonalities. The submittal did not include detailed plans for the wetland restoration to the south of the development site.

The proposed project is located in the Northwood Lake subwatershed, on the southwest corner of the TH 169 and Rockford Road interchange. The proposed project includes approximately 17.1 acres of grading and results in an increase of impervious surface by 0.13 acres.

## **Floodplain**

The current Bassett Creek (TP40 precipitation) floodplain elevation is 890.7 feet (NAVD88) for the North Branch of Bassett Creek upstream of TH 169 and downstream of Rockford Road. The updated XPSWMM floodplain elevation (Atlas 14 precipitation), but not yet adopted, floodplain elevation in this reach is 893.1 (NAVD88).

Proposed grading for the project includes work in the floodplain. However, information regarding floodplain impacts (fill in floodplain and flood levels) was not provided by the applicant.

## **Wetlands**

The project involves work within or adjacent to wetlands. The City of Plymouth is the LGU for administering the Minnesota Wetland Conservation Act of 1991.

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## Stormwater Management

The September 2015 BCWMC Requirements for Improvements and Development Proposals (Requirements) document requires that projects that contain more than one (1) acre of new or 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. As discussed below, all proposed peak flows meet the BCWMC requirement.

Under existing conditions, stormwater runoff flows to an existing wetland at the south end of the development that extends south of the development property.

The proposed stormwater management system includes a series of best management practices (BMPs), which ultimately discharge into the existing wetland. Drainage from the west portion of the site and a portion of off-site runoff from Rockford Road and Lancaster Lane will drain to two iron-enhanced sand filtration basins (P-1 and P-2) (see attached plan sheet showing BMPs). Treated runoff and overflow from the iron-enhanced sand filtration basins as well as overland flow from adjacent impervious surfaces will flow into another filtration basin (P-3). Treated runoff and overflow from filtration basin P-3, along with runoff from adjacent roofs, will flow into an infiltration basin with amended soil extended to the existing peat layer (P-4). Any overflow runoff from the infiltration basins will drain to a stormwater pond on the southeast corner of the site. The stormwater pond will be created by converting the northern portion of the existing wetland (north of the property line).

Stormwater from the central portion of the site will be directed to a wetland walk area (P-7a). Runoff from the roofs of two adjacent buildings and some surface overland flow will drain to permeable paver sections (P-7b) bordering the wetland walk. Soil amendments will be used to allow for infiltration below the permeable pavers. Overflow from the permeable pavers will flow to the wetland walk. Overflow from the wetland walk area will be routed to the stormwater pond. A water return system will be installed to recirculate water from the stormwater pond to the wetland walk to maintain optimum water levels in the wetland walk.

Stormwater from the western portions of the site will drain to two filtration basins (P-8 and P-9). Treated runoff and overflow from the filtration basins will drain to the stormwater pond. The proposed stormwater pond will be constructed with sediment forebays and an iron-enhanced sand filtration bench. Overflow from the stormwater pond will be routed into the remainder of the existing wetland to the south of the development property. The following table summarizes the existing and proposed peak discharges from the project area to the remainder of the existing wetland to the south of the proposed development.

<b>Storm Event</b>	<b>Existing Peak Discharge (cfs)</b>	<b>Proposed Peak Discharge (cfs)</b>
2-year	40.3	0.9
10-year	64.7	1.5
100-year	116.9	31.3

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## Water Quality Management

The BCWMC Requirements document requires that projects on sites without restrictions that create one (1) 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, the MIDS flexible treatment options approach shall be used following the MIDS design sequence flow chart.

The proposed Agora development creates 12.1 acres of reconstructed and new impervious area. The project would be required to capture and retain 1.1 acre-feet of runoff from the proposed development, however a geotechnical report indicates that the site consists of tight clay soils, therefore Flexible Treatment Option #2 was the first feasible option in the MIDS design sequence flow chart. The project is required to provide volume reduction to the maximum extent practicable and provide a 60% annual reduction in total phosphorus. The Agora development meets the BCWMC requirement as described below.

As discussed in the General Background and Comments section above, the Commission conditionally approved a financial contribution towards the Agora development for providing stormwater treatment “above and beyond” what is required, including: construction of a stormwater pond, additional stormwater BMPs to treat off-site areas, and wetland restoration south of the development. The current submittal includes final plans for all stormwater BMPs on the Agora development site and conceptual plans for the wetland restoration south of the development site.

The proposed BMPs on the development site will treat stormwater from the site and off-site areas with two iron-enhanced sand filtration basins, three filtration basins, one infiltration basin with amended soil extended to existing peat layer, an artificially created wetland walk area, permeable pavers, and a stormwater pond (MPCA Design Level 3) with sediment forebays and an iron-enhanced sand filtration bench. The table below summarizes the annual TP loading and removals for the stormwater BMPs.

Device	PP	DP	TP Loading (lbs/year)	PP	DP	TP	Percent Removal
	Loading (lbs/year)	Loading (lbs/year)		Removal (lbs/year)	Removal (lbs/year)	Removal (lbs/year)	
Iron-Enhanced Sand Filtration Basin (P-1) <sup>1</sup>	10.33	8.45	18.78	8.32	4.76	13.08	69.6%
Iron-Enhanced Sand Filtration Basin (P-2) <sup>1</sup>	2.27	3.90	6.17	1.83	2.20	4.03	65.3%
Bio-filtration Basin (P-3) <sup>1</sup>	1.03	2.18	3.21	0.83	0.39	1.22	38.0%
Infiltration Basin with Dry Well, Peat Storage (P-4) <sup>1</sup>	1.99	2.97	4.96	1.09	2.42	3.51	70.8%
Wetland Walk – Ponding (P-7a) <sup>1</sup>	1.92	1.57	3.49	1.05	0	1.05	30.1%
Permeable Pavers (P-7b) <sup>1</sup>	2.88	2.36	5.24	2.86	2.34	5.20	99.2%
Filtration Basin (P-8) <sup>1</sup>	0.50	0.41	0.91	0.42	0.15	0.57	62.6%

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Device	PP	DP	TP Loading (lbs/year)	PP	DP	TP	Percent Removal
	Loading (lbs/year)	Loading (lbs/year)		Removal (lbs/year)	Removal (lbs/year)	Removal (lbs/year)	
Filtration Basin (P-9) <sup>1</sup>	0.44	0.56	1.00	0.37	0.21	0.58	58.0%
Stormwater Pond, MPCA Design Level 3 (P-10) <sup>1</sup>	11.39	10.56	21.95	10.20	2.42	12.68	57.8%
<b>SUBTOTAL<sup>2</sup></b>	<b>28.09</b>	<b>26.95</b>	<b>55.04</b>	<b>26.96</b>	<b>14.88</b>	<b>41.86</b>	<b>76.1%</b>
Wetland Walk – Plant Uptake (P-7a) <sup>3</sup>					2.6	2.6	
<b>TOTAL<sup>2</sup></b>	<b>28.09</b>	<b>26.95</b>	<b>55.04</b>	<b>26.96</b>	<b>17.48</b>	<b>44.44</b>	<b>80.7%</b>

<sup>1</sup>Values provided from MIDS

<sup>2</sup>Values are the total removal values taken from MIDS, not a summarized value from the table

<sup>3</sup>Values provided from Kadlec, R.H. and S. D. Wallace. 2008. Treatment wetlands, second edition. CRC Press, Boca Raton, FL. p. 363.

According to the proposed plans and BCWMC requirements, 60% TP removal is required for the 17-acre development site. The TP removal goal for Agora is 14.15 lbs/year. The proposed project would treat the development site as well as off-site runoff, providing approximately 44.44 lbs/year of TP removal. The proposed TP removal exceeds the treatment goal by 30.29 lbs/year (44.44 – 14.15 lbs/yr).

The above table does not include proposed nutrient removals from the wetland restoration to the south of the development because the applicant did not provide design plans for the wetland restoration. Based on earlier information from the applicant (as presented at the December 2016 Commission meeting), the proposed wetland restoration is to provide an additional 79.16 lbs/year of TP removal. The wetland restoration is not required for the development based on the BCWMC Requirements, but is 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 General Background and Comments (see also agenda item 6Aii).

The wetland restoration design plans will be reviewed as part of the BCWMC's CIP review process and brought back to the Commission for review and approval.

## Erosion and Sediment Control

Since the area to be graded for the Agora development is greater than 10,000 square feet, the proposed project must meet the BCWMC erosion and sediment control requirements. Proposed temporary erosion control features include silt fence, inlet protection, rock construction entrances, biologs, concrete washouts, and street sweeping. Permanent erosion control features include seeding, erosion control blanket, and riprap.

## Recommendation

Conditional approval based on the following comments:

1. The wetland restoration plan must be submitted for Commission review as part of the Commission's CIP review process. The wetland restoration design must meet the Minnesota Stormwater Manual's design standards for a stormwater wetland (i.e., to achieve 40% TP removal).

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2. Portions of the Agora development involve work in the floodplain for the North Branch of Bassett Creek. The applicant must provide floodplain fill and mitigation documentation to demonstrate:
  - a. no net fill in the floodplain
  - b. no increase in flood stage as a result of the proposed project, and
  - c. that the minimum building elevations (lowest floor) are at least 2.0 feet above the 100-year flood elevation.

The current (TP40 precipitation) floodplain elevation is 890.7 feet (NAVD88) for Bassett Creek upstream of TH 169 and downstream of Rockford Road. However, the applicant should take into account the impact of the updated (Atlas 14 precipitation), but not yet adopted, floodplain elevation of 893.1 (NAVD88).

3. The applicant must clarify how the flow path for the Bassett Creek North Branch will be handled/changed as a result of the project. The North Branch appears to flow through the area that will be converted to a pond. Rerouting the creek will likely require a permit from the DNR because the North Branch is a DNR public watercourse.
4. Portions of the Agora development involve work in or adjacent to the North Branch of Bassett Creek, which may affect the streambanks. Documentation must be provided to demonstrate that the creek banks will be stable or stabilized as a result of the proposed project (see Section 2.3 and Section 7.0(3)(q) of the BCWMC Requirements document).
5. Offsite drainage must be accounted for in the existing and proposed conditions HydroCAD models. The modeling must demonstrate that the proposed project does not increase discharge rates.
6. While rate control is not required for offsite runoff which flows onto the project site, the proposed stormwater BMPs must be adequately designed to handle runoff from their respective drainage areas, which may include offsite runoff.
7. BMP storage volumes are not consistent between the HydroCAD model and MIDS model. Models must be modified accordingly or provide justification for the discrepancies.
8. Some permeable paver areas drain to the wetland walk area, while other permeable paver areas drain directly to the stormwater pond. This is not reflected in the HydroCAD or MIDS modeling. Models must be modified to represent the proposed conditions or justification provided for the current methodology.
9. In the proposed conditions MIDS model, an underground infiltration BMP is used to represent permeable pavers instead of a permeable pavement BMP. This methodology claims 100% volume reduction and 99% nutrient removal. Modify the model to represent the proposed BMP as permeable pavement or provide justification for the current methodology.
10. The "Proposed with Additional BMPs and Off-site Drainage" MIDS model and the "Loading from Off-site (North)" MIDS model are inconsistent with their soil types. Please clarify the hydrologic soil group (HSG) for the off-site drainage areas.

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11. For permeable paver design, the Minnesota Stormwater Manual states that *“Runoff from permeable areas is not recommended due to potential clogging of the permeable pavement. The at-grade contributing drainage area into permeable pavement should generally not exceed twice the surface area of the permeable pavement. This guideline helps reduce the rate of surface sedimentation. The 2:1 ratio can be increased to no greater than 5:1 if at least one of these conditions exists:*
  - a. *permeable pavement is receiving runoff from roofs as it tends to be very low in sediment; or*
  - b. *runoff from adjacent impervious surfaces remains unburdened with sediment due to effective pre-treatment prior to entering the permeable pavement.”*

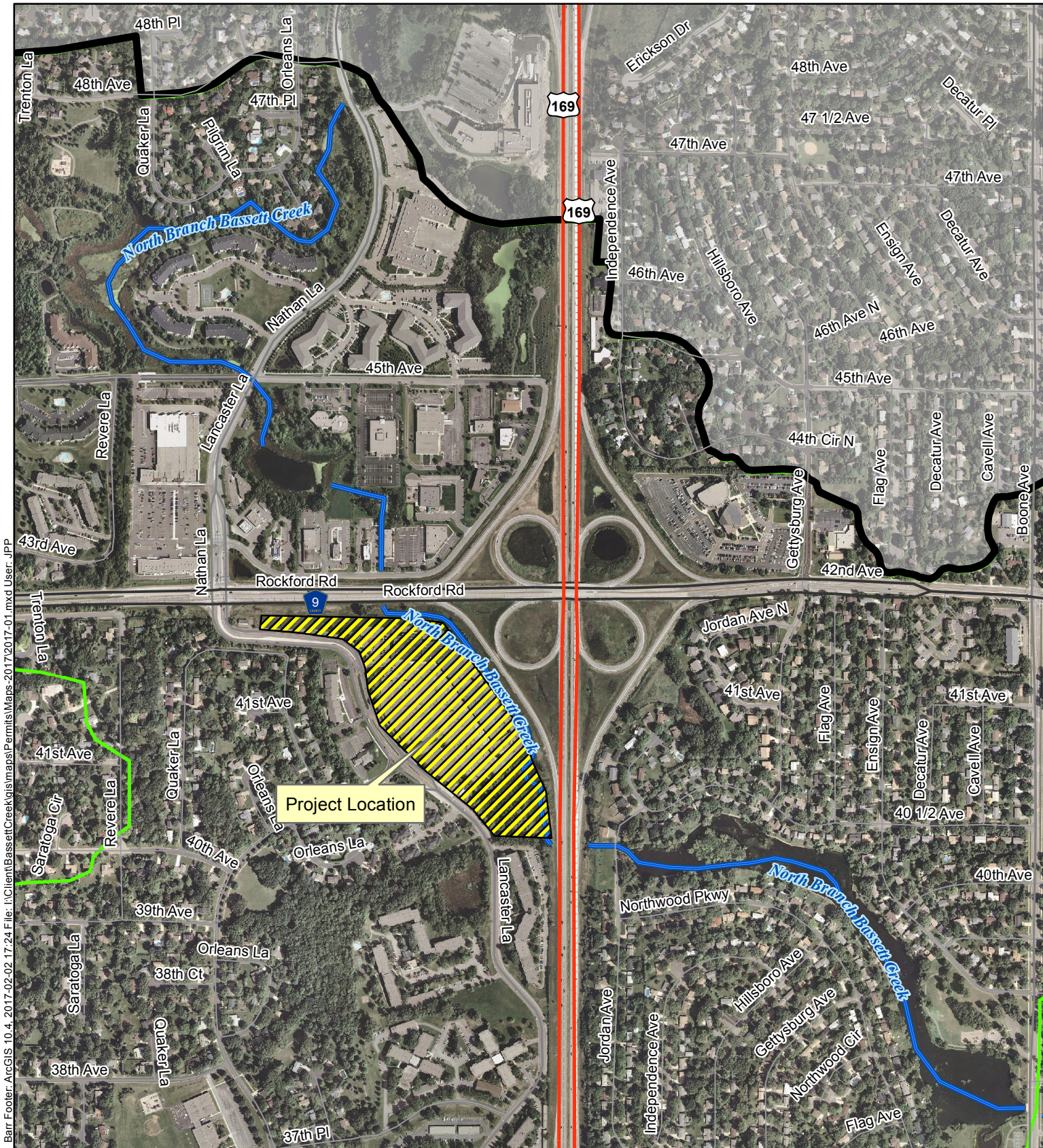
The provided MIDS model and Stormwater Management Plan indicate that the pervious pavers receive runoff from permeable surfaces and that the drainage area to surface area ratio exceeds 5:1. Modification of the pervious paver design to meet the recommendations of the Minnesota Stormwater Manual is recommended.
12. Documentation must be provided to demonstrate that the flow path length to pond width ratio is at least 1.5:1 for the proposed stormwater pond, as is required for a Minnesota Stormwater Manual stormwater pond design level 3.
13. The proposed stormwater pond design does not appear to have sufficient permanent pool volume (57,078 cf required based on 31.7 acre drainage area; 55,229 cf provided). The proposed stormwater pond must be revised to provide adequate storage to meet the Minnesota Stormwater Manual’s requirements for a stormwater pond.
14. A reference for the statement that “wetted peat has a storage capacity of at least 500% its weight” must be provided.
15. Effective energy dissipation devices or stilling basins to prevent erosion at all stormwater outfalls must be provided in accordance with the BCWMC Requirements document.
16. Rock construction entrances must have a minimum cut-off berm height of 2 feet above the adjacent roadway with maximum side slopes of 4H:1V.
17. The following erosion and sediment control notes must be added to the plans:
  - a. Temporary or permanent mulch must be uniformly applied by mechanical or hydraulic means and stabilized by disc-anchoring or use of hydraulic soil stabilizers.
  - b. Temporary vegetative cover must be provided consisting of a suitable, fast-growing, dense grass seed mix spread (at a minimum) at the MnDOT-specified rate per acre. If temporary cover is to remain in place beyond the present growing season, two-thirds of the seed mix shall be composed of perennial grasses.
  - c. Soils tracked from the site must be removed from all paved surfaces within 24 hours of discovery through the duration of construction.
18. A maintenance agreement must be established between the owner and the City for the proposed stormwater BMPs. Plant harvesting needed to maintain the “plant uptake” TP removal should be included in the maintenance agreement.

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19. Revised drawings (paper copy and final electronic files), and all modified supporting information (MIDS model, HydroCAD model, references, etc.) must be provided to the BCWMC Engineer for final review and approval.

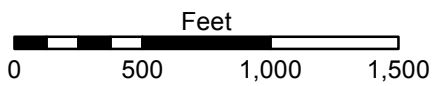




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Imagery Source: Aerial Express (2009)

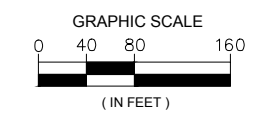
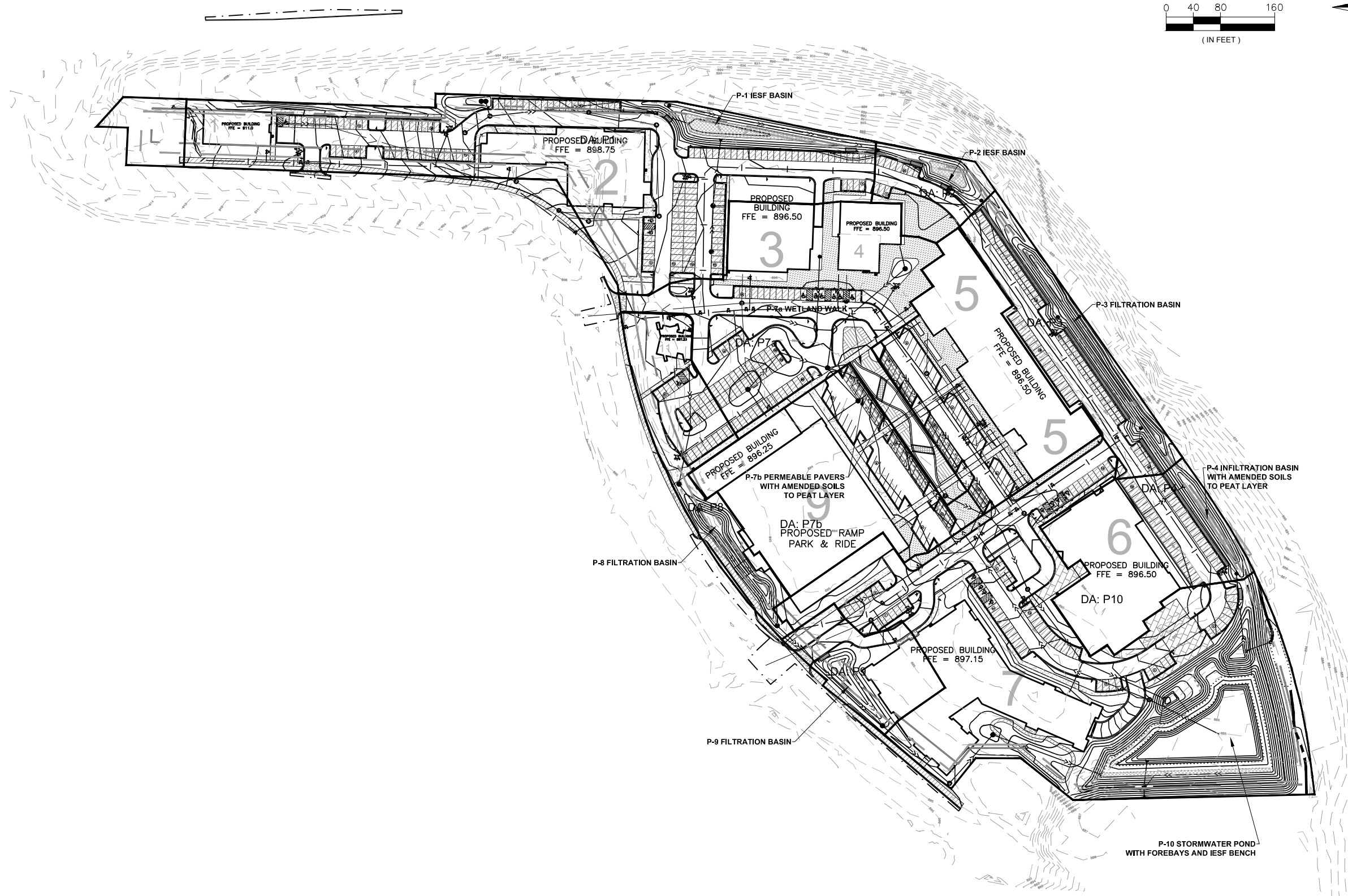
-  Project Location
-  Bassett Creek
-  WMC Boundary
-  Major Subwatershed
-  Municipality
-  Stream



**LOCATION MAP  
APPLICATION 2017-01  
Agora Development  
Plymouth, MN**



CADD USER: Nathan Warner FILE: C:\USERS\NATHAN W\DROPBOX\PROJECTS\160301 - 4 SEASONS REDEVELOPMENT\WORKING FILES\CADD\DWG\PRO-DA.DWG PLOT SCALE: 1:2 PLOT DATE: 1/27/2017 2:50 PM



REVISIONS BY	

I HEREBY CERTIFY THAT THIS PLAN OR SPECIFICATION WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED CIVIL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

CIVIL ENGINEER \_\_\_\_\_ REG. NO. \_\_\_\_\_  
 DATE: \_\_\_\_\_

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318 Cedar Street  
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**PRO-DA MAP**

AGORA  
PLYMOUTH, MN

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SHEET

**PRO-1**