

Memorandum

To: Bassett Creek Watershed Management Commission (BCWMC)
From: Barr Engineering Co.
Subject: Item 5D. Consider Approval to Provide Financial Contributions for Stormwater Management at Agora Development, Plymouth
BCWMC December 15, 2016 Meeting Agenda
Date: December 9, 2016
Project: 23270051 2016 623

5D. Consider Approval to Provide Financial Contributions for Stormwater Management at Agora Development, Plymouth

Recommendations:

- i. Change the Four Seasons Mall Area Water Quality Project (2013 CIP NL-2) from the original design to the project presented here.
- ii. 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.

Background and stormwater management overview

At their meeting in September 2013, the BCWMC conditionally approved 90% plans for the Four Seasons Area Water Quality Project (near Hwy 169 and Rockford Road in Plymouth – see attached location map) that included restoration of a channel upstream of the mall and creation of a stormwater pond. The project was never built due to residents' concerns with tree loss. The BCWMC CIP budget still includes approximately \$850,000 for that project. Since then, the city and BCWMC have been waiting for the mall area to redevelop.

At their meeting this August, the Commission received a presentation from Solution Blue 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 some funding (in the ballpark of \$500,000) toward stormwater management features that would go "above and beyond" pollutant removal requirements for the redevelopment. The following action was taken at the August meeting:
Commissioner Black moved that the Commission move forward with exploring a partnership with Rock Hill Management through an agreement with the City of Plymouth and that Commission staff continue to gather and assess additional information for further consideration including technical and legal issues.

Rock Hill Management and their consultants (Solution Blue and AES) have been working to refine the possible stormwater management features for the site. The following table summarizes three alternatives for the site, with further detail, tables, and diagrams further in this memo. The alternatives presented build off of each other, but the pollutant removal numbers are not additive due to additional BMPs providing stormwater treatment upstream of the proposed stormwater pond. The City of Plymouth may

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also bring information on additional BMP ideas to this meeting. The City did provide a letter regarding the developer's TIF (tax increment financing) request (attached in the meeting materials).

Summary Table: (Note: Alternatives build on each other, but pollutant removals are not additive)

Alternative	Description	Treated Area	TP Removal (lbs/yr)	Total Cost	30-year Annualized Cost Per Pound TP Removed
Alt 2 (meets requirements)	Stormwater pond (P10) @ southern end of site	Redevelopment site	14.88	\$502,500	\$1,846
Alt 3 (Alt 2 + additional BMPs)	P10 + permeable pavers, wetland walk, 2 iron enhanced sand filtration basins, 2 infiltration with peat storage	Redevelopment site + 6.5 acres impervious area north of Rockford Rd. + 4.38 acres impervious area	45.19 (30.31 lbs above required) (NOTE: Pollutant removals for Alt 2 and 3 are not additive)	\$1,173,860	\$1,485 (\$1,308/lb for pollutant removal above requirements)
Alt 4 (Alt 3 + wetland restoration)	All of Alt 3 + restoration of wetland on city-owned land south of P10	All of Alt 3 + 3.74 acres tributary to wetland	124.35 (109.47 lbs above required)	\$1,423,860	\$675 (\$515/lb for pollutant removal above requirements)
TOTAL AMOUNT ABOVE AND BEYOND REQUIREMENTS			109.47	\$921,360	\$515

As noted above, Alternative 4 provides 109.47 pounds of total phosphorus removal above and beyond the BCWMC's requirements, at an annual cost of \$515/pound. The previously-approved Four Seasons Mall Area Water Quality Project was to remove 105 pounds of total phosphorus at an annual cost of \$589/pound of total phosphorus removed (2016 dollars). Because the proposed Alternative 4 will provide at least as much treatment as the previously-approved project, staff recommends that the Commission consider contributing funds from the BCWMC CIP budget towards this alternative.

Proposed stormwater management practices

The following is a summary of the BMPs proposed for each alternative:

Alternative 1 is existing/pre-development conditions, as described in the developer's stormwater report. Because this alternative does not include proposed water quality treatment BMPs, while Alternatives 2-4 do include water quality treatment BMPs, no further information or discussion about Alternative 1 is provided.

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The developer of the site proposes three treatment alternatives for the site (Alternatives 2 – 4). See the attached figures, which show the BMP locations and flow paths of water through the site for each alternative.

Alternative 2 (meeting BCWMC requirements): This alternative includes construction of a stormwater pond (BMP P10 on the treatment train figure) to provide water quality treatment for the 17.07-acre redevelopment site, with 13 acres of impervious area. The treatment pond is designed to meet the MIDS requirements of the BCWMC's September 2015 *Requirements for Improvements and Development Proposals* for the redevelopment project. If the performance goal cannot be met due to site restrictions, the Requirements document requires that the applicant use the MIDS flexible treatment options approach, following the MIDS design sequence flow chart. Because of poor infiltrating soils on the site (clay), the Agora development is pursuing Flexible Treatment Option (FTO) Alternative Number 2, in accordance with the MIDS Design Flow Chart. FTO No. 2 includes achieving volume reduction to the maximum extent practical, removing 60 percent annual total phosphorus load, and considering relocation of project elements to address varying soil conditions and other constraints across the site. The stormwater pond will meet the MPCA Stormwater Manual criteria for a Design Level 3 pond (the pond design with the highest estimated water quality treatment) and will be constructed from a portion of the wetland at the southeastern corner of the site. The wetland work will require approvals from the Wetland Conservation Act LGU, and potentially from state and federal agencies. The pond will include sediment forebays and an iron-enhanced sand berm. Construction of the pond will require a modification of the flow path of the North Branch of Bassett Creek; this modification will require approvals from BCWMC and the Minnesota Department of Natural Resources (MDNR).

The developer is not requesting financial contributions for this alternative and the construction work is limited to the Agora site only.

Alternative 3 (Alternative 2, plus additional stormwater BMPs treating off-site area): This alternative will remove 30.31 pounds of total phosphorus above and beyond the BCWMC's required pollutant removal. This alternative includes treatment for:

- 1) The redevelopment area (17.07-acre site, with 12.3 acres of impervious area and 0.7 acres of permeable pavers)
- 2) An additional off-site area north of Rockford Road (6.5-acre area, 6.5 acres of impervious area). The captured volume is limited by the capacity of the proposed system; the remainder of the flow bypasses the site and flows into the North Branch of Bassett Creek, as it does under existing conditions.
- 3) Additional off-site area resulting from diverting low flows from the North Branch of Bassett Creek into the proposed stormwater pond (19.01 acres, 4.38 acres impervious area).

The proposed BMPs include the stormwater pond from Alternative 2, permeable pavers, a "wetland walk" treatment area with water quality storage and wetland plant harvesting, two iron-enhanced sand filtration basins, two filtration basins, and two infiltration basins with amended soil extending down to the

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underlying peat layer that provides additional storage/infiltration volume. Below is a description of the flow path through the proposed BMPs:

- Stormwater from north of Rockford Road, Lancaster Lane, surface drainage, and buildings 1, 2, and 3 rooftops enter basin P1 (iron-enhanced sand filtration basin). Surface drainage, overflow, and daintile from basin P1 drain to basin P2 (iron-enhanced sand filtration basin). Surface drainage plus overflow and daintile from basin P2 enter basin P3 (infiltration basin with peat storage). Surface drainage plus overflow and daintile from basin P3 enter basin P4 (infiltration basin with peat storage). Basins P3 and P4 include amended soils that allow infiltration of stormwater from the basin to the peat body. The peat body has about 65,000 cubic feet of anticipated storage. Overflow from this treatment train enters the sediment forebay of the pond (P10).
- Rooftop drainage from buildings 5 and 9 enters P7b (permeable pavement subsurface drainage/storage). This drains to another peat body with about 24,000 cubic feet of anticipated storage. Overflows from P7b will enter the storm sewer that enters the wetland walk (P7a). Rooftop drainage from buildings 4 and 10, plus additional surface drainage enter the wetland walk (P7a). The discharge from the wetland walk discharges to the sediment forebay of the pond (P10).
- Rooftop drainage from building 8 enters basin P8 (filtration basin), along with surface drainage. Basin P8 daintile and overflows discharge to the pond (P10). Surface drainage enters basin P9 (filtration basin). Daintile collection conveys basins P8 and P9, and building 7 rooftop drainage to the pond (P10).

The developer is requesting financial contributions from the BCWMC for this alternative due to additional stormwater treatment beyond the 60% total phosphorus removal required for the redevelopment site; the construction work is limited to the Agora site only.

Alternative 4 (Alternative 3, plus wetland restoration): This alternative removes 109.41 pounds of total phosphorus above and beyond the BCWMC's required pollutant removal. This alternative includes the treatment provided by Alternative 3 PLUS wetland restoration to improve nutrient removal efficiency of the existing wetland south of the Agora redevelopment. Treatment is provided for the redevelopment site, the additional off-site watershed area treated in Alternative 3, plus an additional 3.74 acres of watershed area tributary to the existing wetland that will be restored. The proposed wetland restoration design will reconfigure the preferential flow path that limits the total phosphorus removal efficiency of the existing wetland. The proposed design is a multi-cell system with a longer flow path, deeper wetland areas, and shallower wetland meadow areas that will increase the opportunity for sediment and phosphorus deposition and organic phosphorus uptake by plant roots and shoots.

The existing wetland is a part of the North Branch of Bassett Creek which is part of the BCWMC's trunk system. This means the project will need to meet the BCWMC's floodplain requirements for the creek, which includes this wetland. Therefore, the project will have to demonstrate that there is no rise in the

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creek elevation and no loss in floodplain storage. State and federal approvals may be needed for the wetland restoration.

The proposed wetland restoration is located on City of Plymouth property. This alternative involves the developer, in cooperation the City of Plymouth, requesting financial contributions from the BCWMC for additional stormwater treatment provided on the redevelopment site and on City of Plymouth property beyond the 60% total phosphorus removal required for the redevelopment site.

Estimated pollutant removals and costs

The project analysis used a combination of the MIDS calculator and the BCWMC's water quality (P8) model to estimate the pollutant removal provided by each BMP for each alternative. Following is a summary of the estimated pollutant removals provided by each alternative:

Alternative 2 (meeting BCWMC requirements):

BMP	TP Load (lbs/yr)	TP Removal (lbs/yr)	TP Removal (%)
P10 - Stormwater Pond	24.87	14.88	60

Alternative 3 (Alternative 2, plus additional stormwater BMPs treating off-site area):

BMP	TP Load (lbs/yr)	TP Removal (lbs/yr)	TP Removal (%)
P1 – Iron Enhanced Sand Filter Basin	18.74	9.84	53%
P2 – Iron Enhanced Sand Filter Basin	9.39	4.80	51%
P3 – Infiltration Basin with Peat Storage	5.84	5.79	99%
P4 – Infiltration Basin with Peat Storage	2.05	2.05	100%
P7a – Wetland Walk Ponding	3.87	1.16	30%
P7a – Wetland Walk Plant Uptake	0	2.6	NA (no direct runoff to this BMP, load represented in other BMPs)
P7b – Permeable Pavers	5.84	5.84	100%
P8 – Filtration Basin	0.27	0.14	52%
P9 – Filtration Basin	0.78	0.35	45%
P10 – Stormwater Pond (Alternative 2)	21.72	12.62 ¹	58%
Total	68.50	45.19	66%

¹ Lower removal (12.62 vs. 14.88 lbs) due to the additional BMPs upstream of the pond, which treat stormwater runoff.

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Alternative 4 (Alternative 3, plus wetland restoration):

BMP	TP Load (lbs/yr)	TP Removal (lbs/yr)	TP Removal (%)
Proposed Wetland Restoration			
<i>Current Wetland</i>	230.44	13.02	6%
<i>Proposed Wetland Restoration</i>	230.44	92.18	40%
Subtotal: Additional TP Removal Provided by Proposed Wetland Restoration	230.44	79.16	34%
Alternative 3 BMPs	68.50	45.19	66%
Total	298.94	124.35	42%

Summary of total phosphorus removal:

Scenario	TP Removal (lbs/yr)	TP Removal for Potential BCWMC Financial Contribution (lbs/yr)
Alternative 2 (meeting BCWMC requirements)	14.88	0
Alternative 3 (Alternative 2, plus additional stormwater BMPs treating off-site area)	45.19	30.31
Alternative 4 (Alternative 3, plus wetland restoration)	124.35	109.47

Following is a summary of the construction and maintenance costs for each alternative and the associated annualized cost per pound of phosphorus removed.

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BMP	TP Removal (lbs/yr)	Construction Cost (\$)	Annual Cost (\$/lb TP Removed/yr)
Alternative 2 (meeting BCWMC requirements)			
P10 – Stormwater Pond	14.88	\$502,500	\$1,846
Alternative 2 Total for Potential BCWMC Financial Contribution (excludes Stormwater Pond costs)	0	\$0	\$0
Alternative 3 (Alternative 2, plus additional stormwater BMPs treating off-site area)			
P1 – Iron Enhanced Sand Filter Basin	9.84	\$45,000	\$1,217
P2 – Iron Enhanced Sand Filter Basin	4.80	\$31,700	
P3 – Infiltration Basin with Peat Storage	5.79	\$50,000	
P4 – Infiltration Basin with Peat Storage	2.05	\$38,900	
P7a – Wetland Walk Ponding	1.16	\$271,000	
P7a – Wetland Walk Plant Uptake	2.6		
P7b – Permeable Pavers	5.84	\$201,760	
P8 – Filtration Basin	0.14	\$20,000	
P9 – Filtration Basin	0.35	\$13,000	
Alternative 2	12.62 ¹	\$502,500	\$2,176
Subtotal	45.19	\$1,173,860	\$1,485
Alternative 3 Total for Potential BCWMC Financial Contribution (excludes Stormwater Pond treatment and costs)	30.31 ²	\$671,360	\$1,308
Alternative 4 (Alternative 3, plus wetland restoration)			
Wetland Restoration	79.16	\$200,000	\$212
Alternative 3	45.19	\$1,173,860	\$1,485
Subtotal	124.35	\$1,373,860	\$675
Alternative 4 Total for Potential BCWMC Financial Contribution (excludes Stormwater Pond treatment and costs)	109.47 ²	\$921,360	\$515

¹ Lower removal (12.62 vs. 14.88 lbs) due to the additional BMPs upstream of the pond, which treat stormwater runoff.

² The total for potential BCWMC contribution is the subtotal less the amount of treatment required by BCWMC (14.88 lbs)

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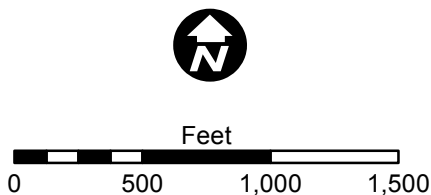
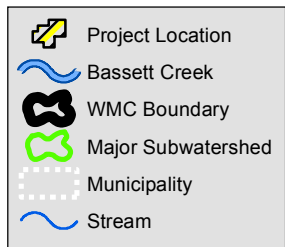
Recommendations

- 1) Change the Four Seasons Mall Area Water Quality Project (2013 CIP NL-2) from the original design to the project presented here.
- 2) Conditional approval for the BCWMC to provide funds from the BCWMC CIP budget as a financial up to the nearly \$850,000 available in the CIP budget as a financial contribution towards Alternative 4, which will provide stormwater treatment above and beyond the BCWMC's requirements at the Agora development (old Four Seasons Mall site) in Plymouth, based on the following conditions:
 - a) 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.
 - b) 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.
 - c) The BCWMC must obtain BWSR approval to substitute this new CIP project for the original Four Seasons Mall Area Water Quality Project.
 - d) The developer must obtain all required local, state, and federal permits for the project.
 - e) 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.

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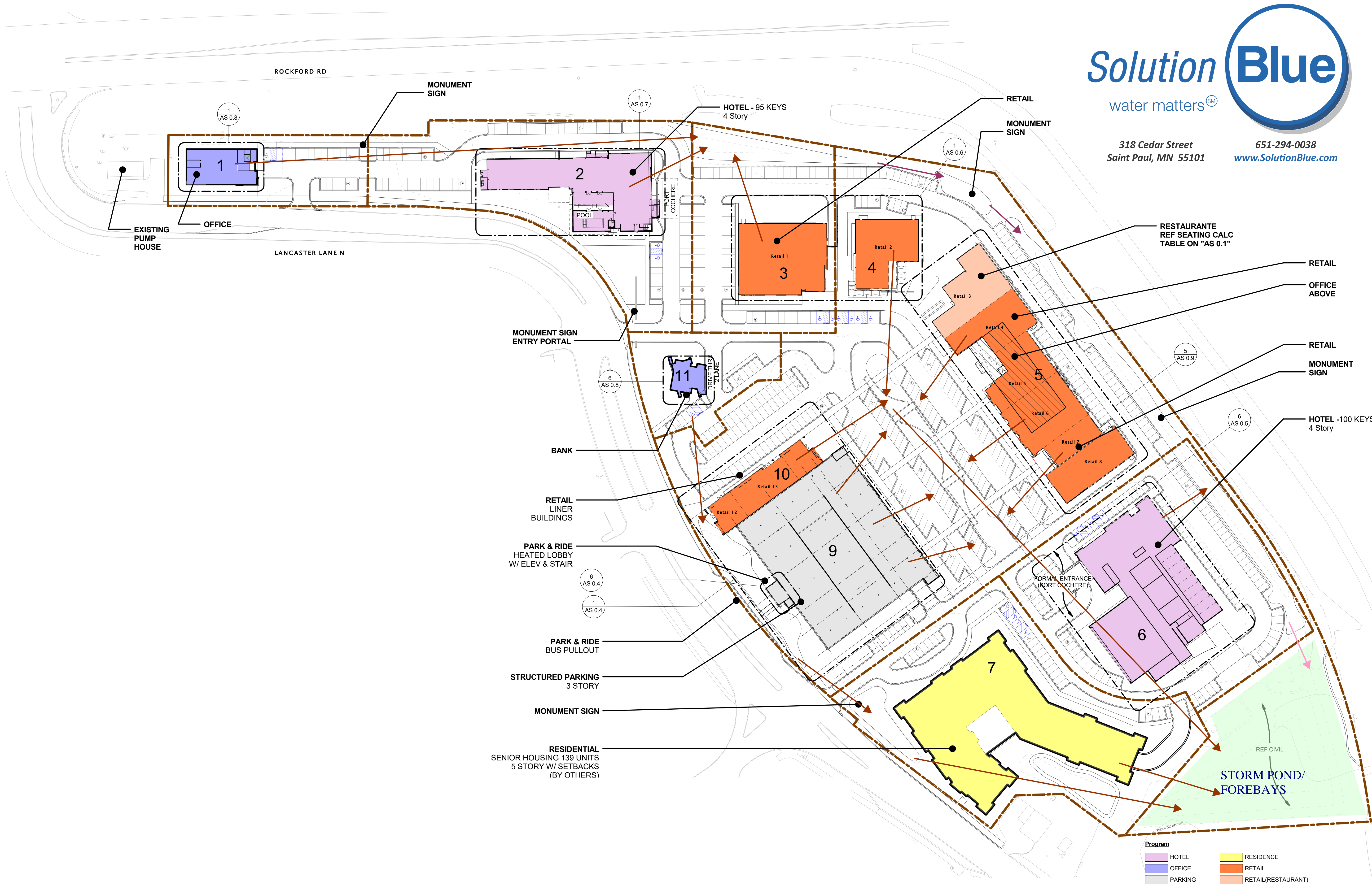


Imagery Source: Aerial Express (2009)



LOCATION MAP
Agora Development
Rockford Road and Highway 169
Plymouth, MN

Alternative 2 - On-site Only



Solution Blue

water mattersSM

318 Cedar Street
Saint Paul, MN 55101

651-294-0038

www.SolutionBlue.com

AGORA
PLYMOUTH MN

esg

elness swenson graham architects

500 washington avenue south
minneapolis minnesota 55415
p. 612.339.5508
f. 612.339.5382
www.esgarch.com

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed architect under the laws of the State of Minnesota.

Gretchen M. Camp

Signature
Gretchen M. Camp
Typed or Printed Name
46433 exp. 06/30/2018
License # Date

NOT FOR CONSTRUCTION

PUD SUBMITTAL
12/9/2016

ORIGINAL ISSUE: 09/13/2016

REVISIONS

No.	Description	Date
A	PUD SUBMISSION	8/15/2016
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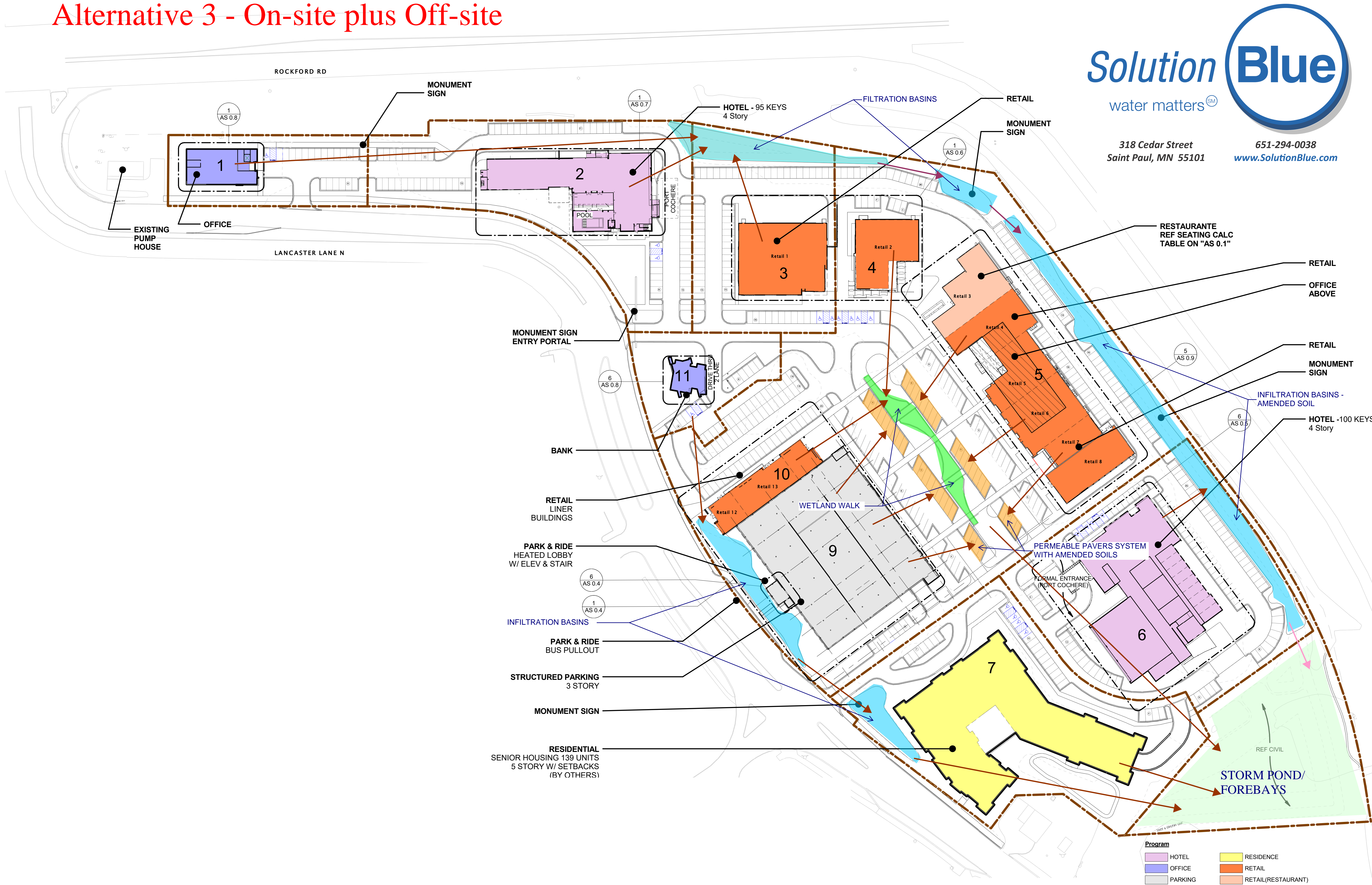
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KEY PLAN

AGORA

SITE PLAN
AS 0.1

Alternative 3 - On-site plus Off-site



Solution Blue
water mattersSM

318 Cedar Street
Saint Paul, MN 55101

651-294-0038
www.SolutionBlue.com

AGORA
PLYMOUTH MN

esg
elness swenson graham architects

500 washington avenue south
minneapolis minnesota 55415
p. 612.339.5508
f. 612.339.5382
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I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed architect under the laws of the State of Minnesota.

Gretchen M. Camp
Signature
Gretchen M. Camp
Typed or Printed Name
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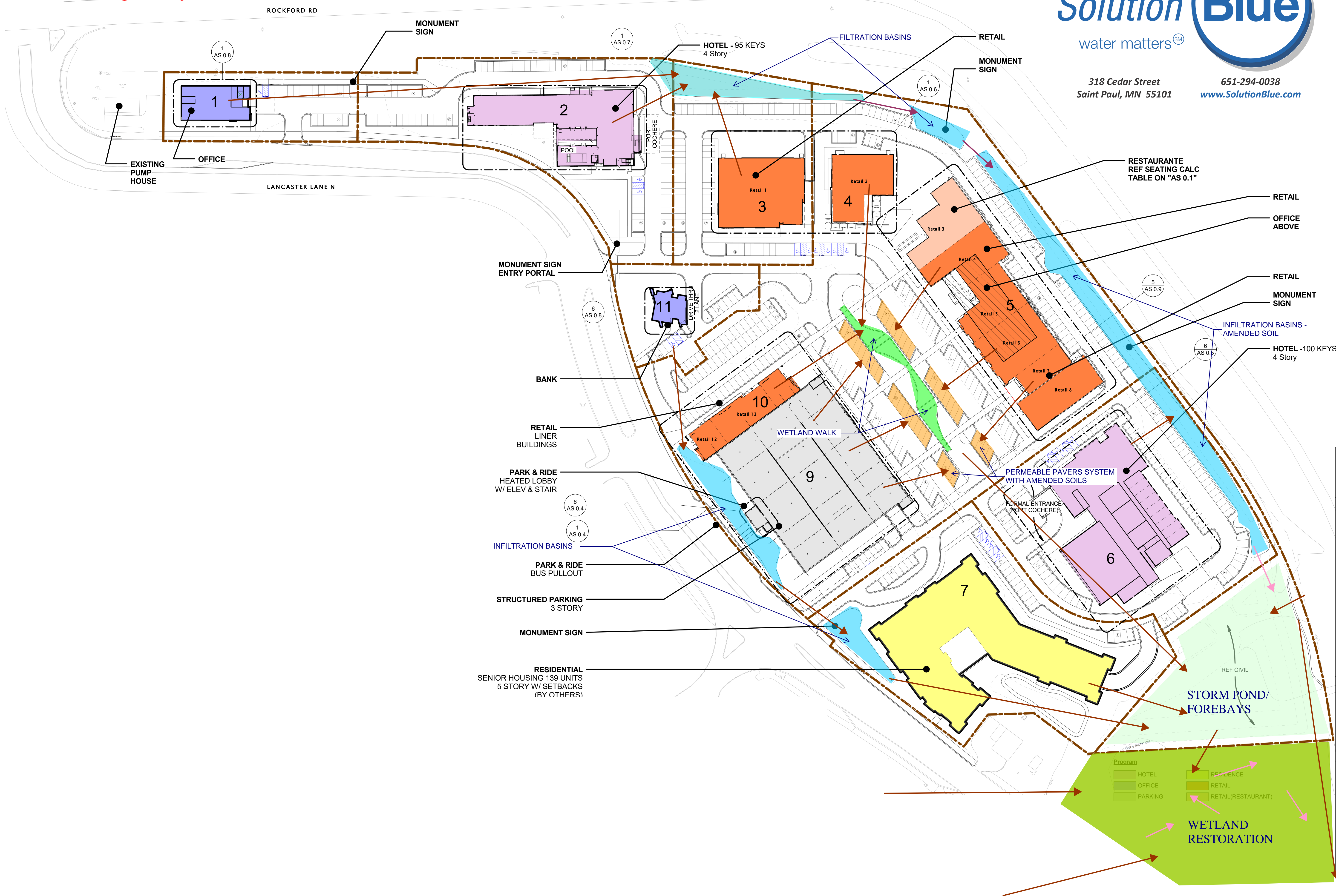
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KEY PLAN

AGORA

SITE PLAN
AS 0.1

Alternative 4 - On-site plus Off-site including City Wetland Restore



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Saint Paul, MN 55101

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www.SolutionBlue.com

AGORA
PLYMOUTH MN

esg
elness swenson graham architects

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minneapolis minnesota 55415
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f. 612.339.5382
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KEY PLAN

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