REVISED

STORMWATER IMPACT STATEMENT

FOR

Aydan Court

Chapel Hill, NC

Prepared for:
CAZCO, Inc.

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REVISED October 31, 2008
REVISED January 6, 2009

Drainage System Revisions – October 31, 2008

The revised stormwater system proposed for Aydan Court will provide stormwater quality and volume controls which will allow the site runoff to exceed the Town of Chapel Hill standards. Our initial SUP submittal used a hydrodynamic separator to achieve 85 % TSS which met the Town's stormwater quality standards. The Town's stormwater peak flow requirement was being managed by using stormwater storage on site. The 2-year volume requirement was being achieved by using rainwater harvesting and irrigating the captured stormwater. These elements from the original plan will still be used in our revised stormwater plan.

We have added additional stormwater elements to the plan that will provide these added benefits:

1. Additional Bioretention and Infiltration basins have been added to the stormwater design that will improve stormwater quality.

2. We have created additional stormwater discharge points instead of one to disperse flow and reduce the potential impact cause by having just one discharge point.

3. We have added additional 'point source' stormwater basins closer to the source of runoff that will achieve additional quality (pollutant) and quantity (volume) reductions.

4. We have provided several smaller bioretention basins and one large infiltration basin that will remove nitrogen, phosphorous and other dissolved metals that would not be removed by the hydrodynamic separator. The primary purpose of the hydrodynamic seperator is to remove the Total Suspended Solids (TSS) which satisfies the Town's water quality component. These newly proposed changes allow Aydan Court to also comply with the proposed Jordan Lake water quality standards that have not yet been adopted but are expected to be adopted sometime in 2009 or 2010.

5. Most of the site will now pass through 2 or 3 water quality structures in series (bioretention, hydrodynamic separator or infiltration basin). The State Stormwater BMP manual provides a method to compute the efficiency of the pollutant removal of several basins in series. This calculation works for Total Suspended Solid removal as well as Nitrogen, Phosphorous and dissolved metals. Two basins in series having 85% TSS removal capability of each basin will result in 97.5% TSS removal when the stormwater passes through both basins.

6. The bioretention basins have been designed in locations where landscaping was planned so no additional clearing of the site is required to construct these basins.

7. By adding a retaining wall along our entrance road, we were able to reduce the proposed cleared area inside the RCD by approximately 1500 sf (area shaded on the revised plan). By proposing an open bottom arched culvert, the stream channel will be left in its natural form. The arched culvert will be oversized to allow wildlife and humans to pass through the culvert.

Drainage System Revisions – January 6, 2009

The most significant revision made since the last Stormwater impact statement submittal on October 2008 was to incorporate stormwater reuse or harvesting to flush commodes inside the 33 unit condominium building. All of the stormwater that falls on the 17,900 sf roof surface of the new building will be captured and stored in a tank to be used for flushing the commodes in the condo building. This will supply the commodes all year and only supplemented with public water during dry periods as needed. The site has 10,000 square feet of proposed impervious surface. The condo building surface area is 65% of the total impervious area.

The area being used for rainwater harvesting to irrigate the site is 14,150 sf or 29% of the total impervious area. This stormwater comes from the courtyard and townhouse roof areas and will be stored in a large tank. This stormwater will be used to irrigate the landscaped areas during the spring, summer and fall which equates to approximately 3 months of the year.

The rainwater harvesting system for the condominium building and the reuse system to supply irrigation water will effectively remove 28.9% (65% + 29%) of the impervious area on site.

The following changes were made to the latest plans and SWIS:

1. Incorporate New Stormwater Harvesting to supply commodes in condo building with stormwater from the roof of the same building.

2. Added new bioretention basins 8A and 9.

3. The underground stormwater storage and infiltration tank located near the discharge point was designed to store at a minimum the 25-year storm event per the Town's stormwater regulations. We have completely removed some of the stormwater discharge (6% of the impervious area) through rainwater harvesting. We have also reduced additional discharge and slowed down the flow path through the site by adding additional small bioretention basins throughout the site. The result is now that we will capture completely all rain events to and including the 100-year storm event. We will slowly release this stormwater from the storage and infiltration tank in a trickle flow at around .0 cubic feet per second or less.

The following is a description of each facility being proposed at Aydan Court:

Stormwater Harvesting tank #1A – Supply for commodes in the 33 unit condo building

Basin 1A is a rainwater harvesting tank that will capture all of the stormwater from the roof of the condo building and store it to be used to flush the commodes in that building. The location of the storage tank will be under the condo building where the covered parking is or adjacent to and outside the building. The exact location of this tank will be determined at the ZCP drawing phase. The condo building includes 37 units of 1, 2 and 3 bedroom design. There are a few bathrooms serving a small gym and meeting room that will be supplied with this water also. The following is the calculation that matches the supply with the demand from the condo building:

SUPPLY: Yearly Average: 48 inches of rain over 12 months (avg.)
4 inches of rain per month average

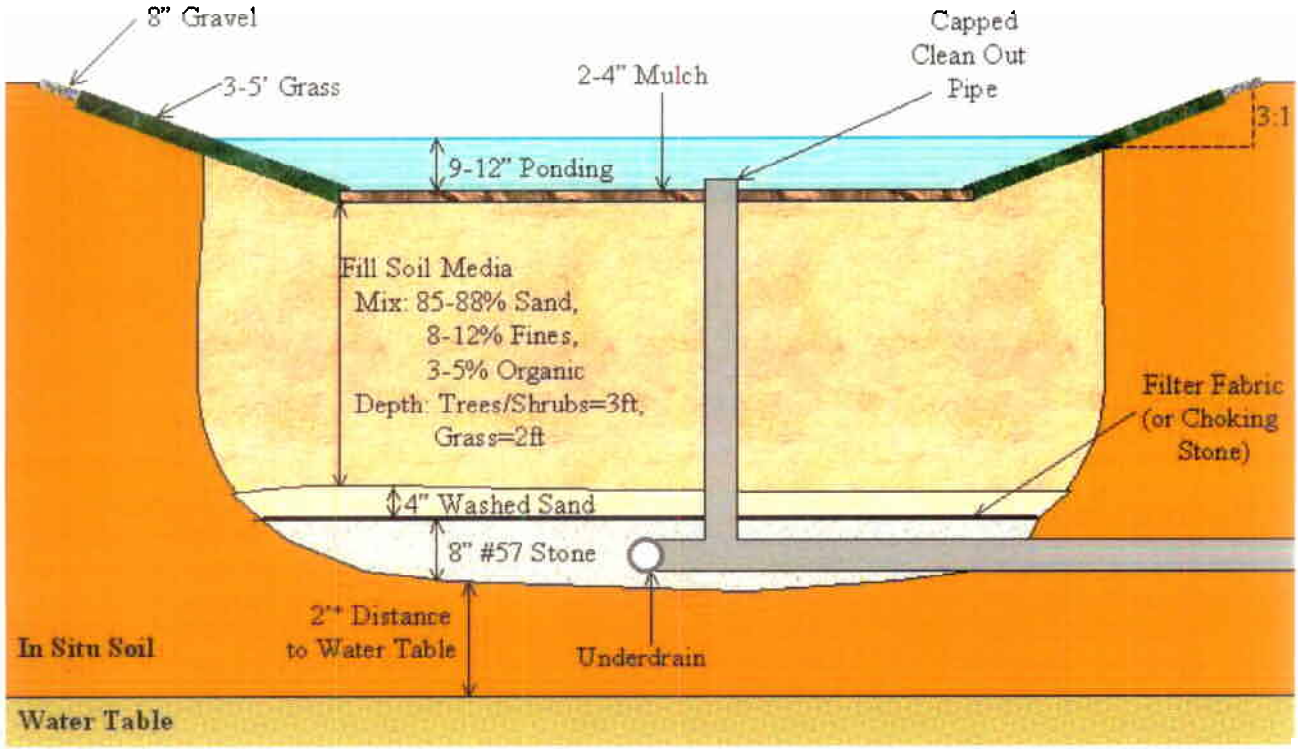
17,900 sf x .333 feet (4 inches) = 5,966.61 cubic feet of water/mo.
5,967 cf. x 7.48 gal/cf. = 44,633 gallons / 31 days = 1440 gpd

DEMAND: 37 units x 2 people avg. = 74. Use 100 to account for guests, and periods of higher demand. 100 people x 8 flushes per day x 1.6 gal per flush = 1280 gpd

Summary: There is 1440 gpd of supply from the roof surface of the condo building. The demand from the building is 1280 gpd. The storage tank will be sized to hold enough water to meet daily commode flushing requirements. The storage tank will be sized at the construction drawing phase along with the rest of the system design.

Basin #2A

Basin 2A is a bioretention basin positioned to capture runoff from the parking lot in front of the condominium building. This basin will provide quality benefits including TSS, nitrogen, phosphorous and dissolved metals removal. Storm events greater than 1" runoff will pond to 9" depth inside the basin and spill into proposed riser structure CB4. The stormwater will then be treated again in the Hydrodynamic Seperator and again inside the infiltration basin. The following picture is an example of a bioretention basin inside a parking lot.

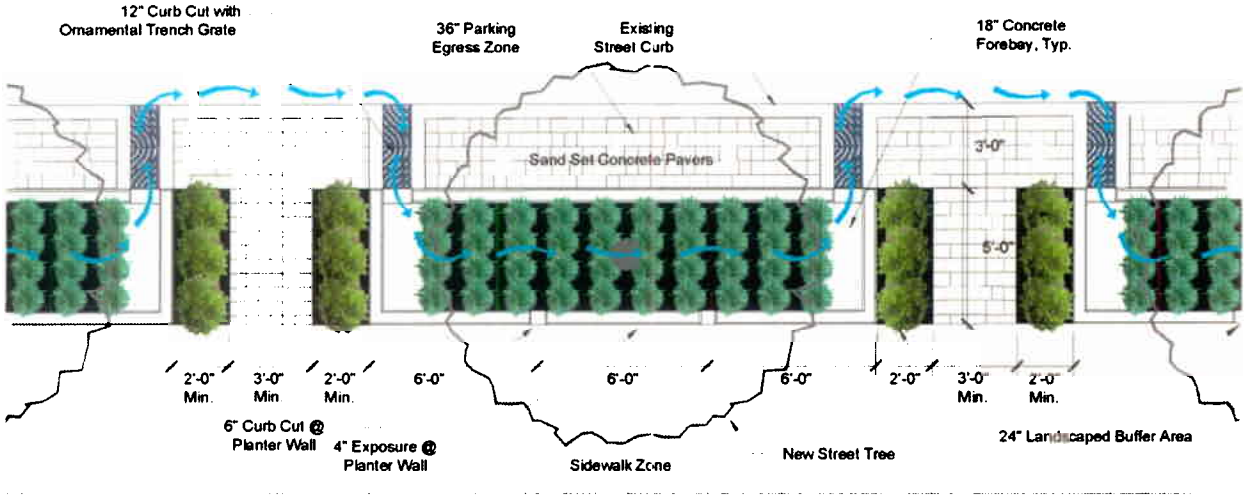


Basin #3A

Basin 3A is a bioretention basin similar to Basin 2A. This basin will capture runoff from the second half of the condominium roof area and provide quality benefits including TSS, nitrogen, phosphorous and dissolved metals removal. Storm events greater than 1" runoff will pond to 9" depth inside the basin and spill into proposed riser structure CB6. The stormwater will then be treated again in the Hydrodynamic Seperator and again inside the infiltration basin.

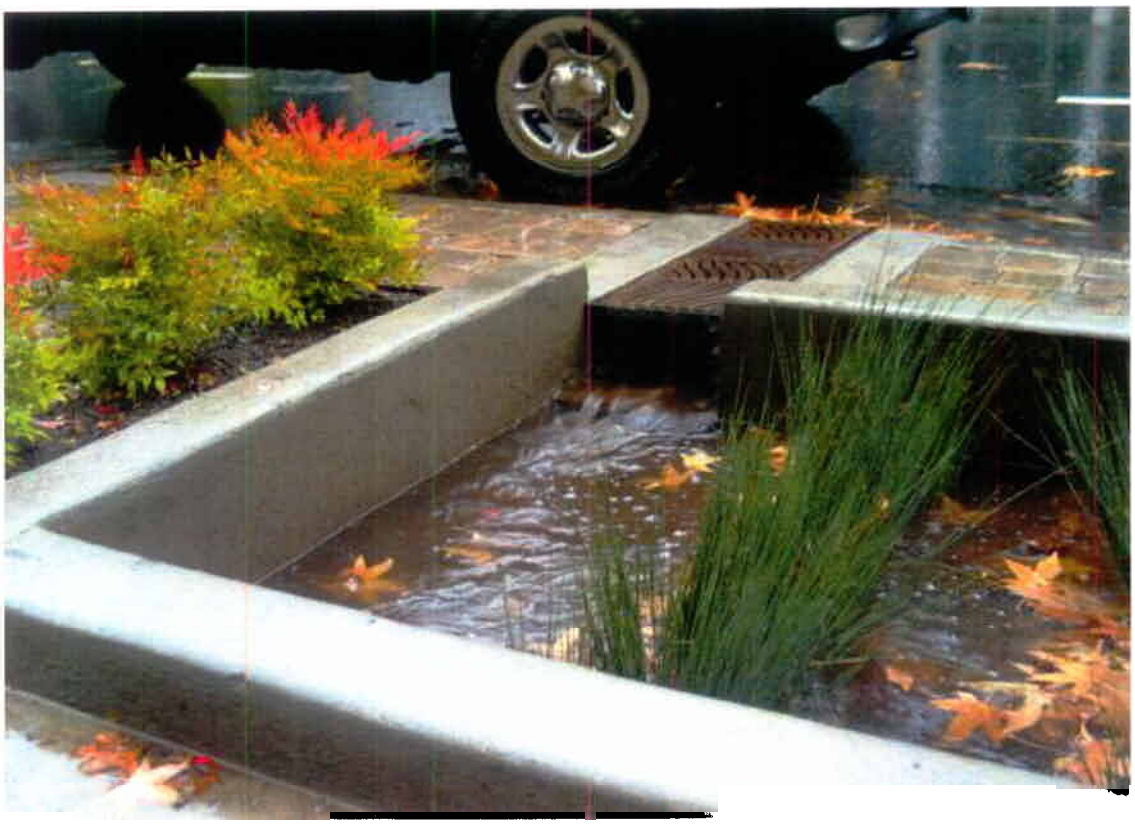
Basin #4A

Basin #4A is a Green Street Basin used in Portland, Oregon to provide bioretention along streets and urban environments. This basin will capture runoff from the adjacent street and roof runoff from a few townhouses and provide quality benefits including TSS, nitrogen, phosphorous and dissolved metals removal. Storm events greater than 1" runoff will pond to 9" depth inside the basin and spill back into the gutter of the street where it will flow to proposed inlet structure CB7. This type of basin works well in narrow, linear areas commonly found adjacent to streets. The following images show what a green street type bioretention basin looks like.



SW 12th Avenue Stormwater Planter ~ Enlarged Plan

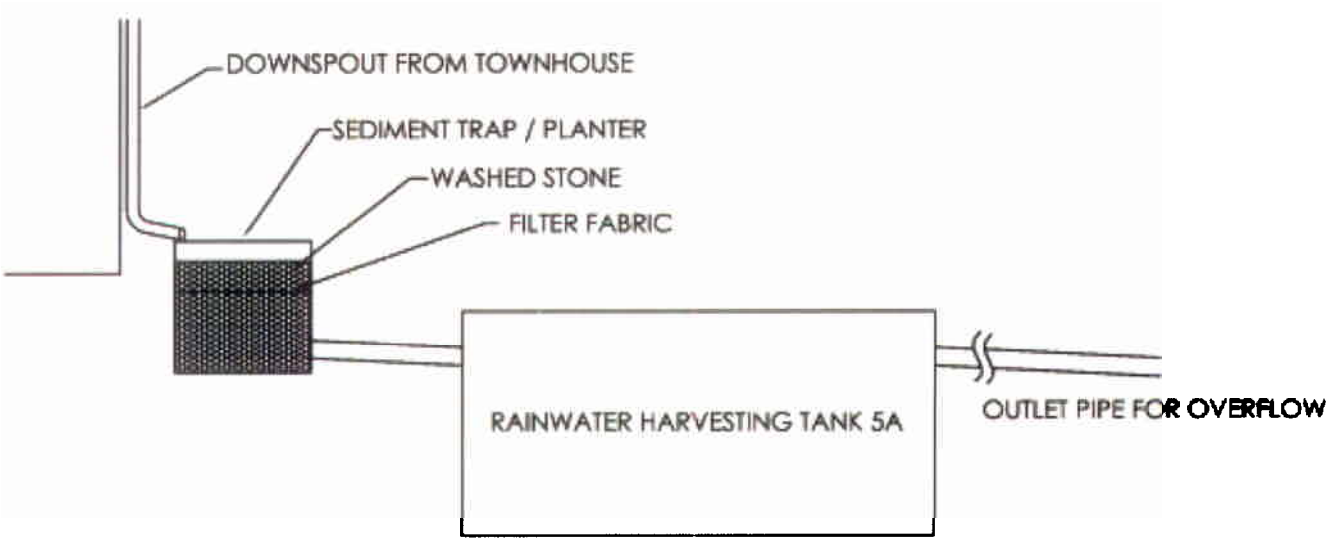
N.T.S.



Rainwater StorageTank- Irrigation Only – Cistern #5A

Cistern #5A will capture runoff from the courtyard internal to the Townhouses and roof water from the adjacent townhouses. This cistern will be the source of water used for irrigation of the project. We did not use this tank to help achieve any stormwater quality or quantity benefits to the site because it will not be used during the winter months and will remain full until the stormwater can again be used for irrigation. It will provide benefit to the project and the Town because during warm months it will supply irrigation water thus eliminating the necessity to use treated Public Water for this purpose.

The rainwater from the townhouses and courtyard will first enter a small planter that is filled with washed stone (gravel) to capture the first flush of water and filter out any sediment. These planters will be tied to this cistern with underground pipes allowing only clean water to enter the cistern. This will keep maintenance of the system to a minimum. When the cistern fills up it will drain out of an overflow pipe near the entry drive. It will be a visual indication of the rainwater harvesting system. This stormwater will flow to the hydrodynamic separator and then to the infiltration basin.



Rainwater Harvesting Tank Detail

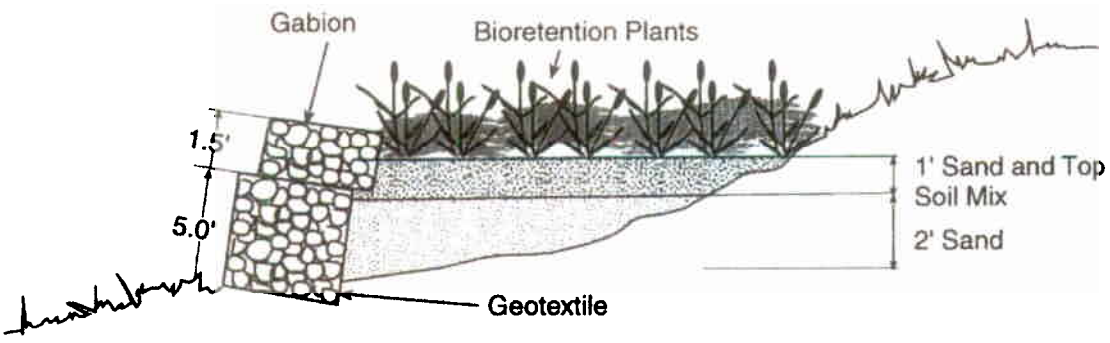
Basin #6A

Basin 6A is a bioretention basin that will provide quality and quantity abatement for the townhouses adjacent to this basin. The basin will be sited along the edge of the RCD and will use a gabion wall to retain the basin. The gabion wall will act as the outlet structure allowing the stormwater to slowly drain through the wall. This is an excellent way to control the discharge and prevent the stormwater from concentrating at one outlet point.

The basin will be oversized to capture and detain the runoff from the 25-year event. This basin will provide all water quality and quantity measures for half of the condominium building. Bioretention Basins provide quality benefits to TSS, nitrogen and phosphorous removal. This basin is similar to basin 1A.

capacity.

Figure 12-3d
Bioretention Terrace Suitable for Use on Slopes 10-20%



Basin #7A

Basin 3A is a bioretention basin similar to Basin 2A and 3A. This basin will capture runoff from the townhouses and driveways adjacent to the basin.

Basin #8A

Basin 3A is a bioretention basin similar to Basin 2A and 3A. This basin will capture runoff from the townhouses and driveways adjacent to the basin

Basin #9A

Basin #9A is a Green Street Basin used in Portland, Oregon to provide bioretention along streets and urban environments. This basin will capture runoff from the adjacent entry drive and provide quality benefits including TSS, nitrogen, phosphorous and dissolved metals removal. Storm events greater than 1" runoff will pond to 9" depth inside the basin and spill back into the gutter of the street where it will flow to proposed inlet structure CB1 This type of basin works well in narrow, linear areas commonly found adjacent to streets.