Leila Talebi (3/28/2012)

AFRICAN SAVANNAH ZOO

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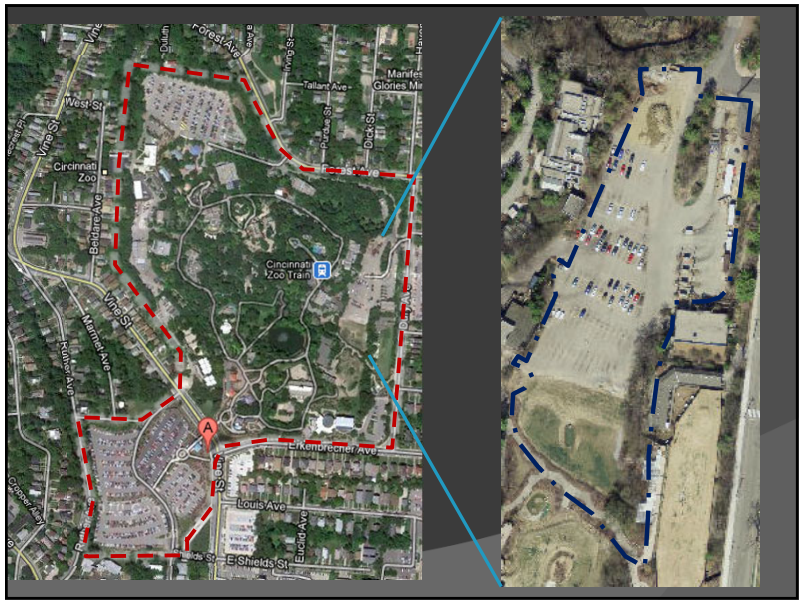

2

GENERAL INFORMATION

- The existing land use of Cincinnati Zoo consists of various types including parking lot, open space areas, and steep wooded hillsides.
- Stormwater runoff currently flows in a northeastern direction into catch basins and storm sewers which are directly rerouted to the Mitchell Avenue Regulator combined sewer system upstream from combined sewer overflow (CSO) 482.

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PROPOSED PROJECT FOR STORMWATER MANAGEMENT

- Replacement of Pavement with Pervious Pavers and Enhanced Turf and Vegetation
- Bioretention Areas and Tree Wells
- Rainwater Harvesting, Storage and Reuse System
- Storm Sewer Separation and Roof Leader Collection

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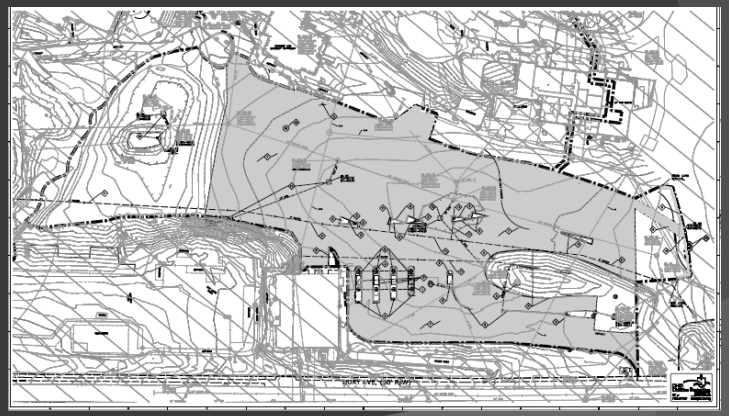
PLAN OF EXISTING ASPHALT TO BE REMOVED



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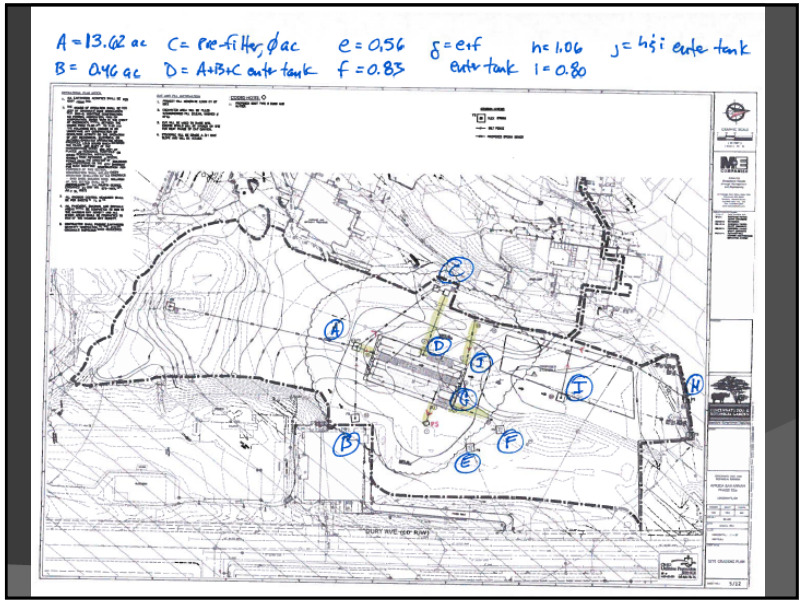

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WATER REUSE OPTIONS

- Irrigation; (4,240,000 gallons annually)
  - The Zoo is a heavy irrigator (close to 2"/week) due to high display quality. The industry standard is 1"/week. Within the Africa Savannah project there will be 4 acres of irrigated area.
- Providing water for filling Swan Lake; (10 months each year and will be able at accept 8,000,000 gallons annually)
  - Swan Lake has a surface area of 50,000 sf. It is generally at the highest elevation of the Zoo and actually receives very little surface water. The lake is currently filled with a 2" domestic water line. The pond requires 6-9" of make-up water 12 months out of the year.
- Providing water for the bear ponds; (5,230,000 gallons each year)
  - The existing bear moat requires between 400 000 to 500 000 gallons of "make-up" domestic. water on a monthly basis. This translates to 13,350 to 16,600 cf per week. The Zoo will construct a pump and filtration system that directs 10 gpm of water to the moat (24/7).

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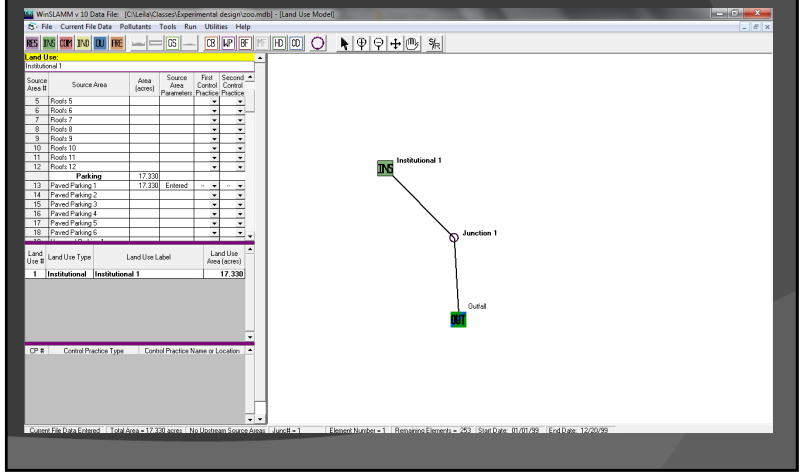
WINSLAMM MODELING



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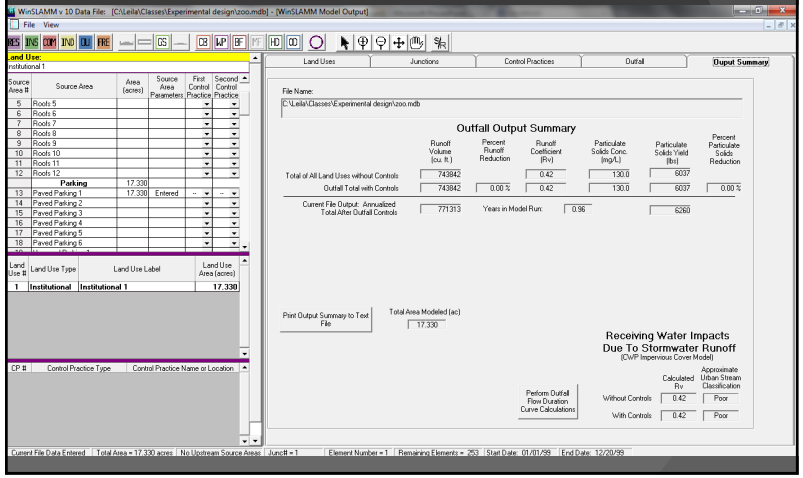
WINSLAMM MODELING



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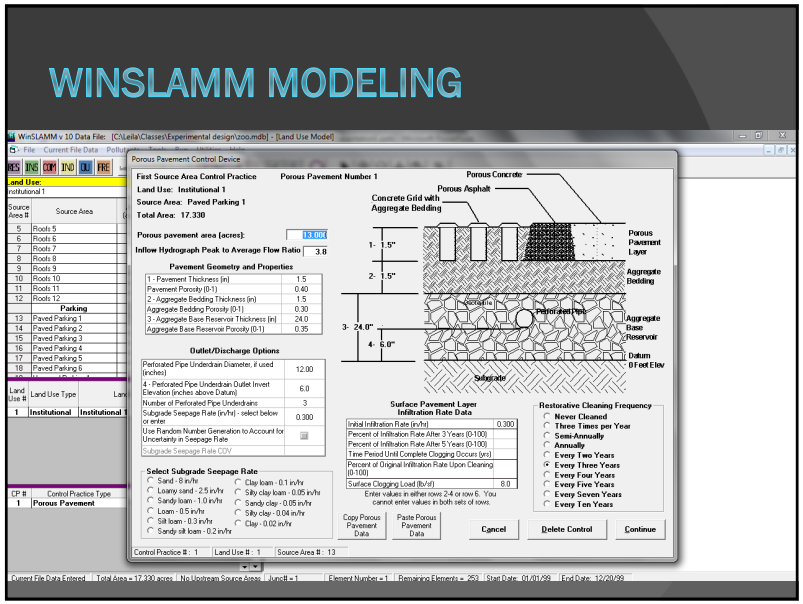

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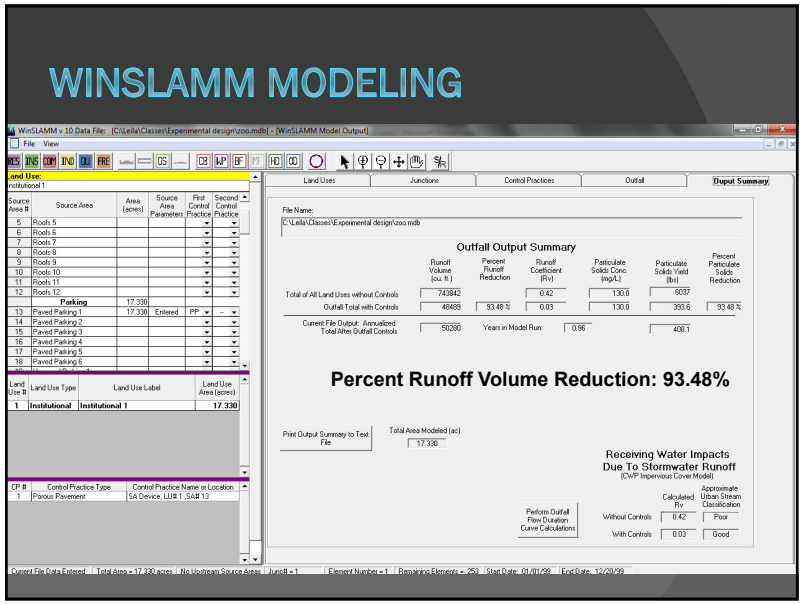

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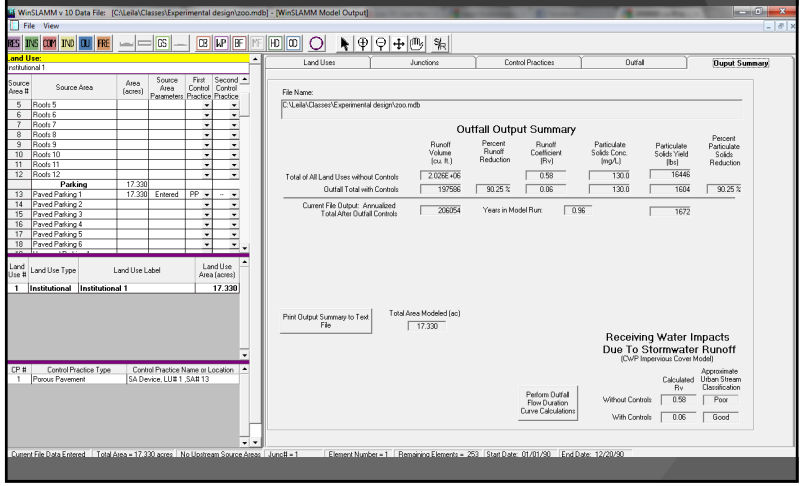
WINSLAMM MODELING (1990)



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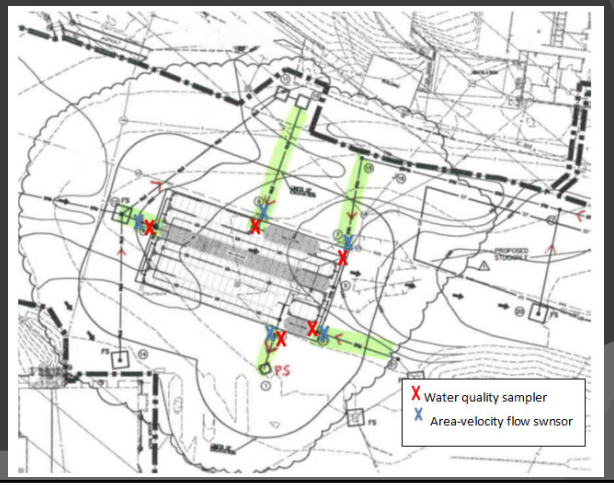
SCHEMATIC OF MONITORING COMPONENTS FOR PIPES



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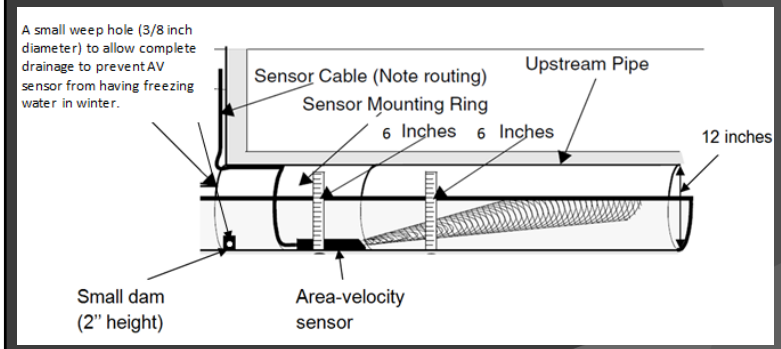
SCHEMATIC OF AREA-VELOCITY IN A 12'' PIPE



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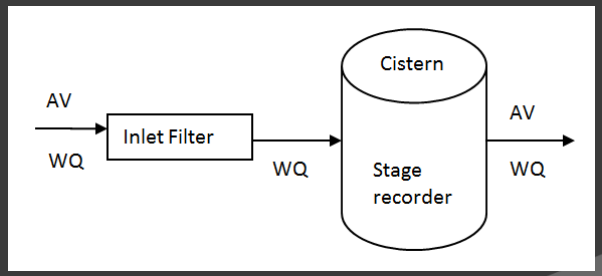
SCHEMATIC OF MONITORING COMPONENTS FOR CISTERN



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SUMMARY OF SAMPLING AND MONITORING LOCATIONS AT CINCINNATI ZOO

- Inlet pipes
  - 4 inlet automatic water sampler and 4 inlet flow monitor (one for each pipe)
- Outlet pipe
  - 1 outlet automatic water sampler and 1 outlet flow monitor
- Cistern
  - 1 water level recorder in the cistern
  - 4 inlet automatic water sampler after filter and before tank (because we have four inlet pipes)
- Therefore, a total of 9 automatic samplers ($27k), 5 flow monitors ($17k), and 1 water level recorders ($0.65k) will be needed at this location.

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Some other examples from;

CINCINNATI STATE TECHNICAL AND COMMUNITY COLLEGE

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- ✓ The site is located along Ludlow Avenue east of the intersection of Ludlow Avenue and Central Parkway.
- ✓ Total Drainage Area: 11.7 acre
- ✓ Located in two combined sewer areas. Runoff from the southern half of campus flows south into CSO 12, runoff from the northern half of campus flows north into CSO 21.

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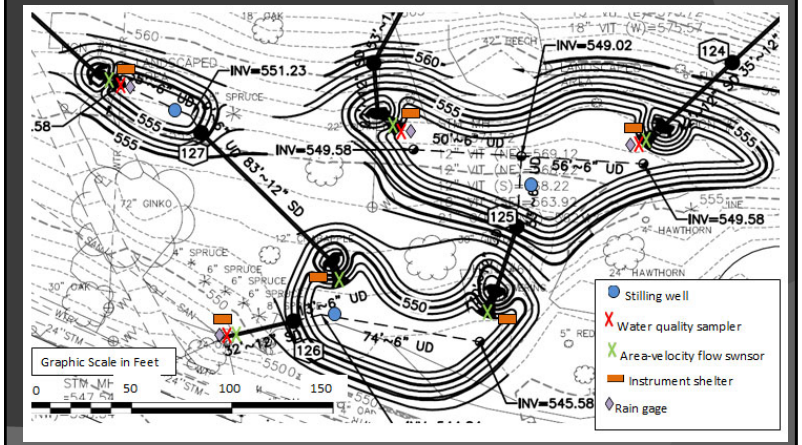
RAIN GARDENS



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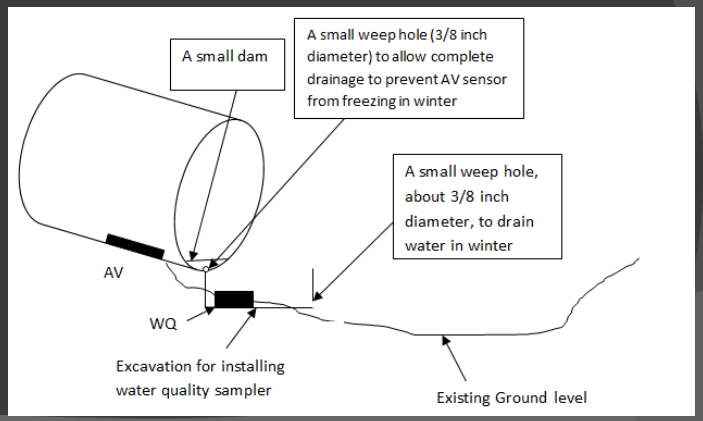
SCHEMATIC OF WATER QUALITY SAMPLING IN THREE INLETS



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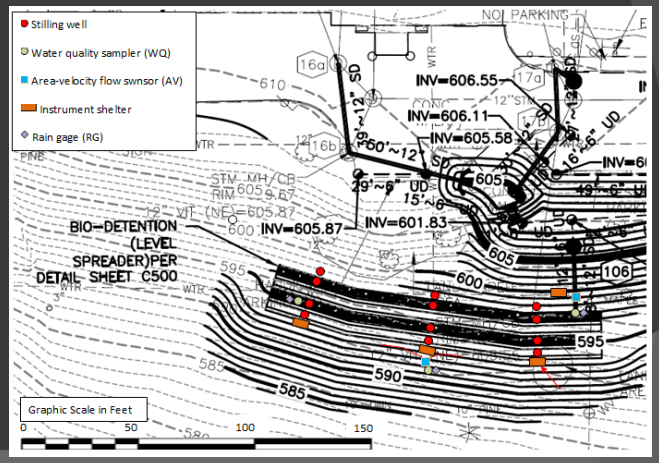
INFILTRATION TRENCHES



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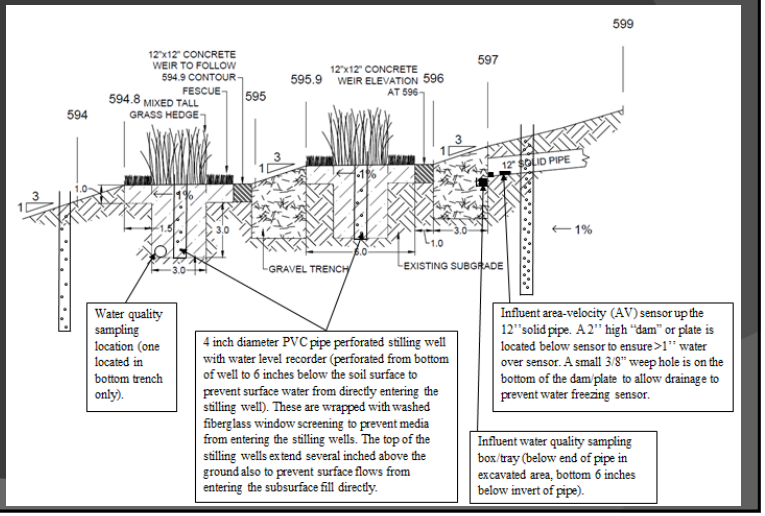
CROSS SECTION OF INFILTRATION TRENCHES



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THANK YOU

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