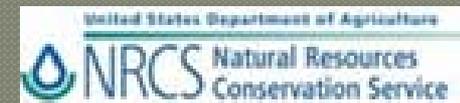
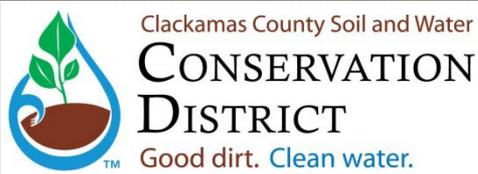


Northwoods Nursery: Innovations in Agricultural Rainwater Catchment

Jason Faucera
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Project Participants:

USDA NRCS

- Conservation Innovations Grant Funding
- Technical Oversight

Northwoods Nursery (Cooperator)

- Venue for Project
- Cash & In-Kind Match
- Staff with Construction Experience

Bruce Wilson, H&R Engineering

- Project Design
- Installation Inspection

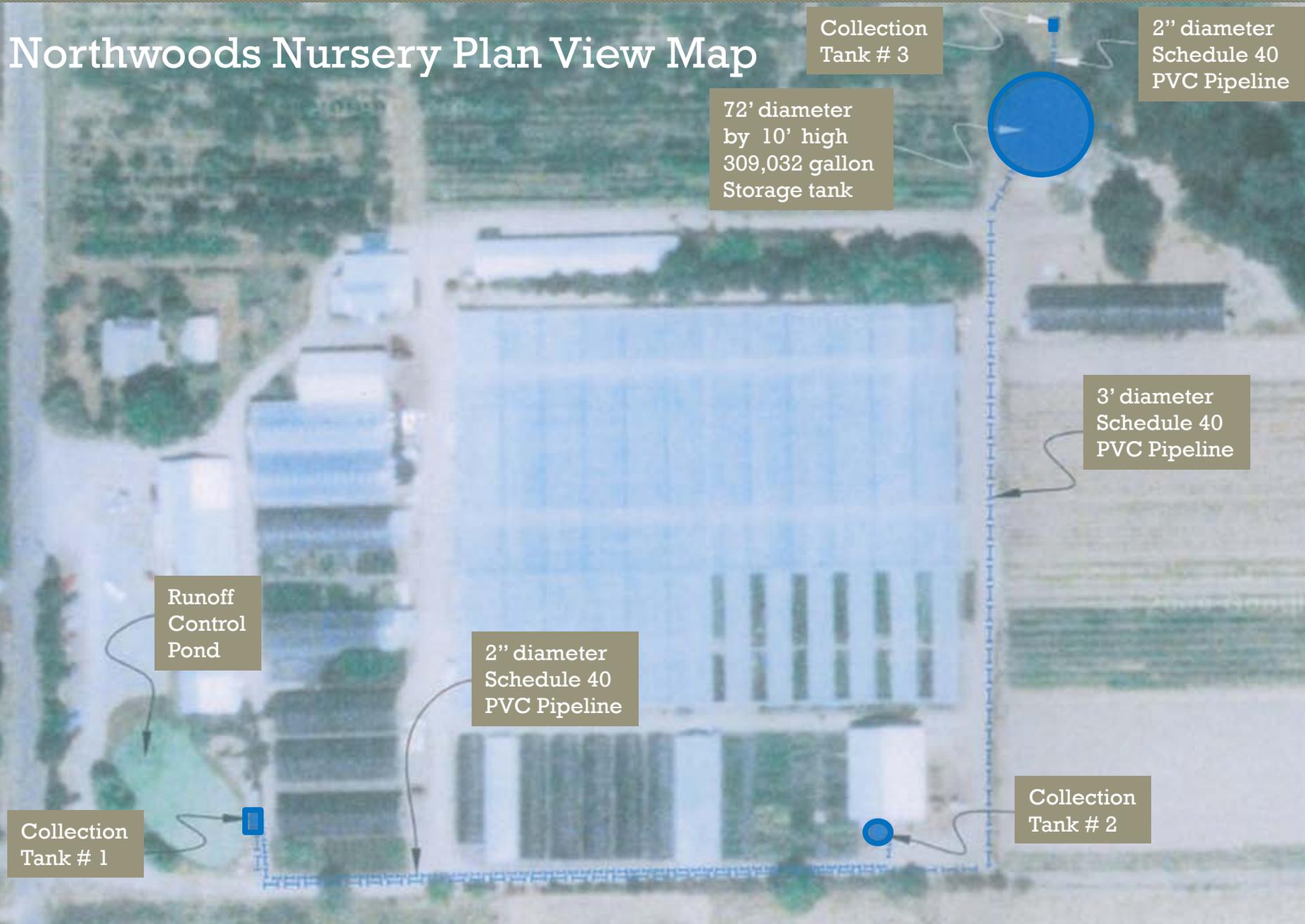
Clackamas County SWCD

- Grant Administration & Project Coordination
- Workshop Sponsorship
- Capital Assistance to Cooperator

Project Goals:

- Reduce groundwater withdrawal with offsets from rain water collection
- Capture, treat, and recycle greenhouse irrigation tail water
- Provide a venue to illustrate the use of large scale rain water harvesting
- Aid in technology transfer to landowners and assist NRCS with integration of large scale rainwater harvesting with existing programs

Northwoods Nursery Plan View Map



Collection Tank # 3

2" diameter Schedule 40 PVC Pipeline

72' diameter by 10' high 309,032 gallon Storage tank

3' diameter Schedule 40 PVC Pipeline

Runoff Control Pond

2" diameter Schedule 40 PVC Pipeline

Collection Tank # 1

Collection Tank # 2



3/17/10 - Site pad pre-installation



3/17/10 - Site pad pre-installation

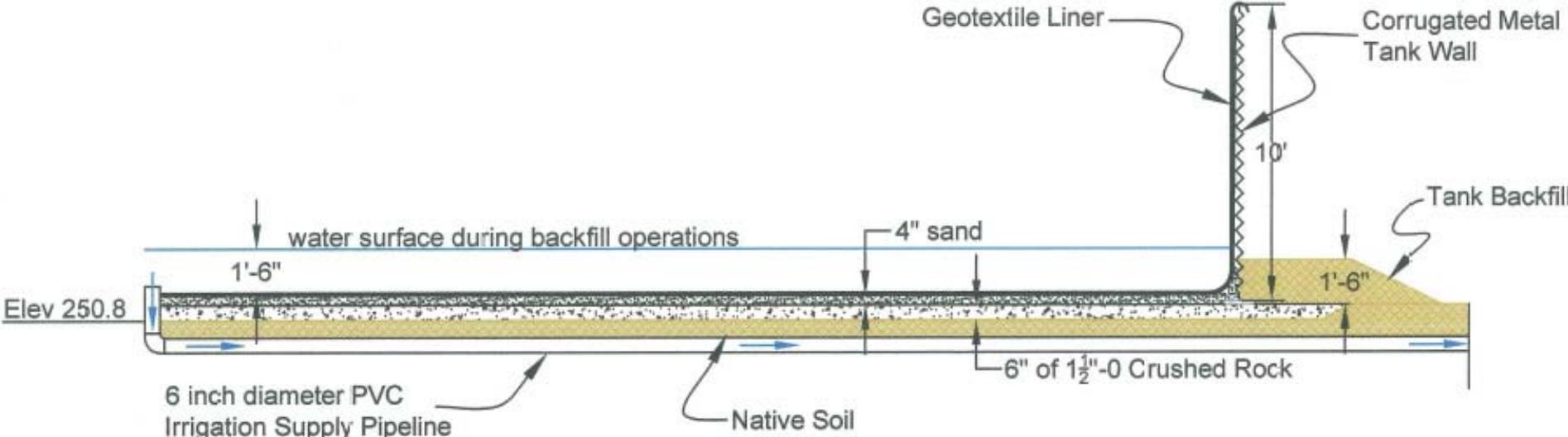


4/14/10 – Soil foundation investigation with Paul Pedone, NRCS State Geologist



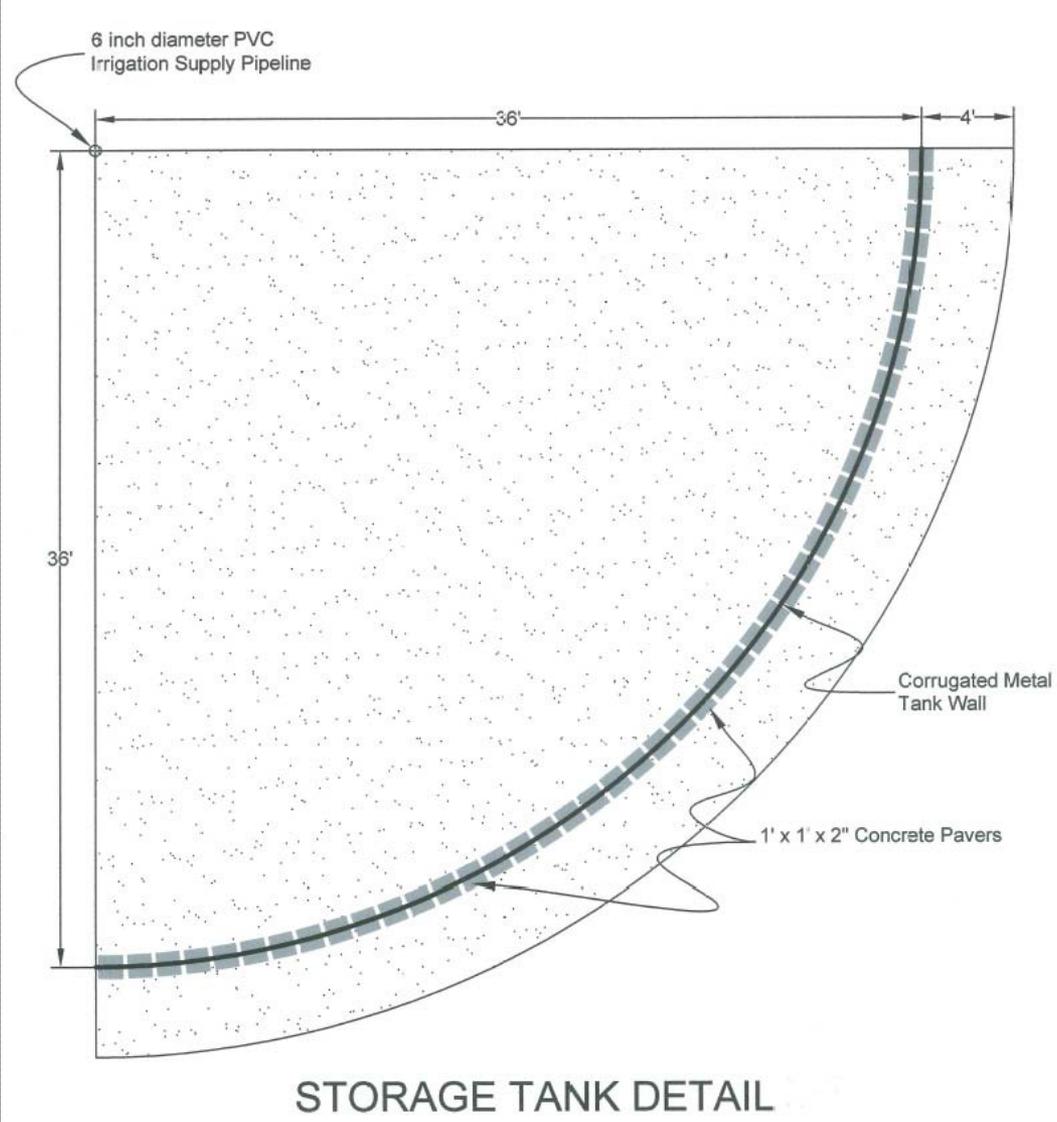
4/14/10 – Soil foundation investigation with Paul Pedone, NRCS State Geologist

Pad design cross section:

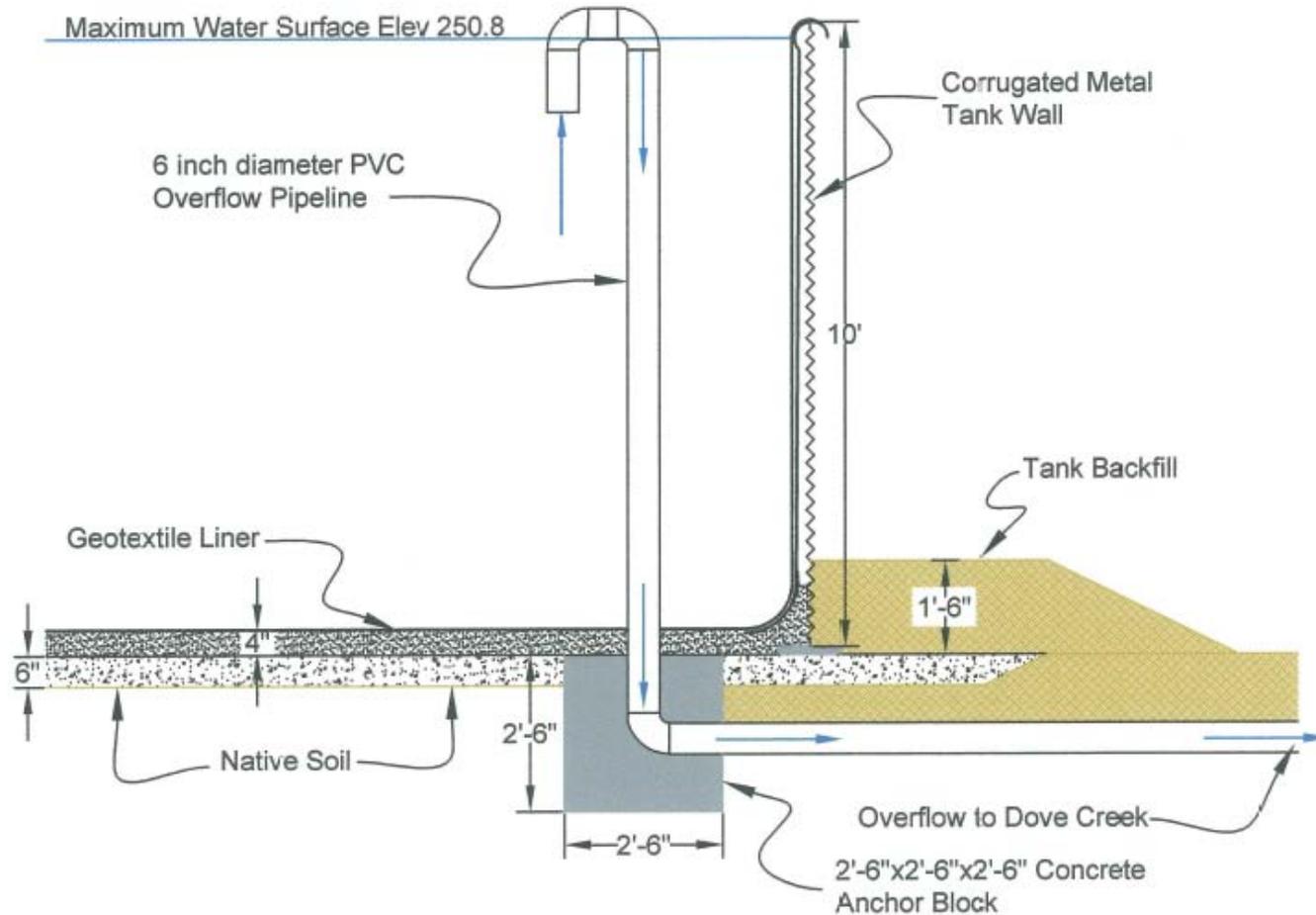


TYPICAL SECTION

Pad design plan view:

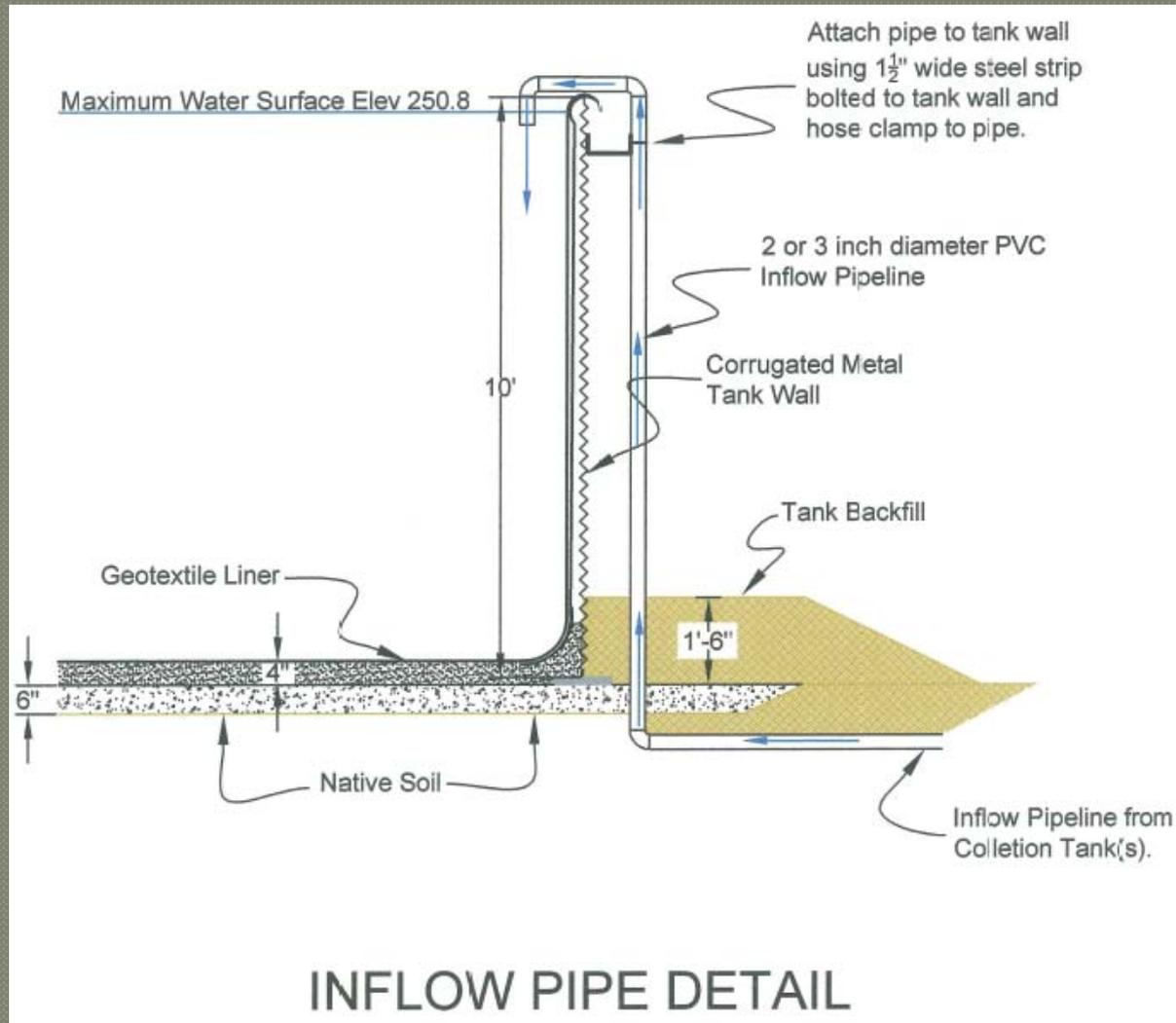


Overflow pipe detail:



OVERFLOW PIPE DETAIL

Inflow pipe detail:





7/23/10 – Site pad excavation



7/23/10 – Site pad excavation



7/26/10 – Site pad leveling complete



7/26/10 – Site pad leveling complete



8/2/10 – 6 inch overflow pipe and hole for anchor block



8/2/10 – Site pad with 6 inch irrigation intake and overflow pipes



8/3/10 – Addition of concrete for overflow pipe anchor block





8/5/10 – 6 inch deep installation of 1.5 inch minus crushed rock



8/5/10 – 6 inch deep installation of 1.5 inch minus crushed rock



8/9/10 – Site pad with 1.5 inch minus gravel installed before compaction



8/9/10 – Site pad with 1.5 inch minus gravel installed before compaction



8/9/10 – Site pad with 1.5 inch minus gravel installed from irrigation intake



8/10/10 – First of four passes with plate compactor on site pad



8/11/10 – Laying/leveling 1' x 1' x 2" concrete pavers for tank ring foundation



8/17/10 – Site pad near completion



8/11/10 – Tank materials arrive on 4 palates



8/19/10 – Lower tank ring panel and sand layer installation



8/19/10 – Inner and outer liners placed inside tank perimeter before assembly



8/19/10 – Lower tank ring panel installed with bolts loosely fastened



8/19/10 – Lower tank ring panel and sand layer installation complete



8/19/10 – Lower tank ring painted for erosion protection



8/25/10 – Second tank ring layer installation



8/27/10 – Third tank ring assembled



8/27/10 – Final tank ring panel installation



8/27/10 – Final tank ring panel installation



8/27/10 – Final tank ring panel installation complete



8/27/10 – Final tank ring panel complete



8/27/10 – Final tank ring panel complete



8/27/10 – Final tank ring panel complete



8/31/10 – 2,800 Bolts tightened between 20-30 Nm from bottom ring up



8/11/10 – Inner felt liner to buffer watertight liner from bolts on tank



9/1/10 – Felt liner arrived as two pieces and draped over edge



9/1/10 – Felt liner fastened with plastic trim and zip ties



9/1/10 – Felt liner installed, watertight liner installation beginning



8/11/10 – Watertight liner



9/2/10 – Watertight liner installation



9/2/10 – Holes in liner for irrigation and overflow lines precut at manufacturer



9/2/10 – Watertight liner has ratchet strap system that was run through liner top



9/2/10 – Liner held in place with clamps



9/2/10 – Liner welded to pipe with manufacturer supplied tape



9/2/10 – Crew wearing socks only and ladders padded with plywood



9/2/10 – Filling the tank with garden hose...priceless



9/2/10 – Liner wrinkles being ironed out



9/3/10 – Installing the “big candy cane” overflow pipe



9/3/10 – Overflow pipe installation



9/3/10 – Overflow pipe installation



Genep
EPA COMPLIANT

9/3/10 – Liner ratcheted in place



9/3/10 – Tank filled to 3 feet to provide opposing force for backfill on lower ring



9/9/10 – Tank backfilling beginning



9/9/10 – Tank backfill in progress on uphill side

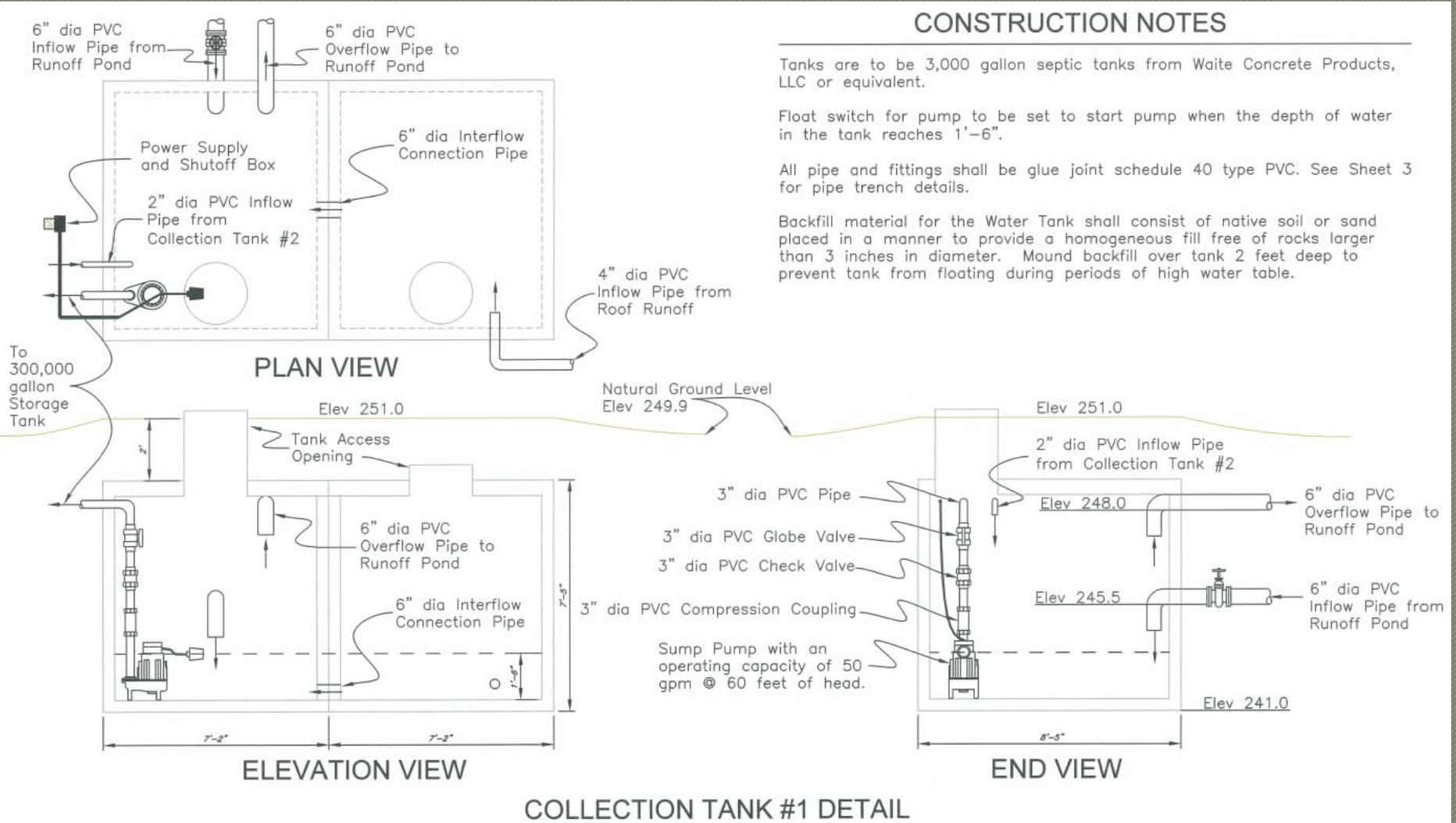


9/9/10 – Tank backfill in progress on downhill side



9/9/10 – Completed tank from irrigation system outflow pipe

Original collection tank design detail:



Collection system as-built components:

- 4 or 5 foot diameter corrugated metal culvert set vertically into concrete pad
- Pad will have rebar reinforcement and 1 foot lip around outside of pipe to address buoyancy
- All inflow and outflow holes in culvert will be sealed to address water rights requirements preventing capture of groundwater
- Pump will be placed to draw water to the large tank
- Floating cover will be purchased and installed

Construction notes:

- Manufacturer wanted to send the tank on two palates at 4,000 lbs. each, Northwoods asked them to break it into smaller pieces
- Engineer suggested a sump pump for the collection as-built, Northwoods has chosen to place the pump outside the collection box and draw from it
- Gravity line from existing roof collection tank in southeast corner was altered by Northwoods to require a pump
- Support for a cover should have been designed and placed in the tank center prior to pad installation, but wasn't due to miscommunication. Retrofitting a cover over a 72 foot diameter round tank has proven problematic.

Challenges:

- Timing of installation with business operations and other grants
- Weather, especially wet weather over the past two springs
- Capital expenses for the Nursery

Thanks!

Aerial
Support
Provided by
LightHawk

jfaucera@conservationdistrict.org

