Construction & Maintenance

of Rain Gardens
(Bio-Retention Basins)

Residential Rain Gardens

Parking Lot Rain Garden

Breaking Ground

- Site selection
- Preliminary Survey
- Identify Drainage Area or Areas
- Identify Inlets and Outlets
- Elevations!!! Water flows down hill.
- Staging Area, Site Limitations.

View of Undisturbed Site Looking Westward toward Black Mtn.

View of Undisturbed Site Looking Towards river Overpass

Bridge Deck with 10% Super Elevation.

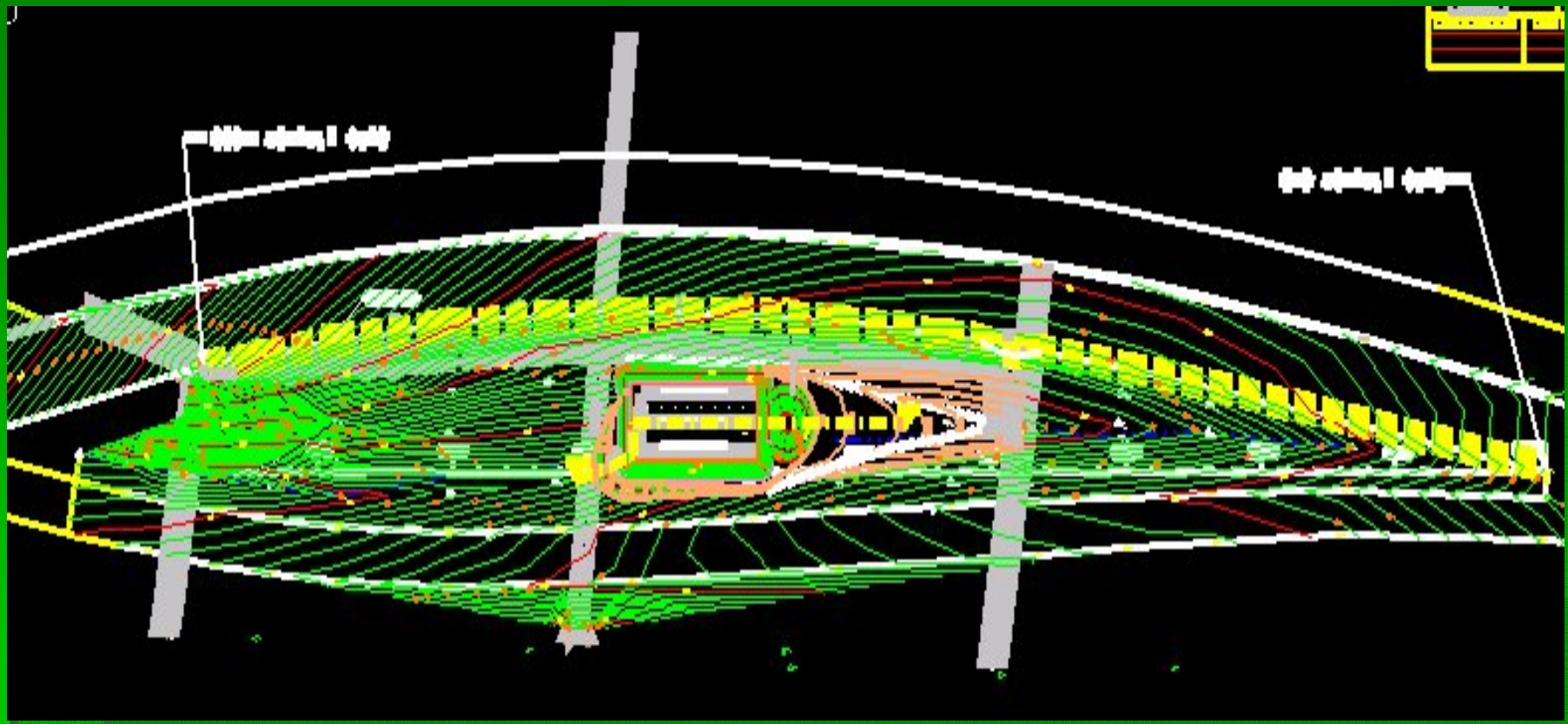
Storm Water Source. From Bridge Deck looking toward Construction Site

Grated Inlet at End of Bridge Deck, 1st Diversion box to Basin

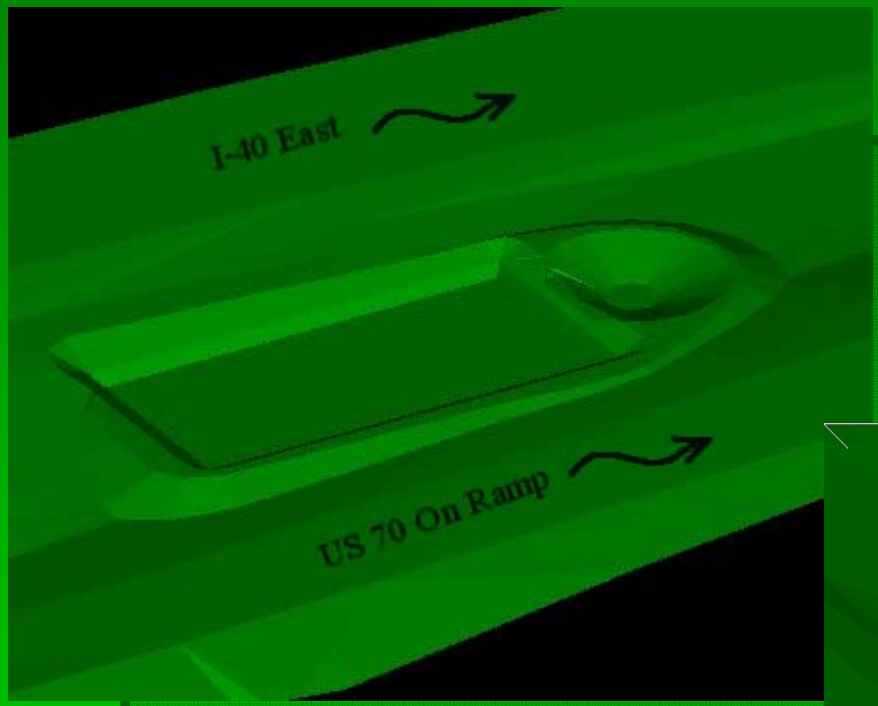
7x5 RCBC crossing through project site

Discharge, Receiving Source. Swannanoa River

Future depiction of what site will look like.



Design plans done in house NCDOT



3-d visualization from Geopak Microstation

Breaking ground on the morning of April 15, 2004

Removing Top soil in Basin Area

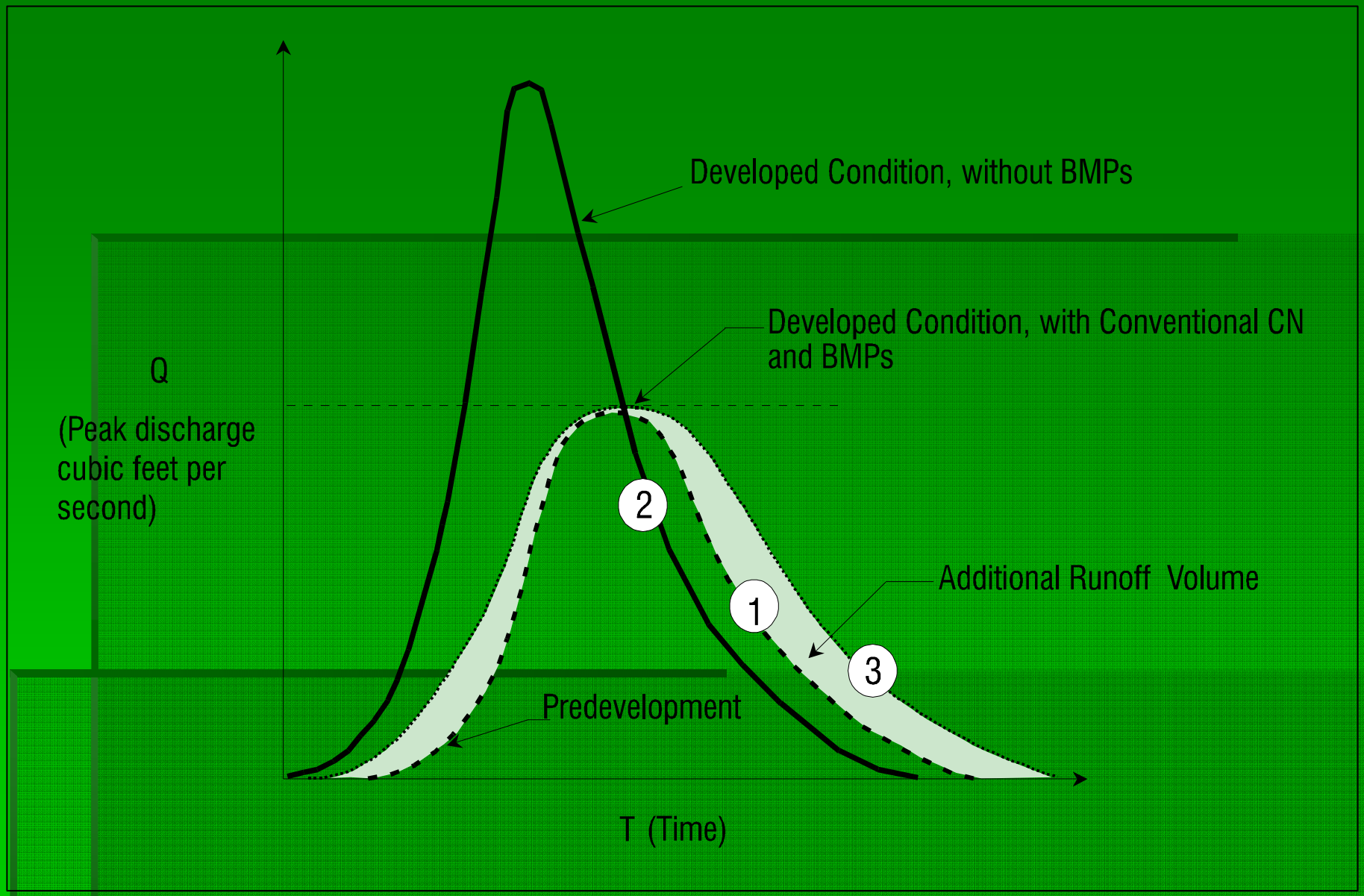
Excavating for the 3 catch basin to be installed along the curb line.

Precast catch basin to be installed along I-40 East

Catch basins in place, backfill with #57 stone.

Looking along pavement edge over 3 catch basins

Excavating for Junction box below diversion box


Developed Condition, without BMPs
Developed Condition, with Conventional CN and BMPs
Q
(Peak discharge cubic feet per second)
2
1
3
Additional Runoff Volume
Predevelopment
T (Time)

Drilling into existing Drop Inlet

Preparation for drilling into upper existing drop inlet at end of bridge deck

New outlet for diversion in upper drop inlet

Installation of riser and manhole section on new junction box

Pipe installation at Junction Box

Excavating basin

Soil strata through fill sections along I-40

Disturbed area during construction

Installation of interior drop inlet inside basin

Finish grade of basin floor

18” HDPE into RCBC

Preparing for paving

Shoulder Being Prepared for Curb

Compacting Asphalt

Asphalt Curb Being Formed

Geotextile Fabric Being Placed in Bottom of Basin

Underdrain perforated pipe being installed

Placing Stone in Basin over underdrain pipe

Finish grade of stone over underdrain pipe

Geotextile Fabric Placed on Top of Stone

Finish grade for Engineered back fill material

Mixing of Engineered Soil, 70% - 30% Ratio

Placing of Engineered Soil / Sand

Placing engineered soil in lifts

Finishing grade on side slopes

Constructing diversion berm around perimeter of basin

Lime and Nutrients Spread Prior to Mulching and Planting

Roto tilling mix for consistency in material

Excavation of Sediment Forebay

Placement of Rip Rap in sediment forebay

Beginning of mulching along interior of basin

Guardrail Installation along I-40 East

Sod Being Placed

Finalizing sod around basin and drop inlet

Lower edge of basin where berm ties to natural ground

Hydro seeding disturbed areas outside of sod perimeter

Ready for planting

Alternative to Sodding, Matting and Silt Fence to protect mulch and engineered soil from initial contamination of silt.

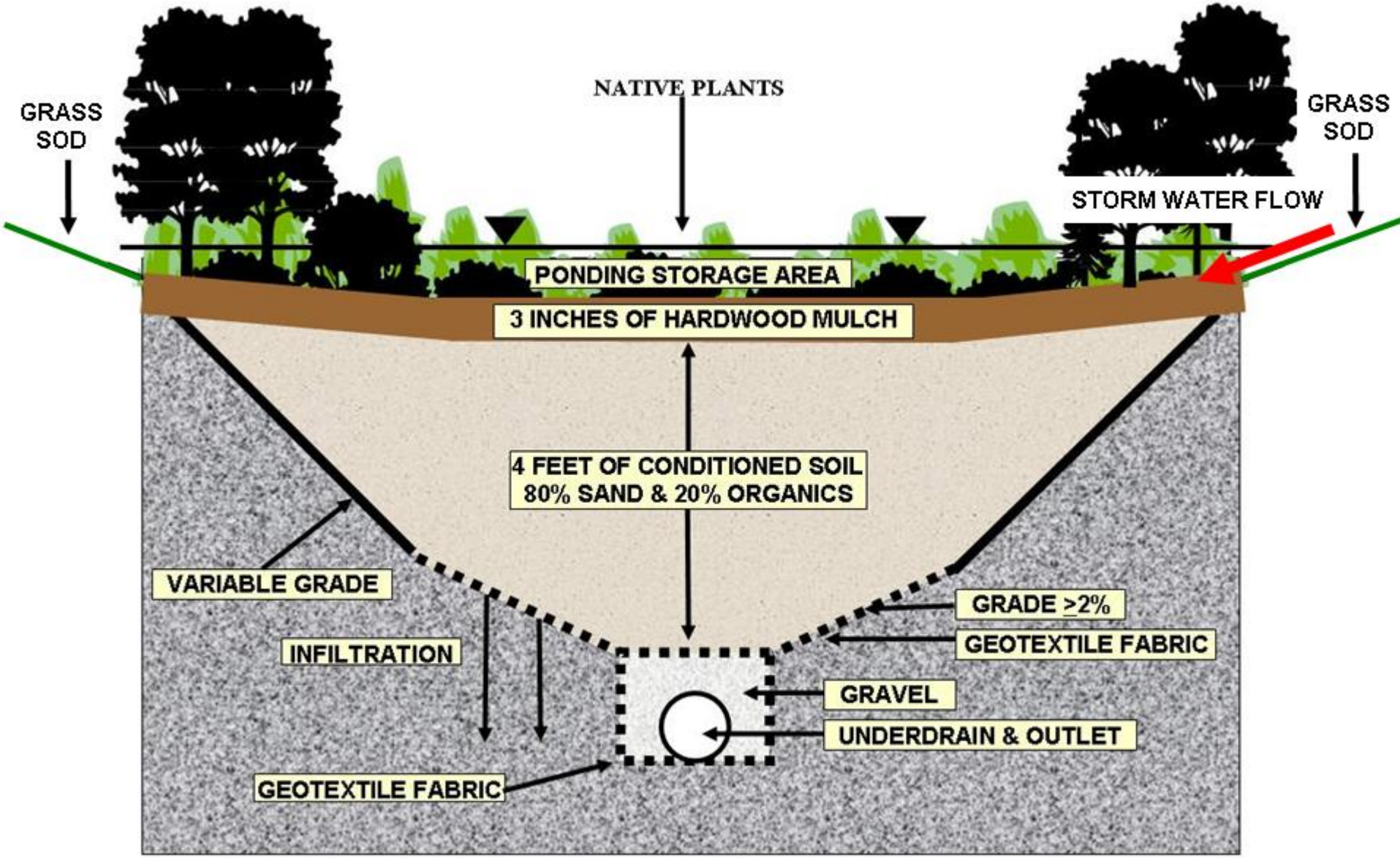
Finished construction

Planting

All Construction and Planting Complete, Ready for Monitoring


NCDOT
Stormwater
PROGRAM


NCDOT
Stormwater
PROGRAM


GRASS SOD
NATIVE PLANTS
GRASS SOD
STORM WATER FLOW
PONDING STORAGE AREA
3 INCHES OF HARDWOOD MULCH
4 FEET OF CONDITIONED SOIL
80% SAND & 20% ORGANICS
VARIABLE GRADE
INFILTRATION
GEOTEXTILE FABRIC
GRADE >2%
GEOTEXTILE FABRIC
GRAVEL
UNDERDRAIN & OUTLET

Materials

- 1. Geo-Fabric, (140 nonwoven, 111)
- 2. HDPE Double Wall perforated pipe.
- 3. “ “Solid pipe for extended clean outs
- 4. Connecting pipe joints, caps.
- 5. Outlet structure, when needed.
- 6. #57 wash stone
- 7. Class B Rip Rap
- 8. Engineered Soil
- 9. Hardwood Mulch, double hammered
- 10. Erosion control matting/fence OR sodding
- 11. Plants

Maintenance, What to look for.

- 1. Proper Drainage: To fast, To slow.
- 2. Off site Drainage, erosion
- 3. Sediment loading: Forebay,Mulch
- 4. Plant growth.
- 5. Mulch Replacement, 1-2 years.
- 6. Forebay Cleaning, 2 years.
- 7. Maintain Records to prolong usage.

Huntersville Ordinance

- ***www.Waterquality.charmeck.org***
- Click on Huntersville Ordinance.

Questions?