COUNCIL MINUTES

SPECIAL WORKSHOP MEETING

February 9, 2011

A special workshop meeting of the City Council of the City of Jacksonville was held Wednesday, February 9, 2011 beginning at 4:00 PM in Council Chambers of the Jacksonville City Hall. Present were: Mayor Sammy Phillips, presiding; and Council Members: Jerry A. Bittner, Fannie K. Coleman, Randy Thomas, and Bob Warden. Mayor Pro-Tem Michael Lazzara and Councilman Jerome Willingham were unable to attend. Also present were: Richard Woodruff, City Manager; Ron Massey, Assistant City Manager; Adah Roberts, Finance Director; Glenn Hargett, Communications and Community Affairs Director; Grant Sparks, Public Services Director; Carmen Miracle, City Clerk; and John Carter, City Attorney. *An audio recording of the Council Meeting is presently available for review in the City Clerk's Office.

CALL TO ORDER

Mayor Sammy Phillips called the meeting to order at 4:00 PM.

ADOPTION OF AGENDA

A motion was made by Councilman Bittner, seconded by Council Member Coleman, and unanimously approved to adopt the agenda as presented.

LAND APPLICATION SITE – TREE PANEL DISCUSSION

Grant Sparks, Public Services Director, stated that since the December 7, 2010 briefing of the pine tree mortality at the land treatment site, Council has visited the site and an expert panel was put together to review the issue.

Using the PowerPoint presentation attached to the official minutes as Exhibit A, Dr. Bruce Johnson, Soil Scientist with Stantec Consulting Services, Inc., introduced the panel and team members and provided the basic questions surrounding the waste treatment site.

Dr. Wade Nutter, Forest Hydrologist with Nutter & Associates, Inc., stated he had been involved in working with the system since its initial concept in 1990. Several potential causes for decline were presented as shown in Exhibit A and the background and components of the Land Treatment Site were reviewed.

Dr. Johnson stated that a multi-disciplinary team was chosen to review the issue because it was a multi-disciplinary problem. Fortunately there was a good body of data from previous work that the team reviewed prior to going into the field.

Mr. Joe Greeley, Wastewater Engineer with Stantec Consulting Services, Inc., reviewed the pre-application treatment system of the plant and stated that clearly pH was one of the stress factors coming from the treatment plant. The treatment lagoons were working the way they should. The rising pH problem occurred in the storage lagoons due in part to the growth of algae especially when the water level was low. As shown by Exhibit A, several possible operational controls were suggested to help alleviate this issue. Staff experience gained over time would also be a key factor for success.

Dr. Robert Rubin, Land Treatment Specialist with Rubin & Associates, reviewed the site characteristics and topography. By and large the operation of the land application system had been successful using the traditional indicators and was doing a good job protecting the surface and ground water quality in the area.

Dr. Aziz Amoozegar, NCSU Professor of Soil Physics, stated that the hydrologic cycle had to be reviewed when looking at the wastewater going out. It was important to manage the water that was irrigated onto the site.

Mr. Lane Rivenbark, Soil Scientist with Nutter & Associates, Inc., pointed out that it was also important to manage the site for fertility and to maintain the proper balance for the soil and the plants.

Dr. Doug Frederick, NCSU Professor of Forestry, stated that the view from the air gave a better perspective of the site condition. By using infrared aerial photography, you could see that the vast majority of the site was in good shape. The pine trees planted prior to the site being converted for land treatment were not the best adaptive trees for spraying.

Overall there were multiple stressors or factors contributing to the tree decline. Not much could be done about the soils and topography, but for the vegetation there needed to be thinning, harvesting, and forest management activities. There were many causes of the decline, so there was not a single fix. Through brainstorming activities, the team came up with a model that staff could use to confirm where there were problems and where they may happen in the future. Dr. Frederick reviewed some of the variables for predicting tree decline. He stressed the

importance of putting a management plan into action to include thinning, harvesting, controlled burns, and reforestation, possibly with alternative species that were more water tolerant.

Dr. Nutter spoke on the importance of the land treatment site regulatory compliance. There was surface water monitoring at 6 locations and groundwater monitoring at 17 locations. He said the land treatment site was meeting all permit and regulatory requirements. The land treatment system was performing extremely well and the intent of this focus was to implement a forest management system and other actions to continue this high level of performance.

Mr. Greely reviewed the pre-treatment action items for the facility and stated that the top three recommendations were low cost or no cost.

Dr. Johnson concluded the presentation by reviewing the action items for the treatment site and stated it was critical to implement the forest management plan.

Councilman Warden asked Dr. Frederick about slash pine and its susceptibility to ice damage. Dr. Frederick stated that prior to seeing the site, he would not have suggested slash pine, but after seeing the current stands at the site, he didn't see any problems with it as a shorter rotation species. It had a place on small tracts. Councilman Warden also asked if the variables for predicting tree decline were presented in priority order. Dr. Frederick stated they were. Soil type was listed as number one because of the range in soil types at the site and tree species would have to be matched up with the conditions.

Dr. Nutter stated that a variety of tree species could be used, but the main purpose was to continue irrigating wastewater. The original plan was to have a rotation with one of the 28 blocks in harvest condition every year. There shouldn't be too much harvesting at one period of time as it could affect the primary objective which was treating wastewater.

Councilman Bittner asked Dr. Johnson about the efficiency of the site and whether the tree growth was the determining factor to the success of the land application site. Discussion followed by the team members on other crop choices and the ability to sufficiently remove the nutrients from the wastewater. Dr. Nutter commented that the trees offered a great deal of flexibility.

Mayor Phillips asked Mr. Greely what would be involved in the management of lagoon levels since he stated that there was a need for a certain level of expertise. Mr. Greely stated that one level of management was the pH level and algae control of the lagoon, but the lagoons also had to function and feed the spray irrigation system. Management would vary with seasonal

needs and rain events. The way the system was set up was not the most operator friendly method. The team's report covered design enhancements that could help the operators.

Mayor Phillips commented on the ground cover at the land treatment site and asked if it was causing any problems and if controlled burns were necessary. Dr. Frederick stated that the ground cover was a benefit especially in the areas of tree mortality and controlled burns should be a part of the management plan. Dr. Nutter stated that the one thing the controlled burns would accomplish was to help get the mid-story under control which effected the distribution of the spray, and reduce the manual labor of staff.

Councilman Thomas asked Mr. Alan Plaster, Premier Forestry, if there was an alternative to thinning the trees out since there had been drawbacks with traditional logging. Mr. Plaster stated that one factor was to have enough capacity, which the City now had. Another factor was the type of logging equipment that could best be used on site and he discussed several options, including a track and tricycle cutter.

Mr. Woodruff stated that even though the City had a management plan since 2002, little had been done to implement it. One of the top recommendations of the panel was for the City to manage the site by controlled burning, thinning and harvesting and to also include reforestation. Part of the past implementation problem was that the bid process moved too slowly. Now the plan was to allow the forester in charge of the management plan to set it up. Mr. Plaster would be back in a few weeks to review that plan with Council. The plan would cover specific actions to take place each year for each section over a 25 year period. The contract would be set up so he could move efficiently because when the weather was ready or the market was right for thinning or harvesting, you had to be ready to respond instead of going out for bids

Mr. Woodruff stated that there was no question that there was a problem at the site, but there was no question that the problem today was not impacting the ratepayers' investment. It had not in any way impinged upon the mission of the site. On the other hand, like Dr. Johnson said, it was essential to manage our infrastructure and the land treatment site was part of our infrastructure. There were expenses, but the site had its own revenue source that would go back into managing the site. Mr. Woodruff assured Council that Staff would implement the plan that had been set forth by the panel and team members.

CLOSED SESSION

A motion was made by Councilman Bittner, seconded by Councilman Thomas, and unanimously approved to recess the Special Meeting at 5:45 PM in order to convene a Closed Session for the purpose of instructing staff in regards to negotiating property acquisition (Georgetown Area – Gibbs Heirs, and Beacham, Dudley, Wallace property – Old Bridge Street and S. Marine Blvd.) pursuant to General Statute 143-318.11.

RECONVENE

Mayor Phillips reconvened the Special Meeting at 6:49 PM and announced that no reportable action had been taken in closed session.

ADJOURNMENT

A motion was made by Councilman Warden, seconded by Council Member Coleman, and unanimously adopted to adjourn the meeting at 6:50 PM.

Adopted by the Jacksonville City Council in regular session this 22nd day of February, 2011.

_____
Sammy Phillips, Mayor

ATTEST:

_____
Carmen K. Miracle, City Clerk

Exhibit "A"

Jacksonville City Council

Special Workshop Meeting
February 9, 2011

Agenda

1. Introduction of Panel & Team Members
2. The Questions
3. LTS Background
4. The Work
5. Findings & Recommendations

The Panel & Team Members

Panel Members

- **Dr. Bruce Johnson**, Soil Scientist, Stantec Consulting Services, Inc.
- **Dr. Wade Nutter**, Forest Hydrologist, University of Georgia Emeritus Professor, Nutter & Associates, Inc.
- **Mr. Lane Rivenbark**, CPSS, Soil Scientist, Nutter & Associates, Inc.
- **Mr. Joseph Greeley**, P.E., Wastewater Engineer, Stantec Consulting Services, Inc.

Panel Members

- **Dr. Robert Rubin**, Land Treatment Specialist, NCSU Emeritus Professor, Rubin & Associates
- **Dr. Aziz Amoozegar**, LSS, NCSU Professor of Soil Physics
- **Dr. Doug Frederick**, NCSU Professor of Forestry; Soil, Water, and Environment, Inc.

Team Members

- **Alan Plaster**, Premier Forestry
- **Seth Ward**, Premier Forestry
- **Jim Bushardt**, NC Division of Water Quality
- **Vincent Lewis**, NC Department of Environment and Natural Resources
- **Mike Jarvis**, MCB Camp Lejeune

Team Members

- **Dr. Richard Woodruff**, City Manager
- **Ron Massey**, Assistant City Manager
- **Grant Sparks**, Public Services Director
- **Ray Holder**, Plant Supervisor
- **Tony Rooks**, Wastewater Treatment Plant Chief Operator
- **Jill Puff**, Chemist

The Questions

Questions

- What is the role of the forest vegetation in the performance of the land treatment system (LTS)?
- What are the management activities that can improve the current and long-term performance of the LTS?
- How is the Jacksonville LTS performing?
- What are the potential causes for pockets of tree decline?

LTS Regulatory Compliance

- Surface water monitoring (6 locations)
- Groundwater monitoring (17 locations)
- No notices of violation
- LTS meeting all permit and regulatory requirements
- LTS able to continue to operate

Potential Causes for Decline

- Water Table: Seasonal high or perched water table
- Oxygen availability
- Forest stand density
- Wastewater pH; soil pH
- Nutrient / micronutrient availability
- Water loading and distribution
- Drought of 2007
- Not likely to be a single cause (multiple factors)

LTS Background

LTS Objective

Land treatment is the application of **treated and disinfected wastewater** to vegetation and soil systems to achieve further treatment, utilize and recycle nutrients, eliminate surface water discharges, and provide long-term protection of the environment.

Background

- Eliminate discharge to New River and Wilson Bay
- Design started in 1990
- Construction and implementation in 1998
- Capacity of 6 mgd on 1,900 acres (out of 6,300 acres total)

Background

- Expansion design 2006
- Construction and implementation in 2010
- Capacity of 9 mgd on 2,300 acres (out of 7,400 acres total)

Components of the LTS

- Pretreatment system
- Storage
  - 700 mg+, 177-acre lagoon area
- Irrigation
  - 28 forested management units (blocks)
  - 3 separate irrigation regimes based on soil characteristics
- Site
  - Access and maintenance
  - Vegetation

System Evaluation

Previous Work

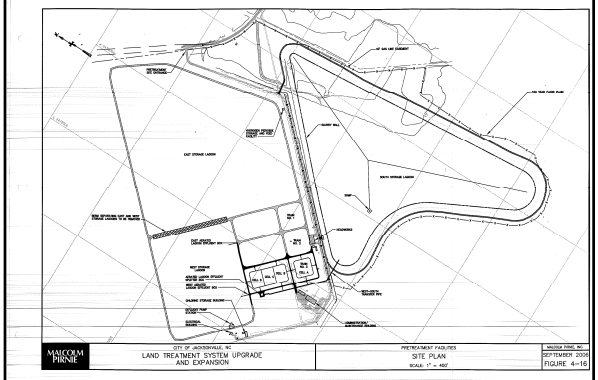
2002	Plaster	**Forest Management Plans**
2004-2007	Nutter	**Permit-related Soil & Irrigation Management**
2008	Nutter	**Studies**
2010	Johnson	**Soil and Water Study**

Multidisciplinary Team Activities

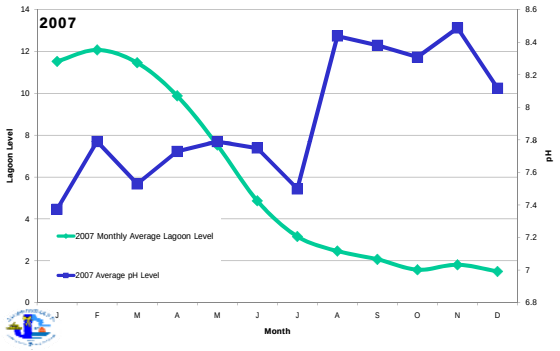
- Pre-meeting review of **data and documents**
- Monday: morning meeting; **field work**
- Tuesday: **field work and process evaluation**
- Wednesday: **assessment, discussion, conclusions, recommendations and presentation**

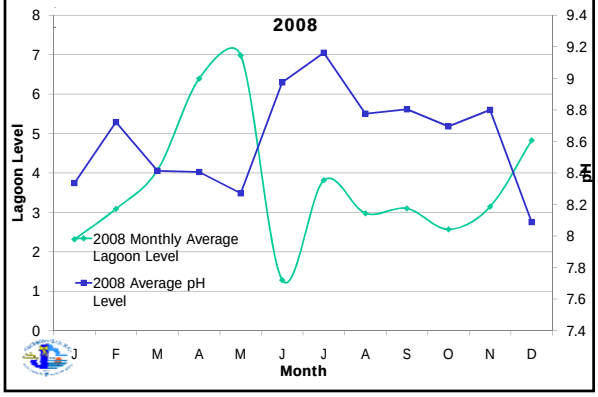
Pre-Application Treatment System

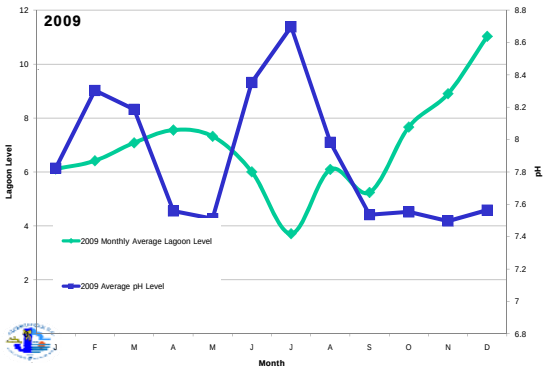
- Major Components
- Off-Site Pump Station and Equalization
- Odor Control Chemical addition
- Headworks Facility
- Aerated Treatment Lagoons
- Storage Lagoons
- Disinfection
- Irrigation Pumping



Wastewater pH and Alkalinity







Operational Controls

- Management of Lagoon Levels
- Existing ultrasonic transducer testing
- Process variations and minor design enhancements
- Hypochlorite additions for algae control
- Addition of Grass Carp
- Algaecide additions ($CuSO_4$)
- Acid addition (H_2SO_4)
- Covering system

Site Characteristics

- General topography
- Micro-topography
- Soils
- Pre-existing plantations
- Native forest

Site

- Topography and landscape
  - microtopography
- Hydraulic loading and irrigation rates
  - uniformity
- Boundary conditions
  - On-site
    - Soil
    - Shallow groundwater
  - Off-site

Topography - general

- Dissected
- Well defined outlets

Micro-topography

- Micro (small) area of influence
- Temporary loss of receiver area

Uniformity

- Application uniformity
- Volume per area
- 1.00 uniform application over entire area
- 0.5 or less suggests less than optimum coverage
- Critical on turf, less so on forests

Site	UC
1	0.16
2	0.55
3	0.53

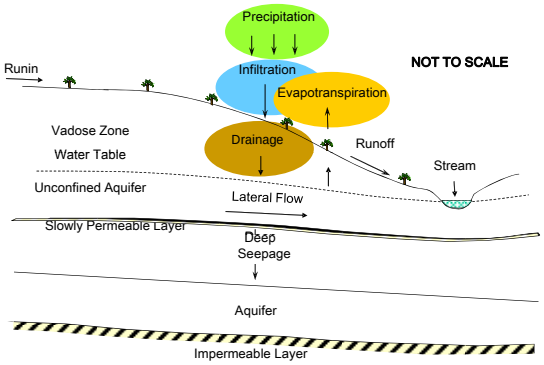
Soil as a boundary

- Infiltration
- Permeability
- Shallow groundwater
- Drainage outlet
- Site outlets

Site as Boundary

- Shallow groundwater
- Surface water monitoring
- Plant – soil – hydrologic components protect local water resources

Hydrologic Cycle



Month	Mean Monthly Precipitation	Percent of Mean Annual Precipitation	80th Percentile Monthly Precipitation
	inches	percent	inches
January	4.10	7.33	4.71
February	4.01	7.17	4.61
March	3.96	7.08	4.55
April	3.11	5.56	3.57
May	4.80	8.58	5.52
June	6.00	10.72	6.89
July	7.01	12.53	8.05
August	6.87	12.28	7.89
September	5.96	10.65	6.85
October	3.34	5.97	3.84
November	3.11	5.56	3.57
December	3.69	6.59	4.24
TOTALS =	55.96	100.00	64.30
		Calculations	Calculations

Click on each step box

Thornthwaite PET Calculation

Month	Step 1: Mean monthly temp.	Daylight hours / 12	Heat index	Calculated PET	Step 2: Site Latitude
	(degrees F)			inches	degrees
January	43.9	0.87	1.53	0.44	34.75
February	45.2	0.85	1.79	0.52	within range
March	51.9	1.03	3.32	1.25	
April	60.3	1.09	5.67	2.39	
May	67.7	1.21	8.05	3.93	
June	73.7	1.21	10.19	5.11	
July	77.5	1.23	11.63	6.01	
August	76.9	1.16	11.40	5.55	
September	72.0	1.03	9.57	4.06	
October	62.1	0.97	6.22	2.37	
November	53.2	0.86	3.66	1.16	
December	45.8	0.85	1.91	0.56	
		TOTALS =	74.93	33.35	
		Calculations	Calculations	Calculations	

Influent, Lagoon Storage, and Zone Setup Worksheet

Calculate the adjusted influent loading by including the gains and losses from the Storage Lagoon, and set up the Spray Zones areas and individual Zone flowrates.

Click on each step box

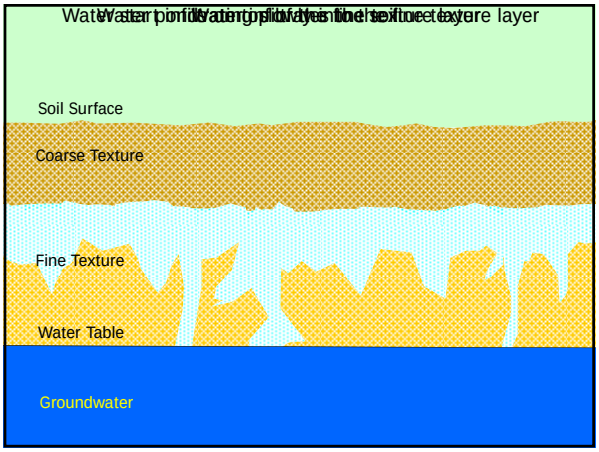
Enter Data ==> Pan Evap. Data | Precip | Lagoon Gains & Losses | Influent

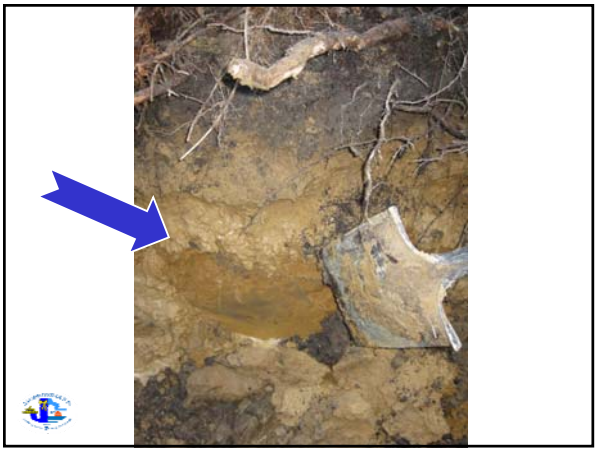
Step 2: Area of Lagoon — acres — 177.00

Step 4: Design Daily Flow (Influent) — gals/day — 9,026,299

Total Flow to be Disposed (Annual Averaged) — gals/day — 9,420,014

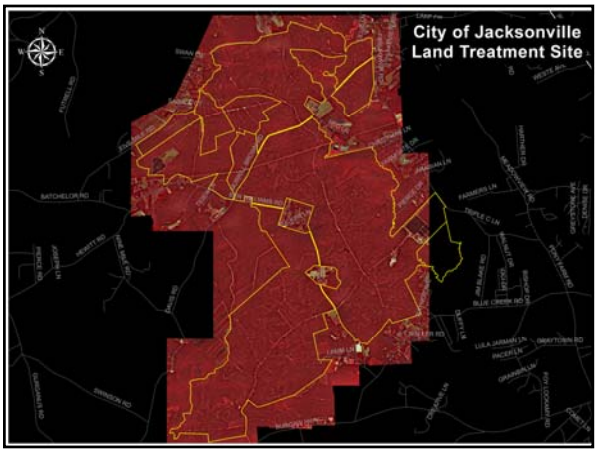
Month	Days per month	Step 1: Pan Evaporation Data	Adjusted Pan Data	Precip	Lagoon Gains from Precip.	Lagoon Losses from Evap.	Design Influent Volume per Month	Total: Influent + Lagoon Gains & Losses
		inches	inches	inches	gallons	gallons	gallons	gallons
January	31	1.30	0.91	4.71	22,640,823	4,373,373	279,815,255	298,082,706
February	28	1.96	1.37	4.61	22,143,830	6,593,700	252,736,359	268,286,489
March	31	3.69	2.58	4.55	21,867,722	12,413,650	279,815,255	289,269,327
April	30	4.91	3.44	3.57	17,173,893	16,517,892	270,788,956	271,444,957
May	31	6.16	4.31	5.52	26,506,330	20,723,058	279,815,255	285,598,527
June	30	6.63	4.64	6.89	33,132,912	22,304,200	270,788,956	281,617,668
July	31	6.96	4.87	8.05	38,710,286	23,414,364	279,815,255	295,111,176
August	31	6.21	4.35	7.89	37,937,184	20,891,265	279,815,255	296,861,175
September	30	4.61	3.23	6.85	32,912,026	15,508,652	270,788,956	288,192,330
October	31	3.29	2.30	3.84	18,443,988	11,067,997	279,815,255	287,191,246
November	30	2.01	1.41	3.57	17,173,893	6,761,907	270,788,956	281,200,942
December	31	1.41	0.99	4.24	20,376,741	4,743,427	279,815,255	295,448,569
			Calcs.		Calcs.	Calcs.	Calcs.	Calcs.
Totals:	365	49.14	34.40	64.30	309,019,627	165,313,486	3,294,598,969	3,438,305,110





Soil and Foliar Analyses

- 105 Soil Fertility Samples
- 25 Foliar Samples
- Evidence of increased Soil pH
- Evidence of Manganese Deficiency
- N-P-K levels adequate



Forest / Stand Health

Factors

- Species adaptability
- Stand density
- Stand age
- Water distribution
- Soil pH; nutrients

Findings & Recommendations

Overall Findings

- **Multiple** stressors / factors contribute to tree decline
- Several stressors can be reduced via **management**
- Targeted actions taken **promptly** will provide greatest benefit for achieving optimal LTS performance
- Some changes **will take time**

Potential Causes for Decline

- Water Table: Seasonal high or perched water table
- Oxygen availability
- Forest stand density
- Wastewater pH; soil pH
- Nutrient / micronutrient availability
- Water loading and distribution
- Drought of 2007
- **Not likely to be a single cause** (multiple factors)

Variables for Predicting Tree Decline

- Soil type
- Topography
- Spray regime (annual, seasonal)
- Forest management
- Plantation age
- Understory vegetation
- Other variables (?)

25 Year Forest Management Plan

- Thinning
- Harvesting
- Prescribed burning
- Reforestation
  - Alternative species

Tree Alternatives

- Slash Pine
- Hardwoods
- Test Planting Areas
- Cypress Trees

Action Items

Pre Treatment

- **Explore pH** adjustment options
- Management of **Storage Lagoon Levels**
- Evaluate Effectiveness of **Existing Transducers**
- Adjustment of **Aeration Treatment Process**

Action Items

Treatment Site

- Implement **Forest Management Plan**
- Explore **Alternative Tree Species**
- **Optimize Water Distribution** within sprayfields
- **Integrate and Manage Aerial Photography and Site Data** into GIS