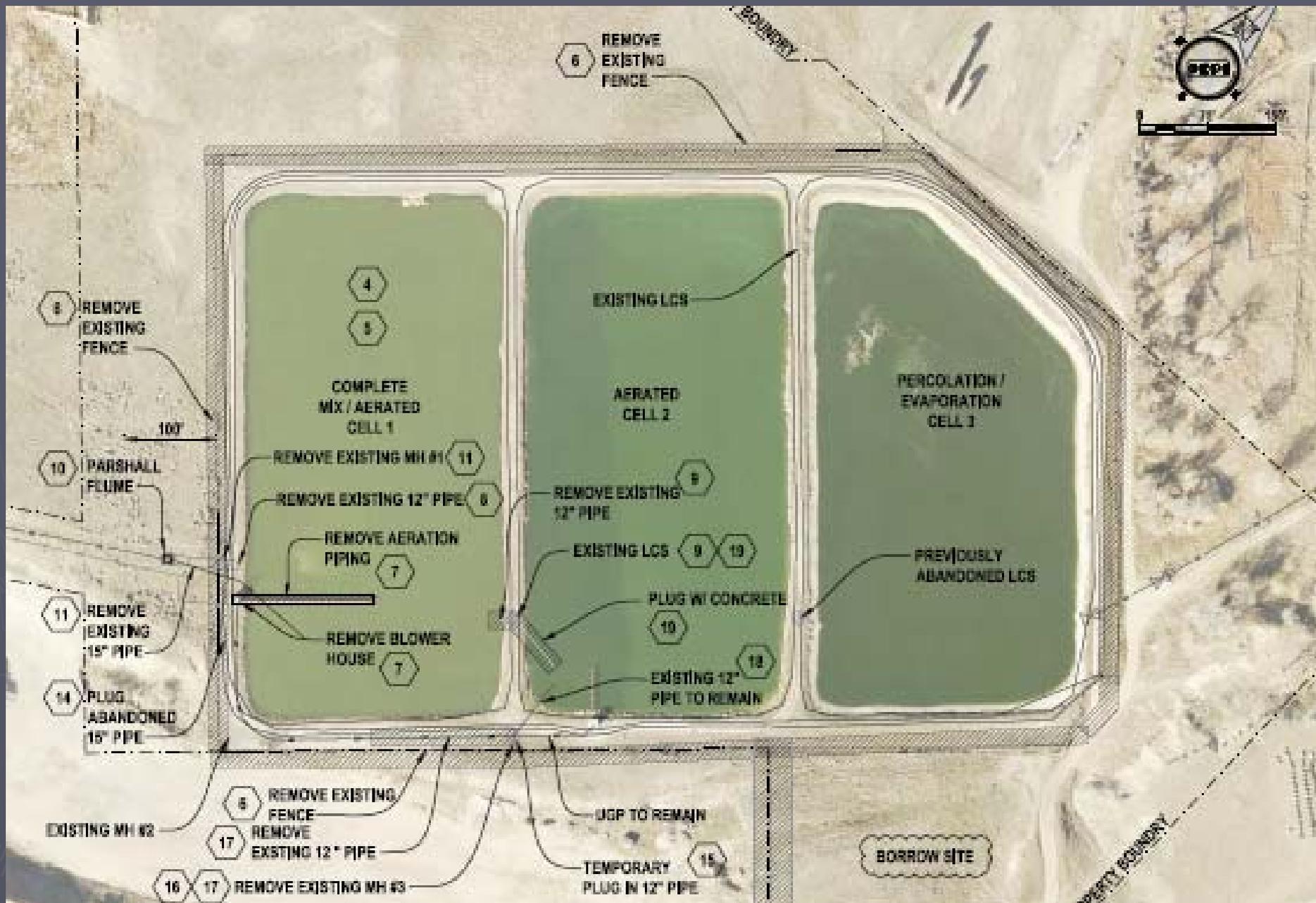


Glenrock Wastewater Treatment Facility

Presented by: Dave Andrews
Glenrock Public Works Director

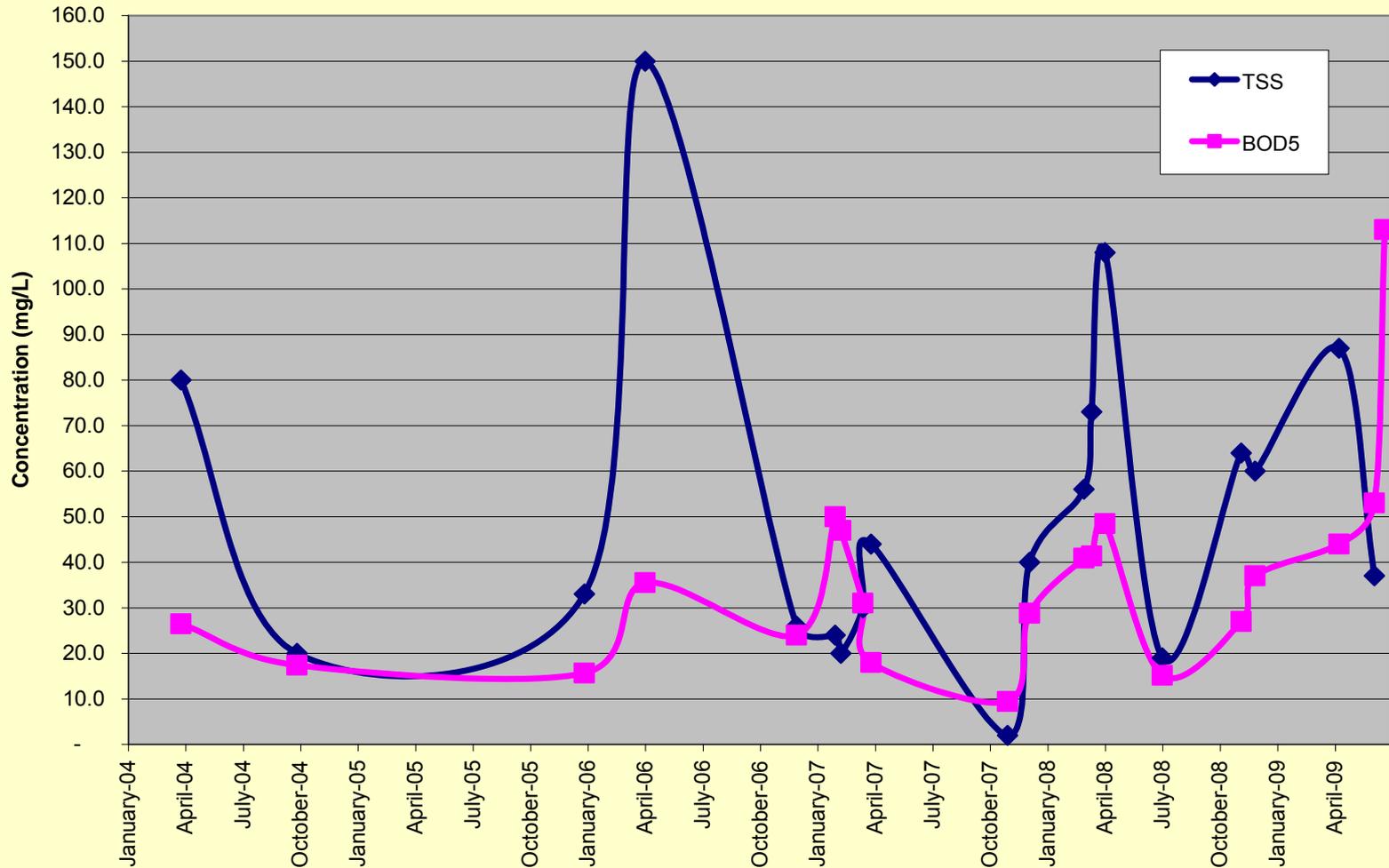
Original WWTF Configuration

- ▶ Influent Flow Rate – 0.25 MGD
- ▶ Cell #1 – Aerated Facultative Cell
 - 6-feet deep
 - 7.4 Million Gallons (30 days)
 - Aeration Grid
 - Baffle Curtain
- ▶ Cell #2
 - 6-feet deep
 - 7.4 Million Gallons (30 days)
 - Aeration Grid
- ▶ Cell #3
 - Evaporation and Infiltration
 - 4 acres
- ▶ Discharge to North Platte River
 - 30 mg/L BOD₅; 30 mg/L TSS



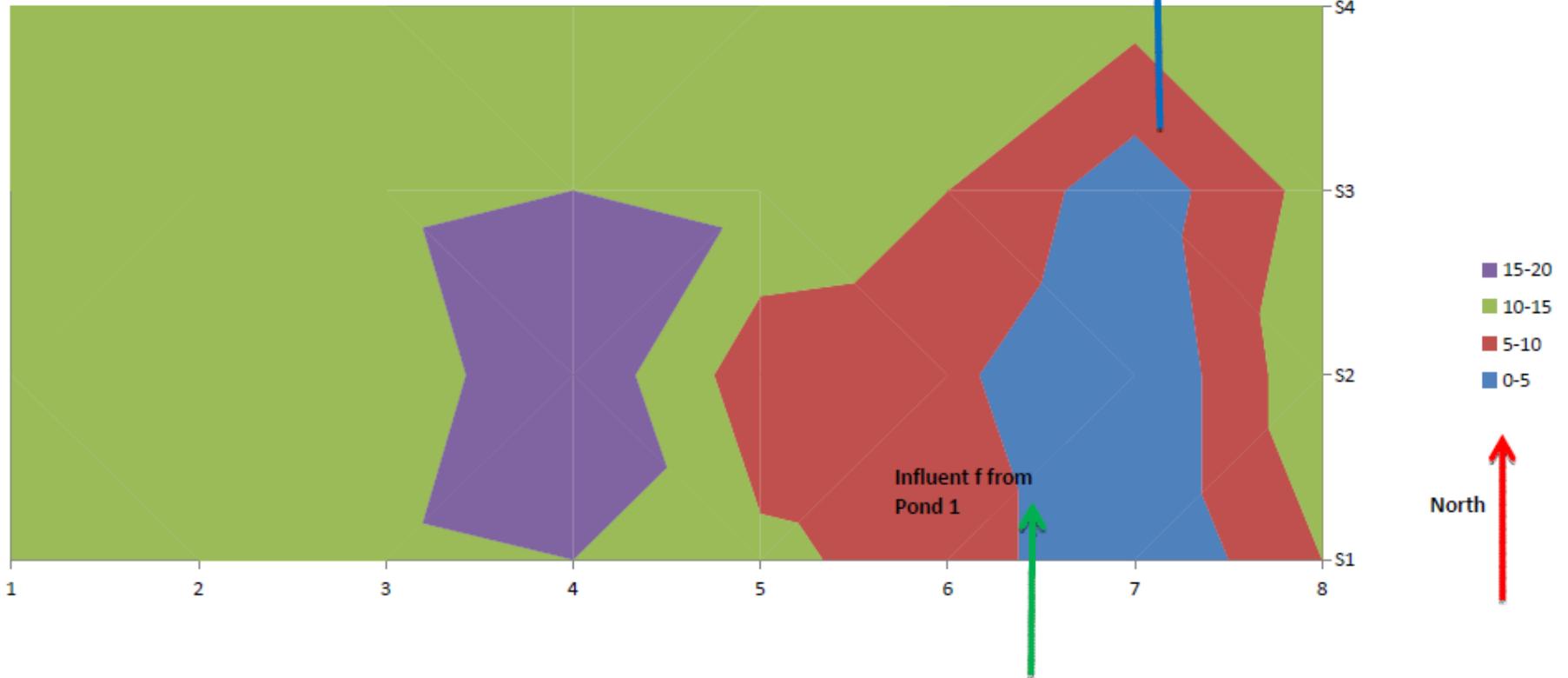
Historic Discharge from Original Lagoons

Glenrock WWTF - Discharge TSS and BOD Concentrations

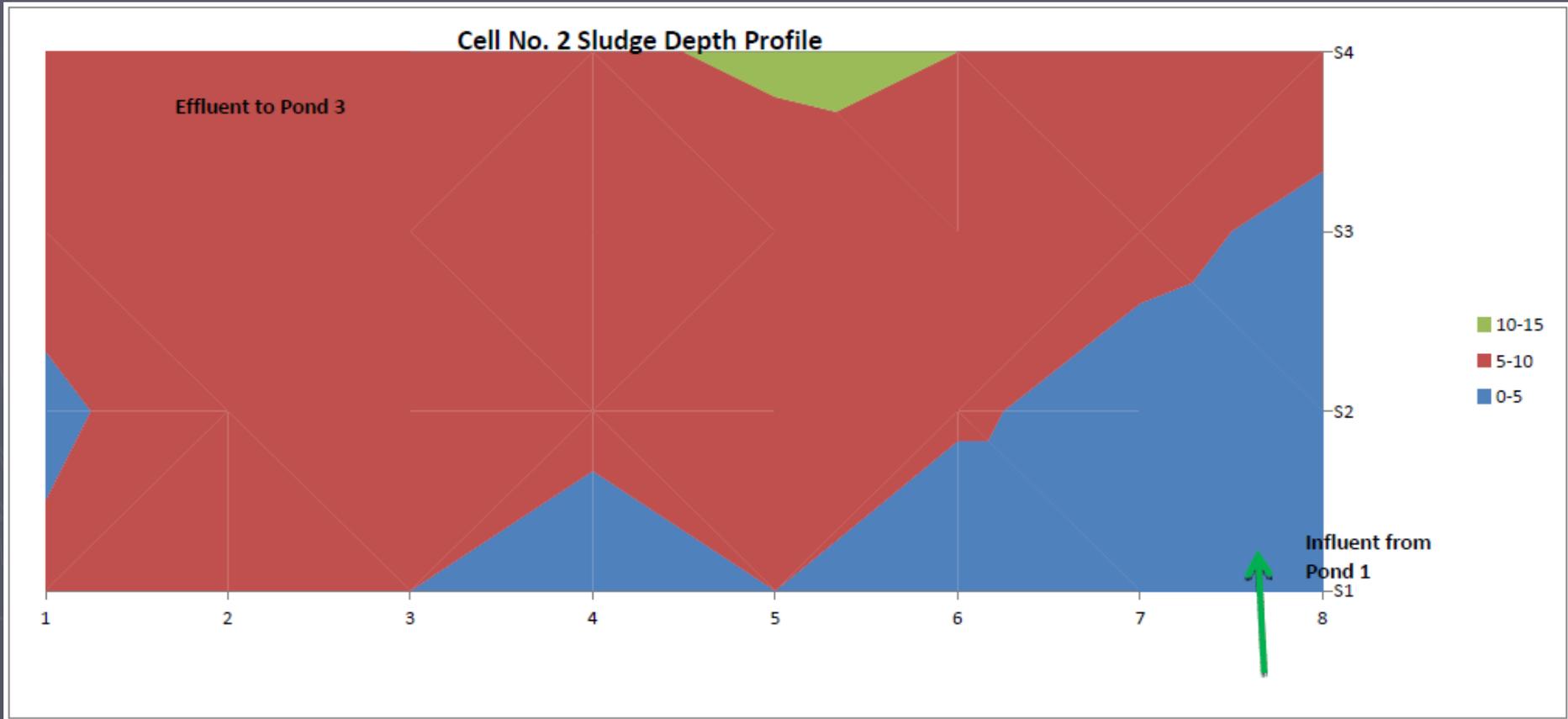


Cell #1 Sludge Profile

Cell No. 1 Sludge Depth Profile



Cell #2 Sludge Profile



Operation and Performance Deficiencies with Existing System

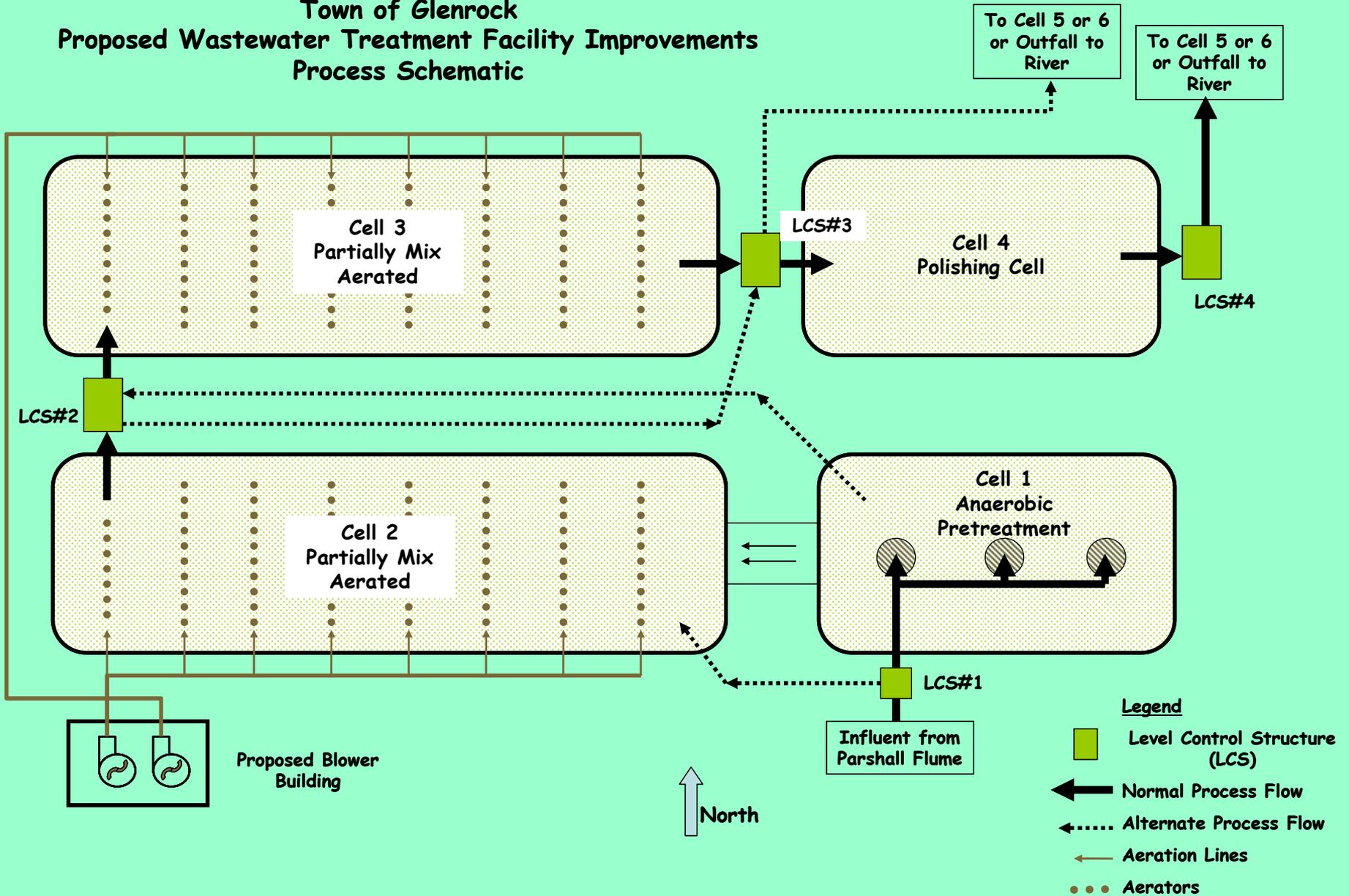
- ▶ Shallow Cells
 - Cold weather
 - Algae Formation
- ▶ Poor Oxygen Transfer
- ▶ Short Circuiting
- ▶ Algae Formation
- ▶ No Mixing

Glenrock WWTF Improvements

- ▶ Four new cells in place of Existing Cell #1
- ▶ Cell 1
 - Covered Anaerobic Pretreatment
 - 8-feet deep
 - 2.5 days detention
- ▶ Cell #2
 - Covered Aerated Partially Mixed Cell
 - 8 days detention
- ▶ Cell #3
 - Aerated Partially Mixed Cell
 - 8 days detention
- ▶ Cell #4
 - Settling/Polishing Cell
 - 2.5 Days Detention



Town of Glenrock Proposed Wastewater Treatment Facility Improvements Process Schematic



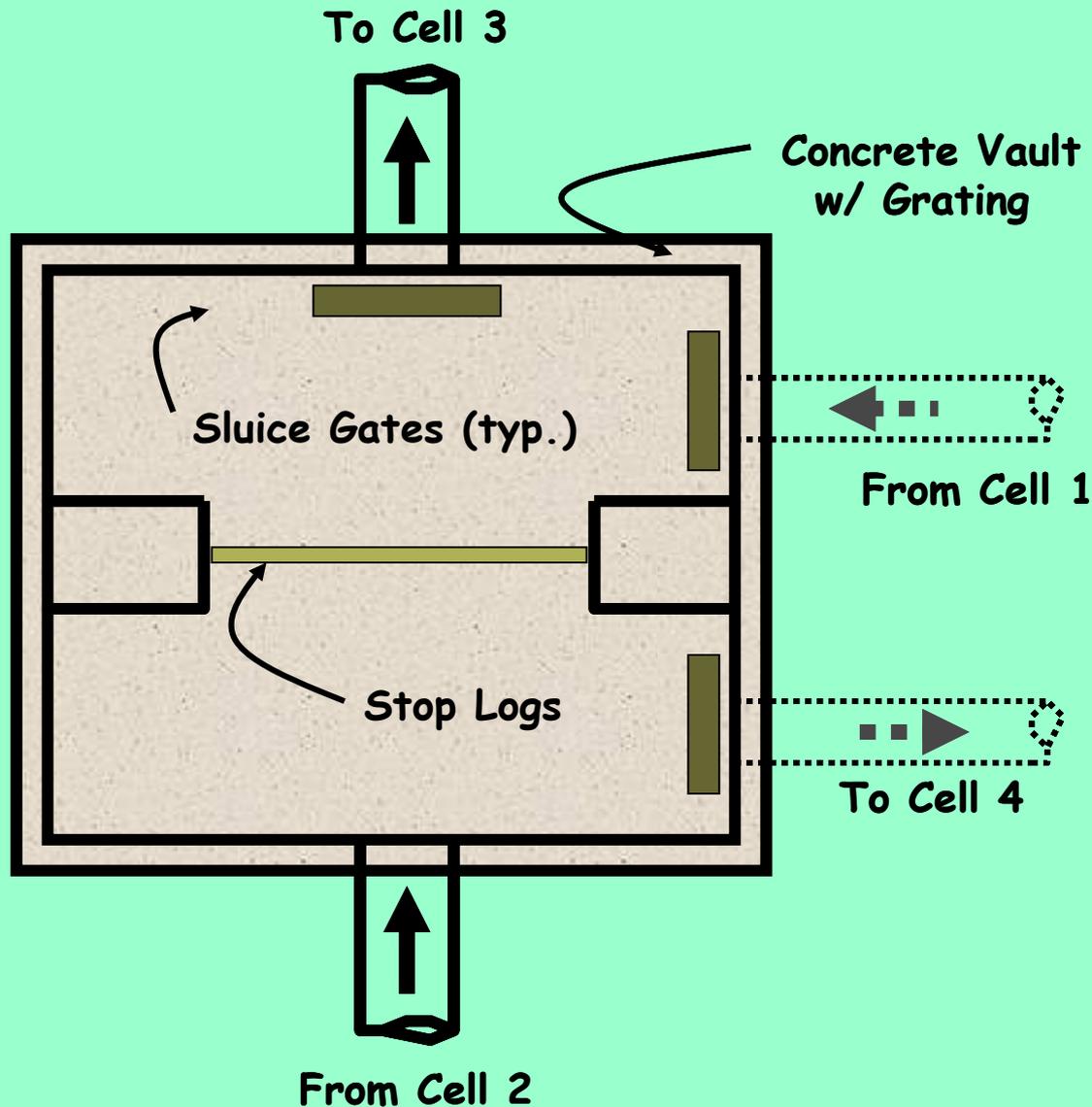
Anaerobic Pretreatment Cell Design

- ▶ Dr. Michael Richard and Stantec Consulting
- ▶ Minimum Depth – 8 feet (deeper is better)
- ▶ Minimum 2 day retention time
- ▶ Insulated cover
- ▶ Inflow at base into concrete pits (quiescent)

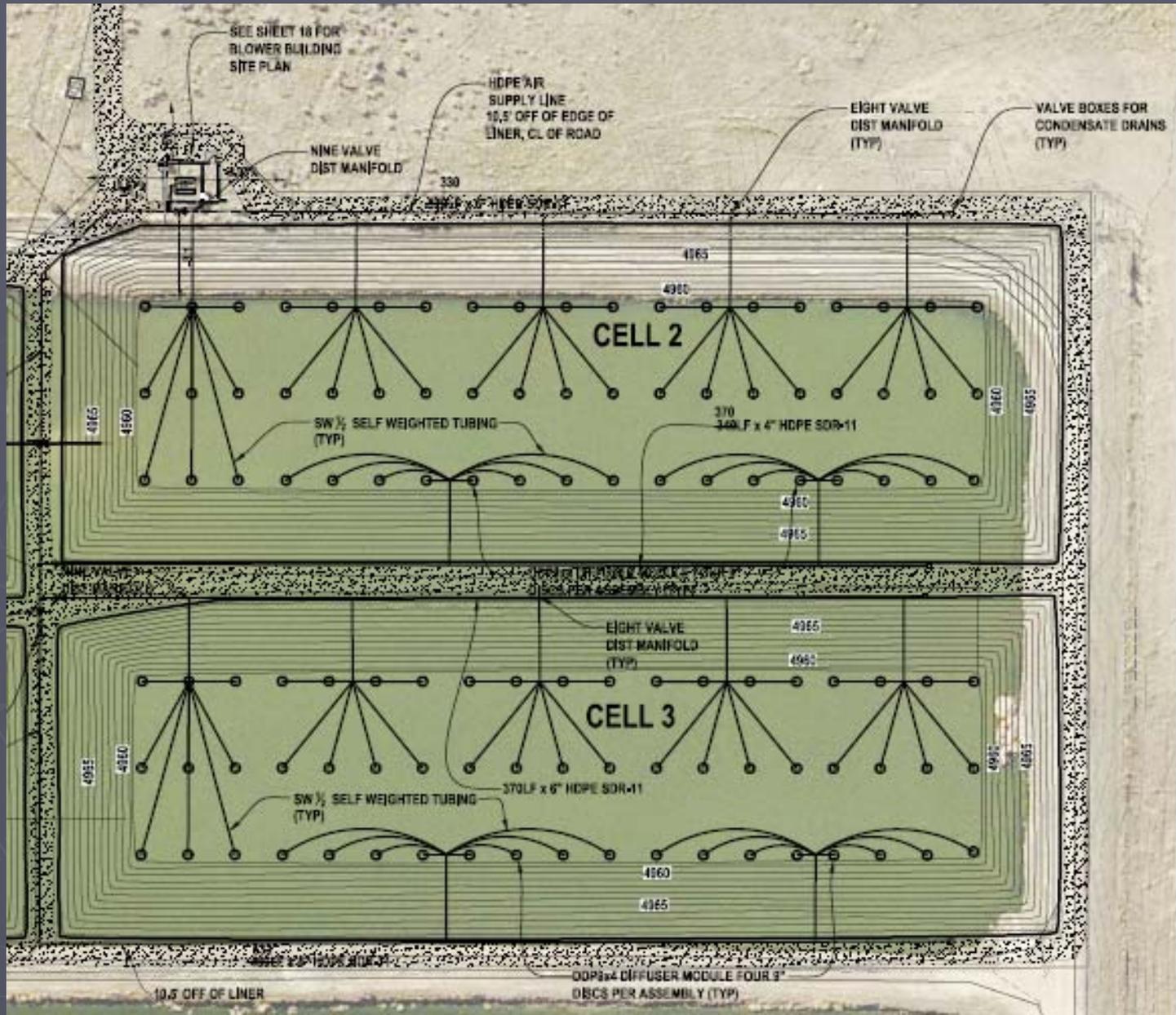
Aeration Design Parameters

DESIGN PARAMETER	2010	2020	2030
Population	2,500	2,900	3,350
Flow Rate, MGD			
Average Daily	0.30	0.35	0.40
Peak Hourly (peaking factor = 2.5)	0.75	0.87	1.00
BOD ₅ Loading, lb/day			
Domestic (@ 0.25 lb/person/day)	625	725	838
NH ₃ Loading as TKN (summer only), lb/day			
Domestic (@ 30 mg/L)	75	88	101
Actual O ₂ Requirements* (AOR), lbs O ₂ /day			
Summer w/ nitrification	699	812	927
Winter w/o nitrification	469	544	638
Standard O ₂ Requirements (SOR), lbs O ₂ /day			
Summer w/ nitrification	1,273	1,480	1,706
Winter w/o nitrification	780	905	1,045
Air Flow** required for SOR, scfm			
Summer w/ nitrification	850	984	1,135
Winter w/o nitrification	520	602	695

Conceptual Design of Level Control Structures



Aerator Design



Sludge Removal from Old Cell



sludge removal

04.10.2011 16:23

Sludge Removal from Old Cell



north west corner of lagoon # 1 sludge

04.06.2011 14:39

Cell Under-drain Piping



Sludge Drain Lines – Cell #1



Liner Layout with Ventilation System



HDPE Liner – Cell #1



HDPE Liner – Pipe Penetration



Cell #1 – Inlet Piping and Sludge Pits



Concrete Sludge Pit – Cell No. 1



Centrifugal Blowers w/ VFD's



09-46 blower building glenrock wastewater

01.04.2012 12:29

Blower Building



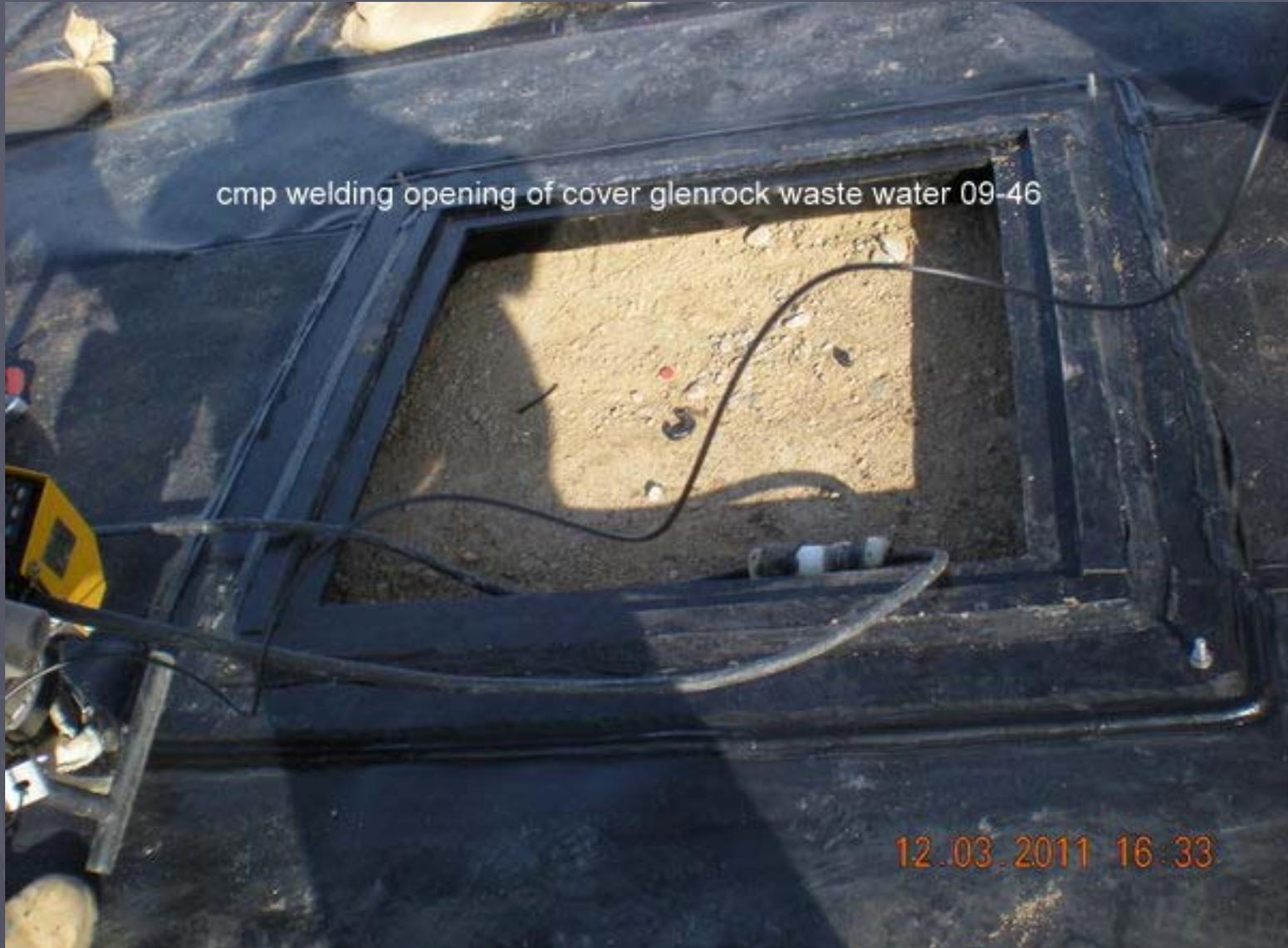
09-46 glenrock wastewater blower building

12.10.2011 12:22

Insulated Cover – Welding Skirt



Access Hatches in Insulated Cover



Installation of Insulated Cover



Insulated Cover Failure



Cable Lacing Failure



Skirt Failure



Proposed Solution and State of the Contract

- ▶ Continuously Weld Skirt to Cover
- ▶ Stitch Weld Cover Panels
- ▶ Contract Suspended until Spring
- ▶ Replace all Damaged Panels
- ▶ Cover Manufacturer and Installer Replacing Cover

Insulated Covers

▶ As Specified

- Allowed lacing and welding
- Performance wind specification – 100 MPH
- Manufacturer's Experience – 10 years
- Warranty – 10 years
- 2-inches of Insulation

▶ Recommended Changes

- Minimum lacing requirements
- Enhanced wind design calculations
- Experience in cold weather and high winds
- 4-inches of Insulation

System Performance

► February 23, 2012 Sample

- Influent – 219.7 BOD
- Cell 2 Effluent – 28.43 BOD
- Cell 3 Effluent – 17.74 BOD
- Cell 4 Effluent – 14.44 BOD

93.4% Removal