

Community Wastewater Treatment Park Presentation

College of Engineering



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IOWA SMALL COMMUNITY WASTEWATER TECHNOLOGY PARK

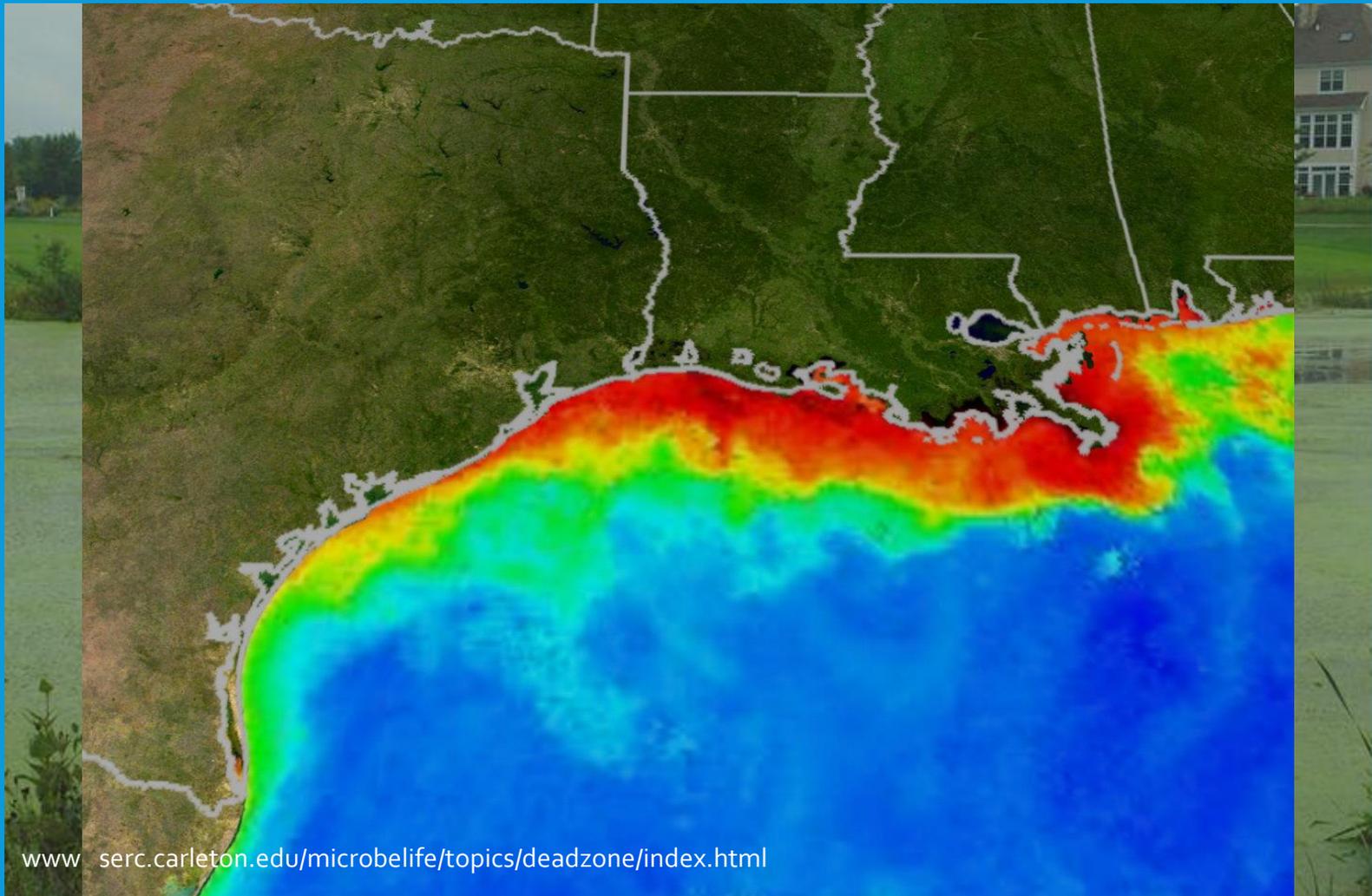
Final Design

University of Iowa

Civil and Environmental Engineering



IOWA HAS POOR SURFACE WATER QUALITY



SMALL COMMUNITIES LACK RESOURCES TO TREAT WASTEWATER CONVENTIONALLY



http://www.tpomag.com/editorial/2012/12/affordable_compliance



<https://www.linkedin.com/pulse/2015-wef-innovative-treatment-award-goes-algaewheel-louis-lefebvre>

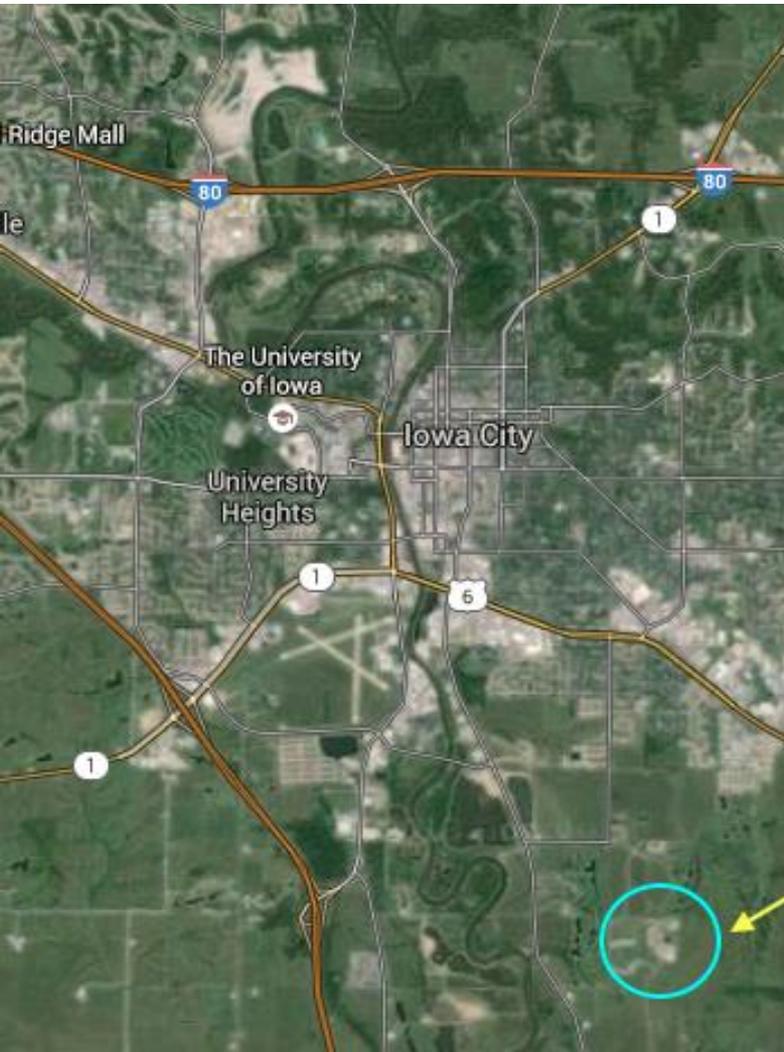


<http://www.build-a-biogas-plant.com/covered-lagoon-digesters/>

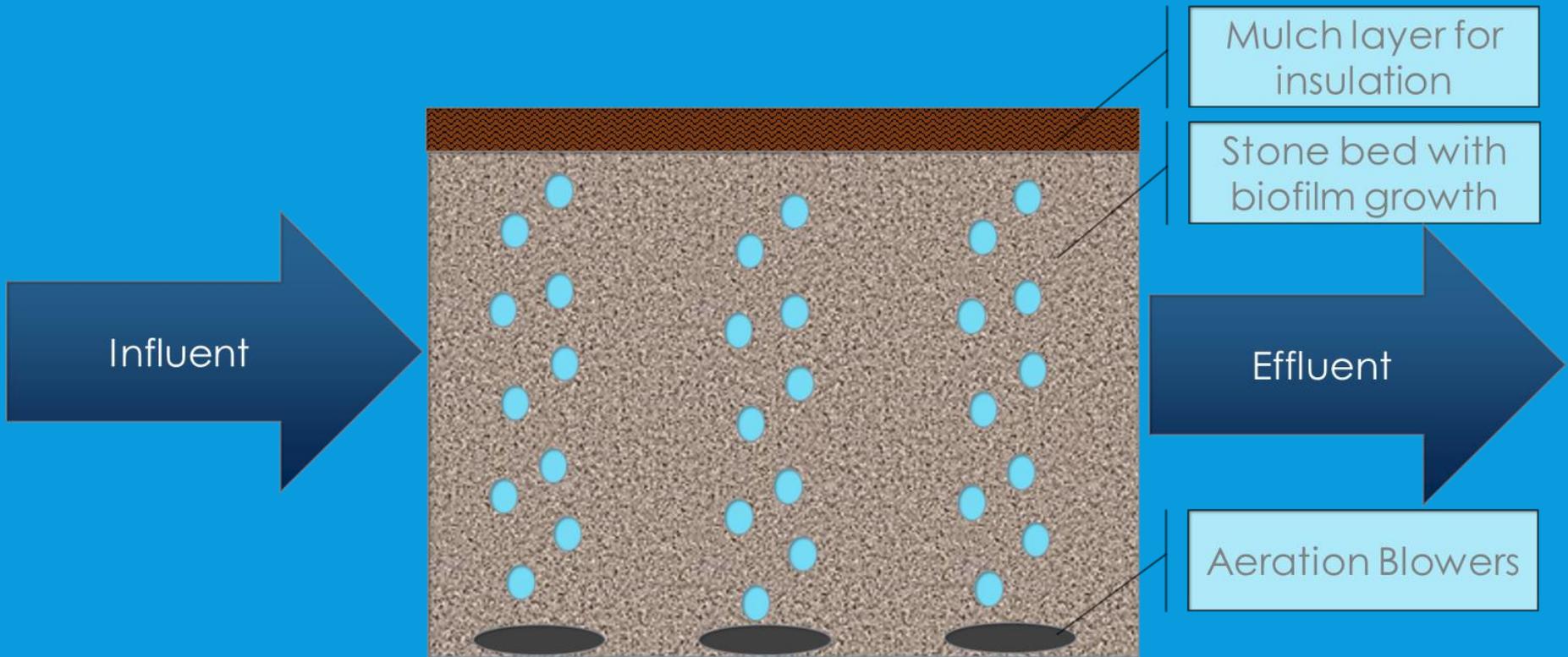
IMPLEMENT POSSIBLE TREATMENT AT WW TECH PARK

- Test technology to:
 - Assess feasibility in Iowa's climate
 - Optimize size
 - Optimize aeration requirements
 - Achieve possible denitrification
- Meet water quality standards defined by:
 - Iowa Nutrient Reduction Strategy
 - Iowa Department of Natural Resources
 - Iowa Water Environment Association
- Gain Iowa DNR approval

SITE AT IOWA CITY WWTP



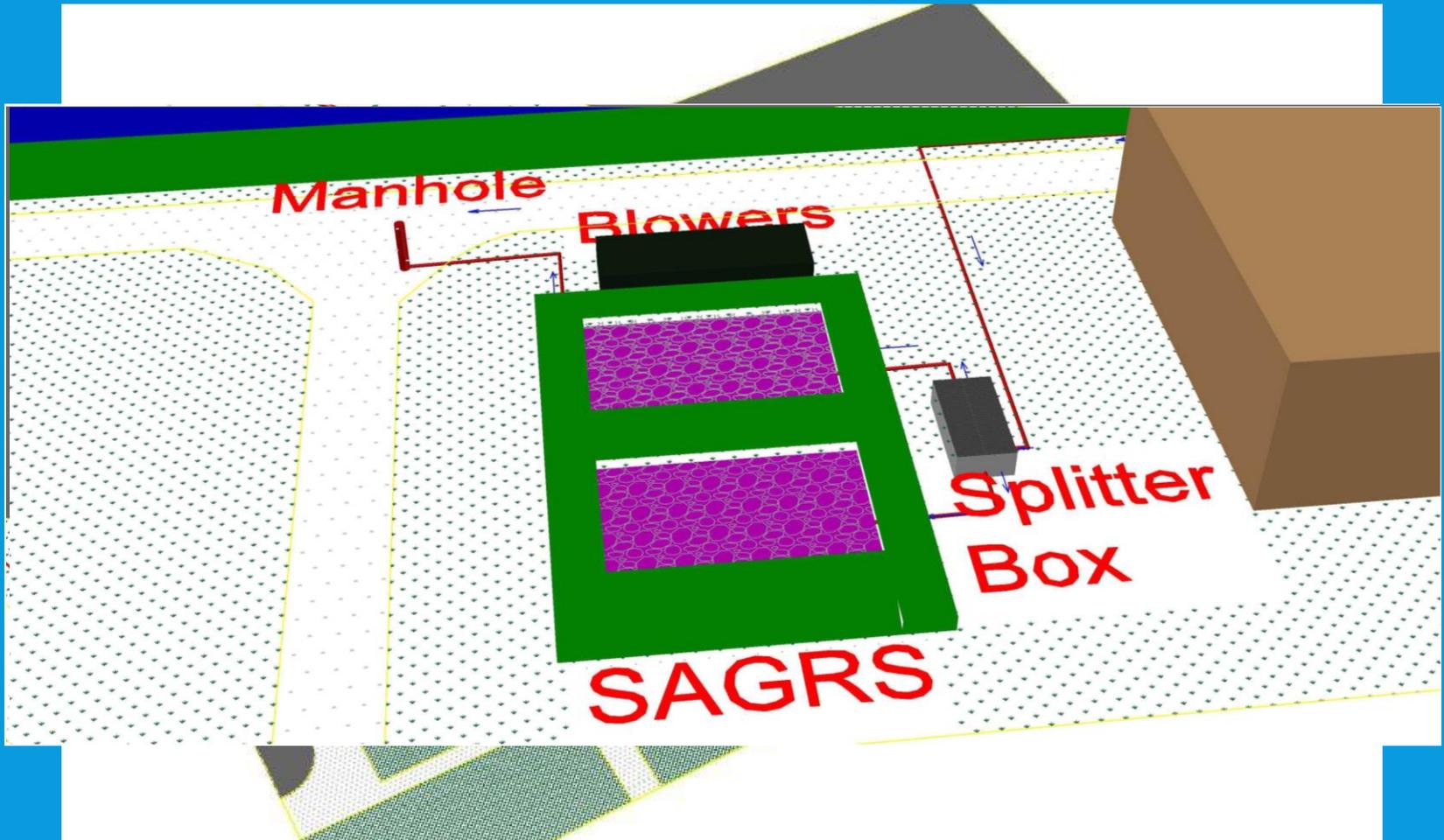
TEST SUBMERGED ATTACHED GROWTH REACTOR (SAGR)



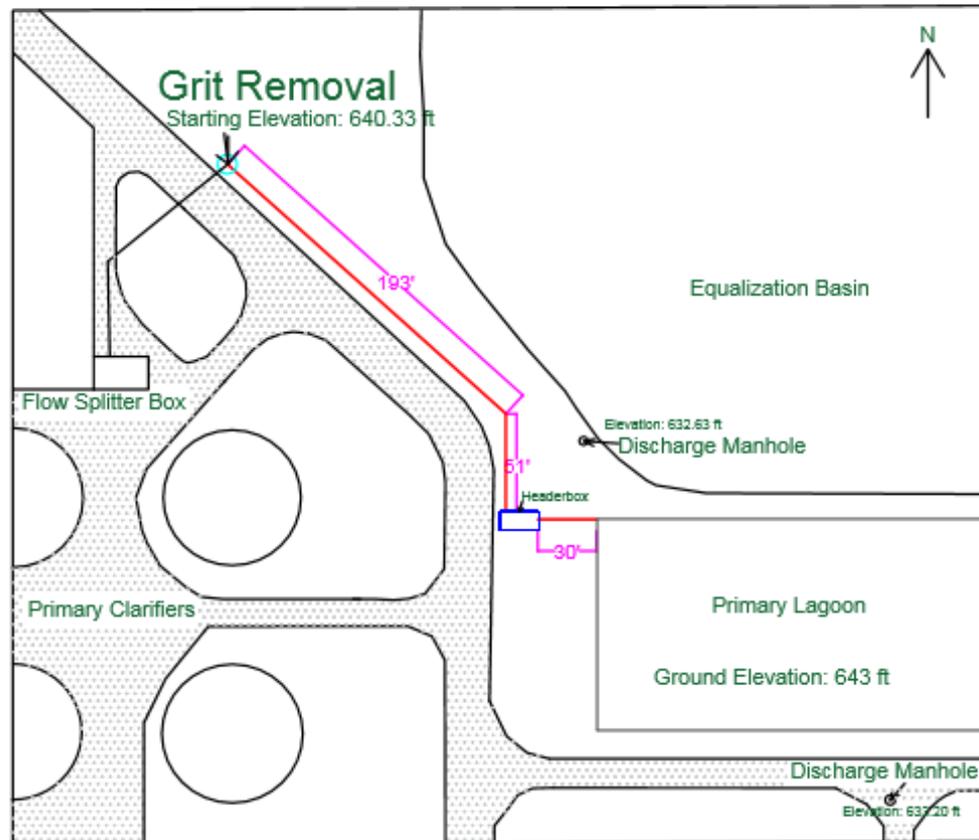
FLEXIBLE DESIGN TO ALLOW TESTING OF MULTIPLE VARIABLES

- Aeration
- Flow control
- Valves to change flow
- Water quality assessment collection points
- Easily altered design to different test technologies

OVERVIEW



DEGRITTED, RAW WASTEWATER PIPELINE TO WW TECH PARK

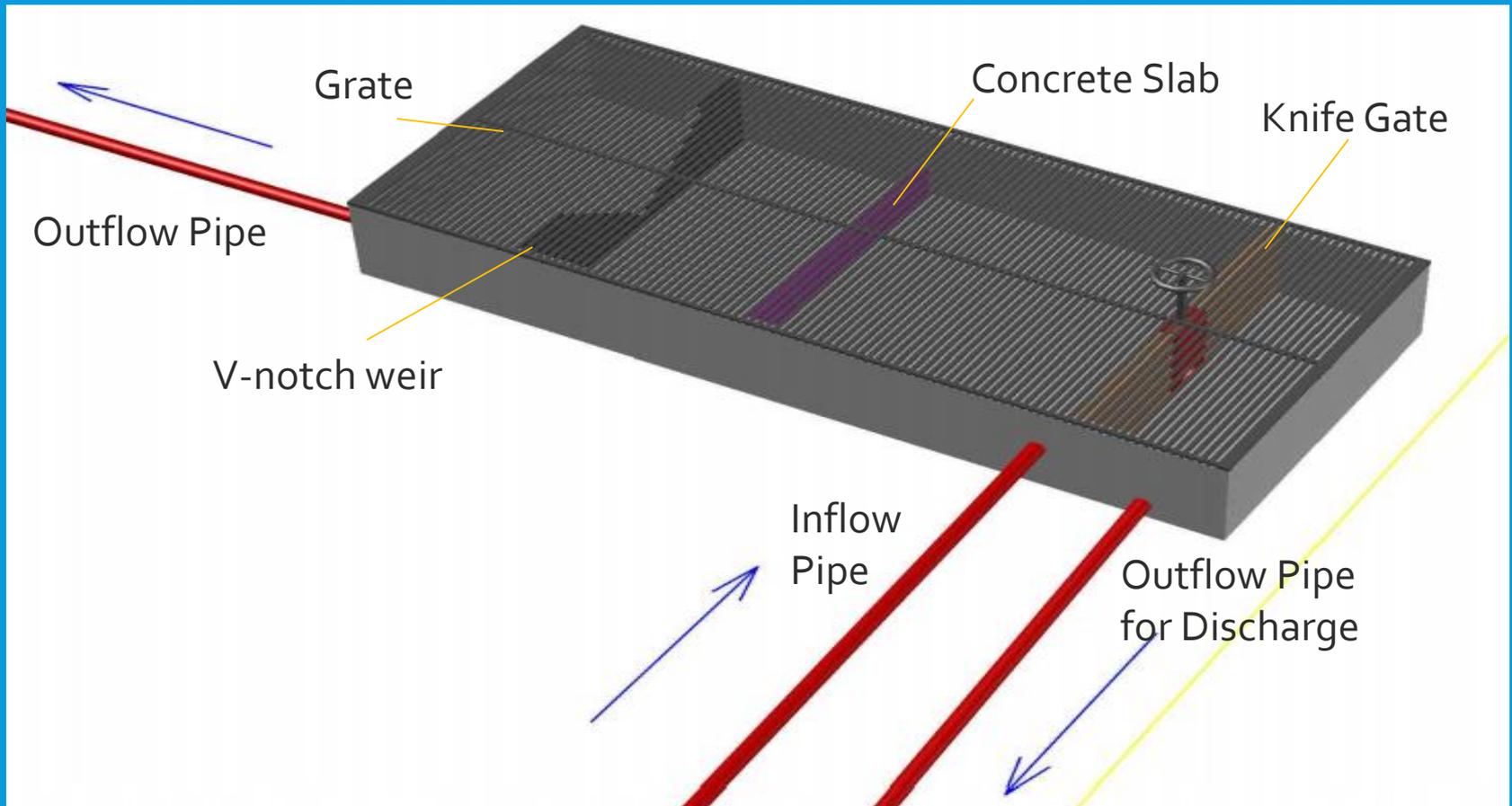


PUMPS

- Located at beginning of pipeline
- 2 pumps in parallel
- AMT 1-1/2" x 1-1/4" Centrifugal Pump
 - 2 HP
 - 155-230 V



HEADERBOX

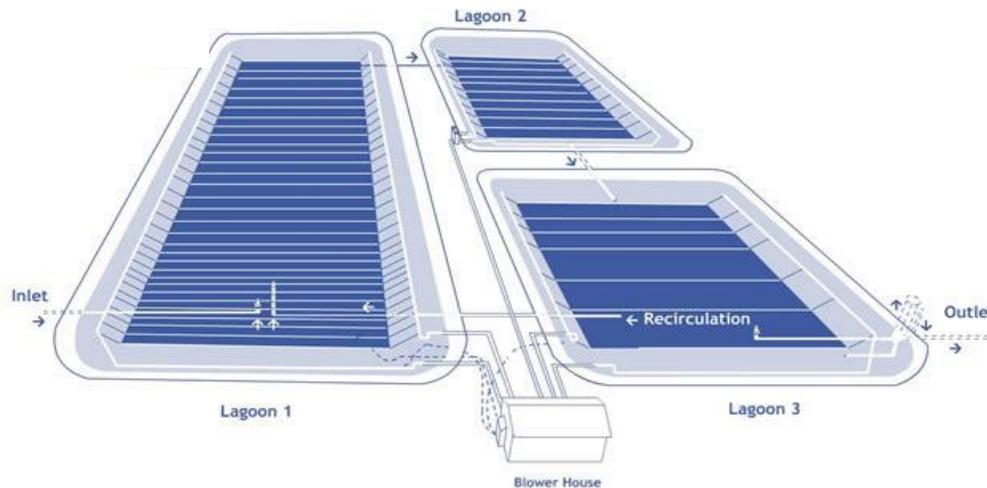


PRIMARY LAGOON

- Dimensions:

Length (ft)	Width (ft)	Depth (ft)	Volume(ft ³)
372	110	6	245,520

- Hydraulic Residence Time (HRT) = 36.7 days
- Goal: maximum 50 mg/L BOD in effluent



SECONDARY LAGOONS

- Dimensions:

Length (ft)	Width (ft)	Depth (ft)	Volume(ft ³)
216	58	8	100,224

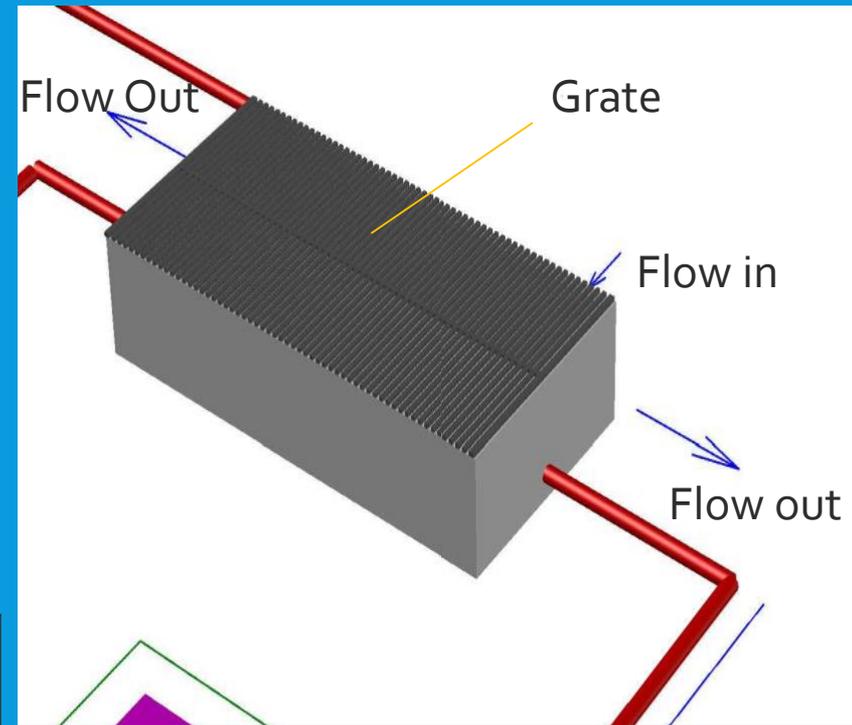
- 2 lagoons in parallel
- HRT = 30 days (DNR Specification)
- Goal: maximum 50 mg/L TSS in effluent



SPLITTER BOX

- Purpose: water sampling after lagoon treatment to ensure BOD and TSS are less than 50 mg/L
- Dimensions:

Length (ft)	Width (ft)	Height (ft)	Volume (ft ³)
20	10	6	1,200



SAGR CELLS

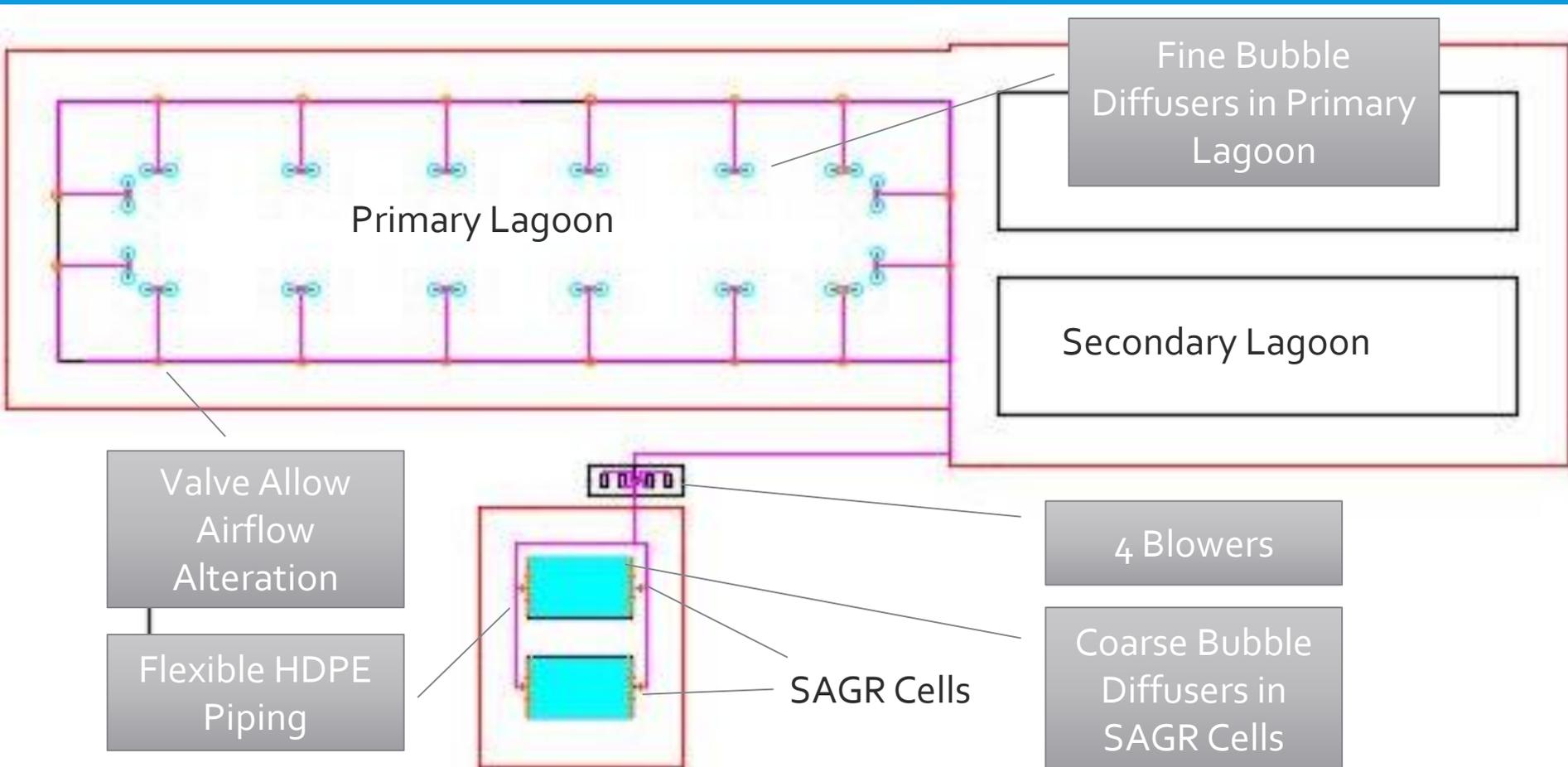
- Dimensions:

Length (ft)	Width (ft)	Depth (ft)	Volume(ft ³)
42.3	26	8	8,795

- 2 cells in parallel
- HRT = 24 hours (DNR Specification)
- Goal: lower BOD, TSS, and nitrogen concentrations to effluent standards



BLOWER SYSTEM



BLOWER

- 4 blowers
- 3-phase, 20 hp Positive Displacement Blowers



DIFFUSERS

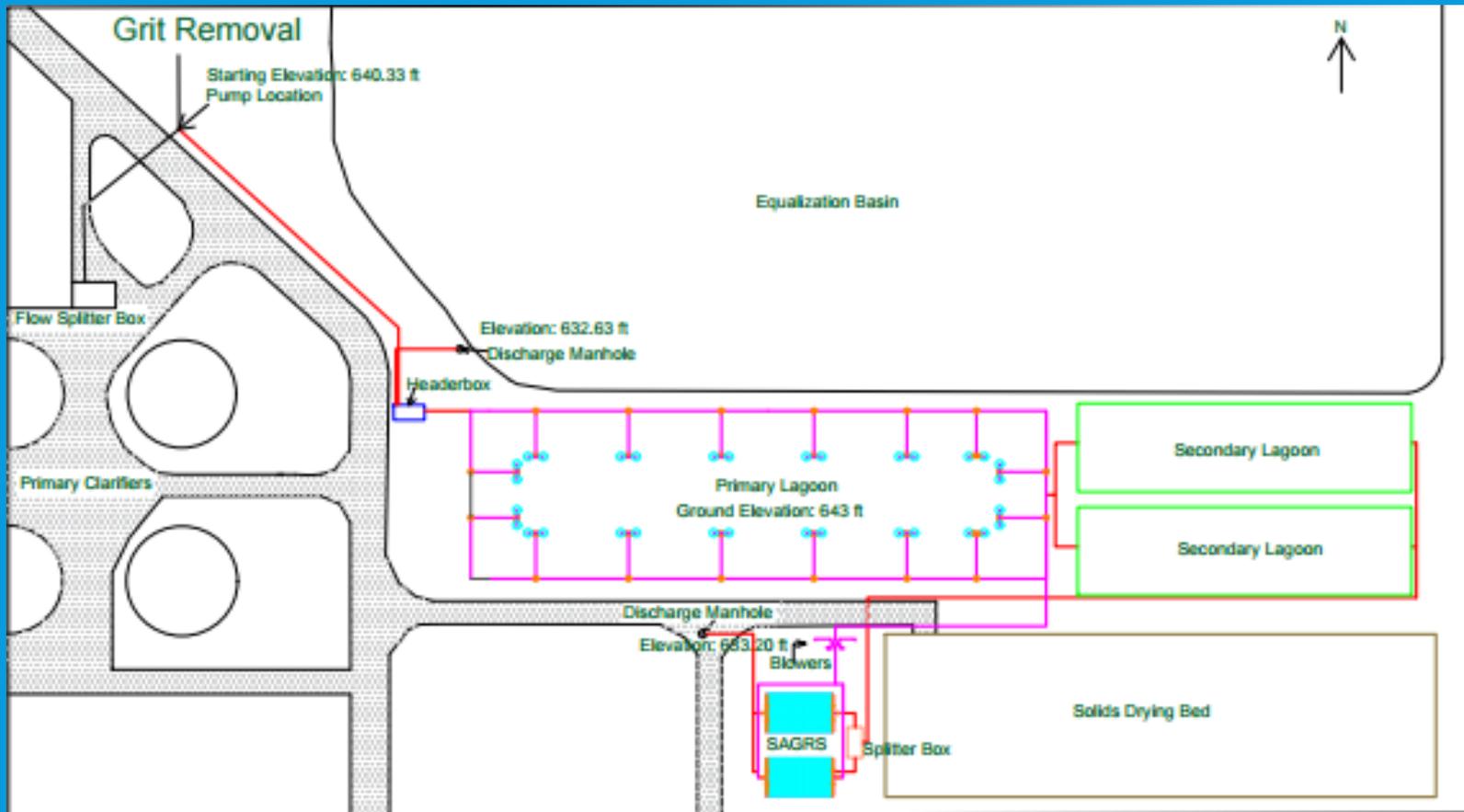
Coarse Bubble Diffuser



Fine Bubble Diffuser



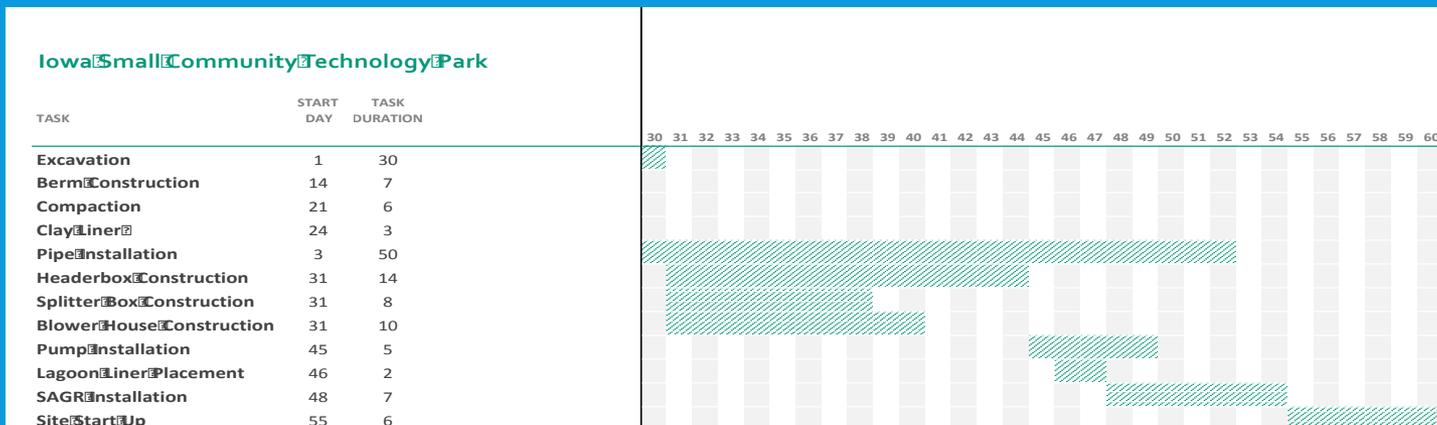
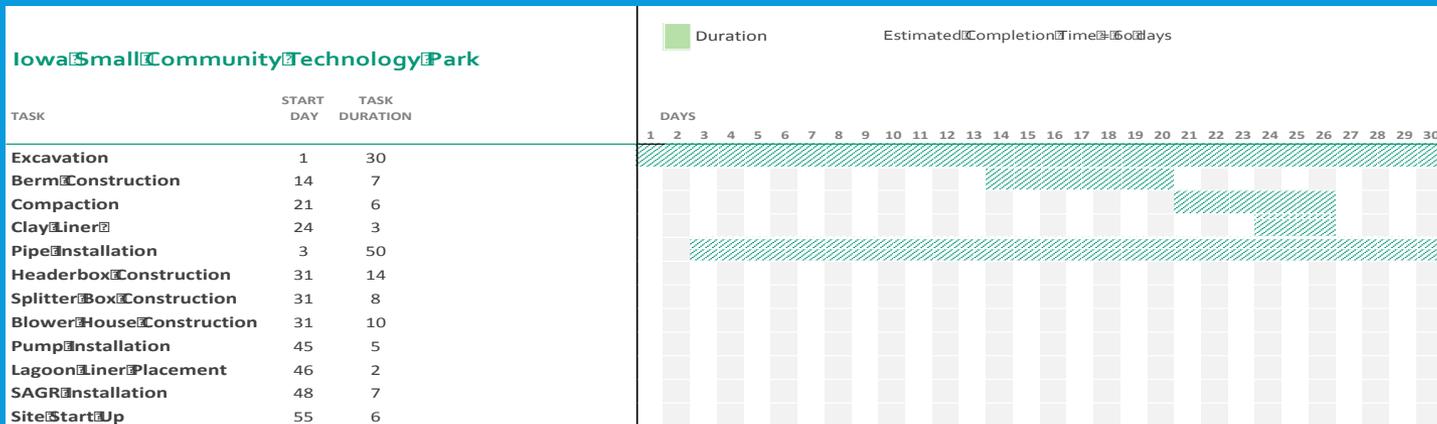
COMPLETE LAYOUT



COST ESTIMATE

Component	Estimated Cost
Primary Lagoon	\$81,610.00
Secondary Lagoons	\$36,160.00
SAGR Cells	\$20,000.00
Headerbox	\$1,540.00
Splitter Box	\$14,910.00
Blower System	\$2,820.00
Piping and Pumping System	\$19,020.00
Total	\$146,060.00

CONSTRUCTION TIMELINE



QUESTIONS?

