

Embracing Collaborative Delivery to Maximize the Value of their Next-Generation Wastewater Treatment Upgrade

WEF – June Webinar

Today...Who and What...

- Project Background & Problem Statement
- Collaborative Contract Model
- Project Partners, Selection and Contract
- Project Challenges
- Project Results
- Q & A



Don Stang
City of Lloydminster
Exec Manager - Operations



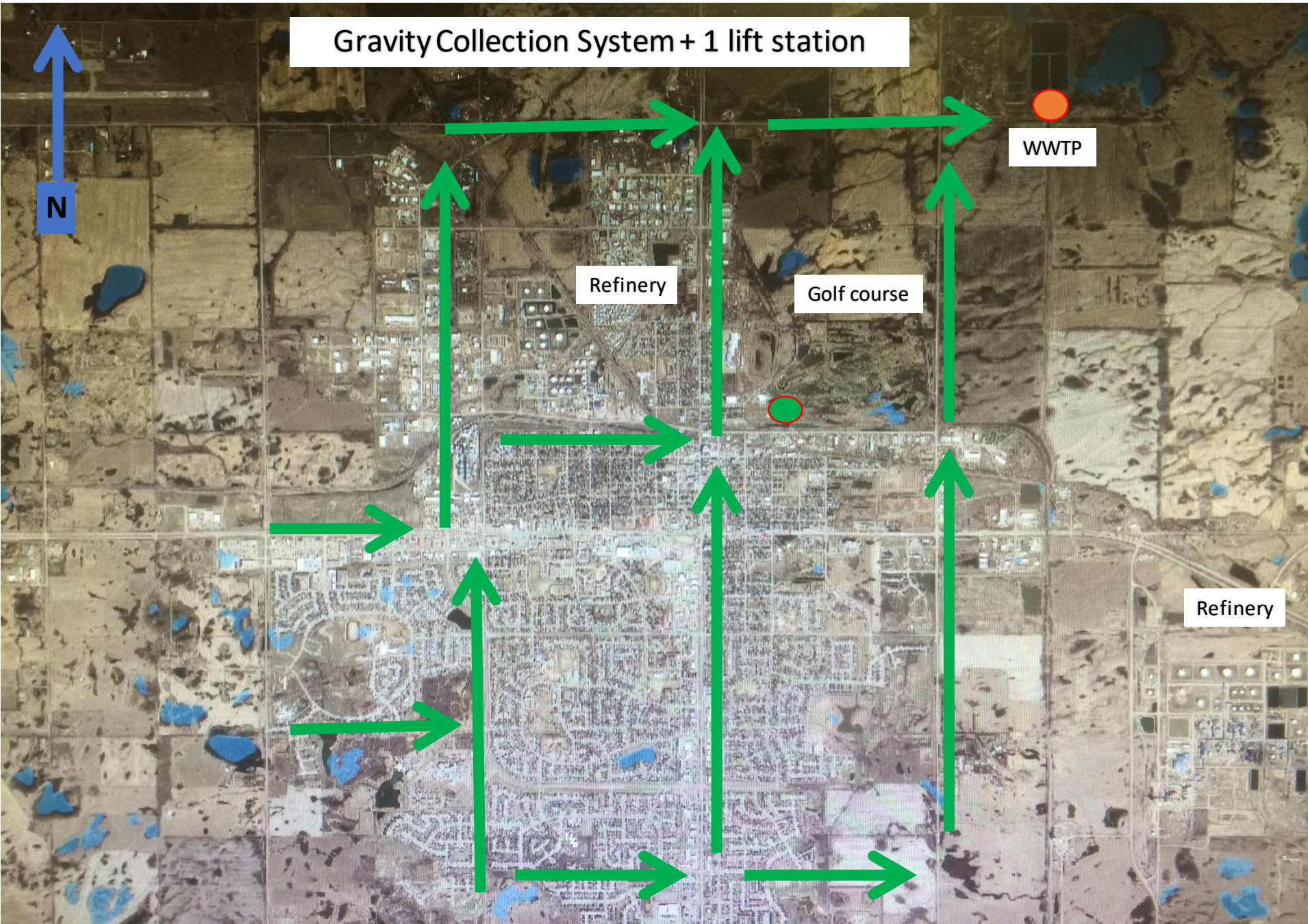
Rob Hacking:
Veolia Water Technologies
Large Projects Director

About Lloydminster

- 32,000 population
- Border City – 60% population in Alberta 40% in Saskatchewan
- 2.5 hrs between Edmonton and Saskatoon
- One Mayor and Council
- Funding Challenges



Gravity Collection System + 1 lift station



Lloydminster – Existing WWTP

- Coarse Screening
- Aerated Lagoons – Cells 1&2
- Final Effluent Storage Lagoon – Cell 3
- Final Effluent Pump Station
- 30Km effluent force main (1981) to North Saskatchewan River
- No significant neighbors
- Neighboring wetland & drainage area



Problem Statement

- Old Wastewater Treatment Facility was not meeting regulatory requirements for approximately 10+ years.
- City of Lloydminster was issued a Federal Directive to be compliant by Dec 2023.
 - Fines and jail time for non-compliance
- Schedule was critical
- Limited Funds
 - Federal and Provincial Funding was approved based on a \$75M project cost.
 - City funds were limited by borrowing capacity and reserve balances. Max budget set at \$81.5M
 - City needed cost certainty
- City also wanted to be forward thinking in its infrastructure...

Delivery Model - Integrated Project Delivery

- City was introduced to IPD during a seminar/conference – Sounded too good to be true.
- Two main drivers in picking IPD over all other project delivery models
 1. Cost certainty – this is established through the Validation Report
 2. Accelerated Schedule – work can start prior to full design completion.
- Other contributing factors to picking IPD
 - Collaborative model – includes all parties up front and throughout the project
 - Innovative project delivery – opportunity to be a leader in municipal project delivery
 - Contractually bound to be collaborative (best for project)
 - Shared in rewards – all parties share profit and are incentivized to deliver under budget.
 - Cost transparency

City Approval – Buy-in



Established a Project Steering Committee

Included all affected department heads including Finance, Communications, Procurement, City Manager, and Mayor. (15 people in total on committee)

Established Owner's Requirements, Goals, Constraints used throughout the project.



Industry Experts

Brought in industry experts to present IPD model to ELT (Executive Leadership Group) and Steering Committee.

City department heads acknowledged potential of using IPD



Presented at Public Council Meeting

Council provided support to moving forward with IPD during public meeting.

July 3, 2019, Council approved by resolution to proceed with IPD:

That Council approve proceeding with the procurement and delivery of the Mechanical Wastewater Treatment Facility Project utilizing the Integrated Project Delivery (IPD) procurement process.



Requirements, Goals and Constraints

1. Project Cost – Not to exceed \$81.5mm, stretch goal of <\$75mm.
2. Environmental Resilience and Sustainability:
 - a. Technology for future reuse or alternate discharge.
 - b. Effluent quality to meet local and federal regulator standards.
3. Effluent reuse and Regional Collaboration
 - a. Reuse water and accepting w/w from regional partners
4. Solids Management
 - a. Cost effective, low complexity.
5. Future Resilience
 - a. Ease of expansion
 - b. Pathway to future regulatory requirements
 - c. Material durability and low O&M requirements
6. Operational Efficiency
 - a. Low O&M, effective use of existing infrastructure, operational flexibility.
7. Schedule
8. Quality Work Environment
9. Leadership & Innovation
10. Transparency
 - a. For the public to understand the project
 - b. For local vendors and businesses to be involved in the project
 - c. Cost transparency for senior leadership, information is shared but also treated with respect

Procurement Partners

- Owner's Engineer – Already established through earlier project work.
- All other parties were procured using QBS (Qualification Based Selection)
- Procurement documents developed to focus on IPD understanding. Proponents asked to show experience and understanding of IPD.
- Proponents were asked to submit profit expectations – Separate from proposal. This was not evaluated for selection purposes.
- Once a party was procured, they became part of the project and procurement team for all other parties
- Order of procurement – Engineer (previously established), General Contractor, Technology Vender, and Electrical/Instrumentation. All 5 (including City) formed IPD Team.

The IPD Team

- Owner: City of Lloydminster
- Engineer: ISL Engineering
- General Contracting Partners
 - Bird
 - Chandos
- Electrical, controls and instrumentation: Magna
- Technology supplier: Veolia Water and Process Technologies

Jun 2020	Council directed Administration to enter into an integrated project delivery contract
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The logo for Bird, featuring the word "bird" in a bold, green, lowercase sans-serif font. Above the letter "i" is a stylized orange and green graphic element.The logo for Chandos, consisting of a stylized circular emblem with a red outer ring and a blue inner ring, and the word "CHANDOS" in a bold, black, uppercase sans-serif font to the right.The logo for ISL Engineering and Land Services, featuring the letters "ISL" in a white, italicized, sans-serif font inside a blue square, with the words "Engineering and Land Services" in a blue, sans-serif font to the right.The logo for Magna IV Engineering, featuring a stylized graphic of horizontal lines in shades of brown and gold, with the word "MAGNA" in a bold, blue, uppercase sans-serif font and "IV ENGINEERING" in a smaller, blue, uppercase sans-serif font below it.The logo for Veolia, featuring a red circular emblem with a white stylized water drop or leaf shape inside, and the word "VEOLIA" in a bold, red, uppercase sans-serif font to the right.

Basis of Design and Technology Selection

- Influent flows based on a 2% pop growth projection.
- Use of primary clarification for minimizing energy and protection against debris and contaminants.
- Use of MBR for high quality water targeted for three possible scenarios:
 - Compliant with regulations for North Sas. River...status quo
 - Suitable for Reuse Water for irrigation or further polishing for heavy industry.
 - Suitable for possible alternative discharge to nearby receiving water bodies
- Use of 1 of the existing lagoon cells for biosolids storage and digestion.
- Use of 2 of the existing lagoon cells for wet weather storage

Condition	US MGD
Dry Weather Flow	4.6
Average Day Flow	5.5
Max Month Flow	8.0
Max Week Flow	10.9
Max Day Flow	13.9
Peak Hour Flow	35.5

Table 4.1.6: Key Influent Wastewater Parameters

Parameter	Value
Biochemical Oxygen Demand (BOD)	270 mg/L
Total Suspended Solids (TSS)	251 mg/L
Volatile Solids Percentage	80%
Total Kjeldahl Nitrogen (TKN - N)	45 mg/L
Ammonia (NH ₃ - N)	28 mg/L
Total Phosphorus (TP - P)	5.1 mg/L
Alkalinity	250 mg/L
Minimum Wastewater Temperature during Dry Weather and Average Day Flows	8°C
Minimum Wastewater Temperature during Max Month Flows	12°C

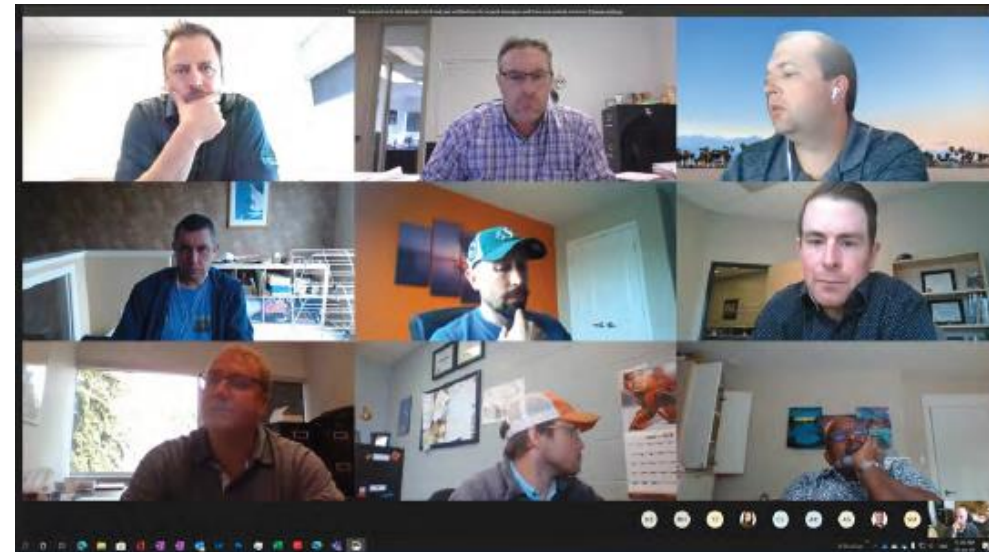
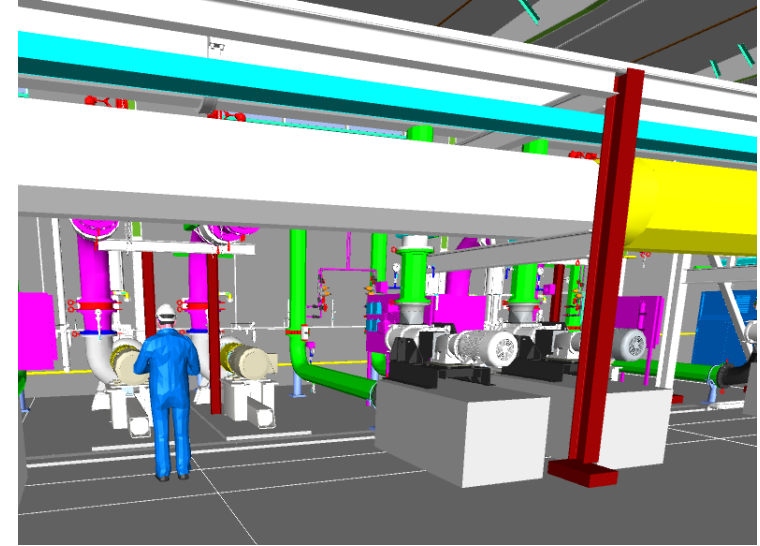
Validation

- Validation Report
 - What are we building?
 - What will it do?
 - How long will it take?
 - What will it cost?
 - How will the team be measured?
- Submitted to council August 2020



Turning Design into Construction Progress...Quickly

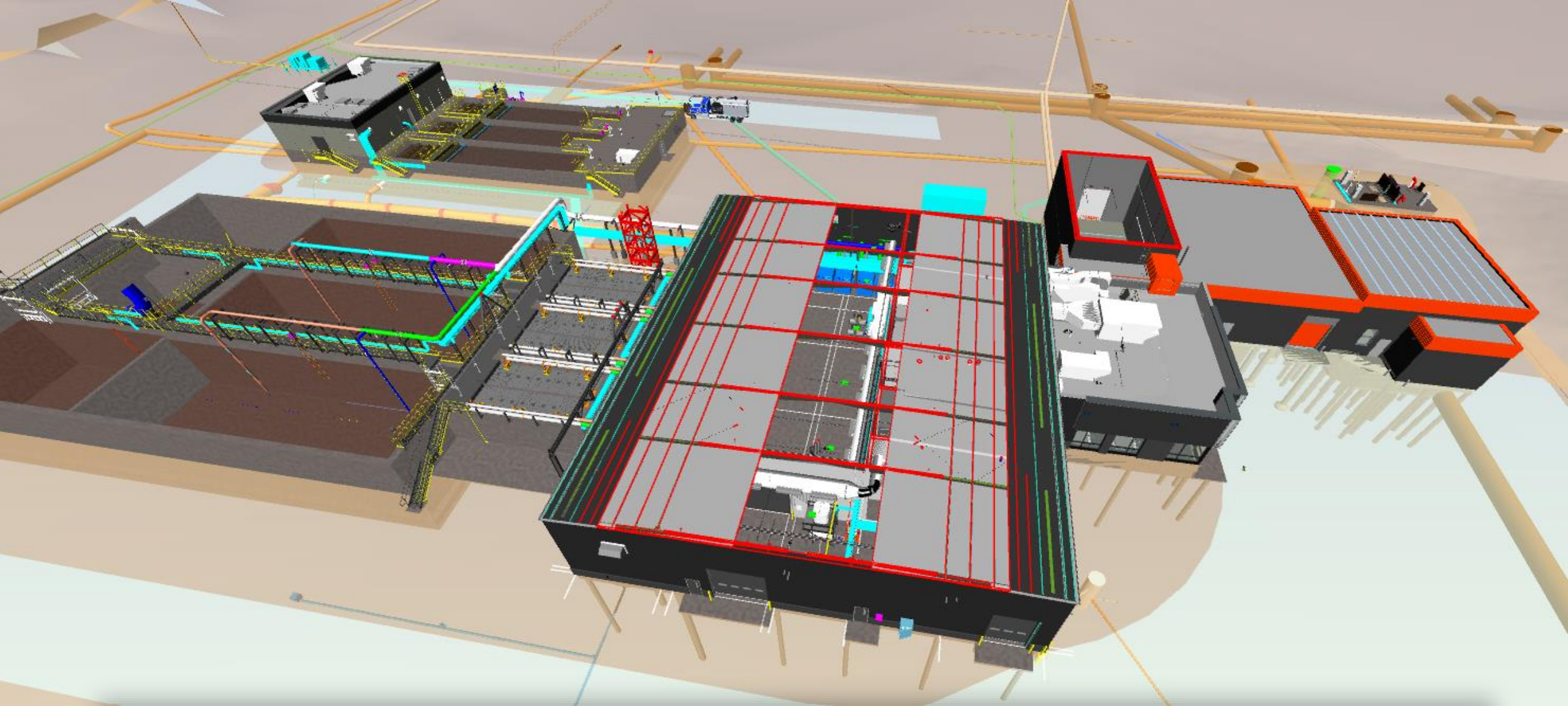
- Schedule of Despair
 - ‘What Do You Need’
- Making Decisions on ‘Ideas’
- BIM model reviews:
 - regular updates
 - broad audience
- Regulator Relationship
 - ‘What Do You Need’



How Did The Team Deal With Issues Along The Way

- COVID:
 - Full stop with the big room
 - Full start with virtual teams mtg
- Seasons - cold
- Pre-engineered building fabrication
- Escalation
- Technology Advancement





Result—Integrated Design and Use of Existing Assets





Primary Clarifier



Bioreactor



Membrane Trains

The Project – End Result

- On Budget:
 - No change orders, managed escalation.
 - On Schedule:
 - Treating 100% of wastewater within regulatory deadline
 - Operations Team successful transition
 - High Quality Effluent including disinfection
 - Winning Awards
- Learn more...<https://www.youtube.com/watch?v=5ZU1gU-73tU>



6-month membrane cassette inspection

Community Benefits

- Project Savings
 - Anticipated the costs would have been more than \$90 to \$100M through conventional project delivery
 - Savings of \$10 to \$20M for taxpayers and debit limits.
- Reuse and Discharge Options
- Local Economy
 - Mandated that local contractors and suppliers be engaged through the project and used when possible.
 - Roughly \$10M+ of project directly through local vendors.
- Donations to Not-For-Profit Organizations.
 - Largest donations ever received by Olive Tree
 - 2 major donations – all from workers on project



City's Perspective - Lessons Learned

- Owner's Requirements, Goals, and Constraints document was used frequently throughout the entire project.
- Getting buy-in from Senior Administration and Council was not easy, but through presentations, past IPD project successes, and a progressive Council, it didn't take long to get approval to move forward.
- The IPD (CCDC 30) Contract was more difficult to finalize than anticipated.
- A collaborative approach to design and construction and inclusion of owners in the entire process was beneficial.
- The people you partner with will determine how successful your project is. Do your diligence on selecting project partners.
- Employee involvement in project and decisions was exceptional.
- City assumed some risk on project – well worth it

Thank-you!

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Questions?

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