If You Can’t Go Green, Go Lean!

Innovative Space-Saving Stormwater Pump Intake Saves Time and Money

Ian Belczyk – Application Engineer – Xylem Water Solutions, FLYGT Products

CSO & CSSF

- Combined Sewer Solids Separation Facility / Combined Sewer Overflow
- Combined Discharge Channel
- Store and/or treat CSO Flows
- Axial Flow Propeller Pumps

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Water Water Everywhere…

Problem:

- Flood control / Stormwater
- New “Weather patterns” (more intense weather events)
- Reliable operation is critical
- Limited space for pump station

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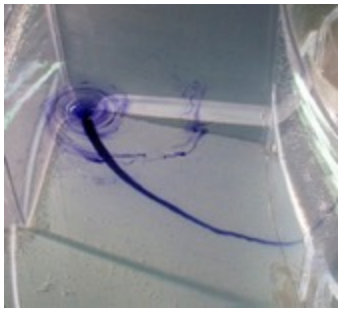
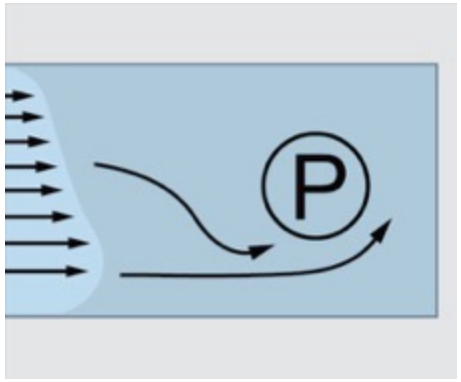
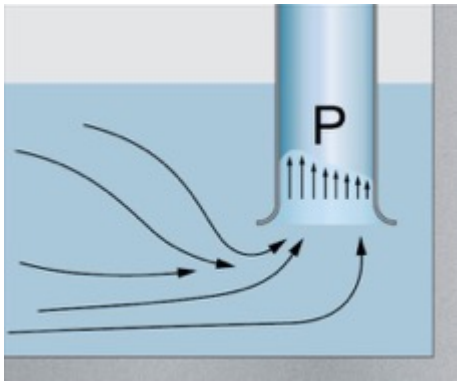
Expertise with Pump Station Design

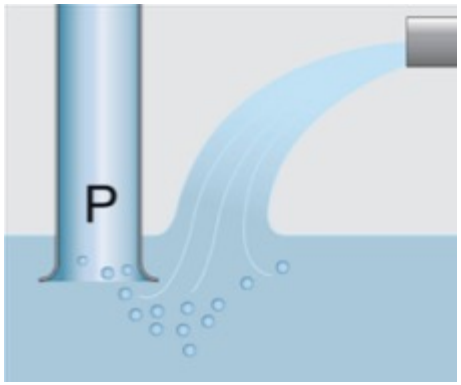
Handling high volumes of water
Adverse hydraulic phenomena :

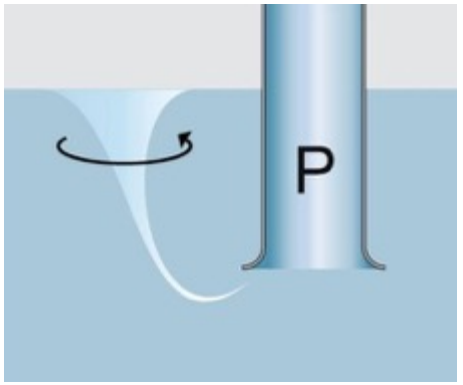
- Excessive pre-swirl
- Uneven velocity at the pump intake
- Entrained air
- Vortices











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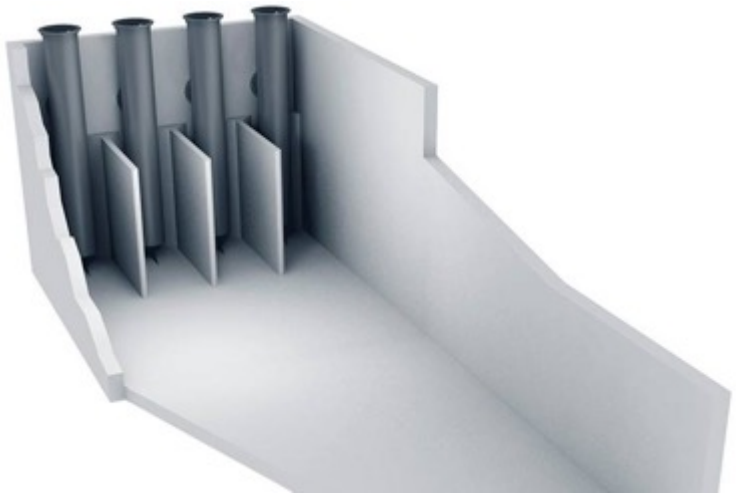
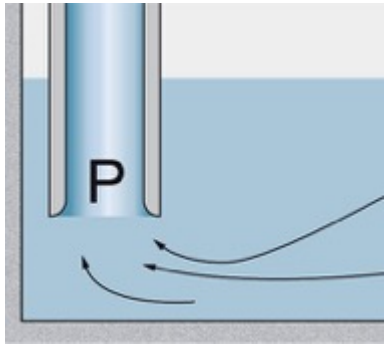
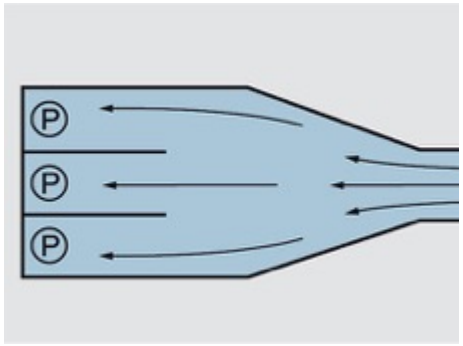
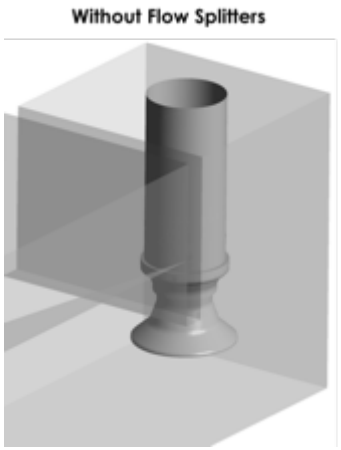
Traditional Approach: Open Sump Intake Design

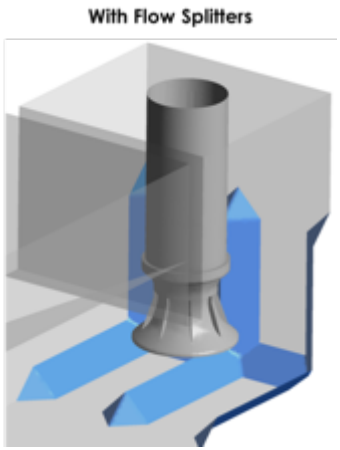
- Simple construction
- Sensitive to non-uniform approach flows
- Requires long forebay and long dividing walls between pump bays
- Only with wide front inlet











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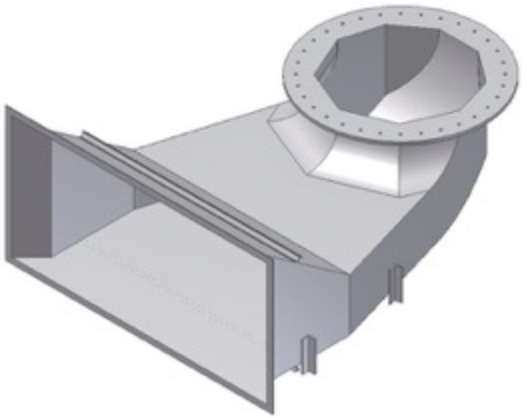
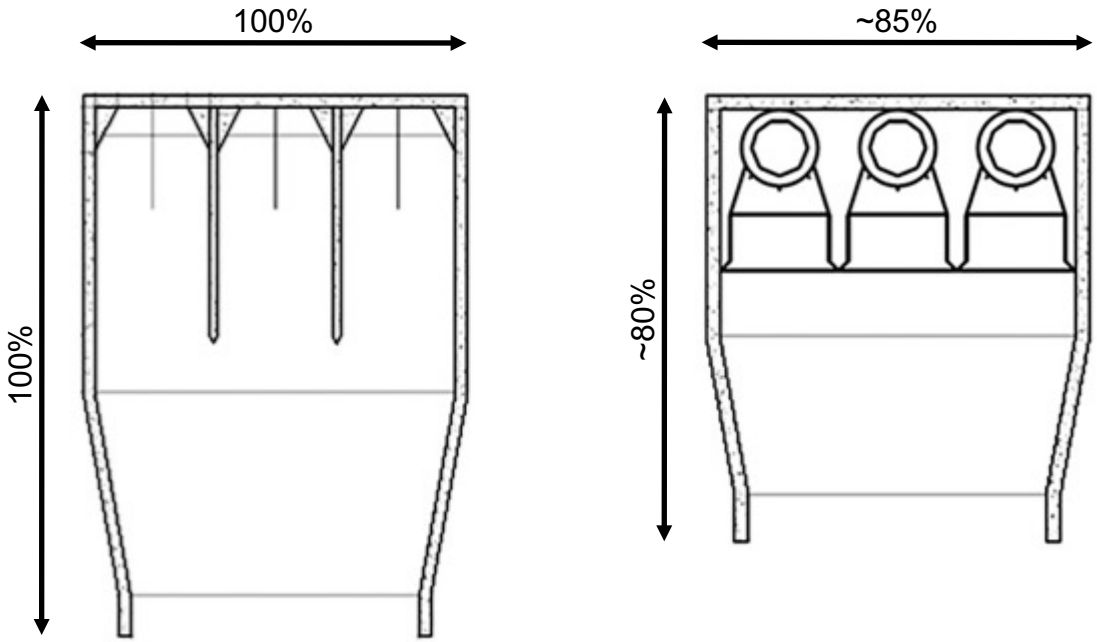
Formed Suction Intake Device

- Conditions and redirects the flow toward the pump inlet
- Minimizes pump station footprint





Formed intake design

Flygt FSI

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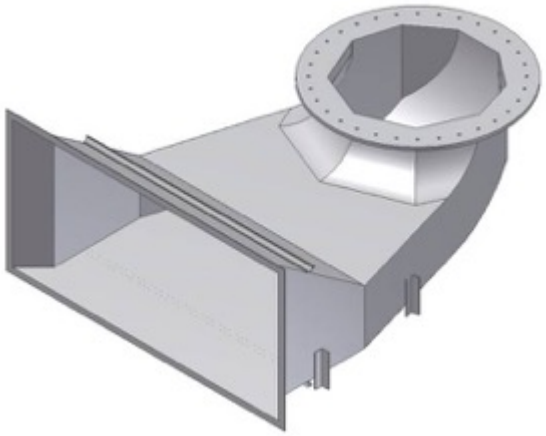
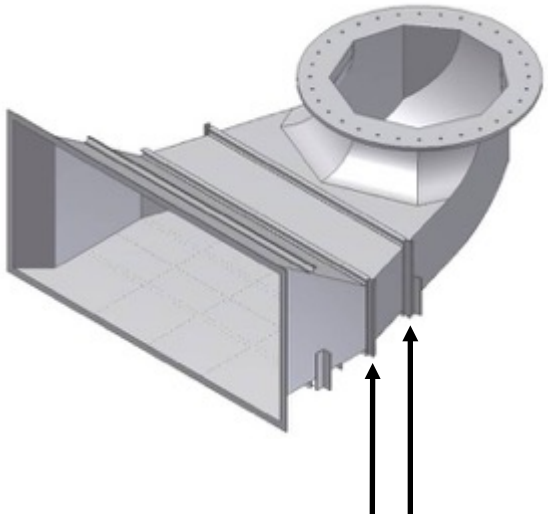
Versions of the Formed Suction Intake

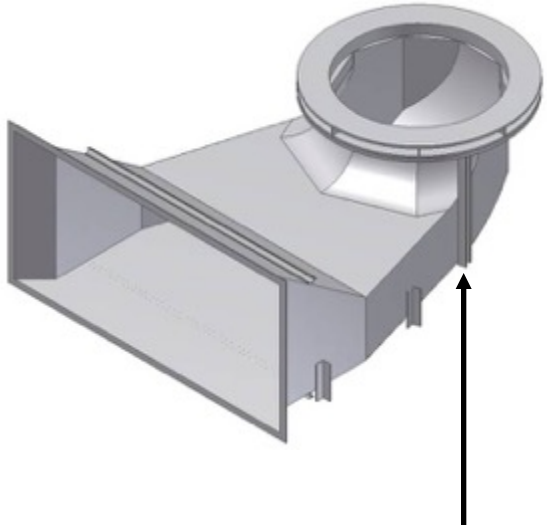
Free standing



Encased in concrete



Supporting the pump



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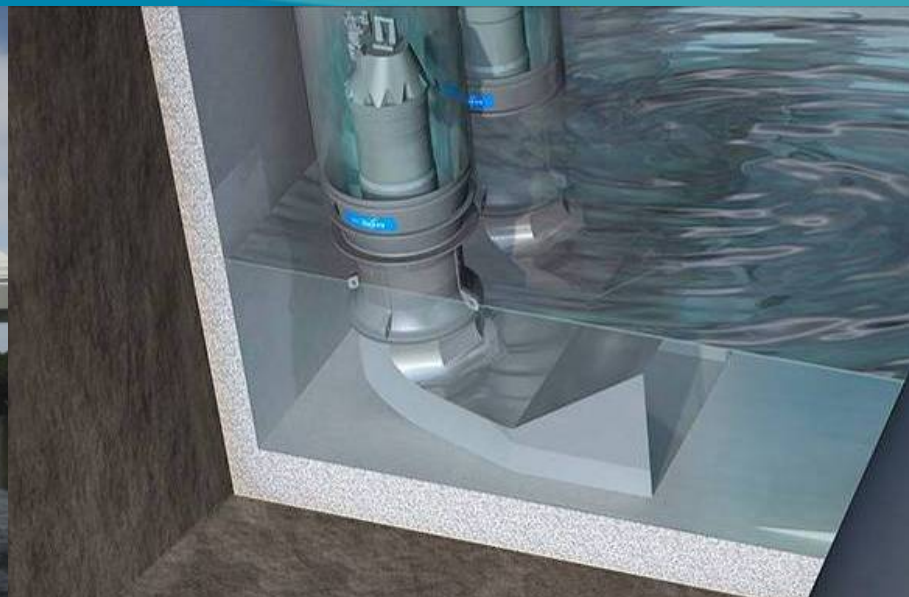
Case Story – Des Moines Metro CSSSF

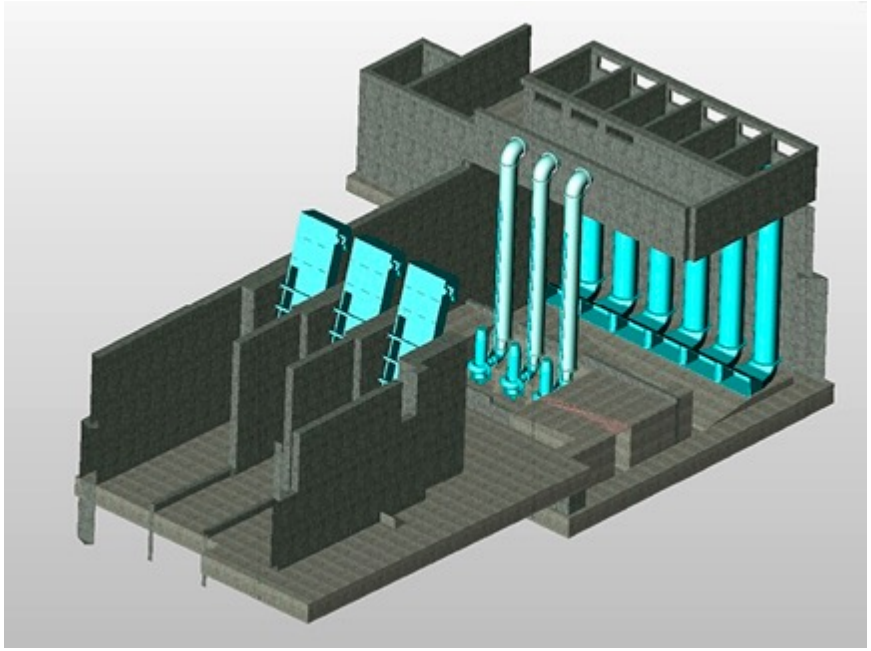
Des Moines, IA



Background

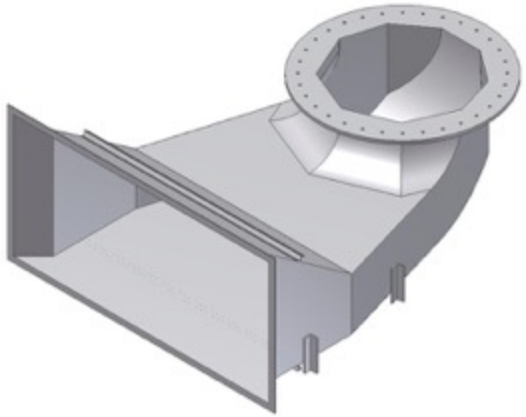
Des Moines, IA

Combined storm and sewage pump station



Capacity: 390 MGD

Pumps: 3 190 HP Centrifugal
6 550 HP Axial Pumps
6 Formed Suction Intakes



Flygt FSI device

- 60% smaller footprint
- 20% reduction in construction costs

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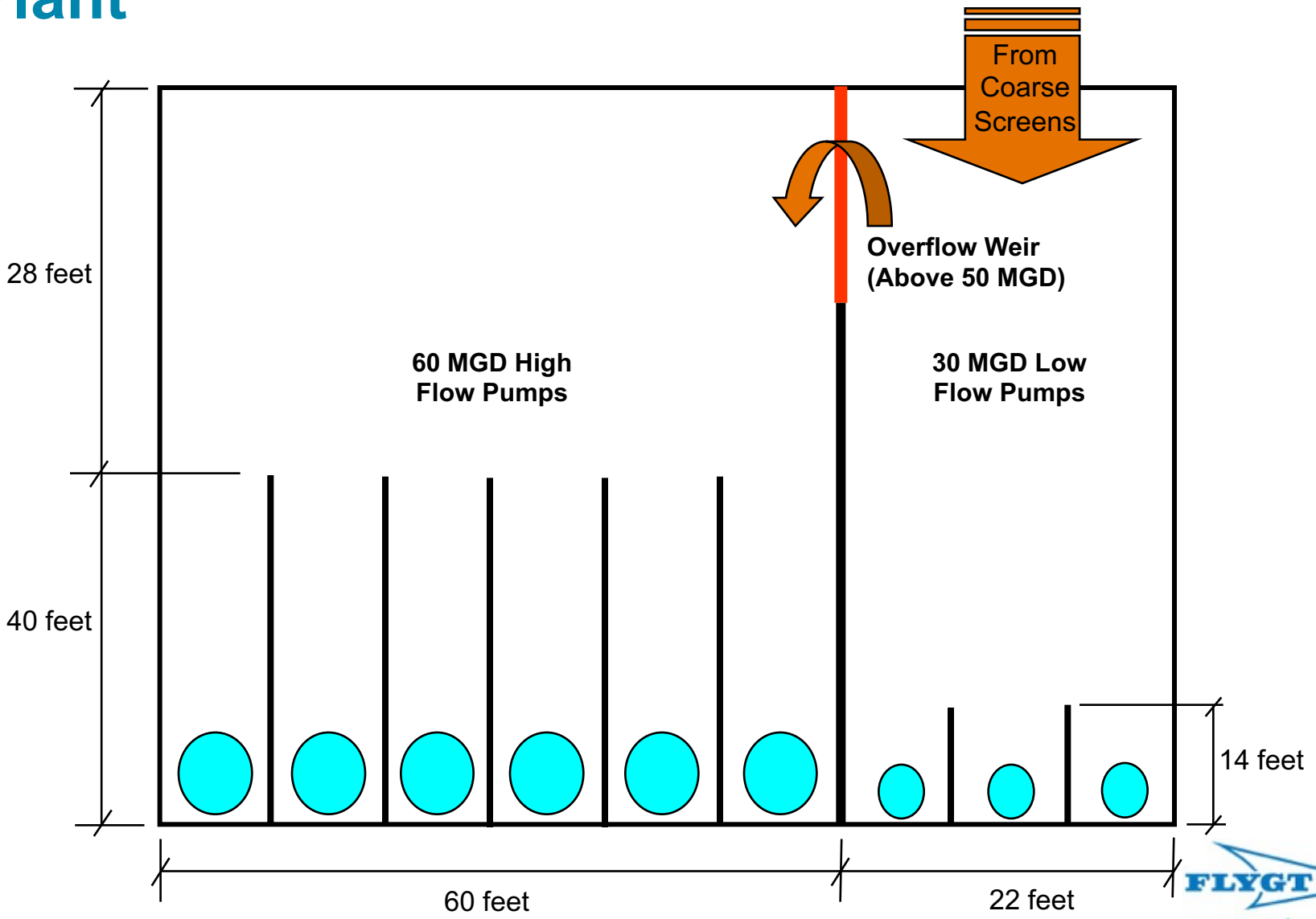
Expansion of existing Wastewater Treatment Plant



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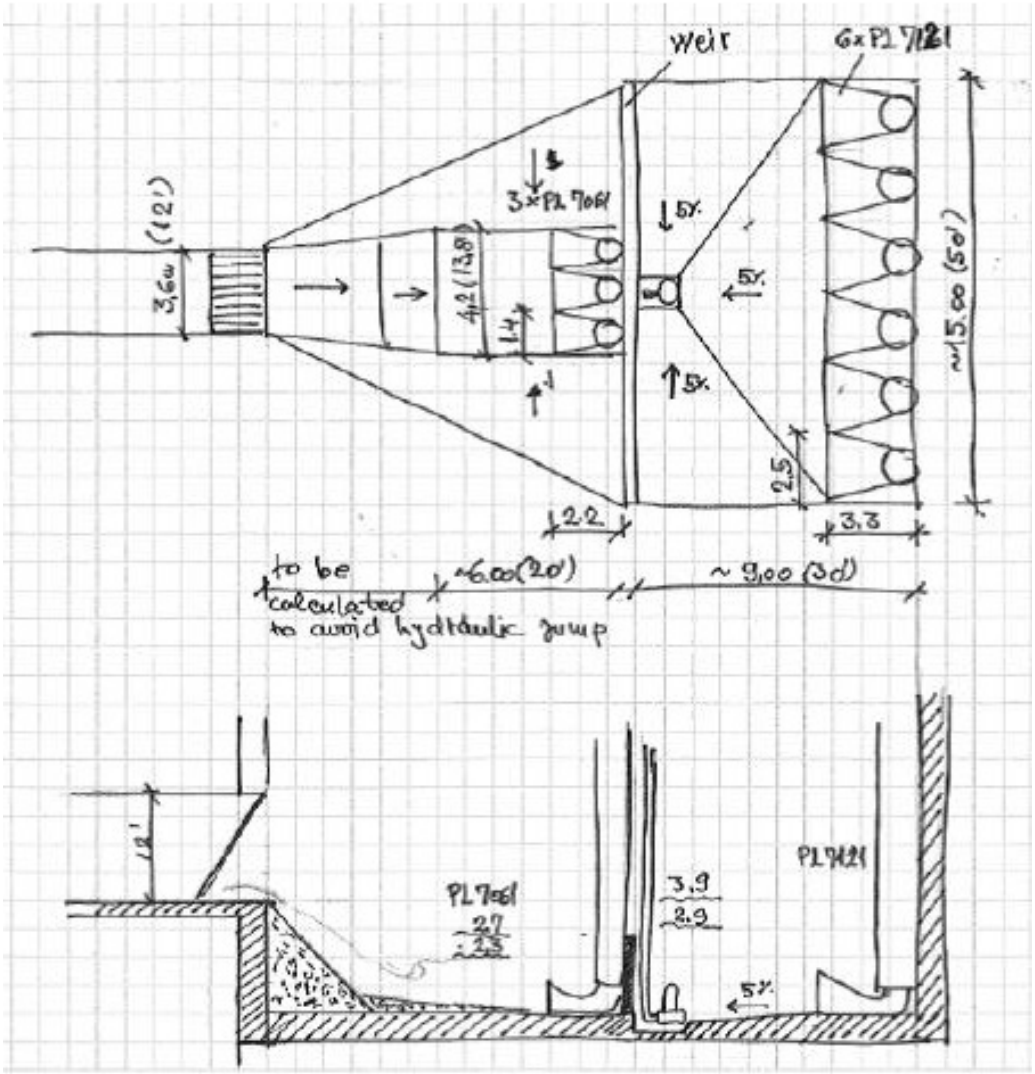
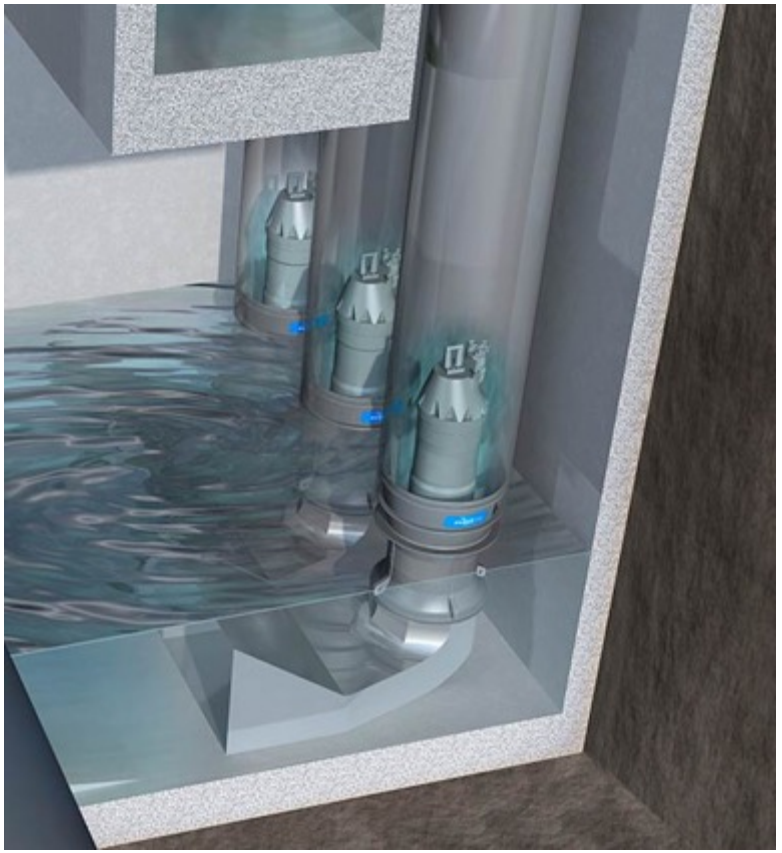
Flygt Proposes Innovative Solution with FSI





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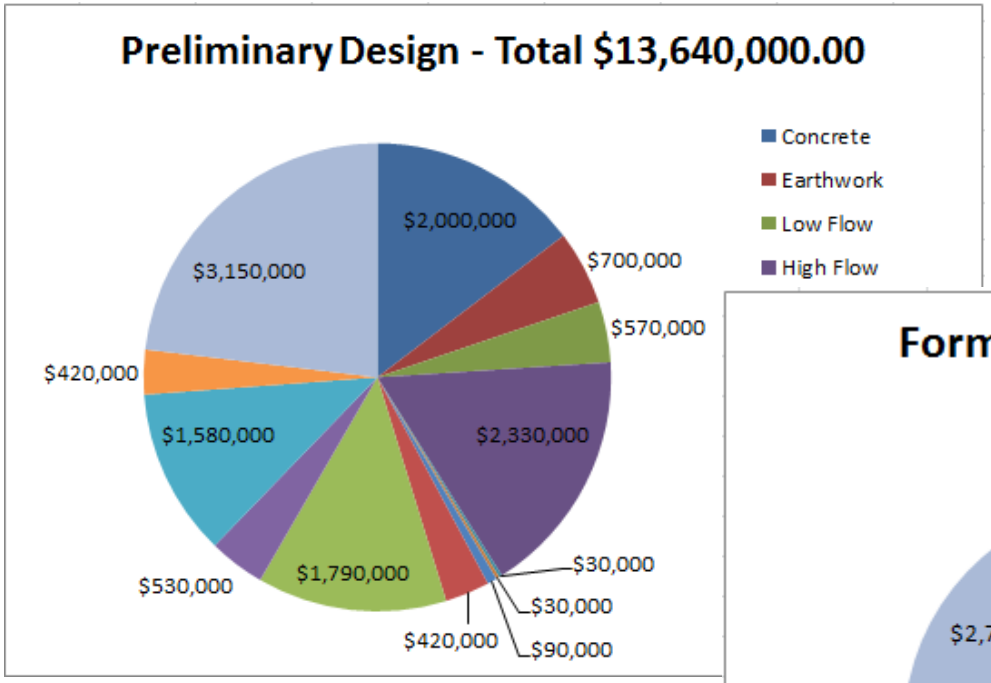
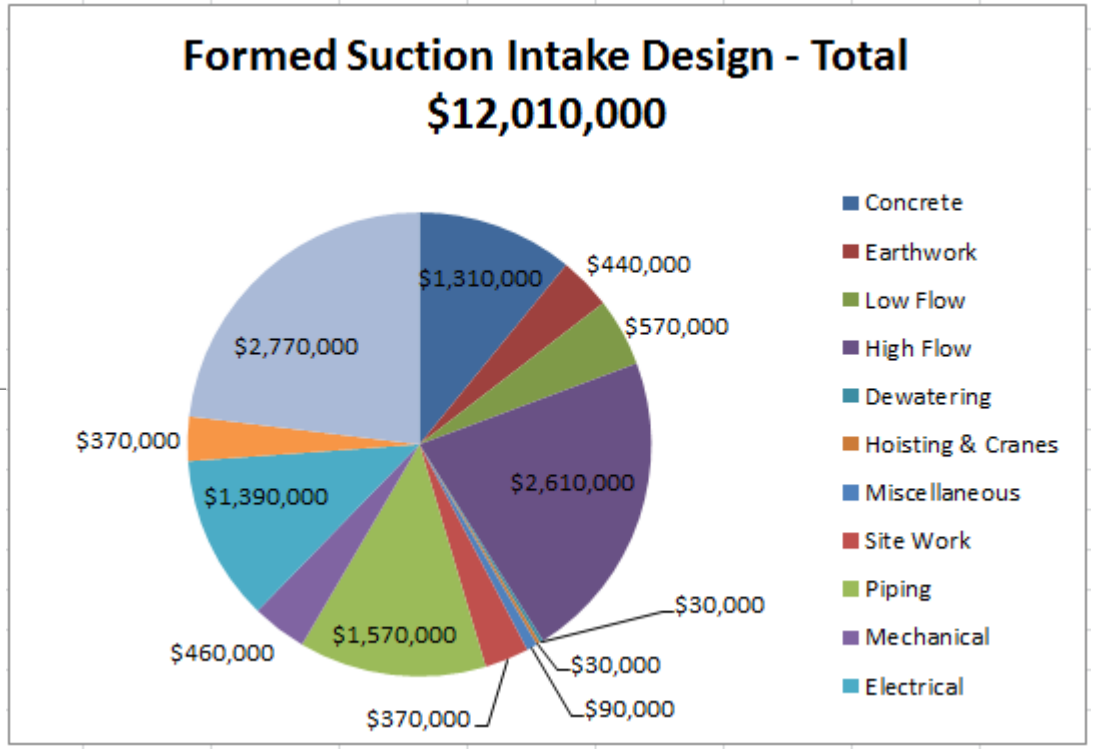
FSI Concept Resulted in Reduced Cost





20% CONSTRUCTION SAVINGS!

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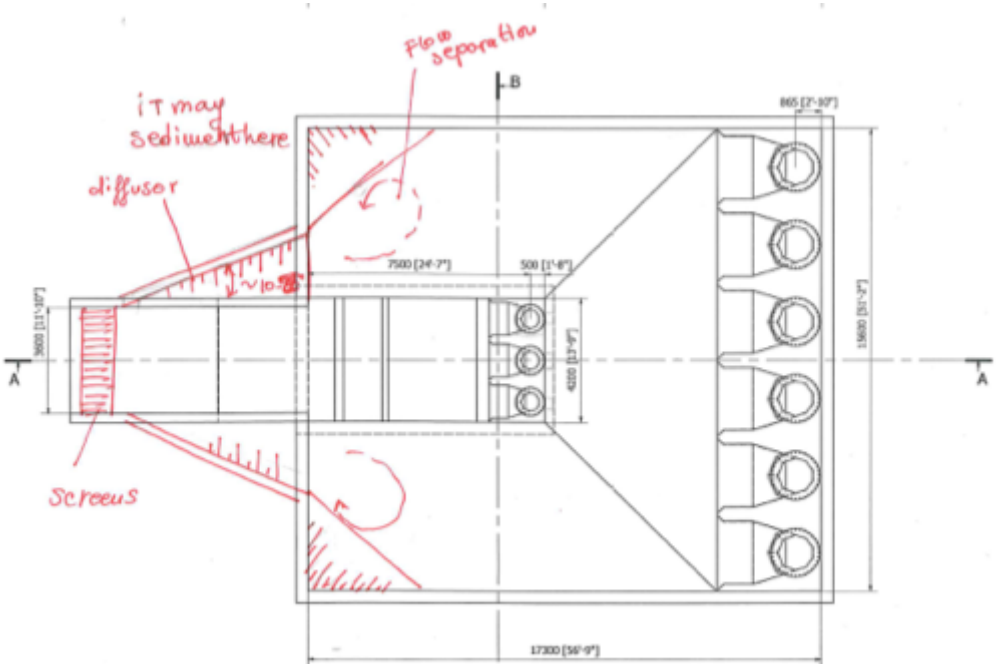
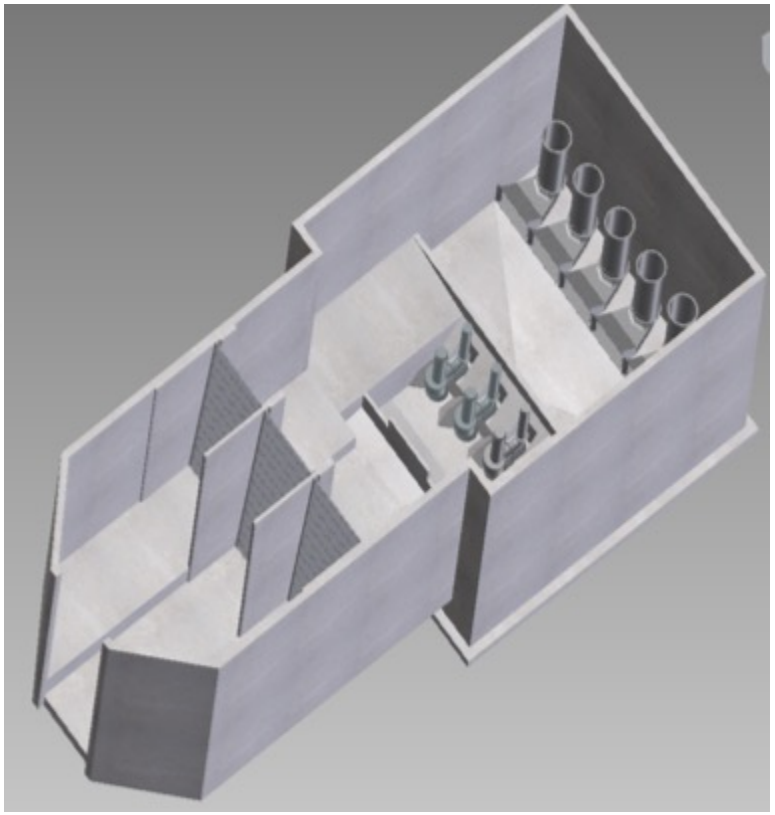
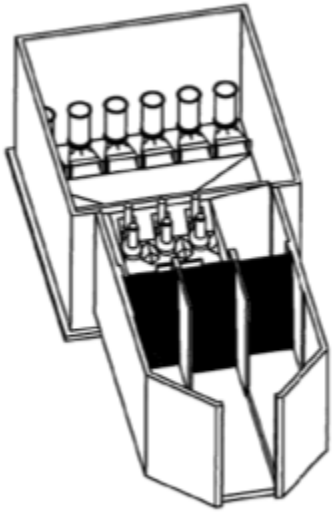
Fine Tuning Concept Drawing of Design







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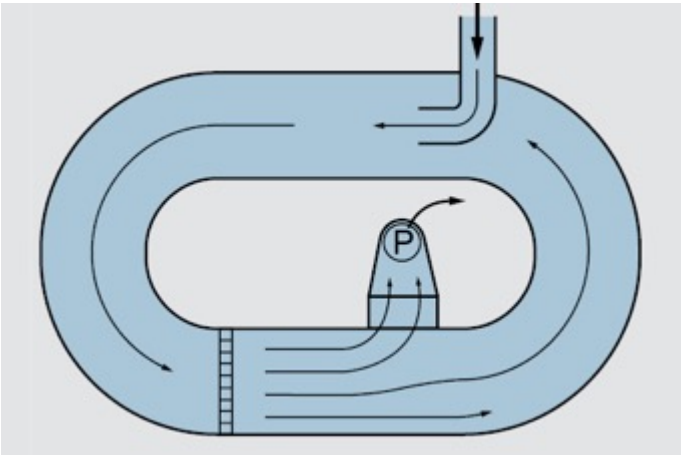
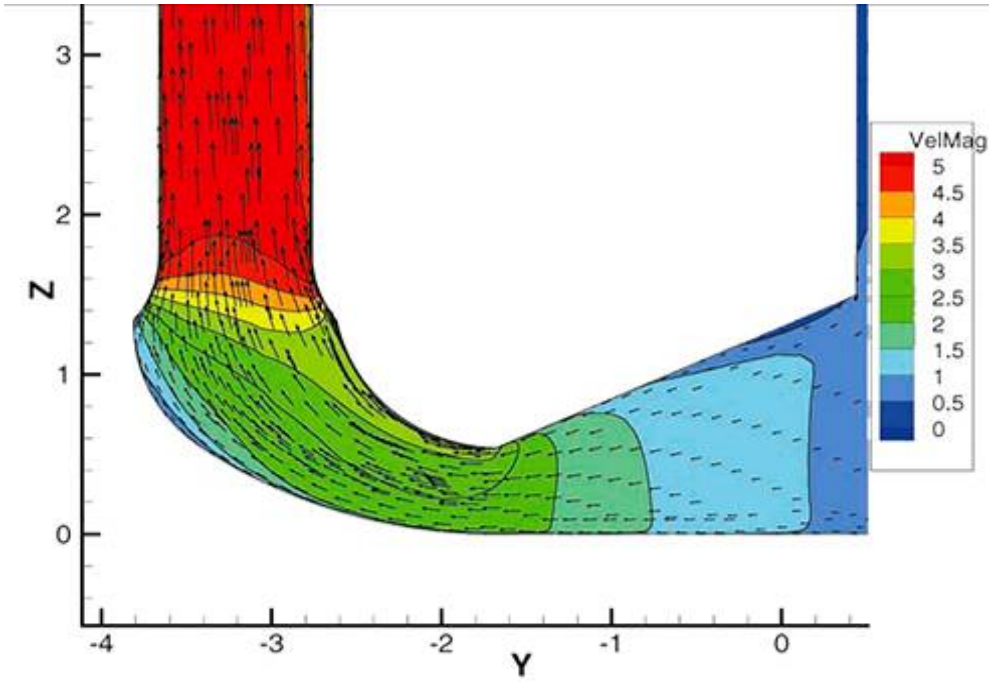
CFD Analysis Validates the Final Model





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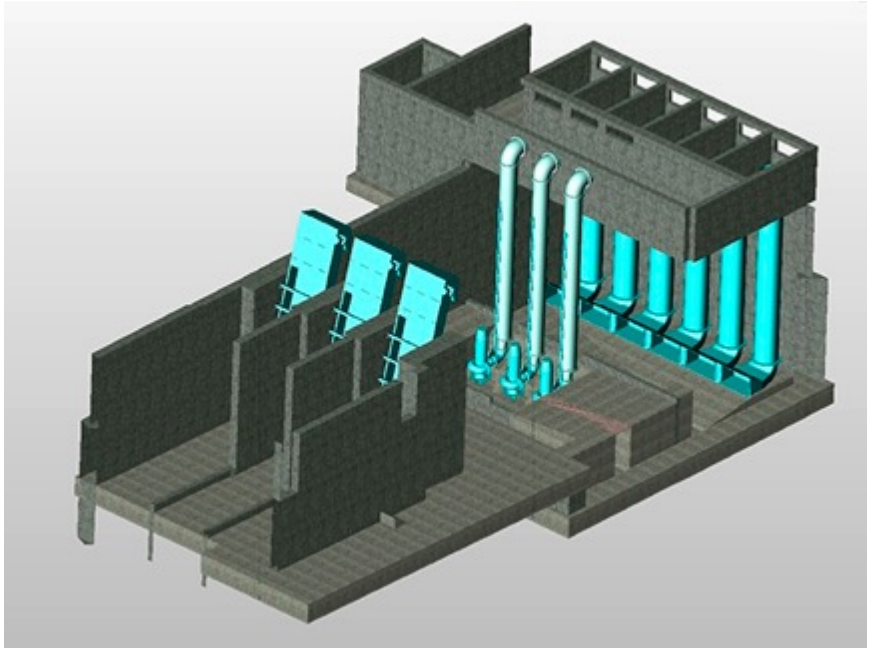
Des Moines, IA

Combined storm and sewage pump station



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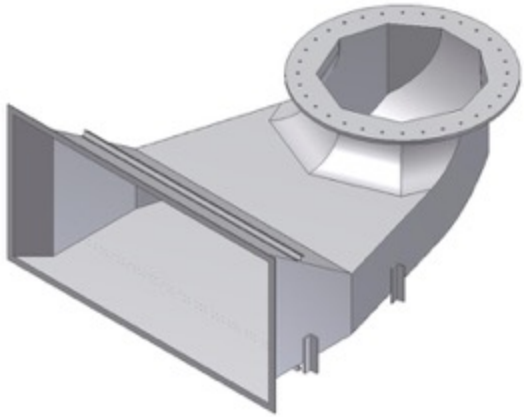

Flygt FSI device

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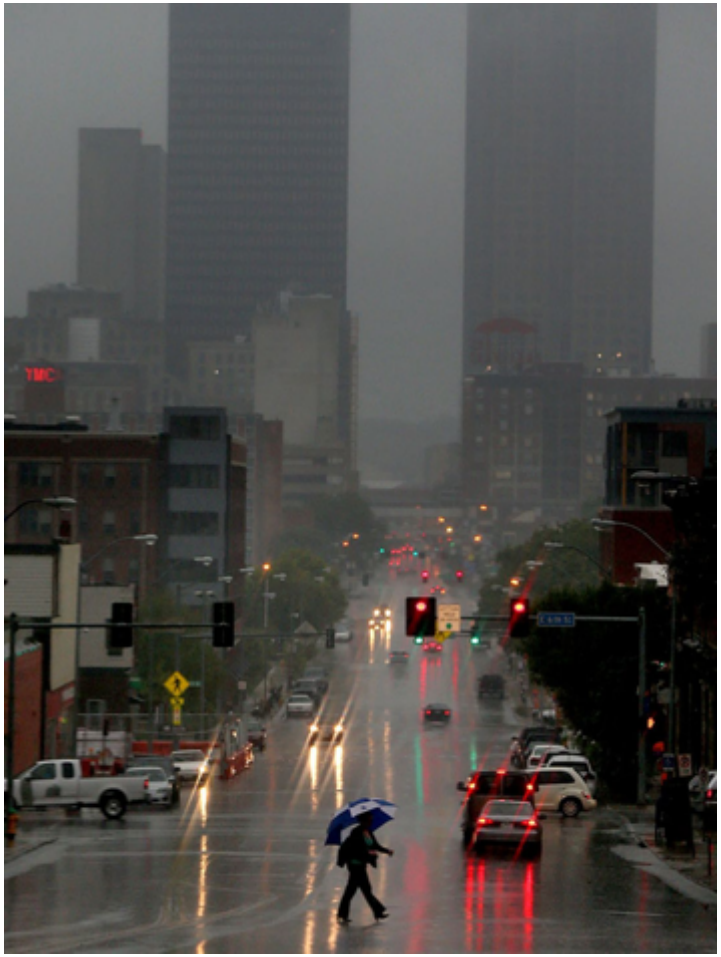
September, 2014…

It was a wet, rainy afternoon as showers fell over downtown Des Moines, IA



Same time at the pump station…

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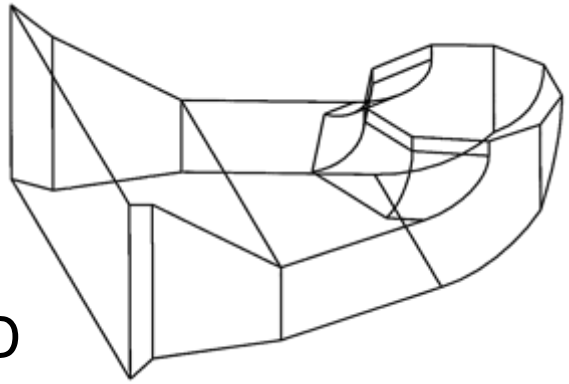
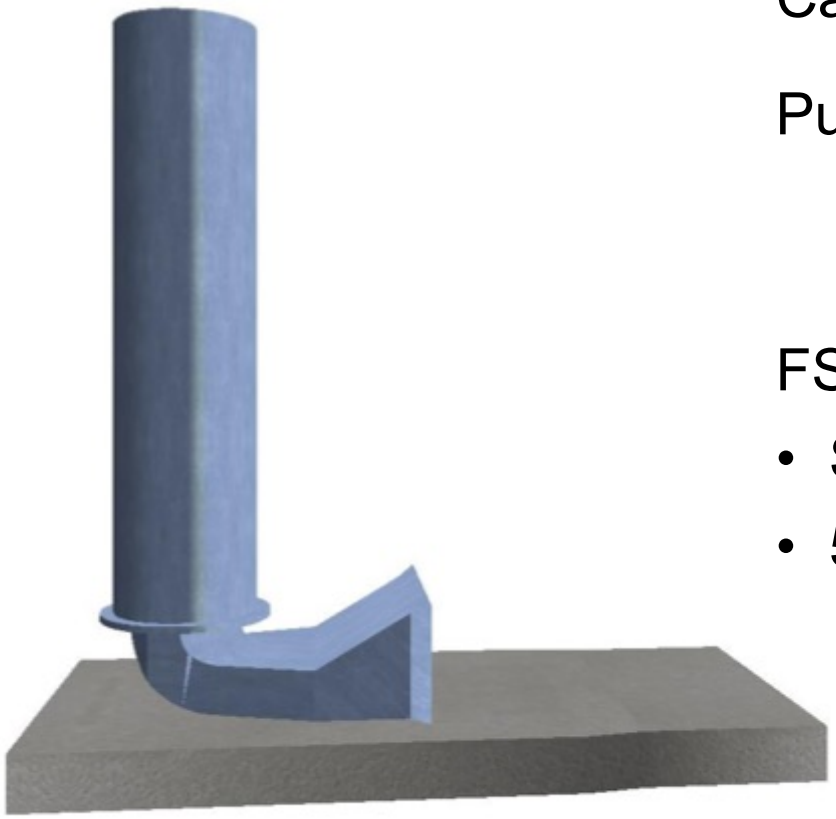
Case Story – Flood Control in Transportation Yard

Decatur, IL

Flood Control Pump Station





Capacity: 30 MGD

Pumps: 1 150 HP Axial Flow Pump
1 Formed Suction Intake

FSI device:

- Station design in less than a week
- 5 months from idea to completion

Speed was key!

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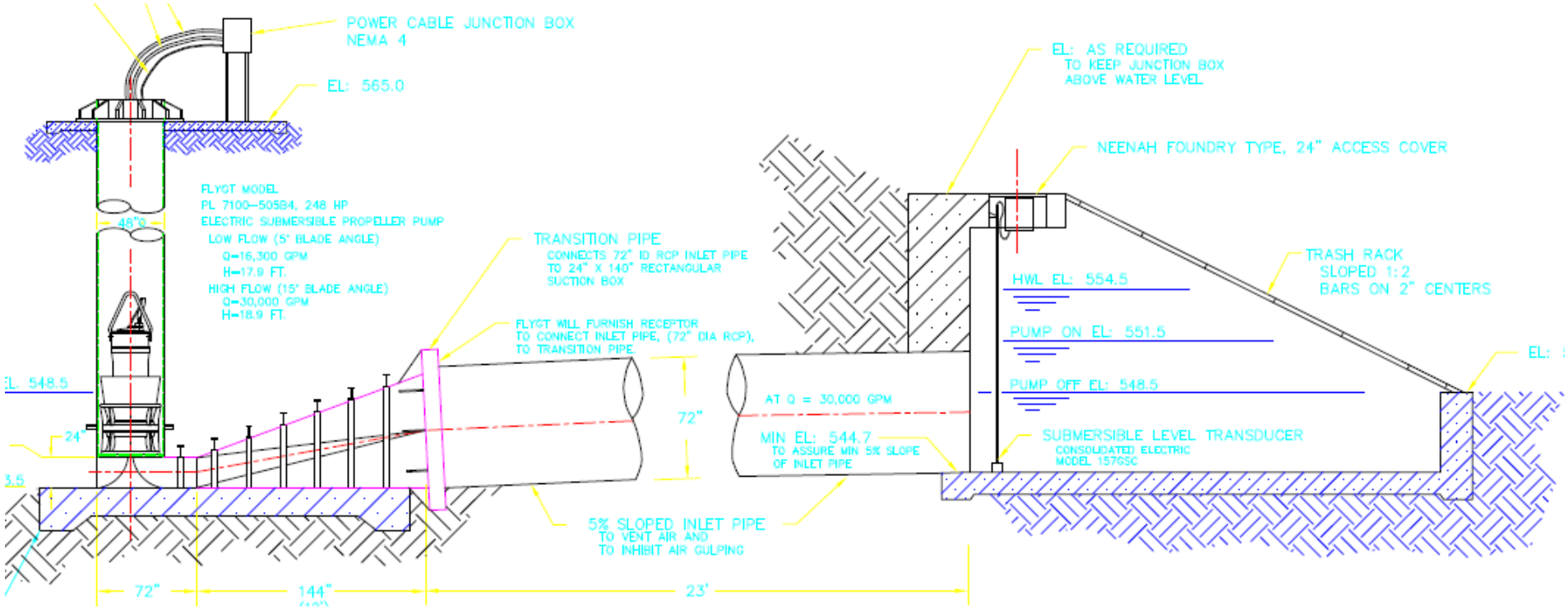
Innovative Solution with FSI

- Extremely simple and compact design
- Does not require concrete structure for storage



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Site Pond with Inlet Pipe

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Outlet Into Ditch – Pump in the Background

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Pump Discharge Tube Connected to the FSI and Inlet Box

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Flood Control Pump Station, Decatur, IL

Capacity: 30 MGD

Pumps: 1 150 HP Axial Flow Pump + 1 FSI

- Station design in less than a week
- 5 months from idea to completion

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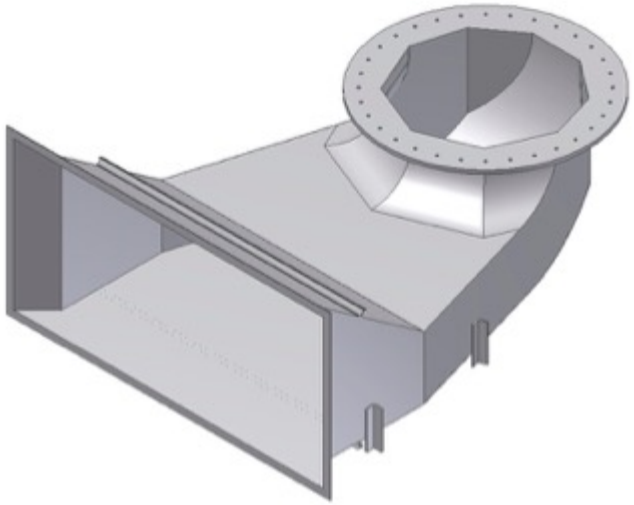
CONCLUSION:
Formed Suction Intake (FSI)

- Save money
  - Minimize pump station size with lower construction costs
  - Fits various applications
- Realize operational efficiencies
  - Hydraulic stability
  - Longer equipment life
- Reduce unplanned costs
  - Increase reliability
  - Implement Solution Quickly
  - Formed / Fabricated



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Questions?

Thank you!

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