Clear for Takeoff: Development within an Overflow and the Protection of Sugar Land Regional Airport
TFMA Fall Technical Summit
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LOCATION

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Old 100-Year Floodplain (Prior to Atlas 14 Updates)

This has been verified in multiple storm events.

Levee Improvement Districts

1D/2D HEC-RAS Model
Video - Atlas 14 100-YEAR

ATLAS 14 100-YEAR ELEVATIONS

Preliminary Concepts

Alternatives altered:
- Channel size
- Channel slope
- With/Without on-site detention
- With/Without tying into drop structure downstream of culvert
Preliminary Concepts

- Tie-in to drain structure downstream of US-90A and railroad
- Originally had options that were entirely upstream of US-90A and the UPRR railroad
- These options were eliminated when the study was updated for Atlas 14 rainfall

Option A
- On-site detention (270 ac-ft)
- 630-ft bottom width channel (730-ft top width)

Option B
- No on-site detention
- Wet bottom pond
- 94 Acres

Very similar developable acreage for both alternatives (~285 Ac Total; ~135 Ac for Residential)

Proposed Conditions Land Use
### Rational Method and Modified Clark

<table>
<thead>
<tr>
<th>Drainage Area</th>
<th>Existing 100-Year (cfs)</th>
<th>Proposed 100-Year (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>155.1</td>
<td>407.8</td>
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<tr>
<td>R2</td>
<td>229.5</td>
<td>718.2</td>
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<tr>
<td>Comm</td>
<td>305.0</td>
<td>853.2</td>
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</tbody>
</table>

### Preliminary Velocity Method TC Calcs

<table>
<thead>
<tr>
<th>Average Tilt</th>
<th>Correlation</th>
<th>TC,TC, (HR)</th>
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</thead>
<tbody>
<tr>
<td>R1</td>
<td>Easting/Rising</td>
<td>1.65</td>
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<tr>
<td>R1</td>
<td>PROPOSED</td>
<td>0.44</td>
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<td>R2</td>
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<td>Comm</td>
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</tbody>
</table>

### Option A Regional Impacts

- Ditch F Outfall: Atlas 14 Rev Exis = 65.40'
  - Option A: 65.39' (-0.01', Control Elevation: 63.62')
- Ditch A Outfall: Atlas 14 Rev Exis = 60.81'
  - Option A: 60.79' (-0.02', Control Elevation: 59.62')

- Bullhead Bayou: 2.14' impacts (Contained in Channel)
- No Impacts on Oyster Creek

Note: Elevations are assumed and not model verified.
Option B Regional Impacts

Bullhead Bayou
2.09' impacts
Contained in Channel

No Impacts on Oyster Creek

Ditch F Outfall:
Atlas 14 Rev Exis = 65.40'
Option B: 65.38' (-0.02')
Control Elevation: 63.62'

Ditch A Outfall:
Atlas 14 Rev Exis = 60.81'
Option B: 60.79' (-0.02')
Control Elevation: 59.62'

Note: Elevations are assumed and not model verified

Dirt Balance – Option A
Wet Pond
Toe El = 40-ft
2,431,900 CY Fill
2,232,400 CY Excavation
Assume 20% lost due to compaction → 1,785,900 CY Excavation
NET: Short by 646,000 CY

Assumption: Fill to elevation 82.75’ (2-5’ of fill)
Assumption: Fill to elevation 80’ (5-6’ of fill)

Wet Pond
Toe El = 51.13-ft

Dirt Balance – Option B
2,243,700 CY Fill
2,876,500 CY Excavation
Assume 20% lost due to compaction → 2,301,200 CY Excavation
NET: Long by 57,500 CY

Assumption: Fill to elevation 82.75’ (2-5’ of fill)
Assumption: Fill to elevation 80’ (5-6’ of fill)
### Summary

- The completion of this project will require successful coordination between:
  - The Developer
  - The City of Sugar Land
  - The Sugar Land Regional Airport
  - TxDOT
  - UPRR
  - USACE

- If completed, this project would create about 285 acres of developable land and protect the Sugar Land Regional Airport from local flood events.

### Next Steps

- Develop cost estimates
- Finalize drainage report
- Investigate and begin permitting processes for USACE, UPRR, and TxDOT