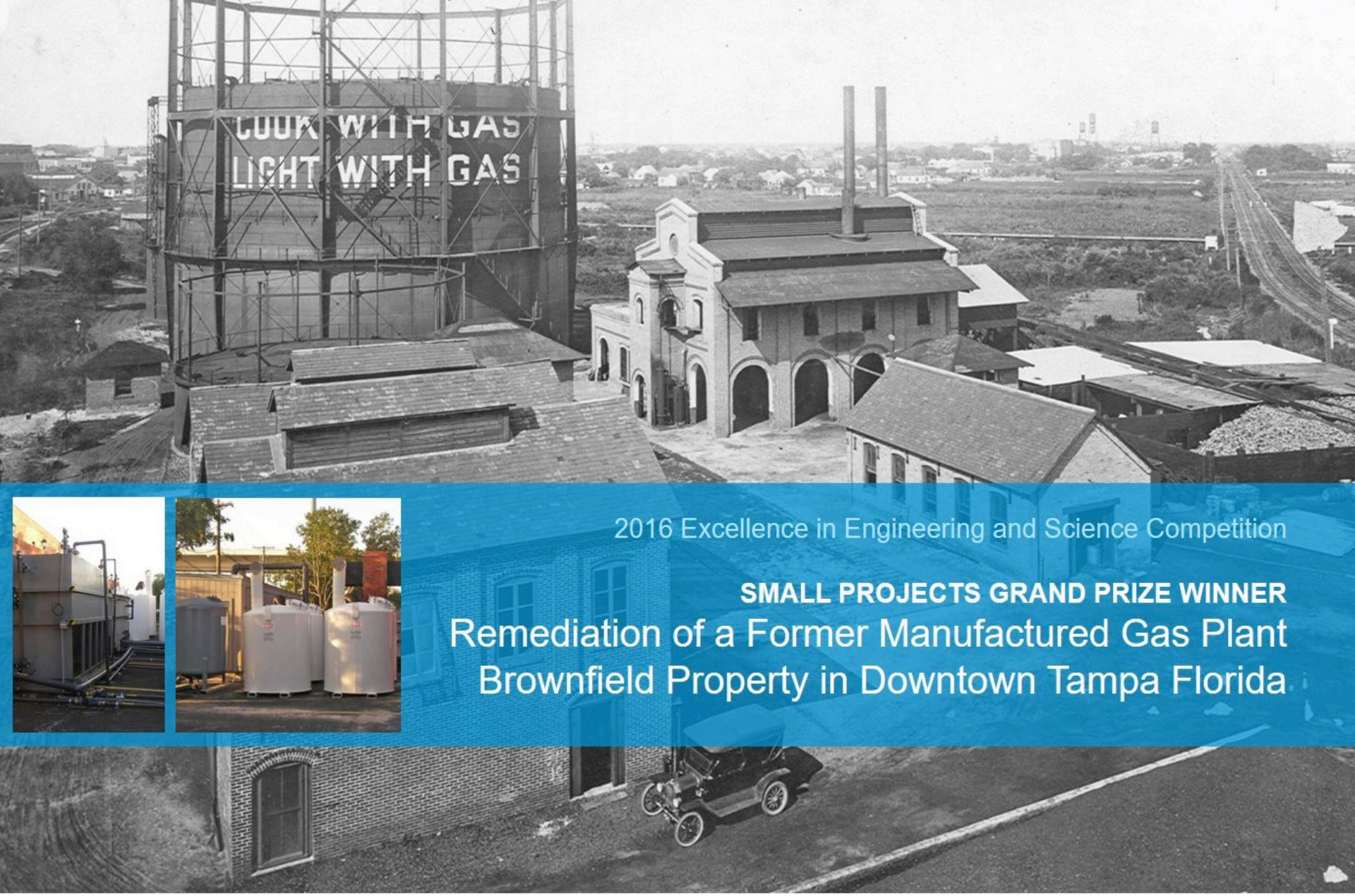

2016 Excellence in Engineering and Science Competition

SMALL PROJECTS GRAND PRIZE WINNER

Remediation of a Former Manufactured Gas Plant Brownfield Property in Downtown Tampa Florida

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AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS & SCIENTISTS®

PRESENTED BY:
Rachel A. Klinger, P.E.

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Former Tampa MGP


COOK WITH GAS
ROOM HEATERS
WATER HEATERS
GAS RANGES
TAMPA GAS COMPANY

1902

1915

1925

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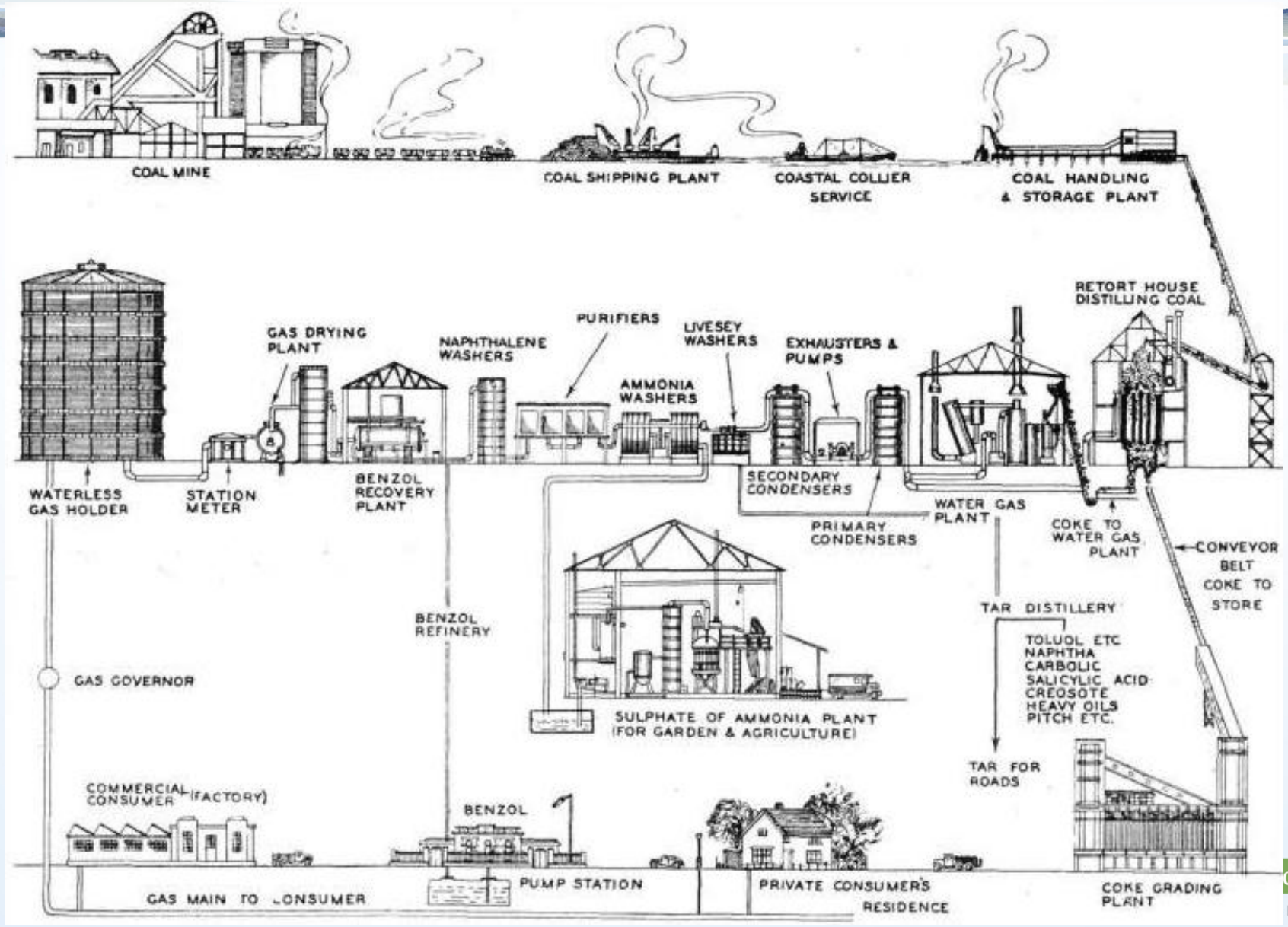
Process Flow of Typical MGP



Process Flow at Tampa MGP

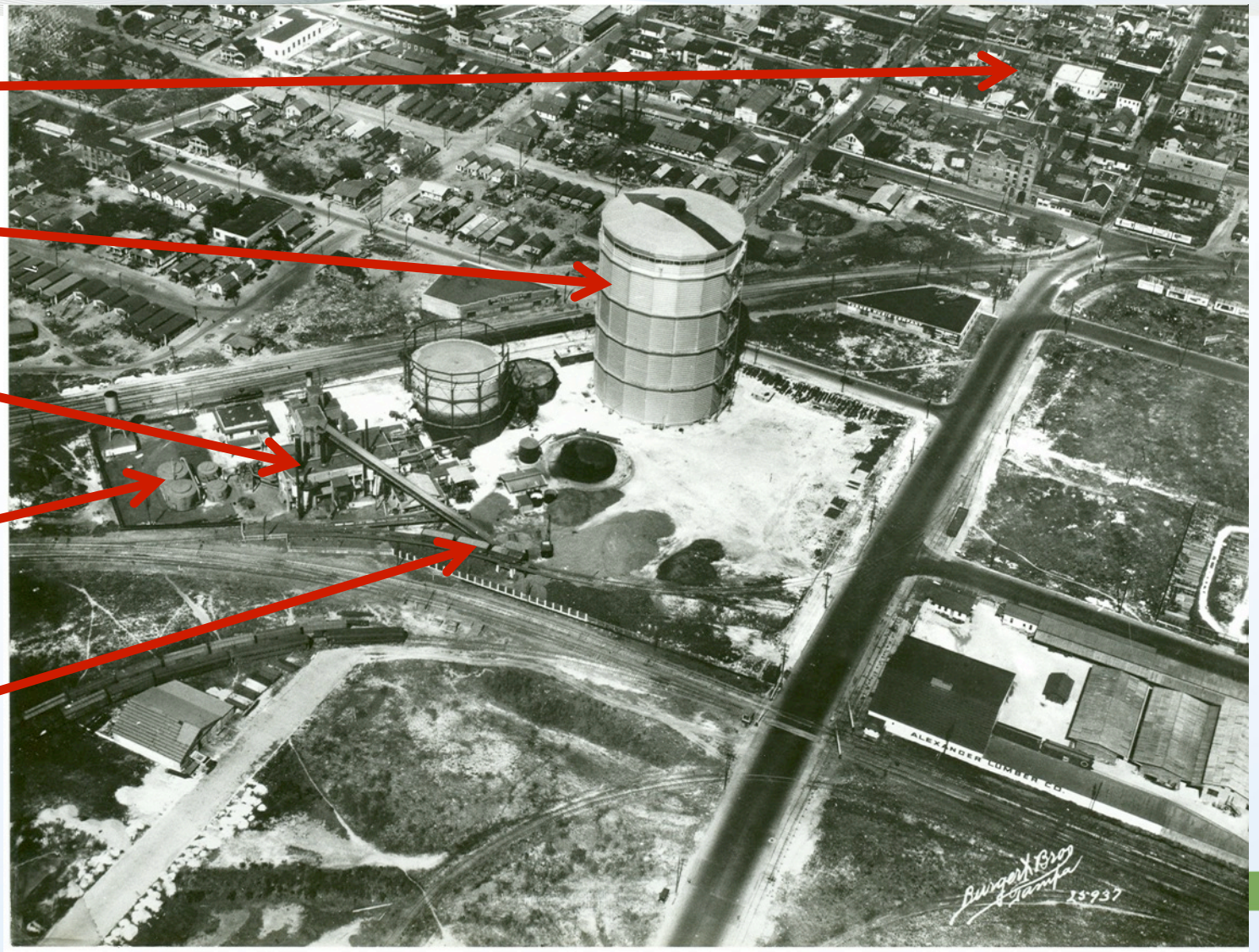
5. Consumer

4. Gas Holder

2. Retort House

3. Purifier Vessels

1. Coal/Coke Storage



1940

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MGP Operations Ceased in 1960

…but MGP residuals remained

1916

2016…100 years later

What is MGP NAPL?

- Byproduct of the gas cooling/purification process (carbureted water gas)
- Condensate forms complex oily liquid mixture: “Coal Tar”
- Quite fluid, with roughly same viscosity as vegetable oil
- Dark red to maroon to brown to black

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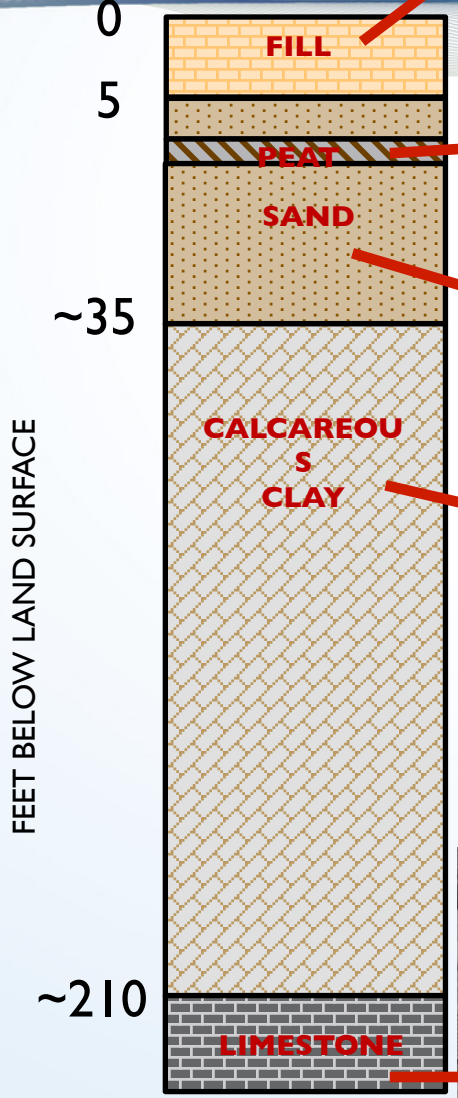
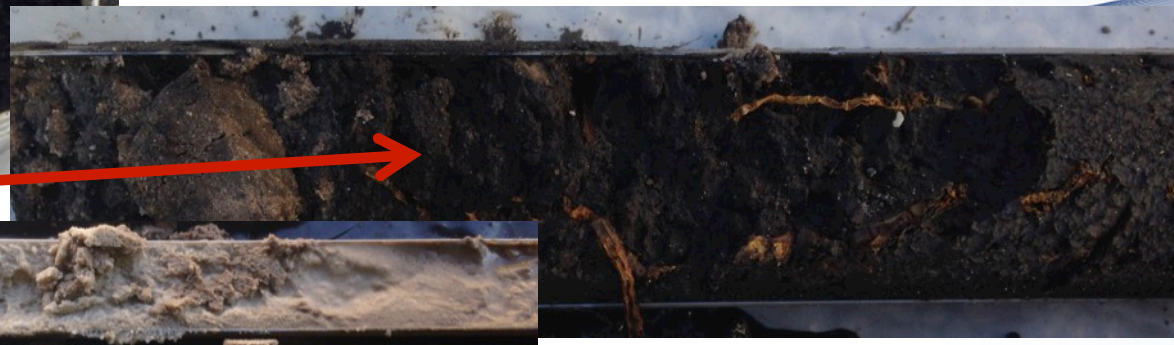
Site Lithology





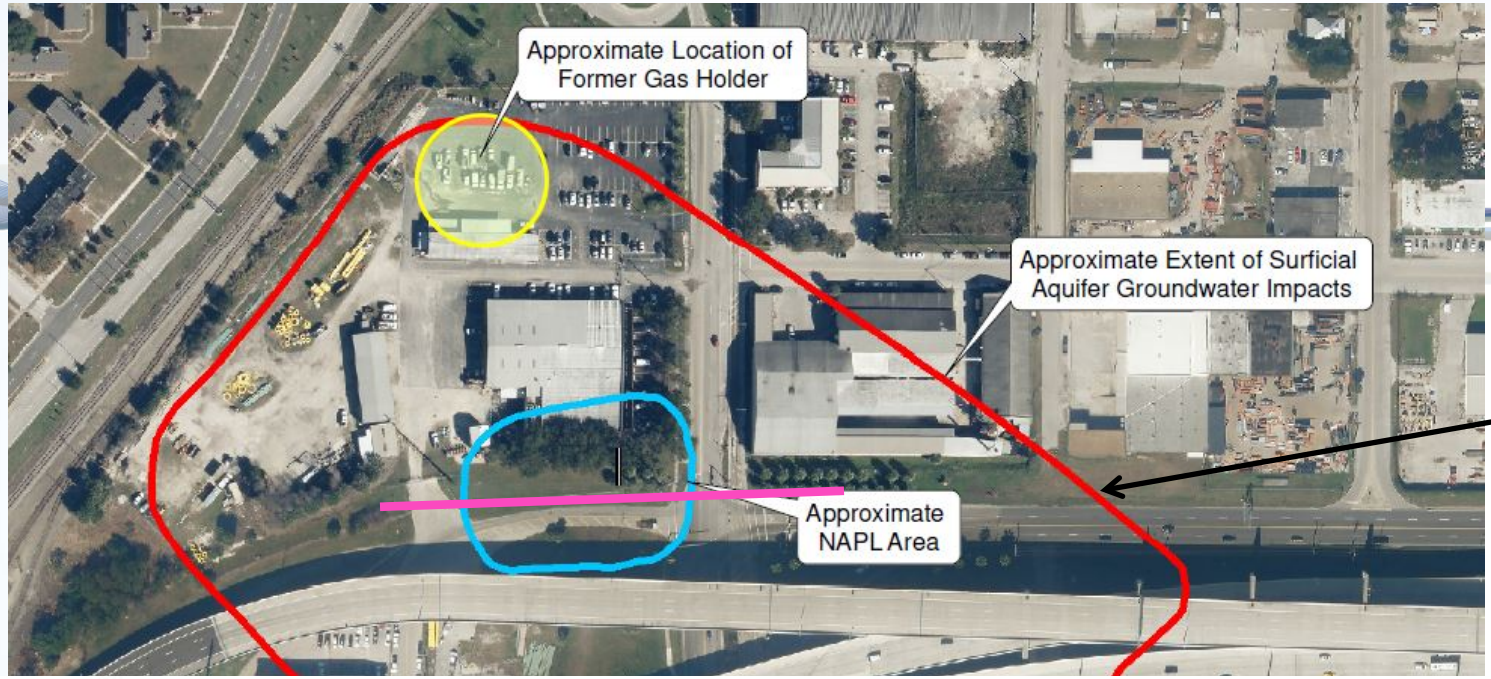
Field Observations

Tar Saturated Sands

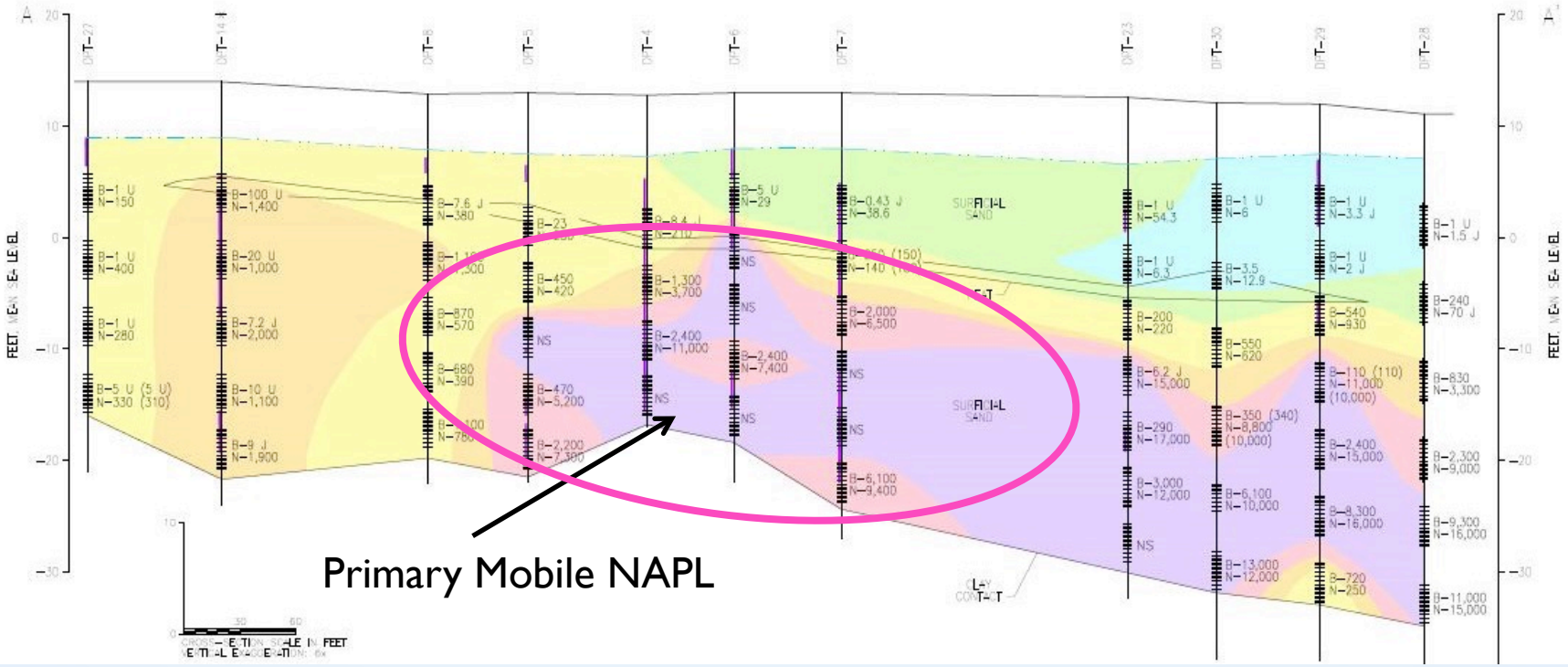
Heavily-Stained with Sheens

Tar Saturated Discrete Lens

Conceptual Site Model



Stable dissolved plume



Project Complexities

- Existing and occupied buildings, roadways, trolley line, and utilities
- Significant hydraulic gradient
- Varying types of NAPL

The final remedial design needed to be flexible to facilitate real-time optimization during operation.

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And FAST!....
Due to driving force – Site Redevelopment

Rendering Credit: Tampa Bay Times

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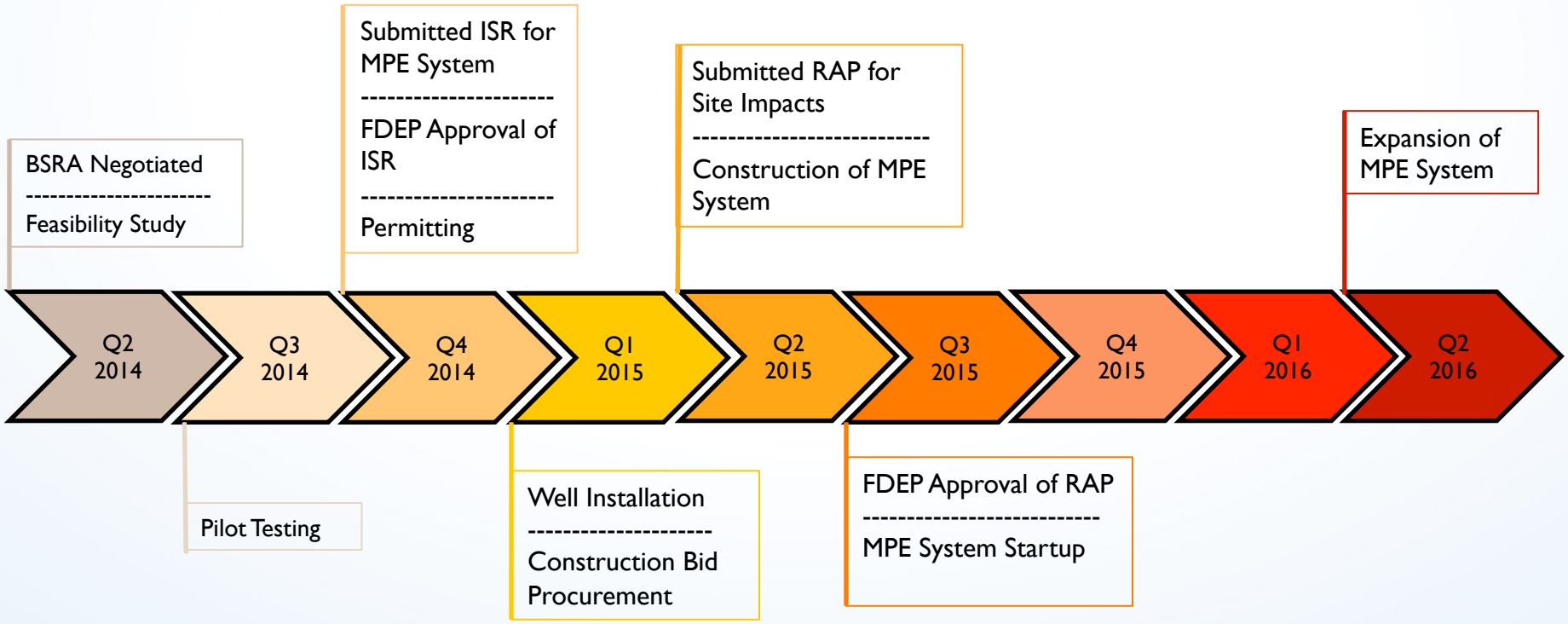
Timeline of Events



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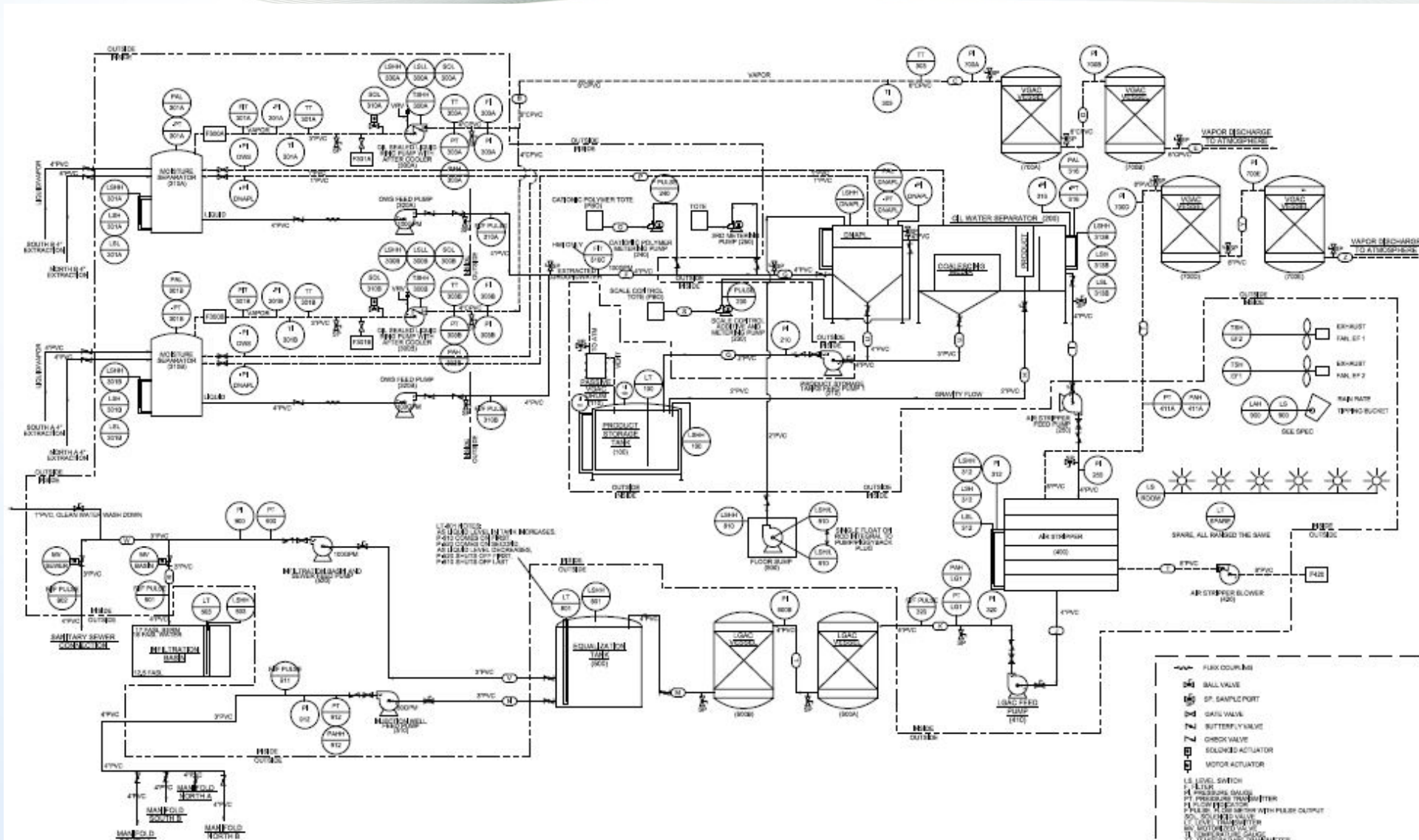
Multi-Phase Extraction



MPE System Objective & Design Summary

Recovery of mobile NAPL using high vacuum (up to 29-in Hg or 394-in wc)

- Max design flow rate = 100 gpm
- MPE design ROI = 20 ft
- DNAPL and LNAPL treatment
- Mass estimates
  - 3,000 gallons NAPL
  - 82,000 pounds of dissolved/sorbed mass
- 44 MPE wells and 50 injection wells

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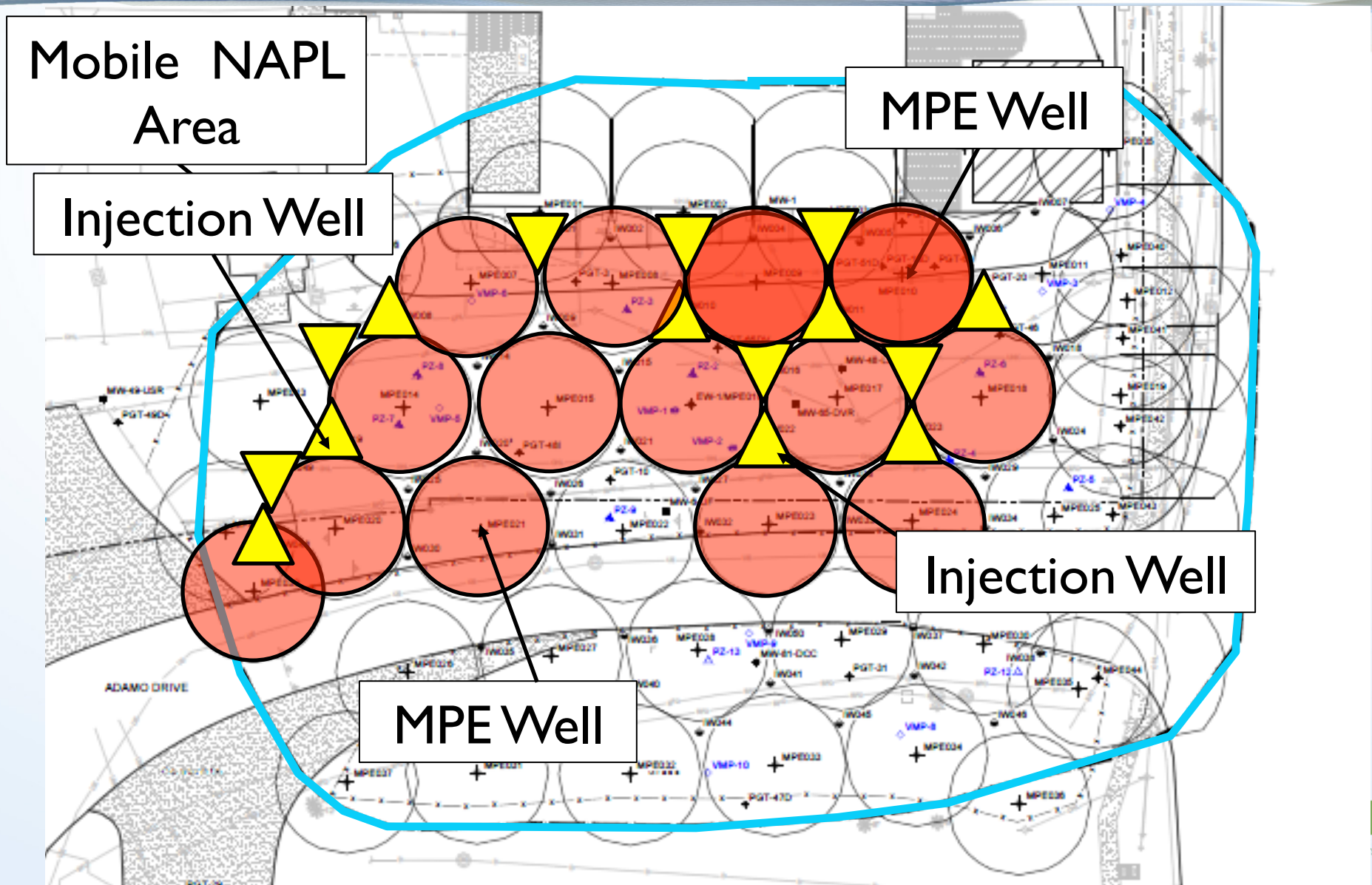
System Layout



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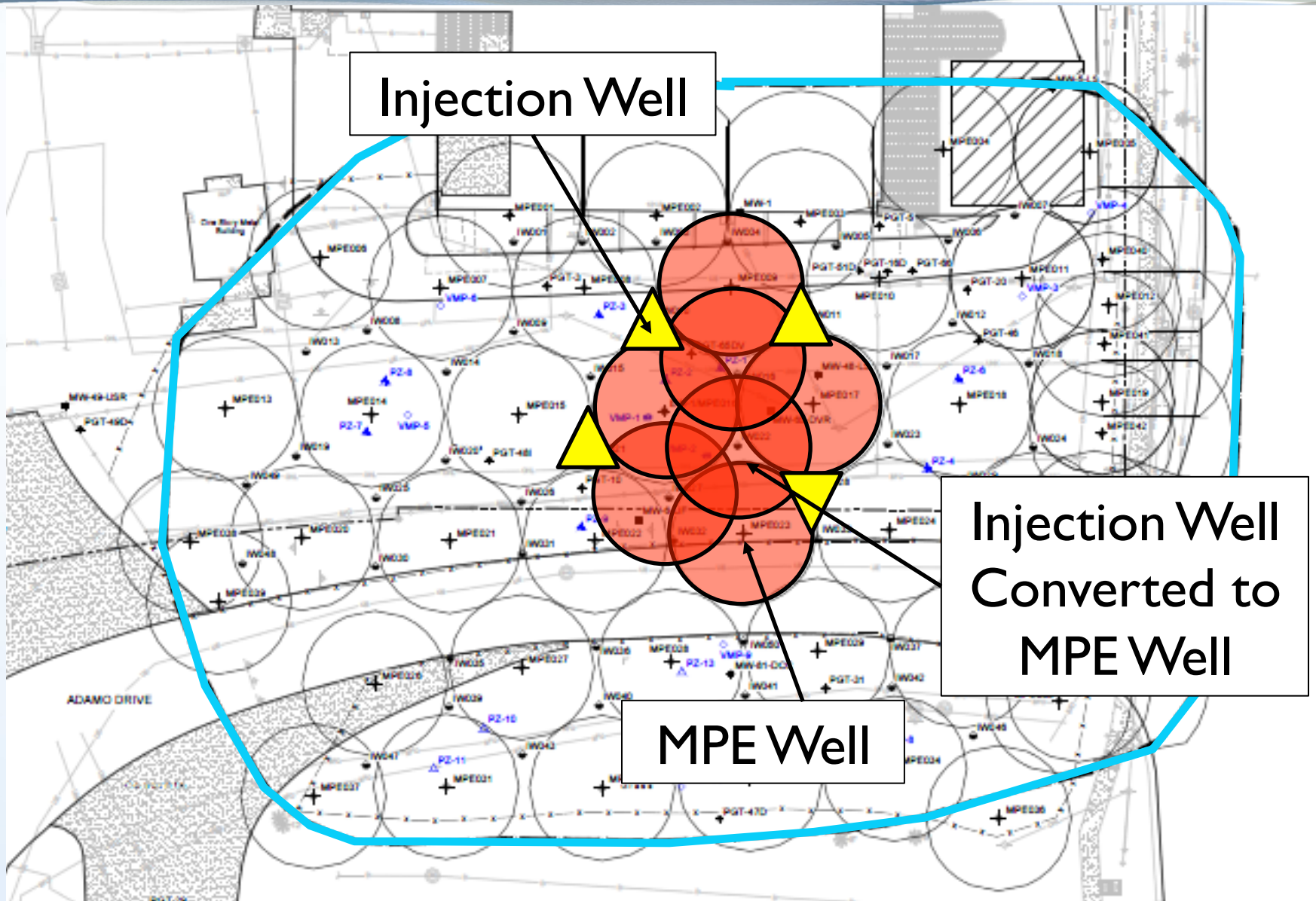
System Layout



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Originality and Innovation

Team Integration

Geosyntec's comprehensive integrated approach to rapidly and effectively address all the impacted environmental media was key to receiving concurrence from all the stakeholders

This project required a team of experienced professionals working in close coordination with FDEP, the City of Tampa, Hillsborough County, TECO PGS, multiple subcontractors, and developers

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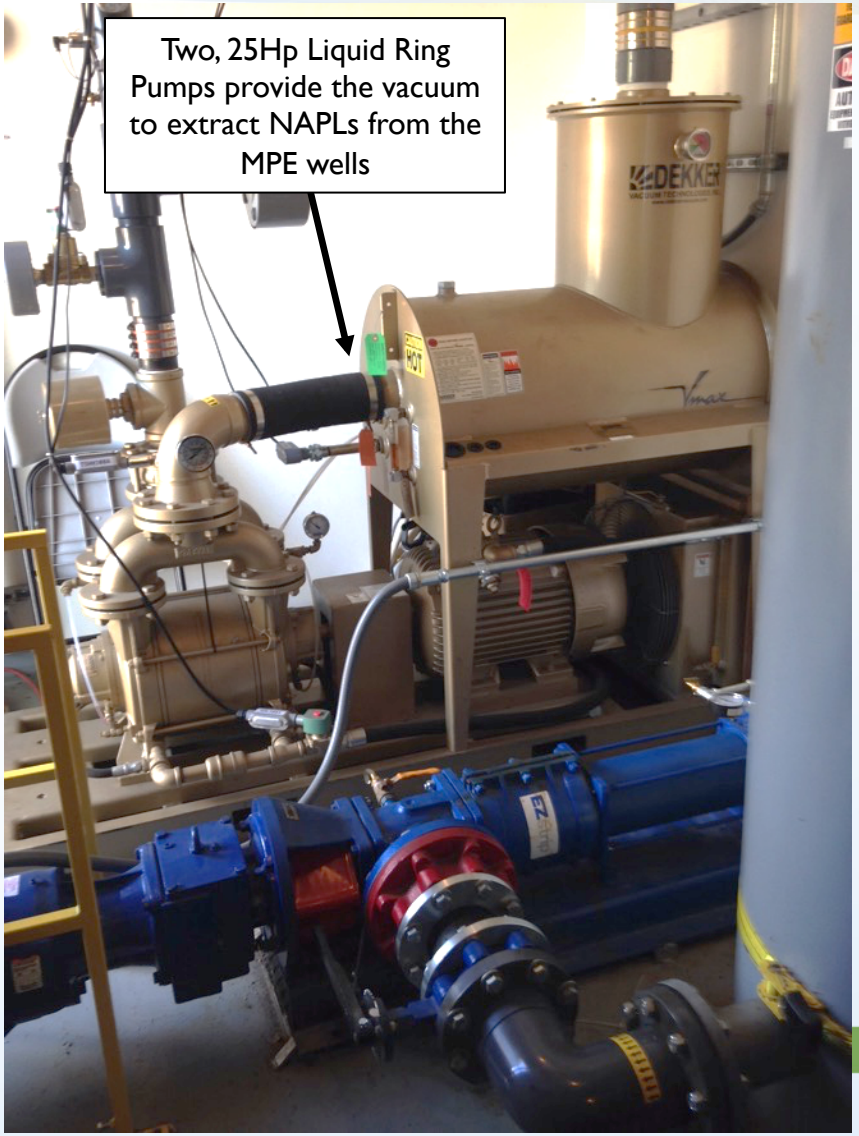
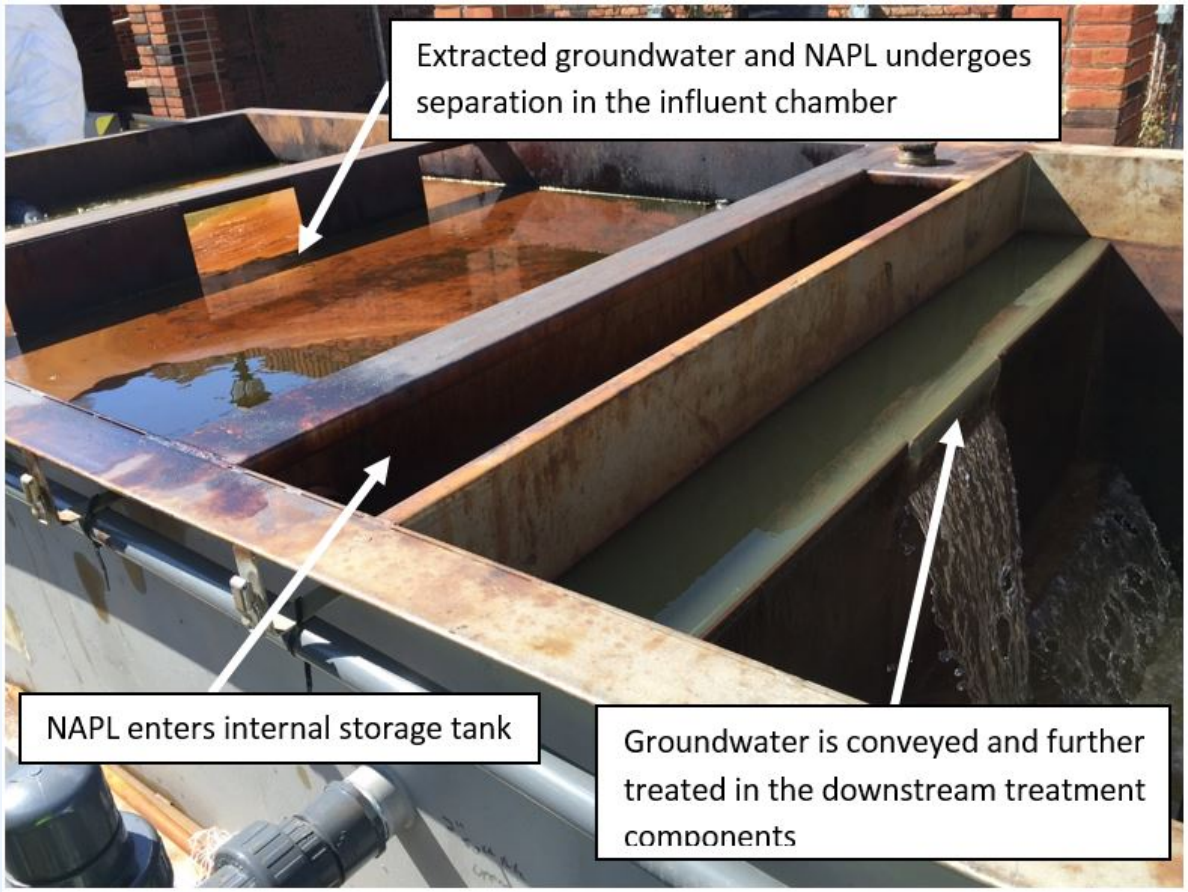
MPE Treatment Train

NAPL and groundwater mixture is extracted from the well field and transferred to the treatment components



Two, 25Hp Liquid Ring Pumps provide the vacuum to extract NAPLs from the MPE wells

MPE Treatment Train



Water is conveyed and discharged in the top of air stripper tower

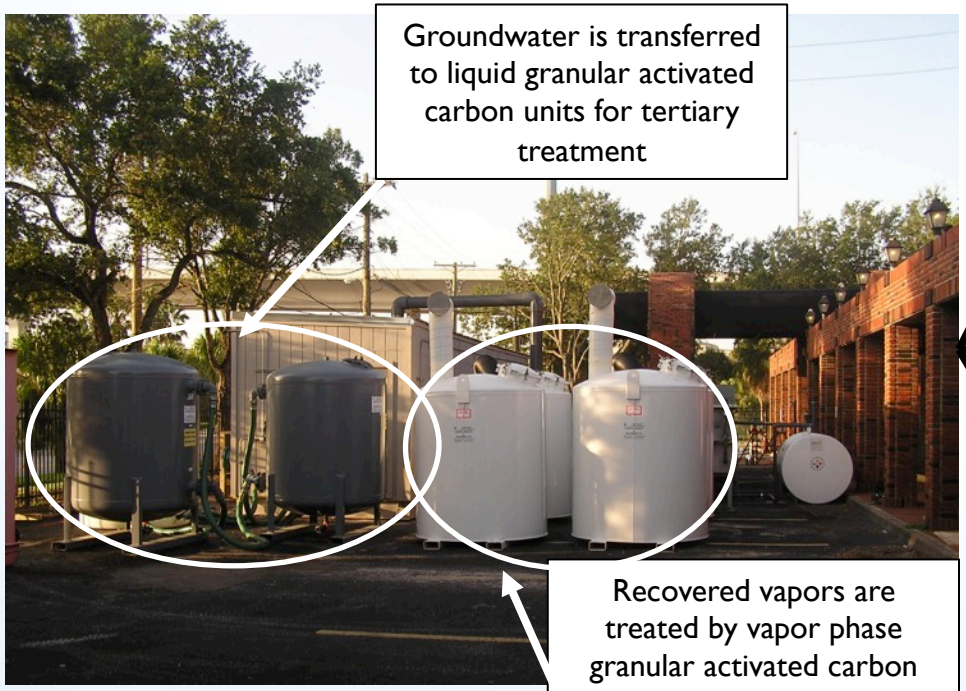
Volatiles are stripped as water passes the treatment trays and contacts air

A blower at the base of the air stripper provides air for volatilization

MPE Treatment Train

Treated groundwater is returned to the surficial via an infiltration basin, reinjected to optimize NAPL recovery, or sent to POTW

Groundwater is transferred to liquid granular activated carbon units for tertiary treatment



Recovered vapors are treated by vapor phase granular activated carbon prior to atmospheric discharge

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MPE Startup

Shades of MGP NAPL

"Yes, that's NAPL"

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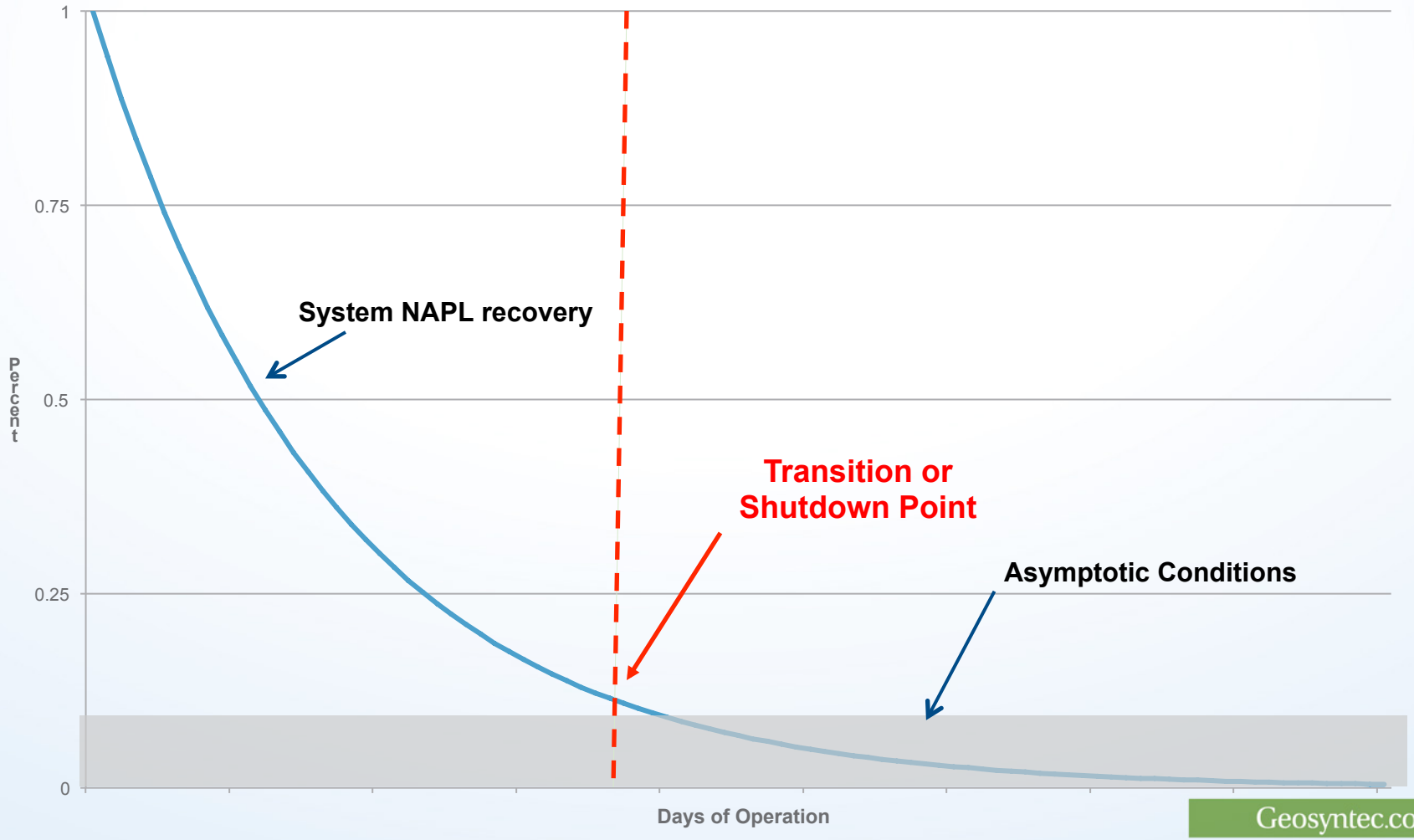
Constant Optimization is Key to Success



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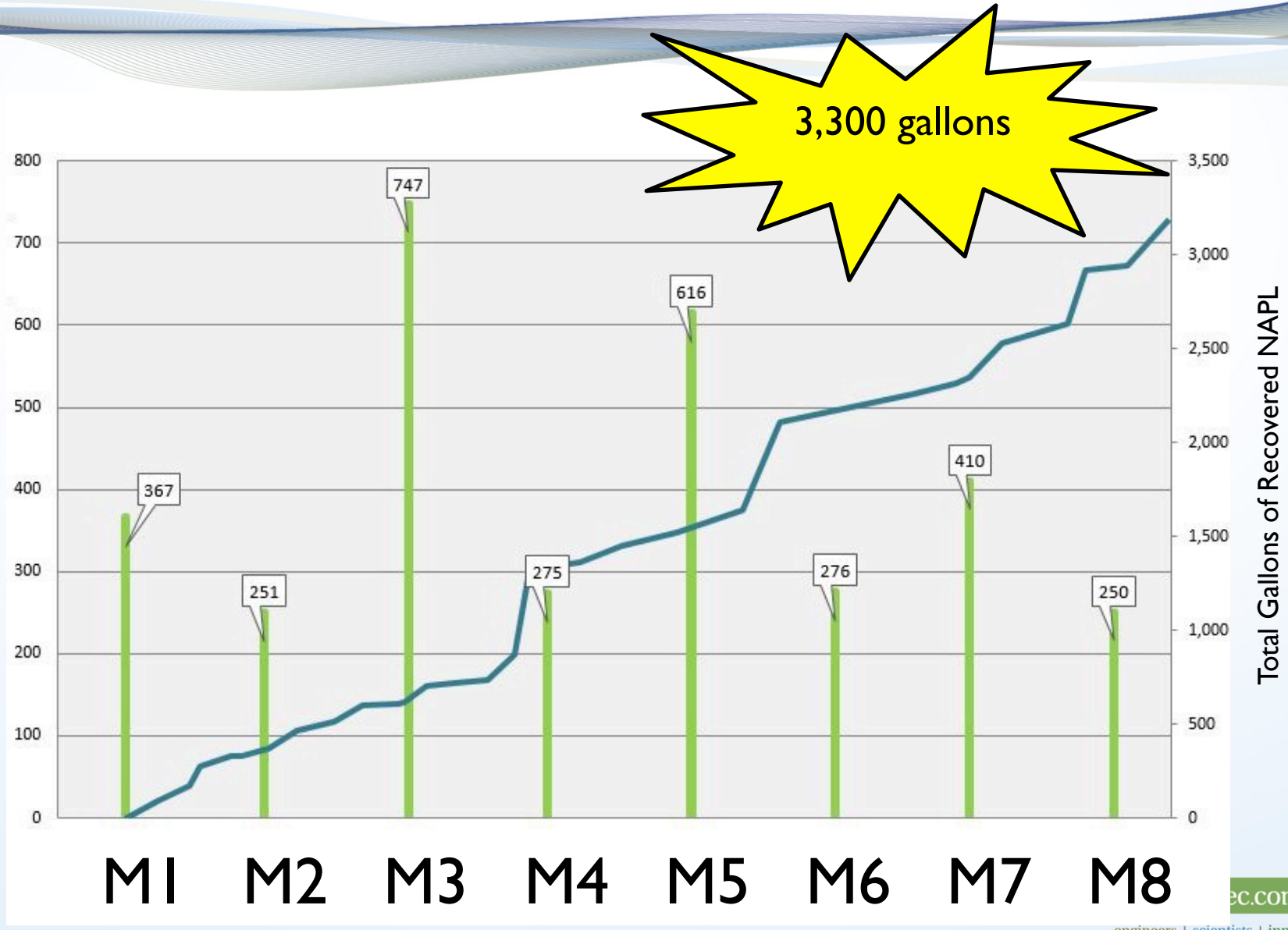
NAPL Recovery



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Can Anyone Guess the Weight of Recovered NAPL in Elephants?




Closing – Transformation of Brownfield

1,000 apartments or condominiums and 40,000 SF of retail space

Significant reductions in MGP waste

Linkage between downtown Tampa to historic Ybor City

Redevelopment proposed to include grocery store in food desert

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Thank you. Questions?

Special thanks to TECO PGS
and other key contributors
Baker Hostetler
Action Environmental
Product Level Control
Equipment with Experience
Carbon Services

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