Project Long Mott Geotechnical and Groundwater Modeling Approach

July 23, 2024

Agenda and Objectives

Agenda:

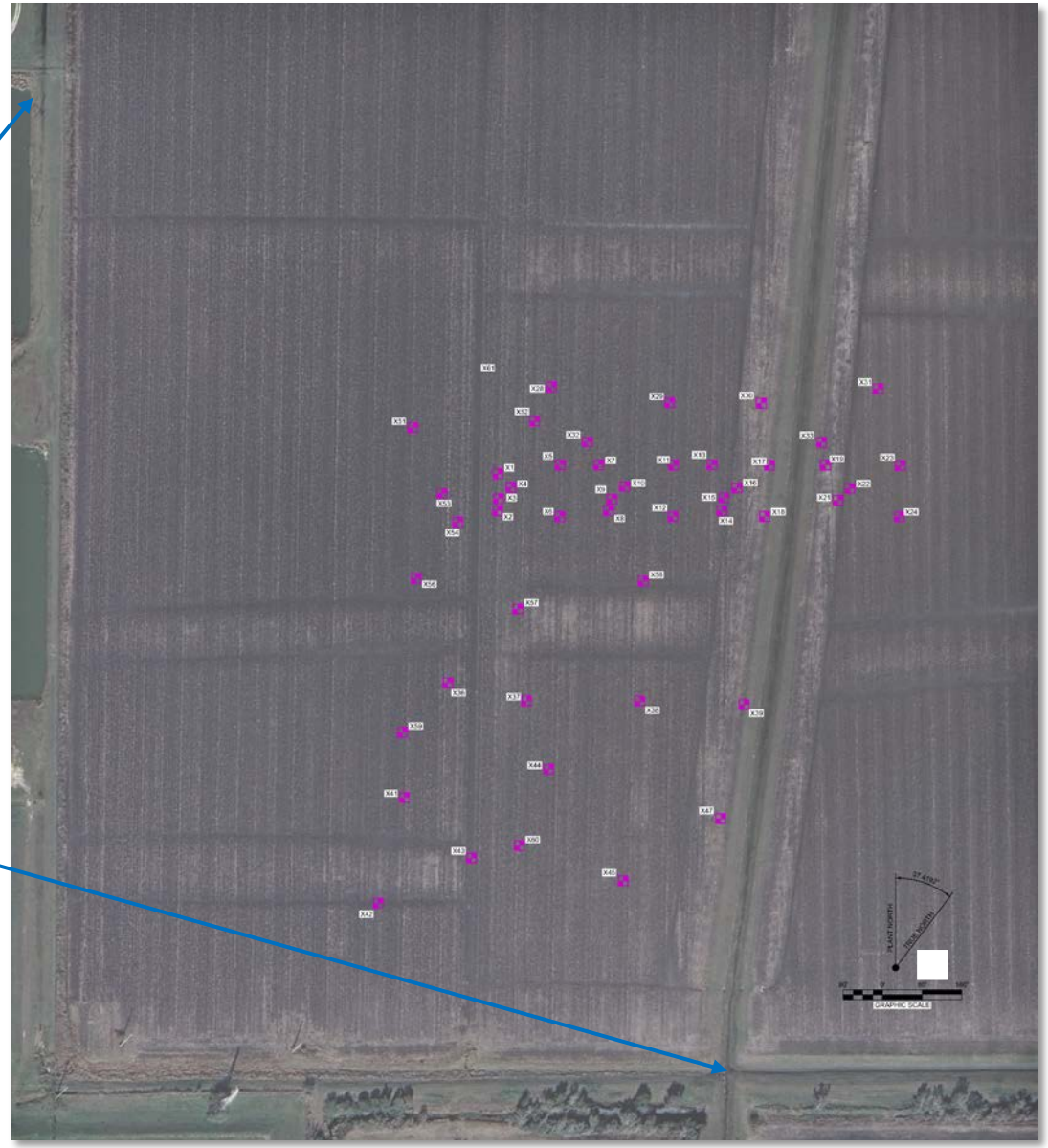
- Introductions/Opening Remarks Background and Context
  - Geotechnical Investigation Approach
  - Groundwater Sampling and Modeling Approach
- Questions/Closing Remarks
- *Closed Meeting*

Objectives:

- Describe the Preliminary Safety Analysis Report (PSAR) Chapter 2, “Site Characteristics” geotechnical investigation approach that is necessary and sufficient for a Construction Permit Application (CPA)
- Describe the scope and methodology of the groundwater modeling approach to support PSAR Chapter 2, “Site Characteristics” and Environmental Report (ER) content
- Achieve a common understanding of how the proposed content meets applicable regulations and guidance

Background and Context

- Figure detailing geotechnical boring plan completed to date
- Project Long Mott (PLM) is located near the existing Dow Seadrift Operations site
- PLM plant structures will be at or above-grade
- Site Characterization activities continuing through Summer 2024



Background and Context

Geotechnical Approach:

- We will rely on data from the completed geotechnical borings performed in the initial site layout area to develop PSAR Chapter 2.5 - Geology, Seismology, and Geotechnical Engineering (Construction Permit Application)
- We will perform additional geotechnical borings within the revised reactor location and the proposed new Nuclear Island to characterize areas that were not previously explored

Background and Context

- Layout of monitoring wells, pumping wells, and sentinel wells for two lower aquifers (all wells shown have been installed)

Background and Context

Groundwater Modeling Approach:

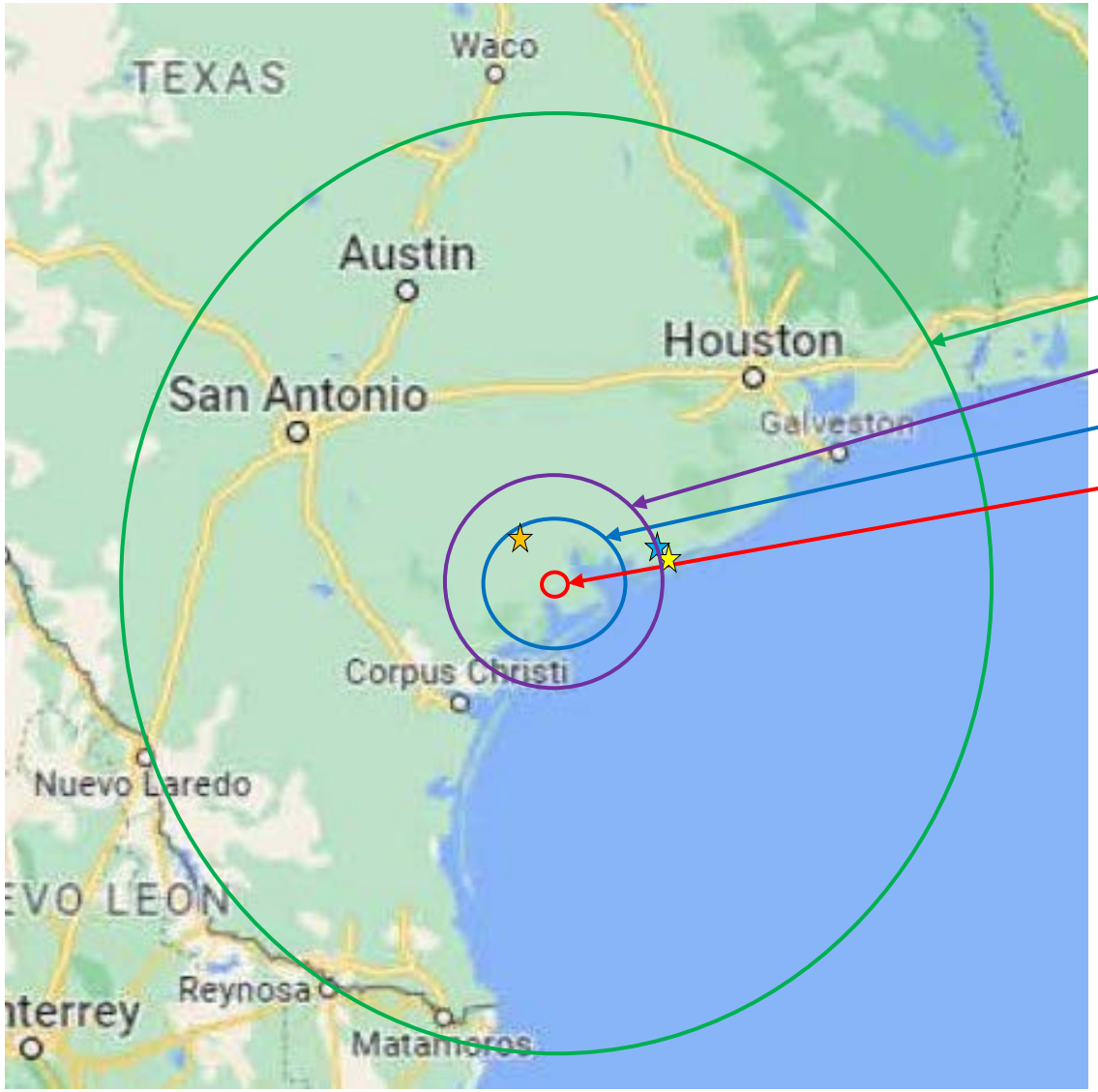
- Additional groundwater information will be obtained in the area west of the previously installed PLM monitoring wells to calibrate the groundwater model:
  - There are existing groundwater wells in the area that are currently used as part of federal and state groundwater monitoring programs
  - We will take a Commercial Grade Dedication approach to use Dow Seadrift groundwater monitoring wells to calibrate the groundwater model

Regulatory Requirements and Guidance for Subsurface Investigations

- **Appendix A to 10 CFR 50, XE-100 Principal Design Criteria 2:**
  - Assessment of the potential impact of natural phenomena affecting the site is necessary to support a determination of adequacy of plant design and operation (*same in RG 1.232 for mHTGR designs*)
- **10 CFR 100 Reactor Site Criteria:**
  - All seismic and geologic factors that may affect design/operation of proposed plant must be investigated
- **Reg Guide 1.132, Sect C.4, Detailed Site Investigation:**
  - Number and depths of core borings/ground water monitoring criteria established
- **Reg Guide 1.208, Sect C.1, Geological, Geophysical, Seismological, and Geotechnical Investigation:**
  - Comprehensive site area and regional investigations should be conducted to support performance-based approach to site specific earthquake ground motion
- **NUREG/CR-5378, Field Investigations for Foundations of Nuclear Facilities:**
  - The depth, layout, spacing of sampling borings, and sampling requirements for a site study depends on the subsurface requirements of the foundation

(Also, RG 4.2, 4.7, NUREG-0800, etc.)

Geologic and Hydrologic Investigation



Seismology, Geology, Meteorology, Hydrology

- **Region** (radius of 200 miles)
- **45 Mile Radius**
- **Vicinity** (radius of 25 miles)
- **Area** (radius of 5 miles)
- **VCS**
- **STP**
- **MAT**

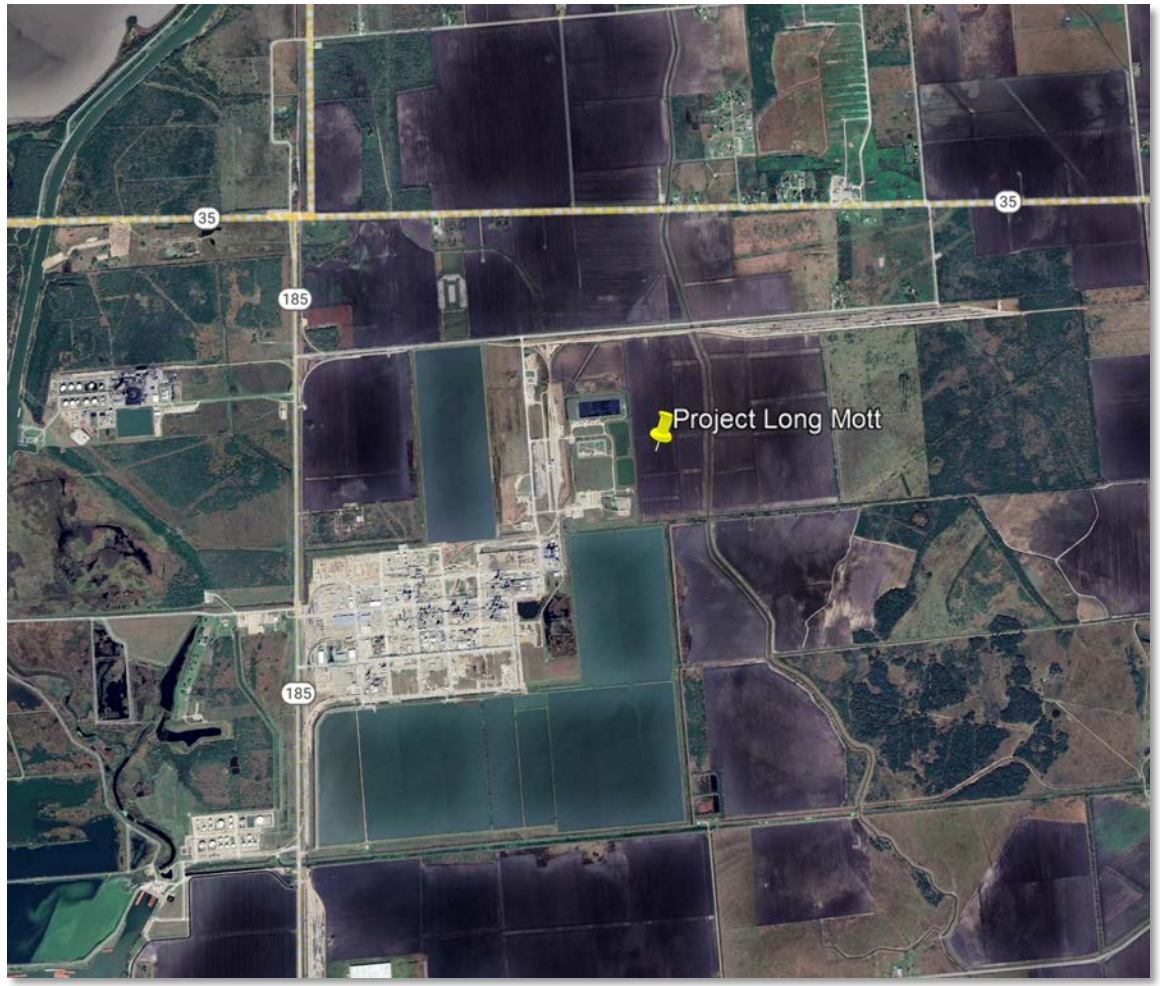
Facility	Approximate Distance from PLM – Miles (kilometers)
Matagorda (MAT)	49 (78)
South Texas Project (STP)	48 (77)
Victoria County Station (VCS)	17 (27)

Geologic and Geotechnical Investigation Guidance

RG 1.132, Appendix D:

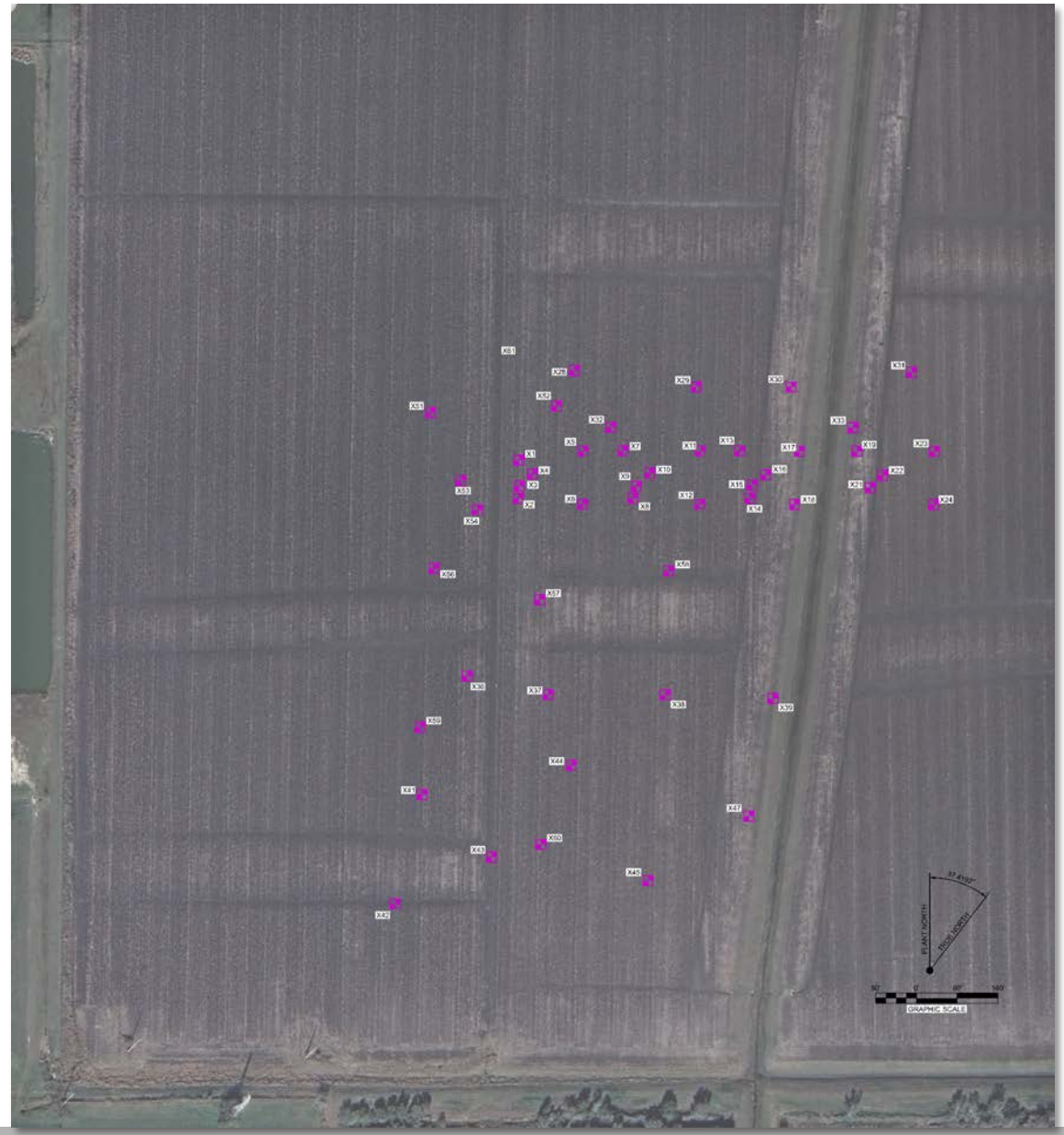
- *For favorable, uniform geologic conditions, where continuity of subsurface strata is found, the recommended spacing is as indicated for the type of structure*
- *At least three borings should be at locations within the footprint of every safety-related structure, unless other reliable information is available in the immediate vicinity or otherwise justifiable*
- *Where soils are very thick, the maximum required depth for engineering purposes, denoted d_{max}, may be taken as the depth at which the change in the vertical stress during or after construction for the combined foundation loading is less than 10% of the effective in situ overburden stress*

The Dow Seadrift Plant has numerous heavily loaded structures that indicate the site has suitable geologic conditions.



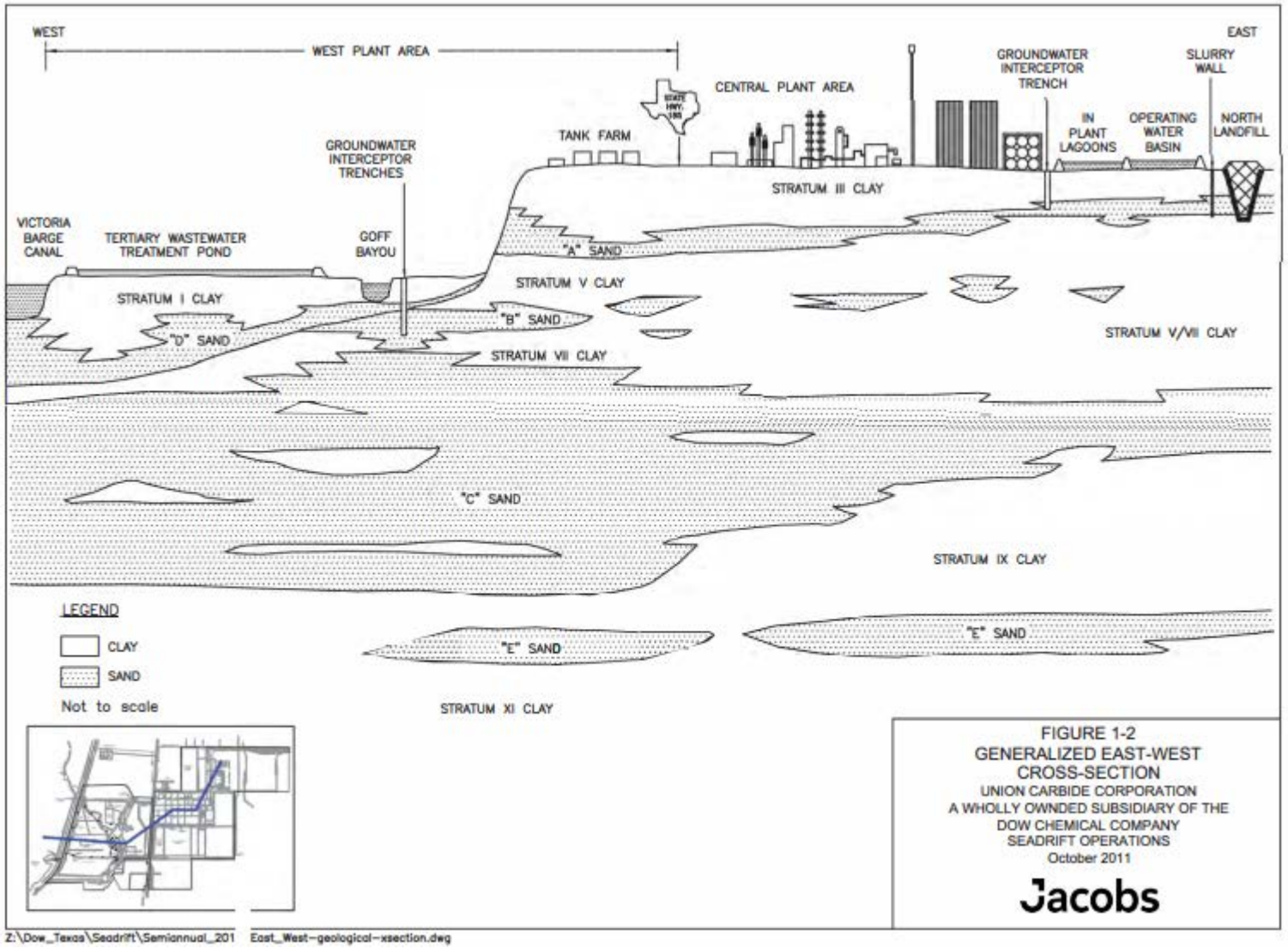
Project Long Mott (PLM) Site Exploration to Date

- To determine the site conditions, we have completed (as of mid-May 2024):
  - Over 12,000 ft of geotechnical borings and
  - Over 3,000 ft of monitoring wells (not shown on figure)



Dow Seadrift – Generalized Hydrogeologic Cross Section

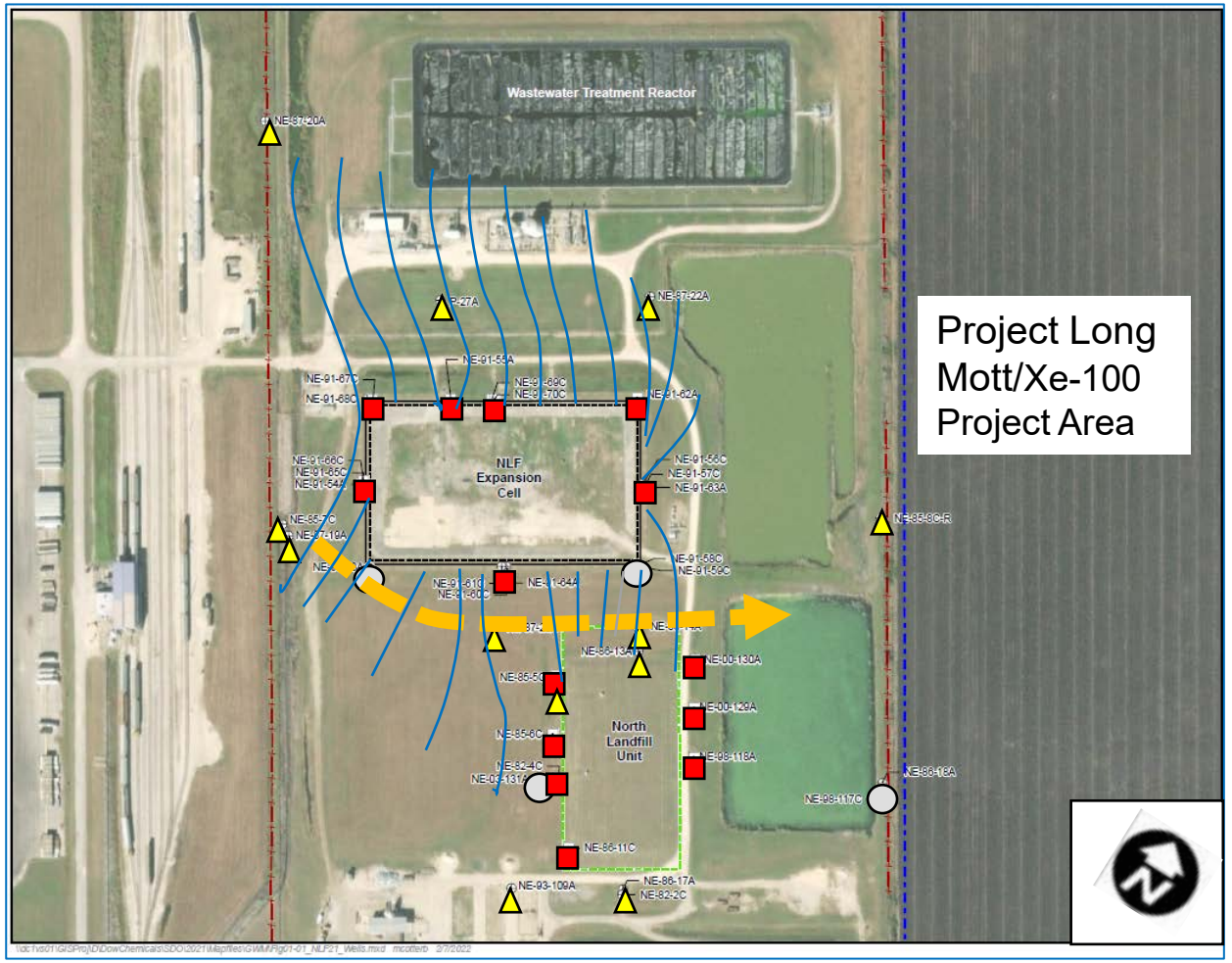
- *There are three primary zones within the Chicot Aquifer at the site:*
  - *"A" Sand*
  - *"C" Sand*
  - *"E" Sand*
- *High degree of heterogeneity among these sand layers: highly variable in thickness and quality (hydraulic properties), not laterally continuous, interbedded clays/silts*



Existing Subsurface Information – Dow Seadrift Site

“A” Sand:

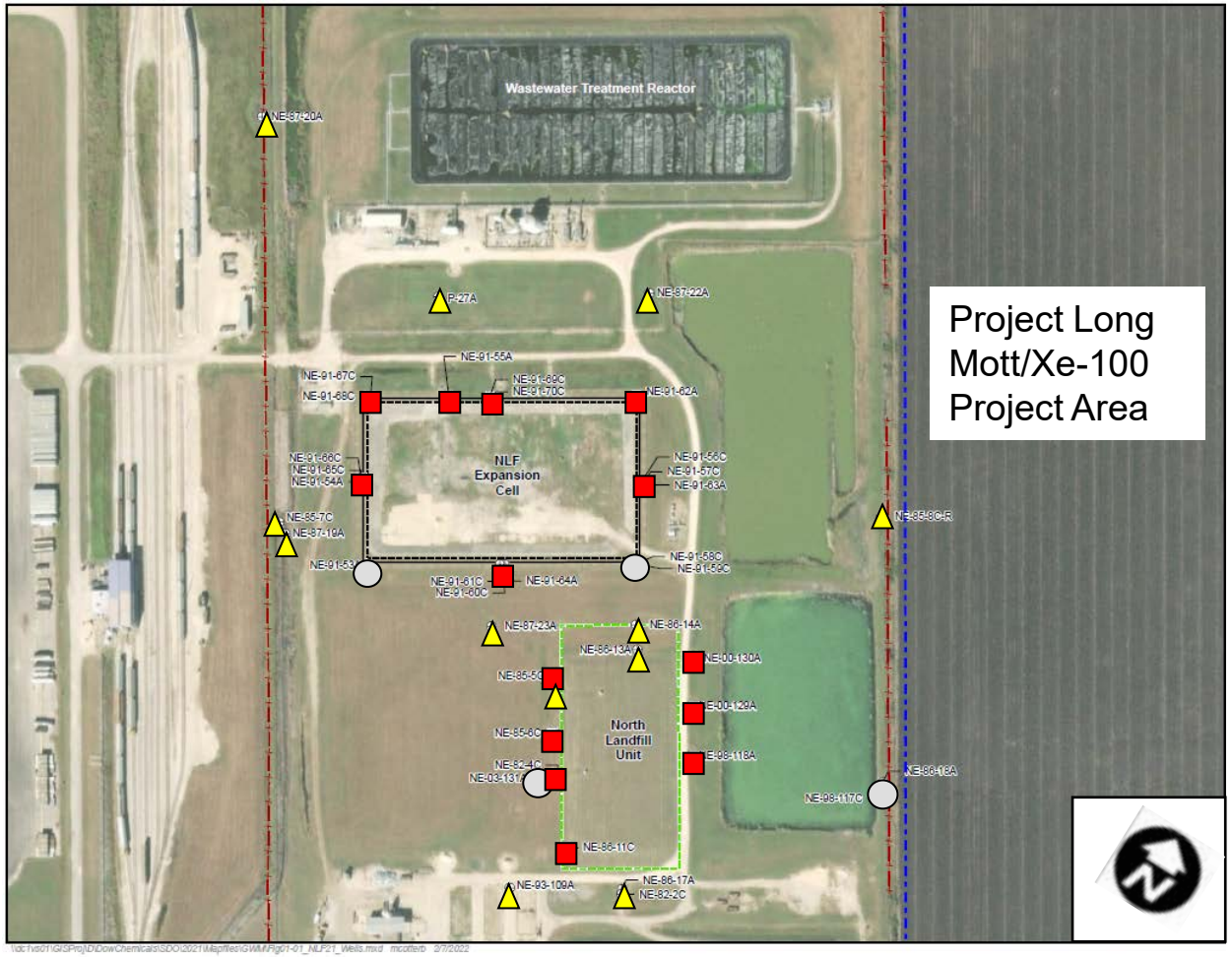
- Depth range:
  - 20-25 ft below ground surface (bgs) at Dow Seadrift (slightly deeper than PLM site)
- Historical data indicate groundwater flow in the “A” Sand has a generally easterly component



“A” Sand Groundwater Flow Direction - 2021 Data

Existing Subsurface Information – Dow Seadrift Site (Adjacent to PLM)

- Previous subsurface investigations have been performed throughout much of the Dow Seadrift site, including the North Landfill Area (shown on this slide), immediately west of PLM site
- Most wells in North Landfill Area are completed in the “A” and “C” Sands



Background Well

Compliance Well

Piezometer

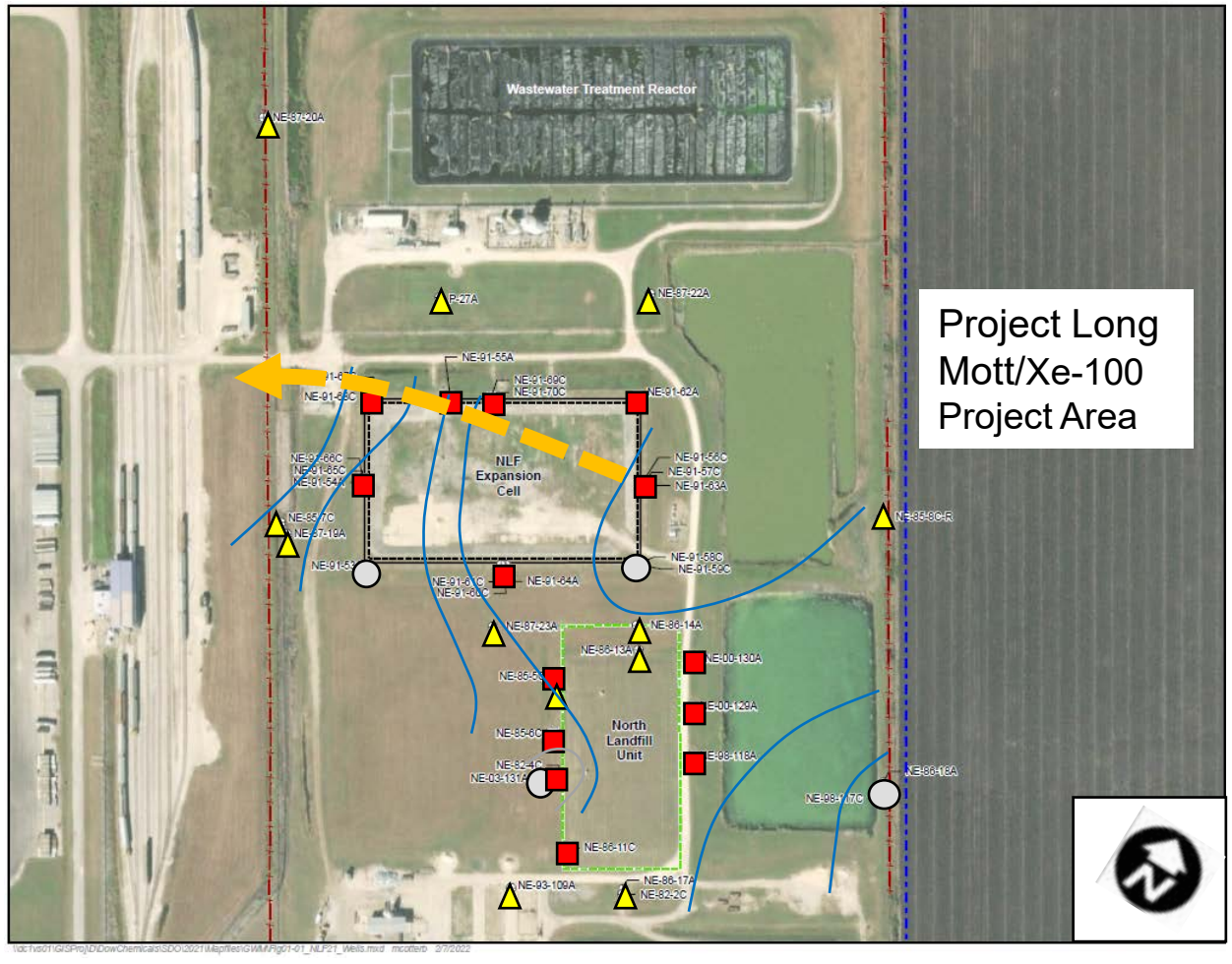
Existing Subsurface Information – Dow Seadrift Site

“C” Sand:

- Depth range: 70-110 ft bgs (25-40 ft thick), similar to PLM
- Direction of flow:
  - Toward the west

“E” Sand:

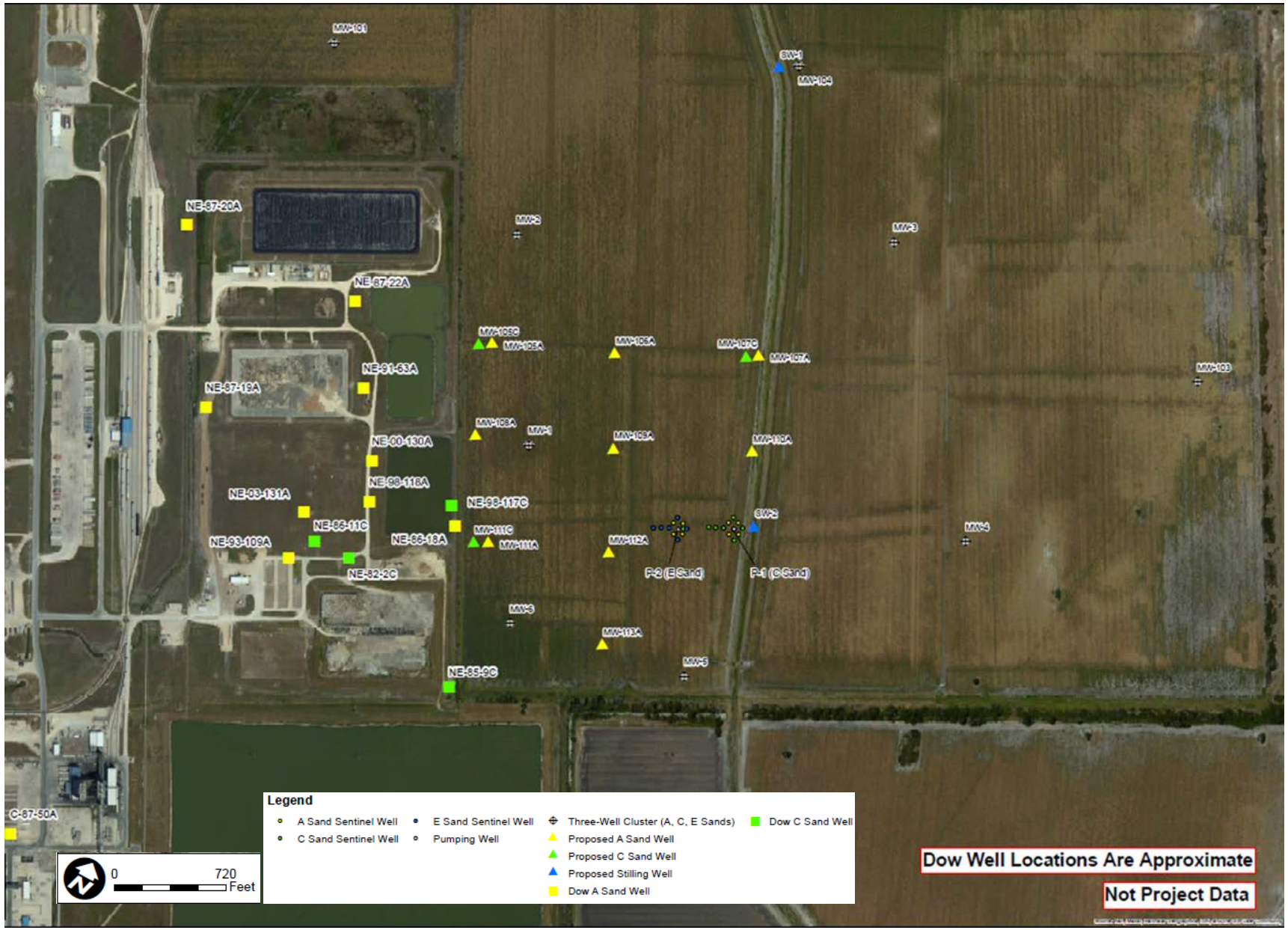
- Depth: 130-160 ft bgs (10-30 ft thick), similar to PLM
- Direction of flow:
  - Believed to be toward the west (limited “E” Sand wells exist)



“C” Sand Groundwater Flow Direction – 2021 Data

ER and PSAR – Existing Well Configuration

- Ten well clusters have been installed: MW-1 through MW-6 and MW-101 through MW-104
- Each monitoring well cluster includes an “A”, “C”, and “E” Sand well (30 wells total)
- P-1 is screened in the “C” Sand
- P-2 is screened in the “E” Sand
- P-1/2 are 6-inch diameter wells that will be used as pumping wells during the Aquifer Pumping Tests (APTs)
- Two pumping test sentinel (observation) well clusters: S-1 through S-6 are “E” Sand sentinel wells; S-7 through S-12 and “C” Sand sentinel wells



ER and PSAR – Additional Sentinel Wells Approved for Installation (Not Yet Installed)

Map ID	Aquifer Zone	Purpose
S-13	A Sand	Primarily to establish interconnectivty or lack thereof between A and E sands during E-Sand pumping test; determine hydraulic conductivity (slug test).
S-14	A Sand	
S-15	A Sand	
S-16	A Sand	
S-17	A Sand	Primarily to establish interconnectivty or lack thereof between A and C sands during C-Sand pumping test; determine hydraulic conductivity (slug test).
S-18	A Sand	
S-19	A Sand	
S-20	A Sand	
S-21	C Sand	Primarily to establish interconnectivty or lack thereof between C and E sands during E-Sand pumping test; determine hydraulic conductivity (slug test).

Dow Seadrift – Adjoining Site

- Selected existing wells within the Dow Seadrift facility will be used to support the development of the groundwater model
- This approach will allow assessment of groundwater flow direction and gradients for determining interactions between the Long Mott Site and the Dow Seadrift facility

Summary

Geotechnical Approach:

- We will initially rely on data from the completed geotechnical borings performed in and near the layout area to develop PSAR Chapter 2.5 - Geology, Seismology, and Geotechnical Engineering (Construction Permit Application)
- We will perform additional geotechnical borings within the reactor location and the Nuclear Island to characterize areas that were not previously explored

Groundwater Characterization and Modeling:

- Additional groundwater information will be obtained in the area west of the previously installed PLM monitoring wells to calibrate the groundwater model
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Closed Meeting

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PLM Site Geotechnical Borings to Date [[ ]]P

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PLM Site Geotechnical Borings [[ ]]P

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Summary

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