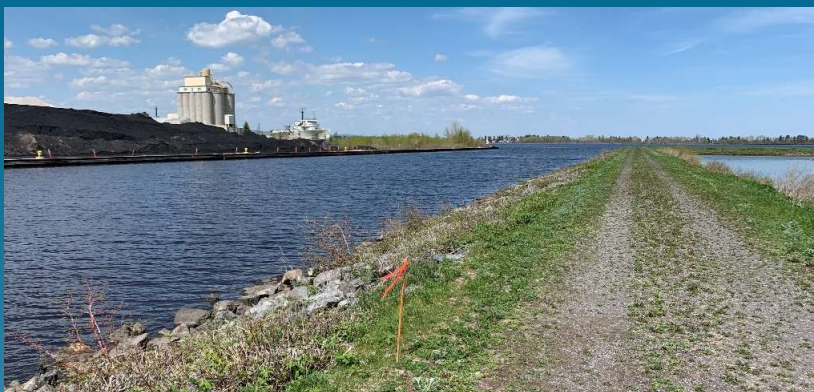




AN ALLETE COMPANY

Former Superior Manufactured Gas Plant Site



December 14, 2020



RAOR – Remedial Action Objectives

- ◆ **RAO 1** - Shallow Soils (< 4ft bgs): Reduce risk to human health receptors from direct contact
- ◆ **RAO 2** - Deeper Soils (> 4ft bgs): Reduce contaminant mass in subsurface soil source materials
- ◆ **RAO 3** – Groundwater: Restore groundwater to the extent practicable

Cleanup Goals/Closure Criteria

- ◆ **RAO 1** - Remove shallow soils that exceed NR 720 DC Industrial Stds
- ◆ **RAO 2** - ~~Remove greater than 70% of total contaminant mass or~~ Reach asymptotic biosparge/SVE degradation curve
- ◆ **RAO 3** - Attainment of stable or receding groundwater plume, as demonstrated over eight quarterly sampling events

PDI Groundwater VOC/PAH Summary

Mean Factor Above Enforcement Standards



Naphthalene

B(a)P

Benzene



PAHs with BioSparge/SVE

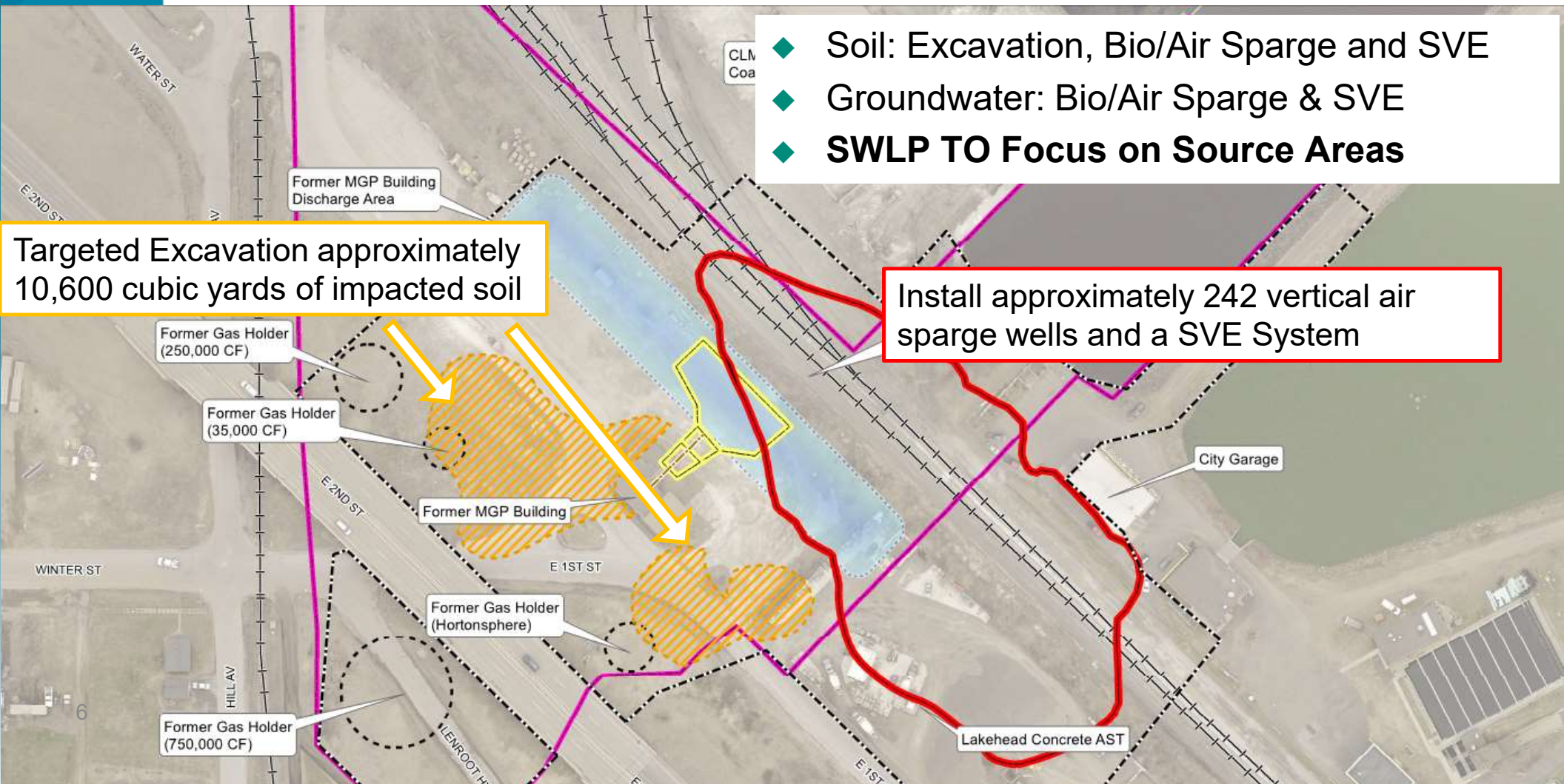
- ◆ Groundwater PAH issues limited in magnitude and extent
- ◆ PDI identified moderate to high populations of aerobic degrader NIDA at MW-7 in the proposed sparge area
- ◆ RAOR to include projected PAH decay rates

Option 3 and Off-site WWTP/BNSF

- ◆ Soil: Excavation, Bio/Air Sparge and SVE
- ◆ Groundwater: Bio/Air Sparge & SVE
- ◆ **SWLP TO Focus on Source Areas**

Targeted Excavation approximately 10,600 cubic yards of impacted soil

Install approximately 242 vertical air sparge wells and a SVE System



Upland Project RD/RA Schedule

Task		RAOR Approval	Upland Design and Contracting (at 60%)	Upland Design Approval	Upland Remedial Construction	Air Sparge Operation	Upland Site Monitoring	Site Closure
2020	Nov							
	Dec							
2021	Jan							
	Feb							
	Mar							
	Apr							
	May							
	Jun							
	Jul							
	Aug							
	Sep							
	Oct							
	Nov							
	Dec							
2022								
2023								
2024								
2025								



