




THE GREEN SIDE OF BROWNFIELD REMEDIATION

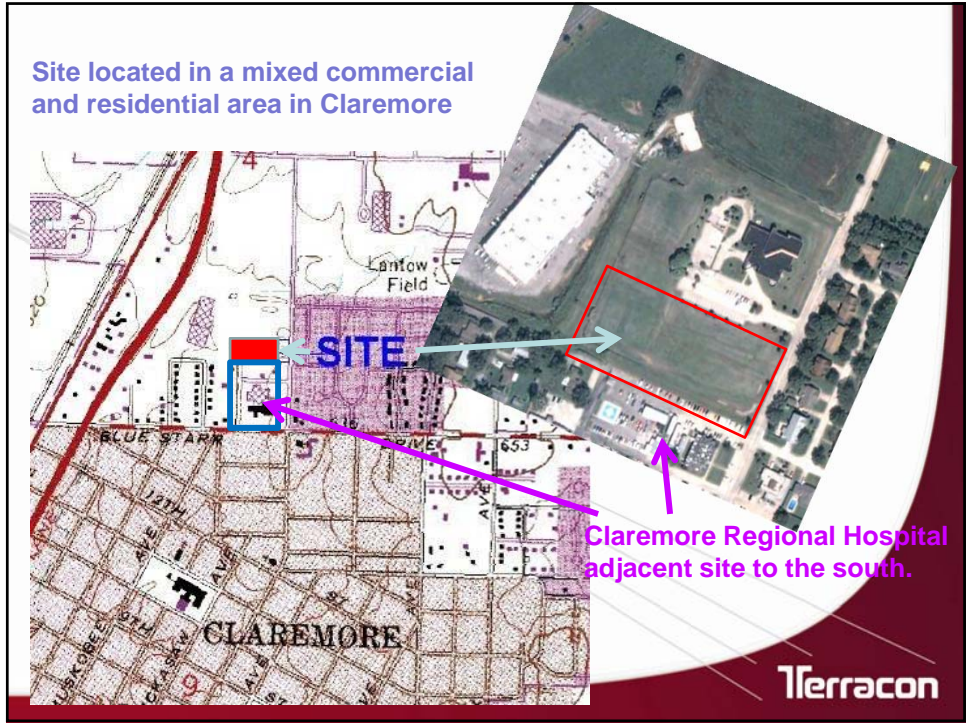
Claremore Medical Office Building


From Landfill to Medical Office
Building
A Brownfield Success Story



In 2002, Claremore Hospital initiated plans to develop a medical office building (MOB) adjacent to the hospital on a vacant lot owned by the City of Claremore.







A local resident stated that, as a child, he lived near the subject site and recalled a landfill on the site. He believed the landfill was approximately 30-40 feet deep.

Previous report of "Subsurface Evaluation of the City of Claremore Abandoned Landfill" dated October 27, 1992 indicated the landfill was located on subject site and property currently occupied by public library. Report indicated the landfill began operations between 1941 and 1958, and was closed between 1958 and 1964.

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Site Investigation / Methane Evaluation

- Borings and temporary monitor wells installed in February and June 2003
 - Arsenic, chromium, lead and mercury, and 1,4-dichlorobenzene concentrations exceed MCLs in groundwater samples

- July 2003, Claremore Regional Hospital:
 - Contracted with the ODEQ under the Oklahoma Brownfields Voluntary Redevelopment Act (Memorandum of Agreement and Consent Order [MACO])

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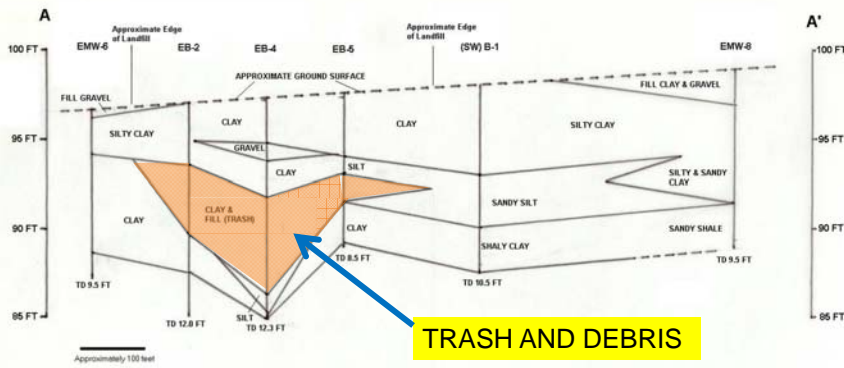
Brownfield Process

- Site Characterization completed in 2003
 - Data, Historical Summaries
 - Pathway/Receptor Assessment
 - Risk Assessment
 - Remedial Options

- Preliminary landfill methane analysis in November 2003 and methane recovery system design in August 2004



Cross Section



Brownfield Process

- Public Notice of Draft Site Cleanup Plan (Dec. 14, 2004)

- Final Site Cleanup Plan (Feb. 8, 2005)

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Elements of Site Cleanup Plan

- Primary receptors:
 - Commercial workers exposed to methane and VOCs via inhalation of vapors
 - Construction workers exposed to via dermal contact and ingestion of impacted soil and GW

- Remedial measures
 - Slab-on-pier building design
 - Segregation and disposal of contaminated soil and GW
 - Methane monitoring/evacuation system

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Cleanup Plan Implementation

- Risk Management Before Construction Operations
 - Pre-construction meeting (December 2004)
- Risk Management During Construction Operations
 - Communications to workers about contaminant exposure
 - Construction worker PPE
 - Management of wastes
 - Equipment decontamination
 - Limited access to construction site
 - Methane monitoring and ventilation system

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Construction Worker Exposure



PPE for construction workers while drilling piers



Setting rebar for concrete piers

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Management of Wastes

Solid Waste (Drill cuttings for piers)



Groundwater Waste (Pumped from piers)

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Finished Piers for Foundation



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Methane and VOC Gathering System

Perforated PVC Pipe



Manifolded Gathering System

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20-mil HDPE Geomembrane and Boots Around Piers, Elevator, Utilities and Other Penetrations

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Medical Office Building



Rooftop Vent Fan



PVC
Ventilation
Pipe Riser



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Sump for drainage
from methane
gathering system

Interior-Mounted
Ultima X Gas
Methane Monitor &
Alarm



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Cleanup Plan Implementation

- Post-Construction Risk Management
 - Methane monitoring of building interior
- Future Monitoring and Maintenance Requirements
 - Cover soil to prevent erosion
 - Construction worker protection during future construction
 - Groundwater monitoring (Limited time)
 - Methane monitoring and ventilation system maintenance

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Land Use Restrictions

- No residential use of property
- No use of groundwater and no drilling of wells other than for investigation or remediation
- No excavation below 2 feet without ODEQ approval

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