

GeorgiaBrownfield

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**Overcoming the Challenges of
Public and Private Landfill Redevelopment**

28 July 2026



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FROM BROWNFIELD TO BLOCKBUSTER: ASSEMBLY STUDIOS

OCTOBER 21, 2025

SITE TOURS

PANEL DISCUSSION

NETWORKING

FOOD & BEVERAGE



Panelist Introductions



GREG HORSTMEIER
GEOSYNTEC



WYATT KENDALL
TAFT / MMM



JEFF TYBURSKI
GEOSYNTEC



RAYMOND LIGHTFOOT
GREEN ROCK

Agenda

- Process Approach to Landfill Redevelopment (Greg Horstmeier)
- Legal Considerations (Wyatt Kendall)
- Case Studies (Jeff Tyburski)
- Q&A (Moderator: Raymond Lightfoot)

Process Approach to Landfill Redevelopment

Greg Horstmeier, PE
Senior Engineer

Two Paradigms We Will Explore

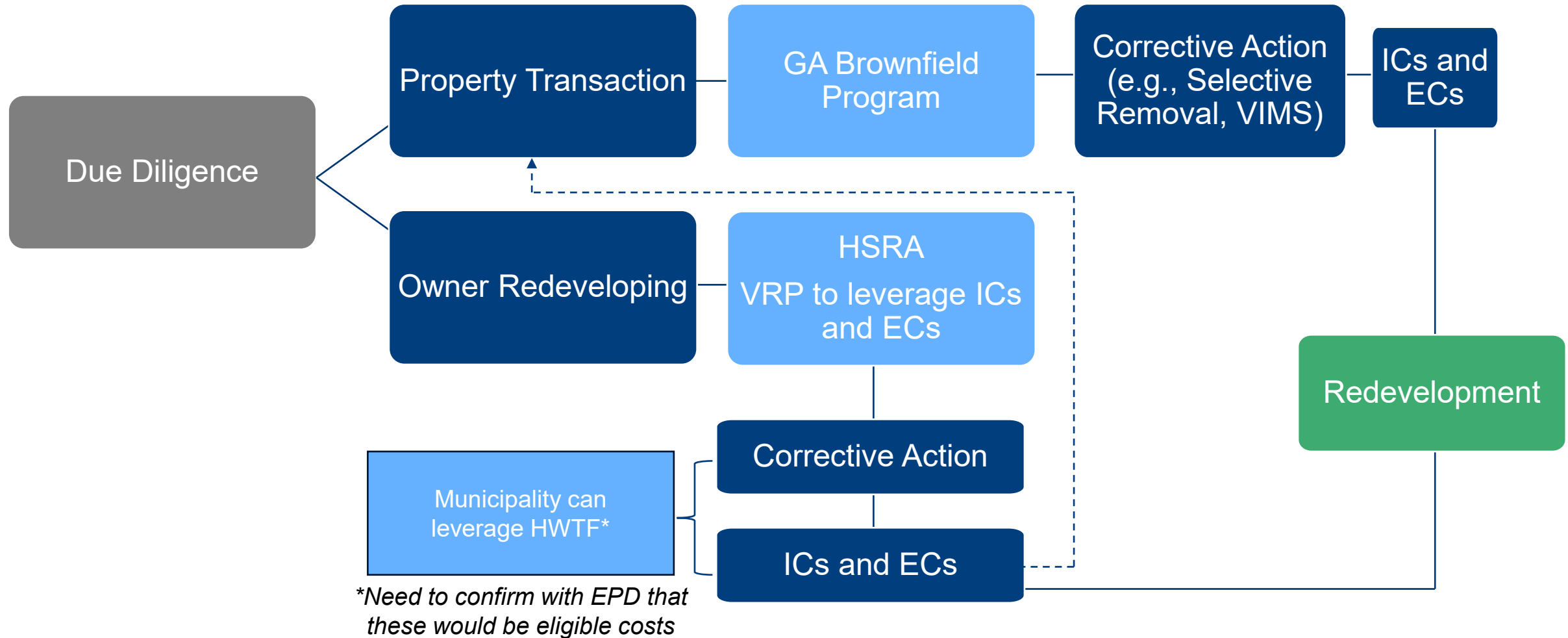
1. Property transaction

1. All Appropriate Inquiries – prospective purchasers can qualify for liability protections under CERCLA
2. Initial redevelopment planning
3. Potential entry into Georgia Brownfield Program (or other voluntary program)

2. Owner redeveloping

1. Due diligence still critical to inform design and construction
2. Initial redevelopment planning
3. Different regulatory strategies

Flowchart: Georgia Regulatory Strategies



Supplemental Investigations: Considerations for Landfills

Environmental

- Leachate generation
- Groundwater impacts
- Landfill gas
 - Methane
 - VOCs
 - H₂S
 - Odors
- Landfill cover
- Waste thickness

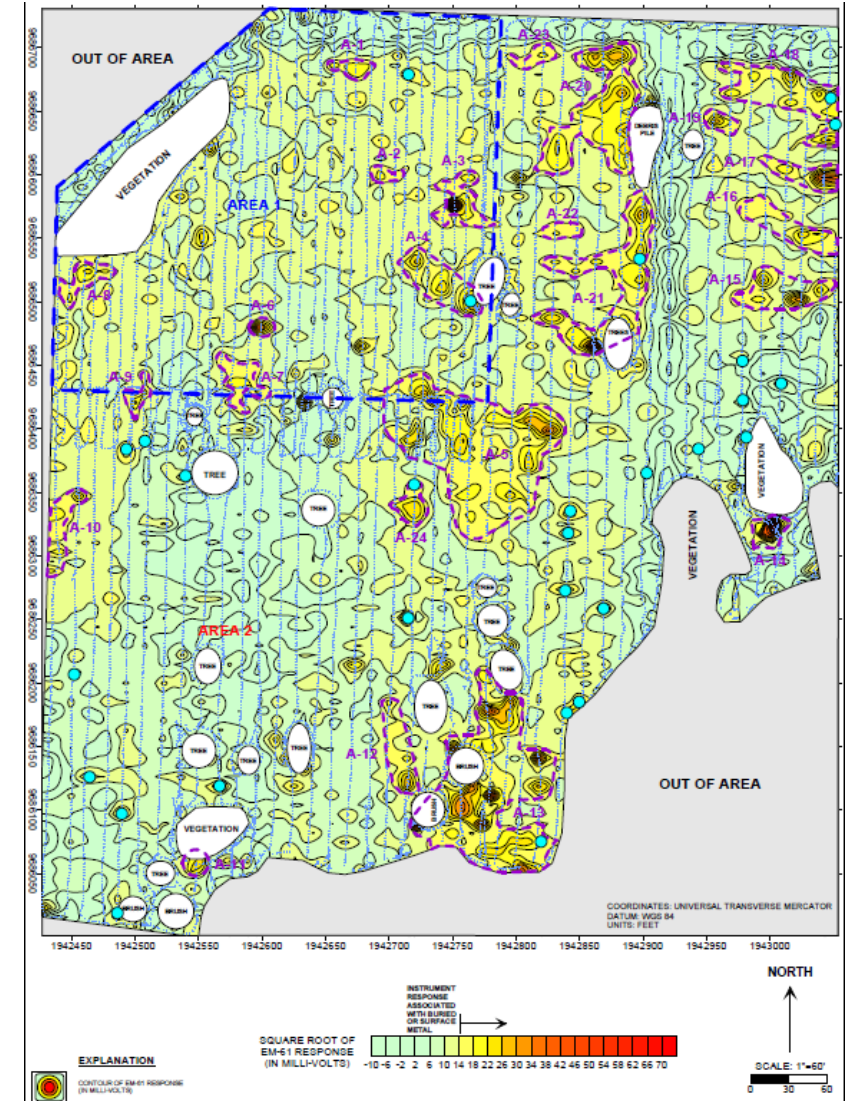
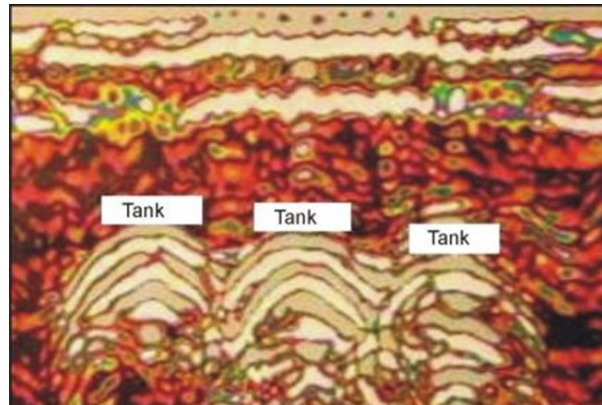
Other

- Geotechnical considerations
 - Settlement
 - Slope stability
 - Bearing capacity and foundation design
- Site design
 - Stormwater
 - Utilities and infrastructure
- Legal & Risk
 - Offsite migration of media
 - Perception



Designing a Supplemental Investigation

- Environmental data gaps
- Limits / depths of waste
- Components of waste (MSW, industrial, etc.)
- Geotechnical investigation
- Geophysical investigation
- Other



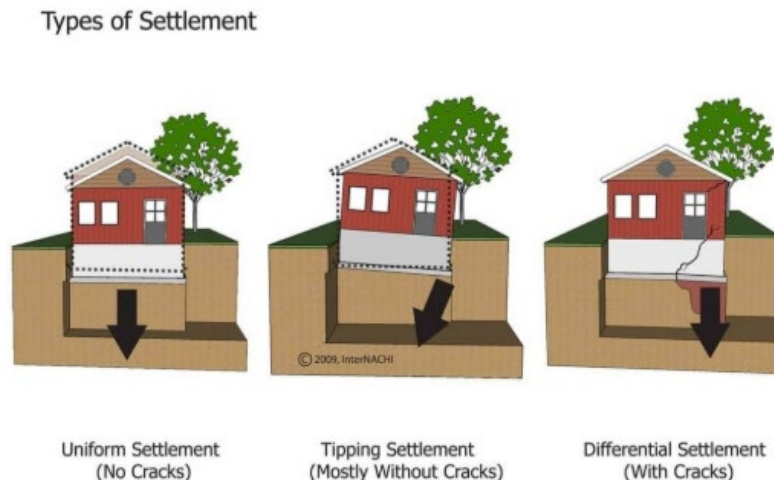
Landfill Characteristics and Potential Mitigation Measures

Media	Landfill Characteristics	Mitigation Measures
Groundwater	Contamination	Corrective Action or MNA
	Depth to Groundwater - geotechnical considerations	Foundation design
Landfill Gas	Age of Landfill	Vapor intrusion mitigation system/ gas collection system
	Constituents	
Landfill Cover	Presence	Engineered Cover (CCL, GCL)
	Thickness - geotechnical considerations	Import / regrade soil Foundation design
Encountered Materials	Reusability of Soil	Materials Management Plan
	Waste Thickness - gas generation - geotechnical considerations (e.g., settlement)	Foundation design Special building materials



Operations, Maintenance, and Monitoring (OM&M)

- Long-term monitoring
 - Groundwater
 - Leachate
 - Inspections of final cover
- Active systems
 - Groundwater remediation system
 - Vapor intrusion mitigation system / gas collection system
- Repairs



Process Approach Summary

Whether a property transaction or owner redevelopment

- Enter with a regulatory strategy and a clear endpoint
- Due diligence is critical to inform redevelopment potential
- Several key environmental and non-environmental considerations for landfill redevelopment
- Key to successful redevelopment is an integrated, multidisciplinary approach

Landfill Redevelopments: Key Legal Considerations

Wyatt Kendall

Environmental Partner

Taft, Stettinius & Hollister LLP

Taft/

Landfill Redevelopments vs Traditional Brownfield Projects: Similarities and Differences

- Landfill redevelopments are similar in many ways to traditional brownfield redevelopment projects.
- However, depending on site-specific circumstances, they can also present unique environmental, regulatory, entitlement, engineering, and development challenges.
- Each of these challenges requires careful attention and risk management.



Key Legal Risks: Landfill Redevelopments

- 1.) Increased liability
- 2.) Complex regulatory issues, including permitting and post-closure care
- 3.) Real estate entitlement risks
- 4.) Construction and development challenges

Increased Liability Risks

Types of Liability Risks

- Federal
- State
- Common Law (e.g., trespass and nuisance claims)
 - Migrating contamination
 - Methane gas
 - Odors
 - Dust/trash



Managing Increased Liability Risk

- Conduct pre-transaction environmental due diligence (closure records, monitoring data, cap and gas collection system condition) to evaluate potential environmental risks and determine potential federal, state, and common law exposure before committing to a reuse concept.
- Evaluate participation in potential state programs like the Georgia Brownfield Program that offer broad liability protections.
- Allocate responsibilities and liability contractually through releases, indemnities, covenants, and cost-sharing arrangements.
- For certain site-specific common law risks, such as odors, methane gas, and dust, build controls and requirements into the redevelopment design and operations (e.g., a Type 5 cap and venting system), and capture them in recorded agreements and leases for future compliance
- Consider possible environmental insurance options

Regulatory Risks: Landfill Permitting & Post-Closure Care

- Key considerations:
 - Pre- vs. post-regulatory landfills
 - Type of landfill
 - Statutory post-closure care periods
 - Ongoing monitoring requirements
 - Collection and venting systems
 - Cap maintenance
 - Financial assurance requirements

Managing Regulatory Risks

- Determine the statutory post-closure care period and whether the site is still under permit/post-closure plan or has reached (or can reach) an end-of-post-closure determination.
- Make continued groundwater, gas, and cap monitoring a condition of redevelopment approvals, and include these duties in environmental covenants, easements, or deed restrictions so they run with the land.
- Require engineering upgrades where redevelopment increases use (e.g., enhanced caps, vapor barriers, and active venting within occupied buildings constructed over landfill materials) and tie these improvements to clear maintenance obligations in development agreements and leases.

Real Estate & Entitlement Risks

- Key considerations:
 - Institutional controls and other property use limitations
 - Zoning restrictions, setback requirements
 - Changes to county or regional solid waste plans
 - Potentially greater public scrutiny and opposition



Management of RE & Entitlement Risks

- Align development plans with technical landfill constraints.
- Support approvals with technical studies and planning consistency.
- Use early stakeholder engagement and community messaging.

Construction & Development Risks



- Key Construction and Development Considerations
 - Worker safety and exposure
 - Soil and groundwater management issues
 - Geotechnical risks
 - Odor and dust challenges
 - Stormwater concerns

Management of Construction & Development Risks

- Include in development and construction contracts site-specific health and safety plans and site management plans for contractors that address landfill gas and contaminated soil/groundwater, with appropriate training and insurance coverage requirements.
- Use construction contracts and development agreements to allocate responsibility for any disturbance of the cap, damage to monitoring infrastructure, or new releases discovered during construction.
- Enhanced geotechnical and civil engineering analyses of settlement, slope stability, and stormwater, with legal obligations to implement and maintain design controls.



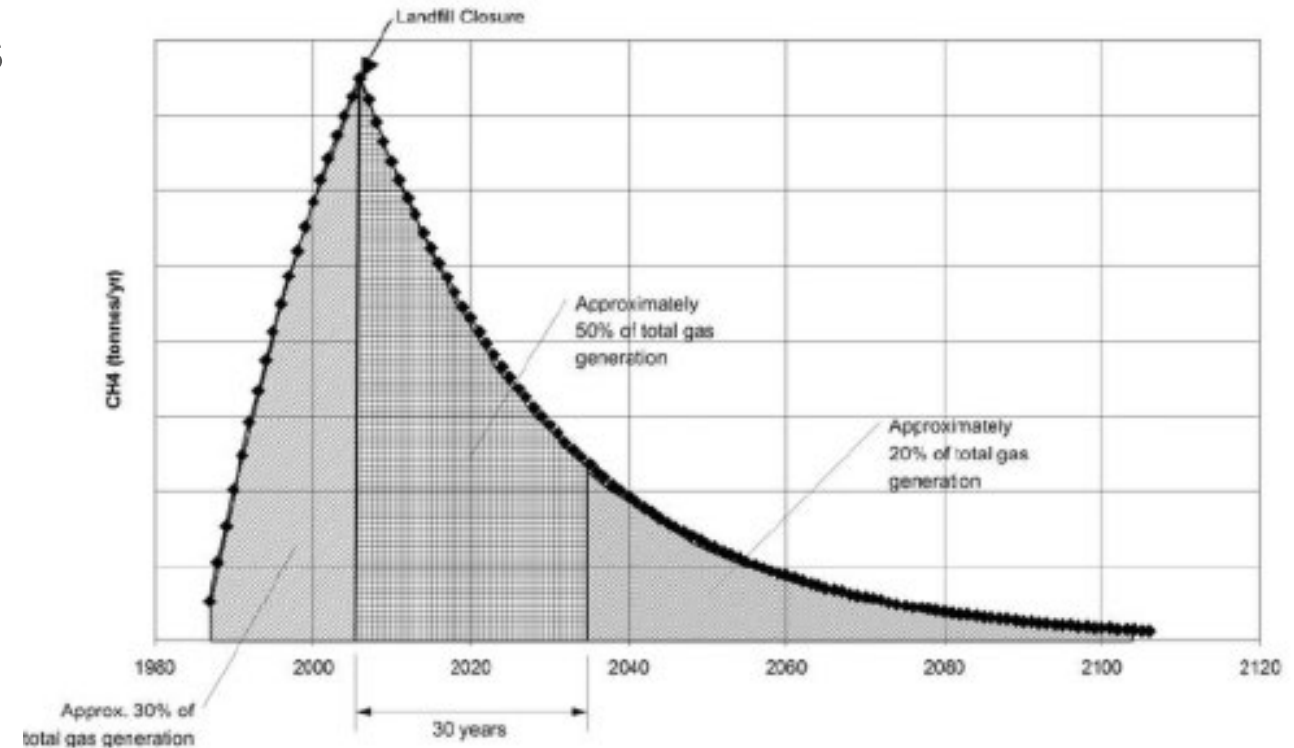
Case Studies

Jeff Tyburski
Senior Principal

In The Spotlight - Why Pre-Regulatory Landfills?

- **Less Is More**

- Closure regulatory requirements
- Pollution
- Thickness, extent and volume
- LFG generation



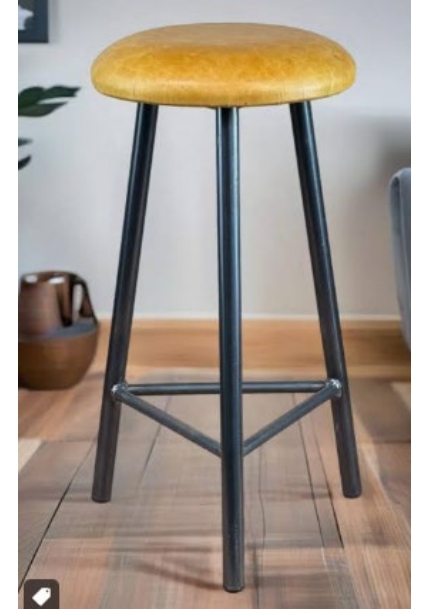
Example Pre-Regulatory Landfill Sites

- **Private Development**
 - Furniture Retail Store, Charlotte, NC
- **Public Development**
 - nCino Sports Park, Wilmington, NC



The Big Three - Landfill Risk Mitigation Measures

1. Final Soil Cover System (FSCS)
2. Landfill Gas (LFG) Mitigation
 - a) Gas Collection and Control System (GCCS)
 - b) Vapor Intrusion Mitigation System (VIMS) for proposed buildings
3. Landfill Environmental Management Plan (EMP)



FSCS Examples

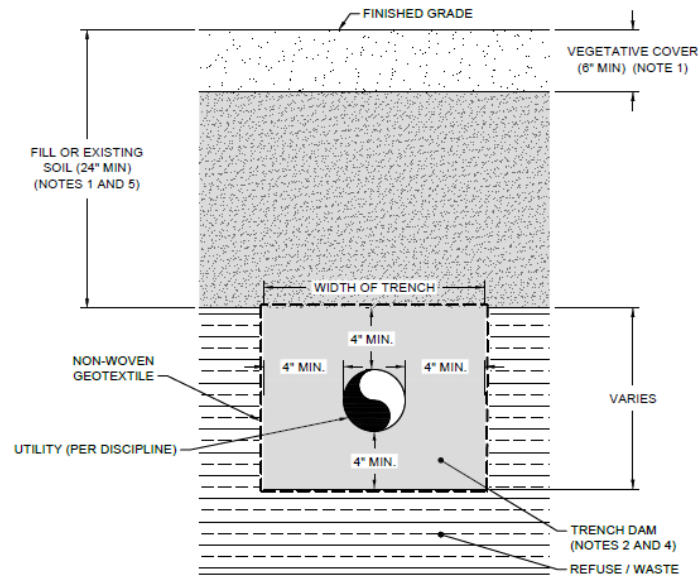
- FSCS Purpose
 - Prevent direct exposure to landfill waste
 - Limit surface water infiltration
 - Limit ambient air into waste
- Minimum thickness varies based on landfill type
- Pervious Areas - Typically 24" but as low as 10"
 - 6-inch erosion/planting later
 - 18-inch underlying compacted layer
 - Demarcation layer/geotextile fabric
- Impervious Areas – Thicknesses can be reduced under asphalt and paved/hardscape surfaces
- No ponding of water
- Utility trench dams
- **Concepts are easy, execution is hard**



FSCS Examples



FSCS Examples



NOTES:

1. IF SOIL COVER CONSISTS OF FILL, TOP SIX INCHES SHALL BE COMPOSED OF SOIL SUITABLE FOR VEGETATIVE GROWTH (E.G., COMPOST MIX, HYDROSEED, ETC.)
2. TRENCH DAM SHALL CONSIST OF 2-SACK CEMENT SLURRY WITH 2 PERCENT BENTONITE, EXTEND A MINIMUM OF 2-FT ALONG THE LENGTH OF THE UTILITY TRENCH, AND FILL THE WIDTH OF THE TRENCH.
3. TRENCH DAMS SHALL BE INSTALLED AT THE FOLLOWING CONDITIONS:
A) AT THE EXTERIOR BUILDING PERIMETER, IMMEDIATELY PRIOR TO THE UTILITY ENTERING THE UNDERSLAB BUILDING ENVELOPE
B) WITHIN 50 FEET OF THE UTILITY ENTERING/EXITING THE PROPERTY BOUNDARY AT THE RIGHT OF WAY
C) AT 300-FT INTERVALS BETWEEN THE TRENCH DAMS DEFINED IN 3A AND 3B; AND
D) AT UTILITY CROSSINGS WHERE THE CROSSING SHARES A COMMON TRENCH.
4. WHEN USED, FILL SHALL CONSIST OF NON-VEGETATIVE SOIL (SANDY CLAYS/SILTS OR CLAYEY/SILTY SANDS).
5. ELECTRICAL CONDUIT TRENCH FULLY ENCASED IN CONCRETE IS AN ACCEPTABLE ALTERNATIVE TO THE TRENCH DAM.

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DETAIL

MINIMUM TRENCH DAM REQUIREMENTS FOR UTILITIES WITHIN WASTE

SCALE: NOT TO SCALE

GENERAL NOTES:

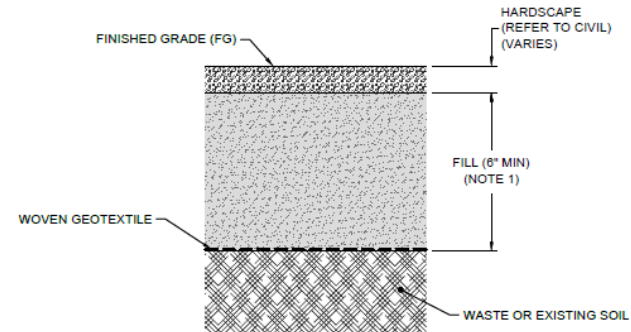
1. SELECTED SPECIES PLANTED IN THE VEGETATIVE COVER SHALL SATISFY NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY (NCDEQ) PRE-REGULATORY LANDFILL PROGRAM (PRLF) GUIDELINES AND CITY OF CHARLOTTE REQUIREMENTS.
2. ALL DISCIPLINES SHALL REFER TO ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR MANAGEMENT REQUIREMENTS OF SOIL, LANDFILL WASTE, WATER, SOIL GAS, AND OTHER MEDIA ENCOUNTERED.

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DETAIL

MINIMUM TRENCH REQUIREMENTS FOR UTILITIES WITHIN WASTE

SCALE: NOT TO SCALE



NOTES:

1. REFER TO GEOTECHNICAL AND CIVIL SPECIFICATIONS FOR FILL MATERIAL REQUIREMENTS BELOW IMPERVIOUS SURFACES.
2. WOVEN GEOTEXTILE REQUIRED AS SEPARATION LAYER BETWEEN FILL AND WASTE.

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DETAIL

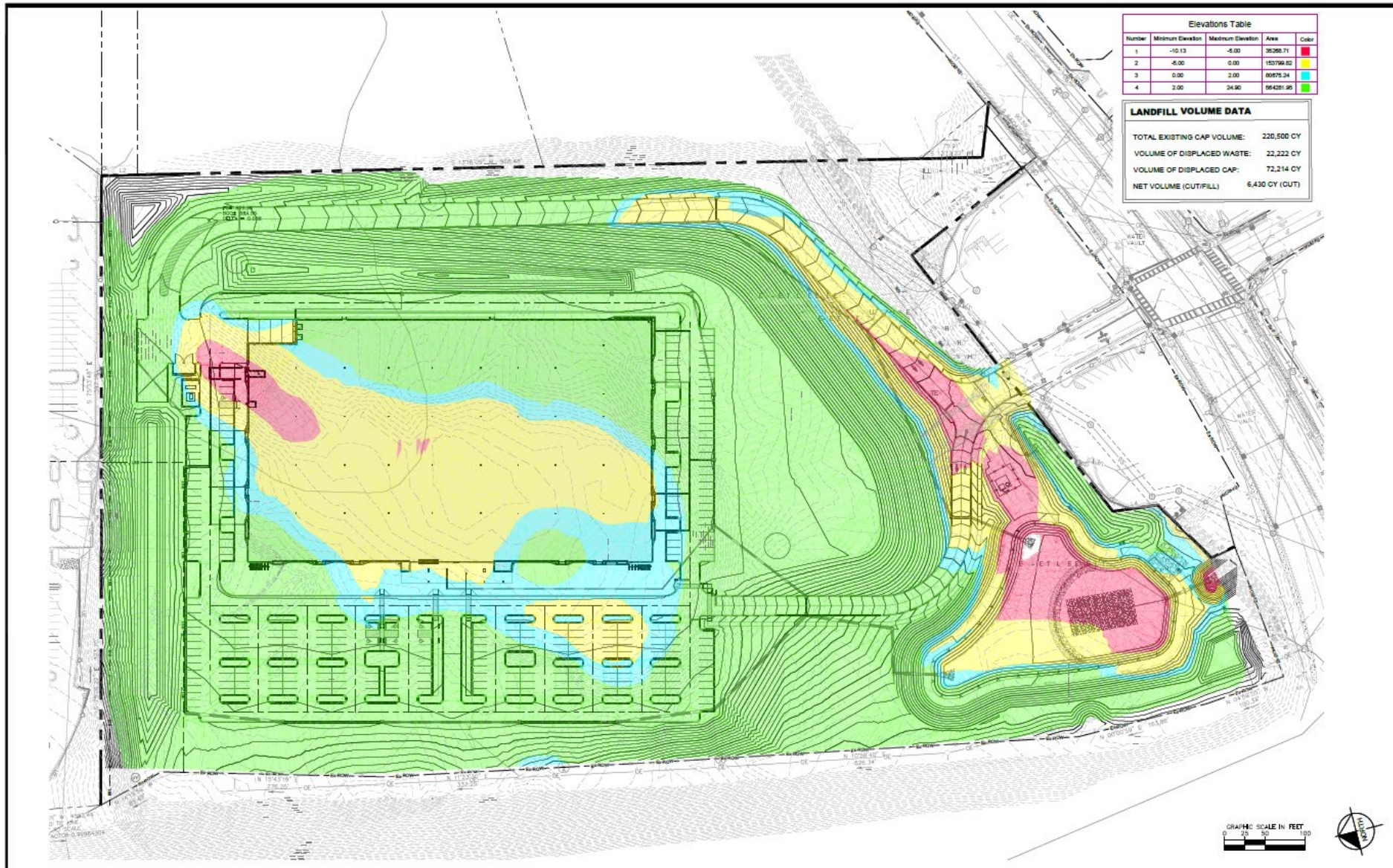
FINAL SOIL COVER BELOW IMPERVIOUS SURFACES

SCALE: NOT TO SCALE

	05/04/2026	90% FINAL SOIL COVER SYSTEM, DESIGN DRAWINGS		
REV	DATE	DESCRIPTION	DRN	APP
 Geosyntec Consultants of NC, PC				
2501 BLUE RIDGE ROAD, SUITE 430 RALEIGH, NORTH CAROLINA 27607 USA PHONE: 919.895.1400				
TITLE: DETAILS I				
PROJECT: FINAL SOIL COVER SYSTEM				
SITE: LIVING SPACES - CHARLOTTE				



FSCS Examples

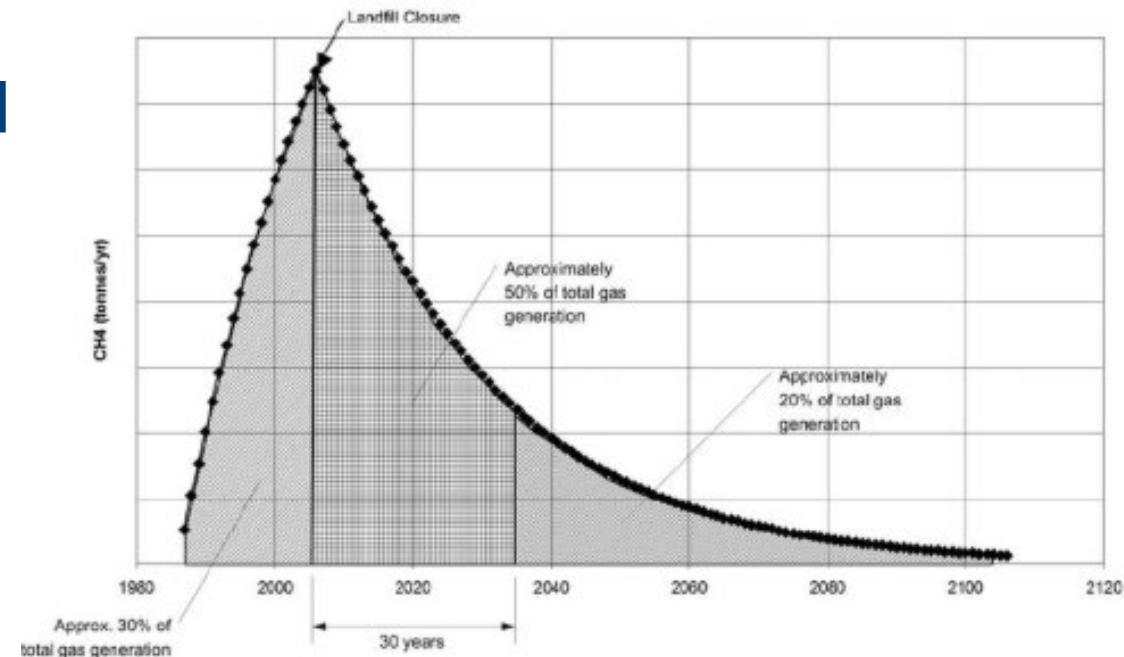


FSCS Examples

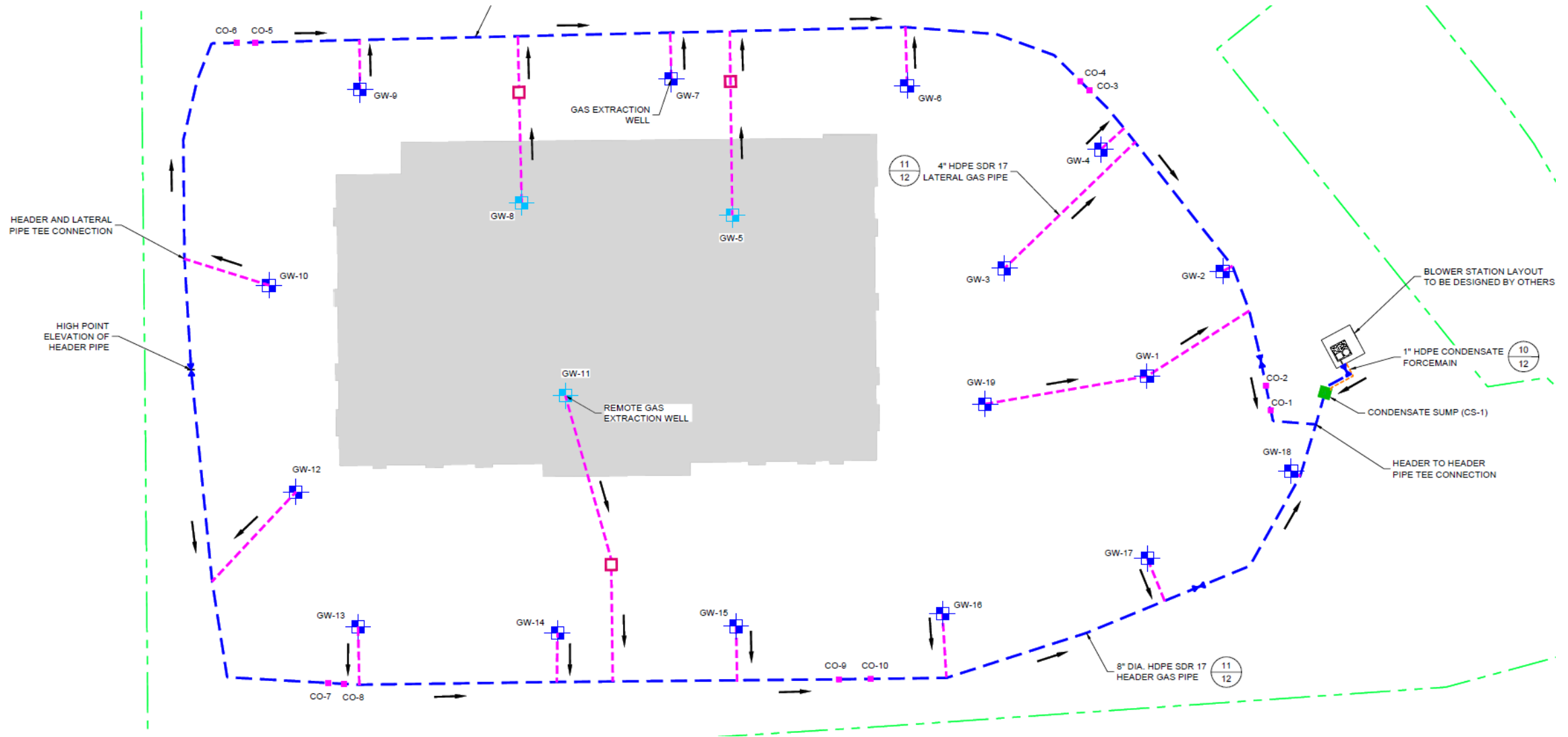


GCCS Examples

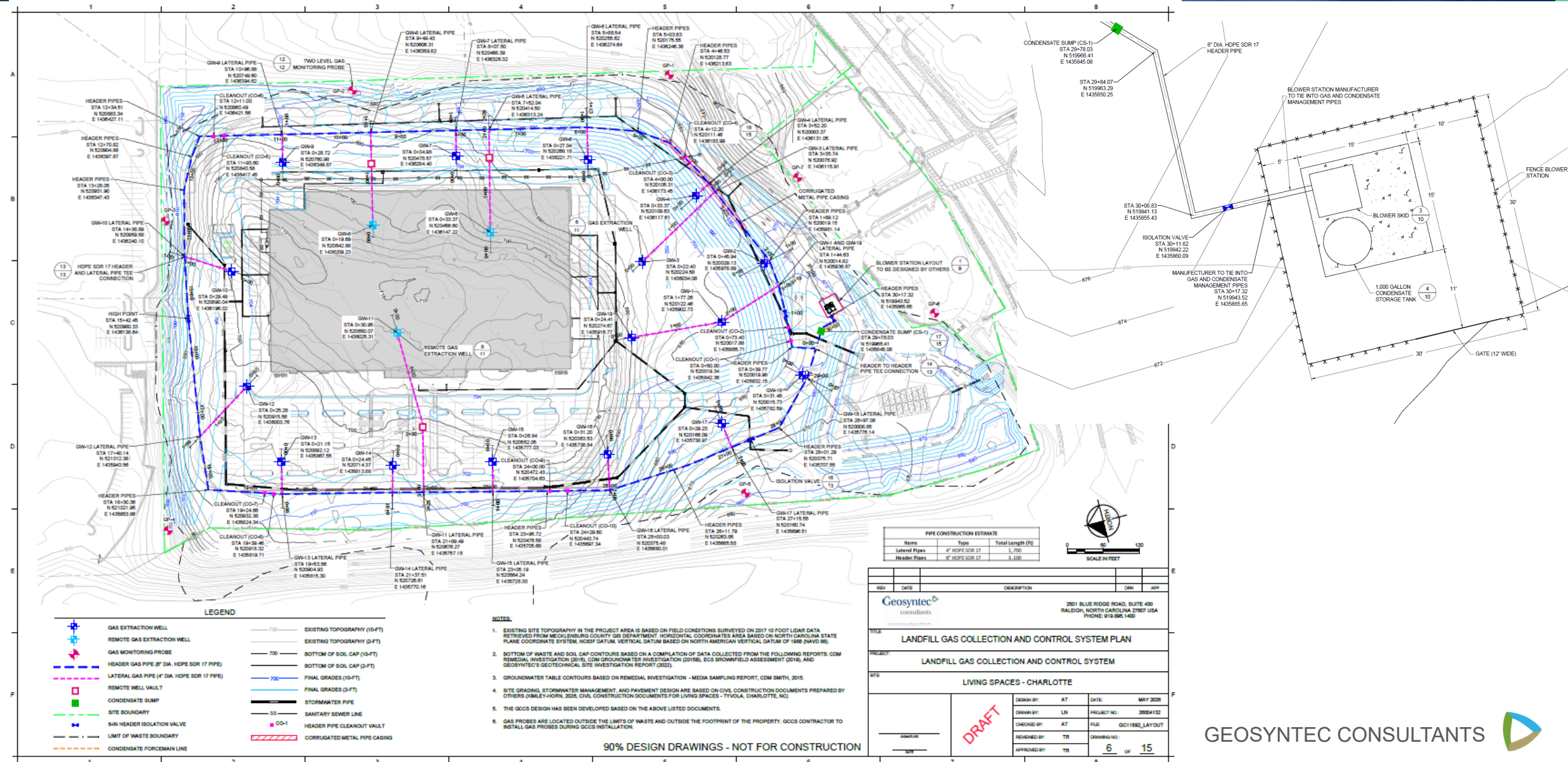
- **Purpose:** Mitigate lateral and vertical migration of LFG
- System of subsurface LFG extraction wells
- Active vs passive operation
- Works in coordination with FSCS and VIMS
- Gas extractions well layout
- Treatment of emissions and condensate
 - Permitted?
 - Granular activated carbon (GAC)
 - Flare



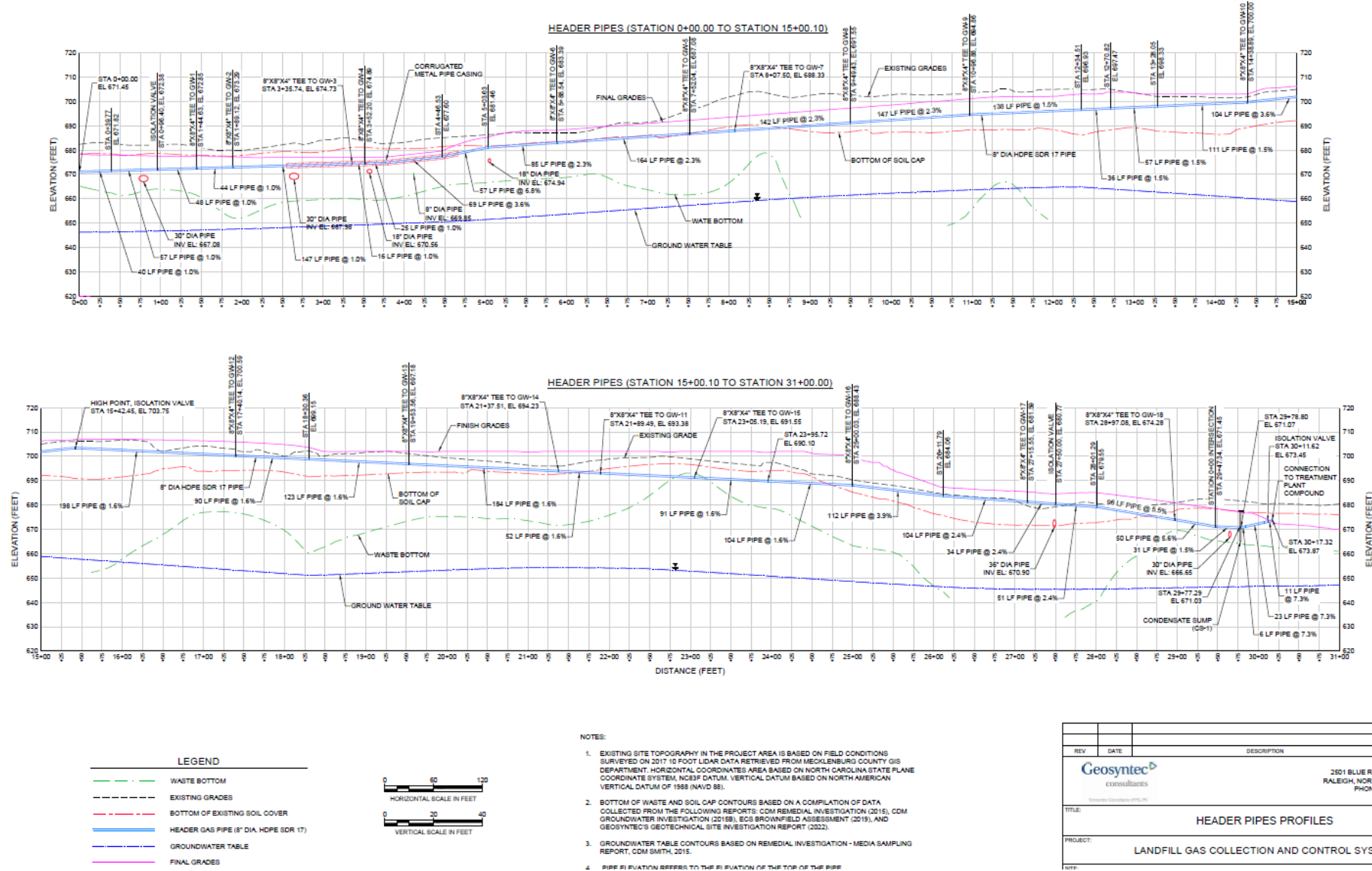
GCCS Examples



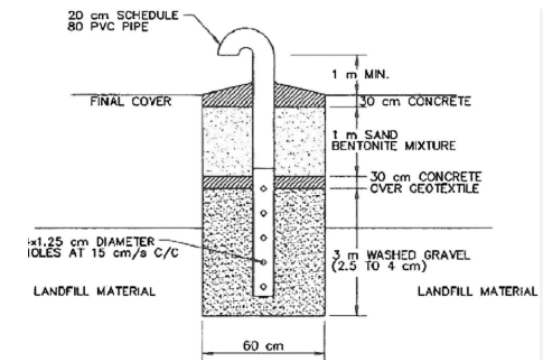
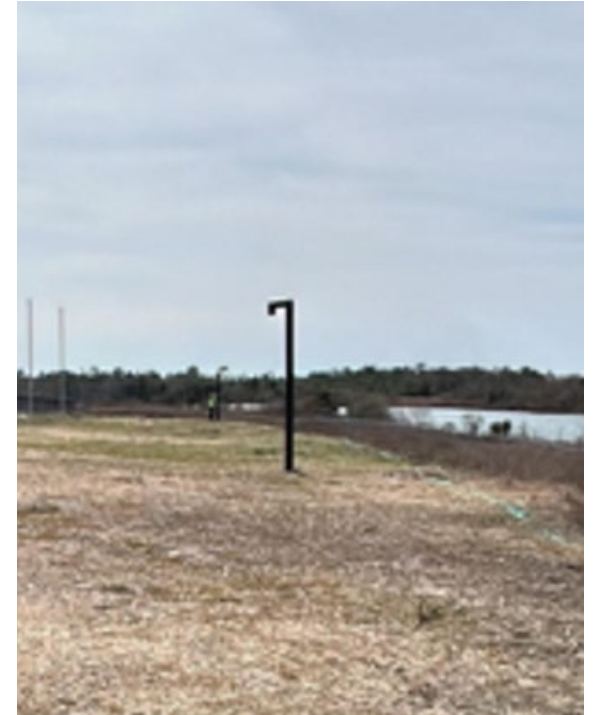
GCCS Examples



GCCS Examples



GCCS Examples



GCCS Examples

1) BLOWER, KNOCKOUT AND GAC UNITS – TYPICAL SKID CONFIGURATION



EXAMPLE OF DECORATIVE SCREENING FOR GCCS



2) TYPICAL GAS COLLECTION WELL VAULTS



3) MONITORING PROBE VAULTS / STICKUPS

4) HORIZONTAL PIPING AND VERTICAL WELLS INSTALLATION EXAMPLES

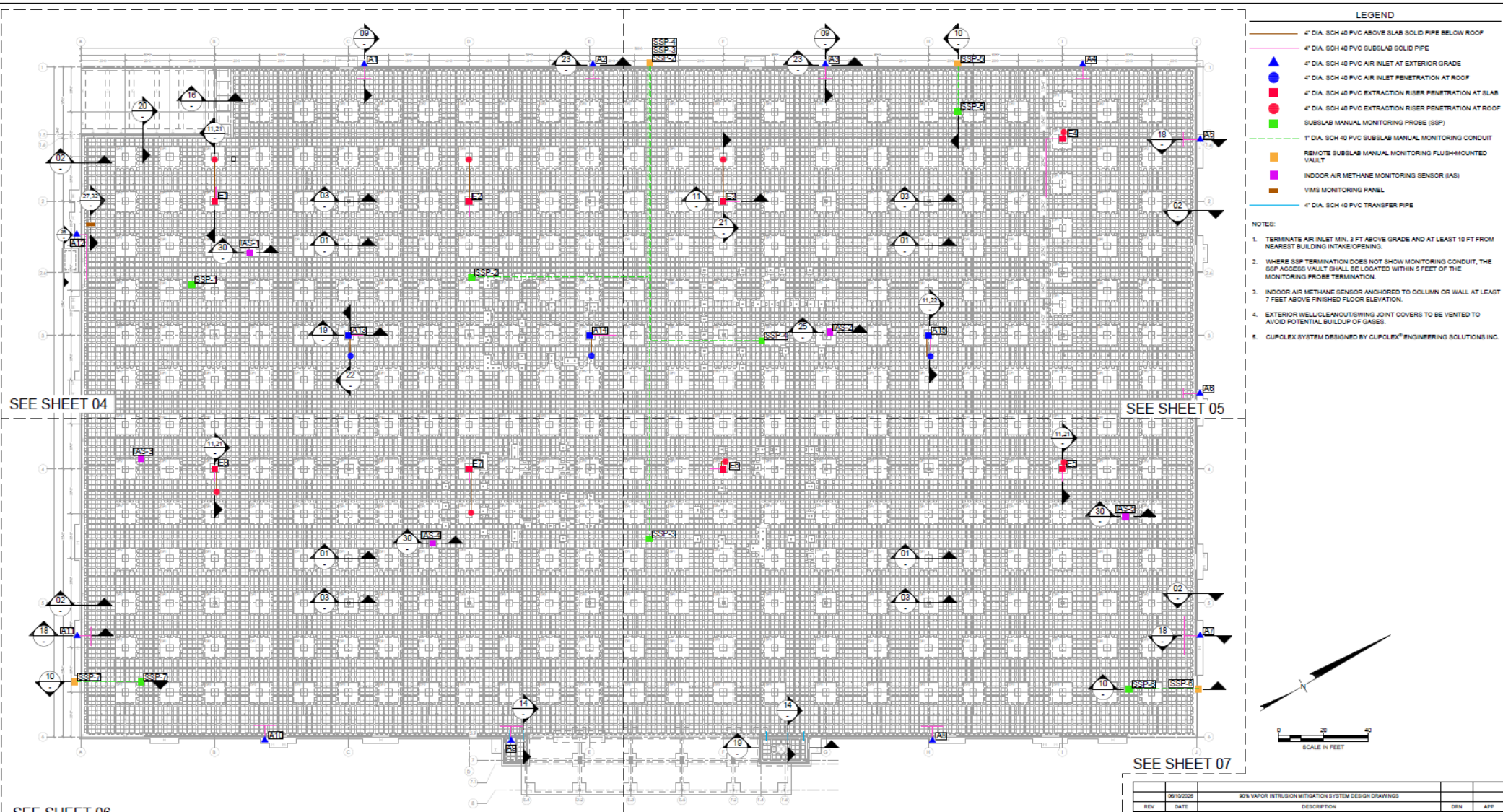


VIMS Examples

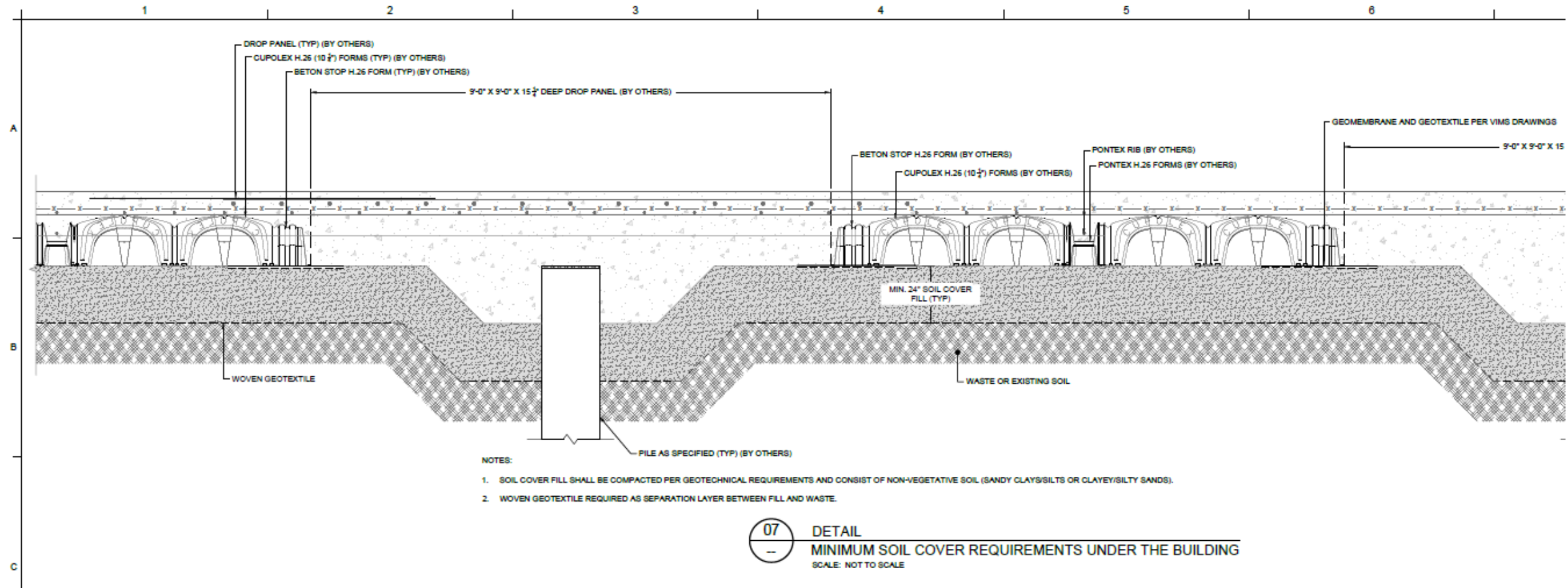
- **Purpose:** Mitigate migration of LFG into a building structure
- Balanced approach -Works in coordination with FSCS and GCCS
- Type of building foundation system
- Depressurization and LFG dilution process
 - Spray applied barrier
 - Cupolex



VIMS Examples



VIMS Examples



VIMS Examples



Landfill EMP

- **Purpose:** Prevent spread of contamination and creation of new exposure pathways during construction
- Typically a regulatory requirement
- Provides “how to” manual for the GC
 - Procedures for management of landfill waste, soil, groundwater, surface water, LFG during construction
 - Roles and responsibilities for contractor and environmental professional oversight
 - Regulatory reporting and notifications
 - Sampling requirements
 - Reuse of landfill waste within existing landfill footprint
 - Import and export of soil and landfill waste
 - Health & safety and monitoring
 - Contingency requirements



- Success: Integrated design and construction planning

- Regulator
- Legal
- Environmental
- Waste Mgmt.
- Geotechnical
- Structural
- Civil
- Mechanical, electrical and plumbing
- Owner



Definition of Environmental Consulting



QUESTIONS & DISCUSSION

Moderator: Raymond Lightfoot