Expect the Unexpected

Contamination at Public Infrastructure Projects

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Introductions

• Dan Fetter, Barr Engineering
• Jackie Dylla, Braun Intertec
• Jake Dalbec, American Engineering Testing
• Kate Kleiter, Westwood Professional Services
Stormwater Management at Brownfield Sites
• Concerns with infiltration at contaminated site
• Example stormwater project at contaminated site
• MPCA Stormwater Manual—Emerging BMPs
Infiltration—What could go wrong?

- Increase contaminant leaching from soil
- Shift groundwater plumes to new areas
- Affect neighboring properties
Increase Infiltration

- Site Boundary
- Neighboring Property
- New Stormwater Feature
- Contaminated Soil
- Stable Groundwater Plume Being Addressed by Natural Attenuation
- Groundwater Flow
- Monitoring Wells (Typ)
Groundwater Plume Affected
Impacts to Neighboring Property

- New Stormwater Feature
- Contaminated Soil
- Monitoring Wells (Typ)
- Groundwater Flow
- Groundwater Plume Affected by Increased Infiltration
- Increased Intrusion Concerns
- Basement
How to resolve?

- Don’t manage stormwater at this location
- Additional study, verify/update conceptual model
- Infiltrate below contamination
- Remove contamination
- Pond liners
Engineered Barrier Project Example

- 2016 Street Rehabilitation Project
- Replace Sanitary Sewer Lift Stations
- New Stormwater Basin
- Brownfield Site
Project Team

city of New Brighton

Kimley-Horn

BARR

American Engineering Testing, Inc.

Bolton & Menk

Minnesota Pollution Control Agency

Department of Transportation

Metropolitan Council
New Stormwater Basin and Lift Station

Co. Road E2
Site Challenges

• Former wetland, filled decades ago with debris/fill
• Petroleum release sites nearby
• Superfund site groundwater plume in neighborhood
• Shallow groundwater
1953 Aerial Photograph

- Former MacGillis & Gibbs Superfund Site (wood treating)
- Proposed Stormwater Basin Location (former wetland)
Environmental Response Actions

- Excavation of Fill/Debris
- Construction Dewatering
- Stormwater Basin Liner
Filtration Basin Liner
MPCA Stormwater Manual—New BMPs

- Best Management Practices
- Site screening suggestions
- Details for liners
- Details for setback from contamination

https://stormwater.pca.state.mn.us/index.php?title=Stormwater_infiltration_and_contaminated_soils_and_groundwater
Asbestos Debris on Roadway Projects

Jackie Dylla, CHMM
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St. Croix Crossing Bridge Project Overview

• New four lane bridge

• Realignment of Hwy 36 and Hwy 95

• Loop trail and other trail facilities

• Total project cost $625 million (approx.)
Environmental Investigation Findings:
What we expected......

Riverside Pond
Environmental Investigation Findings:
What we didn’t expect...
Riverside Pond Remediation

- Advanced contract to remediate asbestos debris and slag.
- Almost 12,000 tons (8,475 cubic feet) removed.
Environmental Investigation Findings:
What we expected....

Former Neighborhood
St. Croix Approach Construction: What we didn’t expect...
St. Croix Approach Construction:
What we didn’t expect...
St. Croix Approach Construction: What we didn’t expect...
Takeaways...

• **Plan ahead** - Due diligence can point to potential problems.

• **Be prepared** - Have contingency specifications and on-call experts in-place.
Petroleum Contamination

Management of Petroleum Contaminated Soils During the South St. Paul Forcemain Improvement Project
Project Context

- **Project Purpose:** Metropolitan Council Environmental Services (MCES) replaced 1 ½ mile of pre-existing structurally deficient pipe to improve safety and reliability of the forcemain sewer system.

- The new forcemain traversed a historic stockyards area of the city.

- The historical area consisted of meat processing facilities, livestock barns and pens, railroad yards, energy plants and storage tanks, and dump sites.

- The area is currently occupied by commercial and light industrial businesses.

- Prior to construction, Phase I/II ESA reports, MPCA VIC enrollment application, MPCA approved-RAP, and a Proposed Actions Letter were prepared.
Typical Views of the Forcemain Construction

View of forcemain installation.

Cross-sectional view of forcemain pipe and trench box.
Primary Contamination Encountered

- Polycyclic Aromatic Hydrocarbons (PAHs) contaminated soils.
- Dump debris containing asbestos containing waste materials (ACWM).
- Petroleum contaminated soils.
Primary Contamination Encountered
Petroleum Contamination Can Result from USTs

Please note the photos of the underground storage tanks (USTs) above are from different project sites.
Location of Petroleum Contamination – Next to Former Gas Station
Initial Steps after Encountering Historical Petroleum Contamination

• Notification: Notify Property Owner and Report contamination to MN Duty Officer with permission from Property Owner.
  – Duty Officer report is required if it’s a new condition/contaminant.
  – UST/Petroleum must be reported within 24 hours or reimbursement percentage may be lowered.
  – Buried historical contamination is usually not an emergency but needs to be contained and/or managed.
Initial Steps after Encountering Historical Petroleum Contamination

• Characterization
  – HAZWOPER trained staff
  – Odors and staining
  – Organic vapor screening
  – Laboratory sampling
  – Photos

• After excavation
  – Stockpile, contain/cover, and secure if necessary
Field Tools for Characterizing Organic Vapors

Photoionization Detector (PID)  Soil sample screening bag
Primary Safety Hazards

• Protect human health by mitigating inhalation, ingestion, and dermal hazards to site users and workers.

• Protect the environment by mitigating hazards associated with stormwater runoff, groundwater contamination, and flora/fauna.

• Emergency response situations?
  – Free product/liquid
  – IDLH (explosive, toxic, biohazard, etc.)
Containing or Covering Soil Stockpiles

Example of a contained soil stockpile in area surrounded by jersey barriers.

Example of a covered soil stockpile from a different site.
Compare Contamination Chemistry to Regulatory Standards

• Regulatory standards and criteria for soil, groundwater and vapors may apply and they may come from the MPCA or possibly OSHA.

• If seeking formal assurances, work with MPCA staff and your environmental consultant.
  – Petroleum Remediation Program
  – Petroleum Brownfields Program
  – Petroleum Public Works Program
    • Costs may be eligible for Petrofund reimbursement but the project must meet the definition of a “Public Works Project” and have a “Project Sponsor”

• Follow guidance and prepare documentation report
How Petroleum Contaminated Soils Were Managed During Forcemain Construction

• Excavation activities occurred in the petroleum “hot spot” over the course of two weeks.

• Strong odors were observed and high organic vapor air monitoring results up to 540 ppm were measured via PID leading to a work stoppage so the contractor could more fully address site safety.

• The excavation and sewer installation activities were appropriately staged and a 10-mil reinforced polyethylene vapor barrier was installed in the base of the trench.

• Trench dams were placed at the margins of the hot spot to further help limit migration of organic vapors.
Trench Lining

10-mil reinforced polyethylene vapor barrier installation in trench.
Use of continuous venting via industrial blower fans was conducted and air-purifying respirators were used by workers who installed the vapor barrier.
Dewatering, filtration, and follow-up sampling were required.
Project Outcomes

• MCES received a **No Further Action** letter for the project.
  
  – Backfilled soils were less than Residential Soil Reference Values (SRVs) for PAHs and less than Soil Leaching Values (SLVs) for volatile organic compounds (VOCs) per testing.
  
  – Although approximately 90,600 tons of PAHs/ACM/petroleum contaminated soils were excavated and disposed at a Subtitle D landfill for the entire project, a much larger amount of soil was **reused** after staging and testing.
  
  – The project team and stakeholders worked within the regulatory framework to comply accordingly and receive MPCA formal assurances.
Useful Tools

By Kate Kleiter, PG

Westwood PS and The Javelin Group
Phase I Environmental Site Assessment

- Government records search (MPCA and MDA What’s in My Neighborhood)
- Historic air photos, Sanborn fire insurance maps
- Site walkover
- Interviews
- Other historic sources

**Recognized Environmental Conditions (RECs)** - The presence OR likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property.
Phase I Environmental Site Assessment

Examples of Recognized Environmental Conditions
Assess the RECs or potential environmental contaminated areas with:

• Drilling rig investigations
• Push probes, sub-slab soil vapor probes
• Test pits, trenching
• Geophysical explorations
• Collecting soil, groundwater and soil vapors for laboratory analysis
Examples of Phase II ESA Sampling Tools
Phase II ESA - Geophysical Tools

Electromagnetic
COST $$$$$$$$$$$$$$$$$$$$$$$ GRANTS

- Phase I ESAs – $2,500 to $25,000
- Phase II ESAs - $8,000 to $200,000
- RESPONSE ACTION PLANS/CLEAN UPs - $10,000 to millions

ASSESSMENT and CLEAN UP GRANTS

- MN Dept. of Commerce Petrofund – petroleum USTs, ASTs
- MPCA Dry Cleaner Fund – dry cleaner site
- Ag Chemical Response and Reimbursement Account (ACRRA) – MN Dept. of Ag., pesticides and fertilizers
- MN DEED – Contamination Cleanup and Investigation Grants
- Metropolitan Council – TOD grants, TBRA grants
- County – Hennepin/Ramsey County
- EPA Brownfields
Voluntary Regulatory Agency Programs

- MPCA Brownfields Voluntary Investigation Cleanup Program
  - Liability Letters
- MPCA Petroleum Brownfields Program
  - Closure Letters
- MDA Agricultural Voluntary Investigation & Cleanup Program
  - Liability Letters
MPCA BMP defines Unregulated Fill, a term meaning the soil if good for off-site use in Minnesota.

Becoming a widely followed MPCA BMP for soil import/export at public projects, brownfield sites, sediment dredging projects.

Typically requires some analytical testing and soil screening by an environmental professional.

Details available on MPCA’s website.
Takeaways

• Know how to recognize historical land uses of concern
• Include environmental actions in design/bidding to minimize construction change orders
• Closely coordinate environmental topics with design of geotechnical, stormwater, and grading
• Questions?