

Soil Reuse Study – An Overview

May 15, 2014

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MinnesotaBrownfields



Soil Reuse Context

- **Brownfields as construction sites**
- **Greenfield vs. Brownfield sites – fate of excess soils**
- **Hauling and landfill disposal as a legitimate and significant cleanup cost component**
- **Eligible cost under Brownfield cleanup grant programs**

Why This Study? – Potential Benefits of Soil Reuse

- **Significant cost savings – individual site cleanups**
- **More efficient use of public brownfield grant funds, private capital**
- **Conservation of landfill space**
- **Reduction of carbon footprint for cleanups – reduced hauling distances**
- **BUT – no documentation of the magnitude of potential benefits**

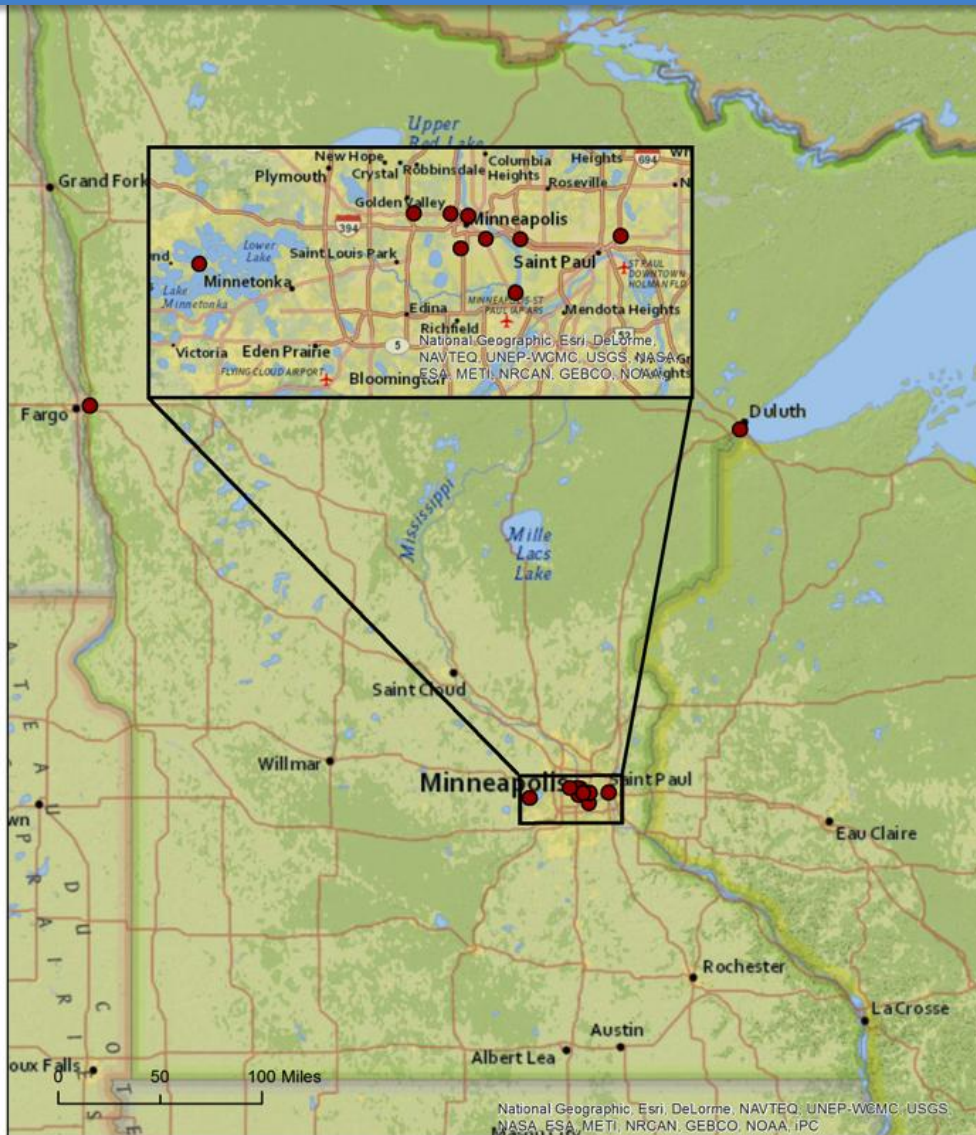
Study Overview - Three Components

- **Case Study Sites:**
 - **Cost Analysis – Potential Savings**
 - **Environmental Impact Analysis**
- **Policy and Legal Analysis**
 - **Barriers to soil reuse**

Soil Reuse Timeline

- **Hennepin County: Needs Assessment and U.S. EPA Memorandum of Agreement**
 - Funding for Soil Reuse Study – 2005 Closeout of RLF
- **2007 MN BF Forum - identifies soil reuse as a significant barrier to brownfield redevelopment**
- **2008 MN BF Forum: “National Models and the Minnesota Experience”**
- **2009-2012: MPCA develops off-site fill reuse guidance:**
 - **Best Management Practices for the Off-Site Reuse of Unregulated Fill**
 - **Off-Site Use of Regulated Fill Policy; Regulated Fill Application**
 - **MN BF Survey on Regulated Fill Policy**

Case Study Sites – Eleven Total



- 0.7 - 46 acres
- Cleanup 2007-2013
- Total soil volume managed = 5,800 – 410,533 cy
- All featured some landfill disposal
- 8 - on-site re-use
- 4 – off-site re-use

Site Data Collected

- **Soil volumes by soil category and management strategy**
 - **On-site reuse, off-site reuse, landfill disposal**
- **Cost to haul and dispose or haul and place**
- **Distance to reuse on-site, cost to place and compact**
- **Distance to landfills and reuse locations**
- **Truck capacity, gas usage (MPG)**
- **Grant funds awarded: total, soil-disposal**

Soil Categories

- **A – “Unregulated Fill” – MPCA Definition**
- **B – “Debris-Containing Fill”**
- **C – “Regulated Fill – Current Policy”**
- **D – “Regulated Fill – Revised”**
- **E – “Contaminated Fill – Landfill Disposal”**

Case Study Sites – Soil Management Practices and Soil Categories

Site Name	Year Completed (Soil Cleanup / Redevelopment)	Size (Acres)	Total Volume of Soil Involved – All Categories (C.Y.)	Soil Management Practices Used		
				On-Site Reuse or Management (Soil Categories)	Off-Site Reuse (Soil Categories)	Landfill (Soil Categories)
222 Hennepin	2012/2013	2.5	33,055			B, C
Beacon Bluff	2010/Ongoing	46	410,533	A, C		D, E
Clyde Ironworks	2007/Ongoing	10.0	16,590	C, D	A	C, D, E
Gateway Gardens	2010/2010	1.3	5,800	A	A	C, D, E
HCMC Clinic	2010/2011	3.1	26,300	A		A, C, E
Heritage Park	2011/2012	2.3	12,785	A		A, B, C, E
Minnesota Veterans' Home	2010/2010	5.2	35,406	A, C	A	B, C
Pelham	2011/2013	6.0	37,400			A, B, D E
Seward Commons	2012/2013	0.7	15,800	A		A, C, D
Sunrise Assisted Living	2005/2005	2.9	14,000	A		A, D, E
The Mist	2006/2006	4.0	62,748		A	C, D, E

Off-Site Reuse – Cost Analysis

Findings

- **Four of eleven sites – unregulated fill**
- **Cost savings ranged from \$49,736 - \$1,066,540**
- **Cost savings represented 42% - 99% relative to landfilling alternative**
- **Cost savings at both large and small scale sites**
- **Cost savings increases with soil volume, distance “savings”**

On-Site Reuse – Cost Analysis

Findings

- **Eight of eleven sites**
- **Cost savings ranged from \$21,293 to \$6,249,674**
- **Cost savings represented 78% - 92% relative to landfilling alternative**
- **Opportunity for cost savings great, but limited by time, space constraints**

Grant Funding – Cost Analysis

Findings

- 9 sites received cleanup grant funds
- Total grant funds awarded: \$5,326,281
- Overall, 52% of grant funds were used for landfill disposal
- Individual sites - from \$206,429 to \$2,176,077 was used for landfill disposal (42% to 100% of the grant award)
- Opportunity for savings

Environmental Impact Analysis

- Compared estimated CO₂ production between soil management strategies
- CO₂ production was estimated using hauling distance, fuel usage (mpg), number of trips, and CO₂ production rate based on truck type.
- Off-site reuse - “CO₂ Savings” depends upon volume and reduction of hauling distance - landfill vs. reuse location
- Off-site reuse - absolute savings: 5,600 kg – 217,500 kg CO₂ per site
- This represented a 21%-88% savings compared to CO₂ production for the landfill disposal alternative

From Case Studies – Limiting Factors for Reuse:

- **Identifying reuse location in time frame for source site redevelopment**
- **Lack of space to stage, segregate, screen and store soil for reuse**
- **Debris in otherwise re-useable unregulated or regulated fill**
- **Geotechnical quality of unregulated and regulated fill**

From Case Studies: Factors Favoring Soil Reuse

- **Opportunity for significant cost savings (large volumes, long hauling distance)**
- **Motivated development team**
- **Problem solving relationship between regulatory staff and consultant leads to individual site solutions**

Legal and Policy Analysis

- Reviewed policy, statute and rules that affect soil reuse in MN
- Pathway for soil reuse and barriers along the pathway
- Current MPCA guidance provides an initial foundation for an effective regulatory framework
- The study team concluded that adjustments are needed to current policy to encourage reuse in-lieu of landfilling

Liability Exposure

- **CERCLA/MERLA**
- **RCRA/MPCA Solid and Hazardous Waste Statutory Authority (Minn. Stat. Chap. 116)**
- **Petroleum (Minn. Stat. Chap. 115C; Minn. Stat. Chap. 115E; and as a pollutant or contaminant under Minn. Stat. § 115B.17)**
- **Solid Waste Rules (Debris in Soil)**

Non-Petroleum Liability Assurances

- **MPCA offers No Action Determinations for importing and exporting sites, although none have been issued to date.**
- **MPCA has determined that it does not have the statutory authority to issue No Association Determinations for soil reuse.**
- **Recommendation: The MPCA should expand liability protection options to include a No Association Determination for the acts of exporting, importing and placing fill consistent with the receiving site's Response Action Plan – this will likely require a statutory amendment.**

Petroleum Site Closure and Assurances

- **Current MPCA petroleum assurances do not apply to soil reuse.**
- **General liability letters address petroleum originating from a tank release and only speak to the site where the tank release occurred.**
- **Recommendation: the MPCA should offer a General Liability Letter that is specific to the reuse of petroleum-contaminated soil in a manner consistent with MPCA guidance and an approved Response Action Plan or Soil Reuse Plan for the receiving site.**
- **Would likely require amendment to Minn. Stat. §115C.**

Debris Containing Fill – A Solid Waste Issue

- **Most or all unregulated debris containing fill is disposed of in landfills, even though this provides no reduction of environmental risk.**
- **MPCA guidance for unregulated fill allows a “de minimis” amount of waste, but this amount is not defined; regulated fill can’t contain any amount of waste.**
- **Current interpretation of Solid Waste Rules disallow reusing fill with debris and are silent on screening and sorting to remove debris.**
- **Standing Beneficial Use Rule**

Debris Containing Fill – Recommendations

- A clear definition of the allowable “de minimis” amount of debris should be defined for unregulated fill and for regulated fill
- Relief or exemption from the Solid Waste Rules should be provided in order to allow the reuse of fill containing debris if screening and/or sorting are feasible.

Intermediate Staging of Regulated Fill

- **Current MPCA Regulated Fill Use guidance does not allow for intermediate staging of soils or staging at the receiving site.**
- **In addition to geotechnical concerns, space and time constraints are often barriers to off-site reuse.**
- **Matching a brownfield redevelopment site “long on soils” up with a site “short on soils” is very difficult under the current constraints of soil reuse.**
- **Disparity between larger sites and smaller sites.**

Intermediate Staging - Recommendations

- **Adjust policy to allow for intermediate staging of unregulated and regulated fill at an off-site location and/or at the receiving site.**
- **Would require appropriate soil management and documentation.**
- **Manager by private – or public – entities.**
- **A pilot project would be a good first step.**

Regulated Fill Use Guidance – Driven by Regulated Fill Definition

- By definition “regulated fill” cannot contain contaminants at concentrations exceeding Industrial Soil Reference Values for SVOCs and metals, Tier 2 Soil leaching Values for VOCs. This limits reuse possibilities.
- Recommendation: Decisions about fill placement should be based on the receiving site Response Action Plan – this would be consistent with the MPCA’s risk based approach to site evaluation and cleanup. Note: this would result in a broadened definition of “regulated fill.”

MPCA Regulated Fill Application – Requires Signature from LUG

- **Current guidance requires that local units of government be notified of regulated fill application – and notification requires signature from Local Unit of Government (LUG).**
- **Recommendation: Signature requirement should be dropped; notification is reasonable but requiring a signature could be interpreted as an approval process, which may unnecessarily and unintentionally create a barrier to soil reuse**

Further Data Needed to Understand Soil Reuse Benefits

- While it is generally understood that grant dollars are used to landfill soils that could otherwise be reused off-site, we don't have sufficient supporting data.
- Recommendation: require that more detailed, unit-cost data be collected and submitted for grant-funded cleanups (DEED, Metropolitan Council, Hennepin and Ramsey County).

Next Steps:

- Request State and local grant programs to collect soil reuse data for grant sites
- Work with MPCA to pursue improved liability options
- Work with MPCA to pursue improvements to Off-Site Use Guidance for Regulated Fill
- Intermediate soil staging facility pilot?

Thank You to Consultants and Property Owners:

- American Engineering Testing, Inc.
- Barr Engineering
- Braun Intertec Corporation
- Landmark Environmental
- Liesch, a Terracon Company
- Loucks Associates
- Peer Engineering
- St. Paul Port Authority

Project Team

- Martha Faust
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THANK YOU

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