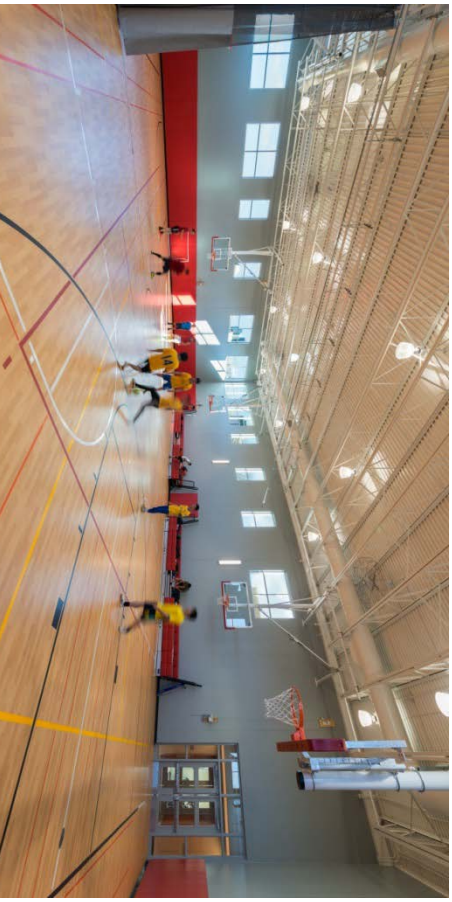

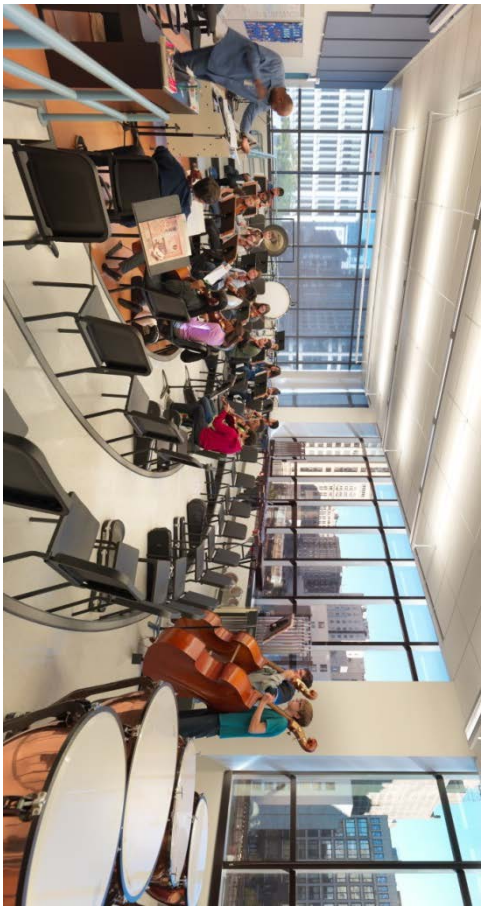

Public Building Commission of Chicago

BUILDINGChicago / Greening the Heartland 2014

Grave to Cradle: Where Remediation Meets Sustainable Design

Grave to Cradle: Where Remediation Meets Sustainable Design

Presenters

- Deeta Bernstein
  - Sustainability Manager; Public Building Commission of Chicago
- LeeAnn Tomas-Foster
  - Deputy Director, Environmental; Public Building Commission of Chicago
- Stephen Colantino
  - Manager, Office of Brownfields Assistance, Bureau of Land; Illinois Environmental Protection Agency

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Learning Objectives

1. Learn how to structure an integrated development program that simultaneously prioritizes economic and environmental sustainability and routinely reclaims environmentally challenged urban sites for greener new facilities.
2. Gain perspective on what it means to a community to have blighted sites repurposed into civic centers and community anchors.
3. Hear an approach to leveraging remediation best practices and available State and Federal funding to ensure maximum funds are available for development. This approach can be used at a program / business process level or an individual project level; including new and existing green remediation strategies and available funding streams such as state and federal grants and loans (including IEPA revolving loan funds), in a way that reduces carbon footprint, meets remediation objectives, and preserves the project development budget.
4. Explore how to establish an integrated environmental services program using three core pillars planning integration; environmental design, management and stewardship; and environmental remediation technology best practices.

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Agenda

1. Introductions
2. PBC Program
    1. About the PBC
    2. The Program - Program and Context
    3. Integrated Program Approach
3. The IEPA Program
    1. About IEPA
    2. Greener Cleanup Principles and Guidelines
4. Case Studies

    Working Together to Get Beyond “Dig and Haul”
    1. Back of the Yards College Preparatory High School
    2. Whitney Young Library
5. Applying Greener Cleanup to Your Projects
6. Q&A

The Program

The Public Building Commission of Chicago

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Mission

The Public Building Commission of Chicago (PBC) is committed to client service and strong stewardship of public resources. The PBC plans, designs and builds facilities that reflect the highest standards of environmental and economic sustainability.

Vision

A built environment in which function, beauty and sustainability are inherent to every community; where physical surroundings inspire and support achievement of the individual goals of those who live, work and visit Chicago and Cook County; and, where people gather to share the common values that truly build our communities.

Daley Center, PBC Offices

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The PBC Program

PBC manages a multi-year capital program - Over $2.6B in development authority

> 4 Million SF of development

Well over 100 total projects

84 LEED-eligible:

- Public Schools
- Municipal: Firehouses / Police Stations / Libraries
- Parks / Field Houses / Harbors
- Other Projects

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The Program - Economic Sustainability

For projects completed in 2013, currently trending $32.9M, 6.02% under original budget.

Construction projects completed in 2013 created 1,744 full-time equivalent (FTE) jobs

Inclusion:

- MBE participation, work awarded in 2013: 32.21% or $116.7M
- WBE participation, work awarded in 2013: 7.73% or $28M
- Combined total: 39.93% M/WBE
- Professional consulting services, 2013, Combined M/WBE participation 70.25% or $11.34 M

The Program – Environmental Sustainability

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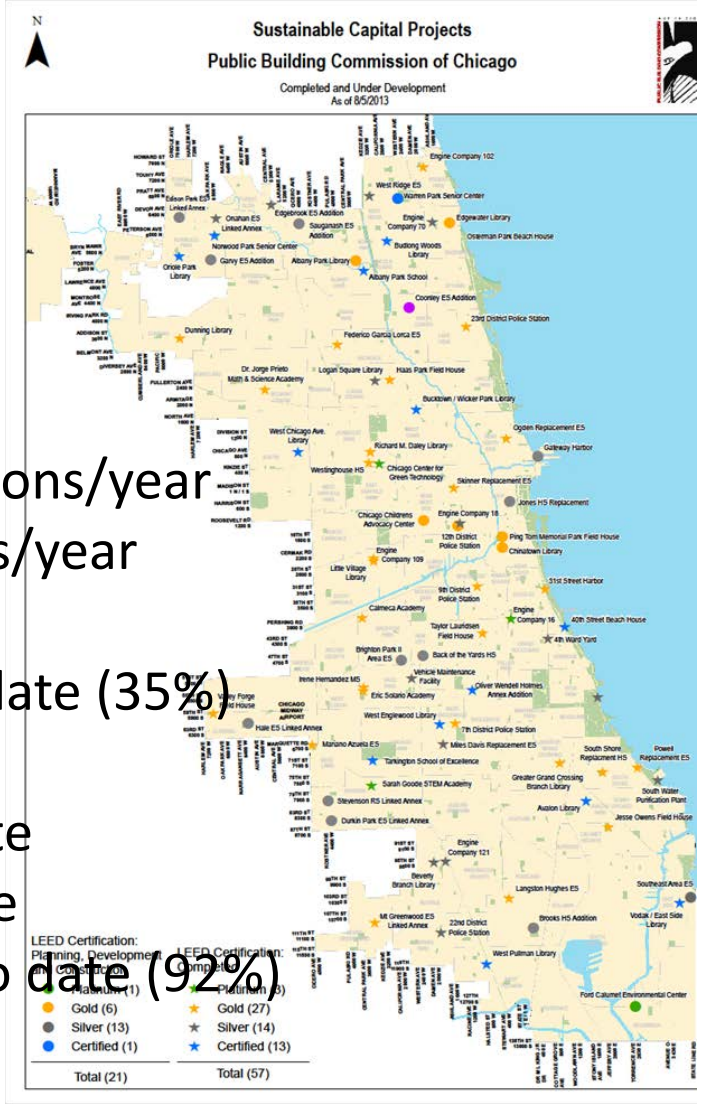
LEED

84 targeting / 66 certified

- Potable water savings: 22,290,577 gallons/year
- Diverted from sewers: 658,491 gallons/year
- Energy savings: $1.46 M / year
- Green roof: 638,892 SF to date (35%)
- Shade Trees: 2,512 to date
- Regional Materials: $101 M+ to date
- Recycled Materials: $66.6 M to date
- Diverted from Landfill: 189,771 tons to date (92%)



Sustainable Projects – Context

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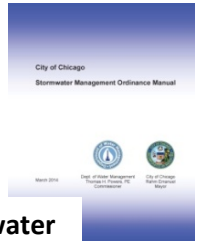
From Green Medians to Sustainable Chicago 2015

Green Alley Program



Stormwater Ordinance

2000 -- 2002 -- 2004 -- 2006 -- 2008 -- 2010 -- 2012 -- 2014

Chicago Standard

Green Urban Design (2008)

Retrofit Chicago

2013

PBC Environmental Sustainability – Program Approach

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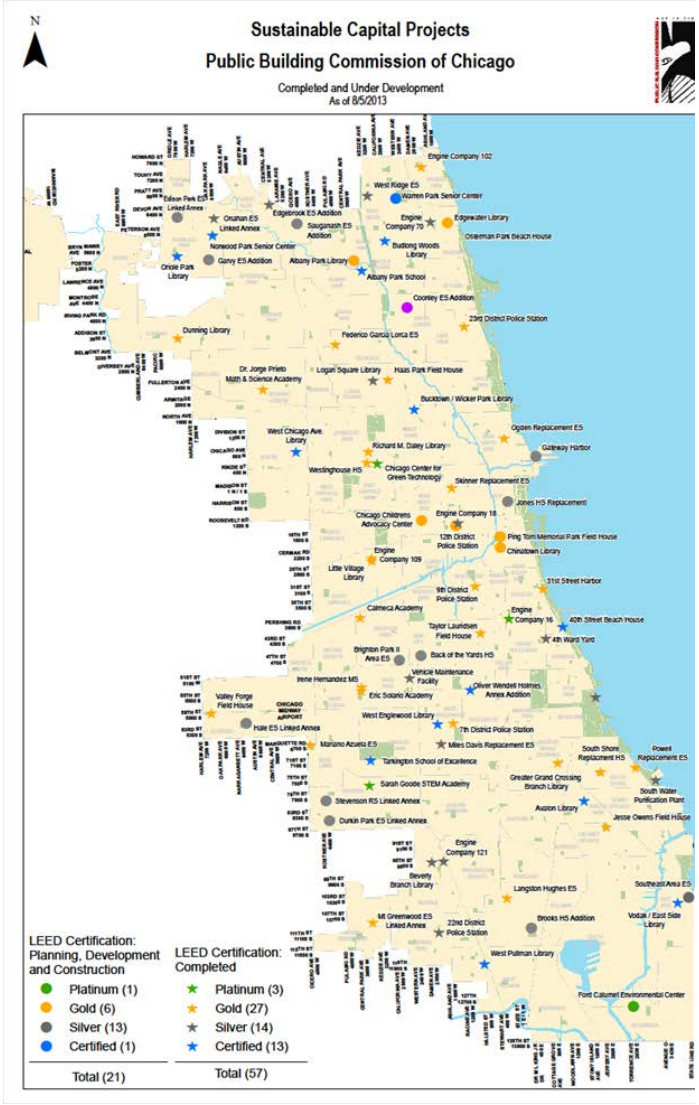
Program-Level Standards

- Processes, Procedures, Design Guidelines
- Reporting Tools
- Contracts and Contract Documents
- Feedback / Lessons Learned

Goals

- Resource Savings
- Health and Quality of Life
- LEED or Sustainable
- Aligned Goals
- Track Metrics



PBC Environmental Remediation – Program Approach

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Program-Level Standards

- Processes & Standards
  - Required Site Evaluations
  - Environmental Design Guidelines & Specifications
  - Environmental Design Integration
  - Construction Requirements & Reporting Tools
  - Feedback/Lessons Learned

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PBC Environmental Remediation – Project Approach

Goals

- Regulatory Compliance: Health and Safety
- Align Project Goals with Client Agency
- Stay on Budget
- Reduce Schedule Impact
- Reduce Neighborhood Impact
- Reduce Environmental Impact
- Generate Positive Messaging

Grave to Cradle – Integrated Program Approach

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Program Goal:

Repurpose impacted sites to Sustainably designed new civic anchors. Save resources in the process.

1. Planning Integration
   - Integrated thinking starts in Planning
   - Synergies of site use, work effort
     Ie: Stormwater management
   - Siting
   - Soil management
2. Environmental design, management and stewardship
3. Environmental Remediation Best Practices
   - Remediation Best Practices aligns with / helps us meet our “green” agenda.

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The IEPA

Mission

The Mission of the Illinois EPA is to protect, restore and enhance the quality of air, land and water resources to benefit current and future generations.

What are Greener Cleanups?

The incorporation of practices, processes, and technologies into cleanup activities with the goal of reducing impacts to the environment through reduced demands on natural resources and decreased emissions to the environment.

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The ASTM Standard will simplify and accelerate greener cleanups

- Uniform process that works across programs
- Carefully vetted BMPs
- Robust reporting and transparency requirements
- Doesn't need state regulator review
- ASTM name provides branding

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The IEPA

Goal:

Greener Cleanup drive market and industry transformation (the LEED of Environmental Remediation)

Greener Cleanups

What are they, and how did we get here?

Cleanups are good for people and the environment. Greener cleanups are better.

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USEPA's Greener Cleanup Principles

"Minimize, Reuse, and Recycle…"

"Reduction, Efficiency, and Renewables…"

"Conserve, Protect, and Restore…"

"Protect Air Quality, Reduce Greenhouse Gases…"

"Improve Quality, Decrease Quantity of Use…"

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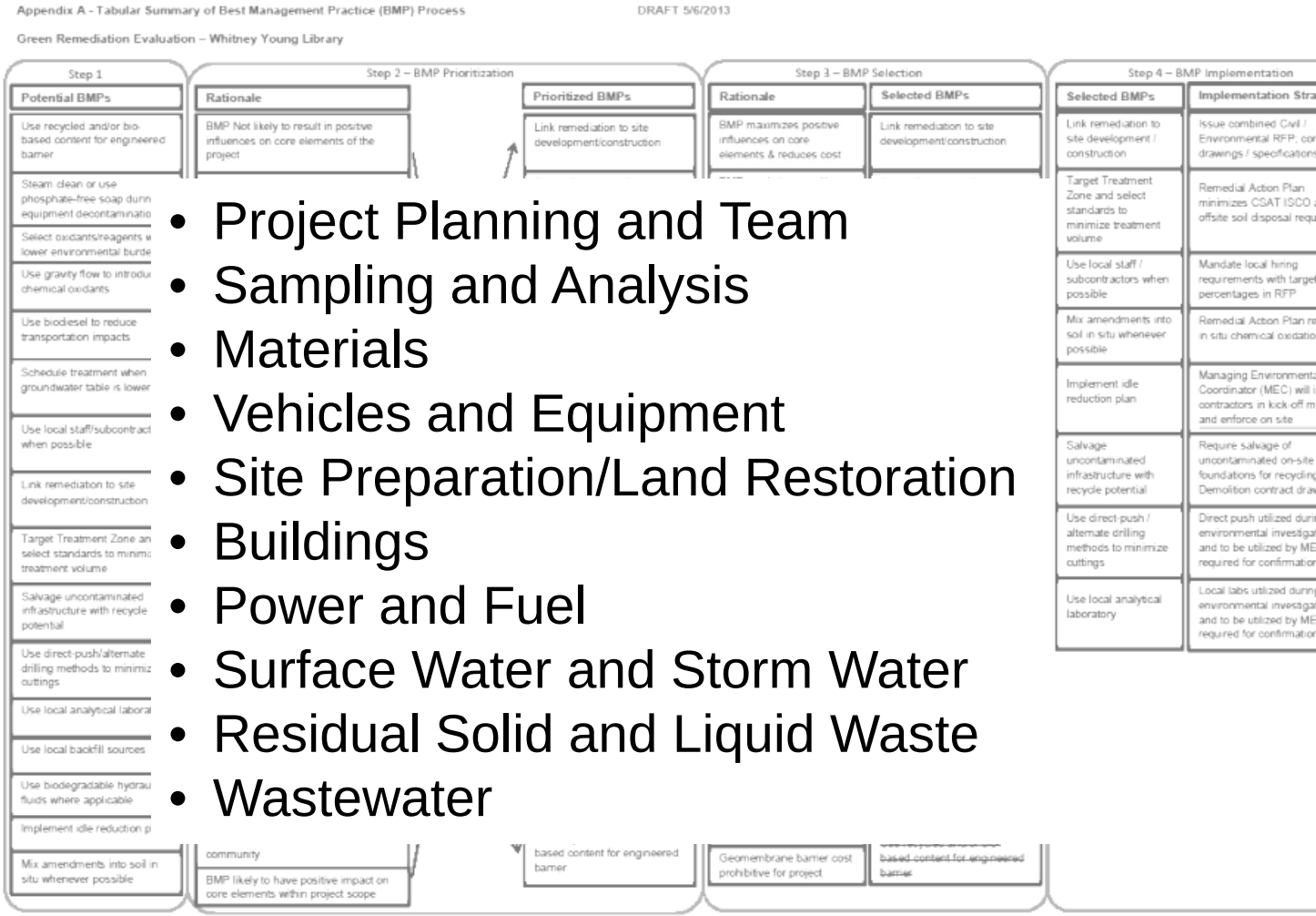
BMP Categories – Greener Cleanup Standards


Appendix A - Tabular Summary of Best Management Practice (BMP) Process

DRAFT 5/6/2013

Green Remediation Evaluation – Whitney Young Library

Step 1

Potential BMPs

Use recycled and/or bio-based content for engineered barrier

Steam clean or use phosphate-free soap durin equipment decontaminatio

Select oxidants/reagents w lower environmental burde

Use gravity flow to introdu chemical oxidants

Use biodiesel to reduce transportation impacts

Schedule treatment when groundwater table is lower

Use local staff/subcontract when possible

Link remediation to site development/construction

Target Treatment Zone an select standards to minimi treatment volume

Salvage uncontaminated infrastructure with recycle potential

Use direct-push/alternate drilling methods to minimiz cuttings

Use local analytical labora

Use local backfill sources

Use biodegradable hydrau fluids where applicable

Implement idle reduction p

Mix amendments into soil in situ whenever possible

Step 2 – BMP Prioritization

Rationale

BMP Not likely to result in positive influences on core elements of the project

community

BMP likely to have positive impact on core elements within project scope

Prioritized BMPs

Link remediation to site development/construction

based content for engineered barrier

Step 3 – BMP Selection

Rationale

BMP maximizes positive influences on core elements & reduces cost

Geomembrane barrier cost prohibitive for project

Selected BMPs

Link remediation to site development/construction

based content for engineered barrier

Step 4 – BMP Implementation

Selected BMPs

Implementation Stra

Link remediation to site development / construction

Issue combined Civil / Environmental RFP; cor drawings / specifications

Target Treatment Zone and select standards to minimize treatment volume

Remedial Action Plan minimizes CSAT ISCO offsite soil disposal requ

Use local staff / subcontractors when possible

Mandate local hiring requirements with target percentages in RFP

Mix amendments into soil in situ whenever possible

Remedial Action Plan re in situ chemical oxidatio

Implement idle reduction plan

Managing Environmenta Coordinator (MEC) will i contractors in kick-off m and enforce on site

Salvage uncontaminated infrastructure with recycle potential

Require salvage of uncontaminated on-site foundations for recycling Demolition contract dra

Use direct-push / alternate drilling methods to minimize cuttings

Direct push utilized durin environmental investiga and to be utilized by ME required for confirmation

Use local analytical laboratory

Local labs utilized during environmental investiga and to be utilized by ME required for confirmation

- Project Planning and Team
- Sampling and Analysis
- Materials
- Vehicles and Equipment
- Site Preparation/Land Restoration
- Buildings
- Power and Fuel
- Surface Water and Storm Water
- Residual Solid and Liquid Waste
- Wastewater

Choose BMPs Based on Expected Footprint Reduction Relative to Other Pertinent Factors

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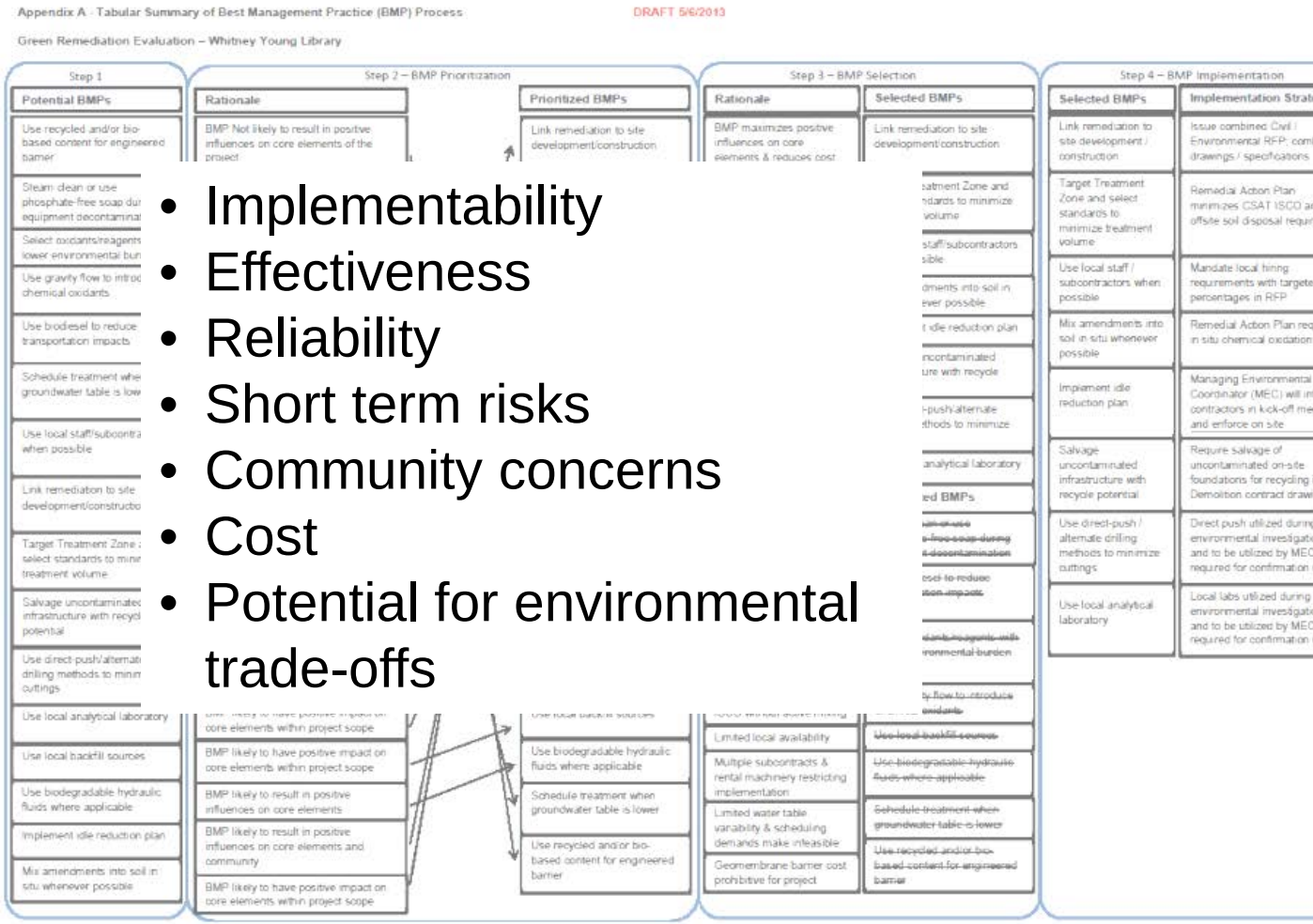

- Implementability
- Effectiveness
- Reliability
- Short term risks
- Community concerns
- Cost
- Potential for environmental trade-offs

Key Attributes of the Standard Guide

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- ✓ Voluntary - Not mandating new cleanup evaluation
- ✓ Transparent - Consensus based development, public reporting
- ✓ Universal - Easier for stakeholders to implement
- ✓ Flexible - Program or State-specific recognition options
- ✓ Minimal Resources - Self-certification
- ✓ Market Driven - Promote technology innovation
- ✓ Verifiable - Documentation to support decisions
- ✓ Economic – Does not necessarily require extra expense

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The ASTM Standard will simplify and accelerate greener cleanups

- Uniform process that works across programs
- Carefully vetted BMPs
- Robust reporting and transparency requirements
- Doesn't need state regulator review
- ASTM name provides branding

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Greener Cleanup Recap

A Simple and Sensible Concept,

Cleanups are good for people and the environment. Greener cleanups are better.

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Greener Cleanup Recap:

- Great “green” tools out there waiting to be used; BMPs already established:

  ASTM Standard Guide for Greener Cleanups

  - Well vetted and finalized
  - Process is transparent and defensible
  - Not green-washing

- Greener cleanup does NOT mean less protective cleanup – Can’t use greener cleanup to justify a lesser remedy

- Small changes to thought process can have effective Green results, and can save money.

Case Studies:

Working Together to Get Beyond "Dig and Haul"

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1. Back of the Yards College Preparatory High School
2. Whitney Young Branch Library

Green Remediation Evaluation

PROPOSED WHITNEY YOUNG LIBRARY EXPANSION
LPC NO.: 0316455026

USEPA BROWNFIELDS HAZARDOUS SUBSTANCES AND PETROLEUM ASSESSMENTS GRANT

USEPA COOPERATIVE AGREEMENT NO. BF-00E00880-0

May 6, 2013

Terracon Project No. A2117021

DRAFT

Prepared for:
Public Building Commission of Chicago
Chicago, Illinois

Prepared by:
Terracon Consultants, Inc.
Chicago, Illinois

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Case Study: Back of the Yards College Preparatory High School

Located: 2111 West 47th Street, Chicago

Completed: Summer 2013

Description: CPS Urban Model High School (UMHS) to serve 1200 students. 212,285-square-foot, three-floor plus lower level, steel frame and masonry construction building

Property Size: 374,572 s.f. (8.82 acres)

Sustainability: Target LEED for Schools minimum "Silver" level certification.

Awards:

- 2014 Good Neighbor Award - Commercial New Construction, Chicago Association of Realtors
- 2014 Chicago Building Congress Merit Award Winner New Construction Chicago Over $55 Million
- 2014 NAEP Environmental Excellence Award-Environmental Stewardship

Case Study:
Back of the Yards College Preparatory High School

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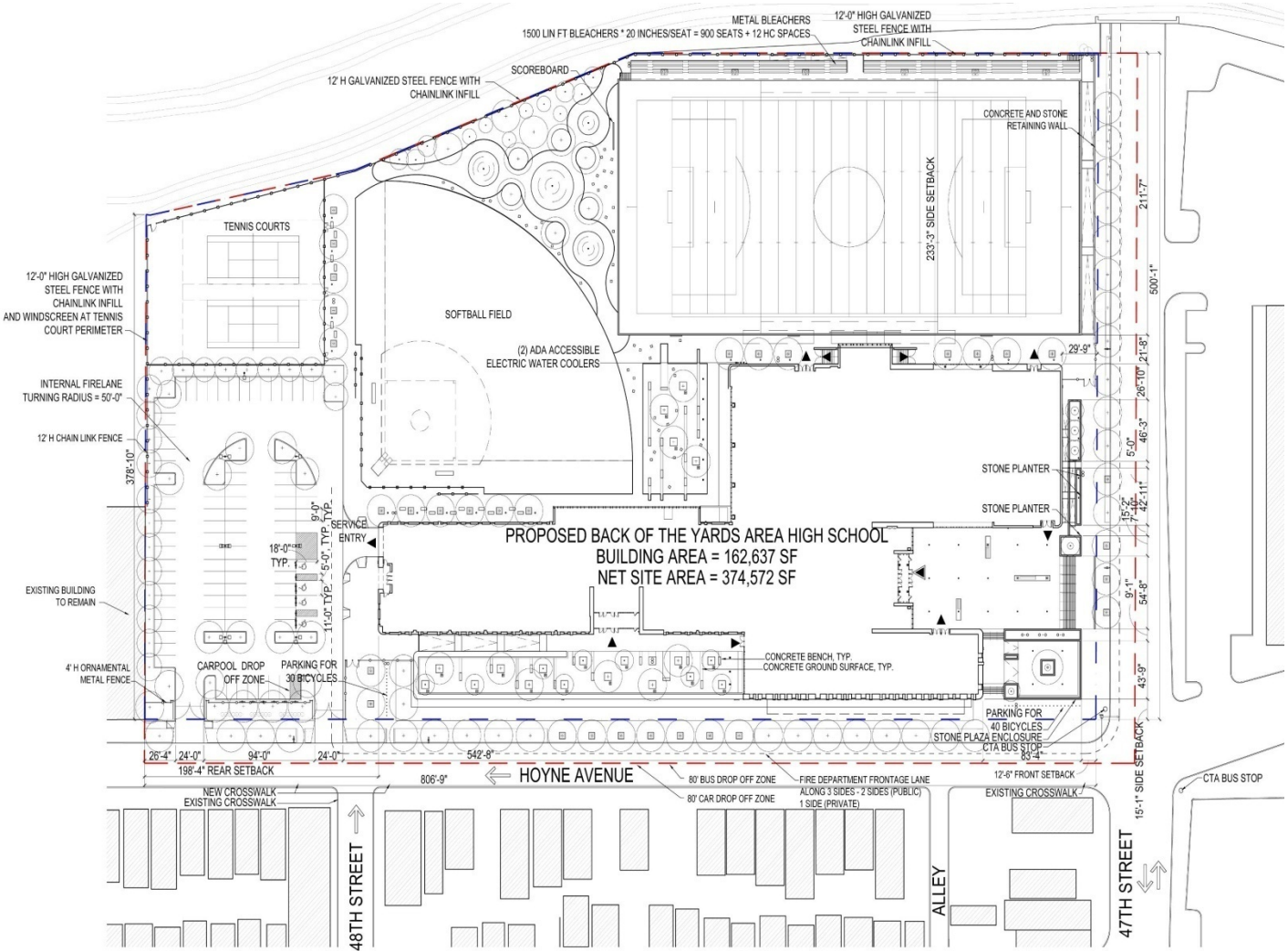

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Case Study: Back of the Yards College Preparatory High School

History

Green Remediation Strategies

- In-Situ Treatment of Hazardous Waste Lead
- Reuse of Pool Clay Spoils to Cap entire site

Funding

- No IEPA or US EPA $
- Green Remediation as cost saving strategy.

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Case Study: Back of the Yards College Preparatory High School

In-Situ Treatment of Hazardous Waste

- **Cost Savings:** $ 33K
- **Volume of Material Diverted from Hazardous Waste Landfill:** ~355 cubic yards
- **Benefits:**
  - Eliminating moving hazardous material from one place to another
  - Treatment rendered the material inert which has a lower environmental burden
  - Used local landfill (Subtitle D vs Subtitle C) which reduced transportation to the landfill
  - Used local laboratory to minimize impacts from transportation

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Case Study: Back of the Yards College Preparatory High School

Reuse of Clay Spoils:

- **Cost Savings:** $ 1.1 M
- **Volume of Material Diverted from Landfill:** ~20,000 cubic yards
- **Trucks eliminated off streets to landfill/clean stone pick up:** 3,676

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Case Study: Back of the Yards College Preparatory High School

- **Benefits:**
  - Reduction of Total Energy Use
  - Reduction of Air Pollutants and Greenhouse Gas Emissions
    - Used local laboratory - minimized impacts from transportation
  - Water Resource Impacts
  - Waste/Materials Management
    - Eliminating moving hazardous material from one place to another
  - Land/Ecosystem Management
    - Treatment rendered the material inert which has a lower environmental burden
  - Minimized traffic congestion, material use, and community disruption

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Case Study: Back of the Yards College Preparatory High School

- **Ancillary Benefits:**
  - Informed / Helped Establish PBC's Program Level Guidelines and BMP's
    - Environmental Design Guidelines
    - Soil Management Plans
    - Specifications
  - Sitting Team Approach
    - Bring on Environmental Design Team early
    - Start thinking in 3D early

- **Alignment with IEPA Green Remediation Guideline**

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Case Study: Whitney Young Branch Library

Located: 415-423 E. 79th Street, Chicago

Completed: Summer 201

Description: In-situ remediation by chemical oxidation and mixing to address “hot spots” of elevated tetrachlorethene concentrations. Installation of 3’ clay cap, stormwater detention area, and storm drain system

Property Size: 0.80 acres

Awards: 2014 NAEP Environmental Excellence Award - Environmental Stewardship

PUBLIC BUILDING COMMISSION

Case Study: Whitney Young Library

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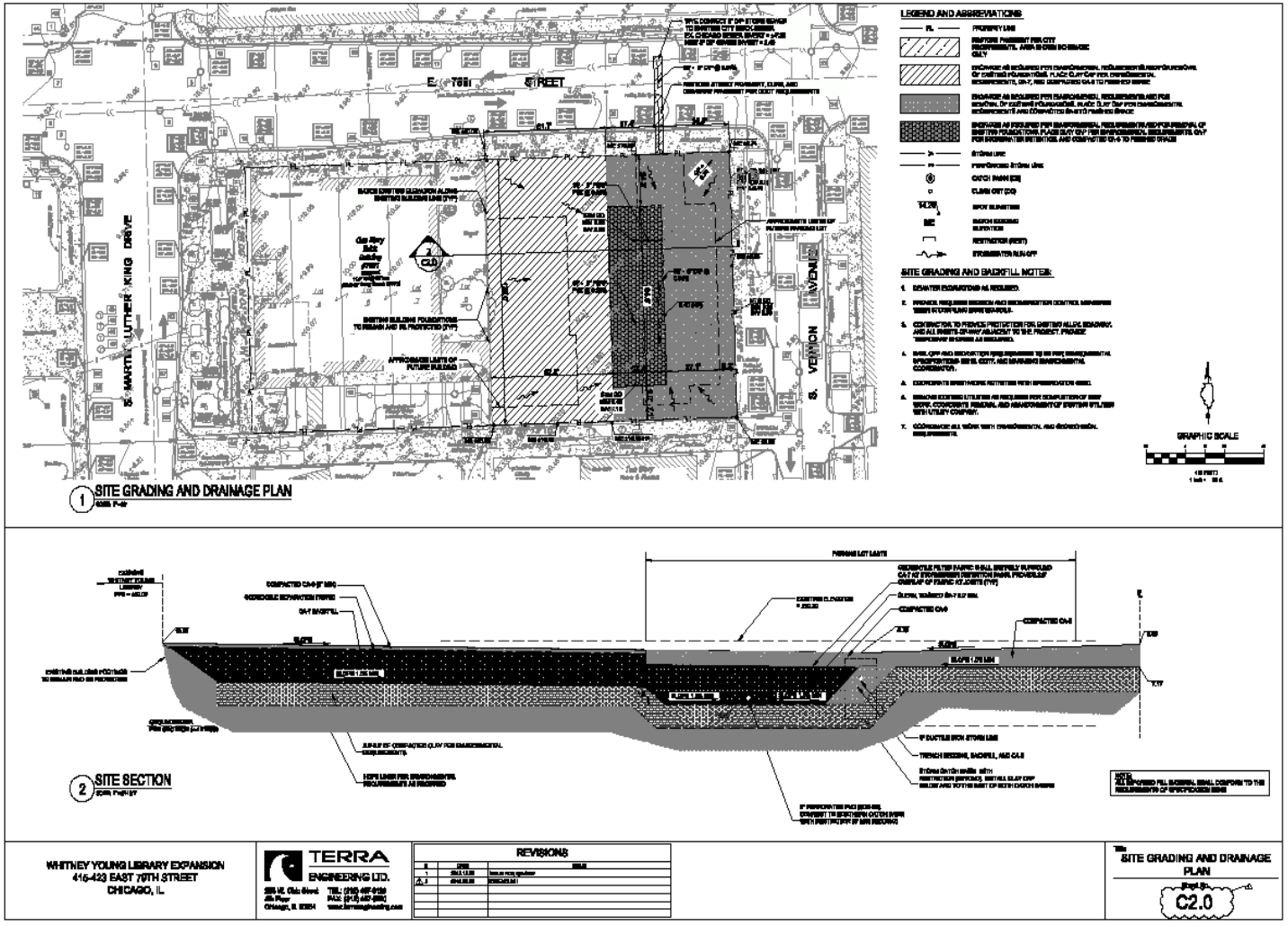

Case Study: Whitney Young Library

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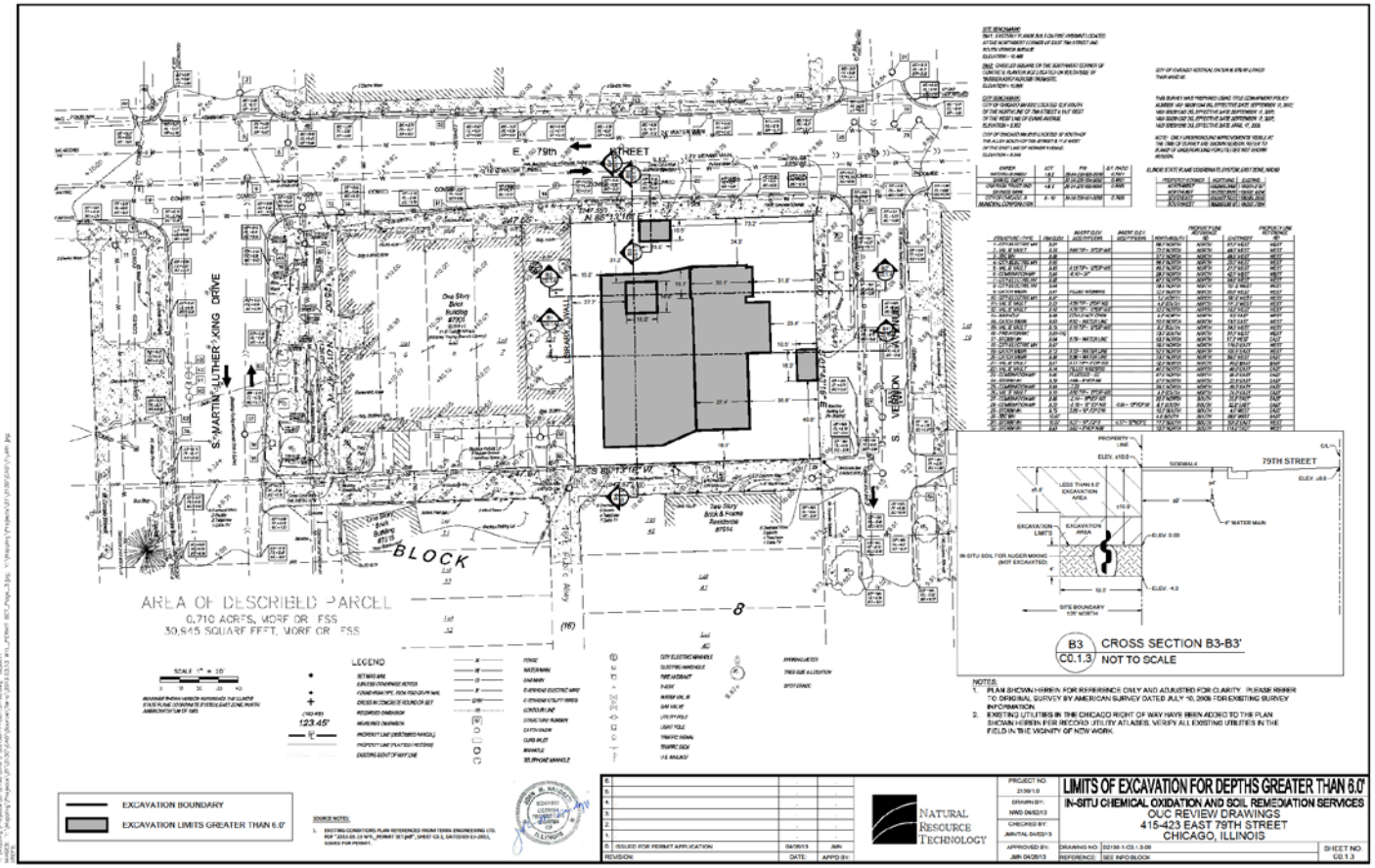

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Case Study: Whitney Young Library

Green Remediation Strategies

- Green Remediation Evaluation
  - Followed new ASTM Guidance for Greener Cleanups
  - IEPA uses results as case study
- In Situ Treatment

Funding

- IEPA Revolving Loan Funding
  - IEPA Green Remediation Evaluation (Study)
  - In Situ Remediation +
- US EPA Brownfield Funding - $600,000
  - Pilot for In Situ +

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Case Study: Whitney Young Library

In-Situ Treatment of Tetrachloroethene with Sodium Permanganate

- **Cost Savings:** $ 1.25 M
- **Volume of Material Deterred from Subtitle D Landfill:** ~22,000 cubic yards
- **Trucks eliminated off streets to landfill/clean stone pick up:** 4,043
- **Recycled Concrete: 480 tons**

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Case Study: Whitney Young Library

Best Management Practices Established for this Project:

- Link remediation activities to site development/construction
- Target Treatment Zone (TTZ)
- Use local staff, including subcontractors, when possible to minimize resource consumption
- Mix amendments into soil in situ whenever possible to minimize dust generation and emissions
- Implement an idle reduction plan
- Salvage uncontaminated objects/infrastructure with potential recycle, resale, donation, or reuse
- Use alternative drilling methods including direct-push technology (DPT)
- Use local laboratory

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Case Study: Whitney Young Library

Benefits:

- Reduction of Total Energy Use
- Reduction of Air Pollutants and Greenhouse Gas Emissions
  - Used local laboratory to minimize impacts from transportation
- Water Resource Impacts
- Waste/Materials Management
  - Eliminating moving hazardous material from one place to another
- Land/Ecosystem Management
  - Treatment rendered the material inert which has a lower environmental burden
- Minimized traffic congestion, material use, and community disruption

Case Study: Whitney Young Library

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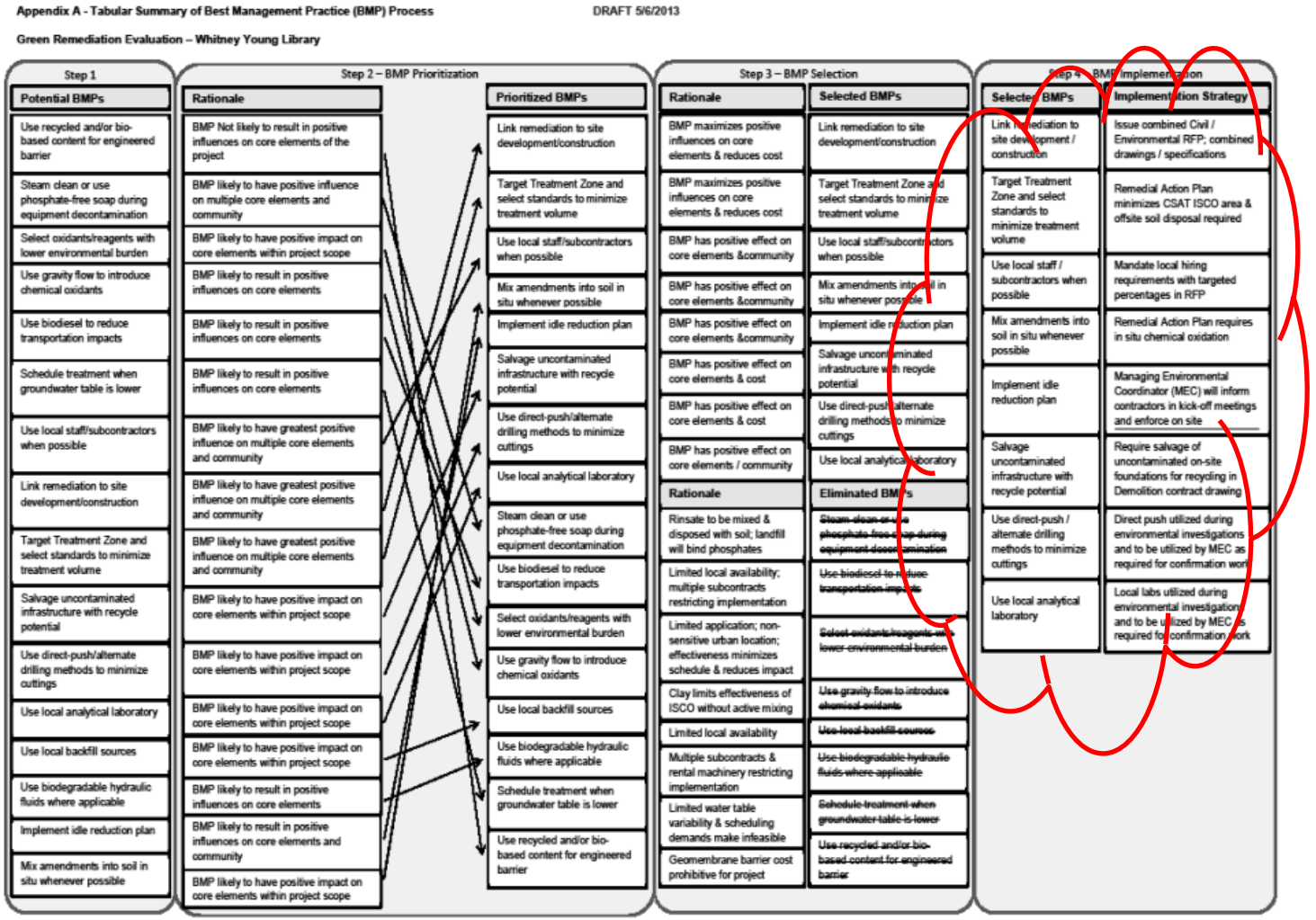

Appendix A - Tabular Summary of Best Management Practice (BMP) Process

DRAFT 5/6/2013

Green Remediation Evaluation – Whitney Young Library

Step 1	Step 2 – BMP Prioritization		Step 3 – BMP Selection		Step 4 – BMP Implementation	
Potential BMPs	Rationale	Prioritized BMPs	Rationale	Selected BMPs	Selected BMPs	Implementation Strategy
Use recycled and/or bio-based content for engineered barrier	BMP Not likely to result in positive influences on core elements of the project	Link remediation to site development/construction	BMP maximizes positive influences on core elements & reduces cost	Link remediation to site development/construction	Link remediation to site development / construction	Issue combined Civil / Environmental RFP; combined drawings / specifications
Steam clean or use phosphate-free soap during equipment decontamination	BMP likely to have positive influence on multiple core elements and community	Target Treatment Zone and select standards to minimize treatment volume	BMP maximizes positive influences on core elements & reduces cost	Target Treatment Zone and select standards to minimize treatment volume	Target Treatment Zone and select standards to minimize treatment volume	Remedial Action Plan minimizes CSAT ISCO area & offsite soil disposal required
Select oxidants/reagents with lower environmental burden	BMP likely to have positive impact on core elements within project scope	Use local staff/subcontractors when possible	BMP has positive effect on core elements &community	Use local staff/subcontractors when possible	Use local staff / subcontractors when possible	Mandate local hiring requirements with targeted percentages in RFP
Use gravity flow to introduce chemical oxidants	BMP likely to result in positive influences on core elements	Mix amendments into soil in situ whenever possible	BMP has positive effect on core elements &community	Mix amendments into soil in situ whenever possible	Mix amendments into soil in situ whenever possible	Remedial Action Plan requires in situ chemical oxidation
Use biodiesel to reduce transportation impacts	BMP likely to result in positive influences on core elements	Implement idle reduction plan	BMP has positive effect on core elements &community	Implement idle reduction plan	Implement idle reduction plan	Managing Environmental Coordinator (MEC) will inform contractors in kick-off meetings and enforce on site
Schedule treatment when groundwater table is lower	BMP likely to result in positive influences on core elements	Salvage uncontaminated infrastructure with recycle potential	BMP has positive effect on core elements & cost	Salvage uncontaminated infrastructure with recycle potential	Salvage uncontaminated infrastructure with recycle potential	Require salvage of uncontaminated on-site foundations for recycling in Demolition contract drawing
Use local staff/subcontractors when possible	BMP likely to have greatest positive influence on multiple core elements and community	Use direct-push/alternate drilling methods to minimize cuttings	BMP has positive effect on core elements & cost	Use direct-push/alternate drilling methods to minimize cuttings	Use direct-push / alternate drilling methods to minimize cuttings	Direct push utilized during environmental investigations and to be utilized by MEC as required for confirmation work
Link remediation to site development/construction	BMP likely to have greatest positive influence on multiple core elements and community	Use local analytical laboratory	BMP has positive effect on core elements / community	Use local analytical laboratory	Use local analytical laboratory	Local labs utilized during environmental investigation and to be utilized by MEC as required for confirmation work
Target Treatment Zone and select standards to minimize treatment volume	BMP likely to have greatest positive influence on multiple core elements and community	Steam clean or use phosphate-free soap during equipment decontamination	Rationale	Eliminated BMPs		
Salvage uncontaminated infrastructure with recycle potential	BMP likely to have positive impact on core elements within project scope	Use biodiesel to reduce transportation impacts	Rinsate to be mixed & disposed with soil; landfill will bind phosphates	~~Steam clean or use phosphate-free soap during equipment decontamination~~		
Use direct-push/alternate drilling methods to minimize cuttings	BMP likely to have positive impact on core elements within project scope	Select oxidants/reagents with lower environmental burden	Limited local availability; multiple subcontracts restricting implementation	~~Use biodiesel to reduce transportation impacts~~		
Use local analytical laboratory	BMP likely to have positive impact on core elements within project scope	Use gravity flow to introduce chemical oxidants	Limited application; non-sensitive urban location; effectiveness minimizes schedule & reduces impact	~~Select oxidants/reagents with lower environmental burden~~		
Use local backfill sources	BMP likely to have positive impact on core elements within project scope	Use local backfill sources	Clay limits effectiveness of ISCO without active mixing	~~Use gravity flow to introduce chemical oxidants~~		
Use biodegradable hydraulic fluids where applicable	BMP likely to have positive impact on core elements within project scope	Use biodegradable hydraulic fluids where applicable	Limited local availability	~~Use local backfill sources~~		
Implement idle reduction plan	BMP likely to result in positive influences on core elements	Schedule treatment when groundwater table is lower	Multiple subcontracts & rental machinery restricting implementation	~~Use biodegradable hydraulic fluids where applicable~~		
Mix amendments into soil in situ whenever possible	BMP likely to result in positive influences on core elements and community	Use recycled and/or bio-based content for engineered barrier	Limited water table variability & scheduling demands make infeasible	~~Schedule treatment when groundwater table is lower~~		
	BMP likely to have positive impact on core elements within project scope		Geomembrane barrier cost prohibitive for project	~~Use recycled and/or bio-based content for engineered barrier~~		

Applying Greener Cleanup to Your Projects

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Next Steps – IEPA Goals:

1. Start applying the guideline to further validate the process
2. Develop a list of BMP's found to be effective and useful on different types of projects
3. Provide case studies and examples for others to follow

PBC program:

1. Case study / example / success story - pushing to deeper level of BMP's
2. Model for local government adoption of this process as standard
3. Provides precedent that others can access

   (ie: 4 reports posted on IEPA website -WYBL and 3 others)

Applying Greener Cleanup to Your Projects

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Cleanups are good for people and the environment. Greener cleanups are better

- Application is entirely voluntary
- Some will choose to ignore it
- … funding opportunities as well as cost savings benefits…

Applying Greener Cleanup to Your Projects

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Cleanups are good for people and the environment. Greener cleanups are better

- What will YOU do?

Questions?

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Resources

IL EPA Greener Cleanups – Description, Case Studies and Decision Matrix for BMP's

http://www.epa.state.il.us/land/greener-cleanups/index.html

http://www.epa.state.il.us/land/greener-cleanups/matrix.pdf

ASTM Standard Guide for Greener Cleanups

http://www.astm.org/Standards/E2893.htm

US EPA Green Remediation Focus

http://www.clu-in.org/greenremediation/

US EPA Principles for Greener Cleanups

http://www.epa.gov/oswer/greenercleanups/pdfs/oswer_greencleanup_principles.pdf

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