

ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES (ABCA)

**US EPA Region 5 Brownfields Cleanup Grants
Trillium Nature Sanctuary: South and Central Sites
179 East Maryland Avenue**

**Cooperative Agreement Nos.
BF-00E00917 & BF- 00E01067**

City of Saint Paul, Minnesota

**Prepared for:
City of Saint Paul**

**Prepared by:
HR Green, Inc.**

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1.0 BACKGROUND AND PURPOSE

In 2011 and 2012, the City of Saint Paul (City) was awarded U.S. Environmental Protection Agency (EPA) Brownfields Cleanup Grants for approximately 20.4 acres of the 42 acre Trillium site in the City of Saint Paul, Ramsey County, Minnesota (site). The purpose of this Analysis of Brownfield Cleanup Alternatives (ABCA) is to identify and evaluate the cleanup alternatives considered for the site based on the site conditions, cleanup goals, and costs. The alternatives are evaluated and an alternative is chosen that best meets the cleanup goals based on the future use of the property in accordance with the EPA and Minnesota Pollution Control Agency (MPCA) guidelines.

Site cleanup will facilitate the construction of the “Trout Brook Nature Sanctuary” in the midst of an urbanized area of Saint Paul. This document describes the proposed remedy to be implemented by the City (with oversight by EPA and the MPCA) for cleaning up the site, and the rationale for the proposed remedy.

The City is issuing this document as part of its public participation responsibilities governed by the Small Business Liability Relief and Brownfields Revitalization Act (SBLRBRA), signed into law by President Bush on January 11, 2002, which amended the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended, by adding Section 104(k). Section 104(k) authorizes the EPA to provide funding to eligible entities to inventory, characterize, assess, conduct planning related to, remediate, or capitalize revolving loan funds for eligible Brownfield sites.

This document highlights the information that is presented in more detail in the site Administrative Record (AR). The information available in the AR includes the Brownfields Cleanup Grant Applications, Community Involvement Plan, Cooperative Agreement Work Plans, historical environmental investigations performed at the site, and results of supplemental ongoing remedial design sampling as available. The public is encouraged to review these documents for a more complete view and understanding of the environmental issues at the site and the basis for the remedy selection discussed in this document. The AR location is noted at the end of this document.

2.0 FACILITY DESCRIPTION/HISTORY

The site is located west of 35E and north of Sims Avenue to Maryland Avenue, and north of Maryland Avenue along Norpac Road and Jackson Street (1200-1202 Jackson Street) in the city of Saint Paul, Minnesota in Ramsey County (Figure 1).

The southern portion of the site was used as a rail yard with several railroad spurs and platforms along with multiple buildings from at least 1903 including a carpenter shop, ice house, lumber storage, car shed, steam boilers and an oil room. Buildings and railroad tracks began to be removed beginning in 1967 and continued up until 1988. The site has contained only one railroad track on the western portion since 1988. According to aerial photographs, possible dumping or landfilling was apparent on the site in 1988.

The northern portion of the site contained residential buildings from 1903-1950. A gas station existed on the 1200 Jackson Street Parcel from the 1940s to the mid to late 1990s. This portion

of the site has been used as an automotive repair and a car dealership since the mid to late 1990s.

Multiple site assessments have taken place on the site since 1990 and are included in the following reports available in the AR identified in Section 7.0:

- *Phase II Environmental Assessment; Glacier Park Company; St. Paul, Minnesota; Sequence #230; June 1990*
- *Phase I Environmental Assessment; Trillium Site; West of Interstate 35E Between Maryland and Cayuga Avenues East; St. Paul, Minnesota; Braun Intertec Corporation; March 14, 2003*
- *Phase II Environmental Site Assessment; Trillium Site; West of Interstate 35E Between Maryland and Cayuga Avenues East; St. Paul, Minnesota; Braun Intertec Corporation; January 13, 2004*
- *Phase II Environmental Site Assessment; Northern Portion of Trillium Site West of Interstate 35E Between Maryland and Cayuga Avenues East; St. Paul, Minnesota; Braun Intertec Corporation; August 2, 2006*
- *Arlington-Jackson West Phase II Investigation Report For Parcels 6-10 and 16-18; St. Paul, Minnesota; Liesch Companies; March 2008*
- *Phase I Environmental Assessment; Jackson Auto Sales and Finance; 1200-1202 Jackson Street; St. Paul, Minnesota; Braun Intertec Corporation; February 23, 2012*
- *Phase I Environmental Site Assessment Update; Proposed Trillium Nature Sanctuary – Southern Portion Between Maryland Avenue and Cayuga Street; St. Paul, Minnesota; Braun Intertec Corporation; November 12, 2012*
- *Phase II Environmental Assessment; Proposed Trillium Nature Sanctuary; 1200-1202 Jackson Street; St. Paul, Minnesota; Braun Intertec Corporation; December 19, 2012*
- *Additional Investigation Results, Response Action Plan Addendum and Construction Contingency Plan; Proposed Trillium Nature Sanctuary and Trout Brook Regional Trail; MPCA VIC Program Project Number VP18042 & MPCA Petroleum Brownfields Project Number PB4279; St. Paul, Minnesota; Braun Intertec Corporation; March 19, 2013*

On the southern portion of the site, Phase II Environmental Site Assessments (ESAs) identified concentrations of contaminants in site soils above applicable MPCA Tier 1 Soil Reference Values (SRVs). The contaminants identified included ethylbenzene, polycyclic aromatic hydrocarbons (PAHs), arsenic, silver, chromium and lead. Contaminants on the northern portion of the site (Jackson Street Parcels) included 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, m,p-xylene, naphthalene, PAHs, arsenic, barium, lead, and mercury above their respective Tier 1 SRVs. Areas of petroleum contamination were also identified on both portions of the site and appear to be more extensive on the northern portion of the site.

Subsurface investigations throughout the entire site indicated the presence of fill soils containing debris such as ash, slag, asphalt, wood, cinders and concrete. Native soils found onsite consisted of swamp deposits consisting of peat, organic silt and organic clay and alluvium ranging from sand to fat clay. Throughout the sampling events, groundwater was encountered at depths ranging from 6-30 feet below ground surface.

3.0 PROJECT GOAL

The City's overall project goal is to prepare the site for recreational use by remediation of environmental impacts in accordance with guidelines established by the MPCA Voluntary Investigation and Cleanup (VIC) and Petroleum Brownfields (PB) Programs to minimize risks to human health and the environment.

The vision for the site is to create a nature preserve in the heart of a heavily urbanized area. The residential area to the west was at one time perched on a bluff that overlooked the Trout Brook valley. With the development of the railroad and industry, the creek was filled and put underground in the Trout Brook storm sewer. The natural valley was lost and, in turn, the neighborhood connection to the natural environment.

Site cleanup will facilitate the construction of the "Trout Brook Nature Sanctuary" in the midst of an urbanized area of Saint Paul. The focus of the facility will be the creation of a stream channel segment which runs the entire length of the park. The Trout Brook Nature Sanctuary will also feature a stormwater management system of filtration ponds and wetlands, restoration of pre-settlement ecosystems, a new portion of the Trout Brook Regional Trail, local connector trails, nature trails, and related amenities for a new park.

4.0 CLEANUP GOALS

Based on the extensive amount of data collected from the site, the primary contaminants of concern (COC) are arsenic, lead, and PAHs. These contaminants are likely the results of the extensive amounts of fill dirt on the site and the historic uses as a rail yard and automotive related businesses. The following health risk information was obtained from the U.S. Department of Health and Human Services' (DHSS) Agency for Toxic Substances & Disease Registry's (ATSDR) Public Health Statements (PHSs).

Arsenic

The U.S. DHSS has determined that arsenic is known to be a human carcinogen. The ingestion of arsenic has been reported to increase the risk of cancer in the liver, bladder, and lungs. Symptoms of arsenic ingestion range from (but are not limited to) fatigue, nausea, and diarrhea. Long-term exposure of adults can result in a pattern of skin changes, which include corns or warts on the palms, soles, and torso. Long-term ingestion may also result in skin cancer. Arsenic exposure can cause increases in blood pressure and anemia. Exposure to high levels can severely damage target organs adults and children and can ultimately cause death. Inhalation of arsenic containing dust may result in a sore throat and irritated lungs. Long-term inhalation exposures may result the previously mentioned skin effects, as well as circulatory and peripheral nervous disorders. Arsenic containing dust may also increase the risk of lung cancer. Dermal (skin) contact with high concentrations of arsenic impacted soil may result in irritation, but does not appear to result to any serious internal effects.

The unborn and young children are particularly at risk from the effects of arsenic. The risk to children as a result of arsenic ingestion is high as children often explore their surrounding environment with their hands. Children also often play in soil, put their hands in their mouths and sometimes intentionally eat soil, which significantly increases the risk of arsenic ingestion. The associated health effects are the same in children as they are in adults.

Lead

The U.S. DHSS has determined that lead is reasonably anticipated to be a human carcinogen. The main target for lead toxicity is the central nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance of the central nervous system. It may also cause weakness in fingers, wrists and ankles. Lead exposure can cause increases in blood pressure and anemia. Exposure to high levels can severely damage the brain and kidneys in adults and children and can ultimately cause death. In pregnant women, high levels of exposure can cause miscarriage. High level exposure in men can lead to damage of reproductive organs.

The unborn and young children are particularly at risk from the effects of lead. Harmful effects include premature births, decreased mental ability in the infant, learning difficulties and reduced growth in young children.

PAHs

The U.S. DHSS has determined that PAHs are reasonably anticipated to be a human carcinogen. The main target organs for PAHs are the skin, liver, and immune system. Studies show that individuals exposed to PAHs and other compounds by breathing or skin contact for long periods can develop cancer. Studies done on mice indicate high levels of benzo[a]pyrene ingested during pregnancy led to difficulties reproducing as well as birth defects and decreased body weight in their offspring. Studies in animals have also shown that PAHs can cause harmful effects on skin, body fluids, and the body's system for fighting disease after both short and long-term exposure. Similar effects could occur in people, but we have no information to show that these effects do occur.

To address potential human and ecological health effects from the COCs, a Response Action Plan (RAP) and Construction Contingency Plan (CCP) has been prepared for the site by the City and approved by the MPCA. The RAP includes the Cleanup Goals for the site based on a Recreational reuse. The Cleanup Goals are based on the MPCA Tier 2 Recreational SRVs. In addition, petroleum Cleanup Goals will be in accordance with the MPCA PB Program guidelines. The CCP, which is included in the RAP, provides a plan for characterizing and remediating unanticipated contamination that is discovered during planned remediation activities or while excavation for redevelopment is occurring (i.e., stormwater ponds, wetland areas, utilities, and site grading).

MPCA will be responsible for cleanup oversight through the VIC and PB Programs. In addition, HR Green, Inc. will monitor cleanup activities on a daily basis as specified in the RAP/CCP. HR Green's professional staff will observe contractor operations and report progress to the City of St. Paul and MPCA on a weekly basis.

5.0 ALTERNATIVES ANALYSIS

5.1 Identification of Remedial Alternatives

The redevelopment of the site will include excavation of several water features including three storm water retention ponds with associated wetland areas and the Trout Brook stream channel (Figure 2). Construction of these areas will generate a total of approximately 44,000 cubic yards (CY) of material that will need to be managed. Based on previous data collected at the site, it is

estimated that approximately 23,000 CY (34,500 tons) of soil will exceed the Recreational SRV and need to be managed according to MPCA guidelines.

Several potential alternatives were evaluated for addressing the impacted soil at the site. From that evaluation, a limited number of practicable remedial alternatives that could be implemented at the site based on available site data and scale of the project. The “No Action” alternative was also included as part of the evaluation to establish a basis for conducting remedial actions at the site. All scenarios except the No Action Alternative require applicable MPCA oversight and shall be performed in accordance with applicable MPCA guidelines. The remedial alternatives identified for consideration include:

1. No action
2. Soil Excavation with Off-Site Disposal
3. Soil Excavation with On-Site Soil Reuse and Limited Off-Site Disposal

5.2 Evaluation of Remedial Alternatives

Each remedial alternative identified above was first evaluated to determine whether it could achieve the City’s overall project goal to prepare the site for recreational use by remediation of environmental impacts by minimizing risks to human health and the environment. Those alternatives that were deemed capable of achieving the overall project goal were further evaluated for effectiveness, cost, and environmental impact. The cost estimates presented in this document are rough estimates that were prepared solely for the relative comparison of the identified alternatives and should not be used as design-level estimates. A description of each alternative and the results of the comparative analysis are presented in the following subsections.

Alternative 1 - No Action Alternative

This alternative would essentially leave the site in its existing state, and would not be used for redevelopment. This alternative should not be considered for redevelopment of the site, as existing impacted soils would remain and not allow for any future site reuse to occur. In addition, the site would continue to present potential health hazards to area residents while still contributing to community blight and limiting potential future beneficial use by the citizens of Saint Paul.

Alternative 2 - Soil Excavation with Off-Site Disposal

This alternative includes the excavation and off-site disposal of all soils (estimated 34,500 tons) containing contaminant concentrations above the MPCA Recreational SRVs and petroleum-impacted soil according to MPCA PB guidelines. It is estimated that this cleanup alternative would cost between \$1.0 and \$1.5 million dollars for impacted material removal, transport, disposal to a permitted landfill, and hauling backfilling to the site to finish redevelopment of the site. This alternative would meet the remedial objectives for the property, but exceeds the cleanup funds available and also has a negative impact on the environment with the increased of fossil fuels transporting the material to an off-site disposal facility.

Alternative 3 - Soil Excavation with On-Site Reuse and Limited Off-Site Disposal

This alternative includes the on-site reuse of impacted soil with limited off-site disposal of impacted soil not meeting the criteria established in the approved RAP. It is estimated that only approximately 2,940 CY (4,410 tons) of impacted soil will require off-site disposal with the remaining impacted soil being used on-site as restricted fill. The estimated cost this cleanup alternative would be between \$290,000 and \$435,000. This alternative meets the remedial objectives for the property and is feasible with the cleanup funds available for the project. In addition to the cost savings, this alternative will also have a more positive impact on the environment with the decreased use of fossil fuels thus lowering greenhouse gas emissions.

5.3 Proposed Alternative

Based on the evaluation of remedial alternatives, the proposed alternative for the site is *Alternative 3 - Soil Excavation with On-Site Reuse and Limited Off-Site Disposal*. The redevelopment plans for the site includes the construction of ponds, wetlands, a stream, and a trailhead/restroom facility. The site is also being redeveloped with a regional and local trail system that will connect to regional trails, and as such, visitor access will largely be limited to the trails and overlook areas. Therefore, as part of the redevelopment, impacted soil will be excavated only to the extent necessary to allow construction of the new site improvements, and impacted soil will be left in place wherever possible. Vegetative cover will be used to the extent possible to limit access to specific areas.

Based on the final design plans, there are several areas (Figure 3) of the site that will require an extensive amount of fill material to complete redevelopment of the site. Most notably, the construction of the trailhead area that will include parking and restroom facilities will require approximately 27,000 CY of fill material to raise the eastern portion of the site approximately 12 feet to finished grade.

The proposed remedy for the site generally consists of the following:

1. Identify areas of impacted soils exceeding the Recreational SRVs using data from previous sampling events and any additional data collected at the site.
2. Soil with contaminant concentrations exceeding the Recreational SRVs will be excavated and used as restricted fill in areas shown on Figure 3. Soil deemed not suitable for use as restricted fill based on criteria established in the approved RAP will be disposed of off-site at an approved landfill.
3. Soil meeting the "clean" criteria established in the RAP will be stockpiled onsite and used for capping impacted soil. A minimum of 4-feet of clean soil will be used to cap impacted soils in green space areas with a minimum of 2-feet below any impermeable surface (i.e. trailhead parking lot), eliminating the human exposure pathway.
4. Vegetative cover will be used to establish vegetation on the site, prevent future erosion of excavated and capped areas, and restrict access to areas where impacted soils remain.

5. An Affidavit of Hazardous Substances will be filed on the site deed. The Affidavit will serve as a notice of soil contamination remaining onsite.

6.0 PUBLIC PARTICIPATION

EPA, in consultation with the City of Saint Paul and MPCA will approve a remedy only after the public is provided with an adequate time period for review and comment, all comments have been reviewed, and responses have been prepared to address the comments. Public comments on the proposed remedy are important to the remedy selection process. EPA, in consultation with the City of Saint Paul and MPCA may ask that the City of Saint Paul modify the proposed remedy or select another remedy, based on new information or comments received from the public.

The City of Saint Paul will solicit input from the public by publishing a public notice soliciting input on the draft ABCA and locations of the Administrative Record in the Saint Paul Pioneer Press and the City's Early Notification System prior to approval of the proposed remedy. The Administrative Record, where the public may review all relevant documents for the site, is available at the following location:

City of Saint Paul Parks and Recreation
25 West 4th Street, Suite 400
Saint Paul, MN 55115
Phone: 651.266.6368
Hours: Mon-Fri, 8:00 a.m. to 4:30 p.m.

7.0 REFERENCES

1. U.S. Department of Health & Human Services. Public Health Service. Agency for Toxic Substances and Disease Registry. ToxFAQs Fact Sheet for Lead, CAS#7439-92-1. March 2011.
2. U.S. Department of Health & Human Services. Public Health Service. Agency for Toxic Substances and Disease Registry. ToxFAQs Fact Sheet for Arsenic, CAS#7440-38-2. March 2011.
3. U.S. Department of Health & Human Services. Public Health Service. Agency for Toxic Substances and Disease Registry. ToxFAQs Fact Sheet for Polycyclic Aromatic Hydrocarbons (PAHs), CAS#83-32-9, 120-12-7. March 2011.

8.0 CONTACTS

The City spokesperson for this project is Kathleen Anglo, Landscape Architect, who may be contacted at:

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Department of Parks and Recreation
25 West 4th Street, 500 CHA

Saint Paul, MN 55102
Kathleen.anglo@ci.stpaul.mn
(651) 266-6368 Phone

The MPCA Voluntary Investigation and Cleanup Program contact is Mr. Gerald Stahnke, who may be contacted at:

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Voluntary Investigation and Cleanup Program
520 Lafayette Road North
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Gerald.Stahnke@state.mn.us
(651) 757-2753 Phone

The US EPA Region 5 Project Officer is Ms. Linda Mangrum, who may be contacted at:

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The environmental consultant assisting with this project is Jonathon Kusa with HR Green, Inc. who may be contacted at:

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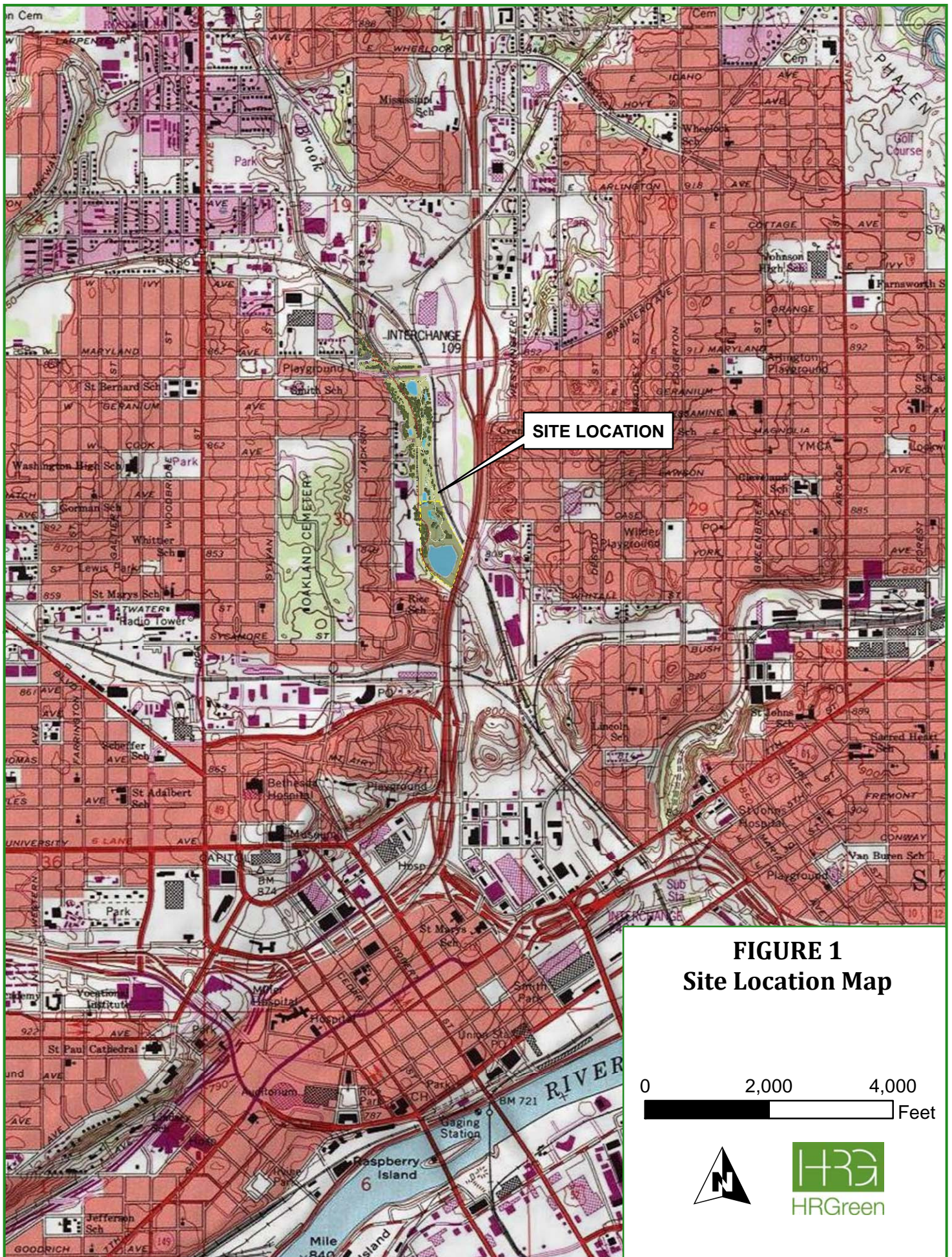
APPENDIX A

FIGURES

Figure 1 – Site Location Map

Figure 2 – Trillium Nature Sanctuary & Trout Brook Regional Trail Redevelopment Map

Figure 3 – Overview of Fill Areas



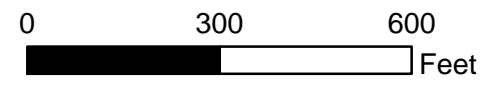
SITE LOCATION

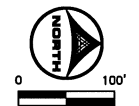
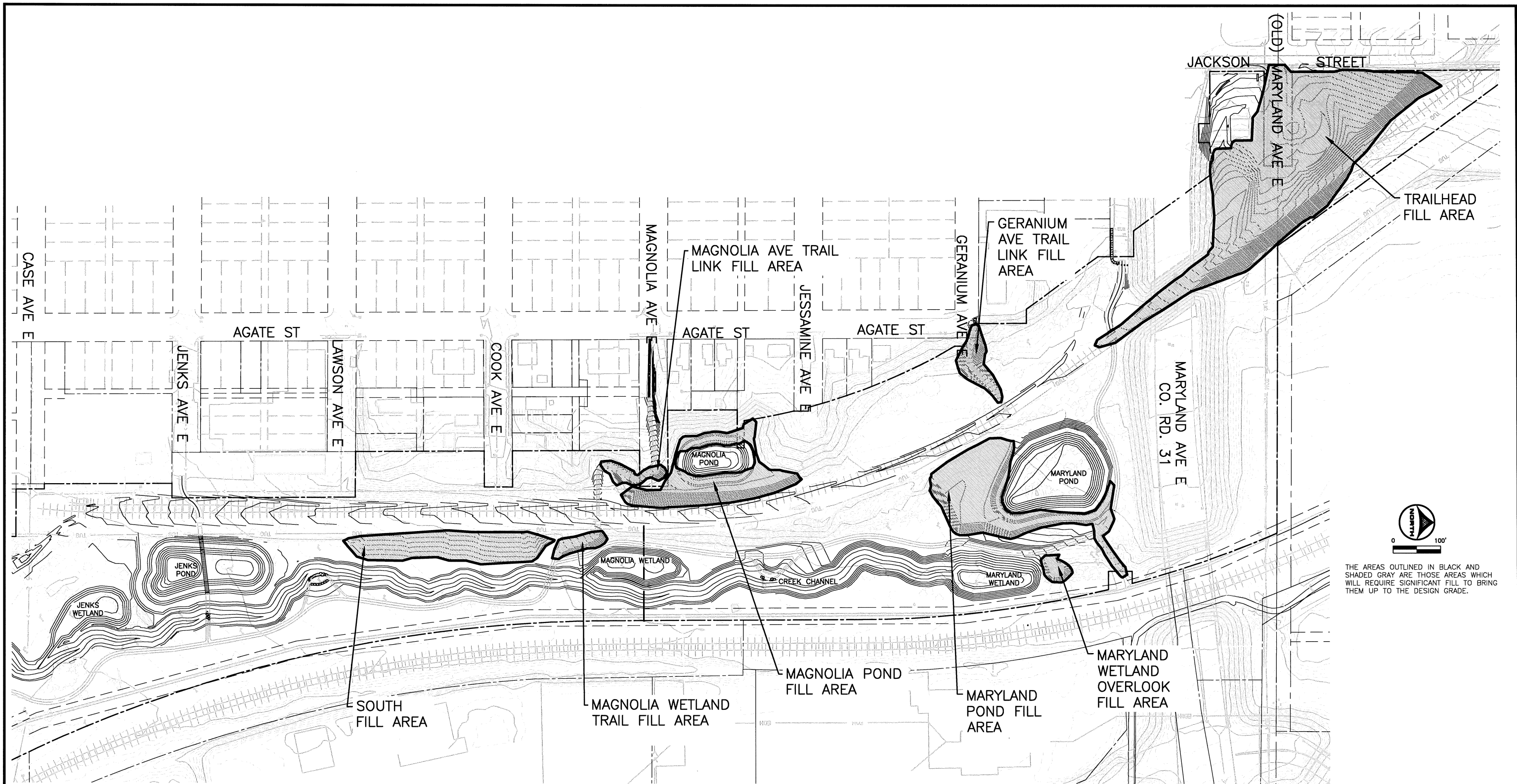
FIGURE 1
Site Location Map

0 2,000 4,000
Feet



FIGURE 2
Site Redevelopment Plan





THE AREAS OUTLINED IN BLACK AND SHADED GRAY ARE THOSE AREAS WHICH WILL REQUIRE SIGNIFICANT FILL TO BRING THEM UP TO THE DESIGN GRADE.

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 CITY OF ST. PAUL
 ST. PAUL, MINNESOTA

BROWNFIELDS
 OVERVIEW OF FILL AREAS

FIGURE NO.
 3