

ATTACHMENT E – HAZARDOUS MATERIALS



Kansas City Streetcar Riverfront Extension
Hazardous Materials and Waste Sites Summary
Technical Report

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Acronyms and Abbreviations

AAI	All Appropriate Inquiry
ACRES	Assessment, Cleanup & Redevelopment Exchange System
AST	Aboveground Storage Tank
ASTM	American Society of Testing and Materials
AUL	Activity & Use Limitation
BTEX	Benzene, toluene, ethylbenzene & xylene
BVCP	Brownfield Voluntary Cleanup Program
CDL	Clandestine Drug Laboratory
CERCLIS	Comprehensive Environmental Response, Compensation & Liability Information System
CERCLIS NFRAP	CERCLIS Sites Where No Further Action Is Planned
CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
CORRACTS	RCRA Corrective Action Sites
EDR	Environmental Data Resources, Inc.
EPA	U.S. Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
E-START	MDNR Environmental Site Tracking & Research Tool
FMGP	Former Manufactured Gas Plant
HSWA	Hazardous & Solid Waste Amendments
LAST	Leaking Aboveground Storage Tank
LQG	Large Quantity Generator
LUST	Leaking Underground Storage Tank
MDNR	Missouri Department of Natural Resources
MGE	Missouri Gas Energy
MGP	Manufactured Gas Plant
MO SPILLS	MDNR's Environmental Response Tracking Database
NPDES	National Priority Discharge Elimination System
NPL	National Priorities List
PCB	Polychlorinated biphenyl
RCRA	Resource Conservation & Recovery Act
SEMS	Superfund Enterprise Management System
SEMS-ARCHIVE	Archived SEMS Sites
SQG	Small Quantity Generator
TSD	Treatment Storage or Disposal Facility
UST	Underground Storage Tank
VCP	Voluntary Cleanup Program

1.0 INTRODUCTION

An environmental desktop review was conducted for the Streetcar route site under consideration as part of the Kansas City Streetcar Riverfront Project. An Environmental Data Resources (EDR) Database search was conducted of state, tribal, and federal environmental databases and historical aerial photos, historical topographic maps, city street directories, and Sanborn Fire Insurance maps. Existing environmental documentation for the Riverfront area provided by PortKC and the Missouri Department of Natural Resources (MDNR's) Environmental Site Tracking and Research Tool (E-START) online dataset was also reviewed. A site visit and Phase I Environmental Site Assessment (ESA) was not conducted as part of the environmental desktop review. The purpose of the review was to identify historical and current sites with the potential to have impacted the soil and/or groundwater within and adjacent to the anticipated construction footprint of the streetcar project. Note that although certain aspects of the American Society for Testing and Materials (ASTM) 1527-13 Standard for Phase I Environmental Site Assessments were conducted as part of this review, the results of this review do not fully meet the requirements of the 1527-13 Standard or the All Appropriate Inquiry (AAI) regulation as codified at 40 CFR 312. Furthermore, this desktop review did not include any inquiry with respect to controlled substances, corporate environmental compliance, radon, methane, asbestos, lead paint, mold, wetlands, or vapor intrusion.

2.0 METHODOLOGY

Government databases were searched in accordance with ASTM 1572-13 through EDR, a commercial provider of that service. The search area provided to EDR for the database search included an area starting near Third Street and Grand Avenue including adjacent properties and the majority of the Riverfront area east to an area near the intersection of East Front Street and North Lydia Avenue. EDR provided a Radius Report containing U.S. Environmental Protection Agency (EPA), State, and Tribal environmental database information in accordance with ASTM defined search distances. EDR's Radius Report lists the Federal, State and Tribal databases searched, a description of the databases, and the most recent release date of each database.

In addition to reviewing government database results, aerial photographs (1969-2015), Sanborn Fire Insurance Maps (1895-1969), historic topographic maps (1890-2015), and city directories (1909-2006) were also reviewed to obtain information about the history of development along the streetcar route and within close proximity.

Copies of the database reports, aerial photographs, fire insurance maps, topographic maps, and city directories reviewed are included in the appendices of this report.

For the streetcar project, it was assumed construction of the majority of the improvements would be completed within existing rights-of-way, with ground disturbance occurring at depths no greater than approximately 18 inches below the existing surface. Utility relocations and installation of catenary poles would involve excavations deeper than 18 inches.

Based on the collected information, sites were evaluated and the relative risk each could pose to the streetcar project was ranked either high, medium, or low based on the distance of the site from the right-of-way, activities that were and/or are being conducted at the site, and the history of releases, spills, or violations for the site, as reported in the search documents and Riverfront area environmental documents. Sites were ranked with the following potential to affect the streetcar project:

High Potential	Sites ranked with a high potential to affect streetcar project construction are those located adjacent to the proposed route with either documented site activities that could have contaminated soil or groundwater on or in the vicinity of the site or that have a history of violations and/or known contaminated soil or groundwater that has not been remediated to the satisfaction of the responsible agency.
Medium Potential	Sites ranked with a medium potential to affect streetcar project construction are those located adjacent to the proposed route with documented current or historical activities that could have contaminated soil or groundwater; however documentation is unavailable regarding a specific release, violation, etc., or those located on adjacent land in proximity to the route with either documented site activities that could contaminate soil or groundwater or that have a history of violations and/or known contaminated soil or groundwater that has not been remediated to the satisfaction of the responsible agency.
Low Potential	Sites ranked with a low potential to affect streetcar project construction are those located adjacent to the proposed route or on land in the vicinity of the streetcar route with no documented site activities that could have contaminated soil or groundwater and do not have a history of violations or releases.

3.0 PROJECT STUDY AREA

The project study area for the hazardous materials and waste sites inventory and analysis looked at the proposed streetcar alignment and properties within the project study area. The project study area generally included an area starting near Third Street and Grand Avenue including adjacent properties and the majority of the Riverfront area east to an area near the intersection of East Front Street and North Lydia Avenue (Appendix B).

Groundwater generally flows in one direction across the project study area and that is northward towards the Missouri River. The topography of the project study area slopes to the north near the south end of the project study area and is generally flat throughout the remainder of the area. Elevations range from approximately 800 feet above mean sea level (msl) at Third and Grand to 760 msl along the Riverfront.

4.0 GOVERNMENT DATABASE SEARCHES

There is no single comprehensive source of information available that identifies all known or potential sources of environmental contamination in the study area. Therefore, to identify and evaluate sites that may potentially contain hazardous materials, petroleum products, or other sources of contamination, a federal and state government database search was conducted by EDR, dated February 8, 2018. The database search included over 100 different environmental databases including sites identified or evaluated as Federal or state Superfund sites; facilities that generate, store, treat or dispose of hazardous wastes; solid waste landfills; facilities that have active, closed, or leaking aboveground storage tanks (ASTs) or underground storage tanks (USTs); sites actively undergoing cleanup; spills involving potentially hazardous materials; and a number of other activities that might be an indicator of a hazardous condition.

A copy of the database report is provided in Appendix C. Due to the volume of sites contained in the EDR report those sites have been reviewed and summarized.

The results of the database searches were prioritized as to the likelihood of soil and/or groundwater contamination present on or in the project study area as described in Section 2.0.

Table 1 is a summary of the databases with recorded sites within and/or near the project study area and the number of sites found by EDR. These databases and the associated sites identified by EDR are discussed in the following sections along with their potential to affect streetcar construction.

Table 1: ASTM Required Database Search Results

Database Name	Number of Sites
Superfund Enterprise Management System (SEMS) formerly known as the Federal Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) List	4
SEMS – Archive formerly known as the CERCLIS No Further Remedial Action Planned (NFRAP) List	5
Federal Resource Conservation and Recovery Act (RCRA) Corrective Action Facilities List (CORRACTS)	3
Federal RCRA non-CORRACTS Treatment, Storage or Disposal (TSD) Facilities List	1
Federal RCRA Generators List Large Quantity Generator (LQG) Small Quantity Generator (SQG) Conditionally Exempt Small Quantity Generator (CESQG) Non-Generators (Non-Gen)	32
Federal Emergency Response Notification System (ERNS) Records of Emergency Release Reports Environmental Response Tracking Database (MO SPILLS)	9
State and Tribal Leaking Underground/Aboveground Storage Tank (LUST and LAST) Lists	33
State and Tribal Institutional Control/Engineering Control Registries	6
State and Tribal Voluntary Cleanup Sites	16
State and Tribal Brownfield Sites State Brownfields US Brownfields (considered optional by ASTM Standard)	31

4.1 SEMS SITES

The Superfund Enterprise Management System (SEMS) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list formerly known as CERCLIS, was renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites area in the screening and assessment phase for possible inclusion on the NPL.

There were four sites identified within approximately 0.5 miles of the streetcar route. Due to the distance, nature of contamination, location down or cross gradient three of the four sites are considered to have a **low potential** to affect the streetcar construction. The Kansas City Coal Gas site located at East First Street and Campbell is the former location of a Manufactured Gas Plant (MGP) and has been the subject of numerous

investigations based on widespread subsurface contamination including semi-volatile organic compounds. Remediation has been conducted and a No Further Action letter with land use controls has been issued by the MDNR. Due to the location of this site, it is considered to have a **high potential** to affect the streetcar construction.

4.2 SEMS ARCHIVE LIST

The SEMS-ARCHIVE list tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the NPL, unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that based upon available information, the location is not judged to be a potential NPL site.

There were five sites identified within approximately 0.5 miles of the streetcar route. Due to the distance, nature of contamination, location down or cross gradient four of the five sites are considered to have a **low potential** to affect the streetcar construction. The Central Feed & Grain site located at 616 East First Street was discovered by the EPA in 1982 and the subject of a EPA Site Investigation (SI) in 1984. Based on the findings of the SI the site was archived by the EPA in 1984. No other database records were identified since that time, but because it is immediately adjacent to the proposed Riverfront Streetcar alignment it has a **medium potential** to affect the streetcar construction.

4.3 CORRACTS LIST

CORRACTS is a list of handlers with RCRA Corrective Action Activity. This report shows what nationally-defined corrective action core events have occurred for every handler that has had corrective action activity.

There were three sites identified within approximately one mile of the streetcar route. Due to the distance, nature of contamination, location down or cross gradient all three sites are considered to have a **low potential** to affect the streetcar construction.

4.4 RCRA NON-CORRACTS TSD FACILITIES LIST

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by RCRA. Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of waste. TSDs treat, store, or dispose of the waste.

There was one site identified within approximately 0.5 miles of the streetcar route. Due to the distance, nature of contamination, location down or cross gradient the site is considered to have a **low potential** to affect the streetcar construction.

4.5 FEDERAL RCRA GENERATORS LIST

The RCRA Generator's List provides information on facilities reporting that they generate hazardous waste and are classified as hazardous waste generators pursuant to the RCRA regulations. Conditionally exempt small quantity generators (CESQGs) generate less than 100 kilograms (kg) of hazardous waste or less than 1 kg of

acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kg of hazardous waste per month. Non-Generators were previously registered as a CESQG, SQG and/or LQG; however, they are not currently generating hazardous waste. There were ten active RCRA generator sites identified within approximately one-quarter mile of the streetcar route including one RCRA-LQG site, three RCRA-SQG sites, and six RCRA-CESQG sites. Twenty-two RCRA Non-generator sites were also identified. RCRA generators are not allowed to treat or dispose of hazardous wastes on-site. Due to the distance, nature of contamination, location down or cross gradient, no history of violations or identification as a RCRA Corrective Action site all but two of these sites are considered to have a **low potential** to affect the streetcar construction. The two sites are described below:

- The Veolia Energy site, 115 Grand Boulevard, is located along the streetcar route. This site is identified as a RCRA-CESQG, but has a long history of industrial use, has been a SQG in the past, and has a history of RCRA violations. Hazardous wastes generated at the site include: spent non-halogenated and halogenated solvents, ignitable waste, corrosive waste, mercury, selenium, and thiourea. The facility has historically received notices for what appear to have been relatively minor RCRA violations. Based on these findings the site is considered to have a **medium potential** to affect the streetcar construction.
- The Robert Foster Living Trust site, 201 Grand Avenue, is also located along the streetcar route. This site is identified as a RCRA Non-generator site that was historically the location of a LQG of hazardous wastes that included 16 different hazardous waste codes. The facility reportedly did not have any reported RCRA violations. Based on these findings the site is considered to have a **medium potential** to affect the streetcar construction.

4.6 ERNS LIST/RECORDS OF EMERGENCY RELEASE REPORTS

The ERNS list records and stores information on reported releases of oil and hazardous substances. MDNR's Environmental Response Tracking Database (MO SPILLS) tracks reported spills of potentially hazardous materials.

There were nine reported incidents in close proximity of the streetcar route. Five of these incidents were reported at 115 Grand Boulevard.

In 1998 approximately three gallons of lubricating oil was spilled when a circulation pump failed. The release was contained and limited to the three gallons. In 1997 a similar incident occurred when approximately six gallons of lubricating oil was spilled. In 1997 a caller reported that a mechanical failure resulted in the loss of number two fuel oil from a pressurized delivery system. Approximately 500 gallons was released and cleaned up with absorbent pads yet approximately 200 gallons reached a combined storm/sanitary sewer. In 1996 a caller reported gasoline vapors in the storm sewer where local authorities discovered a leaking underground storage tank was the source of the vapors. It was reported that 1,700 gallons of gasoline may have been released to the ground and sewer. Another incident occurred in 1990 when during a fire at the Veolia Energy (aka Trigen) site an electrical transformer fell through the floor spilling approximately 40 gallons of PCB contaminated oil. Sorbents were reportedly used to absorb the oil. While these incidents in and of themselves are considered to have a low potential to affect the streetcar construction the long history of industrial use, RCRA violations and hazardous waste generation at this facility cumulatively present a **medium potential** to affect the streetcar construction.

Due to the nature of the remaining four incidents they present no potential to affect the streetcar construction.

4.7 STATE AND TRIBAL LEAKING UNDERGROUND/ABOVEGROUND STORAGE TANK (LUST/LAST) LISTS

The MDNR maintains the LUST list, which contains an inventory of reported leaking underground storage tank incidents and the LAST list, which contains an inventory of reported leaking aboveground storage tank incidents. EDR identified 17 LUST sites and one LAST site on or within one-half mile of the streetcar route. Five of these sites have been issued No Further Action (NFA) letters by MDNR indicating that no additional work is necessary at the site. Of the remaining 12 sites, only four are within one-eighth mile of the streetcar route, which is approximately equivalent of two city blocks in distance. These sites are listed in Table 2.

Table 2: LUST Sites Within One-eighth Mile of the Riverfront Streetcar Extension Route

Facility Name/Address	Location Relative to Riverfront Streetcar Route	Additional Information
United Metro Inc. 301 Grand Avenue	Along Riverfront Streetcar Route	Site Closed in 1995
River Wharf	Along Riverfront Streetcar Route	Site subject of numerous investigations with no record of closure
Kansas City Cold Storage	0-1/8-mile, East	Site Closed in 1996
Tow Lot First and Lydia	0-1/8-mile, South	Site Closed in 1991

Two (i.e., Kansas City Cold Storage and the Tow Lot) of the four sites have a “site closed” note in their files. At these sites the closure occurred between 22 and 27 years ago, a NFA letter was never issued, and cleanup standards have changed since these sites were closed. For these reasons, it is possible that these sites may have impacted the streetcar route; however due to their locations they are considered to have a **low potential** to affect streetcar construction.

Of the other two sites (i.e., United Metro and River Wharf) the United Metro location has a “site closed” note in its file from 1995, while the River Wharf site has been the subject of numerous investigations with no record of closure. Based on the status and location of these sites they are considered to have a **medium potential** to affect streetcar construction.

It should be noted that the LUST database only includes USTs that are known to have leaked. Other USTs may be present along the streetcar route that do not appear on the LUST list or the registered UST list. These unlisted USTs may have been out of service since prior to USTs becoming formally regulated and their presence may be unknown to current property owners and/or occupants.

4.8 STATE AND TRIBAL REGISTERED STORAGE TANK LISTS

MDNR maintains the UST list, which contains an inventory of UST’s regulated under Subtitle I of RCRA and that must be registered with MDNR; and the Aboveground Storage Tank (AST) list, which contains an inventory of aboveground storage tanks. EDR identified 15 UST and no AST sites on or within approximately one-quarter mile of the streetcar route. Hg Consult determined that only three of these sites, all UST sites, are located on land within or immediately adjacent to the streetcar route. These sites are listed in Table 3.

Table 3: USTs Within or Adjacent to the Riverfront Streetcar Extension Route

Facility Name/Address	Location Relative to Riverfront Streetcar Route	Additional Information
United Metro Inc. 301 Grand Avenue	Along route	Three tanks reported as removed and one permanently closed in place. Also discussed in LUST section.
River Wharf	Along route	Tank status at this site is reported as unknown. Also discussed in LUST section.
Kansas City Cold Storage 500 East Third Street	Adjacent to route	Two tanks reported as removed. Also discussed in LUST section.

According to the EDR report, two of the three UST sites immediately along the proposed route previously had USTs; however, those USTs were removed or permanently closed in place. The former presence of USTs at the Cold Storage site is considered to have a **low potential** to affect streetcar construction. The other two sites (i.e., United Metro Inc. and River Wharf) are considered to have a **medium potential** to affect streetcar construction.

4.9 STATE AND TRIBAL INSTITUTIONAL CONTROL

This registry is maintained by MDNR. It includes sites that have activity and use limitations (AULs), which can include either engineering controls or institutional controls or both, registered with MDNR. EDR identified six sites with AULs within approximately one-half mile of the streetcar route; however, Hg Consult determined that only one of these sites is along the streetcar route EDR identifies the site as the Riverfront Park Development, 1200 and 1300 East Riverfront Drive. The EDR report notes that a Certificate of Completion was issued, with AULs, for the site in 2007. The Activity Use is described as a Monitoring Contract with Restrictive Covenants. The site is considered to have a **high potential** to affect streetcar construction.

4.10 STATE AND TRIBAL VOLUNTARY CLEANUP LISTS

The state Voluntary Cleanup Program (VCP) database include sites in Missouri that are in the VCP program which establishes a voluntary, risk-based system of remediation based on protection of human health and the environment relative to current and future uses of a particular site. EDR identified 16 VCP sites within approximately one-half mile of the streetcar route. Hg Consult determined that due to the distance, nature of contamination, location down or cross gradient or site status that 13 of the sites are considered to have a **low potential** to affect the streetcar construction. The remaining three sites are discussed in the following paragraphs:

- The Barrett Pitch Plant, Campbell and Front Streets, and the other two described sites are part of the Kansas City Former Manufactured Gas Plant (FMGP) complex on the north riverfront. Other portions of the site have been enrolled in the Brownfields Voluntary Cleanup Program (BVCP) by the Port Authority of Kansas City (see Riverfront Development Site) and by Missouri Gas Energy (MGE) and underwent remediation. The subject sight is a portion of a former pitch distillery and tar paper factory that closed prior to 1939. The property is now owned by the railroads. An underground tar well was found during test trenching in 2002. Honeywell, as corporate successor to Barrett Manufacturing, investigated and remediated the site with cooperation of the railroads and received a Certificate of Completion without restrictions from the MDNR in 2005. Based on the status of this site, nature of contamination and distance from the streetcar alignment this site is considered to have a **medium potential** to affect streetcar construction.

- The Kansas City Coal Gas site, 101 Campbell Street and 920 East First Street consists of three parcels: North, South, and the “Railroad Parcel”. Station A-North and South are both owned by MGE, which is a parent company of Southern Union, and are fenced and used for equipment and pipe storage. The FMGP operated from approximately 1868 to 1905 and was expanded from south to north during its operation period. No aboveground structures remain today, though the gas holder foundations can be observed. Underground tar holders were located and a plume of naphthalene at levels that exceeded groundwater standards extended north from Station A-South all the way to the Riverfront Park Development site. Investigations were performed by EPA contractors, MDNR, and the majority of investigations, were performed by MGE/Southern Union under the BVCP. Contaminants identified included: benzene, toluene, ethyl benzene, xylene (BTEX); coal tar; and semi-volatile organic compounds. The status of this site is listed as an Active Investigation in the EDR report. Based on the status of this site, nature of contamination and distance from the streetcar alignment this site is considered to have a **high potential** to affect streetcar construction.
- The Riverfront Park Development site, 1200 and 1300 East Riverfront Drive is the western 30-acre portion of an 80-acre site along the south of the Missouri River between the ASB Bridge and Interstate Highway 29 Bridge. The property had a longer history of industrial use including a pitch distillery, ammonia manufacturer, coal storage, various other manufacturing facilities and potential dumping ground for miscellaneous hazardous substances including asbestos and concrete spoils. The property was owned by the Port Authority of Kansas City and was enrolled in the BVCP to address potential contamination resulting from historic uses. Contaminants identified included: ammonia, asbestos, coal tar, construction/demolition wastes, cyanides, metals, polyaromatic hydrocarbons, petroleum and miscellaneous other constituents. The status of the site is listed as having received a Certificate of Completion in 2007 with associated AULs and a Restrictive Covenant. Based on the status of this site, nature of contamination and distance from the streetcar alignment this site is considered to have a **high potential** to affect streetcar construction. This site is also discussed further in Section 5.0 of this document.

4.11 STATE, TRIBAL, AND FEDERAL BROWNFIELD SITES

MDNR maintains a list of Brownfield sites where redevelopment and reuse is hampered by known or suspected contamination with hazardous substances. While many brownfield sites are minimally contaminated, potential environmental liability can be a problem for owners, operators, prospective buyers, and financial institutions. Because of the large number of these sites, their economic impact especially in heavily industrial areas is substantial. The EPA maintains a separate list of Brownfield sites. Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. The Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfield properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfield properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

There were 31 Brownfield sites identified by EDR, including both the State and Federal Brownfield databases. Hg Consult determined that due to the distance, nature of contamination, information provided, location down or cross gradient or site status that 29 of the sites are considered to have a **low potential** to affect the streetcar construction. The remaining two sites are discussed in the following paragraphs:

The Riverfront Park Development and Riverfront Park sites, 1200 and 1300 East Riverfront Drive/Riverfront Drive appear to likely be the same site. Information on the Riverfront Park Development site was presented in the previous section and Section 5.0 of this report. Based on the status of this site, nature of contamination and distance from the streetcar alignment this site is considered to have a **high potential** to affect streetcar construction.

4.12 OTHER EDR DATABASES OF NOTE

4.12.1 Local Lists of Hazardous Waste/Contaminated Sites

MDNR maintains a register of Clandestine Drug Laboratory (CDL) sites where incidents involving drug lab materials have been reported. One site at 501 East First Street was identified in the EDR report, however based on the location and distance of this site from the streetcar alignment this site is considered to have a **low potential** to affect streetcar construction.

4.12.2 EDR Manufactured Gas Plant (MGP) Database

The EDR Proprietary MGP database includes records of coal gas plants compiled by EDR's researchers. Manufactured gas plants were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

A review of the EDR MGP list revealed there are three MGP sites (Northeast of Intersection of Route 9 and East First Street; Guinotte Avenue, Gillis Street, East Third Street and Campbell Street; Northeast of Intersection of Gillis Street and East Third Street) within close proximity of the streetcar alignment and all are part of the Kansas City Coal Gas site discussed throughout other sections of this report. Based on the status of these sites, nature of contamination and distance from the streetcar alignment these sites are considered to have a **high potential** to affect streetcar construction.

4.12.3 EDR Historic Auto Database

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that are available to EDR researchers. EDR's effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Historic Auto list revealed there are 28 sites within close proximity of the streetcar alignment. Hg Consult determined that due to the distance, information provided, location down or cross gradient that 23 of the sites are considered to have a **low potential** to affect the streetcar construction. The remaining five sites are discussed in the following paragraphs:

The United Oil Company (aka United Metro Inc., Indelicato, Otto Nigro Filling Station, and Monark Gasoline & Oil Company) site (listed in the EDR report as two different sites), 301 Grand Avenue is identified in the EDR report as having been a gasoline service station from 1925-1998. This site was also previously discussed in Sections 4.7 and 4.8, and considered to have a **medium potential** to affect streetcar construction.

The Matt Schupfer Auto Repair (aka JL Evans Auto Repair) site (listed in the EDR report as two different sites), 110 East Third Street is identified in the EDR report as having been an automobile repair shop from 1920-

1925. Based on the length of time since this site was an automobile repair shop it is considered to have a **low potential** to affect streetcar construction.

The KCP&L Intake Station, 21 Grand Avenue is identified in the EDR report as having been a gasoline station in 1980 although this seems unlikely and may have been based upon erroneous data. This site is considered to have a **low potential** to affect streetcar construction.

4.12.4 EDR Historic Cleaner Database

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. Again, EDR's effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns but may not show up in current government records searches.

A review of the EDR Historic Cleaner list revealed there are eight sites within close proximity of the streetcar alignment. Hg Consult determined that due to the distance, information provided, location down or cross gradient that seven of the sites are considered to have a **low potential** to affect the streetcar construction. The remaining one site is discussed in the following paragraph:

Laundry & Chemical Supply Company Incorporated, 201 Grand Avenue is identified in the EDR report as having been a laundry supply and equipment dealer in 1961. Based on the described use and other historical uses (see Section 6.4) this site is considered to have a **medium potential** to affect the streetcar construction.

5.0 RIVERFRONT ENVIRONMENTAL DOCUMENTS

Documents provided by PortKC for the Riverfront Development Site were reviewed and included the following:

- Conestoga-Rovers & Associates. (2005, September). *Port Authority, REDI Site- Environmental Remediation, REDI Site Fill, Phase I Environmental Site Assessment Report*. This report includes a Phase I Environmental Site Assessment for a three acre parcel located at 1930 South 45th Street in Kansas City, Kansas where approximately 6,500 cubic yards of clean fill was removed and placed on the Riverfront Development Site.
- Assured Quality Title Company. (2007, September 13). *Declaration of Restrictive Covenant and Grant of Access*. This document formally recorded restrictive covenants and grant of access for the Riverfront Development Site with the Jackson County Recorder of Deeds (Appendix D). It summarizes waste response activities completed by the Port Authority of Kansas City (PAKC), the fact that because chemicals of concern would remain at levels above those appropriate for unrestricted use of the property the restrictive covenant was being recorded to protect public health and safety and the environment, and to prevent interference with the performance, operation, and maintenance of any future response activities selected and/or undertaken by the MDNR. It addresses:
 - Restrictions applicable to the property
 - Restricted residential use (i.e., no single family residential)
 - Vapor intrusion mitigation
 - No drilling or use of groundwater
 - Disturbance of soil permitted under approved contingency plan
 - Potential hazards
 - Alterations of property
 - Interfering activities
 - Emergencies

- o Grant of access to the MDNR and a number of other conditions

The document also includes:

- o Legal descriptions and property maps
- o A soil disturbance contingency plan stating that future site development activities may require special material management procedures
- o An institutional control contract between the PAKC and MDNR
- Belcher, Jim. (2007, September 18). Letter from Jim Belcher, MDNR, Brownfields/Voluntary Cleanup Section to Vincent Gauthier, Port Authority of Kansas City, Missouri. This letter is a Certificate of Completion for the Riverfront Park Development Site acknowledging filing of the Restrictive Covenant and Grant of Access for the site and to certify that, based upon submittals provided, the MDNR determined that the site as safe for all reasonably anticipated land use subject to activity and use limitations (AULs).

6.0 SUMMARY OF PAST USES OF THE STUDY AREA

Documents Hg Consult obtained information from records reviewed in order to identify uses along the streetcar route. The following sections summarize the previous uses along the streetcar route.

6.1 AERIAL PHOTOGRAPHS

Hg Consult obtained and reviewed historic aerial photographs from EDR. Hg Consult reviewed these aerial photographs to obtain information about the history of development along and in the vicinity of the streetcar route. Copies of aerial photographs are included in Appendix E.

Table 4: Summary of Aerial Photograph Review

1969	The area near Third and Grand appears much as it does today except that the northeast corner is occupied by three buildings. Grand Avenue appears to terminate at the ASB Bridge. The southern portion of riverfront area is predominantly developed with a number of rail lines. Surface soils on the northern portion of the riverfront area appear cleared of vegetation and the site of barge activity on the Missouri River. The Route 9 Missouri River Bridge had not yet been constructed. The eastern portion of the riverfront area is occupied by what was at the time the City Tow Lot. Roadways through the riverfront area are limited and unimproved.
1976	The area generally appears unchanged from the 1969 aerial photograph.
1983	The area generally appears unchanged from the 1969 and 1976 aerial photographs with the exception that the Route 9 Missouri River Bridge is under construction and surface soils on the northern portion of the riverfront area are becoming overgrown with vegetation.
1985	The area generally appears unchanged from the 1983 aerial photograph with the exception that construction of the Route 9 Missouri River Bridge appears to have been completed.
1991	The area generally appears unchanged from the 1985 aerial photograph.
1997	The Grand Avenue viaduct has been reconstructed, a number of rail lines have been removed, Berkley Riverfront Park is visible through a series of walkways and roadways, and the City Tow Lot is no longer present.

2006	Buildings on the northeast corner of Third and Grand have been replaced by a surface parking lot, the Berkley Riverfront Park area has been further developed, and surface soils appear disturbed on the southern portion of the riverfront area.
2009	The area generally appears unchanged from the 2006 aerial photograph with the exception that the Christopher S. Bond Missouri River Bridge is under construction.
2012	The area generally appears unchanged from the 2009 aerial photograph with the exception that Front Street has been extended into the riverfront area and construction of the Bond Bridge completed.
2015	The area generally appears unchanged from the 2012 aerial photograph.

Past uses evident in the aerial photos that could have impacted the streetcar route include a long history of industrial and railroad use, as well as, soil disturbance at different points in time.

6.2 FIRE INSURANCE MAPS

Hg Consult obtained fire insurance maps for the streetcar route from EDR. Hg Consult reviewed fire insurance maps between the years 1896 and 1969 to obtain information about the history of development at and adjoining the streetcar route. Only those past uses that are most likely to have the potential to have impacted the soil or groundwater along the proposed route or past uses involving tanks noted within a block of the proposed route are included in the following table. Copies of the fire insurance maps reviewed are included in Appendix F.

Table 5: Summary of Fire Insurance Map Review

Year	Addresses	Description
1896		
	224 East Front Street	Coal Yard
	209 Grand Avenue	Coal Storage
	200 Grand Avenue	Coal Storage
	East Front Street near Grand Avenue	Extensive Railroad Tracks and Operations Including Passenger and Freight Depots
	East of 250 East Front Street.	Two Coal Storage Areas
	820-22 East Front Street	S.E. Barrett Mfg. Co. Pitch Distillery and Tar Paper Mfg.
	Between East Front /East First Streets and Campbell/Gillis Streets	Kansas City Gas Light & Coke Co. Manufactured Gas Plant Complex
	North of East Front Street between Campbell/Gillis Streets	B.P. Clapp Ammonia Co.
1909		
	220 Grand Avenue	Junk Yard
	210 East Third Street	Junk Yard
1939		
	125 East Third Street	Welding
	301 Grand Avenue	Filling Station
	115 Grand Avenue	Kansas City Power & Light Grand Ave. Plant

	West of Grand Avenue on River Bank	U.S. Government Engineers Supply Depot/Wharf
	1106 Guinotte Street	Bulk Oil Station
1950		
		No Additional Findings
1969		
	201 Grand Avenue	Laundry Supply Co.

The historical uses identified above are considered to have a **medium to high** potential to affect the soil and/or groundwater along the streetcar route. Sites within the streetcar route with tanks may be noted on the Sanborn maps but may not have been required to register their USTs with MDNR depending on when the tanks were last used relative to when tank registration became mandatory. Therefore, there may be sites with tanks listed in the above table that do not have corresponding registrations in the MDNR UST database. Those USTs may have been out of service for so long that their presence may not be known to current owners and/or occupants. It should be noted that Sanborn maps are completed over irregular intervals of time. Businesses may come and go in the time in between the completion of two maps; therefore, there may be additional land uses with the potential to have impacted the soil and or groundwater of the streetcar route that would not be indicated on an existing map. Additionally, portions of the area of the streetcar route have been redeveloped multiple times over the past 100 plus years, so there is the potential that the tanks at some of these sites have been removed as they were encountered during redevelopment activities. Even so, standards used for cleanup have changed over the years and sites that had tanks removed more than 15 to 20 years ago may not meet current cleanup standards.

6.3 HISTORIC TOPOGRAPHIC MAPS

Hg Consult reviewed historic topographic maps obtained from EDR. Copies of topographic maps are included in Appendix G. The following paragraphs provide a summary of Hg Consult’s review of the historic topographic maps for the streetcar route.

Table 6: Summary of Historic Topographic Map Review

1890	Due to the scale of the topographic map, individual details in the streetcar route cannot be discerned; however, streets, what is now the ASB Bridge, railroad tracks and a wide Missouri River with what appears to be an island are visible within and near the entire streetcar route. Most of the alignment appears at the time to have been within the Missouri River.
1894	The Missouri River appears to have narrowed slightly by this time, but the topographic map appears generally unchanged from the 1890 topographic map.
1935	The topographic map shows more detail of the area of the streetcar route. Additional rail lines have been added, the Missouri River has further narrowed and with the exception of a small lake, ditch/depression area and unpaved road the majority of the riverfront area appears undeveloped.
1940	The topographic map appears generally unchanged from the 1935 topographic map.
1948	The topographic map appears generally unchanged from the 1940 topographic map.
1957	The riverfront lake is no longer present, although the ditch/depression area is still present and some buildings are depicted in the area. Further to the east the Paseo Missouri River Bridge has been added.

1964	The topographic map appears generally unchanged from the 1957 topographic map.
1970	The topographic map appears generally unchanged from the 1964 topographic map.
1975	The topographic map appears generally unchanged from the 1970 topographic map.
1995	The majority of railroad tracks near the base of Grand Avenue and First Street have been removed the rest of the topographic map appears generally unchanged from the 1975 topographic map.
1996	The topographic map appears generally unchanged from the 1995 topographic map with the exception of Grand Avenue extending east to the Paseo Bridge.
2015	The topographic map appears generally unchanged from the 1996 topographic map with the exception of the addition of the Grand Avenue Viaduct, Riverfront Drive and East Front Street.

Past uses evident in the topographic maps that may have impacted the streetcar route include a long history of rail yards being present in the area of the alignment. The historical railroad uses identified are considered to have a **medium potential** to affect the soil and/or groundwater along the streetcar route.

6.4 LOCAL STREET DIRECTORIES

Hg Consult obtained local street directories from EDR in an effort to identify prior occupants of the streetcar route. EDR often searches adjacent addresses within the same block or on a nearby intersecting street. A copy of the local street directory search is included in Appendix H. City Directories were searched for the following years: 1909, 1920, 1925, 1930, 1935, 1940, 1945, 1951, 1956, 1961, 1966, 1970, 1975, 1980, 1985, 1990, 1995, 2000, and 2006. The EDR summary report was reviewed for the presence of filling and/or service stations, drycleaners and other industrial or manufacturing uses that may have involved the use of hazardous materials or generation of hazardous wastes. The results are included in the following table, by address:

Table 7: Summary of Local Street Directory Review

Addresses	Year(s)	Use/Occupant
2 Grand Avenue	1920-1940	Mo Pac Railroad Co. Freight Depot KC Terminal Railway Freight Depot
100 Grand Avenue	1980-1990	Kansas City Power & Light Co. Warehouse
106 Grand Avenue	1980-1990	Kansas City Power & Light Co. Coal Storage
108 Grand Avenue	1940-1966	Kansas City Power & Light Co. Warehouse
115 Grand Boulevard/Avenue	1925-2000	Trigen-Kansas City Energy Corp. Kansas City Power & Light Co. Electrical Plant KC Rys Co. Power Station
128 Grand Avenue	1961-1990	Kansas City Power & Light Co. Transformer & Relay Station California Chemical Co.
201 Grand Avenue	1925-1985	Foster Engineering Co. Chemical Engineering Calprobe Corp. Manufacturing/Sales Temperature Sensors Laundry & Chemical Supply Co. George B Smith Chemical Works
222 Grand Avenue	1925	Acme Coal Co.

225 Grand Boulevard/Avenue	1980-2000	Western Adhesives
301 Grand Avenue	1925-1985	United Co. Gas Station Otto Nigro Filling Station Independent Oil & Gas Co. Filling Station Monark Gasoline & Oil Co. Filling Station
315 Grand Avenue	1930	Edward Mier Welding

The historical uses identified above are considered to have a **medium to high potential** to affect the soil and/or groundwater along the streetcar route. Petroleum products and/or solvents were likely associated with these uses. As noted in the Sanborn map discussion, tanks associated with these uses may not have been registered due to the span of time they were present at the address (prior to registration requirements). In addition, portions of the area of the streetcar route have been redeveloped multiple times over the past 100 plus years, so there is the potential that the tanks at some of these sites have been removed as they were encountered during redevelopment activities. Even so, standards used for cleanup have changed over the years and sites that had tanks removed more than 15 to 20 years ago may not meet current cleanup standards.

7.0 FINDINGS AND CONCLUSIONS

Based on a review of historical documents, the Riverfront Streetcar route was first developed for use prior to 1895 and is near the original town site of Kansas City on the Missouri River bank. Initial development included rail yards, manufactured gas/power facilities, dwellings, various manufacturing operations, food and produce operations and a gasoline service station. The Grand Avenue area has been continuously redeveloped since that time. There is the potential that some historical activities within the area may have impacted the Riverfront Streetcar route.

A multitude of former land uses within the streetcar route were identified using Sanborn fire insurance maps and city street directories. The most commonly observed historical uses with the potential to have impacted the streetcar route include manufactured gas operations, an ammonia plant, a tar plant, railroad yard operations, power generating facilities, chemical operations, cleaners and a filling station. These historical uses are considered to have a medium to high potential to affect the soil and/or groundwater along the streetcar route. It should be noted that Sanborn maps are completed over irregular intervals of time. Businesses may come and go in the time in between the completion of two maps; therefore, there may have been additional land uses with the potential to have affected the soil and or groundwater adjacent to and/or within the right-of-way where the streetcar project would be constructed that would not be indicated on an existing map. City directories were not searched for every available year or all potential addresses; therefore, the list of land uses with the potential to impact the soil and/or groundwater is not all-inclusive.

Tanks and/or contamination at some sites may have been removed during redevelopment activities or at other times with or without appropriate cleanup activities. Even if a cleanup did occur, standards used for cleanup have changed over the years and sites that had tanks removed more than 15 to 20 years ago may not meet current cleanup standards. If these former tanks were located immediately adjacent to the streetcar route, they have the potential to affect streetcar construction.

The following nine sites were identified by EDR and determined by Hg Consult to have a **medium or high** potential to affect the streetcar route:

- The **Kansas City Coal Gas SEMS/VCP site** located at East First Street and Campbell is the former location of a MGP and has been the subject of numerous investigations based on widespread subsurface contamination including semi-volatile organic compounds. Remediation has been conducted and a No Further Action letter with land use controls has been issued by the MDNR. Due to the location of this site, it is considered to have a **high potential** to affect the streetcar construction.
- The **Riverfront Park Development State and Tribal Institutional Control/VCP site**, 1200 and 1300 East Riverfront Drive is associated with contamination associated with a former MGP, pitch plant, and ammonia plant operations. The EDR report notes that a Certificate of Completion was issued, with Activity and Use Limitations (AULs), for the site in 2007. The Activity Use is described as a Monitoring Contract with Restrictive Covenants. The site is considered to have a **high potential** to affect streetcar construction.
- The **Central Feed & Grain SEMS Archive site** located at 616 East First Street was discovered by the EPA in 1982 and the subject of a EPA Site Investigation (SI) in 1984. Based on the findings of the SI the site was archived by the EPA in 1984. No other database records were identified since that time, but because it is immediately adjacent to the proposed streetcar alignment it has a **medium potential** to affect the streetcar construction.
- The **Veolia Energy Federal RCRA Generators and ERNS/SPILLS site**, 115 Grand Boulevard, is located along the streetcar route. This site is identified as a RCRA-CESQG, but has a long history of industrial use, has been a SQG in the past, and has a history of RCRA violations. Hazardous wastes generated at the site include: spent non-halogenated and halogenated solvents, ignitable waste, corrosive waste, mercury, selenium, and thiourea. The facility has historically received notices for what appear to have been relatively minor RCRA violations. In 1998 approximately three gallons of lubricating oil was spilled when a circulation pump failed. The release was contained and limited to the three gallons. In 1997 a similar incident occurred when approximately six gallons of lubricating oil was spilled. In 1997 a caller reported that a mechanical failure resulted in the loss of #2 fuel oil from a pressurized delivery system approximately 500 gallons was released and cleaned up with absorbent pads yet approximately 200 gallons reached a combined storm/sanitary sewer. In 1996 a caller reported gasoline vapors in the storm sewer where local authorities discovered a leaking underground storage tank was the source of the vapors. It was reported that 1,700 gallons of gasoline may have been released to the ground and sewer. Another incident occurred in 1990 when during a fire at the Veolia Energy (aka Trigen) site an electrical transformer fell through the floor spilling approximately 40 gallons of PCB contaminated oil. Sorbents were reportedly used to absorb the oil. While these incidents in and of themselves are considered to have a low potential to affect the Riverfront Streetcar construction the long history of industrial use, RCRA violations and hazardous waste generation at this facility cumulatively present a **medium potential** to affect the streetcar construction.
- The **Robert Foster Living Trust RCRA Generators site**, 201 Grand Avenue, is located along the streetcar route. This site is identified as a RCRA Non-generator site that was historically the location of a LQG of hazardous wastes that included 16 different hazardous waste codes. The facility reportedly did not have any reported RCRA violations. Based on these findings the site is considered to have a **medium potential** to affect the streetcar construction.
- The **United Metro LUST site**, at 301 Grand Avenue, is near the southern terminus of the streetcar route and has a long history of occupancy as a gasoline filling station. A “site closed” notation was issued in 1995. Based on the site closed date and long history of occupancy the site is considered to have a **medium potential** to affect the streetcar construction.

- The **River Wharf LUST site**, at Second and Grand Avenue is very near the proposed route and has been the subject of numerous investigations with no record of closure. Based on the status and location of this site it is considered to have a **medium potential** to affect the streetcar construction.
- The **Barrett Pitch Plant VCP site**, Campbell and Front Streets, as well as the Riverfront Development and Kansas City Coal Gas sites described at the beginning of this section are part of the Kansas City Former Manufactured Gas Plant (FMGP) complex on the north riverfront. Other portions of the site have been enrolled in the Brownfields Voluntary Cleanup Program (BVCP) by the Port Authority of Kansas City (see Riverfront Development Site) and by Missouri Gas Energy and underwent remediation. The subject sight is a portion of a former pitch distillery and tar paper factory that closed prior to 1939. The property is now owned by the railroads. An underground tar well was found during test trenching in 2002. Honeywell, as corporate successor to Barrett Manufacturing, investigated and remediated the site with cooperation of the railroads and received a Certificate of Completion without restrictions from the MDNR in 2005. Based on the status of this site, nature of contamination and distance from the streetcar alignment this site is considered to have a **medium potential** to affect streetcar construction.
- The **Laundry & Chemical Supply Company Incorporated site**, 201 Grand Avenue is identified in the EDR report as having been a laundry supply and equipment dealer in 1961. Based on the described use and other historical uses of this site it is considered to have a **medium potential** to affect the streetcar construction.

7.1 NO BUILD ALTERNATIVE

Under the No Build Alternative, no construction or excavation would occur within the right-of-way that would disturb any potentially impacted soils or groundwater. Any contaminants present would be left in place.

7.2 BUILD ALTERNATIVE

The EDR search identified multiple potentially contaminated sites in the study area, adjacent and/or in the right-of-way within which construction is proposed. Construction of the streetcar trackway and stops would involve ground disturbance to a depth of approximately 18 inches. Construction of the power substation, installation of catenary poles, and utility relocations could involve excavations to depths greater than 18 inches. During utility upgrade or relocation work, excavations deeper than 18 inches could increase the risk of encountering contaminated materials.

Within the right-of-way where the streetcar improvements would be constructed, potential contamination is less likely to be encountered within the top 18 inches below the surface than at depths greater than 18 inches, because potential sources of contamination from these sites is likely set back substantially from the edge of the right-of-way and proposed streetcar tracks such that past releases would be unlikely to have migrated that distance horizontally. In addition, a large amount of clean fill has been placed upon the riverfront portion of the track alignment at the location of the Riverfront Park Development.

The evaluation of further investigations in the form of agency file searches or a Phase II (subsurface) ESA, which could include soil and groundwater testing, is recommended for those areas that could involve excavations to depths greater than 18 inches near the nine EDR sites identified. Should these activities reveal the presence of hazardous materials, mitigation and clean up measures would be defined in conjunction with the MDNR. In addition, any work within the area of the Riverfront Park Development site should follow the Soil Disturbance Contingency Plan for the site and may require coordination with the MDNR's Brownfields/Voluntary Cleanup Section due to activity and use limitations (AULs) as described in Section 5.0 and Appendix D of this report.

If unanticipated sources of hazardous or regulated materials are encountered during construction activities, the construction manager or designee would immediately notify the City's Environmental Compliance Division. Specific mitigation activities, which address the type, level, and quantity of contamination encountered, would be immediately implemented. The handling, treatment, and disposal of any hazardous materials would occur in full compliance with all federal, state, and local requirements. The discharge of any wastewater suspected of containing hazardous/regulated materials is prohibited without first obtaining a National Pollution Discharge Elimination System (NPDES) Permit through the MDNR covering the one-time discharge of wastewater containing known and specific hazardous constituents. Such a permit may be obtained from the MDNR providing the discharge is well characterized, meets discharge standards, and does not pose a threat to the ultimate surface water body receiving the discharge. If fill material is required in construction of the proposed streetcar facilities, the construction contractor would be required to ensure that the sources of any fill material are free of contamination



APPENDIX A: PREPARER QUALIFICATIONS



APPENDIX B: STREETCAR ROUTE LOCATION MAP



APPENDIX C: EDR DATABASE REPORT



APPENDIX D: RIVERFRONT DEVELOPMENT SITE DECLARATION OF RESTRICTIVE COVENANT AND GRANT OF ACCESS



APPENDIX E: HISTORICAL AERIAL PHOTOGRAPHS



APPENDIX F: SANDBORN MAP SEARCHES



APPENDIX G: HISTORICAL TOPOGRAPHIC MAPS



APPENDIX H: CITY DIRECTORY SEARCHES