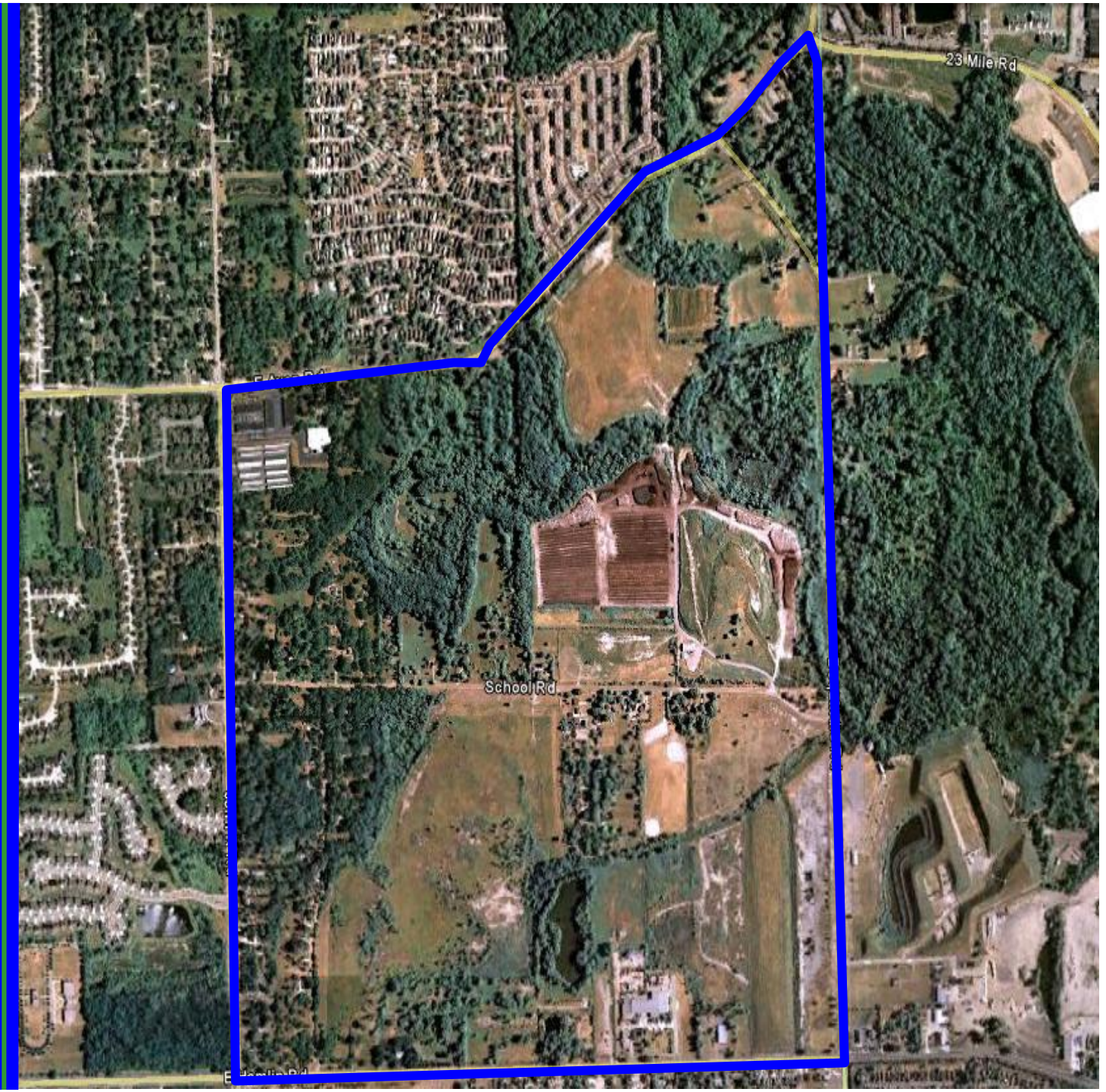
Environmental Concerns Inventory for the Rochester Hills Landfill Planning Area

Rochester Hills, Michigan



Environmental Concerns Inventory
Rochester Hills Landfill Area
Rochester Hills, Michigan

September, 2010

Report Prepared For:

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ASTI ENVIRONMENTAL

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List of Acronyms

ASTI	ASTI Environmental
AUL	Activity and Use Limitations
BEA	Baseline Environmental Assessment
BFRA	Brownfield Redevelopment Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERCLIS-NFRAP	No Further Remedial Action Planed
MDNRE	Michigan Department of Natural Resources and Environment
EAF	Electric Arc Furnace
ECI	Environmental Concerns Inventory
EDR	Environmental Data Research
ERNS	Emergency Response and Notification System
ESA	Environmental Site Assessment
ESI	Expanded Site Investigation
FAR	Floor to Area Ratio
J&L	Jones and Laughlin
JLLF	Jones and Laughlin Landfill
KDLF	Kingston Development Landfill
LSRLF	Local Site Revolving Loan Fund
LUST	Leaking Underground Storage Tank
MBT	Michigan Business Tax
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
NPL	National Priorities List
PCBs	Polychlorinated Biphenyl's
PNAs	Poly-nuclear Aromatics
QLUG	Qualified Local Unit of Government
RCRA	Resource Conservation and Recovery Act
RCRA-CORRACT	RCRA Corrective Action, hazardous waste handlers with corrective action activities
RCRIS	Resource Conservation and Recovery Information System
RDC	Residential Direct Contact
RHBRA	Rochester Hills Brownfield Redevelopment Authority
RI	Remedial Investigation
ROD	Record of Decision
RRD	Remediation and Redevelopment Division
SFLF1	Sandfill Landfill #1
SFLF2	Sandfill Landfill #2
SHWS	State Hazardous Waste Sites
SOCRRA	South Oakland County Resource Recovery Authority
SSI	Site Screening Inspection
STLF	Stand's Trucking Landfill (Six Star Landfill)
SVE	Soil Vapor Extraction
SVOCs	Semi-Volatile Organic Compounds
SWF/LF	Solid Waste Facility/Landfill
TIF	Tax Increment Financing
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOCs	Volatile organic Compounds

EXECUTIVE SUMMARY

With over 520 acres of landfills within its boundaries, the City of Rochester Hills (the City) has taken numerous steps to identify possible reuse strategies and encourage redevelopment of the landfills and surrounding area. Actual and perceived environmental contamination and concern over how environmental impacts limit redevelopment options have limited redevelopment in and around these landfills. To take the next step in addressing this issue, the City commissioned this Environmental Concerns Inventory (ECI) to evaluate the environmental impacts in the area with the highest number of landfills in the City.

This ECI assesses environmental impediments to redevelopment, identifies properties with the highest potential for development, identified potential redevelopment strategies based on environmental impacts, determines changes required to the existing area-wide plan, and identifies incentives for redevelopment on contaminated properties.

Located north of Hamlin Road, east of John R Road, west of Dequindre Road, and south of Avon Road, the Landfill Planning Area occupies the eastern edge of Rochester Hills. This ECI focuses on a Study Area of 59 parcels located in the Landfill Planning Area and includes nine landfills covering approximately 414 acres.

ASTI inspected properties from the public right-of-way, and reviewed federal and state databases and existing records at the City and the Michigan Department of Environmental Quality to

Security Gate at the SOCRRA Landfill in Rochester Hills, MI

complete this assessment. This assessment resulted in the identification of the following general types of environmental concerns in association with specific properties:

- Identified impacts to the soil or groundwater from historical operations during landfill and industrial use, including current and historical municipal solid waste disposal at eight of the nine landfills;
- Suspected impacts to the soil or groundwater from historical operations such as a woodfill landfill, industrial uses, or a former railroad right-of-way;
- Migrated impacts on properties located immediately downgradient of an impacted site, particularly on properties east of the landfills;

- Installed infrastructure or remediation systems that may limit redevelopment on a property: and
- Properties with no identified impacts or historical issues.

The identified environmental concerns indicate that further site specific investigation activities (e.g., Phase I Environmental Site Assessment (ESA), Phase II Investigation, Baseline Environmental Assessment (BEA), etc.) on select parcels are necessary to determine the nature and/or extent of actual impacts. In addition, areas where historic waste disposal activities have occurred will require engineering assessments for development to occur on the unstable fill materials. The need for site-specific additional investigation will be determined by the proposed future use, construction methods, and the historical uses on each parcel and the adjacent parcels.

Several sites, especially those along Hamlin Road, School Road, and in the northeast corner of the Study Area, have a high potential for redevelopment with fewer environmental concerns. Further investigations, controls, or remediation may be required on sites such as in the southeast corner, where previous studies have recommended the creation of a business/industrial park. Some of the sites with the most significant contamination issues have limitations that will prohibit development beyond use as green space or passive recreation, including existing remediation or control equipment, steep slopes with deteriorating caps, or the presence of extensive waste materials.

Addressing environmental impediments to redevelopment in this area will require a coordinated effort between the City and private developers. The costs of assessment, remediation, and redevelopment will be higher than comparable Greenfield properties due to the existing impacts, but these costs can be off-set by the use of area-wide incentive programs. These incentives include grants, tax increment financing, and tax credits.

Brownfield redevelopment tools available in Michigan make this an ideal time to prepare a coordinated plan for redevelopment in the Landfill Planning Area. Taking advantage of tax and grant tools for properties with immediate redevelopment potential could provide funding in the future for those properties with extensive environmental challenges. Grants can be used to conduct assessments throughout the area, or to conduct remediation activities on specific properties.

Creating a Brownfield Plan for the entire Landfill Planning Area will allow developers and the City to capture incremental taxes generated on those parcels where redevelopment occurs. Utilizing a local site revolving loan fund (LSRLF) or a land bank authority can allow the City to use addition resources to conduct assessment and remediation on properties that are undevelopable. Developing an area-wide Brownfield Plan can also provide an incentive to development by permitting developers to apply for the Michigan MBT Brownfield Tax Credit.

The City of Rochester Hills would like to give a special thanks to Oakland County who partially funded this study.

Please note that an interactive base map depicting the subject parcels and associated environmental concerns is also included with the ECI and will be made available online. The map contains the figures in this report including the extents of the landfills, current remediation methods, and known contamination.

1.0 Introduction to the Environmental Concerns Inventory

1.1 Background

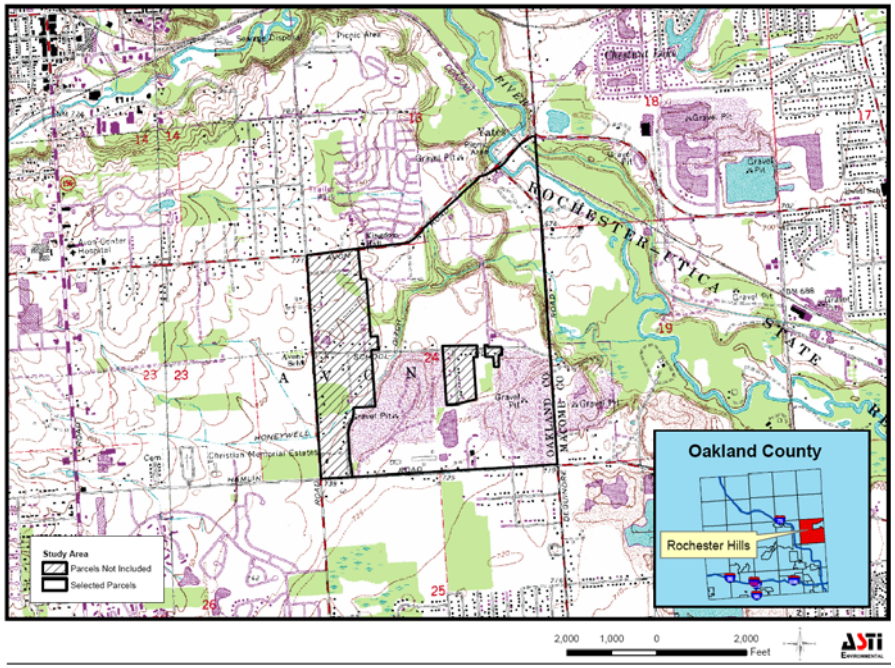
Approximately 520 acres of landfills are located within the City of Rochester Hills (the City), the majority of which are closed. Redevelopment in these landfill dominated areas has lagged behind the rest of the City, partially due to the actual and perceived environmental contamination and concern over how environmental impacts limit redevelopment options.

The City has taken numerous steps to identify possible reuse strategies and to encourage redevelopment of the landfills and surrounding area. In 1999, the City created a Landfill Areas Reuse Strategy as one part of the update to the City's Master Plan. This Landfill Areas Reuse Strategy was one of four special studies to focus on important planning areas in the City.

The purpose of the study was to examine the context of the landfill settings, recommend reasonable reuses, and outline a strategy for transforming the landfill sites to the preferred uses. The study identified two areas of the City: approximately 414 acres of landfills along the eastern edge of the community between Hamlin and Avon Roads and approximately 107 acres of landfills at the western portion of the community along M-59 at Hamlin and Adams Roads.

In order to address these environmental challenges to redevelopment in the Landfill Planning Area, the City commissioned

Figure 1.1, Landfill Planning Area Location Map



this Environmental Concerns Inventory (ECI) for the first area with the largest concentration of landfills. Figure 1.1 shows the location of the Landfill Planning Area. This ECI focuses on 59 parcels within the Landfill Planning Area with the highest potential for redevelopment or the greatest challenges to redevelopment.

1.2 Purpose and Objectives

The objectives of this Environmental Concerns Inventory are to:

1. Assess environmental impediments to redevelopment;
2. Identify properties with the highest potential for development;

3. Identify potential redevelopment strategies based on environmental impacts; and
4. Identify a strategy to obtain incentives for redevelopment on contaminated properties.

This ECI is not intended to represent a level of all appropriate inquiry necessary to provide environmental liability protection for any properties acquired. Nor does this inventory provide sufficient information to determine controls or remediation required on any specific parcel. Redevelopment of any parcel within the Study Area will require the completion of a Phase I Environmental Site Assessment (ESA) and, if necessary, further site investigations and completion of a Baseline Environmental Assessment (BEA) and Due Care Plan as required by Part 201 of Michigan Act 451.

1.3 Landfill Planning Area

The Landfill Planning Area is located north of Hamlin Road, east of John R Road, west of Dequindre Road, and south of Avon Road in Sections 13 and 24 within the City of Rochester Hills, Oakland County, Michigan (Figure 1.1). This area contains 182 parcels of property and nine known landfills. Of these parcels, the Environmental Concerns Inventory focused on 59 former or current landfill, industrial/commercial or residential parcels.

The parcels were selected because they had been historically used as a landfill or were proximate to a landfill. Consequently, the residential developments on Parke Street and along John R Road were not included in this inventory.

Figure 1.2 identifies the zoning for the Study Area and the property ID (see Appendix A for full parcel information). The parcels in the Study Area are zoned for Residential, Business, or Industrial use. Currant land use on the parcels includes commercial and industrial operations, single family residential housing, and vacant land. Figure 1.3 illustrates the proposed future zoning for the Study Area.

1.4 Landfills in the Study Area

The Study Area contains nine landfills that cover twenty parcels. Figure 1.4 identifies the location and extent of fill material of these landfills, including:

1. Southeast Oakland County Incinerator Authority (SOCRRA) Landfill on Avon Road
2. SOCRRA Landfill on Dequindre Rd
3. SOCRRA Yard Waste Composting Landfill
4. Highland Park Woodfill
5. Sandfill Landfill #1 (SFLF1)
6. Sandfill Landfill #2 (SFLF2)
7. Jones and Laughlin Landfill (JLLF)
8. Kingston Development Landfill (KDLF)
9. Stan's Trucking Landfill (STLF)

The Landfill Areas Reuse Strategy identified the ideal reuse of the landfills as follows:

- Golf Course for the SOCRRA landfills on Dequindre and Avon Road
- Environmental Park on the STLF to include habitat restoration and environmental education
- Continued operation of the SOCRRA Leaf Compost Landfill with enhanced buffers and on site linkages between the golf course and other proposed green spaces
- Residential development on the Highland Park Woodfill;
- Business/Industrial park development on SFLF1, SFLF2, JLLF, and KDSF

Figure 1.2, Current Zoning for the Study Area with Property IDs

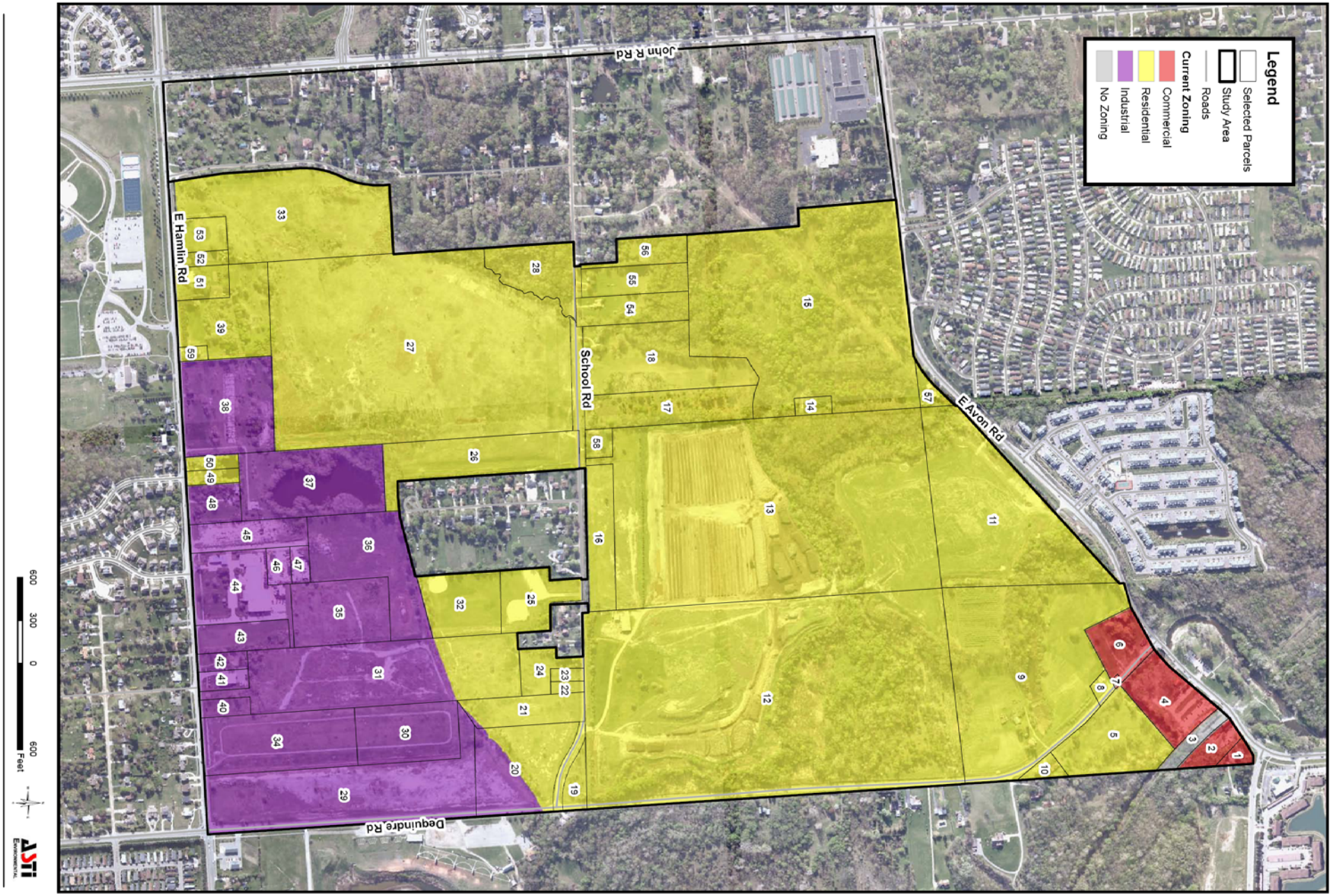


Figure 1.3, Proposed Future Zoning for the Study Area

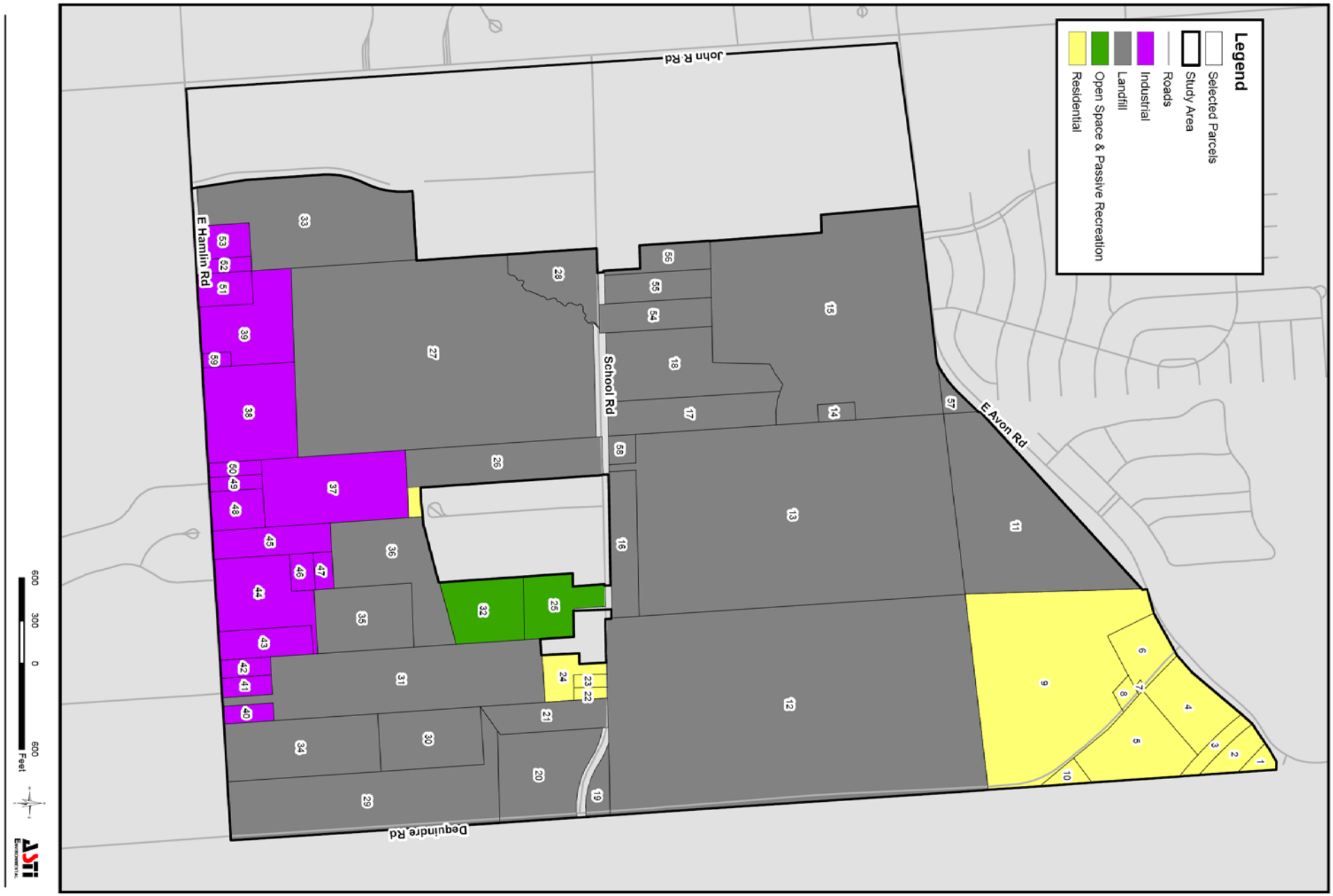


Figure 1.4, Landfill Locations and Permitted Extents

2.0 METHODOLOGY

The Environmental Concerns Inventory used four methods to collect the environmental data: a visual site inspection; an environmental database search; a review of publicly available current and historical file information from the City, as well as federal, state, and local agencies; and a review of other data sources. Each of these data sources provided information on historical site usage, site contamination measured during previous studies, or area wide data that provides insight into contaminant migration.

2.1 VISUAL SITE INSPECTION

A windshield survey in of the Landfill Planning Area was conducted in May of 2010 to observe current site conditions. All observations were conducted from public right-of-ways and access to the properties was not obtained. The objectives of this survey were to identify currently site development, determine potential environmental impacts from current operations, and observe site conditions (such as stressed vegetation) that may indicate environmental impacts or stress.

2.2 DATABASE SEARCH

Environmental Data Research (EDR) conducted a database search to identify potential and confirmed sources of contamination from historical operations within the Landfill Planning Area. EDR provided ASTI with a Radius Map that plots the results found within a specified search radius to show a spatial representation of the results. A copy of the EDR Radius Map report was provided to the City of Rochester Hills. The following state and federal environmental databases were reviewed through the EDR report:

- Federal National Priority List (NPL) - A listing of the highest ranking contamination site targeted from federal clean-up action
- Federal Comprehensive Environmental Response, Compensation, and Liability Information System List (CERCLIS) – A listing of potential uncontrolled hazardous waste sites
- Federal Comprehensive Environmental Response, Compensation, and Liability Information System – No Further Remedial Action Planned (CERCLIS-NFRAP) - Archived sites that have been removed and archived from the CERCLIS database
- Federal Resource Conservation and Recovery Act Corrective Action (RCRA CORRACT) – Hazardous waste handlers with corrective action activities
- Federal Resource Conservation and Recovery Information System List (RCRIS) – A listing of permitted RCRA hazardous waste treatment, storage, and disposal facilities, and RCRA generators of hazardous and non-hazardous waste

- Federal Institutional Controls/Engineering Controls Sites List, sites with institutional/engineering controls in place
- Federal Emergency Response and Notification System (ERNS) – Reported releases of oil and hazardous substances
- State Hazardous Waste Sites (SHWS) – State equivalent to CERCLIS
- State Solid Waste Facility/Landfill (SWF/LF) – Listing of active and inactive solid waste facilities
- State Leaking Underground Storage Tank List (LUST) – A listing of confirmed releases from underground storage tank systems
- State Underground Storage Tank List (UST) – A listing of registered underground storage tank systems
- State Activity and Use Limitations (AUL) – Sites with engineering and institutional controls
- State Brownfields—Industrial or commercial parcels that are abandoned, inactive, or underutilized, on which expansion or redevelopment is complicated due to the actual or perceived presence of contamination
- State Baseline Environmental Assessment (BEA) Sites – A listing of sites which have contamination exceeding the Michigan Part 201 Residential Cleanup Criteria

The database review included the review of aerial photographs of the Landfill Planning Area. Copies of these photographs are included in Appendix B. Photographs reviewed included:

- 1937, 1940, 1949, 1959, 1961, 1964, 1967, 1972, 1980, 1994, 2000, and 2005 aerial photographs

2.3 File Reviews

A review of records obtained through the following City of Rochester Hills offices provided information on the historical uses of each sites.

- Assessors Department
  - An assessment includes the use of the property, the presence and size of any current or previously existing buildings, and ownership information.
- Building/Planning/Zoning Department
  - Different land uses and building types require specific permits and approvals. Documents such as permits and site plan can show how the property has historically been used.
- Engineering Department
  - This also involved the review of documents such as permits, site plans, and building specifications.

A review of records obtained through the Michigan Department of Natural Resources and the Environment (MDNRE) Remediation and Redevelopment Division (RRD) provided additional information on the historical uses of each property.

- Part 201 Sites
  - Includes information regarding sites that have known or suspected chemical releases which have either been assessed or had remediation conducted under part 201 of Michigan Public Act 451 of 1994.
- Waste Management
  - Includes records regarding known and permitted wastes disposal sites.
- Underground Storage Tanks

  - Includes records of underground storage tanks installed under Part 211 of Michigan Public Act 451 of 1994 and known leaking underground storage tanks.

2.4 Other Data Sources

Additional sources of data that were reviewed during the completion of this inventory include:

- A USGS 7.5 Minute Topographic Map for the parcels included in the Landfill Planning Area and surrounding area.
  - A topographic map describes the surface shape and features of a given area with details on elevation changes, the slope of the land, and the presence of permanent, temporary, or man-made water features. This provides information on how contamination may be aggravated or move due to changes in the land.

2.5 Data Gaps

A few limitations exist on the data collected. Site observations were limited to what could be observed on each parcel from a public right-of-way or aerial photos because access to the parcels was not obtained. In addition, interviews with property occupants/owners were not conducted. Thus an evaluation of specific operations and material handling practices could not be completed beyond the use of the identified data sources.

The soil, soil vapor, and groundwater sampling data reviewed were conducted more than five years ago. New samples were not collected as part of this study. Therefore, current environmental conditions at individual sites may differ from that identified in historical data.

Historical Sanborn fire insurance maps were requested for the area. However, searches conducted for these maps did not locate any available maps for the Landfill Planning Area.

3.0 PROPERTY ASSESSMENTS

Based on an assessment of the available information, properties in the Study Area exhibited one or more of the following general types of environmental concerns:

- Identified soil or groundwater impacts from historical operations during landfill and industrial use;
- Suspected impacted soil or groundwater on properties where historical operations occurred;
- Possible migrated impacts immediately downgradient of an impacted site; and
- Properties with no identified impacts or historical issues on certain properties;

An evaluation of individual parcels is provided below.

3.1 PROPERTIES WITH KNOWN IMPACTS

Of the nine landfills included in the Landfill Planning Area, eight landfills have either confirmed or suspected impacts to soil and groundwater. These are the only parcels in the Study Area where soil and groundwater sampling data was available from public sources.

*An **underdrain** is a slotted pipe underneath a landfill used to remove ground water. This prevents the water from infiltrating the landfill and becoming contaminated.*

Figure 3.1, Stan's Trucking Landfill is located on properties 33, 27, and 26

Because of these known impacts, the twelve parcels that include the landfills, as well as adjacent and downgradient parcels, will require extensive assessments to determine the nature and extent of impacts. Although some landfills already have controls or use restrictions, they could require the installation of additional controls or remediation and may require restrictions on future use. The following sections provide a brief summary of each of these parcels.

3.1.1 Stan's Trucking Landfill

Located in the southwestern corner of the Landfill Planning Area, is the former Stan's Trucking Landfill (STLF) property. This property presents the most significant environmental challenges within the Landfill Planning Area. The Landfill covers three parcels (property IDs 26, 27, & 33 in Figure 3.1).

The STLF property housed gravel pit operations sometime before 1937. At the end of sand and gravel production, portions of the gravel pit had been extended below the groundwater level. By approximately 1966, operations were suspended at the gravel pit and Stan's Trucking began utilizing the property for the disposal of municipal solid waste. When landfill operations began in 1966, the operators did not install a liner in the gravel pit. Stan's obtained a permit to operate the landfill from the State of Michigan in approximately 1970. In 1974 or 1975, Oakland County Health Department detected contamination in nearby residential wells.

Following this in 1976, a groundwater study identified the STLF property as the source of the impacts to the residential wells. This study also found the same impacts in the groundwater entering the underdrain of the adjacent South Oakland County Conservation Resource Recovery Authority (SOCRRA) Yard Waste Composting Landfill. The Michigan Department of Natural Resources (MDNR) ordered the STLF closed on June 2, 1975. By this time the landfill operations had resulted in the creation of a large hill having been created on the southeastern portion of the central parcel of the STLF, as illustrated by the green line in Figure 3.1.

A new operator, Six Star Limited, placed a five foot thick compacted clay liner under the north and east portions of the property and resumed landfill operations in 1976. Six Star ceased operations of the landfill in 1981 or 1982 and covered the landfill with approximately 2 feet of clay. Six Star's operations resulted in a relatively level "plateau" north of the hill created by Stan's Trucking, as illustrated by the orange line in Figure 3.1.

RDC criteria *is the maximum concentration of contaminants the MDNRE has determined is acceptable in a residential setting for skin contact by children and adults, based on typical long term exposure to the environmental media concerned (i.e. soil).*

In January 1992, the MDNR issued a Screening Site Inspection (SSI) report. The SSI involved the collection of soil, groundwater, surface water, and sediment samples from the STLF property. The surface soil samples collected during the SSI indicated elevated levels of volatile organic compounds (VOCs) and metals. During the SSI, several monitoring wells that had previously been installed on the property were sampled. Groundwater samples from down-gradient wells located along the eastern property boundary with the Parke Street residences indicated the presence of VOCs, including benzene and chloroethane. Surface water samples collected from the adjacent Honeywell drain contained elevated levels of metals.

*The **MDNR** was originally tasked with the stewardship of Michigan's natural resources including enforcement of environmental regulations. In 1995, the **MDEQ** was formed to oversee environmental regulations. These two departments were recombined in 2010 to become the MDNRE.*

In 1997, the Michigan Department of Environmental Quality (MDEQ) completed a Brownfield Redevelopment Assessment (BFRA) of the property. During the BFRA, surface soil samples collected across the property indicated concentrations of arsenic in exceedance of the current Michigan Part 201 of Act 451 generic residential direct contact (RDC) criteria. The MDEQ collected eight subsurface soil samples during the BFRA. Of these subsurface samples, six had arsenic concentrations exceeding the RDC criteria for arsenic, one exceeded the RDC criteria for lead, and two exceeded the RDC criteria for benzo(a)pyrene. One sample did not have any contaminants that exceeded any RDC criteria. Groundwater was not assessed during the BFRA.

In 2000, the MDEQ conducted a Remedial Investigation (RI) of the STLF property. This investigation assessed and sampled nine groundwater wells located on the property. The RI also assessed the landfill cap and located and inspected all methane vents. The RI determined that VOC groundwater concentrations did not exceed the RDC criteria. However, the groundwater did contain metals above the RDC criteria. Groundwater flow was shown to flow

***The Federal Superfund List** is composed of sites with hazardous substances that exceed the federal screening criteria and pose the most risk to public health and the environment. Long-term monitoring is often required after a superfund site is remediated.*

***A consent decree** is a judicial statement that expresses a voluntary agreement by the participants in a suit to clean up a site that contains hazardous substances. It often occurs when a company is sued by or compelled to comply with a governmental organization.*

***Deed restrictions** are placed by the owner of a property to prevent a future owner from conducting certain activities on site. Owners of contaminated sites place these restrictions to protect human health and prevent exacerbation of existing conditions.*

primarily to the east.

The RI also noted that although the landfill cap had an average thickness of three feet, the composition was inconsistent and would likely not meet the requirements for a Type II landfill cap as required by P.A. 451 Part 115. In addition, several areas had visible refuse at the surface as a result of erosion. Methane was also observed to be escaping from the landfill. At that time, the nine methane vents installed during the capping of the landfill appeared to be in functional condition.

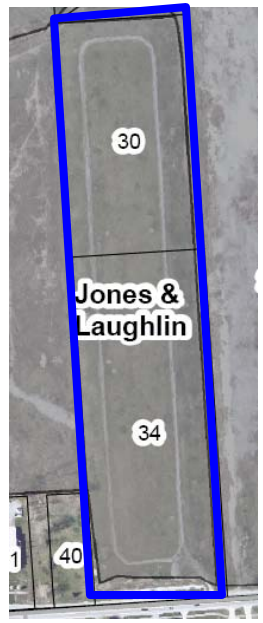
In April 2000, a residence located adjacent to the STLF property along Parke Street caught fire. The local Fire Marshall determined that a buildup of methane gas in the basement of the house caused the fire. The MDEQ, in a subsequent investigation, determined that the methane source came from the STLF property. Further investigations identified four other adjacent houses with elevated methane concentrations in their basements. In June 2000, an emergency remedy for the methane was installed on the city owned parcel of the STLF (property ID 26 in Figure 3.1) .

This emergency remedy consisted of a soil vapor interceptor trench and soil vapor extraction system. A flare was added to the SVE system in August 2000. Since that time, the SVE system and flare have been in operation. In addition, the methane concentrations in soils on the residential parcels are monitored every other week and the interceptor trench and landfill are monitored on an as needed basis. The emergency remedy appears to have successfully reduced the methane concentrations beneath the residences along Parke Street based on the Michigan Department of Natural Resources and Environment (MDNRE) monitoring reports.

3.1.2 Jones and Laughlin Landfill

The Jones and Laughlin Landfill (JLLF) is located near the southeastern corner of the Landfill Planning Area (property IDs 30 & 34 in Figure 3.2). JLLF is currently listed on the Federal Superfund List and is subject to two consent decrees and a deed restriction. With these restrictions, this property poses the most challenges to future development.

Figure 3.2, JLLF is on properties 30 and 34



Prior to June 1951, the property was owned by Underwood Sand and Gravel and utilized as a sand and gravel mine. In June 1951, Underwood received permission from Avon Township (Now the City of Rochester Hills) to begin disposing steel slag in the pit. In 1959, Jones and Laughlin Steel purchased the property to continue disposing steel slag from their Warren, MI Plant. In 1968, Jones and Laughlin Steel began disposing of baghouse filter dust from their electric arc furnaces (EAF)

at the JLLF property. Slag and EAF dust is waste leftover from the production of steel. It often contains high levels of heavy metals that can contaminate soil and groundwater if not disposed of correctly.

This disposal was carried out under a special use permit issued by Avon Township that allowed for the disposal of only inert materials in portions of the pit below the groundwater table. Inert materials do not react with the environment or surrounding chemicals. EAF dusts are not inert and disposal was not permitted below or within two feet above the water table. It is not known if the operators followed this restriction. Disposal of EAF dust and slag continued until approximately November 1980. The landfill was then closed and a two foot thick cap of clay placed over the entire landfill.

In June 1981, Jones and Laughlin completed a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) notification for the property. In July 1983, a preliminary site assessment was conducted, followed by a Site Inspection (SI) in June 1984. Based on the SI, the site was ranked with a score of 31.65 in the Hazard Ranking System.

Based on this ranking, the United States Environmental Protection Agency (USEPA) listed the site on the National Priority List (NPL) in June 1986. In 1991, the USEPA initiated an RI to determine the nature and extent of the contamination at the JLLF property. The RI identified surface and subsurface soils that contained heavy metals (arsenic, mercury, lead, and chromium) and groundwater impacted with heavy metals, VOCs, and semi-volatile organic compounds (SVOCs).

*A **ROD** is a legal degree that requires the potentially responsible party for the contamination to conduct a specific remedial action. This cannot be altered without consent from the USEPA and the Federal Courts.*

In June 1994, the USEPA completed and signed a record of decision (ROD) addressing the soil impacts on the property. The ROD declared the existing cap insufficient and specified construction of an additional cap. The new cap was designed with ridges and valleys to facilitate surface drainage and run-off of storm flow. The lines of these peaks and valleys are represented in 4.8.

In addition, the ROD required the following remedial actions:

1. Abandon the sediment pond on the northern end of the property and fill it with clean fill materials.
2. Consolidate all contaminated surface soils beneath the new landfill cap.
3. Regrade the site, particularly the southwest and east ditches, to promote stormwater runoff.
4. Install a passive soil gas venting system.
5. Implement a long-term groundwater sampling program.
6. Install a perimeter fence.
7. Employ a monitoring plan to monitor the integrity of the landfill cap, fence, and vent system.

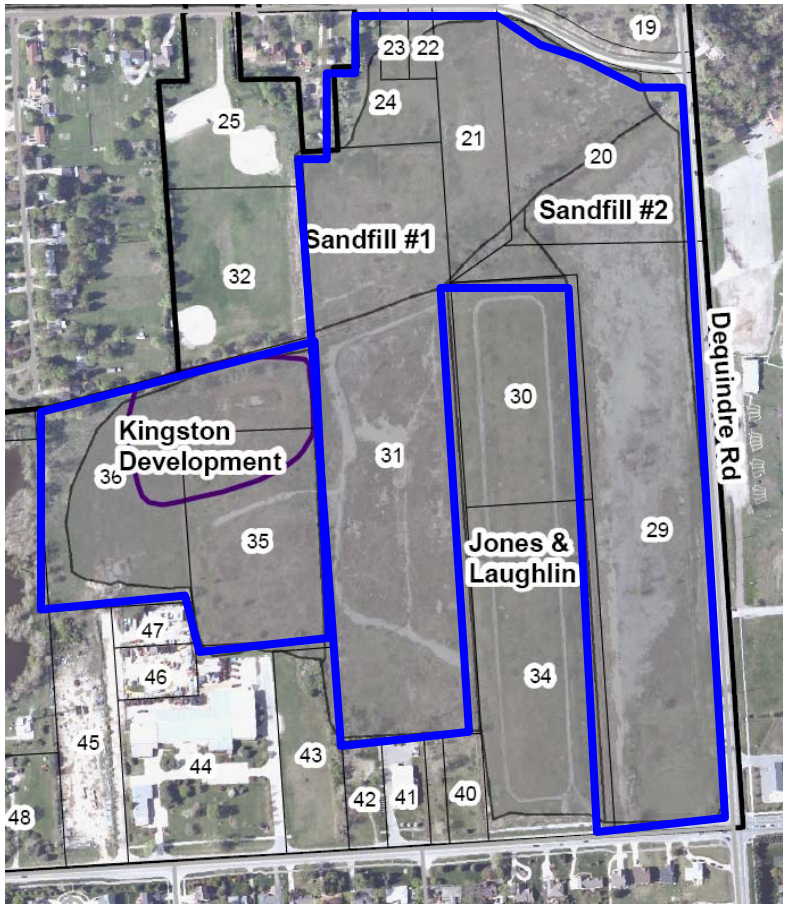
Action on the remedies detailed in the ROD began in June 1996 and was completed in 1997. In addition, a second "no action" ROD was completed in 1997 for the groundwater on the property. The "no action" ROD indicated that groundwater on the property could not be used. A deed restriction was created for this site preventing the use of groundwater on the property.

In September 2001, a five year review of the selected remedy was conducted. This determined that the actions taken protected human health and the environment. LTV Steel (the parent company of Jones and Laughlin Steel) completed bankruptcy in August 2003. As part of the bankruptcy, the company made a cash settlement to the USEPA to continue the operation and maintenance portions of the RODs. A second, five-year review was completed in 2006 that also found the remedy protected human health and the environment. A third review is currently scheduled for 2011.

3.1.3 Kingston Development Landfill

Located west of JLLF and east of STLF is the Kingston Development Landfill (KDLF) (property IDs 35 & 36 in Figure 3.3). KDLF was originally a sand and gravel excavation site. M.A.L. Enterprises (also known as Sandfill) began illegal and undocumented landfilling on the property in the early 1970s. A license for the disposal of domestic and industrial wastes at the property was obtained by M.A.L. Enterprises in late 1973. In 1974 or 1975, the Oakland County Health Department detected contamination in nearby residential wells. Although the KDLF was not identified as the source, it was shut down. The nearby STLF was later identified as the source.

Figure 3.3, Kingston Development (35 and 36) and Sandfill #1 & 2 (22, 23, 24, 29, and 31)



***Leachate** is liquid that is released as waste material decomposes and is typically collected at landfills for treatment.*

In 1977, Kingston Developments was licensed to dispose of steel slag from the Jones and Laughlin Steel plant in Warren, Michigan on an 8 acre unfilled portion of the KDLF pit. Prior to the commencement of these landfilling operations, the pit was reportedly lined with clay. However, no confirmation of this is available. The permit also required the installation of a perimeter underdrain and surface berms. The existence of the underdrain could not be confirmed. Following approval of the disposal activities, approximately 3 or 4 acres of the pit were filled with steel slag before complaints regarding noise and dust caused Kingston Developments to permanently close the site in 1982.

In 1983, new owners of the property began improving the site drainage and filling the unused portion of the pit with clay from the construction of a nearby highway. This portion of the KDLF was formerly referred to as the Kingston Pit and is highlighted by the purple line on Figure 3.3 over properties 35 and 36. MDNR inspections in 1983 and 1985 noted that the property was well vegetated, well covered, unfenced, and equipped with methane vents. The inspects also noted that leachate was seeping from the landfill into a retention pond located north of the property.

In August 1990, the USEPA conducted a SSI of the property. During the SSI, three surface soil samples and one surface sediment sample were collected from the soil and the retention pond respectively. The two on-site surface soil samples and the sediment sample detected elevated levels of VOCs but at levels below regulatory criteria. The off-site background surface soil sample did not detect VOCs above the analytical detection limit.

In September 2000, the MDEQ conducted a BFRA of KDLF. This assessment included the collection of nine surface soil samples, six surface water samples, ten sediment samples, and eight groundwater samples from temporary monitoring wells. Surface soil samples indicated the presence of elevated levels of metals and VOCs. Elevated levels indicate that contamination exceeded naturally occurring concentration levels.

Elevated levels of metals and SVOCs were also detected in the surface water and sediment samples. The groundwater samples indicated the presence of VOCs, SVOCs, and metals that exceeded the related residential standards. No evidence of further investigations conducted on this property could be found.

3.1.4 Sandfill #1 and Sandfill #2

Previously studies have limited the location of the Sandfill Landfill #1 (SFLF1) to property ID 31 and Sandfill Landfill #2 (SFLF2) to property ID 29 (see Figure 3.3). However, this inventory found that The Sandfill landfills #1 and #2 also include the five adjacent parcels north of the primary parcels (property IDs 22, 23, 24, 20, and 21in Figure 3.3).

Landfill operations began at the SFLF1 property in approximately 1967 with a permit issued to M.A.L. Enterprises. The landfill operated until closure in approximately 1971. Following closure of the landfill, a clay cap was placed over the landfill in compliance with Michigan Act 87.

Landfill operations began at SFLF2 in approximately 1968 and continued until 1971. The property was then sold to M.A.L. Enterprises who continued landfill operations until 1977. In 1977, a clay and steel slag cap was placed over the landfill.

During the superfund response at the adjacent JLLF, allegations were made that the SFLF1, and SFLF2 were connected to the JLLF and the same materials were disposed of at all three parcels. These allegations have not been confirmed.

The MDEQ identified the SFLF1as a potential source of environmental impacts in a Preliminary Assessment (PA) in April 1986. The PA did not include any sampling on the property. However, the PA did recommend the need for further investigation on the property. In July 1987, the MDEQ conducted an SI of the SFLF1 property. The SI identified elevated concentrations of metals, organic compounds, and one aroclor of PCBs in surface soils.

In September 2001, an Expanded Site Investigation (ESI) was conducted at the property. The ESI included the collection of ten surface soil samples, fifteen subsurface soil samples, seven surface water samples, six sediment samples, and eight temporary groundwater monitoring well samples. Surface soil samples and subsurface soil samples indicated elevated concentrations of VOCs, SVOCs, pesticides, PCBs, and metals. Surface water samples indicated that elevated levels of SVOCs and metals were present.

Sediment samples indicated the presence of elevated levels of SVOCs, pesticides, PCBs, and metals. Groundwater samples indicated that elevated levels of VOCs, SVOCs, and metals were present in the groundwater. These impacts were spread across the majority of the property excluding a small strip of property leading to Hamlin road.

In addition, the ESI noted a dewatering drain onsite that drained into the adjacent KDLF pit. In September 2002, a Baseline Environmental Assessment (BEA) of the SFLF1 property was conducted for B&B Group, LLP. The BEA was not available for review.

The SFLF2 was first inspected during a September 1999 reconnaissance inspection of the property and several surrounding parcels. In February 2001, the MDEQ conducted a BFRA of the SFLF2 property. As part of the BFRA, ten surface soil samples, five sediment samples, five surface water samples, and nine temporary groundwater monitoring well samples were collected. Surface soil samples indicated elevated levels of VOCs and metals exceeding the residential criteria.

Surface water samples indicated the presence of metals and bis(2-ethylhexyl)phthalate at levels exceeding the residential criteria. Sediment samples indicated the presence of aluminum and lead above the residential criteria. Groundwater samples indicated the presence of metals above the residential drinking water and groundwater surface water interface criteria.

3.1.5 Southeast Oakland County Incinerator Authority

Located in the northeast portion of the Landfill Planning Area are the three Southeast Oakland County Incinerator Authority (SOCRRA) Landfills (property IDs 11, 12, 13, & 16 in Figure 3.4). SOCRRA began disposal of partially incinerated refuse and ash in all three landfills from the SOCRRA incinerator located in Madison Heights, Michigan in 1958. By 1979, a total of 76 acres of fill had been placed in the southern portion of the landfill. In 1977, the SOCRRA applied for a permit to expand the landfill into a 31 acre site north of Honeywell drain. The permit was granted and landfilling in this area commenced in approximately 1979 and stopped in 1982 when the permit expired. Aerial photography indicates capping occurred on all three landfills. However, details on the date and method of capping were not found during the data review.

Figure 3.4, The SOCRRA Landfills are located on properties 11, 12,13, and 16

No soil or groundwater study results for these parcels were available for review. All of these parcels have passive soil gas venting systems installed and either underdrains or leachate collection systems.

SOCCRA currently composts yard waste on the southwestern portion of their parcels. This is primarily located on one parcel (property ID 13 in Figure 3.4). It is anticipated that this operation will continue. However, the current extents were not available.

3.2 Other Environmental Concerns Noted

During the review of individual parcels, other concerns were noted, such as the Highland Park Woodfill, the parcels formerly used as industrial parcels, and a former rail line in the Landfill Planning Area. These concerns could impact redevelopment options on these parcels.

3.2.1 Highland Park Woodfill

The Highland Park Woodfill area is located in the northwest corner of the Landfill Planning Area (property IDs 14 & 15 in Figure 3.5). This parcel was used by the City of Highland Park to dispose of an unknown quantity of diseased trees during the 1970s and 1980s. Current site conditions are unknown, but the woodfill may be unstable and could affect the weight bearing capacity of the soils.

Figure 3.5, Highland Park Woodfill is located on properties 14 and 15.

3.2.2 Industrial Properties

Located along the southern boundary of the Landfill Planning Area are a group of parcels zoned for industrial use. Of these parcels, ten are known to have either historical or current industrial uses onsite and are outlined in Figure 3.6. No impacts or potential sources of contamination are known on these parcels and detailed

site investigations do not exist. However, historical industrial use may have caused impacts.

Figure 3.6, The properties with known prior industrial use include 38, 40, 41, 42, 43, 44, 45, 46, 47, and 48

3.2.3 Rail line

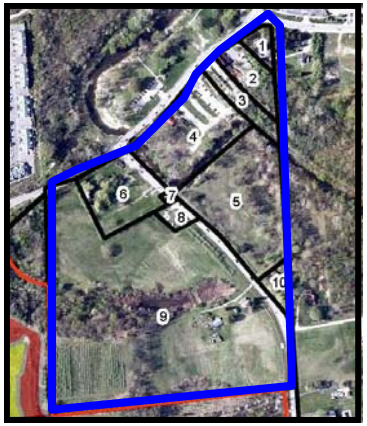
A former rail line is located in the northeast corner of the Landfill Planning Area (property ID 3 in Figure 3.7). While no known contamination exists, rail lines often have poly-nuclear aeromatics (PNA's) impacts from rail operations.

3.3 Properties With No Identified On- Site Impacts

Of the 59 selected parcels within the Landfill Planning Area, 22 have no identified environmental impacts or suspected impacts from historical operations. These parcels are concentrated in four general portions of the Landfill Planning Area.

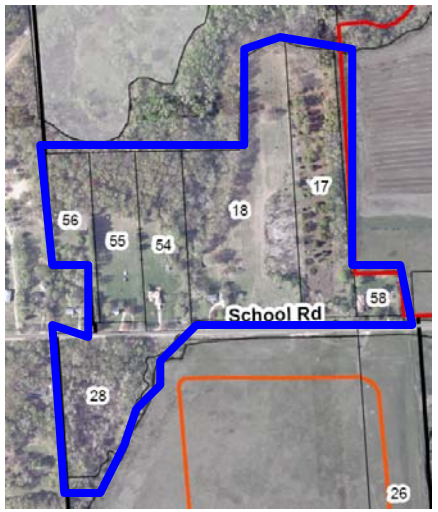
In the extreme northeast corner of the Landfill Planning Area is the largest block of these parcels. Nine of these parcels have had only commercial or agricultural use (property IDs 1, 2 and 4 through 10 in Figure 3.7). The current uses of these parcels include the Yates Cider Mill retail center and orchards and the Riverview Square shopping center. Property nine appears to have been in use as an orchard sometime between 1980 and 1994 on a 3.5 acre portion of the southwest corner of the parcel. These orchard operations have the potential to have impacted surface soils with lead and arsenic. However, no soil sampling has been conducted on this parcel.

Figure 3.7, Properties 1-10



The second area of parcels with no identified impacts is a group of seven parcels located immediately north of the STLF property (property IDs 17, 18, 28, 54, 55, 56, and 58 in Figure 3.8). These seven parcels are currently vacant or residential . Based on the materials reviewed, these seven parcels have either never been developed or have been used only for residential purposes since development. Although, these parcels do not have any known concerns, all but two of them are potentially adjacent to and/or across the groundwater gradient from the STLF property (property IDs 55 & 56) .

Figure 3.8, Vacant or residential properties



The third grouping of parcels with no identified impacts is located in the southwestern corner of the Landfill Planning Area along Hamlin Road. The grouping of parcels includes eight parcels that are adjacent or contiguous to the industrial parcels noted earlier in this report (property IDs 37, 39, 49, 50, 51, 52, 53, and 59 in Figure 3.9). Based on the materials reviewed, these eight parcels have either never been developed or only used for residential purposes.

However, all but four of these parcels are adjacent to the STLF property (property IDs 49, 50, 51 & 59) .

Figure 3.9, Properties 37, 39, 48, 49, 50, 51, 52, 53, and 59 have not been developed or have historically been residential

The final grouping of parcels with no identified impacts is located on School Road. The grouping of parcels includes two parcels (property IDs 25 & 32 in Figure 3.10). Based on the materials reviewed, these two parcels were briefly used as a sand and gravel pit.

Figure 3.10, Properties 25 and 32 on School Road

3.4 Properties Downgradient of Known Impacts

Even though the following parcels are described in Section 3.3 as having no identified environmental impacts, certain factors indicate impacts could be present. In specific, these parcels are located immediately downgradient from one of the eight landfills with known or suspected groundwater impacts.

- One parcel is adjacent to and down-gradient from portions of the SOCRRA landfill (property ID 9 in Figure 3.7) . The groundwater gradient could result in the movement of contamination from the SOCRRA landfill to this site.
- One parcel is adjacent to and down-gradient from the unlined portions of the Stans Trucking landfill (property ID 37 in Figure 3.9) . The groundwater gradient could result in the movement of contamination from the landfill to this site. In addition, this parcel includes a surface water feature that may have been impacted from surface run-off and/or groundwater venting.

4.0 Summary of Findings

Based on the findings summarized in Section 3, an interactive map was developed with details for all parcels within the Study Area. Each layer can be turned on or off by the user. The map also identifies the specific concerns associated with the nine landfills and the other properties included in the Study Area. An aerial map was also created of the Study area.

The interactive map is a PDF file labeled: Interactive PDF. Once the document is open, select the Layer tab on the left hand side and expand the Layer folder. Layers can be turned on and off by clicking the "eye" icon next to the layer name. The aerial map is a PDF file labeled: Parcel Map with Aerial. These maps will also be made available through the City of Rochester Hills.

The following is a summary of the environmental concerns and other concerns found for the properties within the Study Area.

4.1 Environmental Concerns

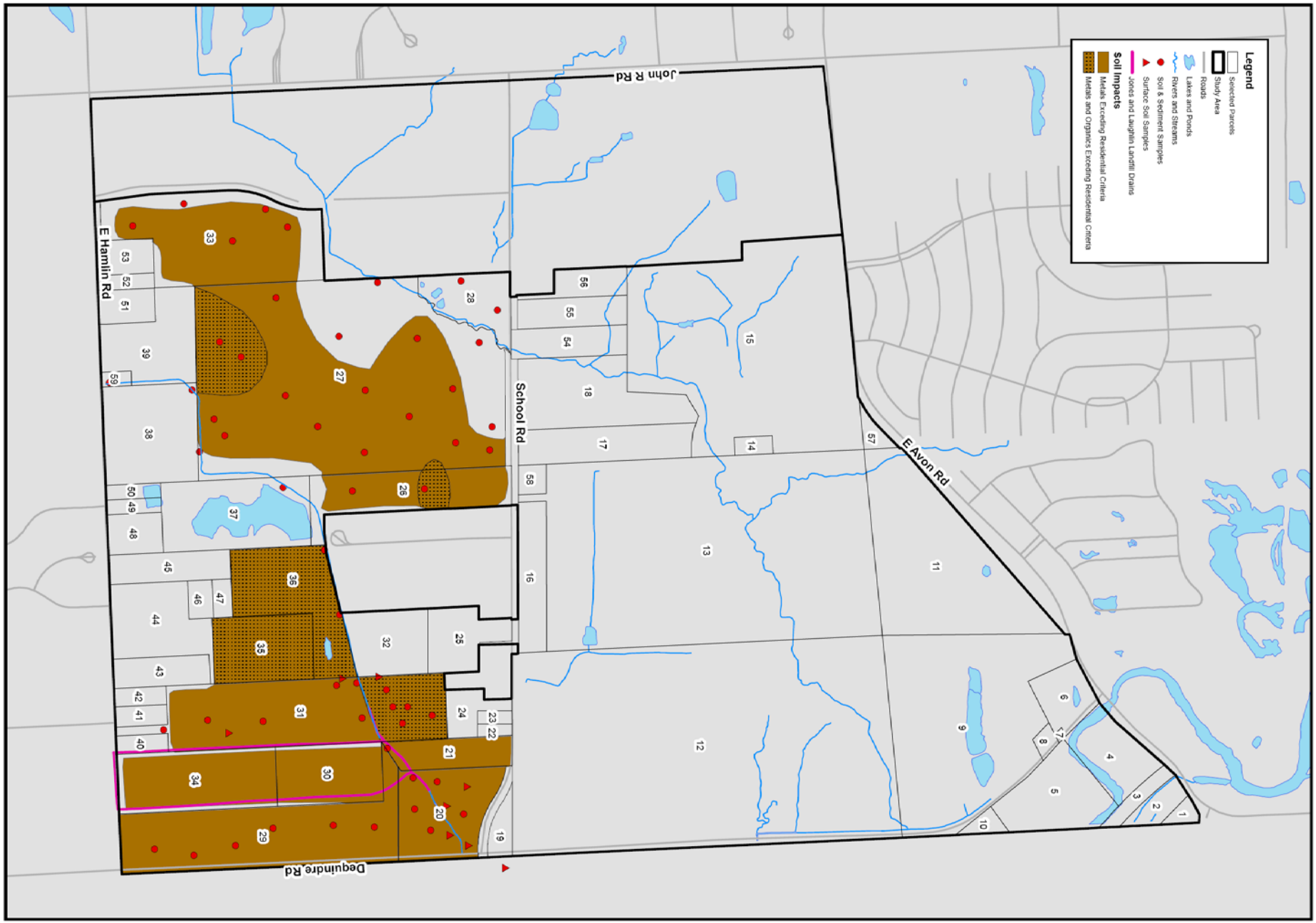
Soil and/or groundwater samples are known to have been collected from eleven parcels within the Landfill Planning Area. In addition two parcels within the Study area have been assessed for the presence of methane in the soil gas. Table 4.1 provides a summary of the impacts identified during these investigations. Properties not listed did not have samples taken on them.

Table 4.1, Compounds Detected in Exceedance of Direct Contact or Drinking Water Criteria

Proeprty Name and Map ID		VOCs		SVOCs		Metals		PCBs		Methane
		R	I/C	R	I/C	R	I/C	R	I/C	R/I/C
SOCRRA Landfills										
	16	--	--	--	--	--	--	--	--	SV
Sandfill Landfill #1										
	31	S/G	<	S	<	S/G	G	<	<	--
Sandfill landfill #2										
	20	<	<	<	<	S/G	S	--	--	--
	29	<	<	<	<	S/G	<	--	--	--
Jones and Laughlin Landfill										
	30	<	<	<	<	S/G	<	--	--	--
	34	<	<	<	<	S/G	<	--	--	--
Stans Trucking Landfill										
	26	S	S	S	<	S/G	S	--	--	SV
	27	S	S	<	<	S/G	S	--	--	--
	33	--	--	--	--	S	--	--	--	--
Kingston Development										
	35	G	G	G	<	S	S	--	--	--
	36	G	G	G	<	S	S	--	--	--

R = Residential Criteria
I/C = Industrial/Commecial Criteria
-- = Not tested or not known
S = Exceedance detected in soil
G = Exccedance detected in groundwater
SV = Exceedence detected
< = Compounds detected but below part 201 Direct Contact Criteria

Figure 4.1, Identified Soil Impacts and Prior Soil Sampling Locations



Properties with known contamination that exceeds any residential criteria will require complete remediation prior to residential redevelopment but could still allow for other uses such as industrial. Table 4.1 indicates that for 11 parcels in the Landfill Planning Area, impacts exceeded at least one residential criteria for at least one of the following contaminants: VOCs, SVOCs, Metals, PCBs, and/or Methane. These parcels all had historical landfill operations located on them. In the State of Michigan, this means that these eleven properties would qualify as facilities per Part 201 of Michigan Act 451 (Part 201) and are considered Brownfields.

If the level of contamination found exceeds commercial or industrial criteria, these uses would be prohibited without site remediation or control. In Table 4.1, six landfill parcels have contaminant concentrations that exceed the commercial/industrial criteria. Any development of these parcels would require additional delineation of impacts, as well as remediation or engineering control. In addition, they would require administrative or institution controls such as prohibitions on groundwater use.

The following sections provide further details on the types and levels of contamination found on each parcel.

4.1.1 Soil Impacts

The locations of previously collected soil samples and identified soil impacts are presented in Figure 4.1. Of the 59 parcels within the Landfill Planning Area, 10 have known soil impacts above the Michigan Department of Natural Resources and Environment (MDNRE) Part 201 generic residential criteria. All 10 of the parcels with identified soil impacts were former landfills including: three parcels in the Stan's Trucking Landfill (STLF), the two parcels of the Jones and Laughlin Landfill (JLLF), four parcels in the Sandfill Landfills (SFLF 1 and 2) and two parcels in the Kingston Developments Landfill (KDLF).

Surface soil samples collected from the STLF indicated elevated levels of volatile organic compounds (VOCs) and metals in exceedance of the Part 201 generic residential direct contact (RDC) criteria. Surface and subsurface soils collected on the JLLF property contained heavy metals (arsenic, mercury, lead, and chromium).

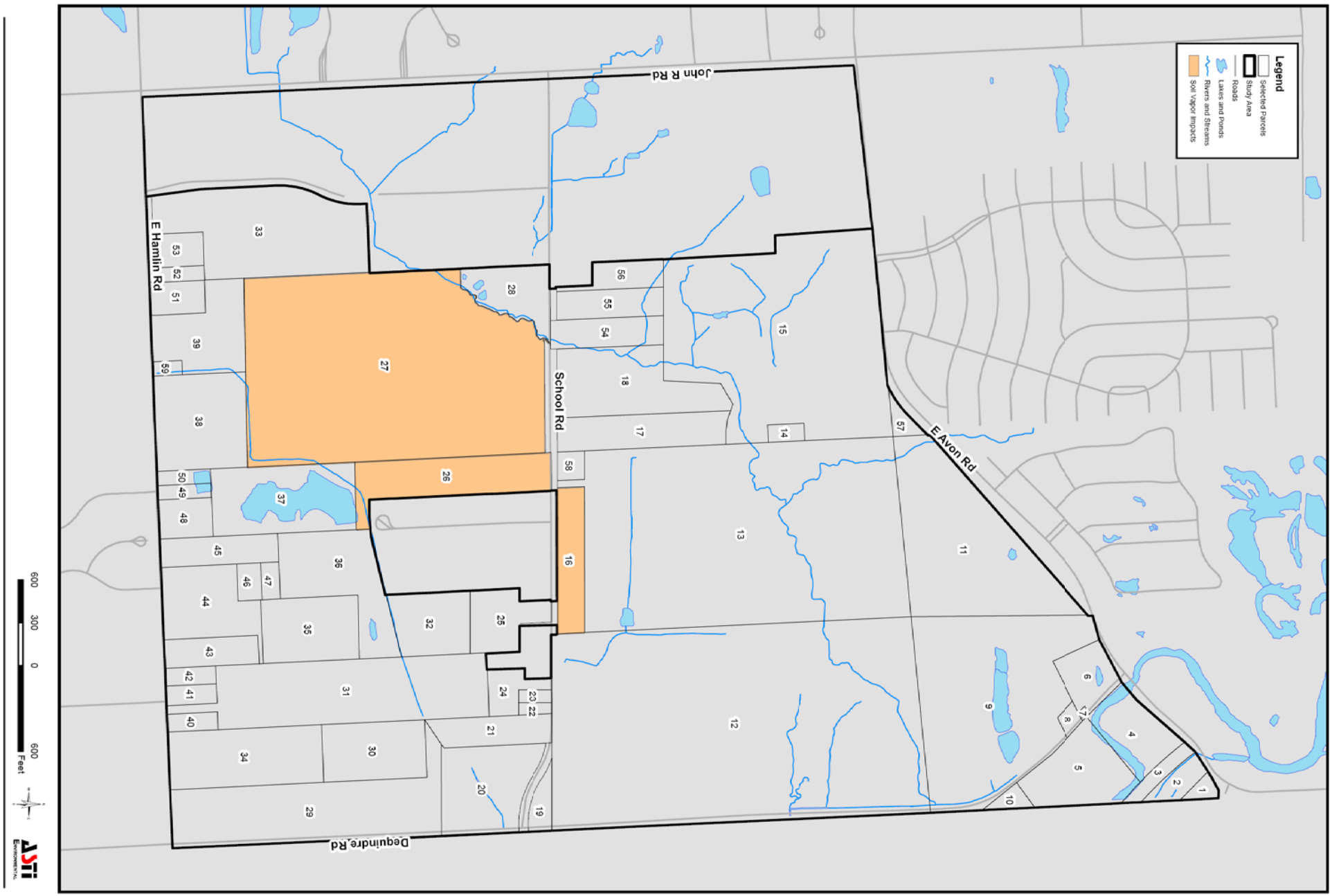
On KDLF, an off-site background surface soil sample did not detect VOCs above the analytical detection limit. Two surface soil samples indicated the presence of elevated levels of metals and VOCs on KDLF. Elevated levels of metals, VOCs, and SVOCs were detected in one sediment sample.

Samples taken from SFLF1 found elevated concentrations of metals, organic compounds, and one aroclor of PCBs in surface soils. The surface soil samples and subsurface soil samples indicated elevated concentrations of VOCs, SVOCs, pesticides, PCBs, and metals. The sediment samples indicated the presence of elevated levels of SVOCs, pesticides, PCBs, and metals. These impacts were spread across the majority of the property excluding a small strip of property leading to Hamlin road on property 31.

On SFL2, surface soil samples indicated elevated levels of VOCs, and metals exceeding the Part 201 residential criteria. The

Figure 4.2, SOCRRA Composting Landfill Still In Use

Figure 4.3, Identified Soil Vapor Impacts and Prior Soil Vapor Sampling Locations



sediment samples found the presence of aluminum and lead above the residential Part 201 criteria. The existing data only identifies the known impacts from the Sandfill Landfills on the two primary parcels (property IDs 29 and 31) for these two landfills.

However, landfilling operations related to both SFLF1 and SFLF2 were conducted on the northern adjoining five parcels (property IDs 20-24). Investigations at these two landfills have not extended onto these parcels. The only samples collected from these five parcels were from an assessment of the sediments within Ladd Drain. Contamination levels did not exceed Part 201 residential criteria but soil contamination from the landfill operations likely exists on these additional five parcels.

No public soil study results were available for review for the three SOCRRA landfills. The current distribution of soil impacts is also unknown due to the lack of investigations and the presence of landfill caps. Subsurface soil sampling is required to quantify impacts exist under the caps.

4.1.2 Soil Vapor Impacts

The locations of previously collected soil vapor samples and the identified soil vapor impacts are highlighted in Figure 4.3. To date, only three parcels within the study are known to have elevated levels of methane in the soil vapor (property IDs 16, 26, and 27). The STLF is known to have impacted the soil vapor beneath the adjacent residences along Parke Street but these parcels are not included in the Study Area. During the investigation of these parcels, elevated soil methane concentrations were noted at the nearby property known as the former Helen Allen Park (property ID 16). Lateral migration from the landfills within the Landfill Planning Area could occur and may affect adjacent parcels.

Figure 4.4 Sampling for Soil Gases

A soil vapor cut-off trench and soil vapor extraction (SVE) system have successfully addressed the soil vapor impacts from the STLF on the Parke Street residences. Periodic monitoring conducted at the Parke Street residences show no elevated levels of methane in the soil vapor at the residences since the installation of the SVE system.

4.1.3 Groundwater Impacts

The locations of previously collected groundwater samples and identified groundwater impacts are shown in Figure 4.5. In 1974 or 1975, contamination was detected in residential wells near STLF. In 1976, a groundwater study identified STLF as the source of these impacts. Groundwater samples collected at STLF indicated the presence of VOCs, SVOCs, and heavy metals in exceedance of the RDC criteria. Surface water samples collected from the adjacent Honeywell drain contained elevated levels of metals.

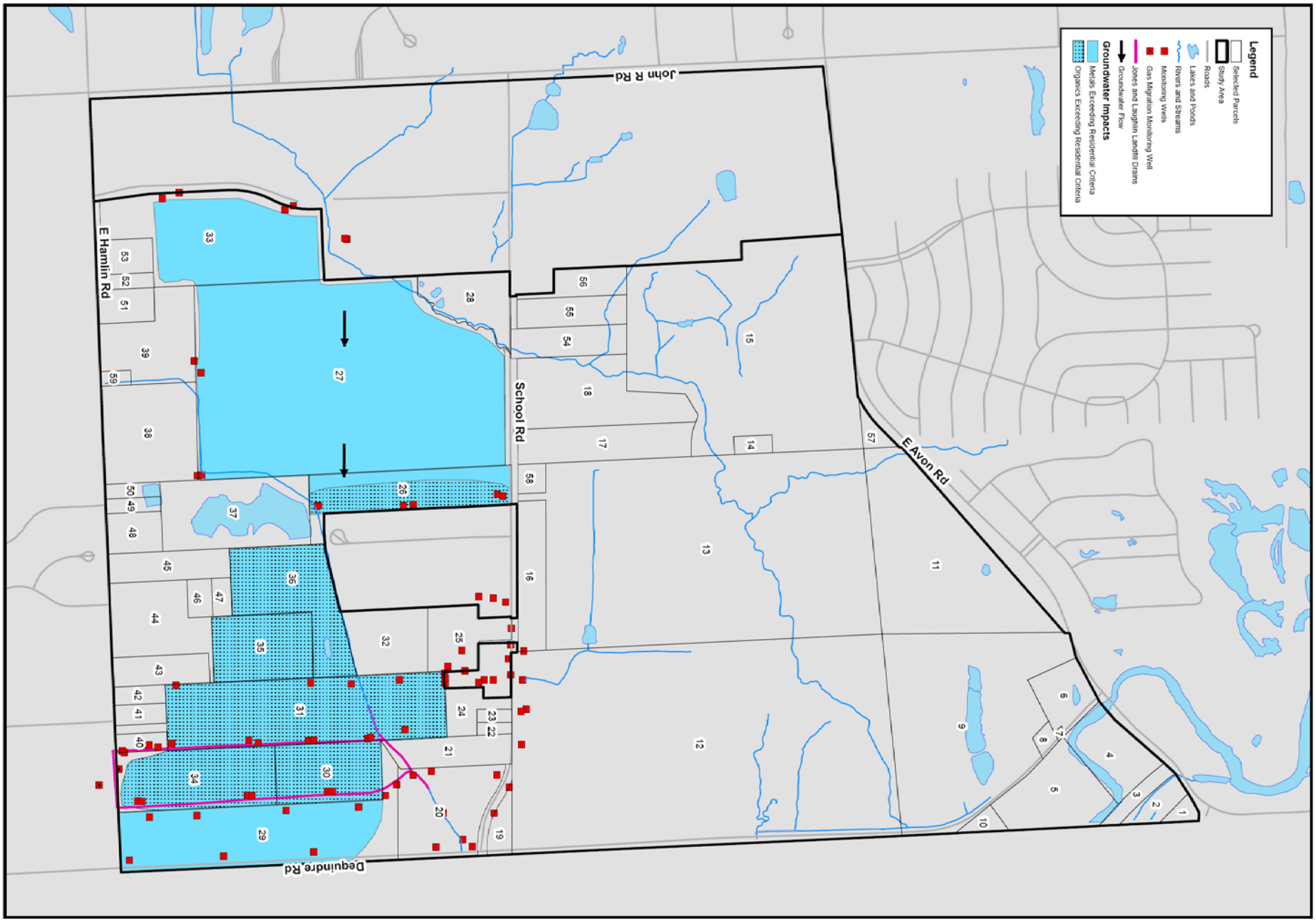
On the KDLF site, groundwater samples indicated the presence of VOCs, SVOCs, and metals that exceeded the current Part 201 residential standards. Elevated levels of metals and SVOCs were also detected in the surface water in the surface water samples.

The groundwater samples collected from SFLF1indicated that elevated levels of VOCs, SVOCs, and metals were present in the groundwater. The surface water samples taken from SFLF1 indicated elevated levels of SVOCs and metals were present. On SFLF2, groundwater samples indicated the presence of metals above the residential drinking water and groundwater surface water interface criteria. Surface water samples collected from SLFL2 indicated the presence of metals and bis(2-ethylhexyl) phthalate at levels exceeding the Part 201 residential criteria.

4.1.4 Landfill Extents

The known boundaries of the identified landfills were previously presented in Figure 1.3 along with the permit limits for the SOCRRA landfill. Twenty parcels are partially or completely within the extents of the nine landfills identified.

Figure 4.5, Identified Groundwater Impacts and Prior Groundwater Sampling Locations



The limits of fill for the STLF extend into the backyards of fourteen residential parcels on the west side of Parke Street. The landfill extents of the STLF extend beneath the garages of two homes and all the way to the west wall of one home along Parke Street.

The SFLF1 and SFLF2 extents join together on the northern end and it is unclear where each landfill ends and the other starts. Studies of aerial photographs indicated that the two combined landfills extend onto five parcels zoned residential and located along the southern side of School Road (Properties IDs 20, 21, 22, 23, and 24).

The extents of the current composting activities on the SOCCRA site are not known.

4.1.5 Remediation Areas

Areas with passive or active remediation systems are shown in Figure 4.7. Active remediation is present on only three parcels within the Landfill Planning Area. These methods include a soil vapor extraction system, an interceptor trench to contain the methane soil vapor migrating off of the STLF, and the leachate collection under-drains employed on the two SOCRRA landfills.

To prevent the methane migrating from the adjacent landfill, active above grade remediation occurs on one parcel of the STLF property (property ID 26) . This remediation system needs to be maintained until methane no longer migrates off the adjacent landfill. The MDNRE is responsible for this system. The system involves exposed piping and vents in addition to intermittent flares within a small structure. Future development of this parcel will be severely limited by the system.

The SOCRRA landfills have either underdrains or leachate collection systems. Evidence indicates that under drains exist at the KDLF and the JLLF. However, exact locations of these systems could not be determined. Future development will have to consider these systems to ensure they are not pierced.

Passive remediation methods employed within the Landfill Planning Area are limited to landfill caps and passive landfill gas vents. Caps and landfill gas vents have been installed on all of the known landfill parcels within the Landfill Planning Area with the exception of the Highland Park Woodfill site. The locations of these landfill gas vents could not be confirmed on most of the landfill parcels The SOCRRA landfills have passive soil gas venting systems installed. While these do not pose as many issues to future development as the above ground remediation systems, construction activities will need to accommodate the passive systems as well. The landfill caps in place on the SOCCRA, STLF, SFLF1, SFLF2, and KDLF will require modification and/or maintenance to ensure that they are capable of protecting human health and the environment as intended. The cap installed on the JLLF is covered by a ROD that does not allow modifications to the cap.

4.2 Design and Construction Considerations

Based on the historical use of the parcels, Figure 4.8 highlights the areas where geotechnical and engineering controls will likely be needed to support redevelopment. These are also discussed below.

4.2.1 Geotechnical Considerations

Each of the nine landfills presents geotechnical challenges for redevelopment. Seven of the nine landfills accepted municipal solid waste at one time during their operations. The three SOCRRA Landfills accepted only incinerator ash. The Highland Park Woodfill property accepted only woodfill (confirmed from nine test pits). These landfilled materials will cause varying degrees of setting and compaction. Therefore, these areas may require specialized construction or removal of unstable landfilled materials

Figure 4.6 Geotechnical Investigations Require Drilling

Figure 4.7, Location of Passive and Active Remediation Systems

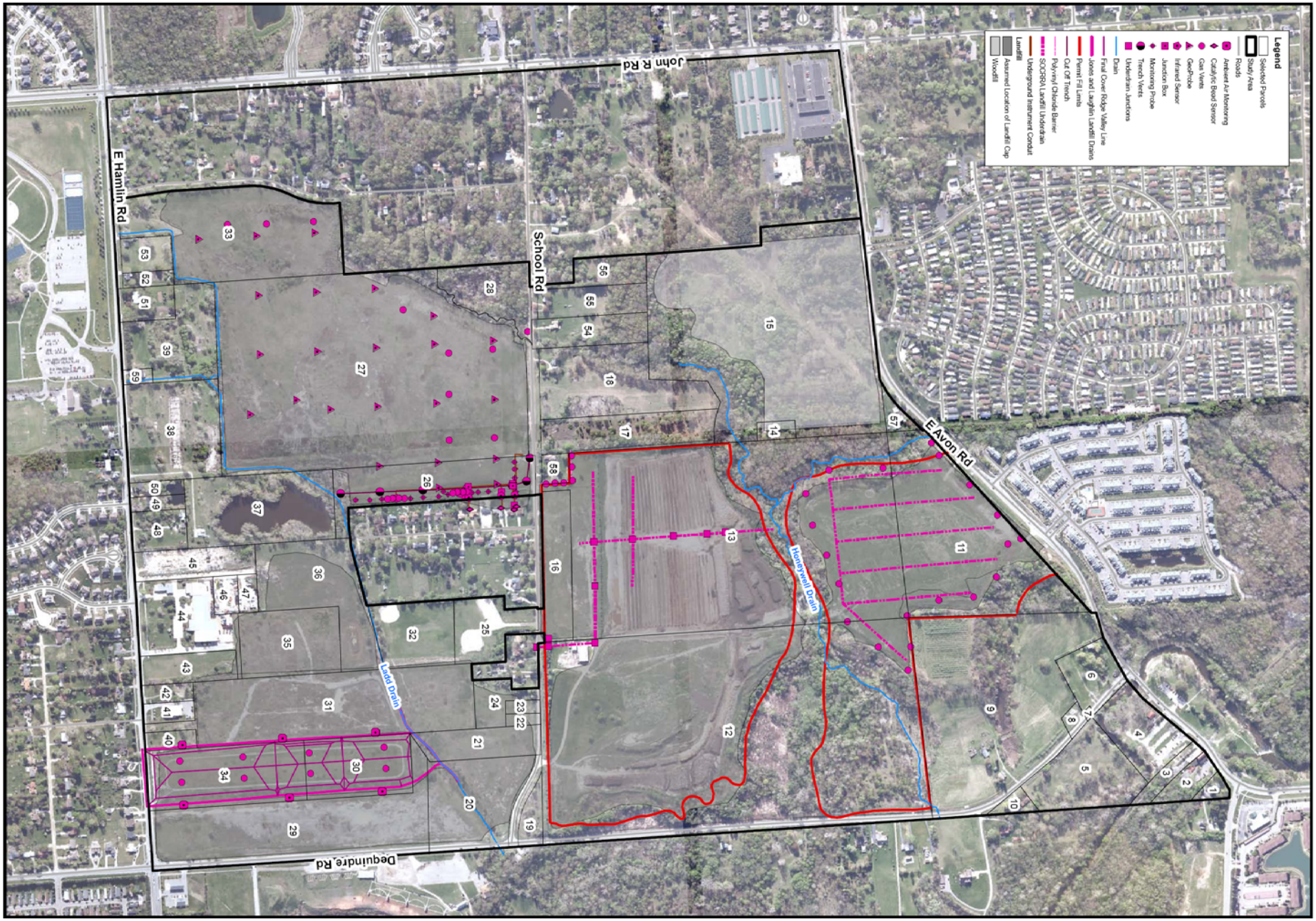
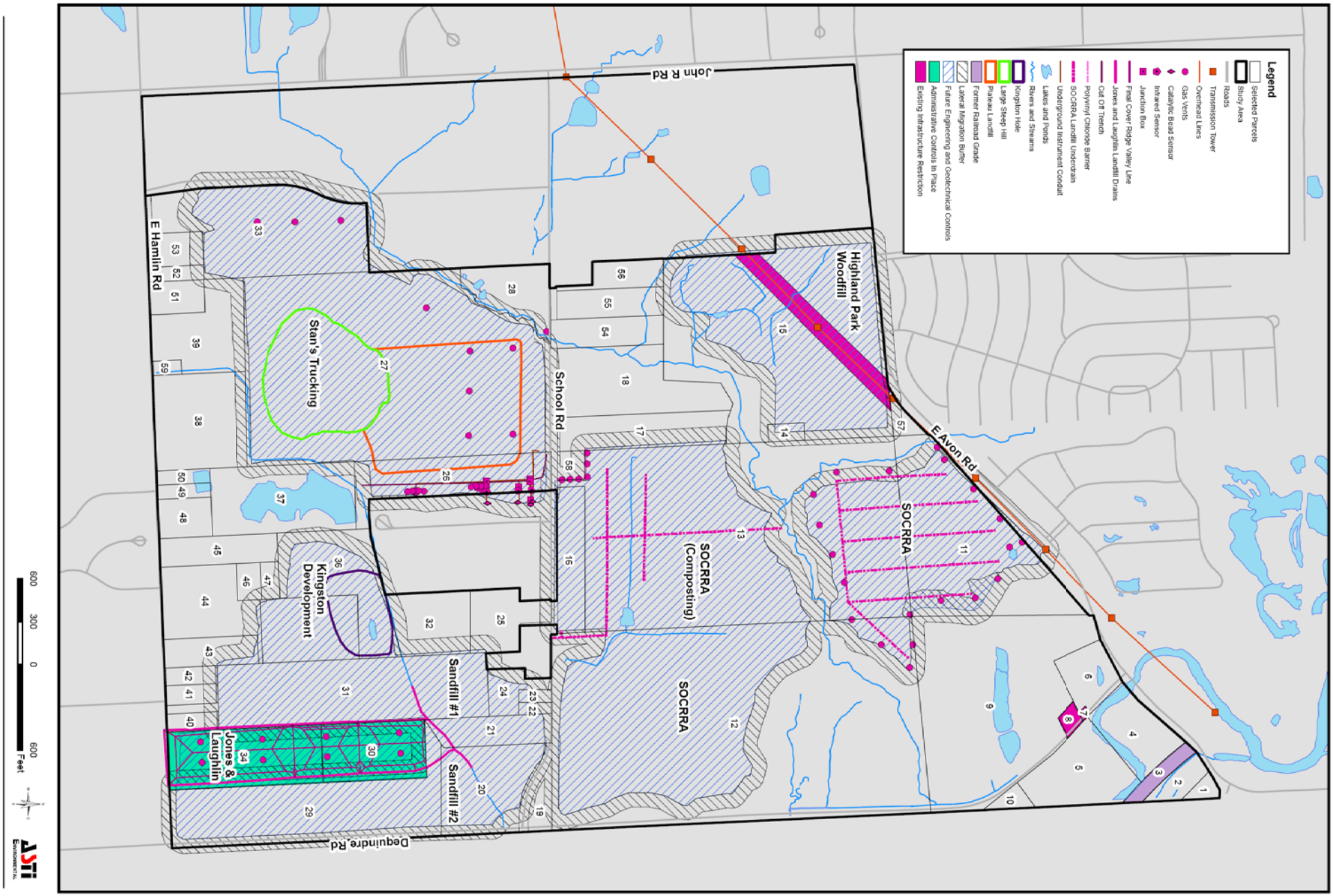


Figure 4.8, Design, Construction, and Other Considerations to Development



to support future development.

4.2.2 Engineering Controls

An engineered control is designed to mitigate potential exposure to impacts found on a property. Landfill caps and passive vents are engineered controls currently employed in the Study Area. The vents are discussed in section 4.1.5. Caps have been installed on all the landfills to limit infiltration of rain and act as a barrier to direct contact. The type, condition, contour, and thickness of the cap will affect how the site can be reused.

The windshield survey and review of available documentation conducted for this inventory indicated that the caps covering the SOCRRA and JLLF landfills appear to be in relatively good shape. The condition of the caps on SFLF1, SFLF2 and the KDL could not be determined during this inventory. The Remedial Investigation discussed in Section 3.2.1 indicates that the cap on the STLF site is in extremely poor condition.

The cap placed on the JLLF parcel is covered by a Record of Decision (ROD) that prevents the alteration of the cap including excavation or below ground foundations. A ROD, an administrative control, is difficult to alter, requiring approval from the USEPA and Federal Courts. Therefore, redevelopment of this site, short of complete remediation, may not be economically. Complete remediation under the current ROD would require the removal and proper redisposal of all waste.

The cap on JLLF creates a sudden increase in elevation. Since the ROD will not allow an alteration to the cap to address this rapid elevation change, the surrounding area would have to be regraded to allow access to the top of the site. This adds a significant cost to the future reuse of the site.

The caps in place on the other parcels may legally be altered and will need to be properly redesigned and maintained. The cap for the STLF will require significant repairs prior to the development or use of the site. In addition, the elevation changes, as highlighted in Figure 4.8, on this site would make it difficult to develop.

Future development conducted on top of a former landfill or within the lateral migration buffer will likely require the installation of engineering controls to mitigate potential exposure to hazardous substances in the soil, groundwater, or soil vapor. This is illustrated in Figure 4.8.

4.3 Other Physical Considerations

Although not strictly environmental concerns, several additional concerns for the development of the Landfill Planning Area were noted during this inventory and are featured in Figure 4.10 These parcels all had historical landfill operations located on them.

4.3.1 Utilities

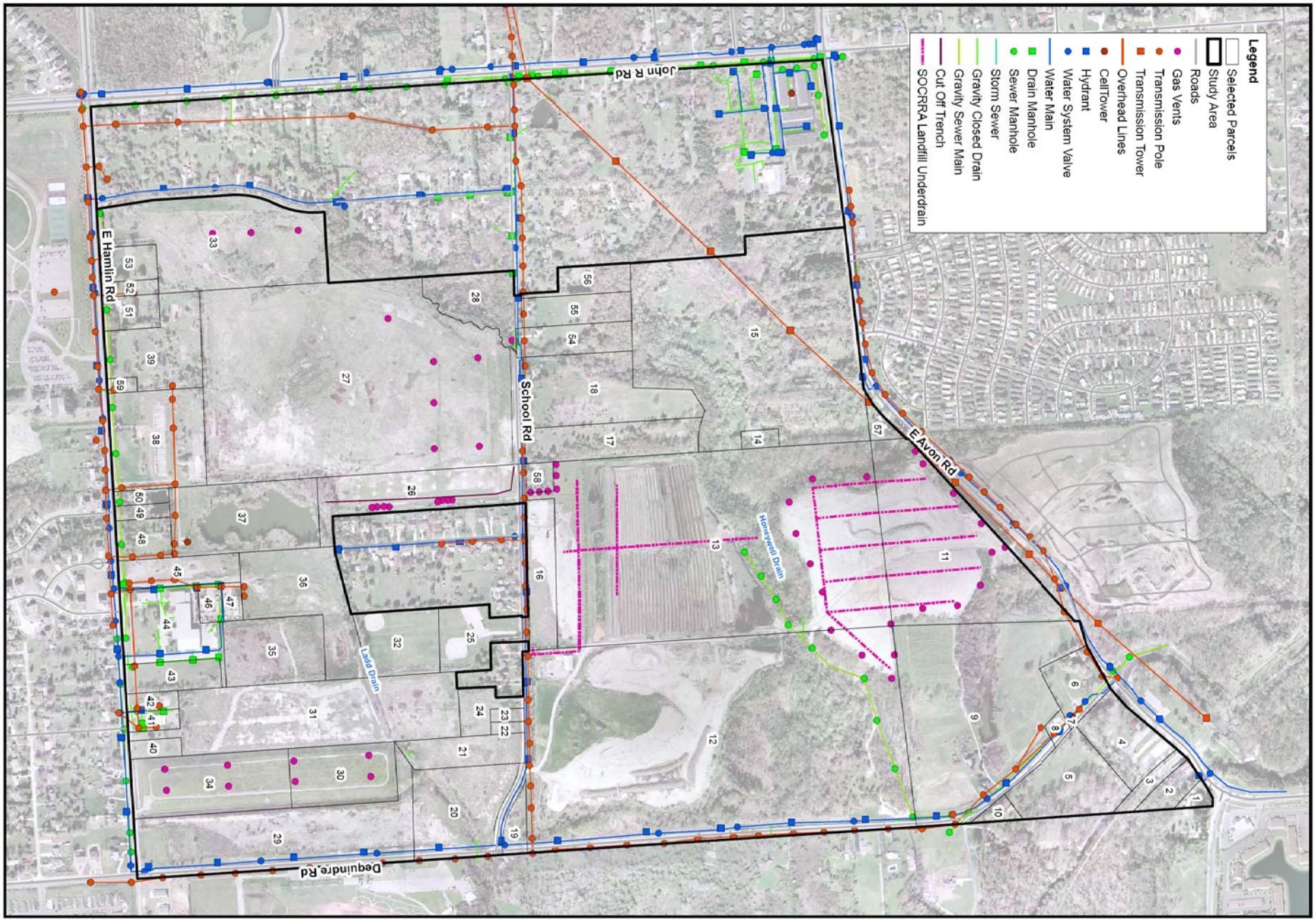
As with any area within a developed city, a significant number of utilities are present throughout the Landfill Planning Area. These utilities are illustrated in Figure 4.10.

In the Landfill Planning Area, the Highland Park Woodfill Property is crossed by high transmission power lines from the northeast corner to the southwest. The presence of these power lines could limit the development potential for this property.

Two small parcels near the northeast corner of the Landfill Planning Area include existing infrastructure (property ID 7 & 8 in Figure 4.8). These parcels are in use as a pumping station for the Oakland Macomb Interceptor sewer. Their likely continued existence would limit the redevelopment of these parcels.

Figure 4.9 Standing on School Road, a dirt road, looking at Helen Allen Park

Figure 4.10, Existing Utilities and Infrastructure



4.3.2 Drains and Wetlands

The Honeywell and Ladd Drains both cross through the Landfill Planning Area in a generally southwest to northeast direction. These drainage ways handle storm water flows within the immediate area. Consideration must be given to these areas during redevelopment to avoid flooding by installing property drainage. These two drains are also surrounded by natural areas and wetlands that may require special consideration during. The most notable water feature is the man-made pond located on property ID 37.

4.3.3 Existing Improvements

Existing improvements within the Landfill Planning Area include roads and buildings. These improvements are not impediments to the development of the Landfill Planning Area but need to be considered during planning. Figure 4.10 shows the location of the known existing improvements within the Landfill Planning Area. It should be noted that School Road, which bisects the Landfill Planning Area from West to East, is a small gravel road.

4.4 Additional Investigation Required

Proper environmental assessment is necessary to support any redevelopment project. Known environmental concerns require additional investigations to determine the extent of impacts. Properties with historical uses need investigations to determine the nature of suspected impacts. These investigations help determine the controls or remediation needed to support the intended future use, and to provide documentation for liability protection for prospective purchasers. In all cases, the extent of the investigation would be based on existing site information and the results of a Phase I ESA. Investigations would include soil, soil vapor, groundwater, sediment, and geotechnical as described below.

4.4.1 Soil Investigations

Eight of the landfills will require additional investigations due to known or suspected soil impacts above the RDC criteria. This will also apply to all parcels adjacent to the landfills as the potential exists for soil impacts to have migrated off site in all directions.

Some parcels will require additional investigation due to other historical uses. If development occurs on property ID 9, the location of the Yates Cider Mill Orchard, further soil investigations should be conducted for the presence of contamination, such as arsenic, due to pesticide usage. Potential impacts from the former railroad line or historical industrial sites will also need to be investigated. The locations of these soil investigations are highlighted in Figure 4.11.

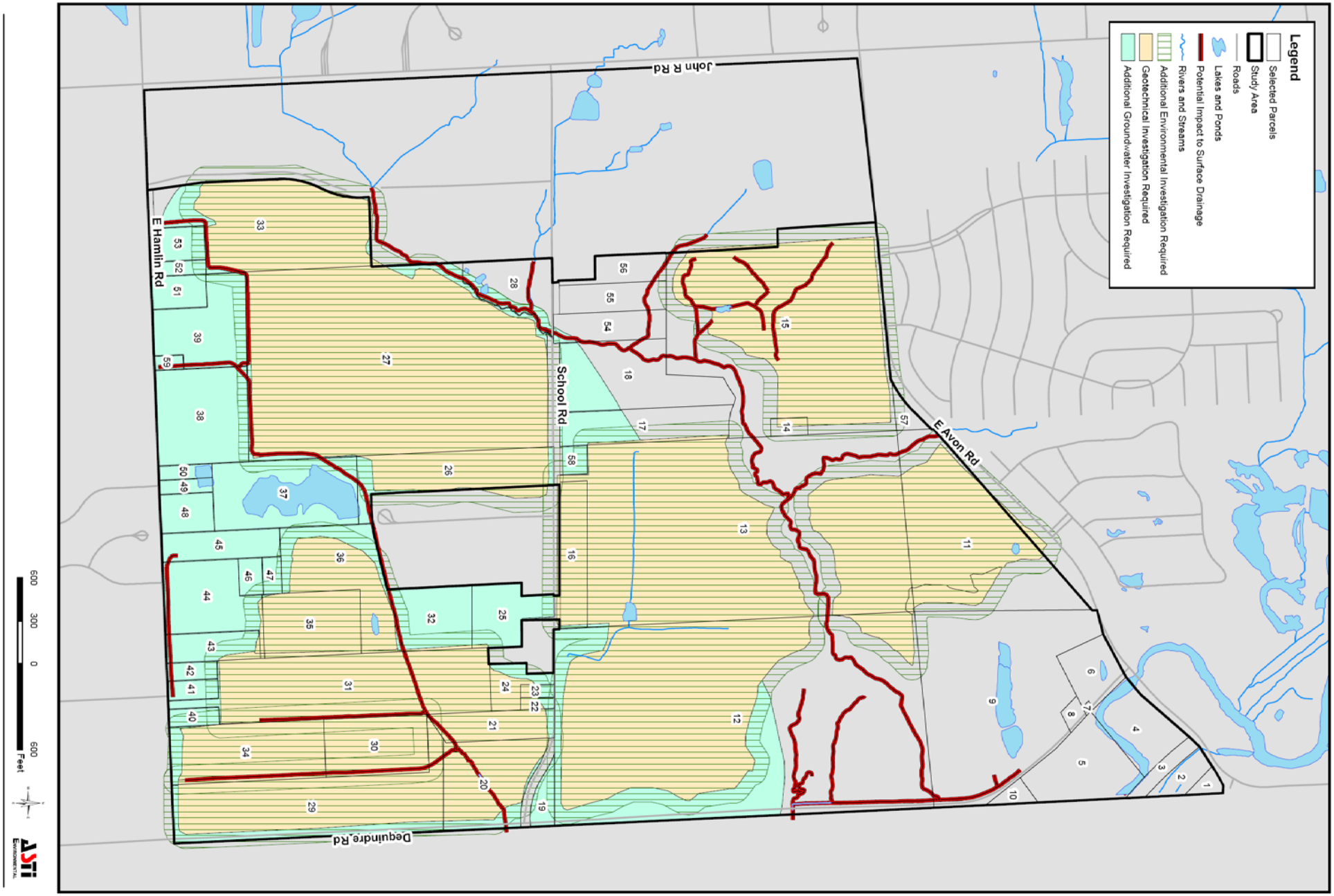
4.4.2 Soil Vapor Investigations

Based on MDNRE guidance documents regarding the migration of soil vapor, all areas within a 100 foot radius of the extents of any landfill that accepted municipal waste should be investigated to determine impacts due to soil gases, specifically methane, migrating from these landfills. This buffer is illustrated in Figure 4.11.

4.4.3 Groundwater Investigations

Groundwater impacts are known to be present beneath five of the nine known landfills. Although this is not necessarily an impediment to redevelopment, it will require restrictions on groundwater use, and may require special building construction if volatile organics are present above the applicable standard. Because the extent of the groundwater impacts within the Landfill Planning Area has not been determined, all parcels adjacent to or down gradient from a landfill should have additional groundwater investigations conducted prior to development. Data regarding groundwater flow were only available for the STLF and SOCRRA sites. Based on this limited information, groundwater within the Landfill Planning Area appears to flow from west to east, potentially impacting 41 parcels highlighted in peach in Figure 4.11.

Figure 4.11, Locations Where Additional Investigations Are Needed



4.4.4 Geotechnical Investigations

Each of the twenty parcels with former landfilling activities will require extensive geotechnical investigation prior to development to determine load bearing capacity, as shown in Figure 4.11. Although the landfills within the Landfill Planning Area stopped accepting refuse at least ten years ago, the filled areas could continue to experience significant settling for the foreseeable future. Based on the findings, this may require specialized engineering considerations during the design and construction of foundations, roads, utilities, and other structures.

4.4.5. Sediment

Sediments in surface water features adjacent to or immediately down stream of the landfills should be investigated prior to redevelopment that would permit public access or residential uses. Impacted sediments have been identified adjacent to several of the landfills. Because of the potential for surface water features to be impacted form surface run-off or groundwater venting, sediments may continued to be impacted from the former landfills. Of particular concern is the pond located on property ID 37 because of it's proximity to, and downgradient location at, the STLF.

4.5 Additional Landfill Information

In addition to the issues noted in previous studies, this Environmental Concerns Inventory noted three additional parcels with historic land filling activity. This historical activity will impact their future reuse.

The five parcels not previously identified as historic landfills are located in the southeast corner of the Landfill Planning Area, immediately north of KDLF, JLLF, SFLF#1and SFLF#2 . These five parcels are not included in the official descriptions of any of these landfills (property IDs 20-24) . Evidence from aerial photographs taken in 1972 and 1980 and from a geotechnical report prepared for the property at 1704 School Road indicates that landfill activity did occur on these parcels. The geotechnical report noted the presence of buried refuse along the southern edge of the property indicating that this area was historically part of a landfill. Based on the available information it is impossible to tell how much of the filling is associated with which of the landfills, or the extent of fill materials on these parcels.

Aerial photographs of Stan's Trucking Landfill in 1972 and 1980 indicate that an additional parcel was used in the filling operations (property ID 33). This parcel is not usually included in the activity descriptions for this land fill.

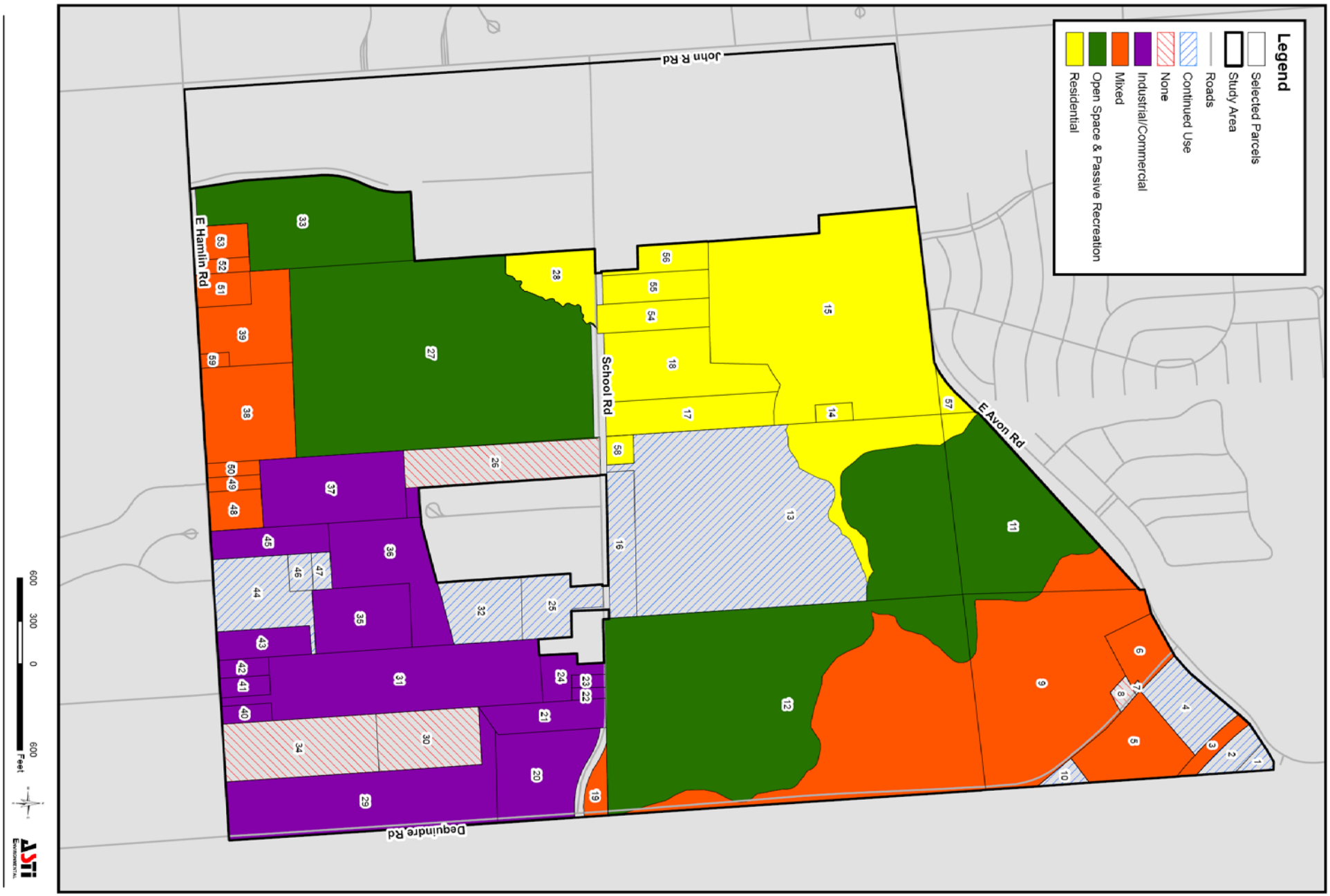
4.6 Impact on Future Use

Unless complete removal of the contamination occurs, certain impacts preclude specific land uses. If residential use is allowed on site without certain controls or restrictions, industrial and commercial use is also allowed. Based on the environmental concerns noted in this inventory, Figure 4.12 illustrates the maximum supported redevelopment if the current impacts are not completely removed.

Historical impacts, particularly the presence of a historic landfill, affect the cost to remediate and reuse the sites. Often properties that have been environmentally impacted from historical use are most economically developed for industrial or commercial uses.

In addition, current zoning includes residential for five of the landfills. Residential reuse may not be feasible on these parcels without extensive remediation, and may be limited on adjacent parcels, depending on the results of the site-specific investigations described above. Appendix C includes a table with details on the current zoning, the proposed future zoning as detailed in maps secured from the City of Rochester Hills, and the redevelopment supported on the parcels in light of the associated environmental concerns.

Figure 4.12, Supported Redevelopment Based on Known or Suspected Environmental Conditions



5.0 Redevelopment Through Brownfield Incentives

A variety of financial incentives are available to cover specific costs associated with redeveloping Brownfields. Sites, such as the landfills and industrial properties within the Landfill Planning Area, are considered Brownfields in the State of Michigan when contamination levels exceed residential cleanup criteria or when they are adjacent and contiguous to such a property. These incentives are intended to serve as financing tools that cover the additional costs related to developing Brownfields, such as site assessments, remediation, and engineered controls. Figure 5.2 illustrates which properties are known facilities because of current samples and properties that are suspected facilities because of historic use, though no samples have been conducted on these sites.

5.1 Overview of Brownfield Incentives

In the State of Michigan, there are four primary sources of funding specifically designed for Brownfield projects: Tax Increment Financing (TIF), Local Site Revolving Loan Funds (LSRLF), Michigan Business Tax (MBT) Credit, and Federal and State Grants. When used together to maximize their benefits, these could help support redevelopment, including the new green spaces and residential and industrial development envisioned for the Landfill Planning Area.

5.1.1 Tax Increment Financing

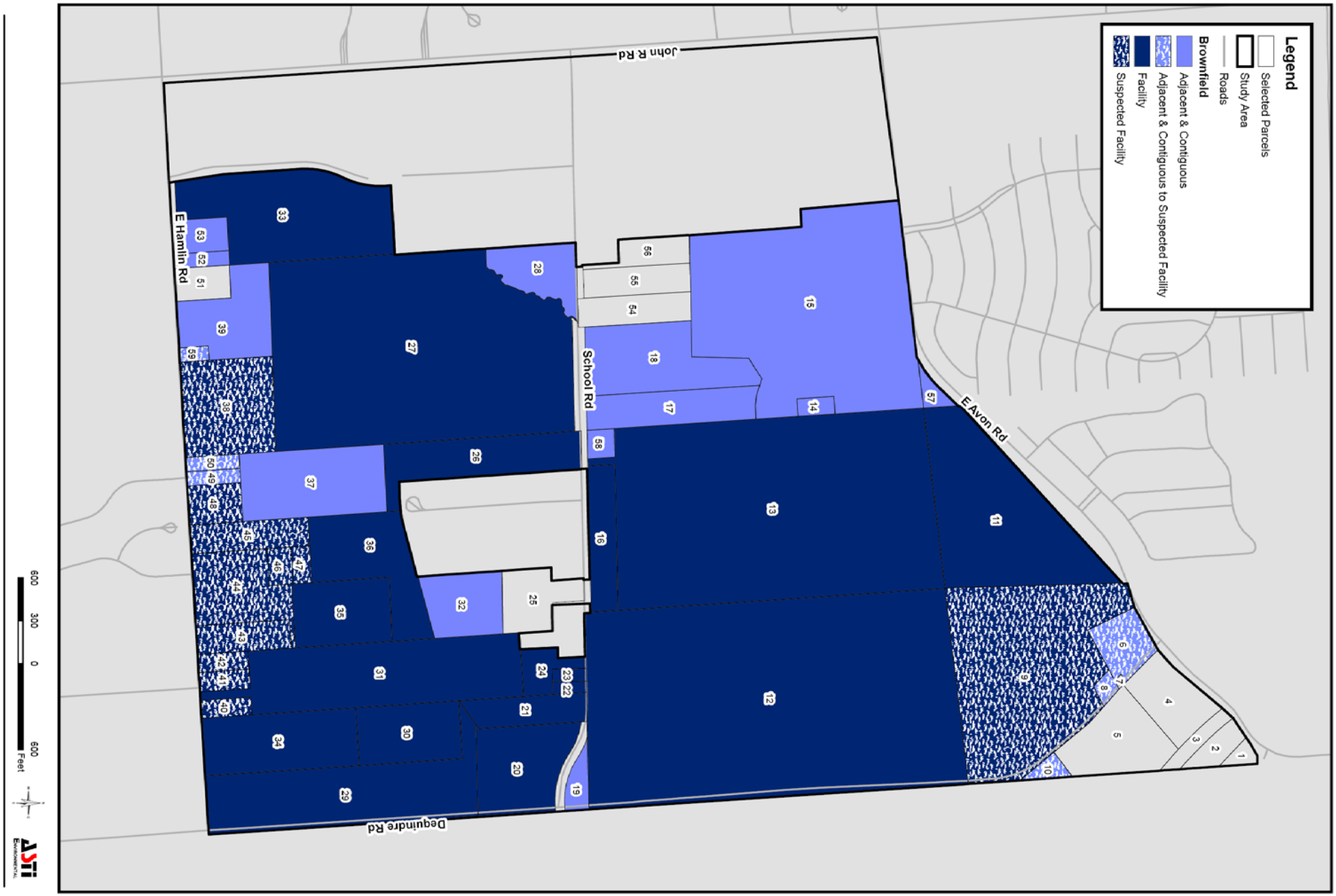
The Rochester Hills Brownfield Redevelopment Authority (RHBRA) can provide funding for certain eligible activities by using Brownfield TIF

Figure 5.1, Incentives exist to reduce the costs to redevelop Brownfields such as the Laughlin and Jones Landfill which has significant environmental impediments to development.

on properties in the Landfill Planning Area. This could allow the RHBRA to capture the incremental increase in property tax generated by development on the included parcels. The funds captured by a TIF can be used to reimburse the municipality, the RHBRA, or a developer for certain eligible activities, to provide administrative funding for the RHBRA, and to provide funding for a LSRLF (see below for more details). Because the City of Rochester Hills is not a Qualified Local Unit of Government (QLUG), activities eligible for reimbursement through a Brownfield TIF in accordance to Michigan Act 381 of 1996 (Act 381) are limited to the following:

- Investigations and Assessments
- Due Care Activities
- Additional Response Activities
- Remediation

Figure 5.2, Properties Eligible for Designation as a Brownfield



- Developing and preparing Brownfield Plans and work plans

The TIF collected on an eligible property can only be used for eligible activities conducted on that property. This precludes the use of TIF funding captured from high value properties to be used on properties with low to no value such as open space land. TIF capture can also not be used by a liable party to complete required assessment or remediation, or to conduct activities otherwise required by regulation. TIF is dependent on the amount and density of development to provide an incremental increase in taxable value, and the amount of the investment will impact the tax capture and the ability to pay for eligible activities.

5.1.2 Local Site Revolving Loan Funds (LSRLF)

Municipalities can create and fund a LSRLF to provide financing for assessment and cleanup activities on Brownfields throughout the municipality. The LSRLF can be used for any eligible activity on any eligible property, on adjacent and contiguous properties, and on any property that has been affected by a release from the eligible property. While funds from TIF can only be used on the property that generated the incremental taxes, the flexibility of the LSRLF permits reinvestment in other properties.

Financial assistance can be provided in the form of a grant, a low-interest loan, or a combination of both. The LSRLF can be funded from TIF on a Brownfield up to an amount equal to the amount of eligible activities included in the Brownfield Plan, or for a maximum of 5 years. The LSRLF can also be funded from LSRLF principle payments and interest payments, and other public and private sources. Fully funded Revolving Loan Funds are also available from the state and the EPA.

Of particular importance is that in order to fund the LSRLF, it must be specifically identified in the Brownfield Plan. As such, inclusion of an LSRLF in all Brownfield Plans completed in the City will reserve access to this funding source in the event that it is established in the future.

5.1.3 Michigan Business Tax Credit

The Michigan Business Tax Credit is a tax credit of typically 12.5% of eligible investments expended by an eligible taxpayer (for-profit entity) on an eligible property that is part of an approved Brownfield Plan. Eligible Investments include the following:

- Site Improvements
- Building Alteration, Renovation, and Improvements
- Construction Hard Costs
- Architecture, Engineering, and Survey Costs
- Equipment and Personal Property

This credit can increase to a maximum of 20% (a maximum of 15% after 2010) for developments in downtowns, traditional central business districts, or traditional commercial corridors in a QLUG or in a county seat. Unfortunately, none of these expanded definitions apply to the City of Rochester Hills.

In addition, the number of large MBT credits (over $10,000,000) are limited each year for non-QLUG communities. This will limit the availability of credits for large projects in the Landfill Planning Area and will require long range planning to secure these large credits before they are assigned elsewhere.

While the City of Rochester is not eligible to directly use this incentive, this incentive can help attract new development and businesses to Brownfields. In addition, it can be used to offset extraordinary costs associated with Brownfield redevelopment that can not be funded through TIF or a LSRLF.

5.1.4 Federal and State Grants

A variety of federal and state grants are available to assist with the redevelopment of Brownfield properties. These grants can be used for site assessments throughout the Study Area and site-specific

cleanups. These are highly competitive grant applications available once per year from the State, the EPA, and various other agencies. Being able to demonstrate prior planning efforts, such as this review, and having specific developers identified can enhance a grant application. The City of Rochester Hills could apply for a site assessment grant or site-specific cleanup grant directly through the USEPA or use the existing grant administered by Oakland County (this ECI was partially funded by that grant).

The deadline for these grants is in the fall of each year, with grants awarded the following spring and funded in late summer. As such, it takes a minimum of one year to obtain grant funding, so applications should be submitted as far in advance of proposed redevelopment as possible.

5.1.5 Other Incentives

Other incentives may be available for individual projects depending on the intended future use. It has become more common to layer incentive programs to fill financing gaps caused by the extraordinary costs of Brownfield redevelopment. These programs include, but are not limited to, BEDI Grants, energy efficiency and alternative energy grants, green space and urban forest grants, and federal tax credits.

5.2 Strategic TIF Capture for Redevelopment

To initiate redevelopment, the RHBRA can create a Brownfield Plan for the entire Land Fill Planning Area. This will provide a basis for a coordinated plan throughout the area, enable TIF capture, and facilitate MBT credits. In addition, it can begin the process of funding a LSRLF dedicated to reinvestment in this area. The TIF will help cover many of the costs associated with defining and delineating the environmental concerns on individual properties, including certain ongoing control or maintenance costs on a site.

Some properties in the Study Area will likely never generate an incremental increase in property taxes due to low redevelopment potential. Other eligible parcels are ready for redevelopment and will generate incremental taxes that can be used to reimburse developers or the City for site specific activities and to fund the LSRLF. This will in turn generate an interest in redevelopment of adjacent properties, where TIF can also be captured, and as the LSRLF is funded, can finance assessment and remediation on any eligible property within the Landfill Planning Area.

To illustrate the potential to capture funds using TIF and the LSRLF, eligible activities were estimated for properties with redevelopment potential in the Study Area (30 total parcels assumed). Based on this site-by-site evaluation, a total of $19.3 million in assessment, remediation and control costs was identified. In addition, investment costs were estimated based on the intended future use of the properties. This evaluation provided approximately $95.1 in incremental taxable value.

Table 5.1, Example Tax Capture By Millage

			Tax Capture for This Plan		
Millage Category	Total Taxes	Taxes to Jurisdictions	Total Capture	Capture for Reimbursement and BRA	Capture for LSRRF
Oakland County Tax	$10,996,361	$6,113,614	$4,882,747	$2,503,660	$2,379,087
Oakland Schools	$7,805,723	$4,339,724	$3,465,998	$1,777,213	$1,688,785
Oakland Community College	$3,670,937	$2,040,920	$1,630,017	$835,802	$794,215
State Education	$13,901,555	$7,728,806	$6,172,749	$3,165,117	$3,007,632
City General	$8,698,898	$4,836,300	$3,862,598	$1,980,572	$1,882,026
City Debt & Bonds	$2,672,574	$2,672,574	$0	$0	$0
City Dedicated Millages	$11,116,610	$6,180,468	$4,936,142	$2,531,038	$2,405,103
	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0
	$0	$0	$0	$0	$0
School Operating	$29,779,590	$20,363,492	$9,416,098	$4,828,165	$4,587,933
School SET	$12,001,675	$6,672,536	$5,329,140	$2,732,551	$2,596,589
Total Incremental Tax	$100,643,923	$60,948,434	$39,695,489	$20,354,119	$19,341,370

Note: Total Taxes are for the full 30 year duration of the Plan

Using the assumptions outlined in Appendix D, this level of investment would provide approximately $100.6 million in new taxes over 30 years, and would support repayment of the eligible activities in 11 years. The LSRLF could capture the same amount, providing funding as early as 2019 for some Brownfield Plans. It is important to note that these estimates were based on existing information, do not reflect actual costs, and are provided for illustration purposes only, and that the total eligible activities and tax collection will vary from those used in this illustration

5.2.1 Alternative Tax Capture Scenario: Increase Density

The City of Rochester Hills may be able to capture the same amount of funds over a shorter period of time by increasing the density allowed on the property. The density of a project can be measured by the Floor to Area Ratio (FAR). The City of Rochester Hills does not directly limit FAR. However, set back requirements and maximum number of stories indirectly limit the allowed FAR.

In Rochester Hills, parcels zoned for industrial or business use have an approximate FAR range of 0.2 - 0.35. Other suburban communities, such as Warren and Brownstown Township, have an FAR range of 0.6 - 0.8 for similar uses while still maintain a low-density setting similar to that found in Rochester Hills.

5.2.2 Utliizing a Land Bank Authority

In a traditional Brownfield TIF program in a non-QLUG, only funding from the LSRLF could be used on eligible activities that occur on eligible properties that do not generate incremental taxes. Thus, some of the sites with the most environmental concerns, such as the STLF property, would not be able to utilize the Brownfield TIF for eligible activities (due to the lack of redevelopment), and would have to wait until sufficient funding had been obtained by the LSRLF.

To extend incentives to undeveloped property, the City could consider working with a Land Bank, such as the Michigan Fast Track Land Bank Authority (MFTLFA), to obtain and manage properties in the Study Area. Once obtained by the Land Bank, TIF from all owned properties could be pooled to permit assessment and remediation funding on those properties with the highest need. Partnering with a Land Bank would also increase the number of eligible properties for the Brownfield TIF, since any property owned by a Land Bank is an eligible property, and therefore a Brownfield, regardless of existing contamination. In addition, purchase by a Land Bank can adjust the initial taxable value to zero, permitting TIF capture for the entire taxable value.

A final benefit of working with a Land Bank, is the additional eligible activities a Brownfield TIF can fund (Land Banks property has all the benefits available in a QLUG). In addition to the eligible activities listed in section 5.1.1, the following activities can also be reimbursed using TIF when part of a Brownfield Plan:

- Land Acquisition for the Land Bank
- Infrastructure Improvements
- Demolition
- Lead or Asbestos Abatement
- Site Preparation

Working with a Land Bank can provide additional benefits, but this must be coordinated with the objectives of the Land Bank Authority. The Land Bank will capture half of the taxes for a five year period, and reassessment of the taxable value may reduce one of the benefits of the current Brownfield TIF program—the fact that the base taxable value is maintained and the municipality does not lose base tax revenues.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 OPPORTUNITIES FOR REDEVELOPMENT

Opportunities for both immediate and long-term redevelopment exist in the Landfill Planning Area. Real environmental challenges exist on some of the properties, but perceived environmental impacts may have delayed reinvestment on properties with minimum or easily mitigated impacts.

Redevelopment efforts can be focused first on the properties with the fewest environment concerns. Than properties that require more assessment, remediation or control measures can be developed. Incremental property taxes from these first developments could be used to reimburse developers for assessment and remediation costs, and to fund a LSRLF for assessment and remediation on other parcels. On properties with the most difficult environmental challenges, these properties could be used as open space or passive recreation until market demand off-sets the high costs of remediation. Some parcels will only be redeveloped under vary favorable circumstances, but these parcels can provide opportunities for permanent green space and passive recreation.

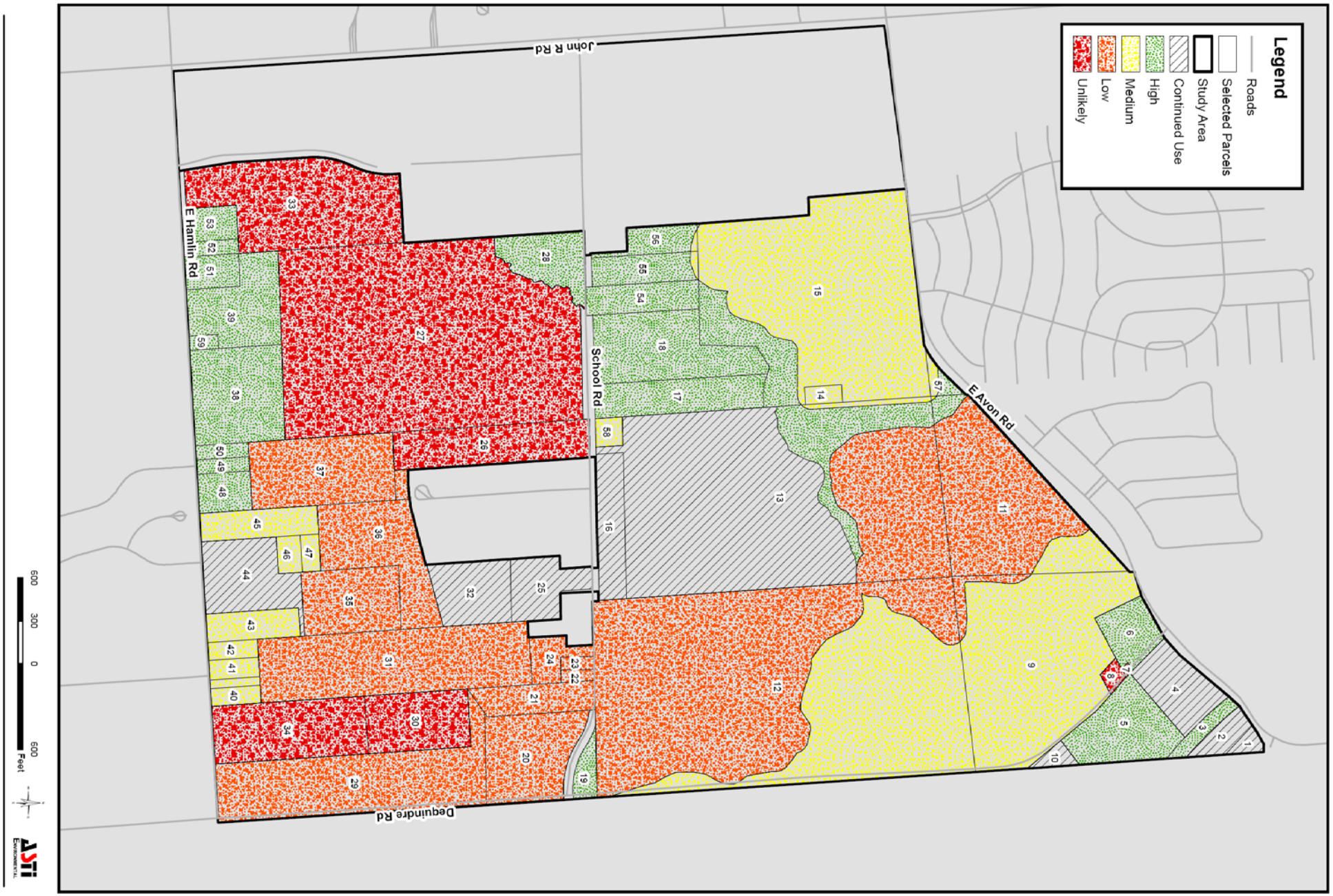
Based on the environmental issues identified in this ECI, Figure 6.1 illustrates which properties have the highest potential for development, and how environmental impacts may limit development options. While some properties may not have significant environmental impacts, current uses or other factors may affect future development not noted in this illustration. As indicated in the figure, some properties with existing development were not considered for redevelopment, regardless of compatibility with surrounding properties or site-specific issues.

For the purposes of this illustration, development refers to any improvements conducted on the land including the creation of open space or the construction of buildings. The categories used for in Figure 6.1 are described below. Please note that site-specific impacts from historical operations may occur on all properties and that these must be identified and address prior to redevelopment.

High—Properties that can be immediately developed. This includes residential properties in northwest, and commercial properties in the northeast. These parcels have little to no known environmental concerns. However, the current uses on some of these parcels could preclude redevelopment.

Medium—Properties that require some remediation or control, or that require additional assessment to determine if assumed impacts have occurred. This includes properties downgradient of the landfills, properties with historical industrial use, and the Highland Park Woodfill. While some environmental concerns may exist, it is anticipated

Figure 6.1, Development Potential



that this will not cause significant impediments to redevelopment. In most cases, industrial or commercial uses is assumed.

Low—Properties that require remediation or control, or where restrictions (engineering, administrative or institutional) limit redevelopment options. This category covers the SOCRRA landfills, Sandfill Landfill 1 and 2, and the Kingston Development Landfill. These landfills have poor caps, deep waste material, and other environmental concerns that will need to be addressed prior to new development.

Unlikely—Properties in this category are the least likely to be redeveloped. These include the Jones and Laughlin Landfill, Stan's Trucking landfill, and the properties currently used for a pumping station.

6.2 Next Steps

The following action items will help continue redevelopment of the Landfill Planning Area:

1. *Create a Brownfield Plan for the entire Study Area to use the Brownfield TIF to fund eligible activities, cover RHBRA administrative costs, and fund an area-wide LSRLF.*
   - A Brownfield Plan could allow for the capture of TIF to finance certain remediation activities in the Planning Area.
   - Allowing for greater density on the industrial parcels within the Planning Area could also help support future development. The increased density could generate more property taxes for a Brownfield TIF capture.
   - Consider using the Land Bank legislation to allocate funding between properties.

2. *Facilitate access to the MBT Brownfield Credit to attract development*
   - Developers can reduce the cost of construction by using the MBT Brownfield Tax Credit against construction costs and certain soft costs.

3. *Conduct further investigations*
   - These investigations will determine the nature and extent of impacts described in this ECI, identify remediation is requirements, identify the cost to remediate, and help define the best future use for the properties.
   - Apply for assessment funding using the current Oakland County Site Assessment Grant.

4. *Adjust land use to be consistent with known impacts*
   - Land use may be limited by existing contamination because prohibitively expense remediation may be required for more sensitive uses.
   - As noted in Section 4, the landfill boundaries for both Sandfill Landfills extend farther than originally thought. If further investigations discover contamination above the residential criteria on these sites, residential use would not be permitted without complete removal of the impacted material.

5. *Apply for an area-wide Site Assessment Grant*
   - Additional sources of funding are available through the State of Michigan and the USEPA. These funds can be utilized in conjunction with the TIF.

6. *Identify a high priority site within the Landfill Planning Area with an interested developer and apply for a site-specific clean-up grant*
   - Specific funding may be required for the most difficult properties.

7.0 LIMITATIONS

The Environmental Concerns Inventory is by necessity a limited investigation based on publicly available documentation. It is not possible to address all past or present land uses and/or site practices that may have affected the quality of the environment, or to determine current site conditions based on historical sampling data. The inventory was designed to identify the areas that may represent the greatest environmental impediments to redevelopment. Interpretations of information provided in this report should be made with respect to the limitations and availability of the data. The results and conclusions of this study do not insure, warrant, or represent that there are no additional environmental issues that might be discovered if additional subsurface investigations were to be undertaken.

As described in this document, both general and specific environmental concerns associated with the subject parcels have been identified as a result of the review of data sources. The identified environmental concerns indicate further site specific investigation activities (i.e., soil sampling) on all parcels are necessary to determine actual impacts and those investigations should be based on the intended future use of the parcel.

Additional investigation is always necessary when development occurs in an area of known or suspected contamination, on parcels adjacent to any of the eight landfills identified within the Landfill Planning Area, or on parcels with historical commercial or industrial uses. The need for any additional investigation on a specific parcel (e.g., Phase II Environmental Site Assessment, Baseline Environmental Assessment, etc.) depends on the proposed construction and final use (location and methods) and the mode of land acquisition (easement or acquisition).

All future purchasers should conduct a site specific Phase I ESA in accordance with American Society for Testing and Materials - E 1527-05. For property with contamination above residential criteria, purchaser should complete a Base Line Environmental Assessment (BEA) in accordance with Section 20126(1)(c) of Part 201 of the Michigan Act 451.

APPENDIX A
TABLE 1: LANDFILL PLANNING AREA PARCEL INFORMATION

Table 1 - Study Area Parcel Information

Property ID	Parcel ID	Property Address	Owner	Size
1	15-13-427-001	1990 Avon Road East	Yates Cider Mill Inc.	0.64
2	15-13-427-002	1950 Avon Road East	Yates Cider Mill Inc.	1.6
3	15-13-427-003	Unknown	City of Rochester Hills	1.26
4	15-13-477-001	1880 Avon Road East	1880 Avon LLC	5.31
5	15-13-477-002	51172 Dequindre Road	51172 Dequindre LLC (Yates Cider Mill)	7.78
6	15-13-476-006	1750 Avon Road East	Riverview Square LLC	3.36
7	15-13-476-007	-	City of Rochester Hills	0.09
8	15-13-476-004	-	Oakland Macomb Interceptor Drain	0.55
9	15-13-476-005	51171 Dequindre Road	51171 Dequindre LLC (Yates Cider Mill)	29.96
10	15-13-477-003	51172 Dequindre Road	Jeffery McComb	0.72
11	15-13-476-001	-	SOCIA	24.5
12	15-24-200-004	1741 School Road	SOCIA	80
13	15-24-200-001	-	SOCIA	73.41
14	15-24-100-021	-	City of Highland Park	0.73
15	15-24-100-020	1406 Avon Road	City of Highland Park	42.57
16	15-24-100-003	-	SOCRRA	4.47
17	15-24-100-026	-	SOCRRA	6.4
18	15-24-100-025	1401 School Road	SOCRRA	10.47
19	15-24-426-001	-	Nabil Siblani	1.3
20	15-24-401-038	-	J&B Land LLC	9.2
21	15-24-401-037	-	J&B Land LLC	4
22	15-24-401-031	-	J&B Land LLC	0.45
23	15-24-401-030	-	J&B Land LLC	0.49
24	15-24-401-032	-	J&B Land LLC	2.18
25	15-24-401-085	1710 School	SOCRRA	4.41
26	15-24-401-048	-	City of Rochester Hills	8.89
27	15-24-326-008	1131 East Hamlin Road	Six Star Investments LLC	59.17
28	15-24-326-007	-	City of Rochester Hills	5.04
29	15-24-401-041	1911 East Hamlin Road	Nichols Investment Properties LLC	17.9
30	15-24-401-039	-	The Michigan Landbank Fast Track Authority	6.73
31	15-24-401-033	-	B&B Group LLP	20
32	15-24-401-086	-	City of Rochester Hills	5.47
33	15-24-302-007	-	CSB Bank	18.29
34	15-24-401-040	-	The Michigan Landbank Fast Track Authority	10
35	15-24-401-046	1805 East Hamlin Road	Safeway Storage LLC	7
36	15-24-401-044	-	Pond Enterprises	10.18
37	15-24-401-003	-	Joan & Gerald Wiegand	11
38	15-24-326-004	1441 East Hamlin Road	Joan & Gerald Wiegand	9.78
39	15-24-326-005	-	William & Judith Hotchkiss	7.32
40	15-24-401-036	1811 East Hamlin Road	Brian & Ronald Mikolakczyko	1
41	15-24-401-035	1785 East Hamlin Road	Schaenzle Tool & Die Inc.	1.09

Table 1 - Study Area Parcel Information

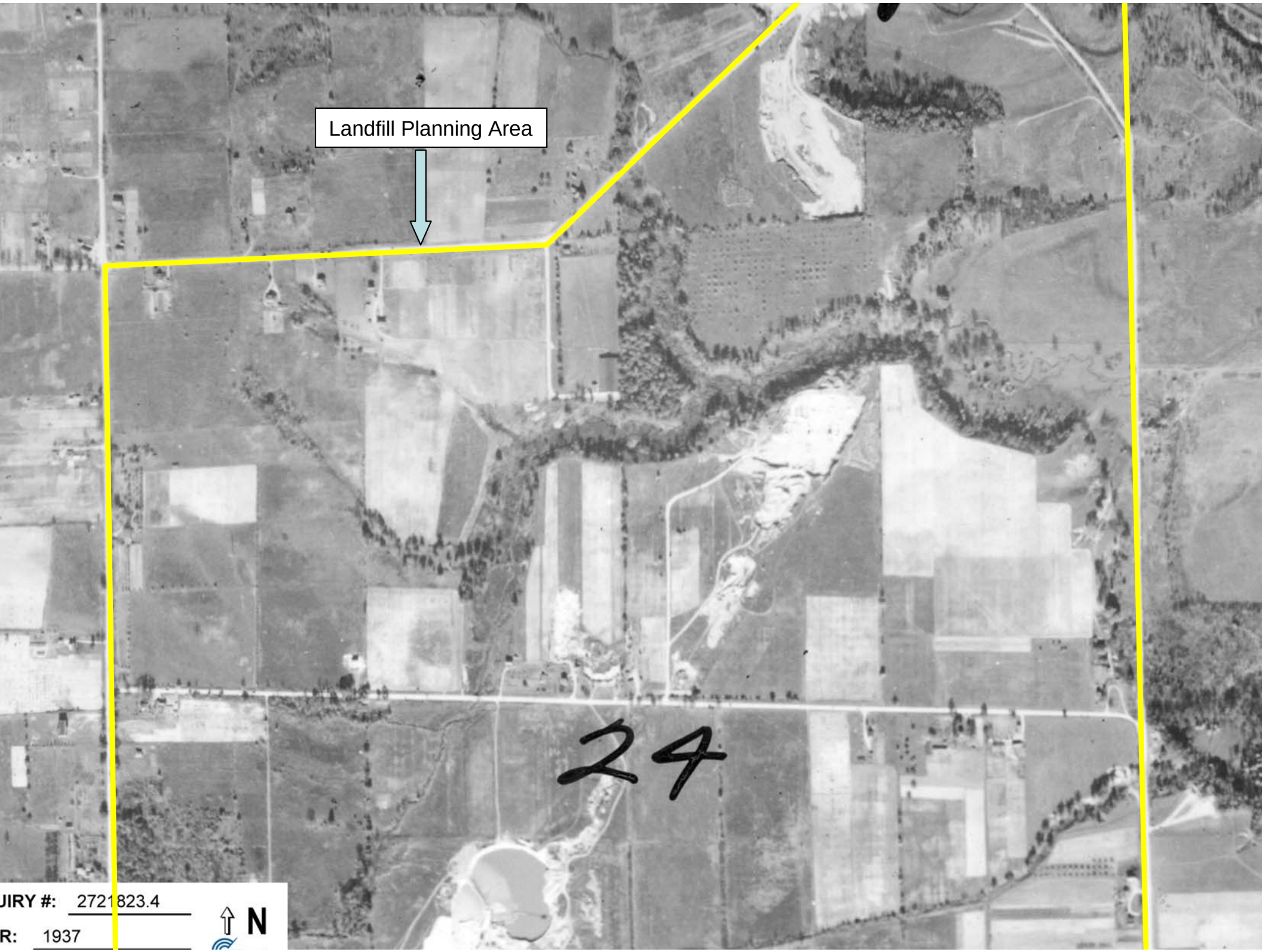
Property ID	Parcel ID	Property Address	Owner	Size
42	15-24-401-034	1765 East Hamlin Road	John Wright	1
43	15-24-401-025	-	Patricia & Patrick Pihajlic	3
44	15-24-401-084	1671 East Hamlin Road	Hamlin Tool & Machine Co.	7.15
45	15-24-401-021	1601 East Hamlin Road	H & H Rentals LLC	3.78
46	15-24-401-022	1665 East Hamlin Road	DDT properties LLC	1
47	15-24-401-045	1663 East Hamlin Road	1663 Hamlin Road LLC	0.79
48	15-24-401-006	1575 East Hamlin Road	J & Y Vettese Properties LLC	2.32
49	15-24-401-004	1515 East Hamlin Road	James Griffin	0.85
50	15-24-401-005	1535 East Hamlin Road	James Griffin	0.85
51	15-24-326-002	1225 East Hamlin Road	William Hotchkiss	2
52	15-24-302-009	1199 East Hamlin Road	Frank Paglia	0.82
53	15-24-302-008	1161 East Hamlin Road	Kenneth Hill	1.89
54	15-24-100-024	1351 School	Wilbur Archer	3.68
55	15-24-100-023	1245 School	Margaret Tessmer	3.43
56	15-24-100-045	1233 School	Frank Suhy	2.49
57	15-13-376-001	1440 Avon Road	Robert Kirschenheiter	0.88
58	15-24-200-002	1505 School Road	Calvin & Patricia Motes	0.87
59	15-24-326-006	1399 East Hamlin Road	Paul & Cheryl Bunk	0.46

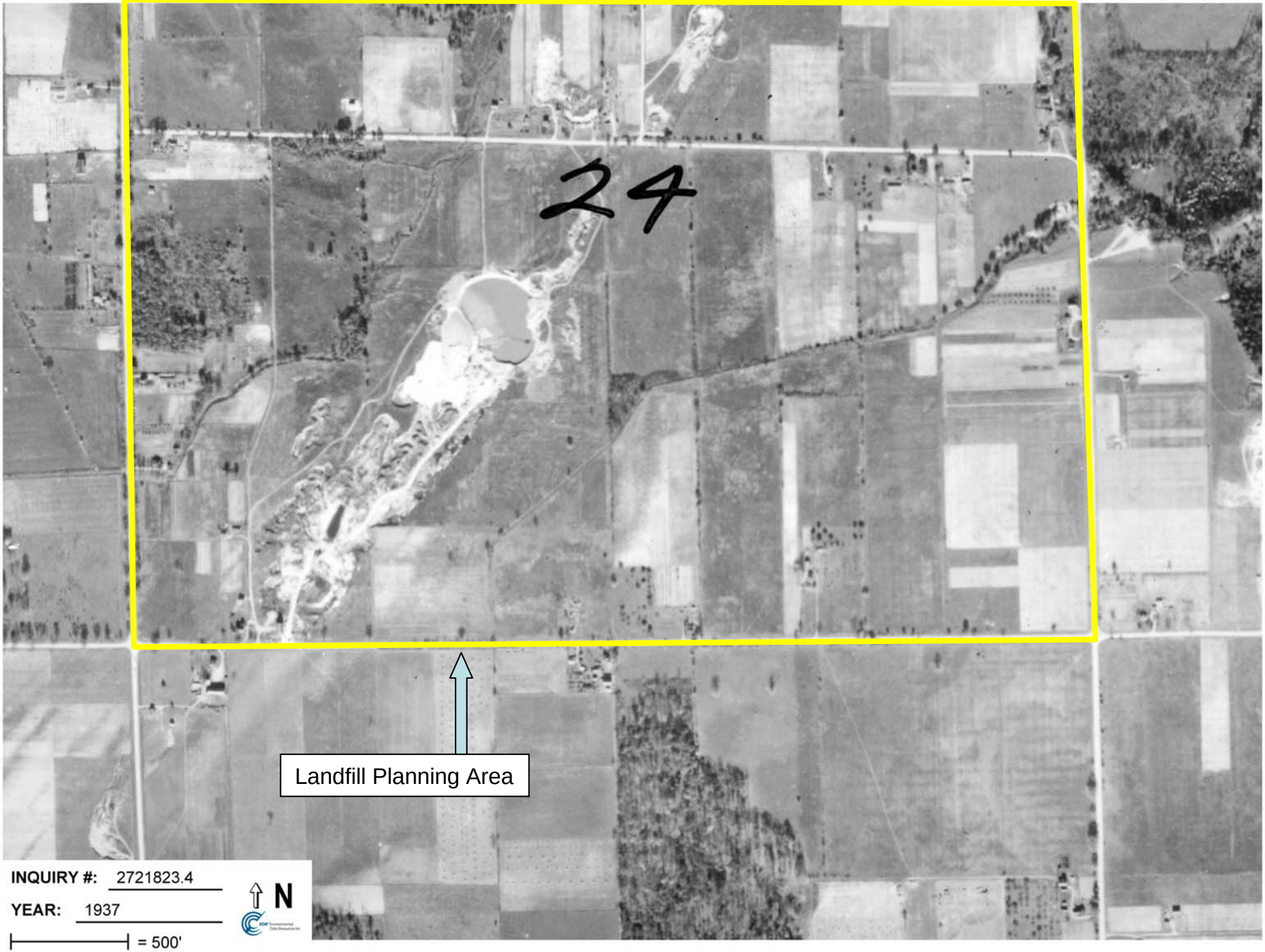
Notes:

1 - From the City of Rochester Hills Zoning Map dated Septembre 2009

2 - From the City of Rochester Hills Future Landuse Map dated February 6, 2007

APPENDIX B
AERIAL PHOTOGRAPHY


Landfill Planning Area
24
JIRY #: 2721823.4
R: 1937
N


24
Landfill Planning Area
INQUIRY #: 2721823.4
YEAR: 1937
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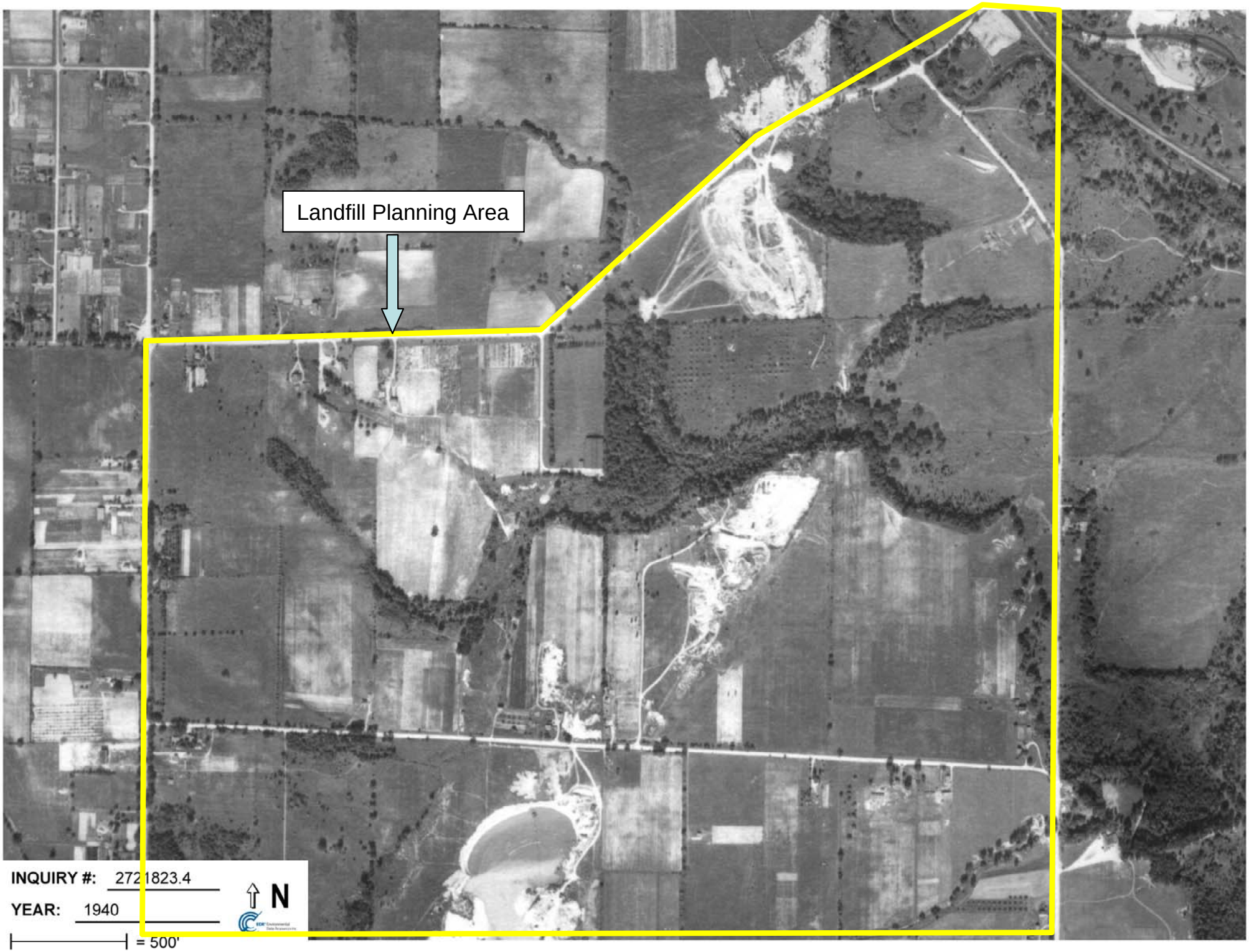
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Landfill Planning Area
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YEAR: 1940
= 500'
N


Landfill Planning Area
INQUIRY #: 2721823.4
YEAR: 1949
N
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Landfill Planning Area
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R: 1949
N


Landfill Planning Area
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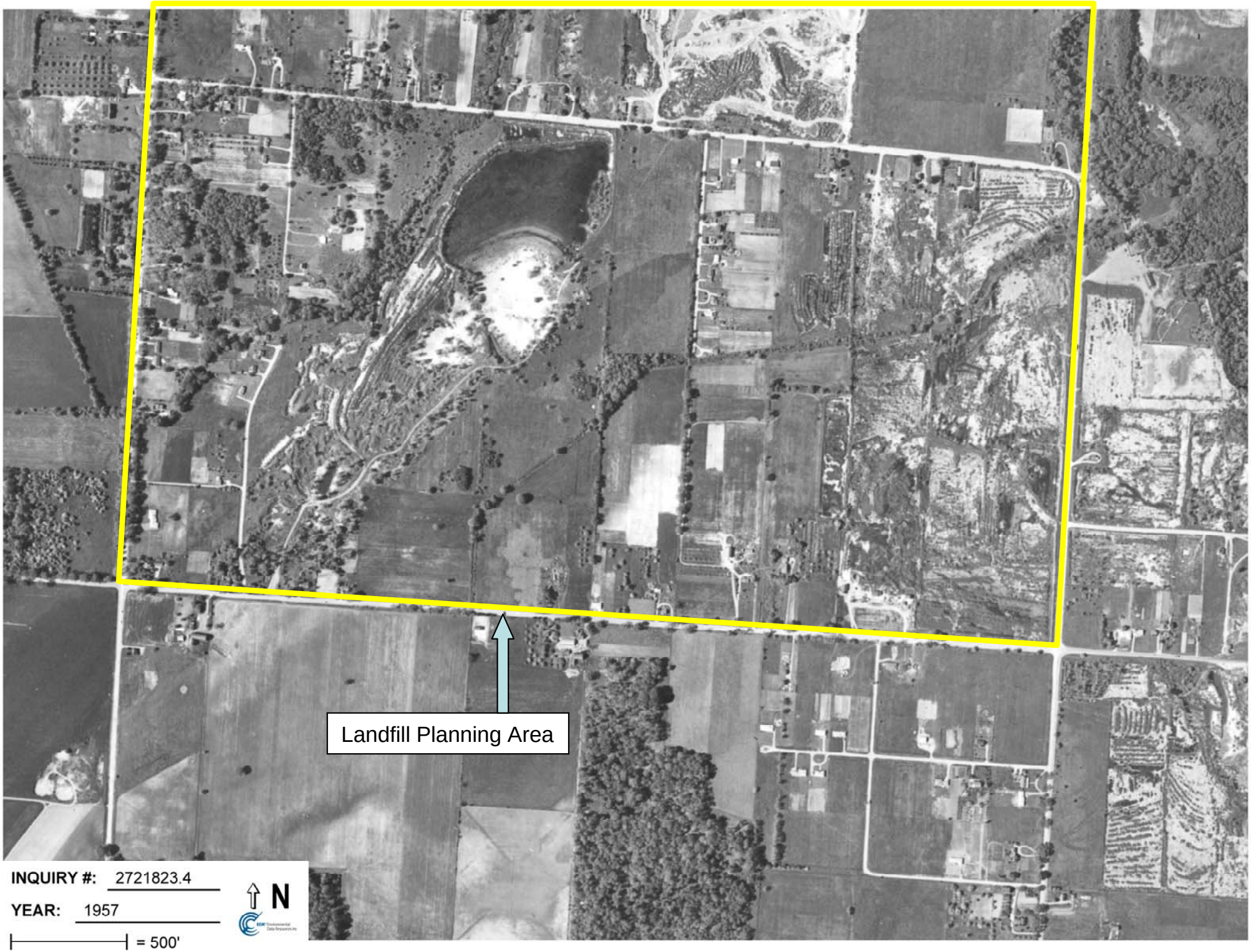
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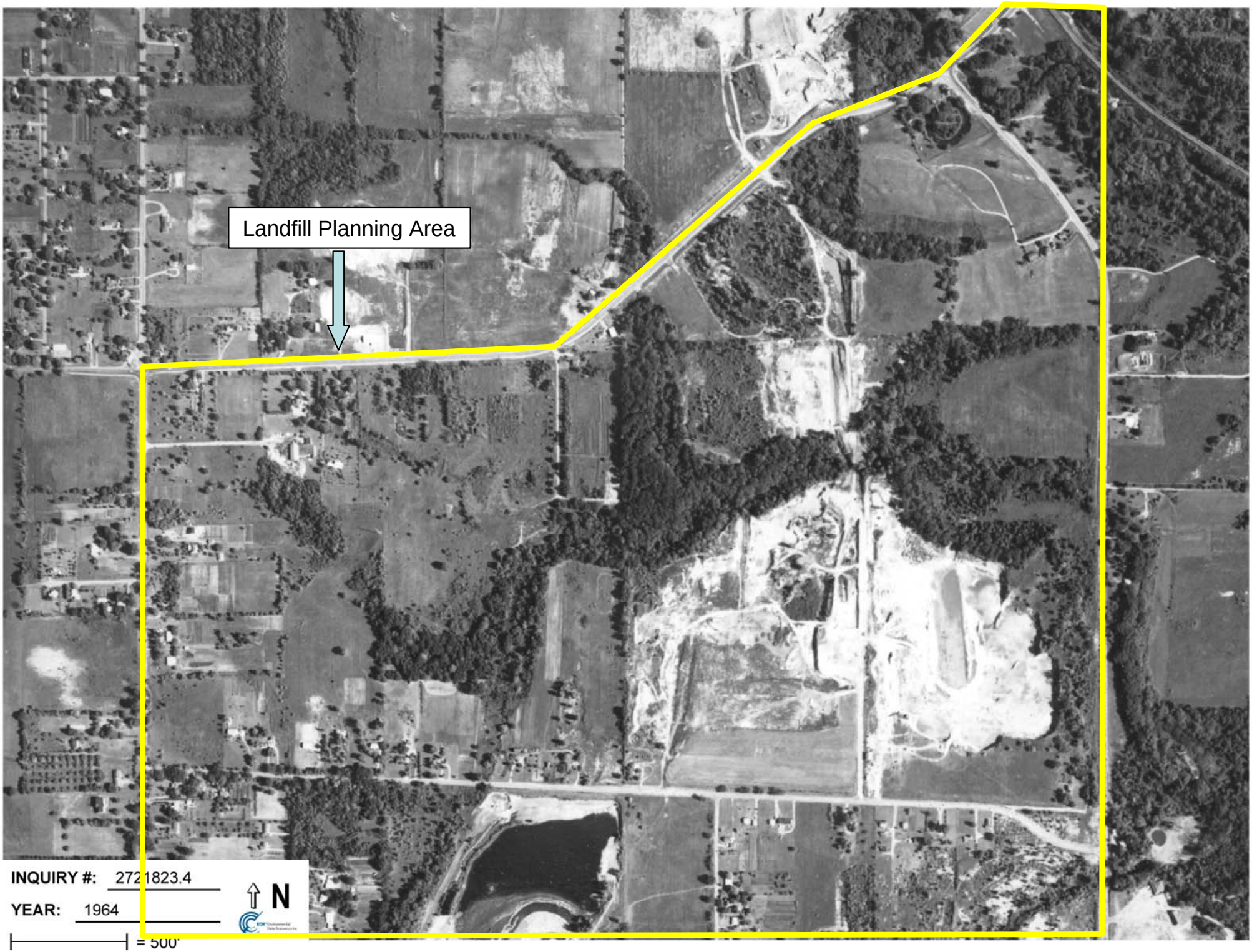
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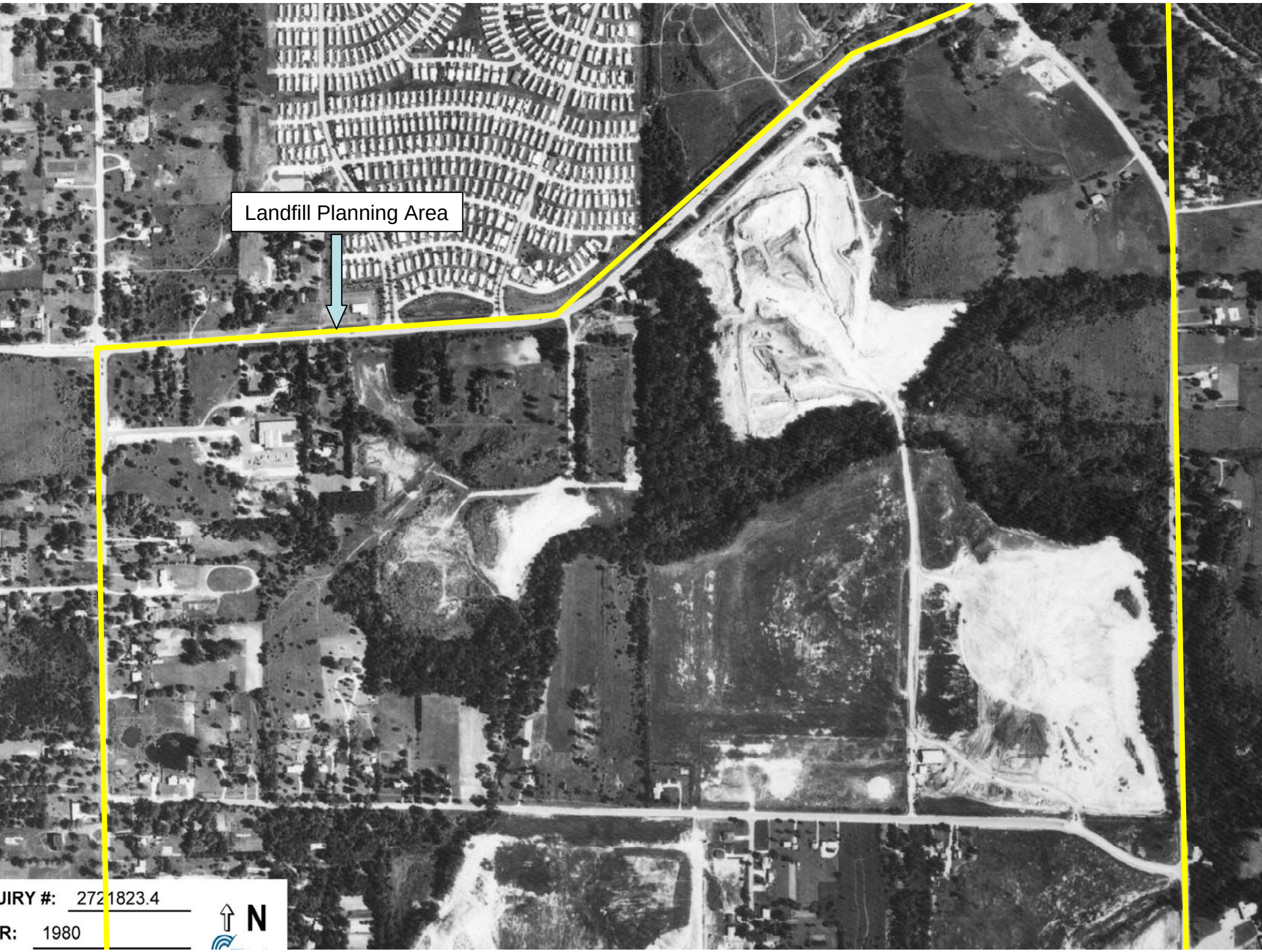
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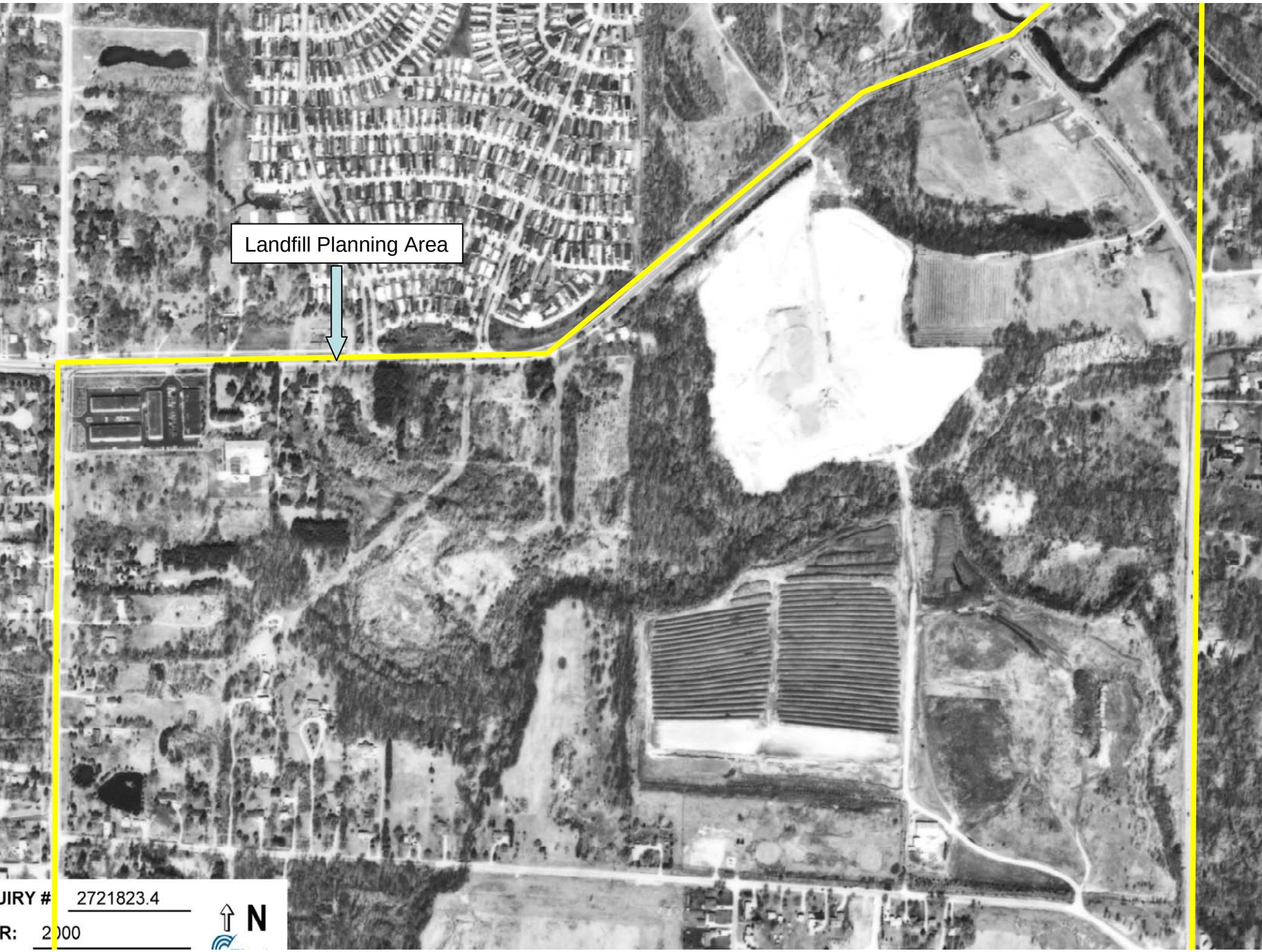
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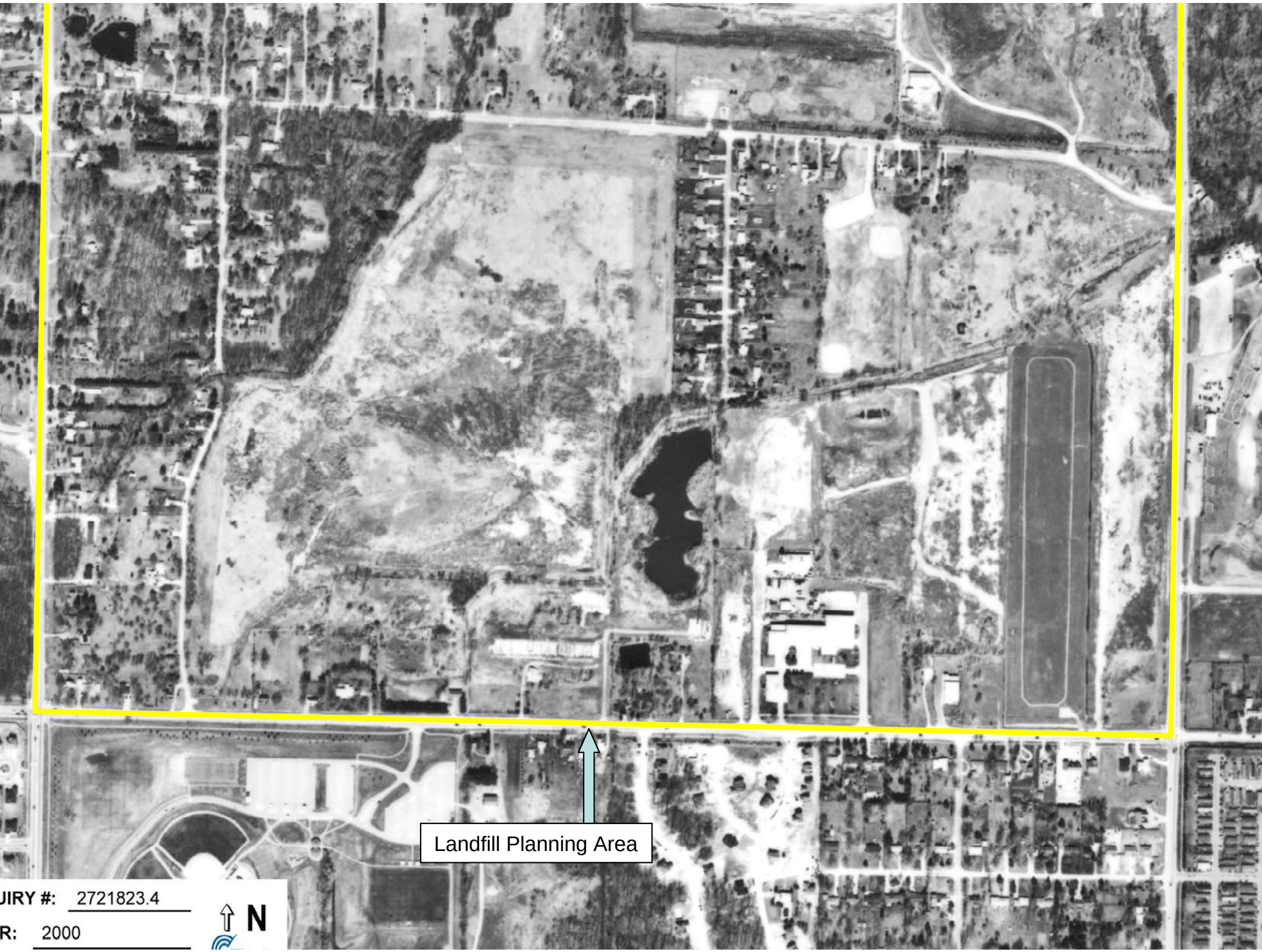
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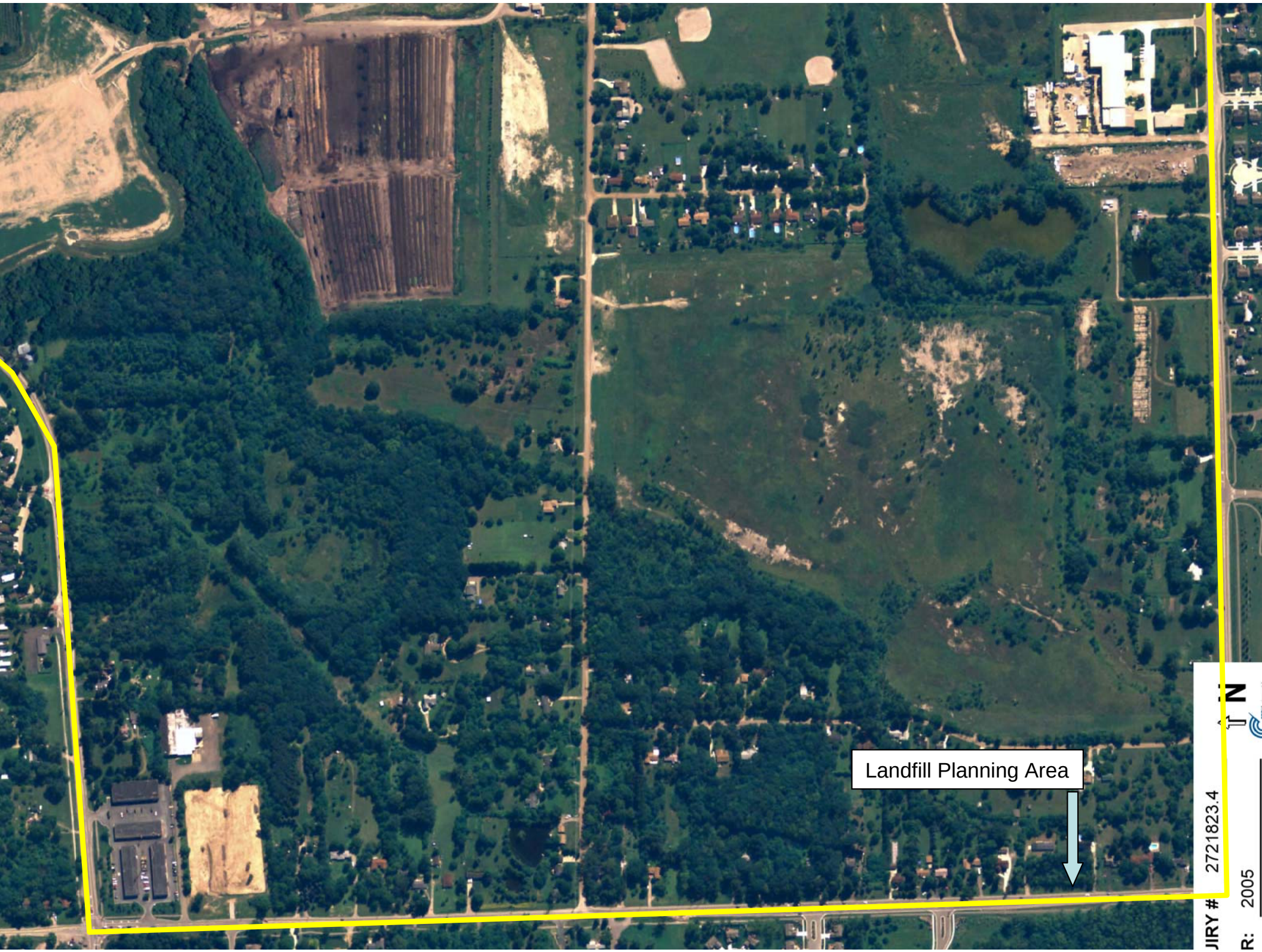
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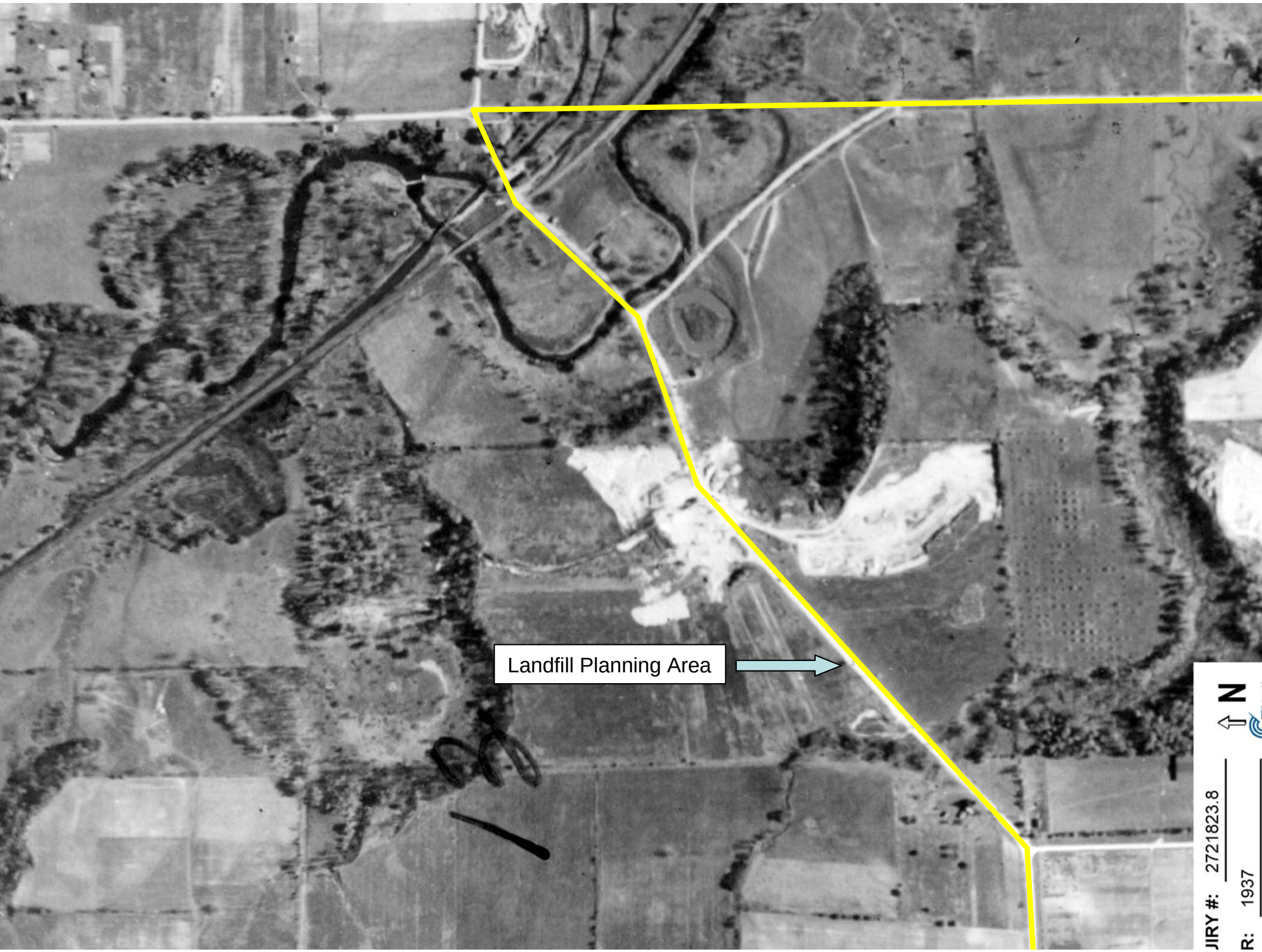
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R: 1937


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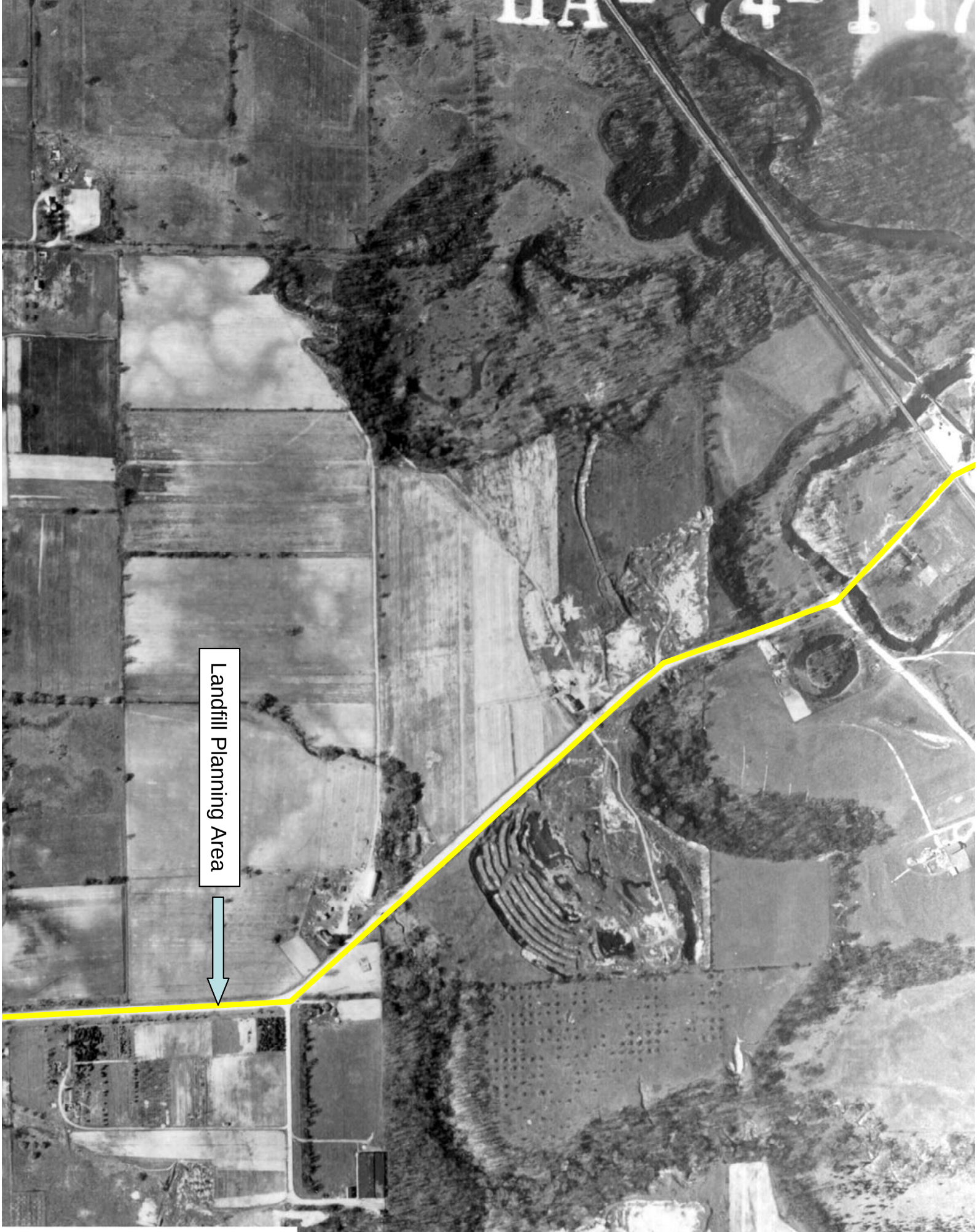

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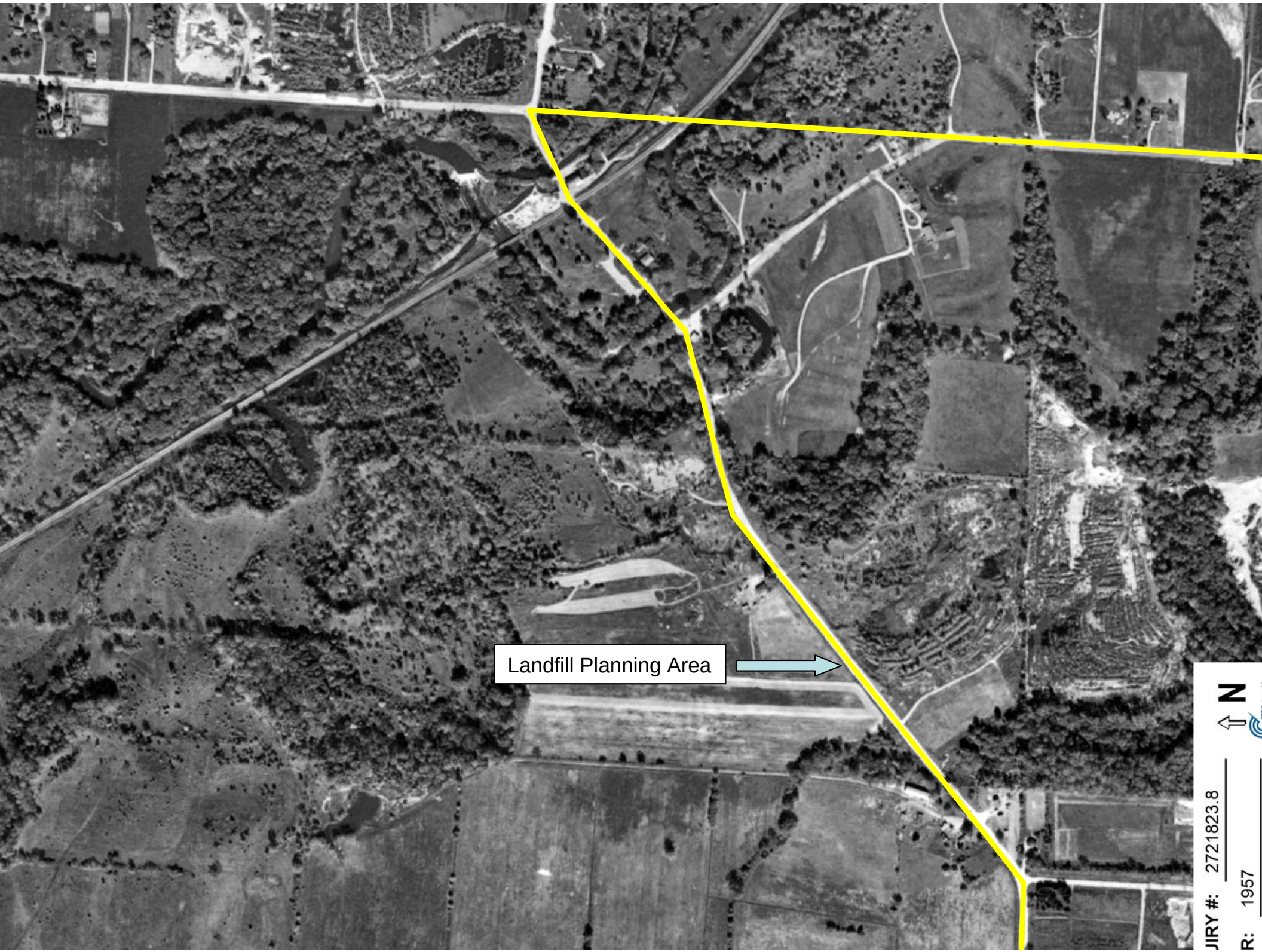
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FM-30-46
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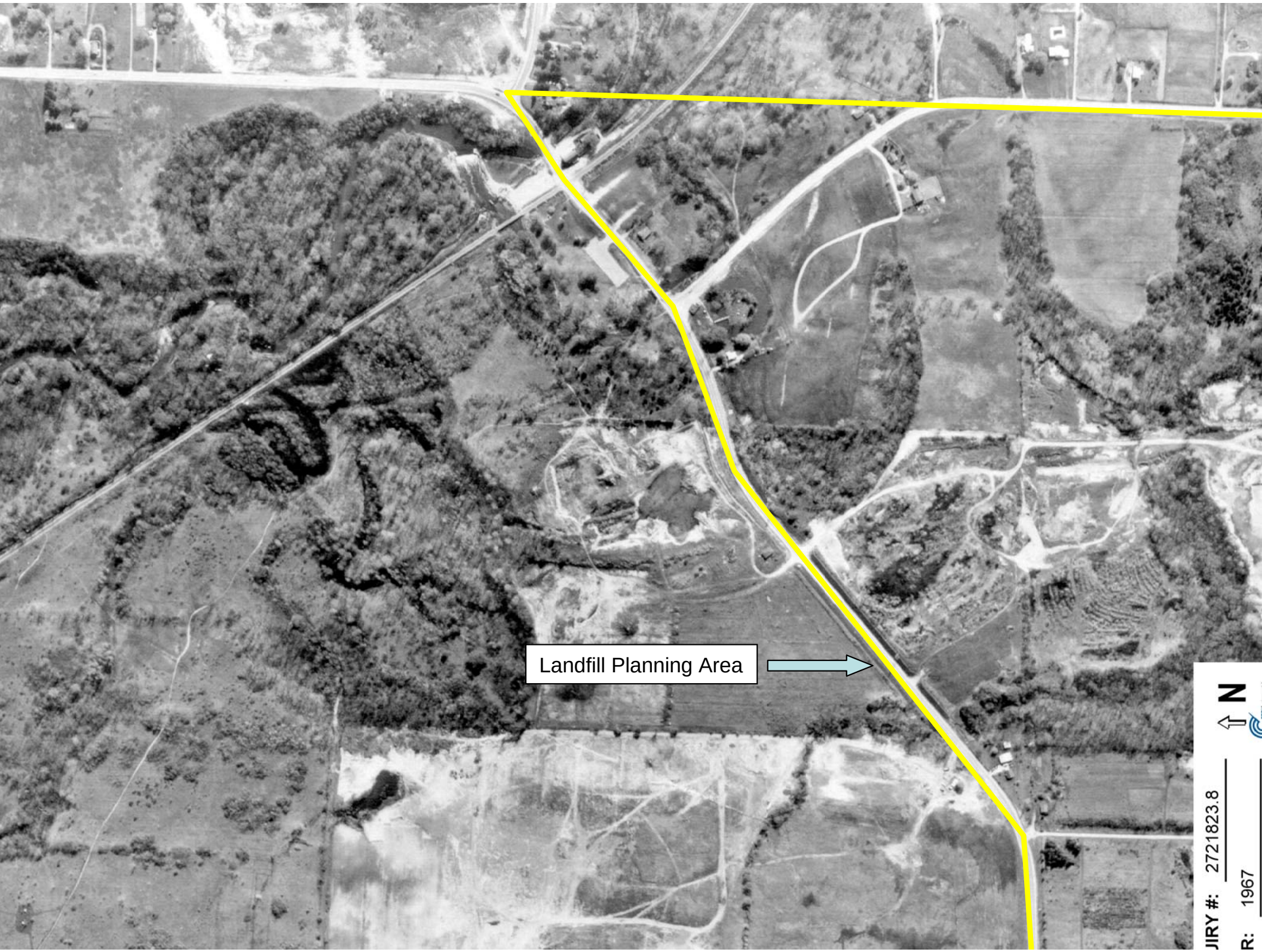
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Landfill Planning Area
N
JIRY #: 2721823.8
R: 1972


Landfill Planning Area
N
2721823.8
1980


Landfill Planning Area
N
JIRY #: 2721823.8
R: 1994


Landfill Planning Area
N
JIRY #: 2721823.8
R: 2000


Landfill Planning Area
N
JIRY #: 2721823.8
R: 2005

APPENDIX C
TABLE 2: DEVELOPMENT POTENTIAL

Table 2 - Supported Redevelopment Table

Property ID	Property Address	Current Zoning[1]	Propsed Future Use[2]	Challenges for Future Development	Redevlopment Potential
1	1990 Avon Road East	General Business	Mixed Residential	--	Continued Current Use
2	1950 Avon Road East	General Business	Mixed Residential	--	Continued Current Use
3	Unknown	General Business	Mixed Residential	--	Mixed
4	1880 Avon Road East	Shopping Center Business	Mixed Residential	--	Continued Current Use
5	51172 Dequindre Road	Residential	Residential	--	Mixed
6	1750 Avon Road East	Residential	Residential	--	Mixed
7	-	Residential	Residential	Infrastructure	Mixed
8	-	Residential	Residential	Infrastructure	Mixed
9	51171 Dequindre Road	Residential	Residential	--	Mixed
10	51172 Dequindre Road	Residential	Mixed Residential	--	Continued Current Use
11	-	Residential	N/A	Landfill	Mixed, Park, and Rediential
12	1741 School Road	Residential	N/A	Landfill	Mixed, Park
13	-	Residential	N/A	Landfill	Park, Residential, Continued Use
14	-	Residential	N/A	Unstable Fill	Residential
15	1406 Avon Road	Residential	N/A	Unstable Fill	Residential
16	-	Residential	N/A	Landfill	Continued Current Use
17	-	Residential	N/A	--	Residential
18	1401 School Road	Residential	N/A	--	Residential
19	-	Residential	N/A	--	Mixed
20	-	Industrial	N/A	Landfill	Industrial
21	-	Residential	N/A	Landfill	Industrial
22	-	Residential	Residential	Landfill	Industrial
23	-	Residential	Residential	Landfill	Industrial
24	-	Residential	Residential	Landfill	Industrial
25	1710 School	Residential	N/A	--	Continued Current Use
26	-	Residential	N/A	Landfill, Remediation System	None
27	1131 East Hamlin Road	Residential	N/A	Landfill, Deteriorated Cap	Park
28	-	Residential	N/A	--	Residential
29	1911 East Hamlin Road	Industrial	N/A	Landfill	Industrial
30	-	Industrial	N/A	Landfill, NPL Site	None
31	-	Industrial	N/A	Landfill	Industrial
32	-	Residential	N/A	--	Continued Current Use
33	-	Residential	N/A	Landfill, Deteriorated Cap	Park
34	-	Industrial	N/A	Landfill, NPL Site	None
35	1805 East Hamlin Road	Industrial	N/A	Landfill	Industrial
36	-	Industrial	N/A	Landfill	Industrial
37	-	Industrial	Industrial	--	Industrial
38	1441 East Hamlin Road	Industrial	Industrial	--	Mixed
39	-	Residential	Industrial	--	Mixed

Table 2 - Supported Redevelopment Table

Property ID	Property Address	Current Zoning[1]	Propsed Future Use[2]	Challenges for Future Development	Redevlopment Potential
40	1811 East Hamlin Road	Industrial	Industrial	--	Industrial
41	1785 East Hamlin Road	Industrial	Industrial	--	Industrial
42	1765 East Hamlin Road	Industrial	Industrial	--	Industrial
43	-	Industrial	Industrial	--	Industrial
44	1671 East Hamlin Road	Industrial	Industrial	--	Continued Current Use
45	1601 East Hamlin Road	Industrial	Industrial	--	Industrial
46	1665 East Hamlin Road	Industrial	Industrial	--	Continued Current Use
47	1663 East Hamlin Road	Industrial	Industrial	--	Continued Current Use
48	1575 East Hamlin Road	Industrial	Industrial	--	Mixed
49	1515 East Hamlin Road	Residential	Industrial	--	Mixed
50	1535 East Hamlin Road	Residential	Industrial	--	Mixed
51	1225 East Hamlin Road	Residential	Industrial	--	Mixed
52	1199 East Hamlin Road	Residential	Industrial	--	Mixed
53	1161 East Hamlin Road	Residential	Industrial	--	Mixed
54	1351 School	Residential	N/A	--	Residential
55	1245 School	Residential	N/A	--	Residential
56	1233 School	Residential	N/A	--	Residential
57	1440 Avon Road	Residential	N/A	--	Residential
58	1505 School Road	Residential	N/A	--	Residential
59	1399 East Hamlin Road	Residential	N/A	--	Mixed

Notes:

1 - From the City of Rochester Hills Zoning

2 - From the City of Rochester Hills Future

APPENDEIX D
BROWNFIELD TAX ILLUSTRATION

FINANCIAL ANALYSIS — ***Rochester Hills Landfill Planning Area***

Appendix D - Example Brownfield Tax Capture — **August 24, 2010**

Jurisdiction: City of Rochester Hills
School District: Rochester Community Schools
Project Type: Commerical, Industrial, and Residential

Assumptions

Estimated True Cash Value:	$ 192,675,740
Projected Taxable Value:	$ 96,337,870
Initial Taxable Value:	$ 1,255,200
Incremental Taxable Value:	$ 95,082,670

Eligible Activity

Total Eligible Expense:	$ 19,341,370

Year			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Percent Complete			0%	0%	10%	15%	25%	40%	55%	75%	85%	100%
Incremental Taxable Value			$ -	$ -	$ -	$ 9,508,267	$ 14,262,400	$ 23,770,667	$ 38,033,068	$ 52,295,468	$ 71,312,002	$ 80,820,269
New Personal Property			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Taxable Value	.2008/2009		$ -	$ -	$ -	$ 9,508,267	$ 14,262,400	$ 23,770,667	$ 38,033,068	$ 52,295,468	$ 71,312,002	$ 80,820,269
Millage Category	**Total Mills/$1000**	**Total Capture**	**Total Tax Capture for All Eligible Activities**									
Oakland County Tax	4.7461	$ 4,882,747	$ -	$ -	$ -	$ 45,127	$ 67,691	$ 112,818	$ 180,509	$ 248,200	$ 338,454	$ 383,581
Oakland Schools	3.3690	$ 3,465,998	$ -	$ -	$ -	$ 32,033	$ 48,050	$ 80,083	$ 128,133	$ 176,183	$ 240,250	$ 272,283
Oakland Community College	1.5844	$ 1,630,017	$ -	$ -	$ -	$ 15,065	$ 22,597	$ 37,662	$ 60,260	$ 82,857	$ 112,987	$ 128,052
State Education	6.0000	$ 6,172,749	$ -	$ -	$ -	$ 57,050	$ 85,574	$ 142,624	$ 228,198	$ 313,773	$ 427,872	$ 484,922
City General	3.7545	$ 3,862,598	$ -	$ -	$ -	$ 35,699	$ 53,548	$ 89,247	$ 142,795	$ 196,343	$ 267,741	$ 303,440
City Debt & Bonds	1.1535	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
City Dedicated Millages	4.7980	$ 4,936,142	$ -	$ -	$ -	$ 45,621	$ 68,431	$ 114,052	$ 182,483	$ 250,914	$ 342,155	$ 387,776
	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
School Operating	18.0000	$ 9,416,098	$ -	$ -	$ -	$ 87,025	$ 130,538	$ 217,563	$ 348,101	$ 478,639	$ 652,689	$ 739,714
School SET	5.1800	$ 5,329,140	$ -	$ -	$ -	$ 49,253	$ 73,879	$ 123,132	$ 197,011	$ 270,891	$ 369,396	$ 418,649
Total Incremental Tax	48.5855	$ 39,695,489	$ -	$ -	$ -	$ 366,873	$ 550,309	$ 917,181	$ 1,467,490	$ 2,017,799	$ 2,751,544	$ 3,118,416
Brownfield Tax Capture		**Total**										
Incremental Taxes		$ 19,341,370	$ -	$ -	$ -	$ 344,323	$ 516,484	$ 860,807	$ 1,392,490	$ 1,942,799	$ 2,676,544	$ 3,043,416
Capture for Brownfield Authority:		$ 1,012,749	$ -	$ -	$ -	$ 22,550	$ 33,825	$ 56,375	$ 75,000	$ 75,000	$ 75,000	$ 75,000
Capture for RLF		$ 19,341,370	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Capture:		$ 39,695,489	$ -	$ -	$ -	$ 366,873	$ 550,309	$ 917,181	$ 1,467,490	$ 2,017,799	$ 2,751,544	$ 3,118,416

Notes:

Property and Taxable Values assume conservative costs and tax rates as described in the Brownfield Plan, are for illustration only, and do not represent actual costs.
State Tax Capture adjusted for Proportionality Test
Includes One Year Delay in Assessed Valuation
The Initial Taxable Value is based on tax records.

Printed 9/8/2010

Jurisdiction: City of Rochester Hills
School District: Rochester Community Schools
Project Type: Commerical, Industrial, and Residential

Assumptions

Estimated True Cash Value:	$ 192,675,740
Projected Taxable Value:	$ 96,337,870
Initial Taxable Value:	$ 1,255,200
Incremental Taxable Value:	$ 95,082,670

Eligible Activity

Total Eligible Expense:	$ 19,341,370

Year		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Percent Complete		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Incremental Taxable Value		$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670
New Personal Property		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Taxable Value	**.2008/2009**	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670	$ 95,082,670
Millage Category	**Total Mills/$1000**	**Total Tax Capture for All Eligible Activities**										
Oakland County Tax	4.7461	$ 451,272	$ 451,272	$ 451,272	$ 451,272	$ 451,272	$ 451,272	$ 451,272	$ 347,465	$ -	$ -	$ -
Oakland Schools	3.3690	$ 320,334	$ 320,334	$ 320,334	$ 320,334	$ 320,334	$ 320,334	$ 320,334	$ 246,647	$ -	$ -	$ -
Oakland Community College	1.5844	$ 150,649	$ 150,649	$ 150,649	$ 150,649	$ 150,649	$ 150,649	$ 150,649	$ 115,995	$ -	$ -	$ -
State Education	6.0000	$ 570,496	$ 570,496	$ 570,496	$ 570,496	$ 570,496	$ 570,496	$ 570,496	$ 439,264	$ -	$ -	$ -
City General	3.7545	$ 356,988	$ 356,988	$ 356,988	$ 356,988	$ 356,988	$ 356,988	$ 356,988	$ 274,869	$ -	$ -	$ -
City Debt & Bonds	1.1535	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
City Dedicated Millages	4.7980	$ 456,207	$ 456,207	$ 456,207	$ 456,207	$ 456,207	$ 456,207	$ 456,207	$ 351,265	$ -	$ -	$ -
	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
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	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
School Operating	18.0000	$ 870,252	$ 870,252	$ 870,252	$ 870,252	$ 870,252	$ 870,252	$ 870,252	$ 670,066	$ -	$ -	$ -
School SET	5.1800	$ 492,528	$ 492,528	$ 492,528	$ 492,528	$ 492,528	$ 492,528	$ 492,528	$ 379,231	$ -	$ -	$ -
Total Incremental Tax	48.5855	$ 3,668,725	$ 3,668,725	$ 3,668,725	$ 3,668,725	$ 3,668,725	$ 3,668,725	$ 3,668,725	$ 2,824,802	$ -	$ -	$ -
Brownfield Tax Capture												
Incremental Taxes		$ 3,593,725	$ 3,593,725	**$ 1,377,057**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capture for Brownfield Authority:		$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ -	$ -	$ -
Capture for RLF		$ -	$ -	$ 2,216,668	$ 3,593,725	$ 3,593,725	$ 3,593,725	$ 3,593,725	**$ 2,749,802**	$ -	$ -	$ -
Total Capture:		$ 3,668,725	$ 3,668,725	$ 3,668,725	$ 3,668,725	$ 3,668,725	$ 3,668,725	$ 3,668,725	$ 2,824,802	$ -	$ -	$ -

Notes:

Property and Taxable Values assume conservative costs and tax rates as described in the Brownfield Plan, are for illustration only, and do not represent actual costs.
State Tax Capture adjusted for Proportionality Test
Includes One Year Delay in Assessed Valuation
The Initial Taxable Value is based on tax records.

Printed 9/8/2010

ASSUMPTIONS

1. To determined eligible properties, it was assumed all landfills, except the Highland Park Woodfill, qualify as facilities in accordance Part 201 because of contamination in exceedence of residential direct contact (RDC) criteria. The Woodfill and majority of the other parcels qualify as Eligible Properties because they are adjacent and contiguous to the facilities.

2. Nine parcels (property IDs 1-5, 25, 51, and 54-56) are not facilities or adjacent and continuous to a facility. Therefore their taxes can not be captured in the plan unless they are independently identified as a facility or included in a Land Bank program.

3. Four parcels currently house the Cider Mill, other commercial or industrial operations, and public utilities (properties 1, 2, 4, 7, 8, 10, 44, 46, 47, 49, 50, 54-56, 58, and 59). It is assumed the land use will not change and that new construction will be limited to vacant or underused parcels.

4. It is assumed that properties part of 11 and 12 and all of 25, 32, and 33 will have green space on them in the future.

5. The SOCRRA Compost Landfill will remain in operation, so all of 16 and two-thirds of 13 were not included.

6. Due to the Record of Decision (ROD) and geotechnical issues with the Jones and Laughlin Landfill outlined in Section 3.1.2, it is assumed that this parcel will not be redeveloped (property IDs 30 and 34 in Figure 1.2).

7. The zoning on 5 parcels (property IDs 20-24) changes from residential to allow commercial or industrial. The Jones and Laughlin Landfill extends on to these parcels. It is assumed that subsequent investigations will reveal contamination levels that exceed residential criteria but this will not necessarily impede development for commercial or industrial use.

8. One parcel has a large pond located on it (property ID 37 in Figure 1.2). Therefore, the developable portion is limited to approximately 125,000 square feet.

9. Development occurs in the following stages:

   - 2011 – 0%
   - 2012 – 0%
   - 2013 – 10%
   - 2014 – 15%
   - 2015 – 25%
   - 2016 – 40%
   - 2017 – 55%
   - 2018 – 75%
   - 2019 – 85%
   - 2020 – 100%

10. The future density on each parcel was determined by using an estimated Floor to Area Ratio (FAR) based on current City codes for similar uses. Residential FAR was estimated using an average unit size of 2,000 square feet and the maximum allowed number of dwelling units for R3 and R4. Business and Industrial FAR was estimating by determining the FAR of several currently zoned commercial and industrial parcels.

    - Residential = 0.16—0.20
    - Commercial/Mixed = 0.25—0.30
    - Industrial = 0.2

11. The cost for eligible activities was determined by the level of

effort required to remediate the site based on the historical use of the property and the projected future use. The projected future use was based on the Supported Uses Map, Figure 4.12.

12. Local and state tax capture is included in the recapture.

13. Personal property, such as equipment, although anticipated to be part of the value added to the Property, is not included in the tax table in order to provide a conservative estimate.

14. The initial taxable value of the properties included in the evaluation is assumed to be approximately $1.2 million based.

15. The projected total taxable value, approximately $96.3 million, is assumed to be 50% of the post-construction property value using estimated costs listed in Appendix D.

16. The Homestead exemption is assumed for all single-family residential components of the project.

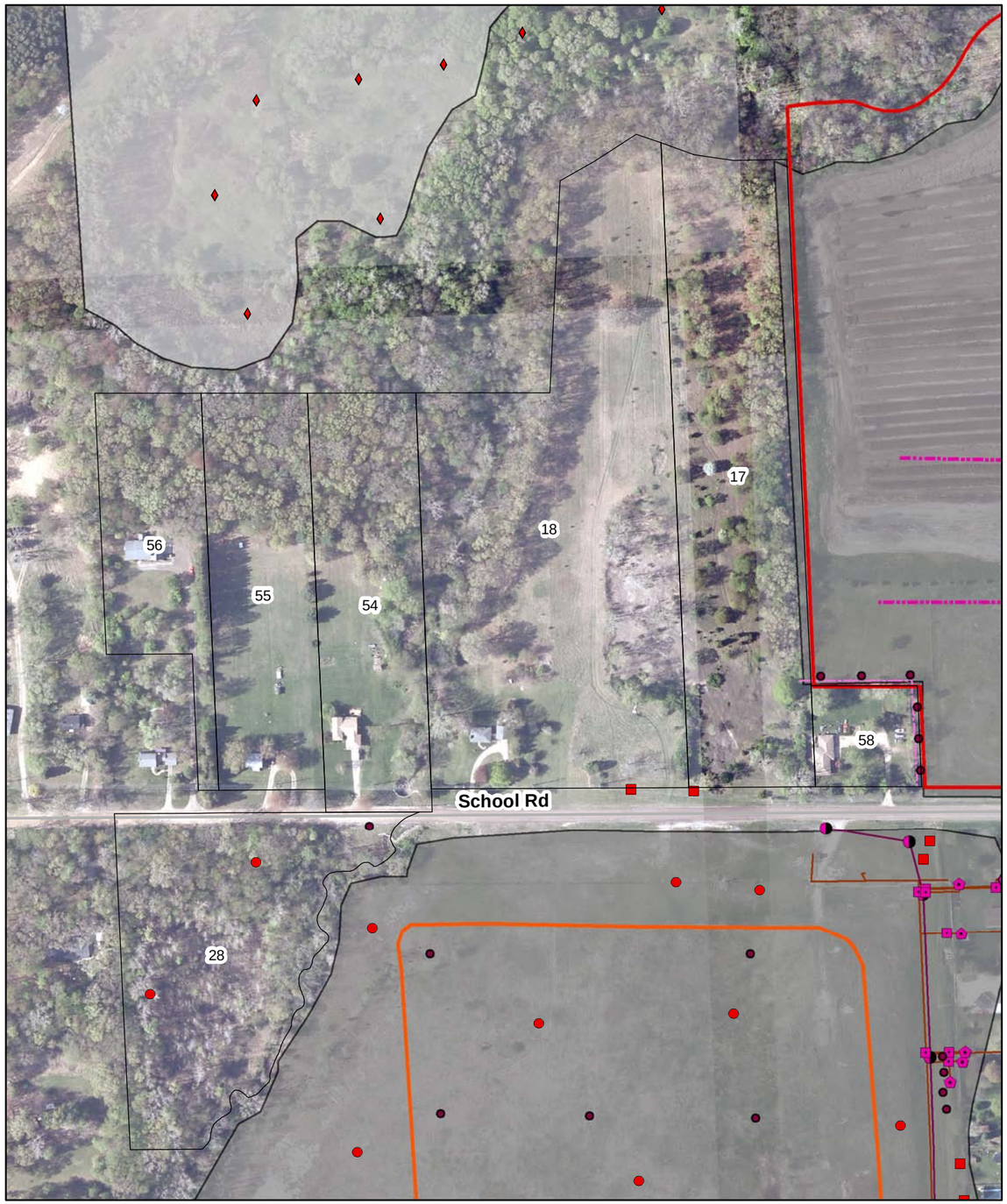
17. No adjustments to the capture of state taxes were necessary in order to comply with the Proportionality Test.

APPENDEIX E
INFORMATIONAL MAP INSERTS

Central Residential Properties
Located in the western central portion of the study area located immediately north of the STLF property is a group of seven parcels with no identified concerns. These seven parcels (map IDs 17, 18, 28, 54, 55, 56, & 58) are currently vacant or residential. Based on the materials reviewed, these seven parcels have either never been developed or have been used for residential purposes since development.
Special Concerns:
Although parcels do not have any known concerns, all but two (Properties 55 and 56) of them are potentially adjacent to and/or across the groundwater gradient from the STLF property.

Opportunity for Redevelopment:
HighThese parcels have little to no environmental concerns on them. It is important to note that current uses may preclude future development.

Conclusions and Concerns:
These parcels requires that proper due diligence be conducted during redevelopment. At a minimum Phase I Environmental Site Assessment (ESA) should be conducted and if determined to be necessary a Phase II Subsurface Investigation, Baseline Environmental Assessment, and Due Care Plan should be completed.



Legend

- Selected Parcels
- Roads
- Gas Migration Monitoring Well
- Test Boring Locations
- Test Pit Locations
- Monitoring Wells
- Soil Sediment Samples
- Surface Soil Samples
- Ambient Air Monitoring
- Catalytic Bead Sensor
- Gas Vents
- Infrared Sensor
- Junction Box
- Trench Vents
- Underdrain Junctions
- Final Cover Ridge Valley Line
- Jones and Laughlin Landfill Drains
- Permit Fill Limits
- Cut Off Trench
- Polyvinyl Chloride Barrier
- SOCRRA Landfill Underdrain
- Underground Instrument Conduit
- Kingston Hole
- Large Steep Hill
- Plateau Landfill
- Woodfill
- Extent of Fill
- Unknown Activity

250 125 0 250 Feet

ASTI Environmental

Central Residential Properties

Highland Park Woodfill
Located in the northwest corner of the Landfill Planning Area is the Highland Park Woodfill area (map IDs 14 & 15 in Figure 3.5). This parcel was used by the city of Highland park to dispose of an unknown quantity of diseased trees during the 1970s and 1980s.

Special Concerns:
The woodfill may be unstable and could effect the weight bearing capacity of the soils.

Opportunity for Redevelopment:
MediumWhile some environmental concerns may exist, it is anticipated that this will not cause significant concerns.

Conclusions and Concerns:
These parcels requires that proper due diligence be conducted during redevelopment. At a minimum Phase I Environmental Site Assessment (ESA) should be conducted and if determined to be necessary a Phase II Subsurface Investigation, Baseline Environmental Assessment, and Due Care Plan should be completed.

Legend

- Selected Parcels
- Roads
- Monitoring Wells
- Soil Sediment Samples
- Surface Soil Samples
- Gas Migration Monitoring Well
- Test Boring Locations
- Test Pit Locations
- Ambient Air Monitoring
- Catalytic Bead Sensor
- Gas Vents
- Infrared Sensor
- Junction Box
- Trench Vents
- Underdrain Junctions
- Final Cover Ridge Valley Line
- Jones and Laughlin Landfill Drains
- Permit Fill Limits
- Cut Off Trench
- Polyvinyl Chloride Barrier
- SOCRRA Landfill Underdrain
- Underground Instrument Conduit
- Kingston Hole
- Large Steep Hill
- Plateau Landfill
- Woodfill
- Extent of Fill
- Unknown Activity

250 125 0 250 Feet

ASTI Environmental

Jones and Laughlin Landfill
Property Map IDs: 30 & 34
Former Operations:
Gravel pit before 1951
Landfill from 1951 until 1981

Previous Investigations:
June 1981, Jones and Laughlin completed a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) notification for the property
July 1983, USEPA preliminary site assessment
June 1984 USEPA Site Inspection (SI)
Listed on the National Priority List (NPL) in June 1986
1991 USEPA conducted an RI
June 1994 Final ROD for Soil impacts
1997 “No Action” ROD for Groundwater

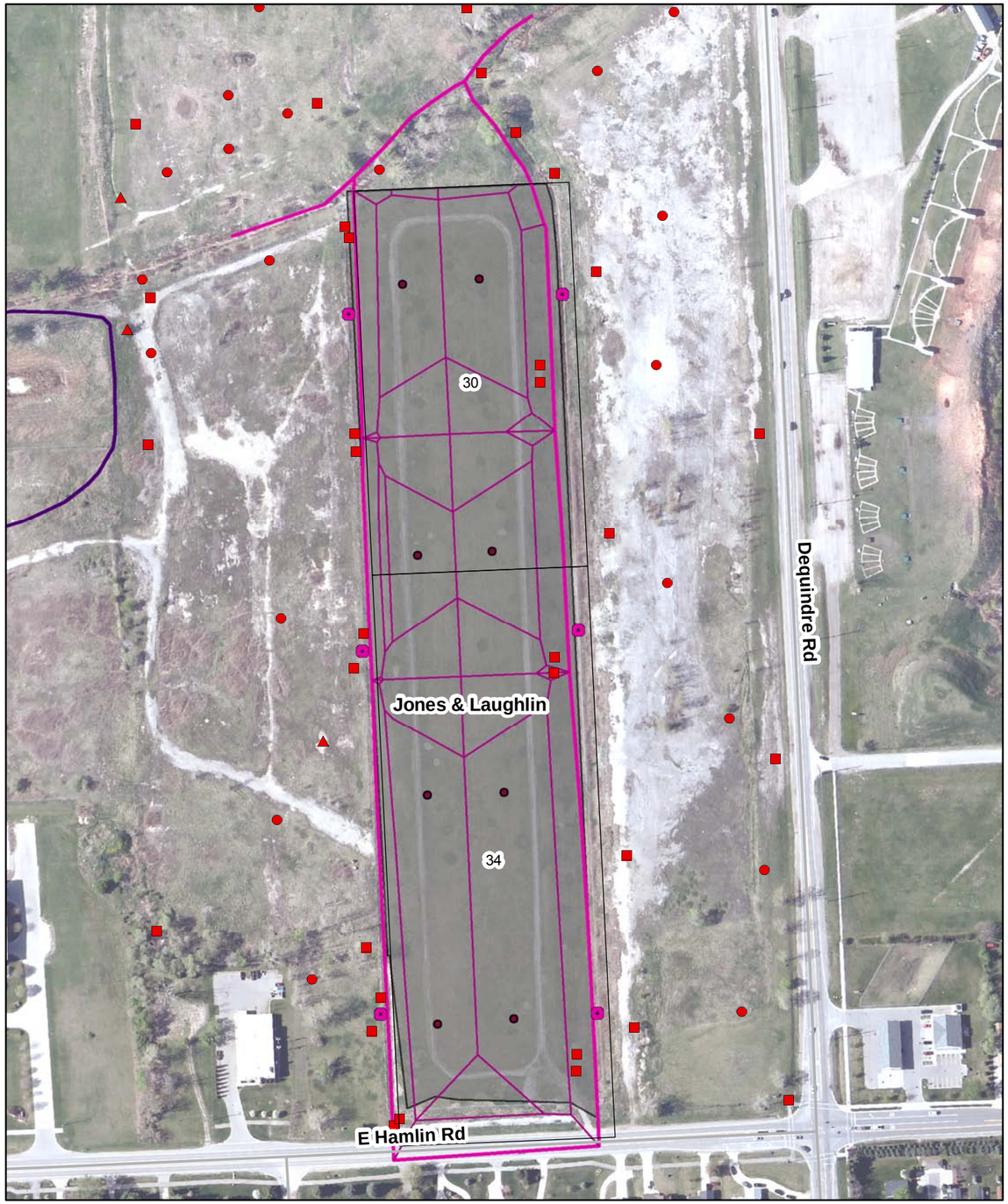
Known Impacts:
Soil: Metals Above Residential Direct Contact Criteria
Groundwater: Metals Above Residential Direct Contact Criteria
Soil Vapor: Unknown/Not Tested

Special Concerns:
The Jones and Laughlin Landfill (JLLF) is currently listed on the Federal Superfund List is subject to two consent decrees, and a deed restriction, is fenced, and capped.
In September 2001, a five year review of the selected remedy was conducted. This determined that the actions taken protected human health and the environment. LTV Steel (the parent company of Jones and Laughlin Steel) completed bankruptcy in August 2003. As part of the bankruptcy, the company made a cash settlement to the USEPA to continue the operation and maintenance portions of the RODs. A second, five-year review was completed in 2006 that also found the remedy protected human health and the environment. A third review is currently scheduled for 2011.

Opportunity for Redevelopment:
UnlikelyThis property's the least likely to be redeveloped. The JLLF has an Record of Decision (ROD) that prohibits that alternation of the cap. This and the steep elevation gain caused by the cap will pose significant legal and financial barriers to future development.

Conclusions and Concerns:
Soil and groundwater above residential criteria are known to have been present on the JLLF properties. These impacts will necessitate significant additional investigation prior to redevelopment of the property. In addition, due to the disposal of waste in the JLLF these properties will also require consideration of potential geotechnical considerations for future development. Addressing these will incur significant cost. The JLLF will likely never be redeveloped.

These parcels requires that proper due diligence be conducted during redevelopment. At a minimum Phase I Environmental Site Assessment (ESA) should be conducted and if determined to be necessary a Phase II Subsurface Investigation, Baseline Environmental Assessment, and Due Care Plan should be completed.



Legend

- Selected Parcels
- Roads
- Monitoring Wells
- Soil Sediment Samples
- Surface Soil Samples
- Gas Migration Monitoring Well
- Test Boring Locations
- Test Pit Locations
- Ambient Air Monitoring
- Catalytic Bead Sensor
- Gas Vents
- Infrared Sensor
- Junction Box
- Trench Vents
- Underdrain Junctions
- Final Cover Ridge Valley Line
- Jones and Laughlin Landfill Drains
- Permit Fill Limits
- Cut Off Trench
- Polyvinyl Chloride Barrier
- SOCRRA Landfill Underdrain
- Underground Instrument Conduit
- Kingston Hole
- Large Steep Hill
- Plateau Landfill
- Woodfill
- Extent of Fill
- Unknown Activity

250 125 0 250 Feet

ASTI Environmental

NORTHEASTERN COMMERCIAL PROPERTIES
In the extreme northeast corner of the Landfill Planning Area is the largest block of these parcels. Nine of these parcels have had only commercial or agricultural use (map IDs 1, 2 and 4 through 10 in Figure 3.7). The current uses of these parcels include the Yates Cider Mill retail center and orchards and the Riverview Square shopping center.

Special Concerns:
Even though these parcels have no identified environmental impacts, certain factors indicate impacts could be present. One of these parcels (map ID 9) is adjacent to and down-gradient from portions of the SOCRRA landfill. The groundwater gradient could result in the movement of contamination from the SOCRRA landfill to this site.

In addition, a portion of this parcel appears to have been in use as an orchard sometime between 1980 and 1994. Orchard operations were located on a 3.5 acre portion of the southwest corner of the parcel. These orchard operations have the potential to have impacted surface soils with lead and arsenic. However, no soil sampling has been conducted on this parcel.

Opportunity for Redevelopment:
HighThese parcels have little to no environmental concerns on them. It is important to note that current uses may preclude future development.

Conclusions and Concerns:
These parcels requires that proper due diligence be conducted during redevelopment. At a minimum Phase I Environmental Site Assessment (ESA) should be conducted and if determined to be necessary a Phase II Subsurface Investigation, Baseline Environmental Assessment, and Due Care Plan should be completed.

Rail line (Property #3)
A former rail line is located in the northeast corner of the Landfill Planning Area (map ID 3 in Figure 3.7). While no known contamination exists, rail lines often have poly-nuclear aromatics (PNA's) impacts from rail operations. Levels of PNA's would have to be investigated before site redevelopment

Special Concerns:
While no known contamination exists, rail lines often have poly-nuclear aromatics (PNA's) impacts from rail operations. Levels of PNA's would have to be investigated before site redevelopment.

Opportunity for Redevelopment:
MediumWhile some environmental concerns may exist, it is anticipated that these will not cause significant concerns.

Conclusions and Concerns:
This parcel requires that proper due diligence be conducted during redevelopment. At a minimum Phase I Environmental Site Assessment (ESA) should be conducted and if determined to be necessary a Phase II Subsurface Investigation, Baseline Environmental Assessment, and Due Care Plan should be completed.

Legend

- Selected Parcels
- Roads
- Gas Migration Monitoring Well
- Test Boring Locations
- Test Pit Locations
- Monitoring Wells
- Soil Sediment Samples
- Surface Soil Samples
- Ambient Air Monitoring
- Catalytic Bead Sensor
- Gas Vents
- Infrared Sensor
- Junction Box
- Trench Vents
- Underdrain Junctions
- Final Cover Ridge Valley Line
- Jones and Laughlin Landfill Drains
- Permit Fill Limits
- Cut Off Trench
- Polyvinyl Chloride Barrier
- SOCRRA Landfill Underdrain
- Underground Instrument Conduit
- Former Railroad Grade
- Kingston Hole
- Large Steep Hill
- Plateau Landfill
- Woodfill
- Extent of Fill
- Unknown Activity

250 125 0 250 Feet

ASTI Environmental

Kingston Development Landfill
Property IDs: 35 & 36
Former Operations:
Gravel pit Before 1970
M.A.L. Enterprises Landfill from 1970 until 1982
Landfill from 1983 until 1985

Previous Investigations:
August 1990 the USEPA conducted a Screening Site Inspection (SSI)
September 2000 the MDEQ completed a Brownfield Redevelopment Assessment

Known Impacts:
Soil: Metals Above Residential and Industrial Direct Contact Criteria
Groundwater: VOCs and SVOCs Above Residential and/or Industrial Direct Contact Criteria

Special Concerns:
The property is currently vacant and capped with clay. No site security is present to prevent access to the property.
Opportunity for Redevelopment:
Low This landfill has a cap that is likely in poor condition and other environmental concerns that will need to be addressed prior to new development.

Conclusions and Concerns:
Soil and groundwater above residential criteria are known to have been present on the KDLF properties. These impacts will necessitate significant additional investigation prior to redevelopment of the property. In addition, due to the disposal of waste in the KDLF, these properties will also require consideration of potential geotechnical considerations for future development.

These parcels requires that proper due diligence be conducted during redevelopment. At a minimum Phase I Environmental Site Assessment (ESA) should be conducted and if determined to be necessary a Phase II Subsurface Investigation, Baseline Environmental Assessment, and Due Care Plan should be completed.

Legend

- Selected Parcels
- Roads
- Monitoring Wells
- Soil Sediment Samples
- Surface Soil Samples
- Gas Migration Monitoring Well
- Test Boring Locations
- Test Pit Locations
- Ambient Air Monitoring
- Catalytic Bead Sensor
- Gas Vents
- Infrared Sensor
- Junction Box
- Trench Vents
- Underdrain Junctions
- Final Cover Ridge Valley Line
- Jones and Laughlin Landfill Drains
- Permit Fill Limits
- Cut Off Trench
- Polyvinyl Chloride Barrier
- SOCRRA Landfill Underdrain
- Underground Instrument Conduit
- Kingston Hole
- Large Steep Hill
- Plateau Landfill
- Woodfill
- Extent of Fill
- Unknown Activity

150 75 0 150 Feet

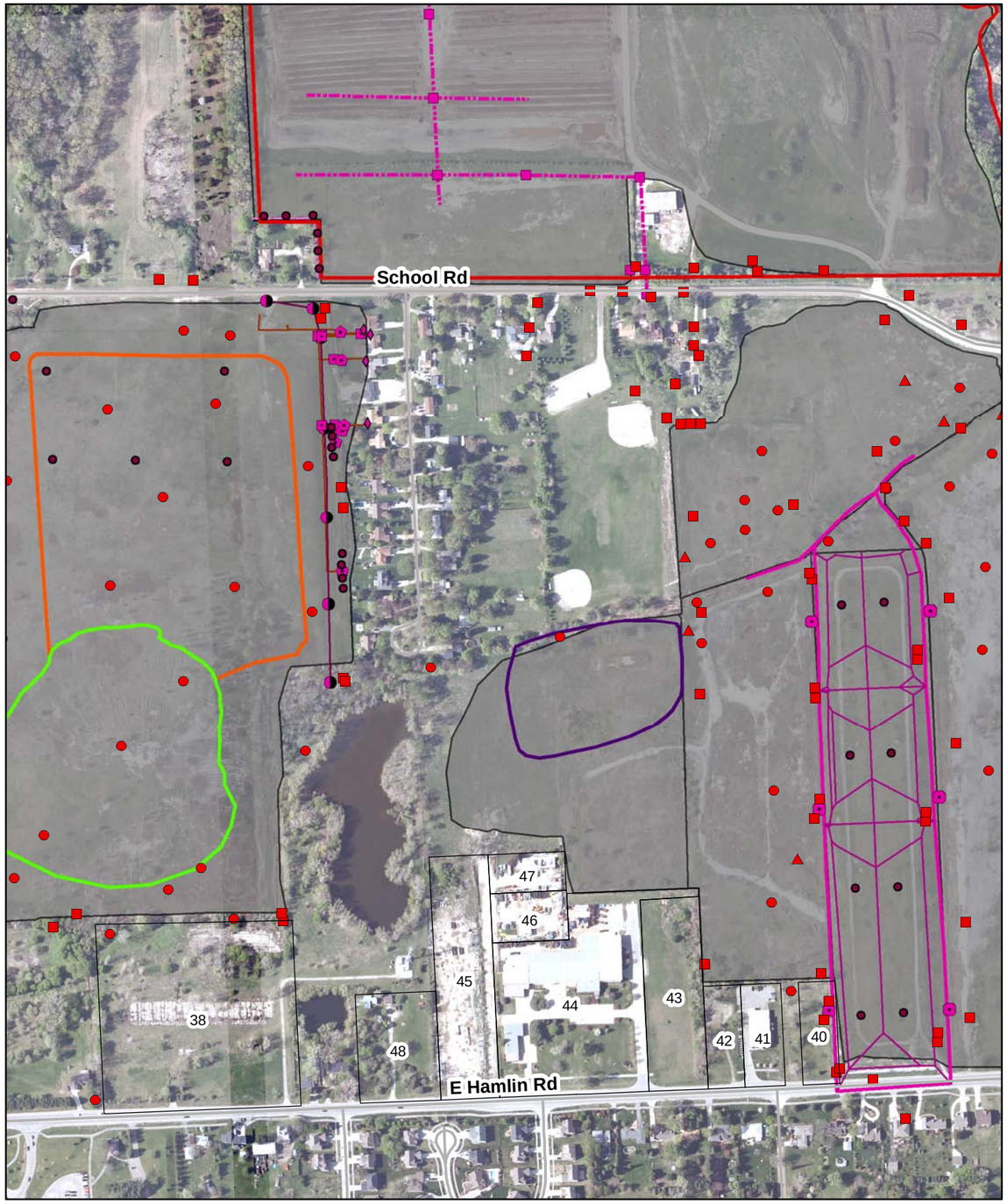
ASTI Environmental

Southern Industrial Properties
Located along the southern boundary of the Landfill Planning Area are ten parcels zoned as industrial (map IDs 38, 40, 41, 42, 43, 44, 45, 46, 47, and 48 in Figure 3.6).

Special Concerns:
Of these parcels, eight are known to have either historical or current industrial uses onsite. No impacts or potential sources of contamination are known on these parcels and detailed site investigations do not exist.

Opportunity for Redevelopment:
MediumWhile some environmental concerns may exist, it is anticipated that these will not cause significant concerns.

Conclusions and Concerns:
These parcels requires that proper due diligence be conducted during redevelopment. At a minimum Phase I Environmental Site Assessment (ESA) should be conducted and if determined to be necessary a Phase II Subsurface Investigation, Baseline Environmental Assessment, and Due Care Plan should be completed.



Legend

- Selected Parcels
- Roads
- Monitoring Wells
- Soil Sediment Samples
- Surface Soil Samples
- Gas Migration Monitoring Well
- Test Boring Locations
- Test Pit Locations
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- Permit Fill Limits
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- SOCRRA Landfill Underdrain
- Underground Instrument Conduit
- Kingston Hole
- Large Steep Hill
- Plateau Landfill
- Woodfill
- Extent of Fill
- Unknown Activity

450 225 0 450 Feet

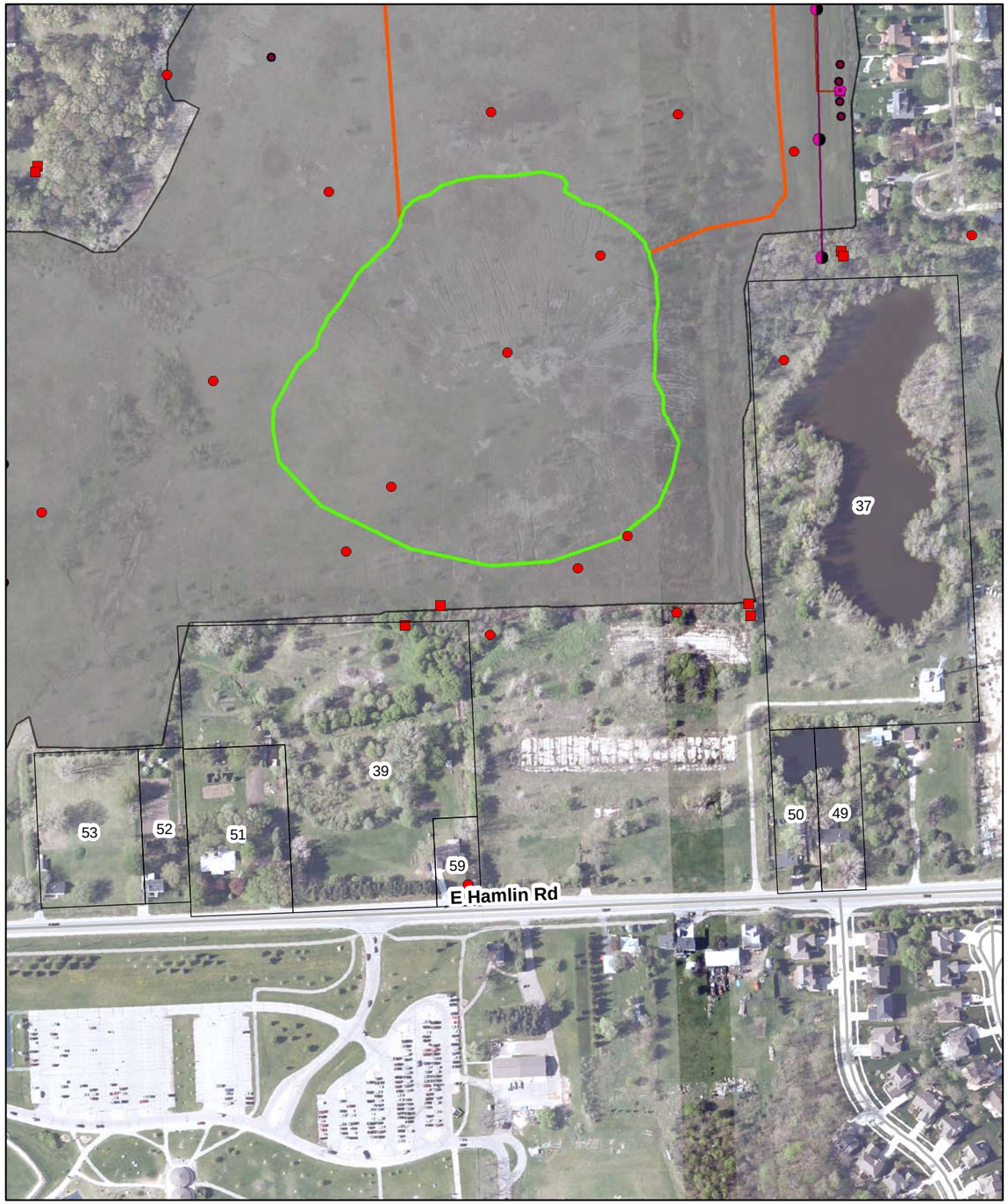
Southern Industrial Properites

Southern Industrial and Residential Parcels
Located in the southwestern corner of the Landfill Planning Area along Hamlin Road adjacent or contiguous to the industrial parcels is a grouping of eight parcels (map IDs 37, 39, 49, 50, 51, 52, 53, and 59) with no identified concerns. Based on the materials reviewed, these eight parcels have either never been developed or only used for residential purposes.

Special Concerns:
However, these parcels are adjacent to and/or potentially down-gradient from the STLF property.

Opportunity for Redevelopment:
HighThese parcels have little to no environmental concerns on them. It is important to note that current uses may preclude future development.

Conclusions and Concerns:
These parcels requires that proper due diligence be conducted during redevelopment. At a minimum Phase I Environmental Site Assessment (ESA) should be conducted and if determined to be necessary a Phase II Subsurface Investigation, Baseline Environmental Assessment, and Due Care Plan should be completed.



Legend

- Selected Parcels
- Roads
- Monitoring Wells
- Soil Sediment Samples
- Surface Soil Samples
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- Test Pit Locations
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- Polyvinyl Chloride Barrier
- SOCRRA Landfill Underdrain
- Underground Instrument Conduit
- Kingston Hole
- Large Steep Hill
- Plateau Landfill
- Woodfill
- Extent of Fill
- Unknown Activity

300 150 0 300 Feet

ASTI Environmental

Sandfill #1 and Sandfill #2
Property IDs: Sandfill #1 – 31
Sandfill #2 – 20 & 29
Additional Parcels – 21, 22, 23, & 24

Former Operations:
Gravel pits before 1967
Landfill until 1977

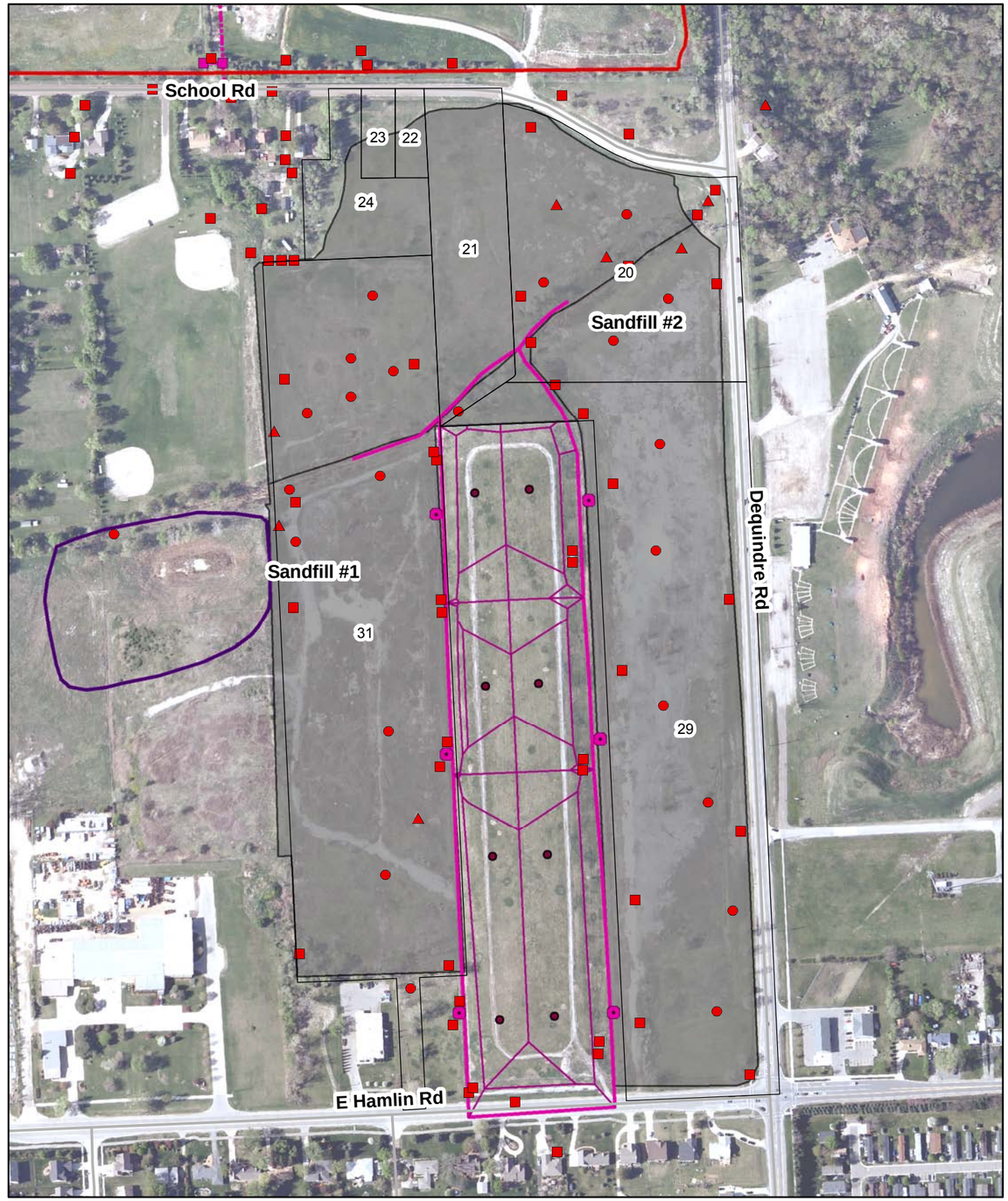
Previous Investigations:
April 1986 the MDEQ conducted a Preliminary Assessment (PA) of SFLF1
July 1987, the MDEQ conducted an SI of SFLF1
September 2001 the MDEQ conducted an Expanded Site Investigation (ESI)
September 2002 a Baseline Environmental Assessment (BEA) of SFLF1
September 1999 reconnaissance inspection of SFLF2 and surrounding parcels
February 2001, MDEQ completed a Brownfield Redevelopment Assessment (BFRA)

Known Impacts:
Soil: VOCs above residential direct contact criteria and Metals Above Residential and Industrial Direct Contact Criteria, PCBs SVOCs and Pesticides above background levels.
Groundwater: VOCs and SVOCs Above Residential Direct Contact Criteria

Special Concerns:
The SFLF1 and SFLF2 are currently vacant. Both have been capped however, the caps likely require repair and modification. No site security is present to restrict access to the property by the public.
The September 2001 ESI noted a dewatering drain onsite that drained into the adjacent KDLF pit. During the superfund response at the adjacent JLLF, allegations were made that the SFLF1, and SFLF2 were connected to the JLLF and the same materials were disposed of at all three parcels. These allegations have not been confirmed.
Opportunity for Redevelopment:
Low This landfill has a cap that is likely in poor condition and other environmental concerns that will need to be addressed prior to new development.

Conclusions and Concerns:
Soil and groundwater above residential criteria are known to have been present on the SFLF1 and SFLF2 properties. These impacts will necessitate significant additional investigation prior to redevelopment of the property. In addition, due to the disposal of waste in the KDLF, these properties will also require consideration of potential geotechnical considerations for future development.

These parcels requires that proper due diligence be conducted during redevelopment. At a minimum Phase I Environmental Site Assessment (ESA) should be conducted and if determined to be necessary a Phase II Subsurface Investigation, Baseline Environmental Assessment, and Due Care Plan should be completed.



Legend

- Selected Parcels
- Roads
- Monitoring Wells
- Soil Sediment Samples
- Surface Soil Samples
- Gas Migration Monitoring Well
- Test Boring Locations
- Test Pit Locations
- Ambient Air Monitoring
- Catalytic Bead Sensor
- Gas Vents
- Infrared Sensor
- Junction Box
- Trench Vents
- Underdrain Junctions
- Final Cover Ridge Valley Line
- Jones and Laughlin Landfill Drains
- Permit Fill Limits
- Cut Off Trench
- Polyvinyl Chloride Barrier
- SOCRRA Landfill Underdrain
- Underground Instrument Conduit
- Kingston Hole
- Large Steep Hill
- Plateau Landfill
- Woodfill
- Extent of Fill
- Unknown Activity

350 175 0 350 Feet

ASTI Environmental

Southeast Oakland County Incinerator Authority
Property IDs: 11, 12, 13, & 16

Known Impacts:
Soil: None
Groundwater: None

Former Operations:
Landfills from 1968 until 1982

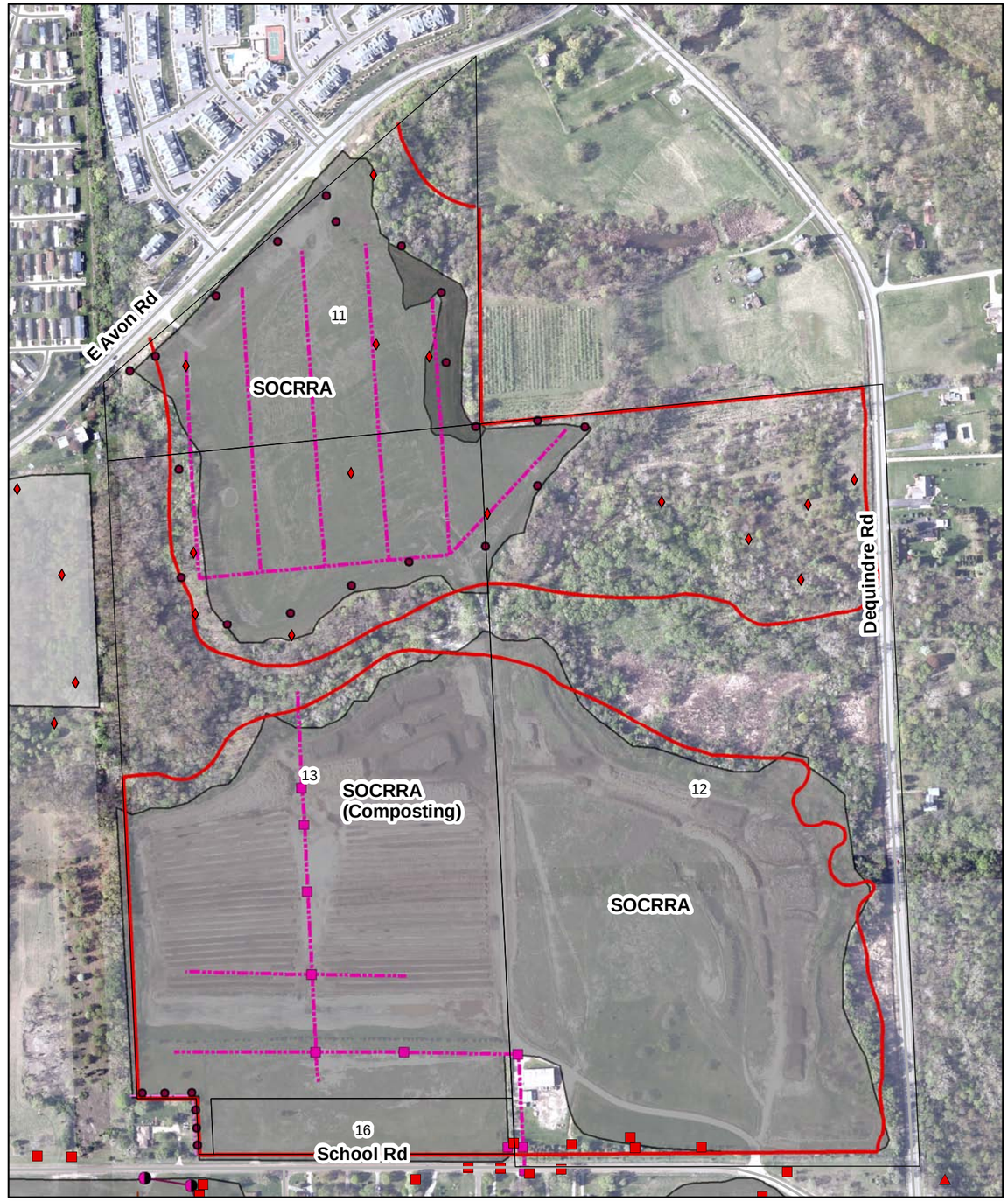
Previous Investigations:
None Known

Known Impacts:
Soil: None
Groundwater: None

Special Concerns:
SOCRRA began disposal of partially incinerated refuse and ash in all three landfills from the SOCRRA incinerator located in Madison Heights, Michigan in 1958. By 1979, a total of 76 acres of fill had been placed in the southern portion of the landfill. In 1979, the SOCRRA began conducting filling operations on an additional 31 acre site north of Honeywell drain. Landfilling on the SOCCRA properties stopped in 1982 when the permit expired. Aerial photography indicates capping occurred on all three landfills. However, details on the date and method of capping were not found during the data review.
No soil or groundwater study results for these parcels were available for review. All of these parcels have passive soil gas venting systems installed and either underdrains or leachate collection systems. SOCCRA currently composts yard waste on the southwestern portion of their parcels. This is primarily located on one parcel (map ID 13 in Figure 3.4). However, the current extents were not available.
Opportunity for Redevelopment:
MediumThis includes the majority of the SOCCRA landfills. While some environmental concerns may exist, it is anticipated that this will not cause significant concerns the uses anticipated in the Landfill Areas Reuse Strategy which includes a golf course on the SOCCRA properties.

Conclusions and Concerns:
Soil and groundwater above residential criteria likely present on the SOCRRA properties. These impacts may necessitate significant additional investigation prior to redevelopment of the property. In addition, due to the disposal of waste in the SOCCRA Landfills, these properties will also require consideration of potential geotechnical considerations for future development.

These parcels requires that proper due diligence be conducted during redevelopment. At a minimum Phase I Environmental Site Assessment (ESA) should be conducted and if determined to be necessary a Phase II Subsurface Investigation, Baseline Environmental Assessment, and Due Care Plan should be completed.



Legend

- Selected Parcels
- Roads
- Monitoring Wells
- Soil Sediment Samples
- Surface Soil Samples
- Gas Migration Monitoring Well
- Test Boring Locations
- Test Pit Locations
- Ambient Air Monitoring
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- Permit Fill Limits
- Cut Off Trench
- Polyvinyl Chloride Barrier
- SOCRRA Landfill Underdrain
- Underground Instrument Conduit
- Kingston Hole
- Large Steep Hill
- Plateau Landfill
- Woodfill
- Extent of Fill
- Unknown Activity

450 225 0 450 Feet

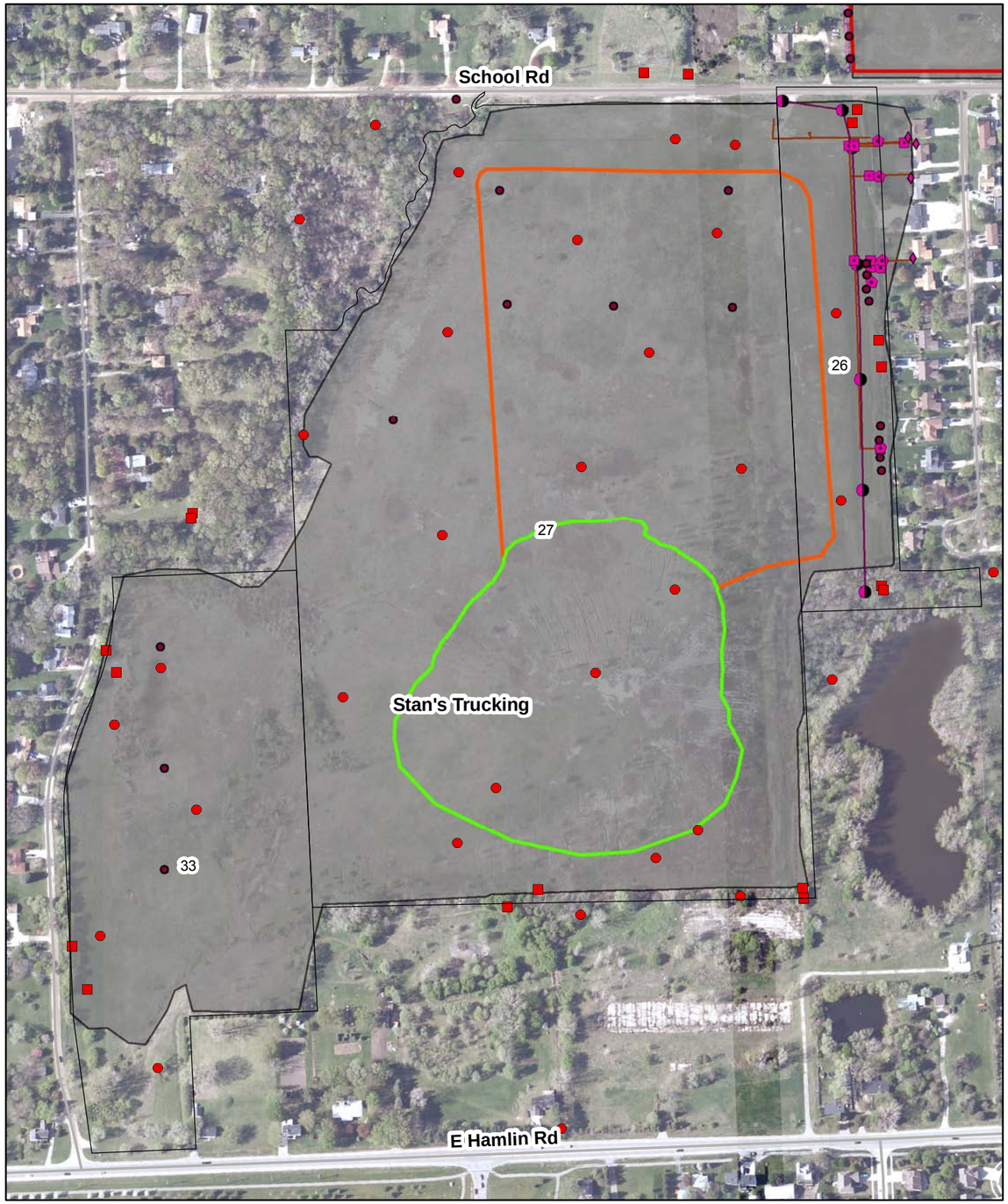
Stan's Trucking Landfill
Property Map IDs: 26, 27, & 33
Former Operations:
Gravel pit From Before 1937 until 1966
Stan's Trucking Landfill from 1966 until 1975
Six Star Landfill from 1976 until 1981

Previous Investigations:
January 1992, MDNR Screening Site Inspection (SSI) report
1997, the MDEQ completed a Brownfield Redevelopment Assessment (BFRA)
2000, the MDEQ conducted a Remedial Investigation (RI)
Known Impacts:
Soil: VOCs, SVOCs, & Metals Above Residential Direct Contact Criteria
Groundwater: Metals Above Residential Direct Contact Criteria
Soil Vapor: Methane is known to be present

Special Concerns:
In April 2000, a residence located adjacent to the STLF property along Park Street caught fire. The local Fire Marshall determined that a buildup of methane gas in the basement of the house caused the fire. The MDEQ, in a subsequent investigation, determined that the methane source came from the STLF property. In June 2000, an emergency remedy for the methane was installed on the city owned parcel (map ID 26) of the STLF.
This emergency remedy consisted of a soil vapor interceptor trench and soil vapor extraction system. A flare was added to the SVE system in August 2000. The emergency remedy appears to have successfully reduced the methane concentrations beneath the residences along Park Street based on the Michigan Department of Natural Resources and Environment (DNRE) monitoring reports.
Opportunity for Redevelopment:
Low This landfill has a cap that is in poor condition, and active above grade remediation system, and other environmental concerns that will need to be addressed prior to new development.

Conclusions and Concerns:
Soil, groundwater, and soil vapor impacts above residential criteria are known to have been present on the STLF properties. These impacts will nessecitate significant additional investigation prior to redevelopment of the property. In addition, due to the disposal of municipal solid waste in the STLF these properties will also require consideration of potential geotechnical considerations for future development. Addressing these will incur significant cost. Portions of the STLF will likely never be redeveloped.

These parcels requires that proper due diligence be conducted during redevelopment. At a minimum Phase I Environmental Site Assessment (ESA) should be conducted and if determined to be necessary a Phase II Subsurface Investigation, Baseline Environmental Assessment, and Due Care Plan should be completed.



Legend

- Selected Parcels
- Roads
- Monitoring Wells
- Soil Sediment Samples
- Surface Soil Samples
- Gas Migration Monitoring Well
- Test Boring Locations
- Test Pit Locations
- Ambient Air Monitoring
- Catalytic Bead Sensor
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- Polyvinyl Chloride Barrier
- SOCRRA Landfill Underdrain
- Underground Instrument Conduit
- Kingston Hole
- Large Steep Hill
- Plateau Landfill
- Woodfill
- Extent of Fill
- Unknown Activity

350 175 0 350 Feet

ASTI Environmental

Stan's Trucking