FORM EQP 5111 ATTACHMENT B4
ENVIRONMENTAL ASSESSMENT

This document is an attachment to Gage Products Company's (Gage) 2024 RCRA permit renewal application Form EQP 5111. The administrative rules promulgated pursuant to Part 111, Hazardous Waste Management, of Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451) §324.11118(3) and R 299.9504(1)(e) and R 299.9504(1)(b) establish requirements for conducting environmental assessments at hazardous waste management facilities. Before receiving an operating license, owners and operators of hazardous waste treatment, storage, or disposal facilities must evaluate the (proposed) facility's impact on air, water, or other natural resources of the state. The evaluation must also include a failure mode assessment. All references to 40 CFR citations specified herein are adopted by reference in R 299.11003.

This license application attachment addresses requirements for an environmental assessment for hazardous waste management units at the Gage Limited Storage Facility (Gage LSF).

Sections listed in the table of contents below that are not applicable to the Limited Storage Facility (LSF) permit renewal are denoted with a strikethrough and the corresponding section has been deleted from the text. This attachment is organized as follows:

LIST OF FIGURES

LIST OF APPENDICES

INTRODUCTION

This environmental assessment for Gage LSF describes current conditions, environmental impacts, and applicable exposure information for landfills and surface impoundments. The goals of the environmental assessment are to describe and discuss:

1. The probable impact of the facility on natural resources, human life, and all environmental elements that affect these values;
2. Probable unavoidable adverse effects of the facility;
3. Alternatives for accomplishing the same objective; and
4. Possible modifications that would minimize adverse effects.

Gage conducts on-site solvent blending, waste solvent recovery operations, packaging and remanufacturing of solvents used by manufacturers, including the automotive industry. The facility also blends custom and reference test fuels, including biofuels and renewable fuels, and specialty chemicals, such as coatings and cleaners. Gage LSF receives wastes from customers and stores these wastes prior to recycling activities. A consequence of this recycling activity is the need for temporary storage of waste materials prior to recycling, and storage of minimal residuals following processing until the wastes are transported for disposal off-site. Hazardous waste storage at the Gage LSF consists of a sheltered container storage area and five vertical bulk storage tanks. Operation of the Gage LSF will stress employee safety and proper waste-handling measures by strict design and engineered controls and thorough in-depth employee training. Proper facility operation will assure that otherwise discarded solvent wastes are recycled for maximum benefit to the environment, waste generators, and Gage. By providing a cost-effective recycling facility, the amounts of waste directed to disposal will be reduced while encouraging Gage's customers to incorporate recycling procedures into their processes. This, in turn, will increase their use of reclaimed solvents due to the environmental and economic benefits available. The design and operation of the Gage LSF ensures that the release of hazardous waste and hazardous waste constituents is prevented and the environment is protected from such releases.

The purpose of this environmental assessment is to describe the existing environment at the Gage LSF and to anticipate what probable effects the temporary storage of hazardous wastes at this site may have on the environment. This environmental assessment will evaluate alternatives and identify measures that have been undertaken to minimize any adverse effects associated with normal operations and during failure mode situations this site.

B4.A CURRENT CONDITIONS

B4.A.1 Facility Description

The Gage LSF has been specifically designed to safely store contained hazardous wastes. The Gage LSF provides both bulk and container storage capacity for wastes received from off-site prior to it being recycled and consists of a truck unloading and container storage building and an adjacent tank farm. The Gage LSF has a maximum storage capacity of 25,000 gallons. This storage capacity reflects the potential total combined capacities of the container storage area plus the capacity of the bulk storage tanks in the limited storage area. The container storage area is designed to have a maximum storage capacity of 2,750 gallons (fifty 55-gallon drums) and the bulk-tank storage area has a capacity of 22,250 gallons (five vertical storage tanks). The maximum storage capacity of the Gage LSF is 25,000 gallons.

The Gage LSF includes an approximately 4,200 square foot building that is enclosed on three sides and has a coated concrete floor. Ignitable and corrosive hazardous wastes (D001 and D002, respectively) and spent solvents (F001, F002, F003 and F005) are stored in this building. The bulk-tank storage area of the Gage LSF includes five (5) aboveground storage tanks and a concrete secondary containment system. Ignitable, toxicity characteristic, and F Listed solvent hazardous wastes (D001, D005, D007, D008, D018, D035, D038, F003 and F005) generated by Gage customers and are stored in these tanks.

Additional facility design information is contained in Attachment A1, Appendix A1-4 and A1-5 as well as Attachments C1 and C2.

B4.A.2 Description of Existing Environmental Conditions

A description of existing environmental conditions at the facility and any surrounding areas that may be affected by the facility is included in this section. Detailed information that is provided in other attachments is not repeated here; however, references to appropriate attachments are provided. Maps, photographs, and other relevant information that are not included in other attachments are included in this section. Important ecological relationships, functions, and interdependence of physical environmental elements and social and economic elements are discussed. Factual information from publications, reports, or personal communications is documented, with sources cited.

The permitted hazardous waste storage areas occupy a very small portion of Gage's eleven-acre facility located in Ferndale, Michigan, within the southwest 1/4 of Oakland County (Township 1 North, and 11 East, Section 35). The *entire* site is approximately one-half mile north of Oakland County's border with Wayne County and the City of Detroit and 10 miles from downtown Detroit. Other nearby communities include Hazel Park, Southfield, Pleasant Ridge, Huntington Woods, and Royal Oak. These communities are part of the larger Detroit metropolitan area in Southeast Michigan. Figure B4-1 illustrates the regional setting of the site. A site plan of the Gage facility and the immediately surrounding area, along with the temporary hazardous waste storage facility area, is provided as Figure B4-2.

B4.A.2(a) Climate

The Great Lakes have a significant effect on the climate in this area by providing a source of moisture, by increasing cloudiness, by lowering temperatures in the summer, and by moderating winter temperatures. While the prevailing westerly winds coming off of Lake Michigan pass over considerable expanses of land surface before reaching the eastern part of the state, the influence of the Great Lakes on this region's weather is somewhat modified. Whenever the winds are from the northeast, east, or southeast, however, the influence of the Great Lakes on the region's climate is much more pronounced due to the proximity of these lakes in these directions. Local climatic variations can be further attributed to the immediate effect of Lake St. Clair and the "heat island" effect of the surrounding urbanized areas. Appendix B4-1 gives data on temperature and precipitation for the survey area, as recorded at Detroit City Airport during the period 2006-2020.

Climatic data for this area, obtained from the National Oceanic and Atmospheric Administration (NOAA) database, have been collected at the Detroit City Airport, which is located approximately 6 miles southeast of the Gage LSF. In winter, the average temperature is 28.6 degrees Fahrenheit (F), and the average daily minimum temperature is 21.9 degrees F. The lowest temperature on record, which occurred on January 09, 1934, was minus 51 degrees F. In summer, the average temperature is 72.8 degrees F, and the average daily maximum temperature is 82.5 degrees F. The highest recorded temperature, which occurred on July 13, 1936, is 112 degrees F.

The total annual precipitation is 36.30 inches. The heaviest one-day rainfall during the period of record was 12.92 inches on July 20, 1919. Average seasonal snowfall is 48.8 inches. The greatest snow depth at any one time during the period of record was 117 inches. The greatest snowfall amount was 32.0 inches recorded on December 2, 1985.

The average relative humidity in mid-afternoon is about 58 percent. The average humidity at dawn, as recorded in from 1969 through 1990 at Detroit, is about 80 percent. The sun shines 67 percent of the time possible in summer and 38 percent in winter. The prevailing wind is from the west. Average wind

speed is highest, 10.2 miles per hour. The average wind directions and speeds for the City of Detroit from 2018 through 2022 can be found on Figure B4-6.

B4.A.2(b) Topography

Much of Oakland County, including the Gage LSF, was covered by a succession of glacial lakes. As a result of this glacial action, Oakland County's land surface is divided into nearby glacial lake plain in southeastern Oakland County with the remainder of the county consisting of two gently undulating to very hilly end moraine bands separated by three major outwash plains (Figure B4-3). These landforms have north to east to southwest orientation (Freenstra, 1982). The general elevation of the moraines increases to the northeast, reaching a maximum of 1,221 feet (MSL) at Pine Knob in Independence township (Curran, 1981), with the lowest elevation being within the City of Southfield approximately nine miles west of the Gage LSF at Eight Mile and Berg Roads, Section 33. The Gage LSF has been surveyed at 637 feet (at the container storage site) and is similarly flat, as is the surrounding terrain, which contains very little local relief. (Figure B4-1 is a portion of the topographic map of the site area, and Appendix B4-2 is a soils survey map of the site area).

B4.A.2(c) Geology

Regionally, the bedrock geology under the Gage LSF consists of Devonian Shales and sandstones. The bedrock is overlain by approximately 200 feet of glacial till. The glacial till consists of stratigraphically discontinuous sand, gravel, silts, and clays. Underlying the Gage site is native mottled brown to gray silty, clayey glacial till that contains small amounts of gravel. In the past, before construction, the area was characterized by a swampy marsh environment. During construction activities, the marsh was filled with approximately 5 feet of silty sand material (Coe, 1985). For a more detailed description of the geology at the site, see Attachment B2 - Corrective Action.

B4.A.2(d) Soils

Regionally, the bedrock geology under the Gage LSF consists of Devonian Shales and sandstones. The bedrock is overlain by approximately 200 feet of glacial till. The glacial till consists of stratigraphically discontinuous sand, gravel, silts, and clays. Underlying the Gage site is native mottled brown to gray silty, clayey glacial till that contains small amounts of gravel. In the past, before construction, the area was characterized by a swampy marsh environment. During construction activities, the marsh was filled with approximately 5 feet of silty sand material (Coe, 1985). For a more detailed description of the soils at the site, see Appendix B4-2 – Soil Survey.

B4.A.2(e) Hydrology

Ground Water Occurrence

The greatest density of community public water supplies per county is in southeast Michigan, including southeast Oakland, Wayne, Monroe and Macomb Counties. The water supplies in this area are generally served by the Detroit Metropolitan water system, which obtains water from Lake Huron and the Detroit River.

A strong correlation exists between the community public water supplies in these areas, which depend on surface water, and the generally non-productive silt-rich lacustrine deposits, which have been classified as Category II aquifers and are not generally an aquifer but may have thin interbedded aquifers at depth. According to the Michigan DEQ Water Well Viewer, no record of drinking water wells exists for the area within a one-mile radius of the Gage LSF.

Surface Water Quality

The Gage LSF borders near the edge of the Lake St. Clair direct drainage watershed and the Clinton River watershed (see Figure B4-5). Surface runoff from the site is collected through combination storm/sanitary sewer lines that transport the waters to the Red Run Drain (settling basin) and then on to the Dequindre Intercept line which runs south to the City of Detroit's wastewater treatment plant for processing prior to release in the Detroit River, which eventually empties into Lake Erie.

The Clinton River is a warm-water stream draining approximately 1,225 square miles in Lapeer, Oakland, St. Clair, and Macomb counties. The river's discharge measured at its mouth averages 470 cubic feet per second. The Clinton River has been identified by the International Joint Commission as an "Area of Concern" where environmental quality is degraded and beneficial uses of the water and biological communities are adversely affected. Problems identified in the Clinton River include pollution from heavy metals and conventional pollutants, contaminated sediments, and an impacted biota.

Lake St. Clair has a surface area of 692 square miles. The near-shore area and open waters of the lake are classified as mesotophic, except for the near-shore area in the vicinity of the Clinton River mouth, which is classified as eutrophic. The lake continues to experience fish-consumption advisories due to bioaccumulated contaminants measured in fish taken from the lake.

Most surface-water-quality problems in all of these watersheds originate from a history of agricultural and urban storm-water runoff and combined sewer overflows (including past problems along the course of the Red Run Drain) as well as some point source discharges.

Ground Water Quality

The Gage LSF is located in an industrial park area within the City of Ferndale, Michigan. The area surrounding Gage and the industrial park is zoned M-2 General Manufacturing District and M-1 light Manufacturing with single-family residential properties located immediately adjacent to the east site boundary. The Gage property fronts on Wanda Street and its western property boundary abuts the CN-Grand Trunk railway yard as shown on Figure B4-4.

Groundwater contamination has been detected at the Gage property. A complete discussion of collected hydrogeological investigation information with well logs and sample analytical results is contained in Attachment B2 - Corrective Action.

Several sites near the Gage LSF have been identified as sites of environmental contamination under Michigan's Natural Resources and Environmental Protection Act (Act 451). Sites identified near the Gage LSF have various groundwater and soil contamination problems from above-ground tank discharges, underground storage tanks, pits, or unknown sources. There are 28 sites identified with risks present of environmental contamination near the Gage LSF. There are 24 sites identified as risks not determined or risks controlled of environmental contamination near the Gage LSF. All sites within a one-mile radius of Gage LSF are listed in Appendix B4-3.

Site Drainage

The direct drainage to the Lake St. Clair watershed is characterized by small drainage areas that have been augmented by man-made ditches and drains. The natural drainage networks are not well developed, and they frequently experience highly variable discharges from low-drought flows to high-volume flows where surface runoff quickly accumulates. Flow direction is generally to the northeast.

Runoff from the Gage property enters combined storm and sanitary sewers and, under normal operating conditions, goes to Detroit's wastewater treatment plant, via the Dequindre Intercept pipeline junction with the Red Run Drain, for processing prior to release to the Detroit River.
The Michigan Department of Environment, Great Lakes, and Energy records were reviewed for any logs of water wells within a one-and-a-half (1 1/2) mile radius of the Gage LSF. The review indicated that there are no drinking water-wells for this area. However, groundwater wells were installed for geothermal use during the 2009/2010 renovations of the Ferndale Public Library (see well logs in Appendix B4-4) located approximately 1 mile northwest of the Site. According to the 2017 City of Ferndale Master Plan, the area is served by municipal water supply.

B4.A.2(f) Land Use and Zoning

As previously discussed, the area that includes the Gage LSF is intensively developed with a mixture of residential, commercial, transportation, and industrial land uses. The pattern of land use in this area reflects the orientation of commercial and industrial developments to the major transportation routes along Interstate 75, Interstate 696, Woodward Avenue, Eight and Nine Mile Roads, for example, and along the CN-Grand Trunk rail line. Residential land uses lay behind these more intensive developments that front on the heavily traveled streets of the area. Other land uses in and around the Gage LSF include public schools, public parks, and single-family residences within a half of a mile north, east, south, and west of the Gage LSF. Figure B4-4 is a City of Ferndale land use/zoning map that indicates the land-use patterns surrounding the Gage LSF.

It is unlikely that the land-use patterns in this area will change in the near future. There is very little vacant land available for residential, commercial, or industrial developments or expansions. In the more distant future, major land-use changes could occur if existing developments were removed, due to deterioration of older established properties, making it necessary to renovate, rehabilitate, or replace existing facilities.

B4.A.2(g) Historical or Archaeological Resources

The Michigan State Historical Preservations Office online database was searched to determine if any significant archaeological and/or historical resources or sites were located at the Gage LSF and whether they would be affected by the Gage LSF. The search identified three known properties that are listed in the National Register of Historic Places. The list is included as Appendix B4-6. The limited hazardous waste storage activities conducted at the Gage LSF are not anticipated to have any adverse effects on the registered historic places (buildings or facility usage) that were identified during the record review.

B4.A.2(h) Social Environment

The social environment, in terms of demographics and infrastructure of the area, is discussed in the following two subsections.

B4.A.2(h)(i) Demographics

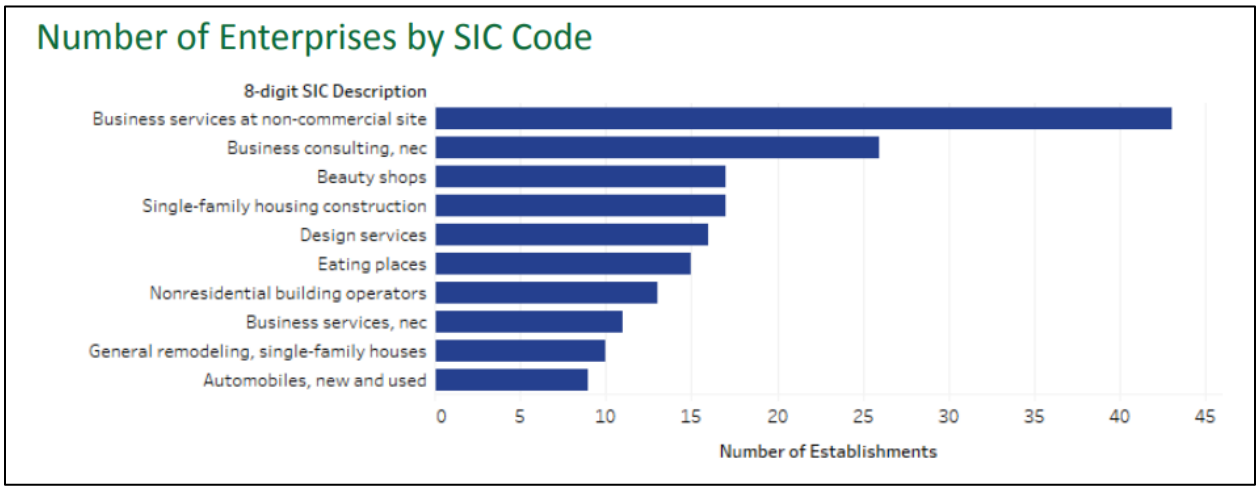
The City of Ferndale, being only 3.88 square miles in area, contains approximately 1.5 percent of Oakland County's total population. In 2020, Ferndale’s population was 19,190, a 3.6 percent decline in the city’s population as compared with the 2010 census data population of 19,900. The population is approximately 72% Caucasian, 17% Black, 4% Hispanic or Latino, 2% Asian and 1% other. The median age of Ferndale residents is 35.7 years, with 84 percent of the population over 18 and about 16 percent under the age of 18. The percentage of people 25 years or older that have graduated from high school is 96.2 percent, with the percentage of persons with a bachelor’s degree 53.1 percent.

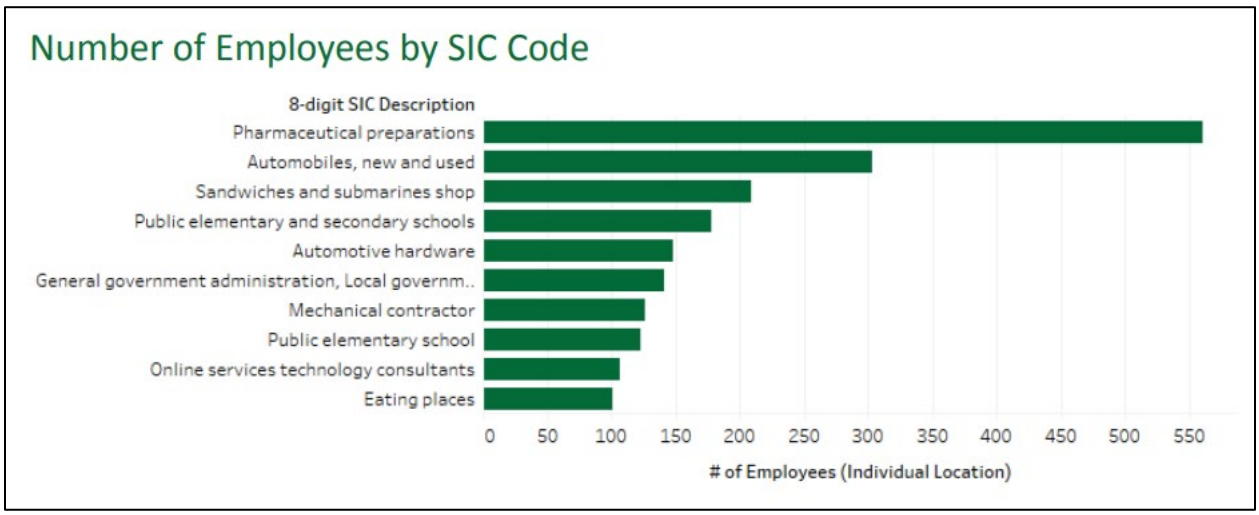
B4.A.2(h)(ii) Infrastructure

There are about 10,234 households in Ferndale with 56 percent of these units being owner-occupied, single-family dwellings. Median household value in Ferndale is $218,000. The median family income is $86,120 for 2023.

Industry and manufacturing form the economic base for both the City of Ferndale and Oakland County. In Ferndale, the work force totals 14,190 with unemployment at 5 percent. The local economy consists of business services, manufacturing firms, businesses in retail trade, and wholesale-trade establishments.

The 2020 Community 360 Metrics Report completed by Cobalt Community Research, shows the below figures for enterprises within the city of Ferndale.





Local law enforcement is handled by the City of Ferndale Police Department. Public utilities available in the city include electric (DTE Electric Co.), natural gas (Consumers Power), and telephone (AT&T) services. Solid waste collection and disposal are provided by the city. Potable water, originating from the

Detroit River, is purchased by the City of Ferndale from the Great Lakes Water Authority (GLWA) and is supplied to residents and businesses throughout the city.

Wastewater collection and treatment services are purchased by the City of Ferndale from GLWA, which performs advanced waste treatment using the following technologies: ammonia reduction, chlorination, phosphorus removal, activated sludge. The plant discharges its treated effluent to the Detroit River, which drains to Lake Erie. The storm and sanitary sewer system in the area surrounding the Gage LSF is a combined system. (Storm water and sanitary wastewaters flow through a single line to the wastewater treatment plant).

B4.A.2(i) Transportation

The major transportation routes that service Ferndale include I-696, I-75, M-102 (Eight Mile Road), Nine Mile Road, and Woodward Avenue. The streets surrounding the Gage LSF include Wanda Street on the east, Nine Mile Road on the north, Hilton on the west, and Eight Mile Road on the south. Truck traffic is excluded from traveling on the residential side streets around the Gage property by posted signs. Trucks traveling to and from the facility are limited to travel upon the major traffic routes to Gage; those routes are I-75, Nine Mile Road and Wanda Street. A private rail spur enters the Gage property near west property boundary, which abuts the CN-Grand Trunk rail line property. Public transportation in the immediate area is available along bus routes located on Woodward Avenue, Eight Mile Road, and Nine Mile Road.

B4.A.2(j) Air Quality

All operations at the Gage LSF are controlled in such a way that there is an absence of dust, odors, and other inconveniences to the local residents. All on-site traffic areas are paved in order to minimize dust. The LSF loading/unloading area is equipped with an equalization line for emissions control from tank trucks loading and unloading. All truck traffic is strictly controlled such that only Wanda Avenue and the major roadways in the area (Nine Mile Road and Interstate 75) are utilized by trucks arriving at the Gage LSF. This substantially reduces truck traffic past residences located east of the facility.

Air quality is directly monitored by inventory of all VOC emitting sources. The total VOC emission inventory is a combined total of VOC emission from each of the following permitted sources: solvent blending operation, boiler operation, remanufacturing (solvent recovery equipment), specialty and fuel manufacturing operations, laboratory paint spray booths and paint drying ovens, and the bulk tank farm areas used for solvent and waste storage.

B4.A.2(k) Noise

The Gage LSF generates relatively low levels of noise. Operations at the Gage LSF have not been the subject of any reported noise complaints from the community. Sounds from the Gage site include hums and muffled clankings, as well as occasional noise from the movement of drums into and out of the storage area. Vehicular truck traffic at the Gage LSF is probably the noisiest aspect of the operations at the Gage LSF and is not inconsistent with other nearby industries in the area. All truck traffic is routed away from residential areas.

B4.A.2(l) Appearance and Aesthetics

The Gage LSF is in a residential and industrial area with no special aesthetic value. Perhaps the most dominant feature of this area is the flatness of the terrain for several miles in any direction. Any panoramic views of this expansive terrain are limited by another dominant feature of the area, the diversity and intensity of land-use activities.

Figure B4-4 illustrates the zoning classifications of the properties surrounding the Gage LSF. These classifications closely follow the actual land-use patterns. The zoning in this area includes Light Manufacturing District, General Commercial District, Restricted Office Space, Vehicular Parking District, Single-Family Residential and Medium-Density Residential. The Gage LSF itself is kept neat and well maintained. The property is entirely fenced with a brick landscaped wall along Wanda and is bordered on the north and south by other industry, on the west by the Grand Trunk railway switchyard, and on the east by Wanda Street. Parking areas for cars and trucks are visible through the site fence, as are facility buildings with their associated process and bulk storage tanks. The limited hazardous waste container storage area is located indoors, so no hazardous waste drums are visible from off the site.

The Gage LSF is located in one of the oldest areas of Ferndale. It was along this boundary with the City of Detroit, north of Eight Mile Road, that the movement of industry and families out of Detroit first took hold in the early 1940's. As available land was developed, industry and families continued to move north, leaving behind a matured, urbanized landscape. Some industrial, commercial, and residential properties in this area have deteriorated; but much of this area continues to remain vital and active. The development of industry and the construction of residential neighborhoods near to these industries proceeded simultaneously in this area so that any aesthetic conflicts would have to be addressed in a historical context.

Not many large old trees remain in this area, though there are a few in scattered locations; one such location is Harding Park, located less than two miles from the Gage LSF. The City of Ferndale has four other city parks: Wanda Park, Wilson Park, Fair Park, and Saratoga Park. All parks are located within one-half mile of the Gage LSF; and all parks include playgrounds and picnic areas with some wooded areas, though most have open fields. Other cultural facilities within a mile of the Gage LSF include the City of Ferndale’s public library and community center.

B4.A.2(m) Terrestrial Ecosystem

The characteristics of the terrestrial ecosystem, in terms of flora, fauna, rare or endangered species, and critical habitat are described in the following subsections.

B4.A.2(m)(i) Flora

Pre-settlement Oakland County was heavily forested compared to Oakland County today, which now contains scattered second-growth woodlots, cultivated fields, and built-up urban communities (such as Ferndale) with landscaped and maintained plant species. A swampy belt encircling Detroit delayed settlement of this area until 1817. Oakland County was officially established in 1819.

Prior to the establishment of settlements in Oakland County, the area consisted of upland forests consisting chiefly of oak, hickory, beech, and sugar maple. Tamarack, aspen, elm, cottonwood, ash, red maple, and eastern white cedar occupied the lower swampy areas.

Cleared forested lands were soon placed into a system of general agricultural development. For a time, wheat was the main crop; but the danger of continuous cropping on the more sloping soils was early recognized and other crops - corn, oats, rye and potatoes were planted.

As these farmlands were converted to residential, commercial, and industrial developments, the resulting vegetation became more representative of a landscape consisting of ornamental plantings of both native and non-native species. The neighborhoods surrounding the Gage LSF contain such plantings, as well as a few very small clusters of remnant woodlands, such as oaks, cottonwoods, and maples. A few

small, vacant lots contain various grasses, forbes, bushes, and small trees characteristic of pioneer species.

The population of Oakland County has increased to almost 1.269 million. Expansion of the Detroit metropolitan area has contributed significantly to the rapid increase in the county population in the middle of the 20th century with the population stabilizing in recent decades.

B4.A.2(m)(ii) Fauna

Wildlife habitat surrounding the Gage LSF is characteristic of an urban environment with intensive land uses where species diversity is very limited. Gray and fox squirrels, eastern cottontail rabbits, and various songbirds may occupy those areas where appropriate habitat is available to support small populations.

B4.A.2(m)(iii) Rare or Endangered Species

The Michigan Natural Features Inventory (MNFI) was requested to search their records to determine whether any known occurrences of federally or state-listed threatened or endangered species, exemplary plant communities, or other natural features of concern were located within a mile and a half of the Gage LSF. Their search indicated that only historic occurrences were on record for this area and it is highly unlikely that listed species will be affected by the Gage LSF activity. This determination is not a definitive statement on the presence, absence, or condition of environmental elements in this area. A more comprehensive site-specific investigation would be required to make such a definitive determination. The letter documenting the MNFI findings is included in Appendix B4-6.

B4.A.2(m)(iv) Critical Habitat

Since all species identified in the MNFI were historically recorded, there is no known critical habitat that would be affected by Gage LSF activities.

B4.A.2(n) Aquatic Ecosystem

The characteristics of the aquatic ecosystem, in terms of flora, fauna, rare or endangered species, and critical habitat are described in the following subsections.

B4.A.2(n)(i) Flora

Lake St. Clair is located approximately 13 miles east of the Gage LSF. The most prevalent aquatic plants in Lake St. Clair are Valisneria American (*wild celery*) and macroalgae (*chara*) with about a dozen additional species of native vascular plants present. Aquatic plants provide critical spawning habitat.

B4.A.2(n)(ii) Fauna

Common aquatic species associated with Lake St. Clair include northern pike, Great Lakes muskie (very abundant), yellow perch, walleye, large-mouth bass, bullhead, and channel catfish. Various waterfowl also utilize the lake.

B4.A.2(n)(iii) Rare or Endangered Species

According to 2023 MNFI inventory included in Appendix B4-6, no rare or endangered aquatic species have been recorded in the area surrounding the facility.

B4.A.2(n)(iv) Critical Habitat

Oakland County has more natural lakes than any other county in the state. It contains about 1,468 lakes and the headwaters of the following five, major rivers: the Clinton, Huron, Rouge, Shiawassee, and Flint Rivers. Also included in the county's water resources are numerous artificial lakes and many streams, creeks, gravel pits, wetlands, and ponds.

Other aquatic systems that may be minimally impacted by storage activities at the Gage LSF include Bear Creek, approximately five miles to the northeast, and the Red Run Drain, located four miles north of the Gage LSF. Both of these drains are waterways that are periodically maintained by removing any vegetation along their banks that may impede surface flow. The effect of these activities has been to substantially modify and disrupt any wildlife habitat. Flow from these drains is then channeled through the Dequindre Intercept line which flows south into the City of Detroit's wastewater treatment plant for processing before release into the Detroit River. During times of heavy rain and above-capacity flow volumes, however, overflow from the Dequindre Intercept line continues in these drains and empties into the Clinton River watershed, which eventually enters into Lake St. Clair.

B4.B ENVIRONMENTAL IMPACTS OF THE FACILITY

This section describes anticipated environmental impacts associated with the normal operation of the Gage LSF for the management of solvent wastes in tank and container storage units and during tank truck loading and unloading activities. A failure mode assessment, including a description of possible failures that could occur and related consequences, is provided in Section B4.B.2.

B4.B.1(a) Climate

Existing operations and the container and tank storage facility should not affect the climate in any way.

B4.B.1(b) Topography, Geology and Soils

Existing operations associated with the Gage LSF will not affect the drainage, topography, streams, lakes, roads, bedrock, or glacial features of the area. There were some very minor impacts to soils on the site related to construction of the container storage facility. These soils had already been greatly altered and were paved or covered with gravel or buildings, so the impact was not significant.

B4.B.1(c) Hydrology

Existing operations associated with the Gage LSF are not anticipated to have adverse effects on groundwater hydrology or groundwater quality as designed and routinely operated, except for the increased paved areas at the facility and the minimization of the opportunity for on-site infiltration. All process, storage, and loading areas have curbing or secondary dike containment systems so that any accidental spills or releases are contained on-site for appropriate cleanup. Groundwater contamination has been detected at the Gage property, and Gage will be implementing a corrective action program pursuant to the 1984 Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act (RCRA). A discussion of the historical site groundwater monitoring is included in

Attachment B2, Corrective Action. Gage qualified for a waiver for groundwater monitoring of the Gage LSF in 1994 and again in 2003, as discussed in Attachment B5 (Environmental monitoring programs).

B4.B.1(d) Land Use and Zoning

Existing operations at the Gage LSF do not affect existing land use or the zoning of the site or nearby areas. A zoning map included as Figure B4-4.

B4.B.1(e) Archeological and Historical Resources

A database search revealed three known properties that are near the Gage LSF, and which are listed in the National Register of Historic Places. Existing and planned activities at the Gage facility are not anticipated to have any adverse impacts on the historic structures or the use of these known historic resources located in the proximity of the Gage LSF. A list of the database findings from the Michigan State Housing and Development Authority, and the National Register of Historic Places is included as Appendix B4-5.

B4.B.1(f) Social Environment

The continuation of operation at the Gage LSF may have some positive effects on the social environment of the area. Gage may hire new personnel to handle the wastes received for processing, and this will help to improve employment opportunities within the local community. Additionally, the presence of Gage's high-quality solvent recycling facility may help attract other employers to the area. The existing operations at the facility will also not adversely affect fire or police protection or sewer services to the community or the Gage property.

B4.B.1(g) Transportation

Truck traffic to the Gage LSF is not expected to increase; and combined with current truck traffic from neighboring facilities in the area, any minimal potential increase in traffic-related noise is not expected to be a source of annoyance for nearby residents. The potential adverse impact will be effectively mitigated by routing truck traffic to and from the site through an established route along I-75, Nine Mile Road, and Wanda Street that will impact the smallest number of residences possible.

The risk of accident is not anticipated to increase due to the presence of the Gage LSF, because the amount of waste transported to the facility will not be increased. If an accident does occur, the impact will be limited to the immediate area of the accident. The primary impacts of a transportation accident will be the possible release of solvent materials to the air and ground. If the accident results in the release of a hazardous waste to the environment, the waste transporter and generator will be responsible for any clean-up activities. Ferndale police and fire departments will respond to any emergency, and are well trained and equipped to do so. Gage recognizes its role and responsibility as the TSD facility which would be receiving the waste material. Gage will use all information and resources available to aid designated response personnel in the containment and cleanup of any spill. Gage will be able to provide Material Data Safety Sheets (SDS) to responding personnel and hospital personnel, if necessary. Gage will also be able to provide whatever spill containment supplies are located at the facility for use in spill control procedures.

B4.B.1(h) Air Quality

Existing operations at the Gage LSF will have no significant impact on air quality. There were minor dust emissions during the construction of the container storage facility. Additional information regarding air monitoring at the Gage LSF is included in Attachment C11 Environmental Monitoring Programs.

B4.B.1(i) Noise

The Gage LSF generates relatively low levels of noise and does not impact the surrounding community as presented in subsection B4.A.2(k).

B4.B.1(j) Appearance and Aesthetics

The Gage LSF is in a residential and industrial area with no special aesthetic value. Perhaps the most dominant feature of this area is the flatness of the terrain for several miles in any direction. Any panoramic views of this expansive terrain are limited by another dominant feature of the area, the diversity and intensity of land-use activities.

Figure B4-4 illustrates the zoning classifications of the properties surrounding the Gage LSF. These classifications closely follow the actual land-use patterns. The zoning in this area includes Light Manufacturing District, General Commercial District, Restricted Office Space, Vehicular Parking District, Single-Family Residential and Medium-Density Residential. The Gage LSF itself is kept neat and well maintained. The site is entirely fenced and is bordered on the north and south by other industry, on the west by the Grand Trunk railway switchyard, and on the east by Wanda Street. Parking areas for cars and trucks are visible through the site fence, as are facility buildings with their associated process and bulk storage tanks. The limited hazardous waste container storage area is located indoors, so no hazardous waste drums are visible from off the site.

Existing operations at the Gage LSF will not significantly change the aesthetics of the area. The conversion of a portion of the facility yard/parking area into a building did not result in any negative impacts on the aesthetics of the neighborhood.

Not many large old trees remain in this area, though there are a few in scattered locations; one such location is Harding Park, located less than two miles from the Gage LSF. The City of Ferndale has four other city parks: Wanda Park, Wilson Park, Fair Park, and Saratoga Park. All parks are located within one-half mile of the Gage LSF; and all parks include playgrounds and picnic areas with some wooded areas, though most have open fields. Other cultural facilities within a mile of the Gage LSF include the City of Ferndale's public library and community center.

B4.B.1(k) Terrestrial and Aquatic Ecosystem

Existing operations at the container facility will have no impact on any aquatic or terrestrial ecosystem. All waste management areas, including storage areas and loading areas, are covered, so runoff cannot come in contact with wastes. Dikes prevent runoff from exiting any areas where wastes may be present. All storage and management areas have secondary containment, so that any leaked or spilled wastes are confined in blind sumps for recovery and disposal and cannot leave the site.

B4.B.2 FAILURE MODE ASSESSMENT

This section provides a failure mode assessment of the Gage LSF operation, including a description of possible failures that could occur and related consequences.

The Gage LSF is used to store hazardous wastes for a time period not to exceed 90 days and consists of a completely enclosed three bay unloading area, container storage area, and covered tank storage farm. Two bays are designed for the unloading of incoming wastes directly into the recycling process or temporary tank storage, and the third bay is designed for unloading 55-gallon drums into the container storage area. The entire facility is designed to contain any leaks or spills and to prevent rain or run-on from entering the facility.

B4.B.2(a) Definition of Failure

While many precautions have been implemented within the existing LSF to prevent the release of hazardous wastes into the environment, such as the design of containment structures as well as the training of employees in handling these wastes, the potential for system failure does exist as it does for any system. A failure in the existing system would be defined as a release of hazardous waste or hazardous waste constituents into the environment due to:

- leak or spill of hazardous waste during waste handling
- leak or spill of hazardous waste during waste storage
- leak or spill of hazardous waste during waste transportation
- chemical reaction between a hazardous waste and an incompatible material
- power outages, failure of electrical equipment, or failure of mechanical equipment
- inadequate storage space for wastes
- inability to identify a facility to accept wastes for treatment/disposal
- acceptance of restricted wastes

B4.B.2(b) Possible Causes of Failure

The possible causes of system failure that could result in the release of hazardous waste or hazardous waste constituents into the environment for each of the failures defined above are summarized as follows:

1. Leakage or spillage of waste could be caused by:

    - leaks from tank trucks or drums during loading/unloading
    - leaks from the secondary containment structures, transfer pumps, piping or valves
    - leakage from waste storage tanks
    - leaks from drums in storage
    - overfilling of storage tanks or drums

2. Each of these failures could potentially cause contamination of soil or groundwater only if the secondary containment system also failed at the same time. Possible causes of failures of the secondary containment system are:

    - physical damage to the secondary containment structures.
    - contact of containment structure with wastes that affect the integrity of the structure.
    - inadequate capacity of the secondary containment to store the volume of wastes leaked or spilled.
    - a loss of containment volume due to the presence of water, wastes, soil or other material in the containment area.
    - a large spill or leak combined with a failure of secondary containment could result in wastes flowing from the site and into nearby storm sewers. This could contaminate the sewage and storm water. This combination of events is highly unlikely.

3. Incompatible chemical reactions between wastes or wastes and their containers could be caused by:

    - the mixing of incompatible wastes in a tank or drum
    - the mixing of incompatible wastes that have leaked or spilled
    - the addition of a waste to a container containing a residue of an incompatible waste
    - the addition of a waste to a container that is incompatible with the waste

4. Power outages, failure of electrical equipment, or failure of mechanical equipment could be caused by:

    - damage to this equipment
    - inadequate maintenance
    - a power failure outside of the Gage facility
    - defective equipment supplied by the manufacturer
    - improper use or installation of equipment

5. Inadequate storage space for wastes could be caused by:

    - the failure to locate and transfer wastes to treatment/disposal facilities on schedule
    - the acceptance of wastes at the facility for which adequate proper storage is not available

6. Inability to identify a facility that will accept wastes to be transferred could be caused by:

    - acceptance of a waste before a facility that will accept it has been identified
    - rendering a waste unacceptable through unintentional mixing as the result of improper containment, inadequate documentation, or inadequate testing
    - a facility that formerly agreed to accept a waste subsequently refusing to accept it

7. Acceptance of a restricted waste could be caused by:

    - inadequate waste evaluation
    - inadequate screening and fingerprint analysis
    - incorrect identification of a waste by a generator

8. Fire or explosion due to improper storage.

    - The risk of fire or explosion due to the improper storage methods is virtually nonexistent. There are very clearly defined proper storage procedures for the materials and containers stored at the facility. Gage Products is committed to complying with these requirements. Inspections are conducted daily to ensure proper storage procedures are being adhered to.

B4.B.2(c) Detection of Failure

Failures of waste storage drums or tanks, containment systems, pumping, piping and management systems will readily be detected by careful observations, regular and routine inspection and testing of equipment, waste handling procedures, communication with disposal facilities for wastes being transferred, and screening of shipments by plant personnel. Facility inspections include observation of waste storage container conditions, any structural deterioration, drum spacing and labeling, waste quantities, equipment operation, containment system integrity, and any potential problems that may lead to system failure. Plant personnel are also instructed to check for any leaks or spills of stored materials and to immediately initiate appropriate response procedures when such releases have been detected. All

inspections are guided by an inspection schedule and are recorded on inspection logs. Members of a private security agency that patrol the site during non-working hours are instructed to make visual inspections of all storage areas and immediately report any signs of material release to Gage authorities and, if necessary, local emergency response personnel.

Leaks and Spills

This failure mode will be obvious if it occurs and will be immediately detected by facility personnel. Incoming tank trucks are unloaded by trained personnel and will be continuously observed by facility personnel. Any leaks or spills from the tanker or hoses connected to receiving tanks will be immediately evident. In addition, Gage performs regularly conducted inspections that are intended to detect any leaks or spills.

Groundwater contamination has been detected at the Gage site, and Gage Products will be implementing a corrective action program pursuant to the 1984 Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act (RCRA). For a complete discussion of the current site groundwater monitoring status, refer to Attachment B5 - Environmental Monitoring, or Attachment B2 (Corrective Action) in particular Table B2-3a & B2-3b (Summary of Groundwater Analysis for Organics and Inorganics at Gage Products).

Incompatible Reactions

The possibility of mixing incompatible wastes is minimized by the use of procedures for identifying and accepting wastes. Incompatible reactions will be easily observed by trained facility personnel who will take prompt action in accordance with Gage's Prevention Plan (Attachment A6) and Contingency Plan (Attachment A7). Measures to prevent reactions of ignitable, reactive and incompatible waste has been provided in Attachment 6 Appendix A6-2.

Power Outages and Equipment Failure

Power outages at the facility will be detected immediately since all equipment and lights operate on electricity. Any pumps in use would cease operating in the event of loss of power. In this way, the transfer, overfilling or release of waste materials will be stopped with loss of power. Failure of mechanical or electrical equipment will also be detected immediately if the equipment stops working completely, delivers reduced power, or emits false signals (in the case of pump controls and meters). Engineered controls ensure that equipment fails in the safe-mode. In addition, operators are trained in procedures for power failure to appropriately shutdown equipment. Regular inspection and testing of critical equipment will detect potential equipment failure.

Inadequate Storage

Inadequate storage will be detected by regular inspections and maintaining inventory of wastes.

Inability to Transfer Wastes

Inability to transfer wastes to treatment/disposal facilities will be detected by refusal of facilities to accept wastes. In this case, another facility will be identified.

Potential Acceptance of Restricted Wastes

Acceptance of restricted wastes will be prevented by proper waste evaluation and shipment screening as described in the Waste Analysis Plan (Attachment A3).

B4.B.2(d) Environmental Effects of Failure

The potential environmental effects of failure would be separated into those effects confined on-site and those effects that may have consequences off-site.

On-Site Effects

The potential environmental effects on-site at Gage as a result of a release of hazardous wastes or hazardous waste constituents would be the degradation of soil and groundwater quality and the exposure of employees to any contact with the release either in the form of a surface leak, spill, or a toxic gas emitted from the chemical reaction of incompatible materials.

The effects of a failure that would degrade air quality would be dependent upon the type of failure, the magnitude of failure, and the type of material lost to the atmosphere from this failure. The waste materials stored at Gage are F001, spent halogenated solvents used in degreasing; F002, spent halogenated solvents; F003 and F005, spent non-halogenated solvents; and characteristically hazardous wastes D001, wastes exhibiting the characteristic of ignitability, and D002, wastes exhibiting the characteristic of corrosivity. A failure mode for the container storage areas that could affect air quality would be the corrosion of a container, a puncture to the container, a release of the container's contents, or improperly covering the container during storage. The container storage areas at Gage allow the natural movement of air so that concentrations of vapors do not build up. The complete failure of the containers and the container storage areas at Gage may result in a localized but temporary degradation of air quality.

Off-Site Effects

Potential off-site environmental effects from system failure may be described as either localized, affecting nearby neighborhoods, or as more regional impacts where the effects span a larger distance beyond the Gage site. Potential localized environmental effects from system failure may include the contamination of exposed soils from the surface runoff of a spill or leak, the degradation of groundwater quality, damage to vegetation or wildlife, and exposure of nearby residents and industries to a toxic gas release. More distant environmental effects may be to surface waters where a spill or release enters the combination sanitary sewer/storm drain.

Many of these potential environmental effects pre-supposes a "worst case" scenario where the system experiences complete failure and large quantities of hazardous wastes have been involved. Under the most probable failure situation, any potential environmental effects would be confined on-site, easily managed, and result in minimal effects to the environment on-site, locally, or regionally.

B4.B.2(e) Possible Corrective Actions in the Event of Failure

If a failure of a waste management system occurs, the following corrective actions would be undertaken as detailed in the facility’s hazardous waste Contingency Plan. This plan describes the procedures that will be followed in the event of an emergency situation such as fire, explosion, tornadoes, severe weather, or any unplanned sudden or non-sudden release of hazardous waste to the ground, air or surface water conveyances at the facility.

5. The discoverer of an emergency situation contacts the Emergency Coordinator. A determination is made whether the situation is an imminent or actual emergency. All facility personnel and appropriate federal, state, and local agencies (including police and fire departments) will also be notified.

6. The character, source, amount, and extent of released materials will be identified. Any potential hazards to human health or the environment associated with this release will be assessed. Evacuation will be initiated if necessary. Any materials that may be reactive with the release will be removed from the area.

7. For a fire and/or an explosion, efforts will be made to prevent the fire from spreading to nearby areas. All feed lines will be shut down and possible sources of ignition will be eliminated. Spills of flammable materials will be contained through the use of chemical absorbents. Flushing the area with large quantities of water or the foaming of the spill will be performed if indicated.

8. In the event of a leak or spill, all waste feed lines will be shut down and the leak or spill stopped. Standing liquids will be transferred to a tank or container. If beyond in-house capabilities, a spill response contractor will be called to remove standing liquids within the containment system and transport the spilled materials to an approved facility or transfer the material into another approved tank or container on-site. Small spills or leaks will be flushed to the sump, and a pump will be used to retrieve the diluted waste materials. Absorbent materials may also be used. Spills or leaks that are not contained will be isolated, appropriately recovered, and disposed. Though the entire Gage LSF is constructed with poured concrete flooring, if soils are impacted, excavation of affected soils may be necessary.

9. If the spill or leak results in the formation and release of a toxic vapor cloud, an assessment will be made of what areas may be impacted and should be evacuated.

10. Actions will be undertaken to prevent the occurrence of fire, explosion, or releases, including the stopping of processes and operations, the collection and containment of released materials, and the recovery or isolation of containers. Valves, pipes, and other equipment will be monitored prior to start up for leaks, pressure build-up, gas generation, or ruptures.

11. Arrangements will be made for the treatment, storage, or disposal of recovered or contaminated materials. These materials will be properly stored at Gage until they can be properly treated or removed.

All of these actions will be undertaken to correct any hazard that may result from the release of hazardous wastes or hazardous waste constituents at the Gage.

B4.B.2(f) Actions to Minimize the Possibility of Failure and Adverse Impacts

The following procedures, structures, and equipment have been established to minimize the possibility of failure and any adverse impacts resulting from a failure of the system:

Uncontrolled reaction of incompatible wastes

One of the reasons for establishing two separate hazardous waste storage areas at Gage is to keep incompatible wastes separate from each other. The possibility of mixing incompatible wastes is minimized by the use of procedures for identifying and accepting wastes for storage. Employees are trained to prevent the mixing of incompatible wastes. In addition, any incompatible reactions are observed by

trained personnel who will take prompt action. All of the wastes handled by Gage are compatible with the sole exception being corrosive hazardous waste, which is only handled in a small isolated section of the container storage building.

Hazards during unloading operations

A trained employee familiar with waste loading and unloading procedures will be available to observe and control waste loading and unloading activities. Every precaution will be taken to assure that these materials are handled properly.

Areas where hazardous wastes are loaded or unloaded have been designed and constructed to contain any spills or leaks and to prevent the release of any materials. Features include concrete curbs, imperviously coated container storage and bulk tank storage area surfaces, sloping floors to accommodate access by forklift trucks and to control the direction of flow, and plugged drains with blind trenches and sumps. Spill response materials are readily available to minimize any potentially adverse effects of a release during waste loading/unloading operations.

Runoff from waste handling areas to other areas

The runoff of accumulated water from within the waste handling and storage areas is prevented through facility design features, including impervious surfaces, sloping floors, secondary containment structures, blind trenches and sumps, and a roof to prevent precipitation from accumulating within these areas. Regular inspections of these areas will identify where runoff from these areas may present a problem.

Contamination of water supplies

Because water for the City of Ferndale is supplied from the Detroit River and there are no recorded potable water wells in use within a 1.5 mile radius of the Gage site, the probability of water supplies becoming contaminated due to system failures at the Gage LSF is considered negligible; however, the actions that have been established to minimize the possibility of failure and other adverse impacts would also effectively prevent the contamination of any water supplies if they were present.

Effects of equipment failure and power outages

In the event of equipment failure or power outage, all loading/unloading activities will cease because the pumps used for loading/unloading activities will require electricity to operate and they will shut down. The high-level alarms on the tanks will not be operable; but since the pumps will not be able to load any material into the tanks, this will not present a problem. Equipment failure or power outages will not result in the discharge of hazardous waste material to the environment.

Exposure of personnel to hazardous wastes

All employees that handle hazardous wastes and that could potentially be exposed to these wastes have been trained in procedures that will minimize their potential exposure. The use of personal protective equipment is covered under training programs, as is the safe and proper handling and storage of hazardous wastes. Employees are also instructed on the hazardous nature of these wastes and what procedures should be followed during an emergency. Both classroom and on the job instruction are included in the training program, which is reviewed and updated annually.

During an emergency, all personnel not essential to the response activities would be evacuated from the area to prevent their exposure to any released hazardous wastes or hazardous waste constituents.

Evacuation routes have been established. Personnel will be allowed to return to the area once the area has been cleaned and it has been determined that it is safe to return the area to normal operations.

The effects of any failures on employee or public health will depend on the type of material lost during failure, the concentration of the material, the type of tissue contacted, and the duration of human contact. Employees at the Gage facility are the most likely population that could be exposed in the event of a release. Losses of dilute acidic or alkaline solutions or more concentrated reagents could pose a threat due to direct contact. The leakage or spillage of corrosive materials, either acidic or alkaline, could cause acute symptoms ranging from tissue irritation to chemical burns on exposed skin or other tissue. Inhalation of acidic fumes or vapors could result in inflammation of the nose, throat, or larynx.

Effects of Tornadoes or Other Severe Storms

Whenever weather conditions indicate the potential for severe weather, Gage personnel will inspect and secure the container storage areas to minimize the impact of heavy precipitation or heavy winds on these areas. The container storage areas have been designed and constructed to withstand most severe storms anticipated to be encountered and to prevent the release of hazardous wastes during storm events. Employees will be evacuated from the facility or sheltered during a tornado warning to minimize any injuries from the storm. Gage has adopted procedures and provided structures to handle most storms and will continue to improve these procedures and structures as needed. The mitigation procedures for hazardous waste releases during a catastrophic event, such as a direct hit by a tornado, have been installed by Gage in the best anticipated way for an unpredictable and low probability situation.

B4.C EXPOSURE INFORMATION REPORT FOR LANDFILLS AND SURFACE IMPOUNDMENTS

The facility does not utilize surface impoundments or landfills. Therefore, Section B4.C is not appliable.

B4.D EVALUATION OF ALTERNATE HAZARDOUS WASTE MANAGEMENT TECHNOLOGIES

The Gage LSF has been specifically designed to safely store contained hazardous wastes. Alternative design features were reviewed, but the final selection of the design reflected several advantages, such as satisfying setback requirements, fire protection needs, and the use of storage capacity already present as well as providing optimum secondary containment structures and separate storage for potentially incompatible wastes.

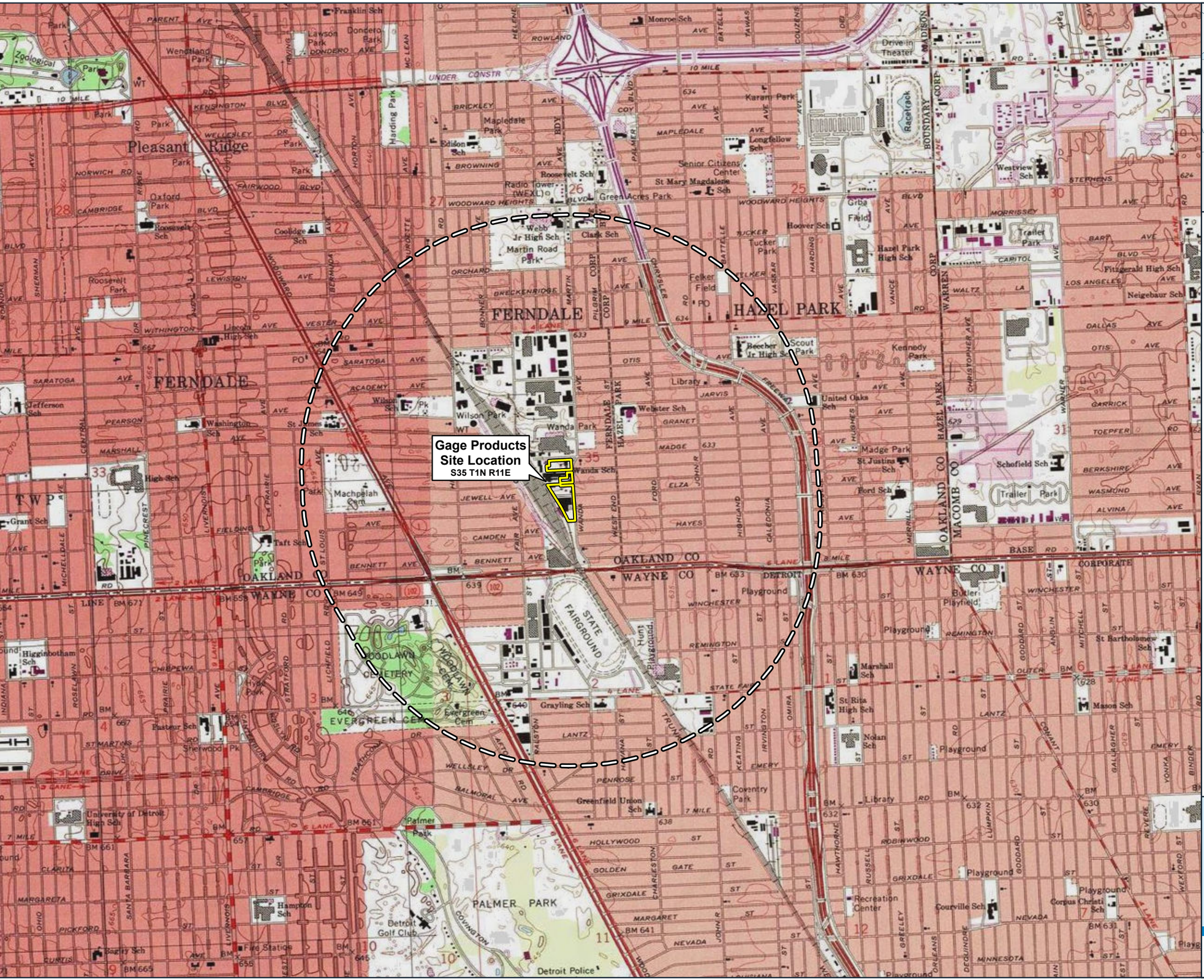
The Gage LSF has a maximum storage capacity of 25,000 gallons. This storage capacity reflects the potential total combined capacities of the container storage area plus the capacity of the bulk storage tanks in the tank farm. The container storage area is designed to have a storage capacity of 2,750 gallons maximum of hazardous wastes (fifty 55-gallon drums). The bulk storage tanks in the limited storage area have a capacity of 22,250 gallons that is made available through utilization of five vertical storage tanks.

The no-action alternative was considered but was not consistent with Gage's objectives of helping to meet the increasing demand for the safe recycling of a variety of wastes from large-quantity and small-quantity generators of hazardous wastes. Those wastes that are accepted for limited storage by Gage LSF are primarily generated from the use of Gage's products that allows Gage LSF to be very familiar with the wastes' characteristics and the proper handling and storage of these materials. This closed-loop recycling process supports Gage's commitment to sustainable manufacturing. Wastes are stored temporarily on-site at Gage LSF until a sufficient quantity has accumulated for effective batch recycling. EPA corrosive wastes (DO02) are temporarily stored in a segregated area within the container storage

area prior to being manifested off-site, within the 90-day storage requirement, to a licensed off-site disposal facility. By storing wastes on-site, Gage LSF can control how the wastes are handled to assure that the environment is protected and that their liability is also minimized. Gage LSF can also take advantage of some cost savings by accumulating sufficient quantities of hazardous wastes within the 90-day storage limit to make collection, disposal, or recycling of these wastes more practical for waste generators. This service is provided to customers (firms purchasing products and returning used products (wastes) for proper handling, storage, recycling and/or appropriate disposal), which enables Gage LSF to have greater control over the use and disposal of their products and supports a sustainable future. In addition, by minimizing the number of times that the wastes must be handled after they have been generated and before they are disposed, the possibility of any releases to the environment from such handling can be reduced. By not storing the hazardous wastes on-site at Gage, any potential adverse impacts from their storage would be eliminated locally, but these potentially-adverse impacts may just be transferred to another location.

The limited storage of hazardous wastes at Gage complements the existing waste management programs of the community, the state, and the nation by providing a properly designed and operated storage facility. Gage's operation of the LSF implements management procedures that reduce the disposal amounts and potential for release of hazardous wastes or hazardous waste constituents to the environment. It encourages reuse/recycling of materials, and thus reduces the consumption of valuable natural resources while promoting a more sustainable environment.

Figures



Property Boundary

Property Boundary 1-mile Buffer

0 2,000 4,000

Feet

Basemap: USGS 7.5 Minute Quadrangle Map

USGS Topographic Map
Gage Products
Ferndale, MI

Attachment B4
FIGURE B4-1

BARR

Barr Footer: ArcGISPro 3.3.1, 2024-09-11 15:57 File: I:\Projects\23\63\1023\Maps\Reports\RCRA Permit Renewal\RCRA Permit Renewal.aprx Layout: Fig01a USGS Topographic Map User: CML3

WASTE MANAGEMENT UNITS	
WMU 1	Tote and Drum Storage Area
WMU 2	Truck Well
WMU 3	Former Underground Storage Tank Area by the Truck Well
WMU 4	Bulk Tank Storage Area
WMU 5	Generated Hazardhous Waste Storage Area
WMU 6	Limited Storage Area Tanks
WMU 7	Railroad Loading/Unloading Area
WMU 8	Former Piping Area
WMU 9	Former Underground Storage Tank Area by Fill House 2
WMU 10	Tank Wagon Loading/Unloading Area
WMU 11	Fill House 1
WMU 12	Fill House 6
WMU 13	Former Underground Storage Tank Area by Fill House 6
WMU 14	Tanker Off-Loading Area
WMU 15	Former Underground Storage Tank Area on Parcel A
WMU 25	Floor Drains that Connect to the POTW
WMU 29	Tote Rinse Area

AREAS OF CONCERN	
AOC 1	Former Generated Hazardous Waste Storage Area
AOC 2	Former Storage Area at the Boiler Building
AOC 3	Back Storage Area
AOC 4	Former Steam-Out and Storage Area
AOC 5	Unpaced Area of Silman Ave.
AOC 6	Silman Ave. Sewers
AOC 7	Covered Storage Area
AOC 8	Open Area of Parcel A
AOC 10	Jewell Avenue
AOC 11	Fuel Release Area

- Property Boundary
- Parcel Boundary
- A — Parcel ID
- Site Feature
- Waste Management Unit (WMU)
- Area of Concern (AOC)

0 100 200
Feet

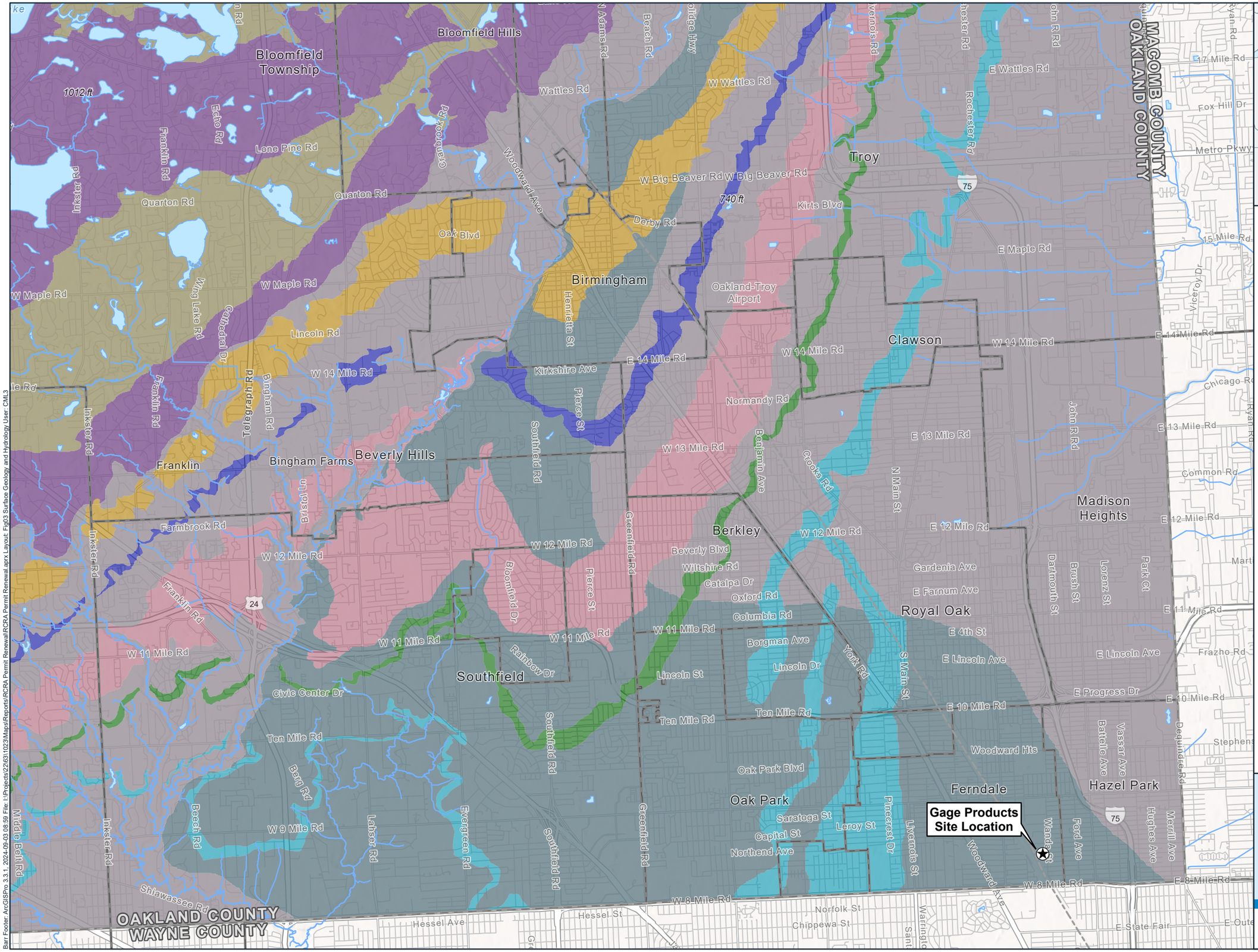
Aerial Image: Nearmap 5/31/2024

Facility Layout Map
WMU and AOC
Gage Products
Ferndale, MI

Attachment B4
FIGURE B4-2

BARR

Barr Footer: ArcGISPro 3.3.1, 2024-09-11 15:11 File: I:\Projects\22\63\1023\Maps\Reports\RCRA Permit Renewal\RCRA Permit Renewal.aprx Layout: Fig04 Locations of Waste Management Units and Areas of Concern User: CML3



Surface Geology and Hydrology for Southeast Oakland County

Gage Products
Ferndale, MI

FIGURE B4-3

BARR

August 29, 2024

Zoning Tax Parcel

R-1
R-2
R-3
R-4
MXD-1
MXD-2
CBD
C-2
C-3
M-1
M-2
P-1
OS
PUD
Transit Overlay District

Figure B4-04
Zoning Designations of Surrounding Property

625 Wanda Avenue, Ferndale, MI

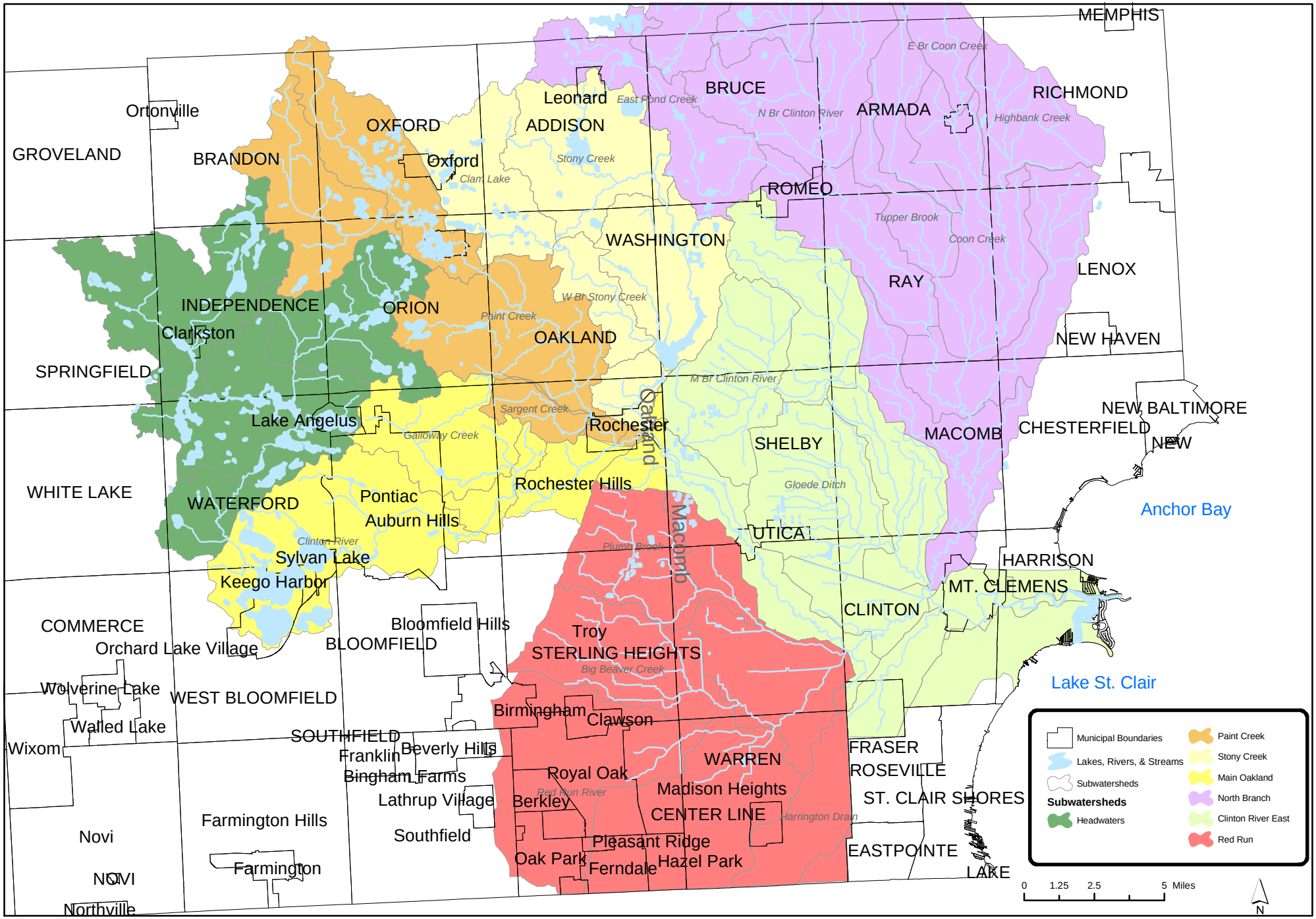
1:18,056

0 0.15 0.3 0.6 mi
0 0.25 0.5 1 km

Figure B4-5
The Clinton River Watershed

This map is provided by the Environmental Stewardship Group of Oakland County Planning & Economic Development Services

L. Brooks Patterson, County Executive

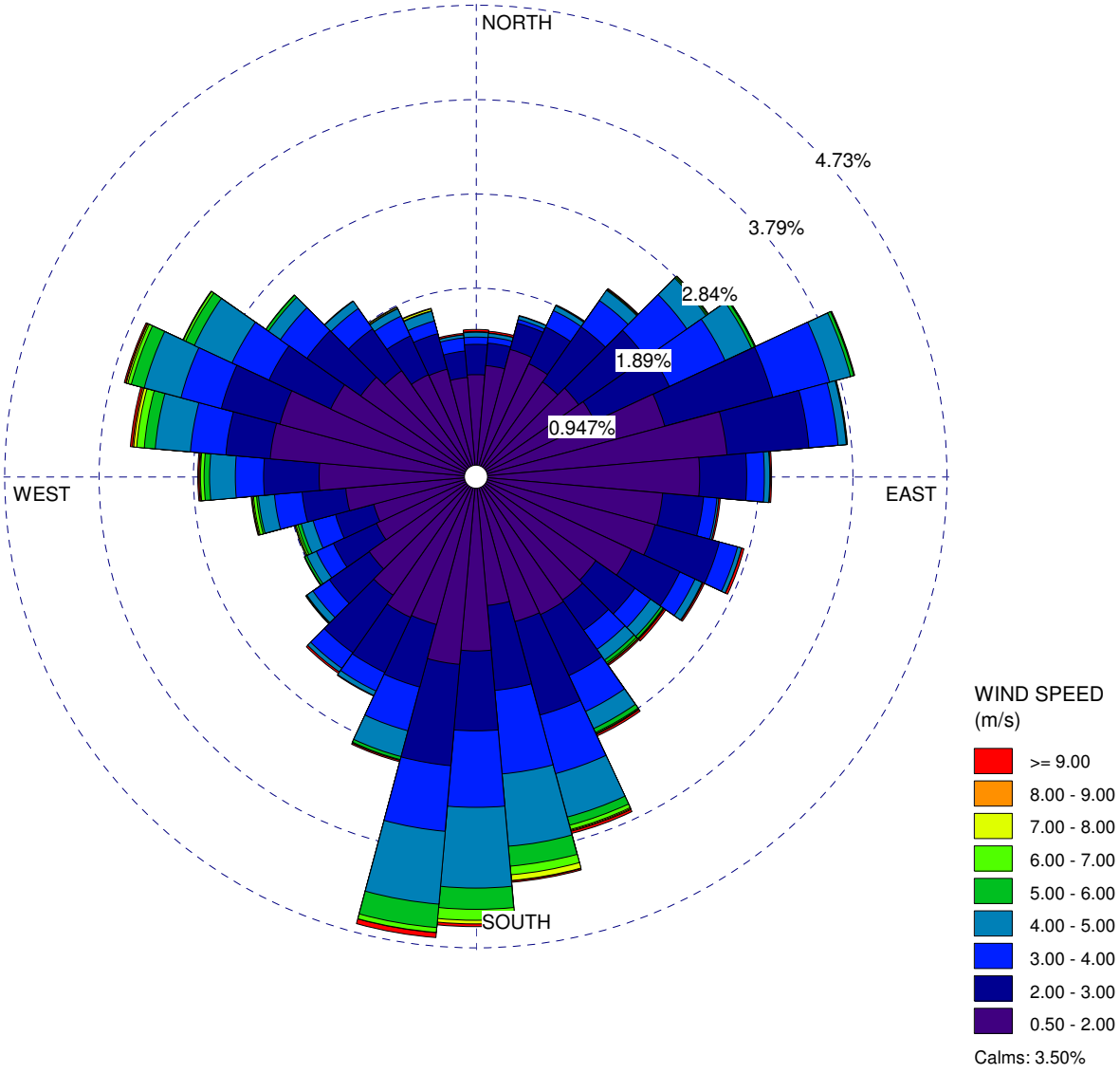


WIND ROSE PLOT:

Oak Park - AQS ID: 261250001
Gage Products Company

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2018 - 00:00** **End Date: 12/31/2022 - 23:00**	**Figure B4-6: Wind Rose**	
	CALM WINDS: **3.50%**	TOTAL COUNT: **43743 hrs.**	BARR
	AVG. WIND SPEED: **2.20 m/s**	DATE: **8/12/2024**	PROJECT NO.: **22631293.00**

Appendices

Appendix B4-1

Climate Data Information

Appendix B4-1

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Summary of Monthly Normals
2006-2020

Generated on 08/27/2024

Current Location: Elev: 631 ft. Lat: 42.2314° N Lon: 83.3308° W

Station: **DETROIT METRO AP, MI US USW00094847**

Temperature (°F)

	Mean						Cooling Degree Days Base (above)						Heating Degree Days Base (above)				Mean Number of Days					
Month	Daily Max	Daily Min	Mean	Long Term Max Std Dev	Long Term Min Std Dev	Long Term Avg Std Dev	55	57	60	65	70	72	55	57	60	65	Max >= 100	Max >= 90	Max >= 50	Max <= 32	Min <= 32	Min <= 0
01	33.2	19.8	26.5	5.1	6.1	5.5	0.4	0.2	0.0	0.0	0.0	0.0	883.7	945.6	1038.4	1193.4	0.0	0.0	2.7	15.7	26.8	2.1
02	34.5	19.9	27.2	6.1	6.0	6.0	0.1	0.0	0.0	0.0	0.0	0.0	778.1	834.1	918.1	1058.1	0.0	0.0	2.8	13.0	25.5	1.5
03	46.6	29.1	37.8	5.8	4.8	5.2	10.5	7.5	4.5	1.5	0.2	0.0	542.2	601.2	691.2	843.2	0.0	0.0	11.1	2.9	20.9	0.2
04	59.2	39.0	49.1	3.8	2.6	3.1	42.1	28.4	14.5	2.7	0.3	0.1	219.0	265.4	341.4	479.6	0.0	0.0	24.1	0.2	6.3	0.0
05	71.5	51.2	61.3	3.2	2.3	2.7	229.6	184.3	126.0	56.5	18.5	10.2	32.9	49.6	84.2	169.8	0.0	0.5	30.7	0.0	0.3	0.0
06	80.3	60.4	70.3	2.0	1.2	1.3	461.1	401.7	314.4	180.0	77.2	49.5	0.7	1.3	4.0	19.6	0.0	2.7	30.0	0.0	0.0	0.0
07	84.6	65.1	74.9	3.2	3.1	3.1	615.1	553.2	460.2	307.0	167.6	121.1	0.0	0.0	0.0	1.7	0.3	6.5	31.0	0.0	0.0	0.0
08	82.5	63.7	73.1	1.8	1.9	1.7	561.0	499.0	406.2	256.1	122.6	82.1	0.0	0.0	0.2	5.0	0.0	2.7	31.0	0.0	0.0	0.0
09	75.2	56.4	65.8	2.3	2.5	2.3	329.7	275.6	200.5	100.2	38.5	23.7	5.9	11.7	26.6	76.3	0.0	1.6	30.0	0.0	0.0	0.0
10	62.4	44.6	53.5	2.8	2.6	2.7	87.5	64.4	37.8	10.9	2.7	1.4	134.0	172.9	239.2	367.4	0.0	0.1	28.3	0.0	1.7	0.0
11	49.1	33.7	41.4	4.9	3.2	3.9	7.5	4.4	1.7	0.1	0.0	0.0	415.5	472.3	559.6	708.1	0.0	0.0	13.7	1.1	13.7	0.0
12	38.0	26.1	32.1	4.7	4.5	4.6	0.3	0.0	0.0	0.0	0.0	0.0	711.6	773.4	866.3	1021.3	0.0	0.0	4.3	9.1	23.9	0.3
Summary	59.8	42.4	51.1	3.8	3.4	3.5	2345	2019	1566	915	428	288	3724	4128	4769	5944	0.3	14.1	239.7	42.0	119.1	4.1

Empty or blank cells indicate data is missing or insufficient occurrences to compute value

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Summary of Monthly Normals
2006-2020

Generated on 08/27/2024

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 631 ft. Lat: 42.2314° N Lon: 83.3308° W

Station: **DETROIT METRO AP, MI US USW00094847**

Precipitation (in.)								
	Totals	Mean Number of Days				Precipitation Probabilities Probability that precipitation will be equal to or less than the indicated amount		
	Means	Daily Precipitation				Monthly Precipitation vs. Probability Levels		
Month	Mean	>= 0.01	>= 0.10	>= 0.50	>= 1.00	0.25	0.50	0.75
01	2.28	13.9	5.7	1.1	0.1	1.41	2.14	3.01
02	2.35	11.8	5.9	1.5	0.3	1.90	2.13	2.83
03	2.83	10.7	6.2	1.9	0.7	1.98	3.10	3.73
04	3.31	12.6	7.2	2.1	0.3	2.29	2.68	4.41
05	3.84	13.1	8.0	2.5	0.7	2.55	3.62	5.09
06	3.44	10.9	6.1	2.3	0.9	2.22	3.66	4.67
07	3.59	10.2	6.2	2.3	1.2	2.44	3.24	4.31
08	3.47	9.1	5.8	2.1	0.9	2.10	3.14	5.80
09	3.40	10.1	6.3	2.1	0.6	1.45	3.32	5.35
10	2.67	12.1	6.5	1.5	0.5	2.08	2.42	3.36
11	2.61	9.9	5.1	2.0	0.5	1.72	2.11	3.32
12	2.51	13.6	5.6	1.7	0.1	1.82	2.65	2.96
Summary	36.30	138.0	74.6	23.1	6.8	23.96	34.21	48.84

Empty or blank cells indicate data is missing or insufficient occurrences to compute value

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Summary of Monthly Normals
2006-2020

Generated on 08/27/2024

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 631 ft. Lat: 42.2314° N Lon: 83.3308° W

Station: **DETROIT METRO AP, MI US USW00094847**

Snow (in.)													
	Totals	Mean Number of Days									Snow Probabilities Probability that snow will be equal to or less than the indicated amount		
	Means	Snowfall >= Thresholds					Snow Depth >= Thresholds				Monthly Snow vs. Probability Levels Values derived from the incomplete gamma distribution.		
Month	Snowfall Mean	0.01	1.0	3.0	5.00	10.00	1	3	5	10	.25	.50	.75
01	13.6	10.9	4.3	1.3	0.5	0.1	15.7	10.3	6.3	1.6	9.1	10.1	14.2
02	16.6	10.6	4.8	1.9	0.5	0.1	17.1	12.2	8.5	5.0	9.3	14.7	23.9
03	5.5	4.5	1.7	0.7	0.3	0.0	6.5	3.7	2.5	1.4	2.2	3.4	7.2
04	1.5	1.7	0.5	0.1	0.1	0.0	0.5	0.1	0.0	0.0	0.0	0.1	2.0
05	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	2.3	2.5	0.6	0.1	0.1	0.0	1.9	0.6	0.4	0.0	0.1	0.6	3.8
12	9.3	8.4	2.7	0.7	0.5	0.1	8.5	5.5	4.5	0.1	2.6	9.3	13.9
Summary	48.8	38.8	14.6	4.8	2.0	0.3	50.2	32.4	22.2	8.1	23.3	38.2	65.0

Empty or blank cells indicate data is missing or insufficient occurrences to compute value

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
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Summary of Monthly Normals 2006-2020

Generated on 08/27/2024

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 631 ft. Lat: 42.2314° N Lon: 83.3308° W

Station: **DETROIT METRO AP, MI US USW00094847**

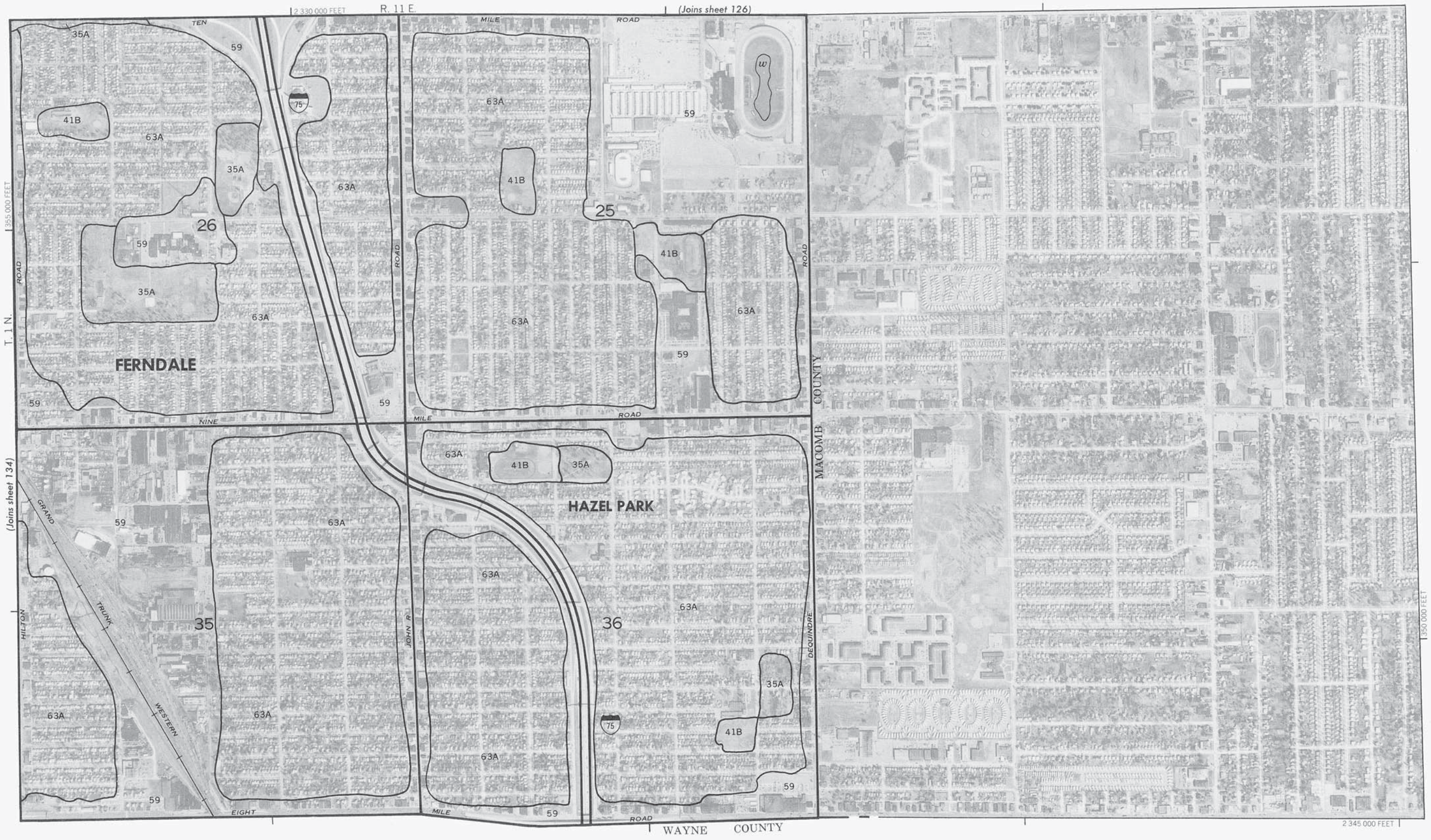
Growing Degree Units (Monthly)												
Base	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Growing Degree Units (Monthly)												
Base	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
40	12.4	15.0	94.6	294.3	661.8	910.4	1080.1	1026.0	773.8	420.4	127.9	26.6
45	3.4	5.3	48.4	179.1	508.0	760.4	925.1	871.0	623.9	279.7	62.2	8.6
50	1.3	1.4	22.6	94.3	360.4	610.5	770.1	716.0	474.4	166.7	24.4	2.1
55	0.4	0.1	10.5	42.1	229.6	461.1	615.1	561.0	329.7	87.5	7.5	0.3
60	0.0	0.0	4.5	14.5	126.0	314.4	460.2	406.2	200.5	37.8	1.7	0.0
Growing Degree Units for Corn (Monthly)												
50/86	4.1	8.3	53.2	163.2	391.7	601.1	744.1	703.7	481.7	219.4	59.2	8.6
Growing Degree Units (Accumulated Monthly)												
40	12	27	122	416	1078	1988	3069	4095	4868	5289	5417	5443
45	3	9	57	236	744	1505	2430	3301	3925	4204	4266	4275
50	1	3	25	120	480	1090	1861	2577	3051	3218	3242	3244
55	0	0	11	53	283	744	1359	1920	2250	2337	2345	2345
60	0	0	4	19	145	459	920	1326	1526	1564	1566	1566
Growing Degree Units for Corn (Monthly Accumulated)												
50/86	4	12	66	229	620	1222	1966	2669	3151	3370	3430	3438

Note: For corn, temperatures below 50 are set to 50, and temperatures above 86 are set to 86.

Empty or blank cells indicate data is missing or insufficient occurrences to compute value.

Appendix B4-2

Soil Survey Information



135

N

1 Mile

5 000 Feet

0 0

1/4 1 000

2 000

1/2 3 000

3/4 4 000

5 000

SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and letters. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas.

SYMBOL	NAME	SYMBOL	NAME
10B	Marlette sandy loam, 1 to 6 percent slopes	40B	Udorthents, loamy, undulating
10C	Marlette sandy loam, 6 to 12 percent slopes	40C	Udorthents, loamy, rolling
10D	Marlette loam, 12 to 18 percent slopes	41B	Aquents, sandy and loamy, undulating
10E	Marlette loam, 18 to 35 percent slopes	42	Pits
11B	Capac sandy loam, 0 to 4 percent slopes	43	Sloan-Marlette association
12	Brookston and Colwood loams	44B	Riddles sandy loam, 1 to 6 percent slopes
13B	Oshtemo-Boyer loamy sands, 0 to 6 percent slopes	44C	Riddles sandy loam, 6 to 12 percent slopes
13C	Oshtemo-Boyer loamy sands, 6 to 12 percent slopes	44D	Riddles sandy loam, 12 to 18 percent slopes
13E	Oshtemo-Boyer loamy sands, 12 to 40 percent slopes	45B	Arkport loamy fine sand, 2 to 6 percent slopes
14B	Oakville fine sand, 0 to 6 percent slopes	45C	Arkport loamy fine sand, 6 to 12 percent slopes
14C	Oakville fine sand, 6 to 18 percent slopes	45D	Arkport loamy fine sand, 12 to 25 percent slopes
15B	Spinks loamy sand, 0 to 6 percent slopes	46A	Dixboro loamy fine sand, 0 to 3 percent slopes
15C	Spinks loamy sand, 6 to 12 percent slopes	47B	Fox-Riddles sandy loams, 1 to 6 percent slopes
15E	Spinks loamy sand, 12 to 35 percent slopes	47C	Fox-Riddles sandy loams, 6 to 12 percent slopes
17A	Wasepi sandy loam, 0 to 3 percent slopes	48	Gilford sandy loam
18B	Fox sandy loam, 1 to 6 percent slopes	49	Cohoctah fine sandy loam
18C	Fox sandy loam, 6 to 12 percent slopes	50B	Udipsamments, undulating
18D	Fox sandy loam, 12 to 25 percent slopes	50D	Udipsamments, rolling to steep
19	Sebewa loam	51B	Leoni gravelly sandy loam, 1 to 6 percent slopes
20B	Glynwood loam, 2 to 6 percent slopes	51C	Leoni gravelly sandy loam, 6 to 12 percent slopes
20C	Glynwood loam, 6 to 12 percent slopes	52A	Selfridge loamy sand, 0 to 3 percent slopes
23B	Sisson fine sandy loam, 1 to 6 percent slopes	53A	Tedrow loamy sand, 0 to 3 percent slopes
23C	Sisson fine sandy loam, 6 to 12 percent slopes	54A	Matherton sandy loam, 0 to 3 percent slopes
25B	Owosso sandy loam, 1 to 6 percent slopes	56A	Urban land-Blount-Lenawee complex, 0 to 3 percent slopes
25C	Owosso sandy loam, 6 to 12 percent slopes	59	Urban land
26	Sloan silt loam	60B	Urban land-Marlette complex, 0 to 8 percent slopes
27	Houghton and Adrian mucks	60C	Urban land-Marlette complex, 8 to 15 percent slopes
31B	Metea loamy sand, 0 to 6 percent slopes	60D	Urban land-Marlette complex, 15 to 25 percent slopes
31C	Metea loamy sand, 6 to 12 percent slopes	61A	Urban land-Capac complex, 0 to 3 percent slopes
32B	Blount loam, 0 to 4 percent slopes	62B	Urban land-Spinks complex, 0 to 8 percent slopes
33	Lenawee silty clay loam	62C	Urban land-Spinks complex, 8 to 15 percent slopes
34B	Kibbie fine sandy loam, 0 to 4 percent slopes	63A	Urban land-Thetford complex, 0 to 3 percent slopes
35A	Thetford loamy fine sand, 0 to 3 percent slopes	67B	Ormas loamy sand, 0 to 6 percent slopes
36A	Metamora sandy loam, 0 to 3 percent slopes	67C	Ormas loamy sand, 6 to 12 percent slopes
38	Napoleon muck	68	Cohoctah-Fox association
39	Granby loamy sand	69	Thomas muck

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool (Davis Airstrip; FLOOD POOL LINE)

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate (75)
- Federal (410)
- State (52)
- County, farm or ranch (378)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small (water; w)

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (GAS)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) (CANAL)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial (water; w)
- Intermittent (int; i)

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (10B; 62C)

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

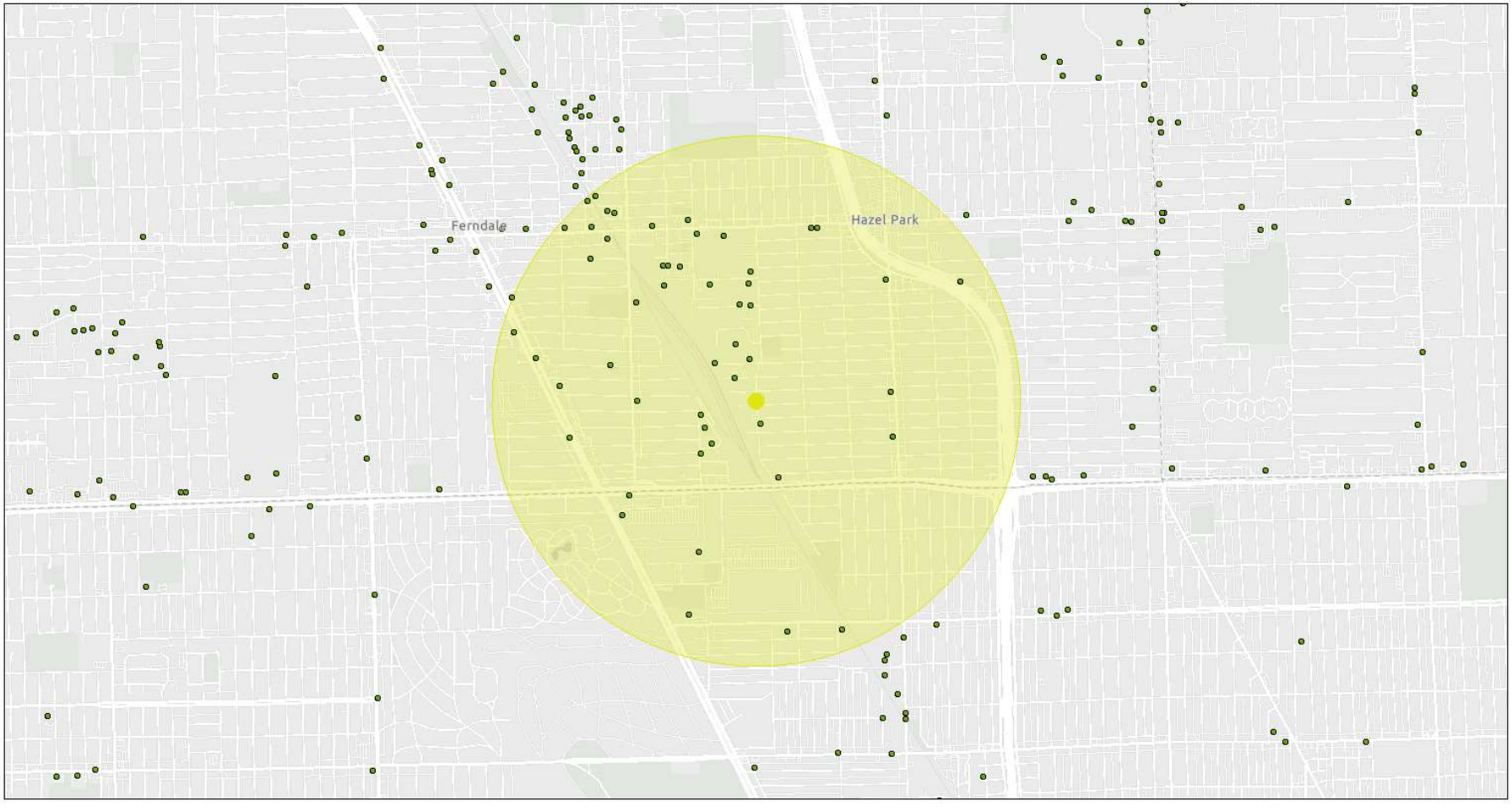
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Pond area
- Sanitary Landfill up to 40 acres in size
- Loamy spot up to 3 acres in size
- Organic soil up to 3 acres in size

Appendix B4-3

Sites of Environmental Contamination

APPENDIX B4-3

Part 201: Sites of Environmental Contamination



8/29/2024, 1:33:46 PM

1:30,967

0 0.28 0.55 1.1 mi
0 0.45 0.9 1.8 km

Source: Michigan Department of Environmental Quality Part 201 Public Database - Site List for the City of Ferndale, Michigan

SITENAME	ADDRESS	CITY	ZIPCODE	COUNTY	LATITUDE	LONGITUDE	SiteID	BusinessType	RiskCondition	Contaminants	HasBeaOrNom	LastUpdated
601 East 9 Mile Road, Ferndale	601 East 9 Mile Road	Ferndale	48220	Oakland	42.46109	-83.125677	50500520	Auto Repair and Salvage	Inadequate Data to Assign Risk	Petroleum Volatile and Semi Volatile Organic Compounds	YES	4/24/2024
Powerfone (aka Eric Enterprise)	1441 Bonner St	Ferndale	48220	Oakland	42.458939	-83.120397	63000944		Risks Controlled-Interim		NO	2/2/2021
Advanced Friction Materials	1435 Wanda Street	Ferndale	48220	Oakland	42.458627	-83.11388	63001145		Risks Present and Require Action in Short-term	Chlorinated Volatile and Semi Volatile Organic Compounds	YES	10/5/2022
ITW Woodworth Manufacturing	1300 East 9 Mile Road	Ferndale	48220	Oakland	42.46068	-83.117861	63005203		Risks Not Determined		YES	3/29/2022
22600 North Chrysler Drive - City of Haz	22600 North Chrysler Drive	Hazel Park	48030	Oakland	42.458095	-83.098389	63005292		Risks Not Determined		NO	4/11/2024
Michigan Press Consulting MFG	475 Wanda	Ferndale	48220	Oakland	42.450339	-83.113169	63005323		Risks Not Determined		NO	2/2/2021
1365 - 1395 Jarvis Street	1395 Jarvis Street	Ferdale	48220	Oakland	42.456839	-83.114695	63005470		Risks Not Determined		NO	2/2/2021
1501 Bonner Street	1501 Bonner Street	Ferndale	48220	Oakland	42.457845	-83.120323	63005532		Risks Present and Require Action in Short-term		YES	1/25/2024
650/668 E. 9 Mile	650/668 East 9 Mile Road	Ferndale	48220	Oakland	42.460437	-83.124493	63005588		Risks Not Determined		YES	2/2/2021
480 Fair Street	480 Fair Street	Ferndale	48220	Oakland	42.450791	-83.117578	63005653	Manufacturing	Risks Present and Require Action in Short-term	Chlorinated Volatile and Semi Volatile Organic Compounds	YES	7/18/2024
22061 Woodward	22061 Woodward	Ferndale	48220	Oakland	42.455307	-83.131413	63005745	Auto Repair and Salvage, Gas Station	Risks Controlled-Interim	Lead, Petroleum Volatile and Semi Volatile Organic Compounds	YES	1/8/2024
1481 Wordsworth Street	1481 Wordsworth Street	Ferndale	48220	Oakland	42.453849	-83.113963	63005765	Manufacturing	Inadequate Data to Assign Risk	Petroleum Volatile and Semi Volatile Organic Compounds	YES	4/18/2024
505 W. 9 Mile Road	505 West 9 Mile Road	Hazel Park	48030	Oakland	42.461	-83.109	63005767		Risks Present and Require Action in Short-term		YES	2/2/2021
450 Fair Street	450 Fair Street	Ferndale	48220	Oakland	42.450098	-83.117311	63005913		Risks Present and Immediate	Chlorinated Volatile and Semi Volatile Organic Compounds	YES	3/20/2024
LaSalle Foundry, Inc.	1221 WORDSWORTH ST	Ferndale	48220	Oakland	42.453608	-83.116572	63005948		Risks Present and Require Action in Short-term	Petroleum Volatile and Semi Volatile Organic Compounds	YES	2/2/2022
Fresard Buick (Former) - 21720 Woodward	21720 Woodward Avenue	Ferndale	48220	Oakland	42.452366	-83.12804	63005963		Risks Present and Require Action in Short-term	Elements/Metals/Other Inorganics, Lead	YES	10/5/2022
Burdette Street Commercial Property	1938 Burdette Street	Ferndale	48220	Oakland	42.462495	-83.126001	63005970		Risks Present and Require Action in Short-term	Elements/Metals/Other Inorganics, PCB, Petroleum Volatile and Semi Volatile Organic Compounds	YES	2/2/2021
Progressive Metal Manufacturing Company	1200, 1300, and 1460 Channing Avenue	Ferndale	48220	Oakland	42.4528	-83.1151	63005980		Risks Present and Require Action in Short-term	Chlorinated Volatile and Semi Volatile Organic Compounds	YES	2/2/2021
Greer Steel Property (Former)	1520 East Nine Mile Road	Ferndale	48220	Oakland	42.460576	-83.115924	63006028	Manufacturing	Risks Present and Require Action in Long-term	Carcinogenic PAHs, Elements/Metals/Other Inorganics	YES	11/29/2023
Ferndale Dog Daycare	1221 East 9 Mile Road	Ferndale	48220	Oakland	42.461441	-83.118532	63006035	Manufacturing	Inadequate Data to Assign Risk	Chlorinated Volatile and Semi Volatile Organic Compounds, Elements/Metals/Other Inorganics, Petroleum Volatile and Semi Volatile Organic Compounds	YES	5/24/2024
Amoco Oil #5230 Former Heating Oil UST	22304 Woodward Avenue	Ferndale	48220	Oakland	42.457212	-83.131599	63006063		Inadequate Data to Assign Risk		YES	11/27/2023
22229 and 22241 John R Road	22229 and 22241 John R Road	Hazel Park	48030	Oakland	42.458166	-83.103912	63500567	Dry Cleaner, Manufacturing	Inadequate Data to Assign Risk	Chlorinated Volatile and Semi Volatile Organic Compounds, Elements/Metals/Other Inorganics	YES	4/10/2024
1333-1337 E. Eight Mile	1333-1337 E. Eight Mile	Ferndale	48220	Oakland	42.447384	-83.111854	63500645	Manufacturing, Manufacturing	Risks Present and Require Action in Short-term	Petroleum Volatile and Semi Volatile Organic Compounds, Petroleum Volatile and Semi Volatile Organic Compounds	YES	8/16/2024
1505-1515 Jarvis Street	1505-1515 Jarvis Street	Ferndale	48220	Oakland	42.4568	-83.1139	63500665		Risks Not Determined		YES	2/2/2021
1505 Bonner	1505 Bonner	Ferndale	48220	Oakland	42.458968	-83.12006	63500666		Risks Not Determined		YES	1/5/2023
21015-21041 John R Road	21015-21041 John R Road	Hazel Park	48030	Oakland	42.449606	-83.103377	63500726		Risks Not Determined		YES	6/1/2023
21205-21333 & 21425-21433 Woodward Ave	21201-21333, 21222 21425-21433 Woodward Ave	Ferndale	48220	Oakland	42.449535	-83.127284	63500735		Risks Not Determined		YES	8/15/2024
21323 JOHN R	21323 JOHN R	Hazel Park	48030	Oakland	42.452057	-83.103521	63500740		Risks Not Determined		YES	10/20/2023
350 Fair Street	350 Fair Street	Ferndale	48220	Oakland	42.4487	-83.1176	63500967		Risks Not Determined		YES	2/2/2021
380 Fair Street	380 Fair Street	Ferndale	48220	Oakland	42.44923	-83.116764	63500990	Recycling, Recycling	Risks Present and Require Action in Short-term	Chlorinated Volatile and Semi Volatile Organic Compounds, Chlorinated Volatile and Semi Volatile Organic Compounds, Elements/Metals/Other Inorganics, Elements/Metals/Other Inorganics, Petroleum Volatile and Semi Volatile Organic Compounds, Petroleum	YES	8/5/2024
503 East Nine Mile Road	503 East Nine Mile Road	Ferndale	48220	Oakland	42.460991	-83.127661	63501075	Auto Repair and Salvage, Auto Repair and Salvage, Commercial and Retail, Commercial and Retail	Risks Present and Require Action in Short-term	Chlorinated Volatile and Semi Volatile Organic Compounds, Elements/Metals/Other Inorganics, Elements/Metals/Other Inorganics, Lead, Mercury	YES	6/4/2024
730 Breckenridge St.	730 Breckenridge St.	Ferndale	48220	Oakland	42.462743	-83.125418	63501151	Commercial and Retail, Commercial and Retail	Risks Present and Require Action in Long-term	Carcinogenic PAHs, Carcinogenic PAHs, PCB, PCB	YES	4/26/2024
803 - 815 Vester Street	803 - 815 Vester Street	Ferndale	48220	Oakland	42.461824	-83.12398	63501170		Risks Not Determined		YES	9/13/2022
810 ROSEWOOD STREET	810 Rosewood Street	Ferndale	48220	Oakland	42.461946	-83.124537	63501174	Manufacturing	Risks Controlled-Interim	Elements/Metals/Other Inorganics, Petroleum Volatile and Semi Volatile Organic Compounds	YES	4/10/2024
911 East 9 Mile Road (Formerly 1031 East	911 East 9 Mile Road (Formerly 1031 East 9 Mile Road)	Ferndale	48220	Oakland	42.461146	-83.121239	63501201	Auto Repair and Salvage, Gas Station	Risks Present and Require Action in Short-term	Elements/Metals/Other Inorganics, Petroleum Volatile and Semi Volatile Organic Compounds	YES	3/22/2024
965 Wanda	965 Wanda	Ferndale	48220	Oakland	42.45464	-83.115031	63501211	Manufacturing, Manufacturing	Risks Present and Require Action in Short-term	Chlorinated Volatile and Semi Volatile Organic Compounds, Chlorinated Volatile and Semi Volatile Organic Compounds, Elements/Metals/Other Inorganics, Elements/Metals/Other Inorganics, Petroleum Volatile and Semi Volatile Organic Compounds, Petroleum	YES	3/15/2024
517 - 535 West 9 Mile Road	517 - 535 West 9 Mile Road	Hazel Park	48030	Oakland	42.461017	-83.109448	63501304	Manufacturing	Risks Present and Require Action in Long-term	Chlorinated Volatile and Semi Volatile Organic Compounds, Petroleum Volatile and Semi Volatile Organic Compounds	YES	1/9/2024
1341 Wanda Street	1341 Wanda Street	Ferndale	48220	Oakland	42.457965	-83.114077	63501358	Manufacturing	Risks Present and Require Action in Short-term	Chlorinated Volatile and Semi Volatile Organic Compounds, Elements/Metals/Other Inorganics, Mercury, Petroleum Volatile and Semi Volatile Organic Compounds	YES	1/10/2024
1310 - 1350 Academy Street	1310 - 1350 Academy Street	Ferndale	48220	Oakland	42.457936	-83.116956	63501363	Manufacturing	Risks Present and Require Action in Long-term	Chlorinated Volatile and Semi Volatile Organic Compounds, Elements/Metals/Other Inorganics	YES	1/9/2024
Suburban Collision of Ferndale	1100 East Saratoga St & 1503 Farrow Ave	Ferndale	48220	Oakland	42.458907	-83.119154	63501414	Auto Repair and Salvage	Risks Present and Require Action in Long-term	Elements/Metals/Other Inorganics, Petroleum Volatile and Semi Volatile Organic Compounds	YES	11/9/2023
Former Collision Center	630 Hilton Road	Ferndale	48220	Oakland	42.451558	-83.122317	63501417	Auto Repair and Salvage, Gas Station	Risks Present and Require Action in Long-term	Elements/Metals/Other Inorganics, Mercury	YES	11/8/2023
721 East Saratoga Street, Ferndale	721 East Saratoga Street	Ferndale	48220	Oakland	42.459313	-83.125731	63501556	Manufacturing	Inadequate Data to Assign Risk	Elements/Metals/Other Inorganics, Lead	YES	3/20/2024
1285 Wordsworth Street, Ferndale	1285 Wordsworth Street	Ferndale	48220	Oakland	42.453499	-83.12432	63501591	Manufacturing	Inadequate Data to Assign Risk	Elements/Metals/Other Inorganics, Petroleum Volatile and Semi Volatile Organic Compounds	YES	3/19/2024
21950 Woodward Avenue, Ferndale	21950 Woodward Avenue	Ferndale	48220	Oakland	42.453891	-83.129829	63501592	Auto Repair and Salvage, Gas Station	Inadequate Data to Assign Risk	Petroleum Volatile and Semi Volatile Organic Compounds	YES	3/14/2024
1280 - 1306 Hilton Road, Ferndale	1280 - 1306 Hilton Road	Ferndale	48220	Oakland	42.456933	-83.122402	63501646	Manufacturing	Inadequate Data to Assign Risk	Elements/Metals/Other Inorganics, Lead, Mercury, Petroleum Volatile and Semi Volatile Organic Compounds	YES	8/16/2024
Gateway Market Place	20540 Woodward Avenue	Detroit	48203	Wayne	42.445336	-83.123391	82002539		Risks Present and Require Action in Short-term	Carcinogenic PAHs, Elements/Metals/Other Inorganics, Lead	YES	12/1/2022
Charleston Street (south of State Fair)	Charleston Street (south of State Fair)	Detroit	48203	Wayne	42.439046	-83.107126	82002953		Risks Present and Require Action in Short-term		NO	2/2/2021
Former Grayling Elementary School	744 Adeline	Detroit	48203	Wayne	42.438938	-83.111212	82002967		Risks Not Determined		YES	2/2/2021
19950 & 20200 Woodward Avenue	19950 & 20200 Woodward Avenue	Detroit	48203	Wayne	42.439905	-83.118484	82007020		Risks Present and Require Action in Short-term		YES	5/3/2023
2121 W. Eight Mile Road	2121 W. Eight Mile Road	Detroit	48234	Wayne	42.44641	-83.12288	82007482		Risks Controlled-Interim	Elements/Metals/Other Inorganics	YES	8/1/2023
Department of Agriculture / State Fair G	1120 West State Fair Avenue	Detroit	48203	Wayne	42.443311	-83.117719	82008629		Inadequate Data to Assign Risk		YES	7/20/2023

Source: Michigan Department of Environmental Quality Part 201 Public Database -
Site List for the City of Ferndale, Michigan

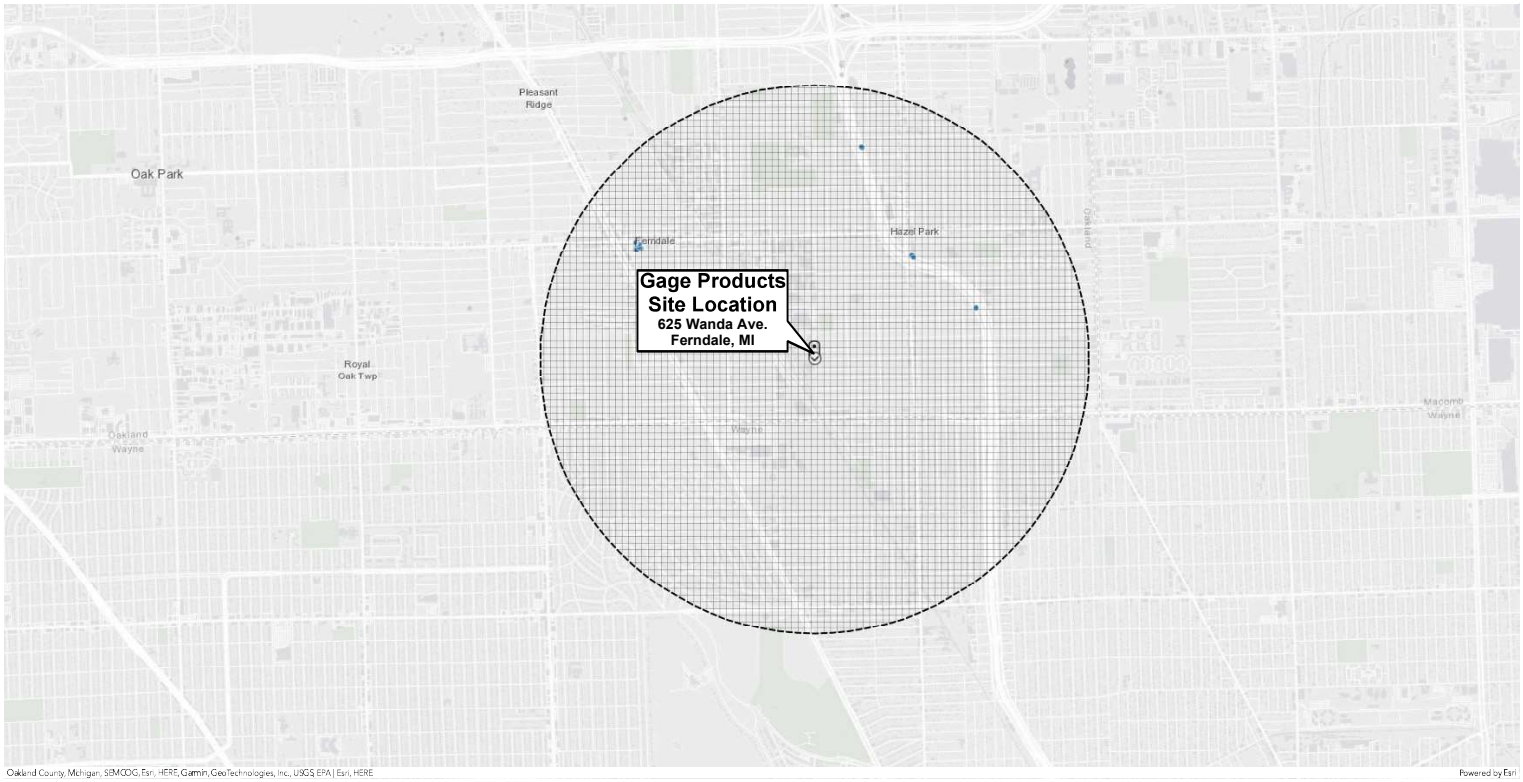
LUST Name	Regulatory Program	Full Address	Risk Condition	Release Status	EGLE District	Latitude	Longitude
Former Gage Oldsmobile/Jim Fresard Pontiac	213	21800 WOODWARD AVE, FERNDALE, MI, 48220	Risks Not Determined	Open	Warren	42.45326758	-83.12917474
Hilton Heights Service	213	2701 Hilton Rd., Ferndale, MI, 48220	Risks Controlled-Interim	Open	Warren	42.46859146	-83.12372785
Gage Oldsmobile Inc	213	21710 Woodward Ave, Ferndale, MI, 48220	Risks Not Determined	Open	Warren	42.45172224	-83.12841915
Ed Schmid Ford	213	21600 Woodward Ave, Ferndale, MI, 48220	Risks Not Determined	Open	Warren	42.45099231	-83.12875232
Livernois-marshall Service Stati	213	940 LIVERNOIS ST, FERNDALE, MI, 48220	Risks Present and Require Action in Short-term	Open	Warren	42.45458133	-83.14253539
Quality Electric	213	1100 FIELDING ST, FERNDALE, MI, 48220	Risks Present and Require Action in Long-term	Open	Warren	42.44932318	-83.14242904
LaSalle Foundry (FAC10000102)	213	1221 WORDSWORTH ST, Ferndale, MI, 48220	Risks Not Determined	Open	Warren	42.453561	-83.115171
Jamil Jarbo	213	21355 Woodward Ave, Ferndale, MI, 48220	Risks Present and Require Action in Short-term	Open	Warren	42.448769	-83.12702
Wcsx / Whnd Radio Station	213	1 RADIO PLAZA ST, FERNDALE, MI, 48220	Risks Not Determined	Open	Warren	42.45340231	-83.16345455
Eclispe Industrial	213	1600 BONNER ST, FERNDALE, MI, 48220	Risks Not Determined	Open	Warren	42.459369	-83.120079
Automotive Repair Facility	213	211 E 9 MILE RD, FERNDALE, MI, 48220	Risks Not Determined	Open	Warren	42.46092333	-83.13232443
Boron Oil Co (Former)	213	3366 HILTON RD, FERNDALE, MI, 48220	Risks Present and Require Action in Long-term	Open	Warren	42.4754347	-83.12330004
Gage Products Co	213	625 WANDA ST, FERNDALE, MI, 48220	Risks Not Determined	Open	Warren	42.45153663	-83.11365145
William Beaumont Hospital	213	1031 E 9 MILE RD, FERNDALE, MI, 48220	Risks Present and Require Action in Short-term	Open	Warren	42.461259	-83.120907
Former Amoco Oil #5230	213	22304 WOODWARD AVE, FERNDALE, MI, 48220	Risks Not Determined	Open	Warren	42.45728611	-83.13162688
Former American Industrial Door	213	1501 BONNER ST, FERNDALE, MI, 48220	Risks Present and Require Action in Short-term	Open	Warren	42.45784608	-83.12030326
Former Gas Station - Ferndale Temple Property	213	344 W 9 MILE RD, FERNDALE, MI, 48220	Risks Not Determined	Open	Warren	42.460747	-83.138403
Percy's Super Service (Payless)	213	11002 W 8 MILE RD, FERNDALE, MI, 48220	Risks Not Determined	Open	Warren	42.44606136	-83.17072484

Source: Michigan Department of Environmental Quality
Part 213 Public Database - Site List for the City of Ferndale, Michigan

Appendix B4-4

Water Wells

Water Wells
South Central & Southeastern Michigan



2 Mile Radius

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 2534201001	**Permit No:** 0125636	**County:** Oakland		**Township:** Royal Oak
		Town/Range: 01N 11E	**Section:** 34	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 63000038068

Elevation: 651 ft.
Latitude: 42.46007
Longitude: -83.13223
Method of Collection: GPS Std Positioning Svc SA On

Distance and Direction from Road Intersection:
East of Woodward on the South side of 9 Mile #11

Well Owner: City of Ferndale

Well Address:	**Owner Address:**
222 E. 9 Mile Ferndale, MI 48220	222 E. 9 Mile Ferndale, MI 48220

Drilling Method: Rotary
Well Depth: 402.00 ft. **Well Use:** Other
Well Type: Boring (No Casing) **Date Completed:** 10/14/2009
Casing Type: Other **Height:**
Casing Joint:
Casing Fitting:
Diameter:
Borehole: 5.50 in. to 402.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: Below Grade
Well Yield Test: **Yield Test Method:**

Screen Installed: No **Intake:**

Formation Description	Thickness	Depth to Bottom
Sand	10.00	10.00
Clay	125.00	135.00
Shale	45.00	180.00
Limestone	111.00	291.00
Shale & Limestone Layered	111.00	402.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Other	26.00	None	

Wellhead Completion: Other

Nearest Source of Possible Contamination:

Type	Distance	Direction
Sewer line	65 ft.	East

Abandoned Well Plugged: No
Reason Not Plugged: Other

Geology Remarks:

Drilling Machine Operator Name: Dan Cesal Jr
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 78-2224
Business Name: Cesal Well Drilling
Business Address: 5331 N Byron, Corunna, MI, 48817

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: 26 - 94 lbs bags of Portland Cement 104 - 50 lbs bags of Sand 1" loop 400' long

Other Remarks: Well Use:closed loop geothermal, Casing Type:closed loop geothermal, Grouting Material 1:M-111, Wellhead Completion:closed loop geothermal, Not Plugged Reason:no well to plug, Map Scale:Unknown, Elevation Datum:Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 2534201001	**Permit No:** 0125636	**County:** Oakland		**Township:** Royal Oak
		Town/Range: 01N 11E	**Section:** 34	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 63000038068

Elevation: 651 ft.
Latitude: 42.46007
Longitude: -83.13223
Method of Collection: GPS Std Positioning Svc SA On

Distance and Direction from Road Intersection:
East of Woodward on the South side of 9 Mile #11

Well Owner: City of Ferndale

Well Address:	**Owner Address:**
222 E. 9 Mile Ferndale, MI 48220	222 E. 9 Mile Ferndale, MI 48220

Drilling Method: Rotary
Well Depth: 402.00 ft. **Well Use:** Other
Well Type: Boring (No Casing) **Date Completed:** 10/14/2009
Casing Type: Other **Height:**
Casing Joint:
Casing Fitting:
Diameter:
Borehole: 5.50 in. to 402.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: Below Grade
Well Yield Test: **Yield Test Method:**

Screen Installed: No **Intake:**

Formation Description	Thickness	Depth to Bottom
Sand	10.00	10.00
Clay	125.00	135.00
Shale	45.00	180.00
Limestone	111.00	291.00
Shale & Limestone Layered	111.00	402.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Other	26.00	None	

Wellhead Completion: Other

Nearest Source of Possible Contamination:

Type	Distance	Direction
Sewer line	65 ft.	East

Abandoned Well Plugged: No
Reason Not Plugged: Other

Geology Remarks:

Drilling Machine Operator Name: Dan Cesal Jr
Employment: Employee

Contractor Type: Water Well Drilling Contractor **Reg No:** 78-2224
Business Name: Cesal Well Drilling
Business Address: 5331 N Byron, Corunna, MI, 48817

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: 26 - 94 lbs bags of Portland Cement 104 - 50 lbs bags of Sand 1" loop 400' long

Other Remarks: Well Use:closed loop geothermal, Casing Type:closed loop geothermal, Grouting Material 1:M-111, Wellhead Completion:closed loop geothermal, Not Plugged Reason:no well to plug, Map Scale:Unknown, Elevation Datum:Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 2534201001	**Permit No:** 0125637	**County:** Oakland		**Township:** Royal Oak
		Town/Range: 01N 11E	**Section:** 34	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 63000038069

Elevation: 648 ft.
Latitude: 42.46008
Longitude: -83.13217
Method of Collection: GPS Std Positioning Svc SA On

Distance and Direction from Road Intersection:
East of Woodward on the South side of 9 Mile #12

Well Owner: City of Ferndale

Well Address:	**Owner Address:**
222 E. 9 Mile Ferndale, MI 48220	222 E. 9 Mile Ferndale, MI 48220

Drilling Method: Rotary
Well Depth: 402.00 ft. **Well Use:** Other
Well Type: Boring (No Casing) **Date Completed:** 10/16/2004
Casing Type: Other **Height:**
Casing Joint:
Casing Fitting:
Diameter:
Borehole: 5.50 in. to 402.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: Below Grade
Well Yield Test: **Yield Test Method:**

Screen Installed: No **Intake:**

Formation Description	Thickness	Depth to Bottom
Sand	10.00	10.00
Clay	125.00	135.00
Shale	45.00	180.00
Limestone	111.00	291.00
Shale & Limestone	111.00	402.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Other	26.00	None	0.00 ft. to 402.00 ft.

Geology Remarks:

Wellhead Completion: Other

Drilling Machine Operator Name: Dan Cesal Jr
Employment: Employee

Nearest Source of Possible Contamination:

Type	Distance	Direction
Sewer line	65 ft.	East

Contractor Type: Water Well Drilling Contractor **Reg No:** 78-2224
Business Name: Cesal Well Drilling
Business Address: 5331 N Byron, Corunna, MI, 48817

Abandoned Well Plugged: No
Reason Not Plugged: Other

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: 26 - 94 lbs bags of Portland Cement 104 - 50 lbs bags of Sand 1" loop 400' long

Other Remarks: Well Use:closed loop geothermal, Casing Type:closed loop geothermal, Grouting Material 1:M-111, Wellhead Completion:closed loop geothermal, Not Plugged Reason:no well to plug, Map Scale:Unknown, Elevation Datum:Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	**Permit No:** 125687	**County:** Oakland		**Township:** Royal Oak
		Town/Range: 01N 11E	**Section:** 34	**Well Status:** Active	**WSSN:**	**Source ID/Well No:**

Well ID: 63000038162

Elevation: 798 ft.
Latitude: 42.46015
Longitude: -83.13172
Method of Collection: GPS Std Positioning Svc SA On

Distance and Direction from Road Intersection:
East of Woodeard on the South side of 9 mile rd #15

Well Owner: City of Ferndale

Well Address:	**Owner Address:**
222 E 9 Mile Ferndale, MI 48220	222 E 9 Mile Ferndale, MI 48220

Drilling Method: Rotary
Well Depth: 402.00 ft. **Well Use:** Other
Well Type: Boring (No Casing) **Date Completed:** 11/2/2009
Casing Type: Other **Height:**
Casing Joint:
Casing Fitting:
Diameter:
Borehole: 5.50 in. to 402.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: Below Grade
Well Yield Test: **Yield Test Method:**

Screen Installed: No **Intake:**

Formation Description	Thickness	Depth to Bottom
Sand	10.00	10.00
Clay	30.00	40.00
Sand	5.00	45.00
Clay	80.00	125.00
Shale	55.00	180.00
Limestone Hard	111.00	291.00
Shale	111.00	402.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	26.00	None	0.00 ft. to 402.00 ft.

Geology Remarks:

Wellhead Completion: Other

Drilling Machine Operator Name: Dan Cesal Jr.
Employment: Employee

Nearest Source of Possible Contamination:

Type	Distance	Direction
Sewer line	65 ft.	East

Contractor Type: Water Well Drilling Contractor **Reg No:** 78-2224
Business Name: Cesal Well Drilling
Business Address: 5331 N Byron, Corunna, MI, 48817

Abandoned Well Plugged: No
Reason Not Plugged: Other

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks:

Other Remarks: Well Use:Geothermal, Casing Type:Geothermal bore, Wellhead Completion:Geothermal Bore, Not Plugged Reason:No well to plug, geothermal bore, Map Scale:Unknown, Elevation Datum:Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No:	Permit No: 125688	County: Oakland	Township: Royal Oak

Town/Range:	Section:	Well Status:	WSSN:	Source ID/Well No:
01N 11E	34	Active		

Well ID: 63000038163

Elevation: 888 ft.
Latitude: 42.46013
Longitude: -83.13182
Method of Collection: GPS Std Positioning Svc SA On

Distance and Direction from Road Intersection:
East of Woodward on the South side of 9 mile rd #16

Well Owner: City of Ferndale

Well Address:	Owner Address:
222 E. 9 Mile Rd Ferndale , MI 48220	222 E. 9 Mile Rd Ferndale , MI 48220

Drilling Method: Rotary
Well Depth: 402.00 ft. **Well Use:** Other
Well Type: Boring (No Casing) **Date Completed:** 11/2/2009
Casing Type: Other **Height:**
Casing Joint:
Casing Fitting:
Diameter:
Borehole: 5.50 in. to 402.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: Below Grade
Well Yield Test: **Yield Test Method:**

Screen Installed: No **Intake:**

Formation Description	Thickness	Depth to Bottom
Sand	10.00	10.00
Clay	30.00	40.00
Sand	5.00	45.00
Clay	80.00	125.00
Shale	55.00	180.00
Limestone Hard	111.00	291.00
Shale	111.00	402.00

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Bentonite slurry	26.00	None	0.00 ft. to 402.00 ft.

Geology Remarks:

Wellhead Completion: Other

Drilling Machine Operator Name: Dan Cesal Jr.
Employment: Employee

Nearest Source of Possible Contamination:

Type	Distance	Direction
Sewer line	65 ft.	East

Contractor Type: Water Well Drilling Contractor **Reg No:** 78-2224
Business Name: Cesal Well Drilling
Business Address: 5331 N Byron, Corunna, MI, 48817

Abandoned Well Plugged: No
Reason Not Plugged: Other

Water Well Contractor's Certification

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

Signature of Registered Contractor **Date**

General Remarks: 111 Grout Mixture
Other Remarks: Well Use:Geothermal Bore, Casing Type:Geothermal Bore, Wellhead Completion:Geothermal Bore, Not Plugged Reason:No well to plug, geothermal bore, Map Scale:Unknown, Elevation Datum:Unknown

Water Well And Pump Record

Completion is required under authority of Part 127 Act 368 PA 1978.
Failure to comply is a misdemeanor.

Import ID:

Tax No: 25-36-184-039	**Permit No:** 128420	**County:** Oakland		**Township:** Royal Oak
		Town/Range: 01N 11E	**Section:** 36	**Well Status:** Active	**WSSN:**	**Source ID/Well No:** Meyer well 1

Well ID: 63000081651

Elevation:

Latitude: 42.455459

Longitude: -83.096449

Method of Collection: Interpolation-Map

Distance and Direction from Road Intersection:
approx 70 ft East of the southeast corner of E Granet Ave and S Chrysler Dr.

Well Owner: Oakland Corridor Partners

Well Address:	**Owner Address:**
752 E Granet Ae Hazel Park, MI 48030	31707 Research Park Ave Madison Heights, MI 48071

Drilling Method: Auger/Bored
Well Depth: 116.00 ft. **Well Use:** Other
Well Type: New **Date Completed:** 11/3/2021

Casing Type: Steel - black **Height:** 2.00 ft. above grade
Casing Joint: Welded
Casing Fitting: None

Diameter: 8.00 in. to 30.00 ft. depth

Borehole: 36.00 in. to 116.00 ft. depth

Pump Installed: No
Pressure Tank Installed: No
Pressure Relief Valve Installed: No

Static Water Level: 27.00 ft. Below Grade
Well Yield Test: **Yield Test Method:** Other

Formation Description	Thickness	Depth to Bottom
Clay Silty	95.00	95.00
Sand & Gravel Clayey	12.00	107.00
Sand Fine To Medium	9.00	116.00

Screen Installed: Yes **Filter Packed:** Yes
Screen Diameter: 8.00 in. **Blank:**
Screen Material Type: Other
Screen Installation Type: Attached

Slot	Length	Set Between
0.12	66.00 ft.	30.00 ft. and 96.00 ft.
0.04	20.00 ft.	96.00 ft. and 116.00 ft.

Fittings: None

Well Grouted: Yes **Grouting Method:** Grout pipe outside casing

Grouting Material	Bags	Additives	Depth
Neat cement	144.00	None	0.00 ft. to 20.00 ft.
Bentonite dry granular	10.00	None	20.00 ft. to 21.00 ft.

Wellhead Completion: 12 inches above grade

Nearest Source of Possible Contamination:

Type	Distance	Direction
None		

Geology Remarks:

Drilling Machine Operator Name: Rohrschieb
Employment: Subcontractor

Contractor Type: Dewatering Well Contractor **Reg No:** 41-2704
Business Name: Kelley Dewatering and Construction Co.
Business Address: 5175 Clay Avenue, SW, Wyoming, MI, 49548

Water Well Contractor's Certification

This well and/or pump installation was performed under my registration.

Signature of Registered Contractor **Date**

General Remarks: screen material notes: torch slot carbon steel used between 30-96 and 40 slot door screen between 96-116

Other Remarks: Well Use:dewatering, Screen Material:see notes in general remarks, Yield Test Method:no test pump

Appendix B4-5

Historic Sites

Attachment B4, Appendix B4-5
ARCHAEOLOGICAL/HISTORICAL SITES
Ferndale, Michigan*

Ferndale School
130 E. Nine Mile Road
Ferndale, Michigan

Campbell House
3112 Hilton Road
Ferndale, Michigan

George Washington Carver Elementary School
21272 Mendota
Ferndale, Michigan

*Sites listed with the public database from the Michigan State Housing and Development Authority, State or National Historic Landmarks for the city of Ferndale, Michigan

Appendix B4-6

Michigan Natural Features Inventory (MNFI) Report

Michigan State Listing 2023 Update for Endangered, Threatened, Extirpated and Special Concern Species

Underlined scientific names hyperlinked to MNFI Explorer Pages Michigan Natural Features Inventory (msu.edu)

Scientific Name	Common Name	2009 Status	2023 Status	Directional Change
Birds				
Accipiter gentilis	Northern goshawk	SC	T	Uplisted
Antrostomus vociferus	Eastern whip-poor-will	SC	T	Uplisted
Asio otus	Long-eared owl	T	E	Uplisted
Bartramia longicauda	Upland sandpiper	None	T	Added
Buteo lineatus	Red-shouldered hawk	T	SC	Downlisted
Canachites canadensis	Spruce grouse	SC	T	Uplisted
Chlidonias niger	Black tern	SC	T	Uplisted
Chondestes grammacus	Lark sparrow	X	None	Delisted
Cistothorus platensis	Sedge wren	None	SC	Added
Coccothraustes vespertinus	Evening grosbeak	None	T	Added
Colinus virginianus	Northern bobwhite	None	SC	Added
Cygnus buccinator	Trumpeter swan	T	SC	Downlisted
Falco columbarius	Merlin	T	SC	Downlisted
Falco peregrinus	Peregrine falcon	E	T	Downlisted
Hylocichla mustelina	Wood thrush	None	SC	Added
Oporornis agilis	Connecticut warbler	None	SC	Added
Setophaga discolor	Prairie warbler	E	SC	Downlisted
Setophaga dominica	Yellow-throated warbler	T	None	Delisted
Setophaga kirtlandii	Kirtland's warbler	E	T	Downlisted
Sturnella magna	Eastern meadowlark	None	SC	Added
Sturnella neglecta	Western meadowlark	SC	None	Delisted
Tyto alba	Barn owl	E	X	Downlisted
Vermivora chrysoptera	Golden-winged warbler	SC	T	Uplisted
Fishes				
Coregonus zenithicus	Shortjaw cisco	T	E	Uplisted
Etheostoma spectabile	Orangethroat darter	SC	T	Uplisted
Hiodon tergisus	Mooneye	T	E	Uplisted
Macrhybopsis storeriana	Silver chub	SC	T	Uplisted
Notropis dorsalis	Bigmouth shiner	SC	T	Uplisted
Noturus miurus	Brindled madtom	SC	T	Uplisted
Sander canadensis	Sauger	T	E	Uplisted
Insects				
Bombus affinis	Rusty-patched bumble bee	SC	E	Uplisted
Bombus auricomus	Black and gold bumble bee	None	SC	Added
Bombus fervidus	Yellow bumble bee	None	SC	Added
Bombus penslyvanicus	American bumble bee	None	E	Added
Calephelis muticum	Swamp metalmark	SC	E	Uplisted
Chlosyne gorgone	Gorgone checkerspot	SC	X	Downlisted
Cordulegaster erronea	Tiger spiketail	SC	T	Uplisted
Fitchiella robertsonii	Robertson's flightless planthopper	SC	E	Uplisted
Flexamia huroni	Huron River leafhopper	T	E	Uplisted
Flexamia reflexa	Leafhopper	SC	T	Uplisted
Hesperia ottoe	Ottoe skipper	T	E	Uplisted
Incisalia henrici	Henry's elfin	T	None	Delisted
Macromia alleghaniensis	Alleghany river cruiser	None	T	Added

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Insects *cont.*				
Oarisma poweshiek	Poweshiek skipperling	T	E	Uplisted
Papaipema sciata	Culvers root borer	SC	T	Uplisted
Polygonia gracilis	Hoary comma	SC	X	Downlisted
Pyrgus wyandot	Grizzled skipper	SC	T	Uplisted
Speyeria idalia	Regal fritillary	E	X	Downlisted
Stylurus notatus	Elusive clubtail	SC	T	Uplisted
Stylurus plagiatus	Russet-tipped clubtail	SC	E	Uplisted
Tachopteryx thoreyi	Gray petaltail	T	E	Uplisted
Herptiles				
Glyptemys insculpta	Wood turtle	SC	T	Uplisted
Siren intermedia nettingi	Western lesser siren	SC	E	Uplisted
Sistrurus catenatus	Eastern massasauga rattlesnake	SC	T	Uplisted
Terrapene carolina carolina	Eastern box turtle	SC	T	Uplisted
Mammals				
Myotis lucifugus	Little brown bat	SC	T	Uplisted
Myotis septentrionalis	Northern long-eared bat	SC	T	Uplisted
Perimyotis subflavus	Eastern pipistrelle, Tricolored bat	SC	T	Uplisted
Sorex fumeus	Smoky screw	T	SC	Downlisted
Mollusks				
Leptodea leptodon	Scaleshell	E	X	Downlisted
Fossaria cyclostoma	Bugle fossaria	T	SC	Downlisted
Ligumia recta	Black sandshell	E	T	Downlisted
Physella parkeri	Broadshoulder physa	T	SC	Downlisted
Planorbella smithi	An aquatic snail (no common name)	E	SC	Downlisted
Potamilus ohiensis	Pink papershell	T	SC	Downlisted
Pyganodon subgibbosa	Round lake floater	T	SC	Downlisted
Stagnicola contracta	Deepwater pondsnail	E	SC	Downlisted
Stagnicola petoskeyensis	Petoskey pondsnail	E	SC	Downlisted
Truncilla donaciformis	Fawnsfoot	T	E	Uplisted
Plants				
Adlumia fungosa	Climbing fumitory	SC	T	Uplisted
Agastache scrophulariifolia	Purple giant-hyssop	None	SC	Added
Agrimonia rostellata	Beaked agrimony	T	SC	Downlisted
Androsace occidentalis	Rock-jasmine	E	X	Downlisted
Antennaria rosea	Rosy pussytoes	E	X	Downlisted
Aristida dichotoma	Three-awned grass	X	None	Delisted
Aronia arbutifolia	Red-fruited chokeberry	None	T	Added
Artemisia serrata	Sawtooth wormwood	None	T	Added
Astragalus canadensis	Canadian milk vetch	T	SC	Downlisted
Baptisia lactea	White false indigo	SC	T	Uplisted
Beckmannia syzigachne	Slough grass	T	SC	Downlisted
Berula erecta	Cut-leaved water parsnip	T	SC	Downlisted
Betula nigra	River birch	None	SC	Added
Boechera missouriensis	Missouri rock cress	SC	T	Uplisted
Botrychium acuminatum	Moonwort	E	None	Delisted

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Plants *cont.*				
Botrychium mormo	Goblin moonwort	T	E	Uplisted
Botrychium spathulatum	Spatulate moonwort	T	X	Downlisted
Braya humilis	Low northern rock cress	T	X	Downlisted
Calamagrostis lacustris	Northern reedgrass	T	None	Delisted
Caltha natans	Floating marsh marigold	T	E	Uplisted
Cardamine maxima	Large toothwort	T	SC	Downlisted
Carex billingsii	Three-seed sedge	SC	None	Delisted
Carex davisii	Davis's sedge	SC	None	Delisted
Carex festucacea	Fescue sedge	SC	T	Uplisted
Carex hirsutella	Sedge	None	SC	Added
Carex inops ssp. heliophila	Sun sedge	SC	T	Uplisted
Carex media	Sedge	T	E	Uplisted
Carex squarrosa	Sedge	SC	None	Delisted
Carex tincta	Sedge	T	E	Uplisted
Carex viridistellata	Greenstar sedge	None	T	Added
Chasmanthium latifolium	Wild oats	E	X	Downlisted
Clematis occidentalis	Purple clematis	SC	None	Delisted
Collinsia parviflora	Small blue-eyed-Mary	T	SC	Downlisted
Collinsia verna	Blue-eyed-Mary	None	T	Added
Coreopsis palmata	Prairie coreopsis	T	E	Uplisted
Cystopteris tennesseensis	Tennessee bladder fern	T	None	Delisted
Dasistoma macrophylla	Mullein-foxglove	E	T	Downlisted
Dennstaedtia punctilobula	Hay-scented fern	T	E	Uplisted
Diarrhena obovata	Beak grass	T	None	Delisted
Dichanthelium microcarpon	Small-fruited panic grass	SC	X	Uplisted
Draba cana	Ashy whitlow grass	T	E	Uplisted
Draba incana	Twisted whitlow grass	T	E	Uplisted
Eleocharis radicans	Spike-rush	X	E	Uplisted
Eleocharis melanocarpa	Black-fruited-spike-rush	SC	None	Delisted
Erigeron acris	Fleabane	T	X	Downlisted
Eriophorum russeolum	Bog cotton	None	T	Added
Eryngium yuccifolium	Rattlesnake-master	T	E	Uplisted
Festuca altaica	Rough fescue	T	SC	Downlisted
Geum virginianum	Pale avens	SC	T	Uplisted
Gillenia trifoliata	Bowman's root	E	X	Downlisted
Glyceria acutiflora	Manna grass	X	E	Uplisted
Houstonia caerulea	Azure bluet	X	T	Uplisted
Huperzia appalachiana	Mountain fir moss	SC	E	Uplisted
Hypericum adpressum	Creeping St. John's-wort	T	E	Uplisted
Hypericum swinkianum	Swink's St. John's-wort	None	SC	Added
Juncus scirpoides	Scirpus-like rush	T	X	Downlisted
Juncus stygius	Moor rush	T	E	Uplisted
Lechea minor	Least pinweed	X	T	Uplisted
Lechea stricta	Bushy pinweed	SC	X	Downlisted
Ludwigia sphaerocarpa	Globe-fruited seedbox	T	E	Uplisted

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Plants *cont.*				
Luzula parviflora	Small-flowered wood rush	SC	X	Downlisted
Lycopus virginicus	Virginia water-horehound	T	SC	Downlisted
Malus ioensis	Prairie crabapple	SC	X	Uplisted
Mertensia virginica	Virginia bluebells	E	T	Downlisted
Mikania scandens	Climbing hempweed	T	E	Uplisted
Mimulus alatus	Winged monkey flower	X	T	Uplisted
Minuartia dawsonensis	Rock sandwort	None	T	Added
Monarda clinopodia	White bergamot	None	T	Added
Myosotis verna	White forget-me-not	None	SC	Added
Myriophyllum farwellii	Farwell's water milfoil	T	None	Delisted
Nelumbo lutea	American lotus	T	SC	Downlisted
Packera insulae-regalis	Ragwort	None	T	Added
Panicum philadelphicum	Philadelphia panic-grass	T	E	Uplisted
Penstemon pallidus	Pale beard-tongue	SC	X	Downlisted
Persicaria robustior	Stout smartweed	None	T	Added
Platanthera orbiculata var. macrophylla	Large round-leaved orchid	None	T	Added
Poa autumnalis	Bluegrass	None	X	Uplisted
Poa paludigena	Bog bluegrass	T	SC	Downlisted
Potamogeton pulcher	Spotted pondweed	E	T	Downlisted
Prosartes hookeri	Fairy bells	E	T	Downlisted
Ranunculus ambigens	Spearwort	T	X	Downlisted
Ranunculus cymbalaria	Seaside crowfoot	T	X	Downlisted
Ranunculus gmelinii	Yellow water crowfoot	None	SC	Added
Rhynchospora nitens	Short-beak beak-rush	None	X	Added
Rhynchospora scirpoides	Bald-rush	T	SC	Downlisted
Rorippa aquatica	Lake cress	T	SC	Downlisted
Rubus acaulis	Dwarf raspberry	E	T	Downlisted
Sagittaria brevirostra	Short-beaked arrowhead	SC	X	Uplisted
Salix pellita	Satiny willow	SC	T	Uplisted
Sarracenia purpurea f. heterophylla	Yellow pitcher plant	T	None	Delisted
Silphium laciniatum	Compass plant	T	E	Uplisted
Sisyrinchium hastile	Common blue-eyed-grass	X	None	Delisted
Sisyrinchium strictum	Blue-eyed-grass	SC	T	Uplisted
Solidago missouriensis	Missouri goldenrod	T	X	Downlisted
Solidago vossii	Voss's goldenrod	None	E	Added
Sparganium androcladum	Branching bur weed	None	SC	Added
Sphenopholis nitida	Shining wedge grass	None	SC	Added
Sphenopholis obtusata	Prairie wedge grass	None	SC	Added
Spiranthes ovalis	Lesser ladies'-tresses	T	SC	Downlisted
Tanacetum huronense	Lake Huron tansy	T	SC	Downlisted
Tradescantia virginiana	Virginia spiderwort	SC	T	Uplisted
Trillium recurvatum	Prairie trillium	T	SC	Downlisted
Utricularia ochroleuca	Northern bladderwort	None	T	Added
Valerianella chenopodiifolia	Goosefoot corn salad	T	E	Uplisted

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Plants *cont.*				
Valerianella umbilicata	Corn salad	T	E	Uplisted
Viburnum prunifolium	Black haw	SC	None	Delisted
Viola epipsila	Northern marsh violet	E	X	Downlisted
Viola pedatifida	Prairie birdfoot violet	T	E	Uplisted
Viola rotundifolia	Round-leaved violet	None	T	Added
Vitis vulpina	Frost grape	T	SC	Downlisted
Wolffia brasiliensis	Watermeal	T	None	Delisted
Wolffiella gladiata	Florida mudmidget	None	T	Added

E = Engangered, **T** = Threatened, **X** = Extirpated, **SC** = Special Concern

Added – Previously unlisted species, now state listed E, T, SC, or X

Delisted – No longer state listed as E, T, SC, or X

Uplisted – Moved from lower status to higher status (E > T > X > SC)

Downlisted – Moved from higher status to lower status (E > T > X > SC)