

Submittal Document I.D. Community Impact Statement required in connection with  
Special Land Use Permit Application






NOVEMBER 10, 2015

# COMMUNITY IMPACT STATEMENT

D-BAR-A PROJECT  
AMERICAN AGGREGATES OF MICHIGAN

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## SECTION 1 INTRODUCTION AND SUMMARY

This report has been prepared to evaluate and document the potential environmental and community impacts of a proposed sand and gravel mining operation in Metamora Township, Lapeer County, Michigan, in accordance with *Section 1533 Community Impact Statement Requirements of Ordinance 23 Metamora Township Zoning Ordinance*.

This report is part of a larger set of exhibits and documents, prepared in accordance with Township requirements, including: a) Mining and Reclamation Plans which illustrate existing conditions, proposed mining and operations activities, and proposed land reclamation, and b) a set of Submittal Documents that evaluate the potential impacts related to the proposed mining operation. These plans and documents are listed in the Submittal Table of Contents and referenced throughout this Community Impact Statement where appropriate.

### 1.1 Proposed Activity

This report assesses a proposal by American Aggregates of Michigan (AAOM) to mine existing sand and gravel resources on a 724 acre site in Metamora Township, Lapeer County, Michigan; 154 acres of this site are owned by AAOM, and the remaining 570 acres are owned by the Boy Scouts of America (BSA), and are under a lease agreement with AAOM. The parcels of land that are the subject of this report and proposal are described in Submittal Document II. A. Legal Descriptions, and Submittal Document III. A. Sealed Boundary Surveys.

The site is located in portions of Sections 2, 3, 11 and 12 of Metamora Township with the majority of the site located in Section 11. The site is located north of, and adjacent to, Dryden Road, and west of Wilder Road (refer to Figure 1. Regional Map). The Village of Dryden (part of Dryden Township) is approximately 6 miles to the east of the site along Dryden Road; the Village of Metamora (within Metamora Township) is approximately .75 miles to the west, also along Dryden Road.

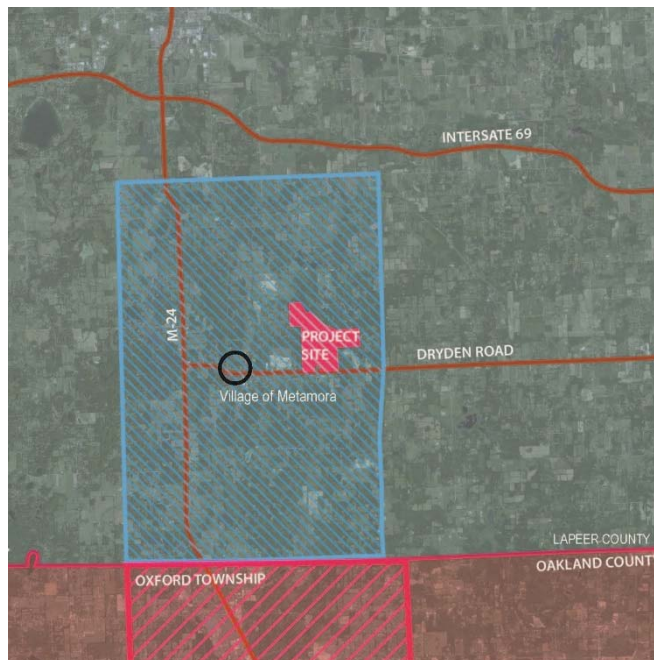
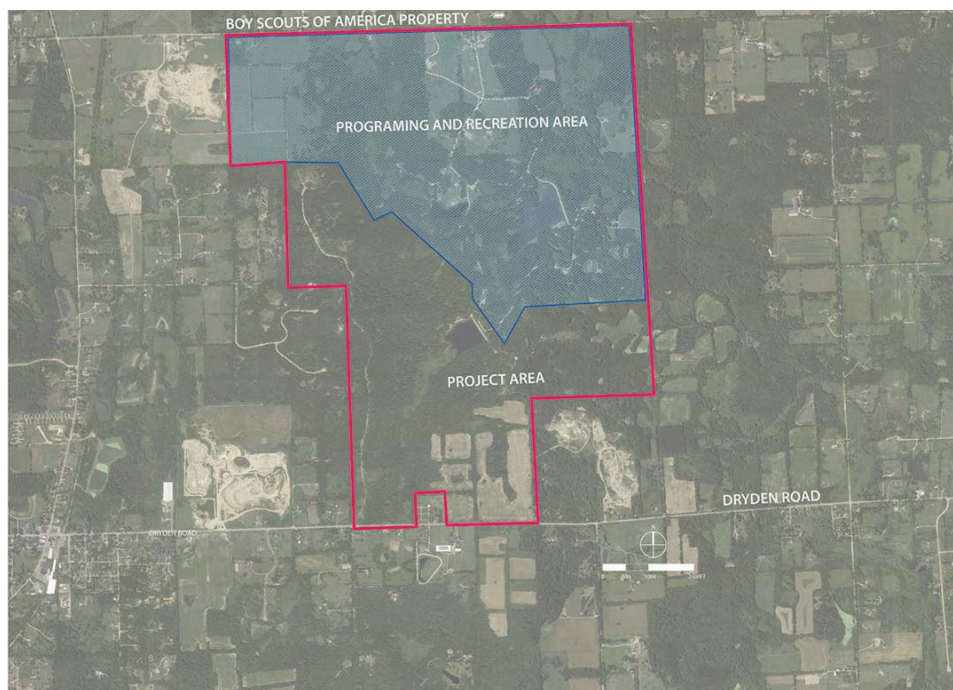


Figure 1. Regional Map

For purposes of clarity in reading this report, please note that the following nomenclature standards have been utilized:

- The project is proposed by AAOM, which is a wholly owned subsidiary of the Edw. C. Levy Co., a privately held corporation with headquarters in Detroit, Michigan. This report, and the other Submittal Documents, may refer to either or both entities; however, both names refer to the same corporate entity.
- The overall land holdings of the BSA will be referred to as the “D-bar-A Ranch.”
- The parcel of land owned by AAOM will be referred to as the “Guy Parcel” in reference to its previous owner.
- The area being leased by AAOM from the BSA will be referred to as the “Lease Parcel.”
- The combined area of the Guy Parcel and the Lease Parcel will be referred to as the “D-bar-A Project Site” (or “Project Site”), which is 724 acres in size (refer to Figure 2. Site Map).
- The area within the Project Site that is subject to mining activity will be referred to as the “Mining Area,” which is 496 acres in size.



*Figure 2. Site Map*

The estimated extraction activity will take place in five distinct phases, which will be completed in approximately 30 years, subject to market conditions. AAOM estimates that the site contains approximately 22,000,000 cubic yards (or about 30,000,000 tons) of marketable sand and gravel reserves. Typical aggregate mining equipment will be utilized during the mining activity, including bucket loaders, transport trucks and conveyors. An aggregate processing plant will be constructed on the east side of the site. Mining activity is not expected to go below the water table on the site. The preparation of the land for mining will be done on an as-needed basis, leaving existing land cover in place until removal is required for mining activities. Similarly, reclamation will be completed on an ongoing basis such that the area disturbed by mining at any one time will be limited to what is required for efficient, safe, and responsible operations. Mining and reclamation plans include mitigation measures to limit the impact of the mining activity on the community and natural environment.



At the completion of mining activity, site reclamation will result in a range of land form types and habitats, and a land shape conducive to recreational and agricultural uses desired by the BSA.

## 1.2 Project Objectives

The project objectives are to extract natural resources from the Project Site for the production of construction grade aggregates for sale to markets in the local metropolitan region, while shaping the land to meet the changing recreational and agricultural needs of the BSA.

## 1.3 Regional Context

The Project Site is surrounded by low density uses, including rural residential lots, recreational land, sand and gravel mines and agricultural fields. Metamora Township, though populated at a low density, is within 10 miles of more highly developed parts of Metropolitan Detroit (such as Oxford) and the City of Lapeer, and is within 25 miles of Flint and Pontiac, and the majority of Oakland County.

Sand and gravel mining and trucking are not new to the area surrounding the Project Site. Within 0.5 miles of the Project Site are four ongoing mining operations; three out of the four utilize Dryden Road as a haul route (refer to Figure 3. Site Surroundings). AAOM's proposed mining operation will also use Dryden Road as a haul route, which is designated as a Class A, all-weather haul route by the Lapeer County Road Commission.

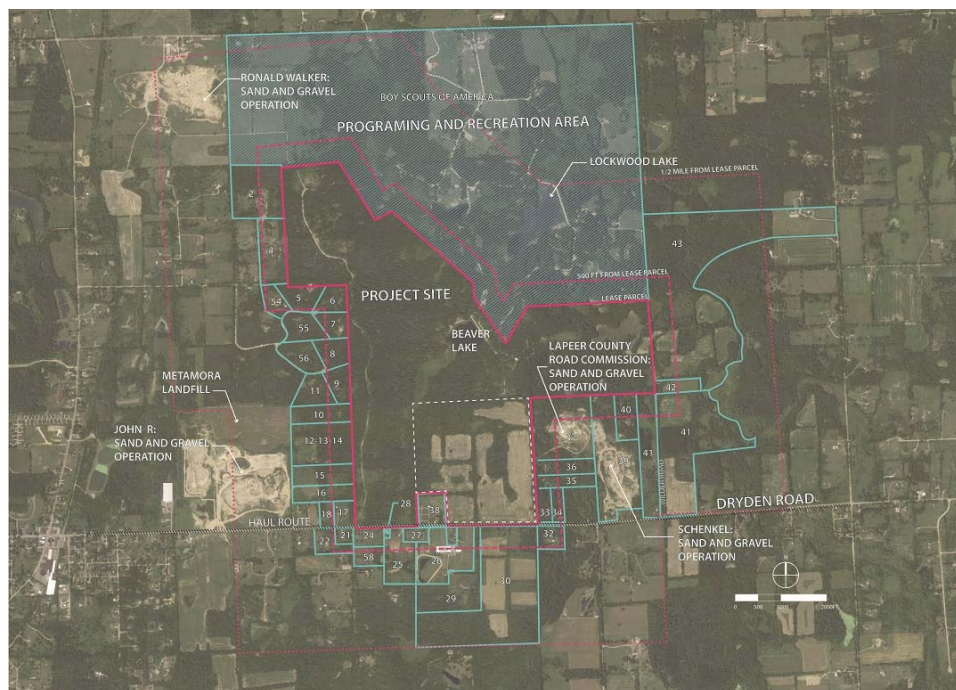


Figure 3. Site Surroundings

## 1.4 Potential Impacts and Benefits

The purpose of this report is to examine the natural and cultural environment of the existing site and to assess the potential impacts and benefits of the proposed mining operation. Existing information, field observations and data provided by AAOM and professional consultants were used in the preparation of this assessment.

This section summarizes the potential impacts and benefits of the proposed mining as determined by this assessment.

#### 1.4.1 Short-Term and Limited Impacts

The following are impacts that were determined to be short-term and minor in significance. AAOM anticipates that these impacts will be managed within regulatory limits set by the applicable governing bodies.

- A change in the visual character of the site and the potential for limited views of the mining activity (e.g. the top of the processing plant).
- An increase in noise levels at the site and immediate surroundings; this increase is anticipated to be in compliance with Metamora Township standards.
- A limited displacement of wildlife, particularly related to incremental (and typically annual) tree removal and earthwork operations necessary to clear the land for mining activities.
- An increase in fugitive dust levels generated by the site activities, which will be controlled within regulatory requirements through standard mitigation practices utilized by AAOM.
- Additional truck traffic on Dryden Road; however, this traffic will have no significant impact on the capacity of the road. Dryden Road is a Class A, all-weather county road and is utilized as a haul route for existing mining operations.

#### 1.4.2 Long-Term Impacts

Some of the Project Site's environment will be subject to long-term impacts due to the proposed mining operation, including:

- A change in topographic shape and storm water drainage patterns of the Project Site.
- The loss of approximately 9 acres of unregulated wetland habitat.
- The incremental removal of 406 acres of woodland over the life of the mining operation.

These impacts are considered to be limited in significance in that they do not represent a loss of unique resources relative to the area directly surrounding the Project Site and Lapeer County.

#### 1.4.3 Mitigation Measures to Reduce Adverse Impacts

As part of its plan to mine and reclaim the proposed Project Site, AAOM proposes to implement the following measures:

- Vegetative buffers will be left in an undisturbed state and screening berms will be constructed as needed to limit visual and noise impacts from the mining activities on adjacent residential neighbors and motorists using public roads.
- Active mining zones will be secured through fencing and signage to protect visitors to D-bar-A Ranch.
- The Project Site will be shaped by mining activity to maintain the fundamental drainage patterns of the existing Project Site.
- Storm water run-off from the mining area will be managed to limit impacts to regulated wetlands, lakes, streams or adjacent properties.
- The Project Site will be reclaimed on an ongoing basis to limit the amount of exposed, un-vegetated land.

- The BSA will contribute to the reclamation and reuse of the Lease Parcel through an ongoing program to reforest significant areas of the site and return other parts of the site to agricultural production, both of which will support the use of the property and the D-bar-A Ranch as a recreational facility.
- Standard operational procedures will be utilized to limit potential impacts associated with mining activity, such as fugitive dust, noise from equipment, and the possibility of groundwater contamination; these measures will be in compliance with regulatory requirements.
- AAOM and the BSA will pursue reforestation of selected acreage as part of BSA's registered tree farm.

#### 1.4.4 Community Benefits

The proposed mining operation will benefit the community in the following ways:

- Increase the long-term value of the Project Site and its potential for recreational use by the BSA.
- Provide long-term financial stability to the BSA and the D-bar-A Ranch for programming, capital improvements, and maintenance of the facility.
- Provide the local community and the regional construction industry with a readily available source of construction grade sand and gravel in close proximity to the demand, thereby reducing costs for both tax-payer funded and private construction projects in the region.

#### 1.4.5 Summary

Based on the investigations by AAOM and the assessment of environmental impacts presented in this report (including the supplementary technical studies), the Project Site is an appropriate and viable location for a sand and gravel mining operation. This conclusion is supported by the following:

- The Project Site contains an excellent reserve of sand and gravel resources, which can be mined, processed, and sold with a reasonable expectation of financial return to support the local, regional and state construction industry.
- The anticipated short- and long-term environmental impacts are limited in significance, and AAOM has proposed measures to reduce or eliminate the impacts that may be inherent in the mining process to ensure the project operates in compliance with applicable federal, state, and local laws and ordinances.
- There are no serious consequences on the local community and natural environment associated with the proposed sand and gravel mining operation.

## **SECTION 2     NEED FOR ACTION**

### **2.1     Project Need**

Construction is a vital component of the American economy. Roads, bridges, airports, schools, hospitals, housing and commercial development all require concrete, asphalt and base materials derived from local sand and gravel deposits. These material resources are also required to maintain, repair and replace our infrastructure over time. A readily available source of sand and gravel is a critical component to facilitate economically viable construction and infrastructure replacement projects.

In order to determine the need for the proposed new sand and gravel mine, AAOM conducted a market assessment to evaluate the current and future supply and demand of sand and gravel in the region (refer to Submittal Document II.B. Southeast Michigan Aggregate Market Study). The following is a brief summary of that study.

Natural aggregate deposits found in Michigan originated from glaciers that carried and deposited sediment across the state. Within the greater southeast Michigan region, the primary deposits of sand and gravel are located in an arc to the west, northwest and north of Detroit. Because of this geologic formation, sand and gravel operations supporting the entire region are restricted to the areas defined by this arc.

In 2015, it is anticipated that 23.7 million tons of aggregate will be sold in southeast Michigan. This demand is being met primarily by the 33 sand and gravel mines spanning across nine counties in southeast Michigan. It is supplemented by 1) limestone shipped into the market from both northern Michigan and Monroe County, 2) iron and steel slag aggregate products manufactured in the Dearborn area, and, 3) to a limited extent, recycled concrete and asphalt aggregates. Concrete and asphalt manufacturers consume the majority of these aggregates. There are over 100 ready-mix concrete plants and over 25 asphalt plants in southeast Michigan that rely on the locally available sources of sand and gravel to produce their products.

Based upon 30 year forecasts prepared by the Southeast Michigan Council of Governments (SEMCOG), demand for aggregate products is expected to grow, based upon several factors: 1) growth in population and number of households, 2) corresponding growth in jobs in the region, and 3) the increasing need to invest in the regional road network, due, in part, to inadequate investment over the past several years in road and bridge maintenance. At the state level, recent legislative actions address the inadequate investment and will increase the demand for aggregates dramatically. As noted in the Southeast Michigan Aggregate Market Study, several bi-partisan studies have revealed that “Michigan roads continue to fall into disrepair and that an additional \$1.2 billion in annual spending is necessary to bring 90% of the roads to a “good” condition. This amount is for State trunk-lines and does little for local roads which will require additional funding as well. The recent passage of a comprehensive road fund package by the State of Michigan will generate \$600 million a year in incremental funding for roads and bridges in 2017, growing to \$1.2 billion per year in 2021. This represents a doubling in MDOT road projects and a corresponding doubling of demand for quality aggregates to support those projects.”

Of the 33 active sand and gravel operations in the nine county metropolitan Detroit region, 14 of these mines are expected to be fully depleted in the next 10 years, resulting in the loss of approximately 5.6 million tons of annual aggregate production. Furthermore, based on the current projections for demand and the known permitted sand and gravel operations and reserves, it is anticipated that by 2024 (e.g. within 9 years) the demand for sand and gravel will outpace the ability of local operations to produce the

required materials, resulting in materials shortages and the need to import sand and gravel from more distant locations, which will significantly drive up costs for basic infrastructure investments such as roads, bridges, and housing.

As an example, based upon current fuel prices, increasing the distance of hauling aggregates by 20 miles would cost consumers and tax payers approximately \$2 more per ton of aggregate. For aggregates that typically cost between \$6 - \$10 per ton, this incremental transportation charge represents a 20% - 33% increase in the delivered cost of the product. As the sand and gravel resources of the southeast Michigan area become limited in their availability and “permitability,” producers are required to look in more distant locations.

This search for available deposits of sand and gravel is often compromised by suburban and rural large lot residential development patterns, which effectively prevent access to the natural resource. This trend, combined with the fact that many of the glacial deposits in the arc surrounding the Metropolitan Detroit region have already been exhausted, is forcing aggregate producers to move further and further from the center of demand, causing disproportionate increases in the cost of aggregates being delivered to the marketplace.

Alternative aggregates, such as slag and recycled products, have limited capacity to meet increasing market demand because these materials are by-products of other processes and production cannot be readily increased to respond to limited supplies of natural (e.g. sand and gravel) aggregate products. Furthermore, these alternative aggregates often cannot meet the demanding specifications required for road and bridge work. Although production rates at existing sand and gravel plants can sometimes be increased, these actions only hasten the depletion of permitted sand and gravel reserves. To meet the market demand for sand and gravel products and provide cost effective materials for the construction market, new sand and gravel operations must be explored and permitted.

The sand and gravel produced by AAOM and other Edw. C. Levy Co. companies serves a significant internal need to meet the demands of asphalt and concrete producers that are affiliated with the Edw. C. Levy Co. AAOM estimates that the internal need may range from 1,500,000 tons to 2,000,000 tons per year (subject to market conditions). This built-in demand, coupled with the growing demand for sand and gravel based on anticipated road and infrastructure investment and the projected reduction in available sand and gravel in the market, solidifies the conclusion that there is sufficient demand to support the proposed operation in Metamora.



## SECTION 3 DESCRIPTION OF PROPOSED ACTION

### 3.1 Authority and Permitting

The following authorities, permits, and related rules and regulations may be applicable for typical sand and gravel mining sites. AAOM will apply for and adhere to such permits and authorities as appropriate for the proposed mining activity.

#### Federal National Pollution Discharge Elimination System (NPDES)

NPDES permits are required for any operation that will discharge waste or wastewater into the surface waters of the state.

The sand and gravel mining operations proposed for the Project Site will not discharge any waste or wastewater into the surface waters of the state, and therefore, an NPDES permit is not required.

#### Industrial Storm Water

Federal regulation (Title 40, Code of Federal Regulations, Part 122.26) requires that a regulated facility apply for industrial storm water permit coverage if storm water runoff exposed to industrial materials and/or industrial activities discharges to surface waters of the state.

There are three criteria that must be met to require a facility to obtain an industrial storm water permit. The three criteria are as follows:

- Standard Industrial Classification (SIC) Code is a regulated industrial activity.
- Storm water from the facility discharges to waters of the state.
- Industrial materials and/or activities are exposed to storm water.

In the case of the proposed sand and gravel mining operations at the Project Site, all three of these criteria are met and the site is required and shall obtain an industrial storm water discharge permit prior to commencing operations.

The operations at the Project Site would qualify for coverage under the Michigan Department of Environmental Quality's (MDEQ) General Permit for Industrial Storm Water Discharges. The General Permit for Industrial Storm Water Discharges includes the following requirements, which will be met by AAOM.

- Visual assessment of storm water discharges
- Implementation of a Storm Water Pollution Prevention Plan (SWPPP)
- Implementation of a short term storm water characterization study
- Oversight by an MDEQ Certified Storm Water Operator over the facility's storm water treatment and control measures, including the SWPPP
- Prohibition of storm water discharges that are contaminated

A copy of the General Permit for Industrial Storm Water Discharges is included for reference in Submittal Document II.H MDEQ Permit Regulations.

### Wetlands Permit

Part 303, Wetlands Protection of Natural Resources and Environmental Protection Act (NREPA), PA 451 of 1994, as amended, provides criteria for regulated wetlands in the state of Michigan. A wetland is regulated if it meets any of the following criteria:

- Connected to one of the Great Lakes or Lake St. Clair.
- Located within 1,000 feet of one of the Great Lakes or Lake St. Clair.
- Located within 500 feet of an inland lake, pond, river or stream.
- Not contiguous to one of the Great Lakes or Lake St. Clair, or an inland lake, pond, stream, or river, but more than 5 acres in size.
- Not contiguous to one of the Great Lakes or Lake St. Clair, or an inland lake, pond, stream, or river, and less than 5 acres in size, but the MDEQ has determined that these wetlands are essential to the preservation of the state's natural resources and has so notified the property owner.

The regulated and non-regulated wetlands on the Project Site are described in detail in Section 5.1 Wetlands, Streams and Water Bodies. Any mining activity in regulated wetlands would require an approved MDEQ permit. The limits of mining on the Project Site have been purposely designed to avoid regulated wetlands. The current mining plans do not include any mining activity within regulated wetlands on the Project Site, so no direct impacts, which would require a permit from the MDEQ, are anticipated. In addition, studies related to storm water and groundwater flow have determined that no significant or long-term indirect impacts are anticipated to regulated wetlands.

### Metamora Township Special Land Use Permit

Pursuant to Section 1429 of the Metamora Township Ordinances, a Special Land Use permit must be granted to allow the start of a new sand and gravel mining operation within the township. According to the ordinance, the permit is considered by the Township Planning Commission and a public hearing is required. The Township Planning Commission is required to act upon the request for a Special Land Use Permit, to either grant the permit as submitted, grant the permit with specific conditions applied, or to deny the permit request.

### Metamora Township Biennial Soil Removal Permit

Pursuant to Ordinance No. 34: Soil Removal Ordinance, a Biennial Permit is also required for new mining operations, and the initial permit request is submitted concurrently with the request for a Special Land Use Permit. Should the Township Planning Commission grant the Special Land Use Permit and make a positive recommendation regarding the Biennial Soil Removal Permit, the Township Board is then responsible for considering, and taking action on, the Biennial Soil Removal Permit. Assuming a positive action from the Township Board on the Biennial Permit, the mining entity is required to submit an application to renew the Biennial Soil Removal Permit every 2 years during active, ongoing operations. This permit renewal application also requires approval by the Township Board following consideration and recommendation from the Township Planning Commission.

### Water Well and Septic Permits

Permits for potable water well and septic disposal system installation at the Scale Trailer/Office will be required from the Lapeer County Health Department.

A permit for the make-up water well supplying the processing plant will also be required. Michigan and the other states and provinces in the Great Lakes region have each enacted laws that require major water users to report water withdrawals made within the Great Lakes Basin. This information provides an environmental baseline for managing water resources in a more integrated manner, and strengthens the legal basis for opposing unwarranted diversions of water from the Great Lakes region.

Registration of all large quantity water withdrawals is required in the State of Michigan. Large quantity withdrawals are defined as having pump(s) with a combined capacity of 70 or more gallons per minute (GPM).

An MDEQ Water Withdrawal permit is required for the installation of well(s) with a combined capacity greater than 2,000,000 gallons per day (1,388 GPM).

The proposed sand and gravel mining operation at the Project Site will utilize a groundwater well with a capacity greater than 70 GPM, but less than 1,388 GPM. Therefore, a large quantity water withdrawal registration with the MDEQ is required and shall be obtained by AAOM. An MDEQ Water Withdrawal permit will not be required.

#### Air Quality

The U.S. Environmental Protection Agency (USEPA) regulates the emissions of particulate matter (PM) from nonmetallic mineral crushing facilities through the New Source Performance Standards (NSPS), Subpart OOO. Sand and gravel mining operations are covered by these regulations. USEPA has delegated authority to implement these regulations to MDEQ.

The MDEQ has developed and enforces Air Pollution Control Rules, which restrict the level of PM that can be emitted into the air. MDEQ provides two options for permitting sand and gravel crushing facilities, a Permit to Install and a General Permit to Install. The General Permit to Install was established to streamline the permitting process for sand and gravel (a.k.a. nonmetallic mineral) crushing operations because these operations are relatively consistent and simple. To qualify for a General Permit to Install, the sand and gravel crushing operation must meet several criteria, including:

- Crushing less than 2 million tons per year at any one site.
- Locating crushing equipment 500 feet from any residential or commercial establishment, or place of public assembly.
- Implementing a fugitive dust control program.

The proposed sand and gravel crushing operation for the Project Site meets these criteria and therefore qualifies for coverage under the General Permit to Install for Nonmetallic Mineral Crushing Facilities.

#### Construction Storm Water

Construction activities that disturb one or more acres of land and have a point source discharge of storm water to waters of the state (streams, rivers, lakes, and wetlands) are required to obtain a NPDES permit. A construction storm water NPDES Permit would apply to the initial development phase or ground breaking at the Project Site. This permit will be obtained by AAOM prior to commencing construction at the Project Site. The primary purpose of this permit is to minimize the runoff of soil and sediment into waters of the state during initial site construction.



## Soil Erosion and Sedimentation Control Permit

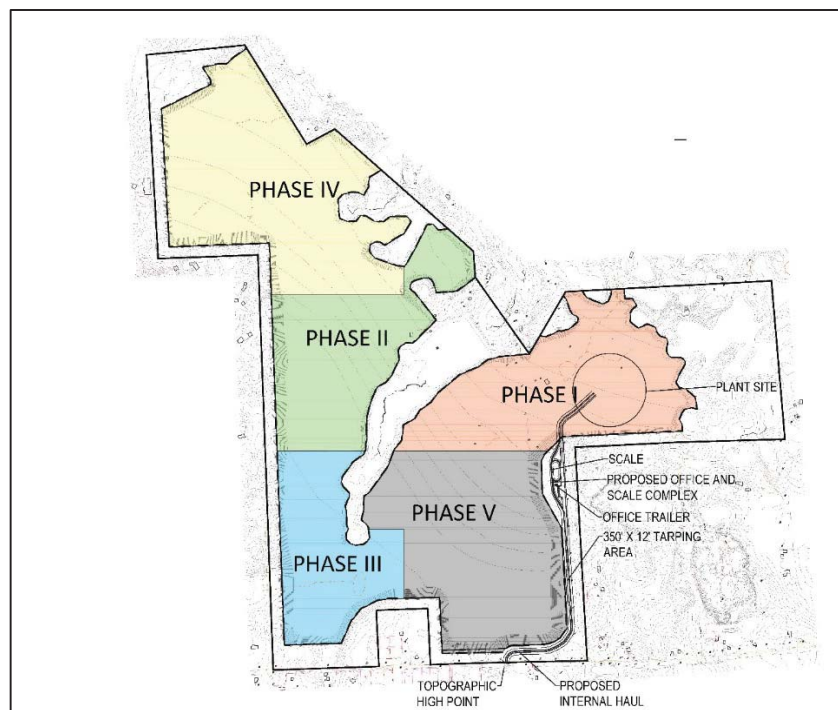
A soil erosion and sedimentation control permit is required by the State of Michigan, and is administered locally by the Lapeer County Health Department, Environmental Health Division. Part 91, Soil Erosion and Sedimentation Control (SESC), of the Natural Resources and Environmental Protection Act (NREPA) (Part 91). This permit provides for the control of soil erosion and protects adjacent properties and the waters of the state from sedimentation. A permit is required when an area greater than 1 acre is disturbed, or when a site is disturbed that is within 500 feet of a waterway or wetland. The goal of the regulation is to prohibit the loss of soil from a construction site that may impact other properties or important natural resources. This permit will be required prior to commencing mining activity, and will require renewal regularly throughout the mining process.

AAOM will obtain and maintain the required permits for the proposed operation as a basic condition of mining at the Project Site, as they currently do at a number of sand and gravel mining sites in southeast Michigan.

### **3.2 Proposed Mining Plan**

Of the 724 acre Project Site, 496 acres are included within the Mining Area. The remaining 228 acres of land are located in preservation areas or setbacks, and will not be disturbed by sand and gravel extraction activity. Construction of earth berms will occur in the mining setback area to mitigate visual and noise impacts during each mining phase. During final reclamation work, land within the setbacks and buffer areas may experience minor landscape clearing and earth shaping to ensure a safe and smooth transition of grades; however, no such activity will impact regulated wetlands.

Figure 4. Mining Operations and Phasing Map, illustrates mineral extraction phasing, the location of operational facilities and other aspects of proposed mining plans.



*Figure 4. Mining Operations and Phasing Map*

The initial efforts will clear an area of approximately 40 acres in size for the processing plant site. In Phase I it is likely that the operation will utilize a small scale, temporary plant during the initial 3-5 years of mining, as the plant site is mined and prepared for installation of a long-term processing plant. The long-term processing plant will be set at an elevation below existing grade and will extend to a height of 50 feet above its base. The plant will include screens, classifiers, screws, conveyors and other equipment to process the aggregate.

The production process is a continuous (not “just in time” or “batched”) operation, in which large inventories are accumulated and then depleted over time. The raw sand and gravel feedstock is washed, screened, separated by size, and sometimes crushed, to produce a variety of products that meet specifications required for use in different applications.

Based upon the nature of the aggregate deposit found in the Mining Area, AAOM will produce at least five basic products for distribution into the marketplace. These products include: 1) “2NS” sand, used primarily in ready-mix concrete and septic fields, 2) “6A/6AC,” also used in ready-mix, septic fields, and as pipe bedding, 3) “34R,” also known as pea gravel, used in drainage-related applications, 4) “21AA/21AC,” used as a base product and in asphalt products, and 5) “20 Series,” which represent a variety of products used for gravel roads, shoulders and base products. This listing excludes certain blends and specialty products, including mason sand, asphalt “splits,” and a variety of fill sand products.

These processed products are placed in cone-shaped stockpiles by a series of stacking conveyors. Inventories are built up in the spring to meet increased demand during the summer construction season, and again in the fall, to meet demand during the winter months, when freezing temperatures prevent the operation of the wash plant. Inventories are also required to meet demand during maintenance and repair downtime.

Township Ordinance No. 38 requires the following:

#### *SECTION 308. SPECIFIC REQUIREMENTS FOR STRIPPING OPERATIONS*

*Article 9: In order to prevent all unnecessary dust and blowing of sand, there shall be no stockpiling of sand in piles in excess of one thousand (1000) cubic yards each and all stockpiles shall be restricted to a maximum height of fifteen (15) feet.*

As described above, these requirements for stockpiling of product are unrealistic for a commercial grade producer of sand and gravel based on basic production needs and the equipment available to the sand and gravel mining industry. A typical day of production at a commercial sand and gravel operation in southeast Michigan can generate 3,000 – 5,000 cubic yards of material. Therefore, it is impractical, if not impossible to meet the township standards. AAOM anticipates that the larger stockpiles at the proposed operation will be approximately 50 foot in height above the plant floor grade. As noted below, the processing plant will be built approximately 35 feet below the existing grade; limiting any potential visual impacts. In addition, given that material stockpiles have been washed and contain water (as required to meet construction standards), stockpiled materials are not a likely source of blowing dust and sand.

A water well will be installed in the processing plant area, which will supply water to the plant to wash the raw sand and gravel. This process removes the fine sand and silt from the deposit in order to meet the specifications for sand and gravel products established by the Michigan Department of Transportation (MDOT) and other users of the products. In a closed loop system, the wash water utilized by the processing plant will be filtered through a series of setting basins, allowing the fine sands and silts to settle out and the water to be re-circulated back to the processing plant. Well water is used to supplement

the re-circulating water as needed; however, the closed loop system reduces the operation's reliance on the well and groundwater. AAOM anticipates that no processing water will be discharged into adjacent drainage ways or wetlands.

Access to the site will occur off of Dryden Road at a point approximately 900 feet west of its intersection with Ribble Road. Improvements along Dryden Road, including a passing flare, and a deceleration taper will be installed at the site entrance pursuant to the recommendations made in the Traffic Study prepared by Bergmann Associates (Submittal Document II.G. D-bar-A Project, Traffic Impact Study). A gravel road, with an asphalt apron, will be constructed on the Project Site from the site entrance to the administrative office, and then extended to the processing plant. The administrative office, scales, and permanent bathrooms will be located in the northeast corner of the Guy Parcel as indicated on the plans.

Concurrent with plant installation and through Phase I of the mining, screen berms 10 to 16 feet high will be constructed along Dryden Road from the cemetery to Ribble Road, then north along Ribble Road to the northeast corner of the Guy Parcel, and finally along the southern and eastern edges of the plant site. Existing trees along Ribble Road will be left in place to help screen the site activity. The berms will be constructed of stripped overburden and graded to have a range in height to respond to site topography and screening needs. Once graded, topsoil will be spread and the berms will be seeded with an appropriate seed mix.

As new phases are initiated, and mining activity gets close enough to adjacent properties such that berms are required to comply with township noise standards, berms will be constructed in these areas to screen neighboring residences. Along the remaining property boundary of the Project Site, (where the Mining Area is adjacent to residential properties), AAOM proposes to construct 12 to 16 foot berms within the mining setback.

In all cases the screening berms will be built to meet the intent of the relevant ordinances, which is to screen adjacent uses from views of the mining activity and help mitigate any potential noise impacts.

The requirements for screening a mining operation are outlined in two places in the Township ordinances; Ordinance 23: Metamora Township Zoning Ordinance and Ordinance 34: Soil Removal Ordinance. In Section 1429 of Ordinance 23 the requirements include the installation of a 6 foot high seeded and planted berm with side slopes not to exceed 4:1 (horizontal: vertical), or the planting of evergreen trees in a double row at 15 foot spacing. In Ordinance 34 the requirements include an 8 foot tall berm with side slopes or 4:1, that is "properly landscaped with turf grasses, trees, shrubs and the like." Noise and view studies conducted for the proposed project have led AAOM to propose a screening approach that meets the intent of the (inconsistent) ordinances and increases protection for neighbors beyond what the required screening could provide. The proposed screening approach includes:

1. Earthen berms, 10 to 16 feet in height, along the perimeter of the Mining Area where adjacent to neighboring properties.
2. Side slopes that are 3:1 (horizontal: vertical) on the side slopes facing neighbors, and 2:1 side slopes facing the mining operation. This allows AAOM to consolidate the berm location and footprint of the berm within the setback.
3. By consolidating the berm footprint, existing trees located in the setback area can be preserved, in a band that is at least 50 wide. These preserved trees will soften the appearance of the berm.
4. The berm will be seeded in grasses, and left unmown to provide for a more rural character.
5. The berms will be removed as part of final reclamation and blended into adjacent grades.

AAOM proposes to erect a 4 foot high No.11 woven wire mesh security fence, topped with a single strand of barbed wire, to secure the active Mining Area. Signs will be posted at a spacing of no more than 200 feet along the fence, indicating "Keep Out-Danger." The fencing and signage are both pursuant to township ordinances. Security fencing will be relocated from time to time throughout the mining period to ensure that the Mining Area is secured, while leaving as much land as possible in the Project Site for recreational use by the BSA.

Each year AAOM will clear the vegetation from a predetermined area of the Project Site and remove the overburden from the area to be mined in the following years. Only those trees which are required to be removed to accommodate mining in the near-term will be removed, leaving the remaining trees in place to act as a visual and noise screen. The BSA intends to continue to harvest timber from the site throughout the duration of the mining period as has been practiced in the past. Topsoil and overburden will either be utilized in reclamation of previously mined areas, or will be stockpiled separately for future reclamation uses. No topsoil will be removed from the Project Site.

Once the temporary processing plant and auxiliary facilities (truck scales, septic field, etc.) are installed, Phase I mining operations will begin. As indicated in Figure 4, the Phase I mining operation will encompass 102 acres and will be located on the eastern side of the Project Site. Initial efforts in Phase I will begin in the central area of the phase, and will remove aggregate to an elevation of approximately 975 feet, which is approximately 10 feet above the water table, and approximately 35 feet below the average grade of the plant site. Initial mining efforts will focus on creating a level base for the installation of the long-term processing plant, as well as excavating areas for settling ponds and fine sand storage. A pond will be excavated near the processing plant for use in storing wash water. The pond will receive water from both the closed looped recycled water process and from the water well located near the plant.

The sand and gravel will be excavated using front end loaders, commencing at the base of the mining face, and working (generally) toward adjacent property lines. This approach uses the face of the mining activity as a noise and visual buffer for neighbors, reducing the observable presence of the mining activity. Aggregate will be extracted by end loaders to a depth approximately 10 feet above the elevation of the water table, except as may be needed to manage storm water and create infiltration meadows, as noted in the Surface Water Hydrology section of this report. The front end loaders will place the aggregate into hoppers, which feed belt conveyors that transport the raw material to the processing plant.

Operating hours for the mine will be limited to 6:00 a.m. to 6:00 p.m. Monday through Friday and 6:00 a.m. to 12:00 noon on Saturday, in conformance with township ordinances.

Work will continue into Phase II (83 acres in size) above the water table in a similar fashion as in Phase I, described above. Berms will be constructed along the western boundary of the Project Site as noted above. A conveyor will be extend into the Phase II area, and the mining activity will generally move from east to west.

Once mining efforts are complete in Phases I and II, the work will shift to Phase III (63 acres) at the southwestern side of the Project Site. The field conveyor and feed hopper will be extended to the south from the Phase II area. Part of the Phase III area will be integrated into the aggregate wash water recirculating system and silt and fine sand storage. Topsoil and overburden exist in sufficient quantities in Phases II and III to reclaim the pit floor of these phases.

Phase IV (132 acres) will shift extraction work to the northwestern part of the Project Site and will progress from the south to the north and west. The field conveyor and feed hopper will be extended to

the north from the Phase II area. Overburden and topsoil quantities exist within Phase IV in sufficient amounts to reclaim both the pit floor and the high bank on the western and northern edges of the property during and immediately following the mining of this phase.

The final phase of work, Phase V, is 116 acres in size and includes the area south and west of the processing plant site. The overburden and topsoil in Phase V are in greater quantities than are required for the basic reclamation of this phase; some of the initial overburden taken from Phase V will be hauled to Phase II and III to reclaim the mining face on the western edge of the mining area. At the close of mining operations, all reclamation efforts will be finalized and the processing plant, administrative office and related facilities removed from the Project Site.

Based on the known information about the sand and gravel resources at the Project Site, AAOM projects that the mining activities will proceed based on the schedule and sequence indicated on the Mining and Reclamation Plans.

The mining activity and schedule outlined in this report are the best available estimates based on a thorough study of the Project Site's resources and many years of previous mining experience by AAOM. Actual extractive methods and phasing schedules may vary slightly based on field conditions and market demands.

### **3.3 Reclamation Plan**

AAOM has established a positive track record in the reclamation of sand and gravel operations and has returned many properties to a productive, long-term use. Proper reclamation is designed to:

- Ensure the long-term safety of community members.
- Return the disturbed land to productive use as agricultural fields, recreation, residential development, or other uses to ensure that the property will not be left as a scar on the land and an environmental liability for the Township and its residents.
- Properly establish a landscape cover to eliminate soil erosion and fugitive dust.

Local governments establish regulations which determine the requirements for reclamation. In Metamora Township, the requirements for reclamation of sand and gravel mines are contained in Ordinance 34: Sand and Gravel Ordinance. A summary of the conditions established by this ordinance include:

- Slopes should not exceed 3:1 (e.g. 1 foot of vertical drop for every 3 feet of horizontal distance).
- Topsoil is spread on the reclaimed grade and the topsoil is stabilized with plants.
- Slopes are treated to protect from erosion.
- Drainage ways and wetlands are delineated and protected.
- Mining and reclamation are to proceed on an ongoing basis in 10 acre "cells" to limit the disturbed area to the lesser of 20 acres or 40% of the land subject to the permit.

The proposed Mining and Reclamation Plan conforms to Township ordinances for slopes, topsoil, erosion control and wetland protection. Figure 5. Reclamation Plan illustrates the general land slope and configuration of the site, post-mining. The reclamation activities are specifically planned to shape the property for productive re-use, as discussed elsewhere in this report.



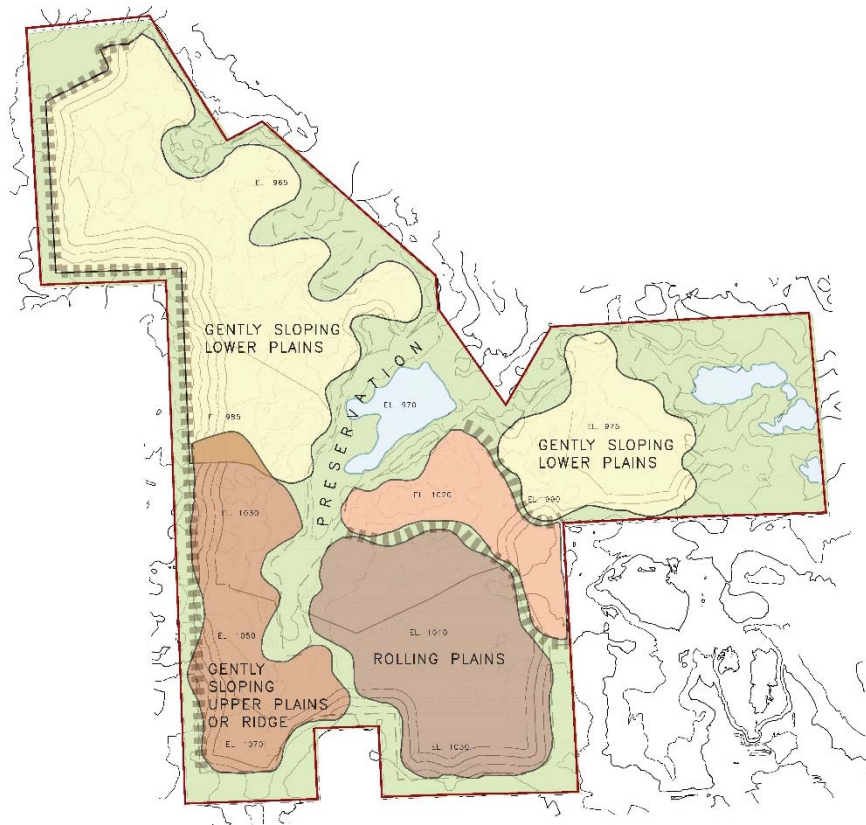


Figure 5. Reclamation Plan

Most local ordinances limiting mining to 10 acre cells are derived from the State of Michigan laws and rules regarding the mining of sand dunes (Act 451 of 1994, Part 637, SAND DUNE MINING). These regulations were not meant to apply to the mining of sand and gravel pits because of the notable differences in mining sand dunes as opposed to commercial sand and gravel extraction. Specifically, these two types of mining differ in deposit type, consistency, extraction approach and processing methods. Dune sands are much more consistent and pure than glacial sand and gravel deposits. The increased variability of glacial sand and gravel requires that the raw feed to the processing plant be a blend of extracted aggregates from multiple faces within the pit to ensure that the material transported to the plant is an appropriate mix of coarseness to meet product specifications. The consistency and purity of dune sands allow a smaller mining face and less complicated processing, which often occurs off-site.

AAOM proposes that the mining and reclamation plans for the Project Site include a strategy for the sequential mining and reclamation of the site. Ordinance 34, Metamora Township's Sand and Gravel Ordinance, allows for the lesser of 20 acres or 40% of the permitted site to be disturbed at any one point in time. AAOM is proposing that the total area disturbed and un-reclaimed at any one time be no more than 40% of the permitted area (or approximately 290 acres of the Project Site). This calculation includes the plant area, stockpile area, internal haul route, scale trailer and the internal road network as disturbed area. The 40% figure also addresses the fact that certain disturbed areas, particularly in the vicinity of the plant, should not be reclaimed with the perimeter berm material until the project is complete, in order to maintain buffers for neighbors. This proposal, while not adhering strictly to the requirements of the ordinance, meets the intent of the ordinance while recognizing the typical industrial requirements for producing sand and gravel materials suitable for the construction materials market.

Site reclamation will occur as mining of a specific area within a phase is complete and adequate overburden is available through stripping operations to achieve the intended grades. Overburden will be spread to achieve positive surface drainage and to blend with existing adjacent topography. Once appropriate grades are established, topsoil will be spread and seeded. At the completion of site reclamation, all disturbed areas will be planted to establish grasses appropriate for the region.

The BSA proposes assisting in the reclamation of disturbed areas through tree planting and reforestation efforts, as part of their ongoing programs to promote sustainability. As noted elsewhere in this report, previous tree planting efforts by the BSA over the last 50 years have helped increase the woodlands on the Project Site from 200 acres in 1941 to 555 acres in 2013.

### **3.4 Future Land Use**

The BSA has established a list of potential uses of the Project Site that will benefit both the operations of the D-bar-A Ranch as well as the diversity of recreational opportunities available for Boy Scouts. The key to integrating new uses into the D-bar-A Ranch is the use of mining and reclamation to shape the land in ways that can accommodate the new uses.

From a ranch operations perspective, the mining can create broad rolling fields that are suitable for agricultural production of crops to support the horse and cattle being raised at the D-bar-A Ranch. Also, as noted earlier, the reclamation of the site creates opportunities for the BSA to participate in reforestation including planting of native trees, shrubs and grasses to stabilize the soils. This effort to reestablish habitat will be an ongoing project throughout the mining and reclamation process.

From an adaptive reuse perspective, there are a number of activities that can be supported on the reclaimed land. For future planning purposes, the BSA is considering the following uses which could be integrated into the D-bar-A Ranch:

- Active adventure sports area (zip line, climbing, sledding, obstacle course)
- Group activities (amphitheater, sports fields, paint ball, disc golf, camping)
- Trail based activities (BMX, X-country running and skiing, dog sledding, equestrian)
- Passive recreation (interpretive learning, wetland walks)

The BSA and AAOM will work together to ensure that the land is shaped in a manner that fits the long-term goals of the BSA.

While it is premature to speculate on the post-mining land uses of the Guy Parcel, AAOM does not anticipate any land uses other than recreational or residential, consistent with the Metamora Township Master Plan.

## **SECTION 4     ALTERNATIVES CONSIDERED**

Aggregate resources are required by the concrete, asphalt and construction industry in the ongoing maintenance and development of our built environment. While alternative sites can be found for other land uses, quality aggregate resources can only be extracted where they exist. Furthermore, while the materials underlying many parcels of land may include elements of sand and gravel, not all sand and gravel deposits have the compositional qualities that are suitable for use in the construction industry.

This section of the report will examine the impacts of the alternatives available to mining sand and gravel at the proposed Project Site.

### **4.1     No Action**

If the proposed Project Site is not mined, the most likely short-term result would be that the Lease Parcel would remain in its current state. The likely short-term result for the Guy Parcel would be to continue the current agricultural activities, or to develop the site for residential use. The No Action Alternative is not without negative consequences, as discussed below:

1. The construction materials market would be directly impacted by limiting the available resources of sand and gravel for use, leading to rising prices, and shortages in readily available materials.
2. The BSA will lose revenue to support programs and the physical infrastructure of the D-bar-A Ranch and other facilities.
3. The BSA will lose the opportunity to have their land shaped to support desired activities and uses.
4. The No Action Alternative, while posing no threat of significant environmental impact, does not address the market demands of the area for construction grade sand and gravel products. To meet this demand, other extraction sites may be established in less suitable areas where 1) transportation of materials may be less economically and environmentally efficient, and 2) more adverse impacts on the immediate and surrounding environment could result.
5. Mining operations on properties near the Project Site will continue to be used for sand and gravel mining and use Dryden Road as a haul route.

### **4.2     Alternative Sites**

AAOM has considered a range of sites in the region for sand and gravel operations. These sites were considered on a confidential basis as each opportunity became known. While no site specific data can be revealed regarding these site investigations because of the proprietary nature of such work, knowledge of the criteria that lead to the selection of the proposed Project Site is key to understanding the process. The site selection criteria utilized in this process is as follows:

1. Proximity to Market Demand: A significant factor in the cost of construction aggregates is the distance from the source of materials to the market. The proposed Project Site is located in an area of southeastern Michigan that is undergoing and/or anticipating substantial growth and development. As development grows closer to the Project site, and infrastructure replacement needs mount, this location will gain greater economic viability as a long-term source of quality sand and gravel. Longer hauling distances to areas of demand result in higher construction costs which are passed on to the consumer. In fact, the cost of transportation of aggregates often equals or exceeds the cost of the materials on a per ton basis.
2. Direct Access to the Regional Transportation System: The Project Site will have direct access to Dryden Road, a Lapeer County Class A, all-weather haul route, which links directly to M-24 to the



west of the site and M-53 to the east of the Project Site, both significant north-south corridors in the regional transportation network.

3. Quantity and Quality of Aggregate Materials Available: Geological investigations performed by AAOM have convinced the company that the reserves at the Project Site are significant in quantity and high in quality.
4. Site Logistics: A parcel of land must have a size and configuration that is suitable for the efficient extraction of sand and gravel from the ground, both in terms of the property dimensions and in the depth of the clay overburden that typically lies between the topsoil and the sand and gravel deposit. The Project Site meets these criteria.
5. Low Density of Development of the Project Site and its Surroundings: Given the agricultural, recreational, and rural residential uses in the area, the Project Site offers the opportunity to extract aggregates from a site near market demand while being surrounded by low densities of development and use.
6. Availability of Land: A larger number of properties have sufficient marketable sand and gravel resources than are actually available to establish a mining operation, yet AAOM can only control properties for which there is a willing seller or lessor. AAOM has secured a lease agreement with the BSA to extract, process and sell aggregate at the Project Site as described in this report, and currently owns the Guy Parcel.

## SECTION 5 AFFECTED ENVIRONMENT AND ANTICIPATED IMPACTS

### 5.1 Wetlands, Streams and Water Bodies

The Project Site is located in the Flint River South Branch sub-watershed of the Flint River watershed in southeast Michigan. Field investigations completed by King & MacGregor Environmental, Inc. in 2015 identified a total of approximately 54.4 acres of wetland on the Project Site. Of this total, approximately 8.8 acres are within the mining area, while the remaining 45.6 acres are located in the mining setbacks and buffer areas. By total area, most of the 54.4 acres of wetland are palustrine wetland systems and include forested, scrub-shrub and emergent/open water wetland habitats. Of these, about 44 acres are MDEQ-regulated wetlands. None of the 8.8 acres within the Mining Area are regulated. Refer to Figure 6. Land Cover (from the King & McGregor report) for the location of wetlands and other vegetative land covers on the Project Site.

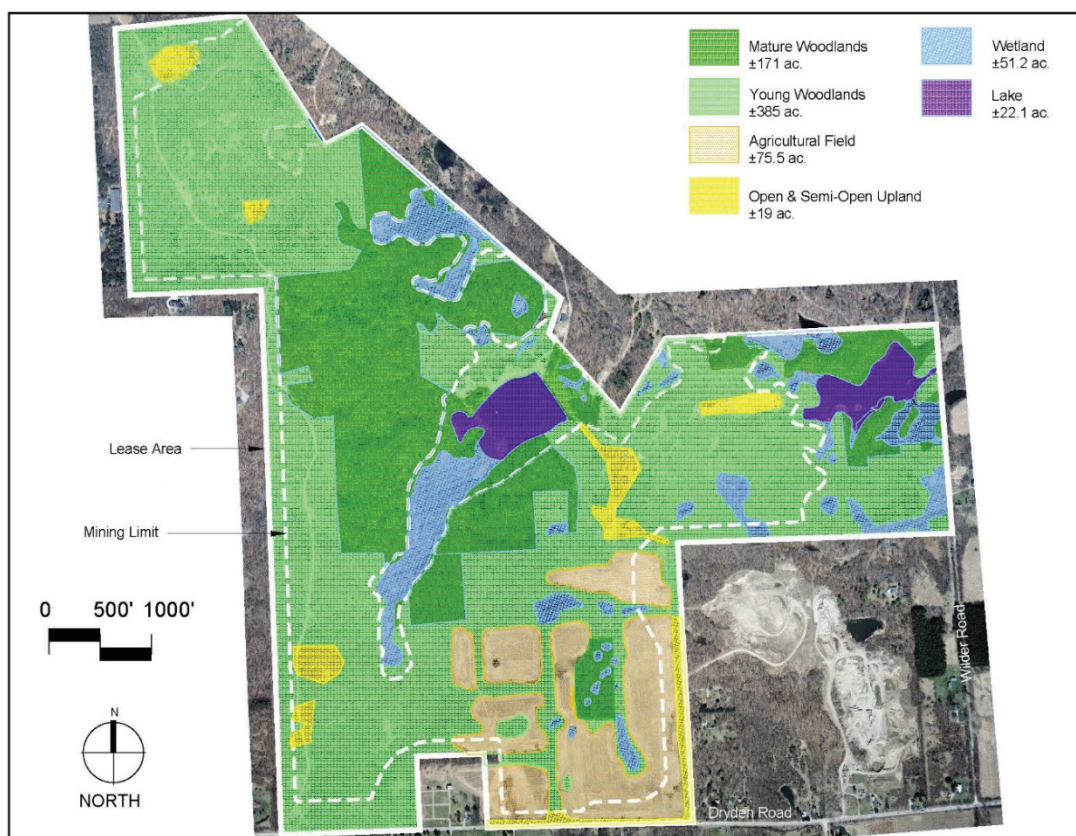


Figure 6. Land Cover

Lakes and streams are defined in Part 301 Inland Lakes and Streams of the Natural Resources and Environmental Protection Act PA 451 of 1994. Two lakes lie on the Project Site, outside of the Mining Area. They are Beaver Lake and an unnamed waterbody along Wilder Road. Streams on the Project Site include unnamed headwater tributaries to Trout Lake and Beaver Lake as well as an unnamed tributary in the eastern portion of the property, which originates off-site to the south and exits the Project Site at Wilder Road. None of the streams are located within the Mining Area.

According to the report produced by King & MacGregor Environmental, Inc., the Michigan Natural Features Inventory (MNFI) indicates there are approximately 19,846 acres of wetlands in Lapeer County.

The approximately 44 acres of regulated wetland identified on the Project Site comprise approximately one-quarter of 1% of the wetlands in Lapeer County. The 8.8 acres of unregulated wetlands within the Mining Area will be removed incrementally over the life of the mining operation. There are no anticipated direct or indirect impacts to the regulated wetlands on the Project Site.

As noted in the report by King & MacGregor Environmental, Inc., no direct impacts to lakes and streams such as filling, dredging, structures or surface water removal for aggregate processing are proposed. The hydrology supporting Beaver Lake, regulated wetlands, and on-site streams comes primarily from streams, direct precipitation, and groundwater discharge. Storm water runoff from adjacent upland areas contributes very little water to the wetlands, lakes and streams that are located within, and adjacent to, the Project Site. While the upland areas near these features will be modified in shape and drainage pattern, the studies of storm water hydrology and hydro-geology have concluded that the change in land form will not impact the hydrology of these resources.

## **5.2 Woodlands and Vegetative Cover**

The Project Site is currently estimated to be approximately 79% woodland. The woodland area has continually expanded since the establishment of the D-bar-A Ranch. According to aerial imagery produced by the MNFI, the Project Site was 28% woodland in 1941, and 61% woodland in 1982. Tree planting efforts have been ongoing on the property by the BSA for the past 50 years. Older woodlands, which predate the D-bar-A Ranch, typically have fewer non-native invasive species and are generally of higher value. Woodland areas historically have been selectively cut to generate revenue for the D-bar-A Ranch with little or no impact.

The MNFI identifies black oak barren pre-settlement vegetation on the Project Site. Oak barrens are fire-dependent grasslands dominated by oaks that have between 5 and 60% canopy. With the suppression of fire in the landscape, oak barrens succeed into closed canopy forests. No oak barren was identified on the property.

Approximately 133 acres of mature woodlands and 273 acres of young woods will be removed during the proposed mining operations. Removal of the woodlands will be accomplished incrementally over the life of the mining operation, as land is cleared in advance of the active mining. Reforestation of some of the reclaimed areas will occur through proactive management activities by the D-bar-A Ranch or through natural succession, as has previously occurred. The removal of approximately 400 acres of woodland represents approximately four-tenths of 1% of the total area of forested land cover estimated by the National Oceanic and Atmospheric Administration to exist in Lapeer County in 2010 (NOAA 2015) and is not regionally significant.

Remaining cover types on the Project Site include agricultural fields and open and semi-open upland fields.

The botanical inventory of the Project Site completed in 2015 identified 120 plant species native to Michigan in the wetlands, woodland and open fields. No plant species listed as federal or state endangered or threatened species were identified on the Project Site.

### 5.3 Wildlife Habitat

The rural nature of the Project Site includes mostly woodland cover, as well as agriculture, pasture, vacant open land and low-density residential development. Direct and indirect evidence of regionally specific mammals, birds, reptiles and amphibians throughout the Project Site were observed by the professionals at King & MacGregor Environmental, Inc. during their field observations. The U.S. Fish and Wildlife Service threatened and endangered species list identifies two mammalian species (Indiana bat (*Myotis sodalis*, endangered), northern long-eared bat (*Myotis septentrionalis*, threatened)) and one reptile (eastern massasauga (*Sistrurus catenatus catenatus*, proposed threatened)) as occurring in Lapeer County. Information provided by the MNFI identified one amphibian (Blanchard's cricket frog (*Acris crepitans blanchardi*) (state threatened)) and two reptile species (spotted turtle (*Clemmys guttata*) (state threatened), and eastern massasauga) as occurring in Lapeer County, all of which frequent wetlands and riparian areas. No protected reptile or amphibian species were observed during the course of 2015 Project Site evaluations.

The transition of woodland cover to pasture/grassland habitat may displace wildlife species that breed, forage, or shelter in woodland habitat. However, the tree clearing will occur incrementally, 40 acres initially and in 10 – 15 acre phases thereafter, so wildlife should be able to migrate to similar habitats on the D-bar-A Ranch or adjoining properties. To mitigate potential impacts to migrating species, tree clearing will be restricted to October 1 to March 31 when protected migratory bats and birds are not active in Michigan and most migratory bat and bird species are not actively nesting or fledging. It is unlikely that wildlife that prefer wetland habitats will be impacted by the mining activity because there is no direct impacts proposed to regulated wetlands.

Increased competition for food and breeding opportunities related to woodland removal, increased on-site vehicular traffic, and increased noise and human activity will occur on the Project Site. However, these issues should not create significant impacts on the local wildlife populations.

### 5.4 Geology and Topography

The 1982 Quaternary Geology Map of Michigan, with respect to Lapeer County, and more specifically Metamora Township, shows the area of the Project Site as part of a regional end moraine. See Figure 7. Lapeer County Quaternary Geology Map for an excerpt of the Quaternary Geologic map of Lapeer County. The Project Site itself is identified with a circle-marker and is listed on this map in a yellow-brown color, stating "End moraines of coarse-textured till."

An end moraine marks a standstill period of a glacier where materials of all sizes accumulate. Small streams, rivers and valleys are formed by the melting ice, transporting and depositing material to different locations and thickness on and within the glacier. As the glacier receded to the north across Lapeer County and beyond, the mixture of gravel, sands, silts and clays were left behind.



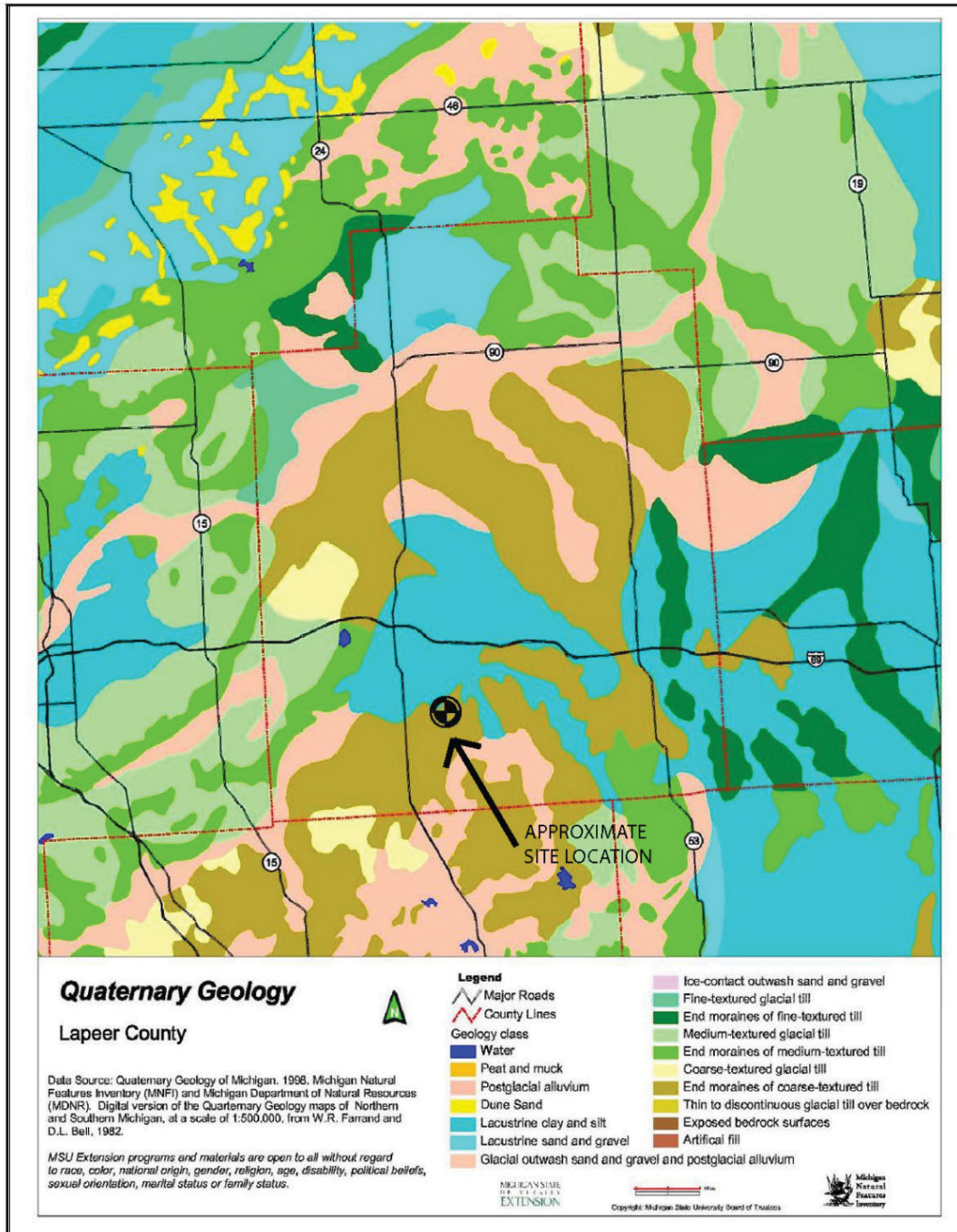


Figure 7. Lapeer County Quaternary Geology Map

The Lapeer County Comprehensive Development Plan (Final Draft: August 2006) states in section 3.2, Geology and Topography, that, “The highest points in Lapeer County (over 1,200 feet above sea level) are generally found in the very southern areas including parts of Hadley, Metamora, Dryden, Almont, Lapeer, and Attica Townships. A concentrated belt of high glacial moraine deposits formed the gentle rolling hills in this part of the County.”

Within the Project Site, a hummocky ridge line distinguishes the surface topography while glacial debris with sporadic occurrences of non-sorted clay and small areas of outwash characterize the subsurface. A large valley bisects the site with rolling hills to the east with a high ridge and hills to the west. In general, this particular end moraine deposited large quantities of sand and gravel with pockets of fine sand, silts and clay.

Soil borings and material testing on the Lease Parcel and the Guy Parcel indicate both properties are underlain with a pocket of glacial outwash that is associated with the regional end moraine. Outwash material consists of silt, sand, and gravel that have been derived from unsorted glacial debris. The glacial rubble is picked up and sorted by the action of meltwater flowing from the glacier and then deposited in very close proximity. Often these small outwash deposits are excellent sources for sand and gravel.

A total of 75 soil borings have been conducted on site by AAOM, confirming the above geologic background information. Soil borings range from 38 to 176 feet in depth, with an average depth of approximately 100 feet. Included in these soil borings are nine observation wells that have been installed on the property to assist in identifying water elevations. Material quality testing has been conducted on a total of 186 samples collected from the soil borings. The sieve analysis tests evaluated the quality of the material, and were used to determine that the geologic resources found on the Project Site are a viable source of materials to produce construction grade, quality aggregate. Specifically, these tests indicate the following:

- The sand and gravel on the Project Site has the correct coarseness and range of particle sizes to meet the raw material requirements for the production of concrete sand (MDOT 2NS), road gravel, fill sand, septic stone, and similar construction materials. AAOM estimates that the Mining Area will produce approximately 22,000,000 cubic yards of marketable material.
- The quality and quantity of sand and gravel discovered on the Project Site is economically significant enough to warrant the installation of a processing plant, administrative office, and related facilities necessary to produce sand and gravel products.
- The quantity of materials on the Project Site that are not sold as products (e.g. topsoil, overburden and inner-burden (typically clay), and fine sand and silts) is large enough to meet reclamation needs for the Project Site, and limited enough to allow for the efficient and profitable extraction of the sand and gravel resources.

A sample cross section, running from the western property boundary toward the southeast near the intersection of Olds Road and Ribble Road (see Figure 8. West to East Profile below) shows the existing surface topography and reclamation finish grade along with four soil borings. Additional cross sections and boring information can be found in the Mining and Reclamation Plans.

West to East

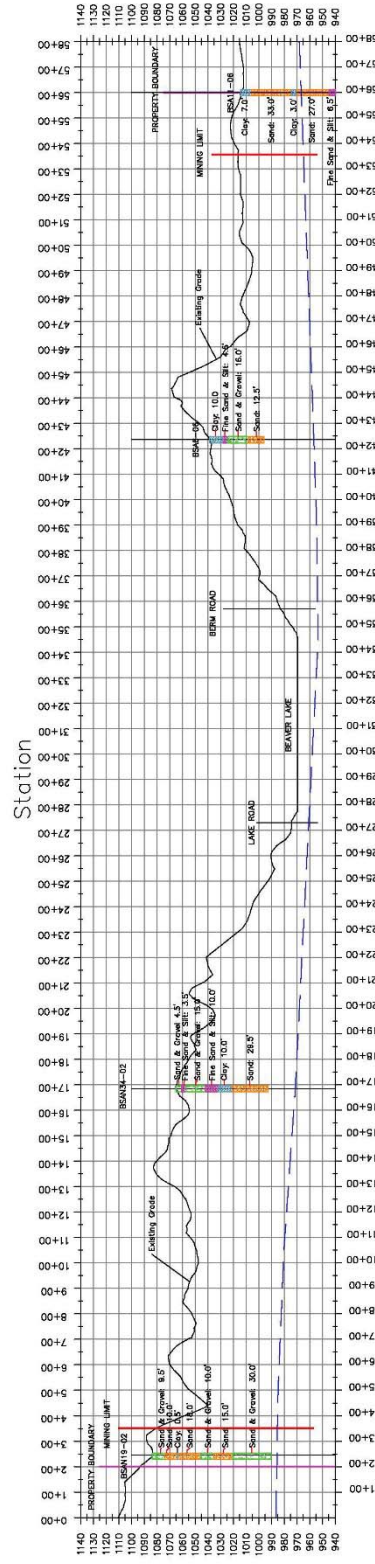


FIGURE 5  
GEOLOGIC CROSS-SECTION  
METAMORA, MICHIGAN  
HYDRO-LOGIC PROJECT No.: 04-206

Figure 8. West to East Profile

This property contains a mixture of silt, fine sands, gravel and stone, with sporadic inner-burden clay deposits. A few soil borings revealed a 'hard pan' type material that is best described as a cemented sand and gravel conglomerate.

The on-site data collection, soil borings, geologic and historical background provide sufficient evidence of a construction grade quality sand and gravel deposit. The magnitude of the property, in terms of overall acreage and topography, support the quantity of reserves that AAOM has determined adequate to support this operation and permit application.

The extraction of sand and gravel, by its very nature, will change the topographic shape of the Project Site. No significant short- or long-term adverse impacts to the environment will result from the alteration of the topographic shape of the site. It is the intent of AAOM to adhere, at a minimum, to the final topographic grading guidelines as set forth in the Metamora Township Ordinance 34: Soil Removal Ordinance.

The reclaimed landforms of the site can be placed into five categories, as illustrated on Figure 5. Reclamation Plan and described below:

1. Gently sloping lower plains just above the water table. These are located on the northern half of the Project Site, and will subtly slope toward the north and east.
2. Gently sloping upper plains and ridges. These landforms will be at a higher elevation than the lower plains, with slope transitions meeting reclamation grading requirements of the Township ordinances.
3. Rolling plains. The rolling plains will be formed by the volumes of overburden and inner-burden found in the southeast part of the Mining Area, which provides an opportunity to create topographic relief on the pit floor.
4. Sloped edges along the western and southern boundaries of mining, with the maximum slope meeting the Township ordinance standards.
5. Wet Meadows. Located along the edges of the buffer areas, especially where adjacent to wetland, these landforms will provide for storm water management, and diversified habitat.

While these landforms will not directly replicate those of the existing Project Site, they are landforms found commonly in Lapeer County and southeast Michigan.

## **5.5 Surface Water Hydrology**

A study of the surface water hydrology of the proposed Project Site was conducted for both the existing condition and for the proposed reclaimed site. The purpose of this study was to evaluate the potential impacts the proposed mining activity may have on surface water hydrology and existing wetlands at the Project Site to ensure the stability of these natural systems throughout and after the mining activity.

### **5.5.1 Project Site Surface Water Hydrology**

The 724 acre Project Site is predominately woodlands but also contains areas of wetlands, open water, agricultural fields and open area uplands. The soils on the Project Site vary, although a majority of the site consists of Boyer Loamy Sand and Lapeer Sandy Loam. These soils are classified by the USDA Natural Resources Conservation Service (NRCS) as well drained soils with moderately high to high permeability and low to very low surface runoff. See Custom Soil Resource Report for Lapeer County, Michigan page 10 (Submittal Documents II.I USDA NRCS Soil Resource Report). Hydrologic Soil Group



(HSG) “A” will be used for runoff calculations in this report, as it best fits characteristic soils with high permeability.

Land use outside of the Project Site is typical of that found on the Project Site - largely woodland with some agricultural, wetlands, open water and low density residential areas. Dryden Road is the southern boundary. To the west of the Project Site is a mixture of residential homes and woodland. A sand and gravel mine owned by the Lapeer County Road Commission occupies a portion of the eastern edge of the Project Site and Wilder Road occupies the remaining edge. Based on existing topographic data, the existing sand and gravel mine does not appear to create off-site runoff. To the north of the site is additional land owned by the D-bar-A Ranch, rural agriculture and residential land uses.

The on-site topography contains hilly slopes with small isolated pockets of low areas throughout and a larger wetland which encompasses a valley in the center of the Project Site. Within the Project Site, there are 14 distinct drainage areas or sub-watersheds. Most of the current drainage areas drain to localized depressions or wetlands within the Project Site, while a few portions of the site flow off-site, as shown in Figure 9. Existing Drainage Areas.

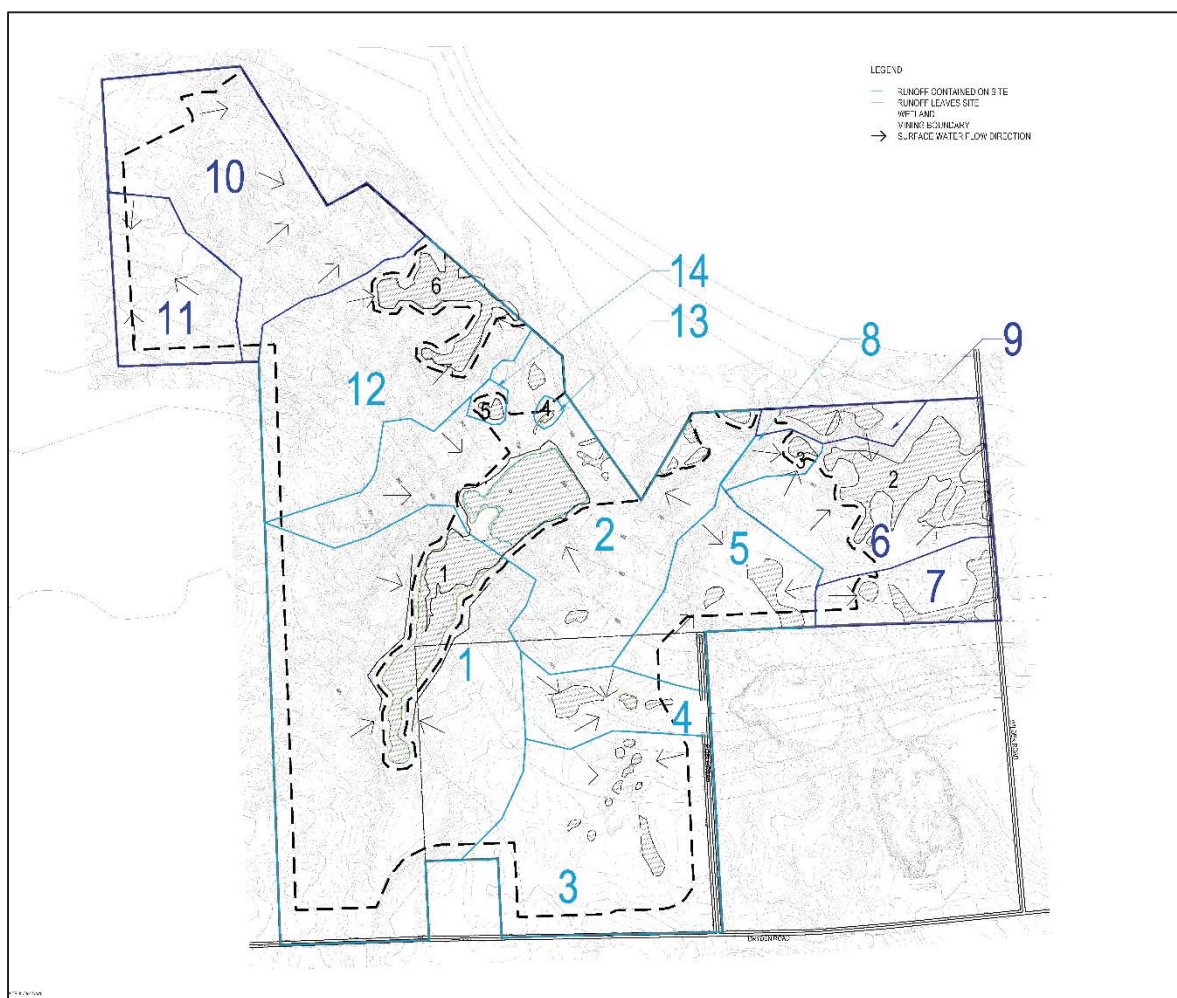


Figure 9. Existing Drainage Areas

The surface water hydrology for these drainage areas was studied for both the existing and proposed conditions. In the proposed reclaimed condition, the area within the mining limits is assumed to be a meadow or prairie. According to the mining and operation plan, the site will be mined and reclaimed simultaneously. Therefore, limited amounts of the Project Site will have bare soil at one time. Trees and shrubs will be planted on some parts of the reclaimed site by the BSA; however, a land cover of meadow will be used in this study to assume conservative runoff characteristics. A comparison of the runoff characteristics of the existing and proposed condition can be found in Table 1 below. Curve Number (CN) is a measure of runoff potential based on soils, plant cover, amount of impervious areas, interception, and surface storage. There is a slight increase in CN in the proposed condition based on the anticipated land cover/use. Given the relatively high porosity of the site soils and the predominance of wooded land cover, the runoff producing event in the proposed condition is about 3 inches of precipitation. Conversely, it takes about 4 inches of precipitation to produce runoff in the existing condition. Similarly to the existing condition, a majority of the proposed condition runoff will remain on-site due to the large side slopes outlined in the Reclamation and Mitigative Measures Section of this report.

<b>Cover</b>	<b>Curve Number (CN)</b>	<b>Existing Condition (ac)</b>	<b>Proposed Condition (ac)</b>
Wetlands/ Water	100	54	45
Open Area Uplands	45	47	540
Woodlands	33	553	139
Agricultural Field	61	70	0
Total Area (ac)	n/a	724	724
Average CN	n/a	41	46

*Table 1. Runoff Characteristics Comparison*

Due primarily to the relatively high porosity of the Project Site soils and lack of impervious surfaces, the required storm event to create runoff for the existing and proposed conditions is 4 inches and 3 inches of precipitation, respectively. This amount of precipitation is representative of a significant storm event. During smaller, more regular storm events (which represent over 90% of all storm events), there will be no appreciable runoff from the Project Site.

The 100-year storm event (5.27 inches) was used as the design storm for comparing the two conditions of the Project Site, as this is the typical design storm for Lapeer County pursuant to Drain Commission regulations. The change in land cover from predominately woodland to predominately meadow will cause a slight increase in CN, from approximately 41 to 46. The total site runoff for the 100-year storm event will increase from 918,244 CF to 1,568,726 CF as a result of the change in land cover and topography of the Project Site. The majority of this runoff will either remain on the Project Site and percolate through the soils to groundwater or discharge off-site to additional land owned by D-bar-A Ranch. This increase in storm water runoff from the Project Site is not anticipated to have any adverse impacts to onsite or off-site drainage patterns.

In the proposed and existing condition of the site, the majority of annual stormwater is either a.) utilized by plant cover, b.) absorbed into the groundwater aquifer, or c.) drains via the ground surface to adjacent wetlands. Changes to the topography of the site related to the mining activity will modify the proportions of runoff that fits into each of these categories; however it will not measurably change the net runoff leaving the Project Site.

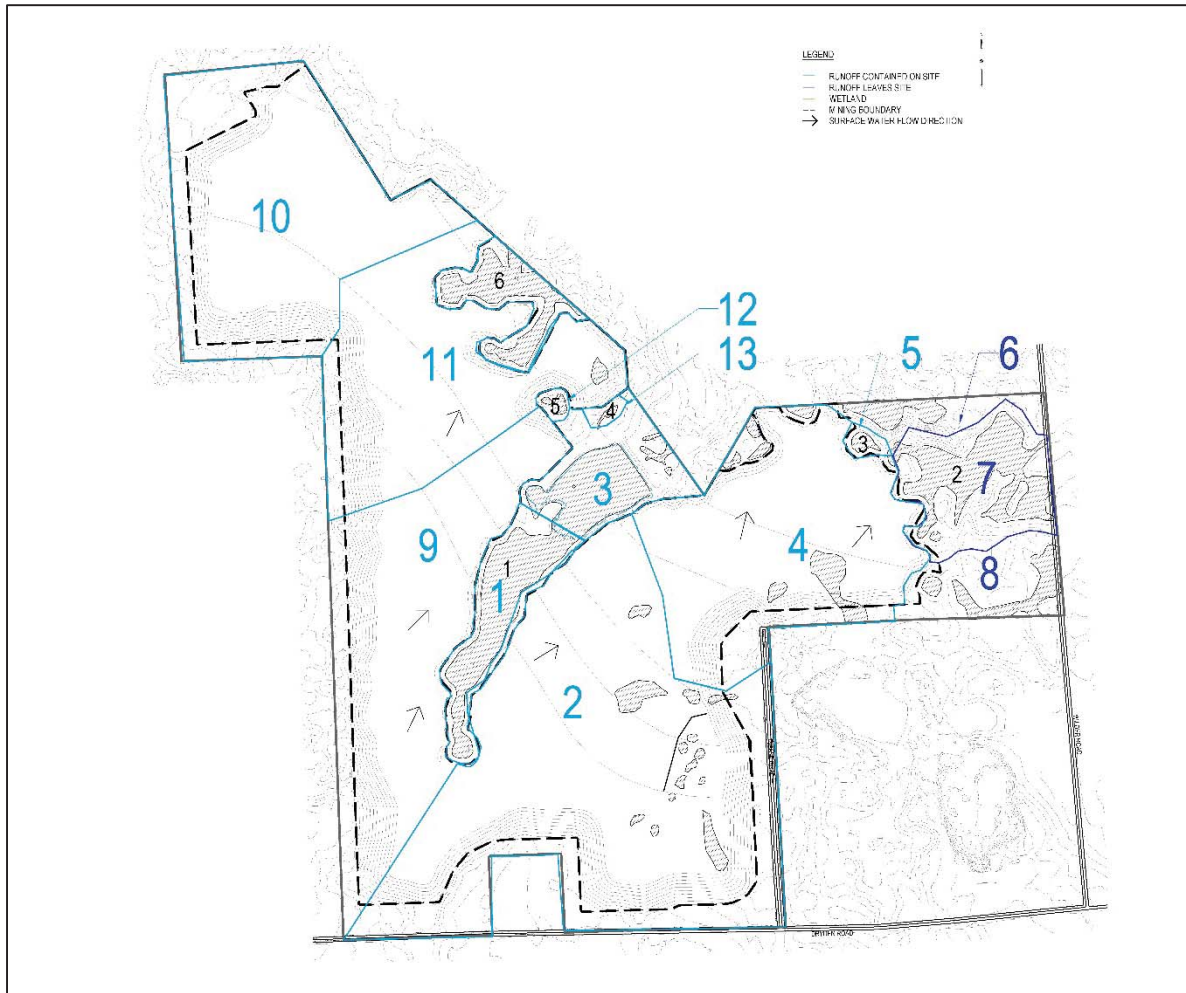


Figure 10. Proposed Drainage Areas

### 5.5.2 On-Site Wetland Hydrology

The majority of the wetlands on the Project Site are hydraulically connected to groundwater. These wetlands have approximately the same static water elevation as the groundwater. Groundwater-fed wetland hydrology is primarily sustained by groundwater hydrology, with small contributions from storm water run-off and direct precipitation.

There are two perched wetlands on the Project Site that may be regulated by MDEQ. Perched wetlands are wetlands that lie on top of an isolated clay lens above the ground water table. Direct precipitation and surface water runoff are the primary hydraulic inputs to this type of wetland. The other regulated wetlands on the site are fed predominately by groundwater.

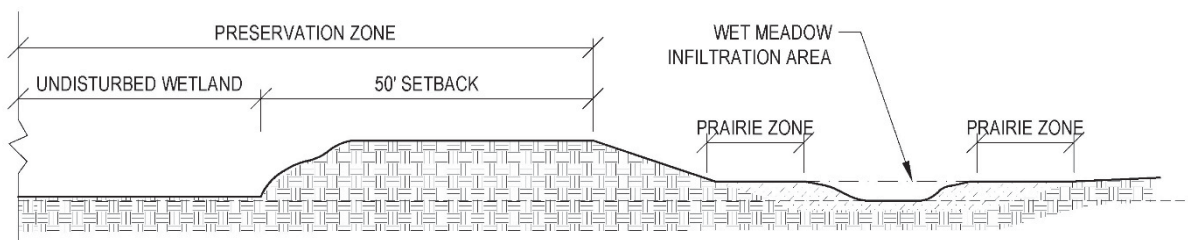
In Figures 9 & 10, the location of the six regulated wetland systems on the Project Site are identified by the black numbers, 1 through 6. Wetlands 1, 2, 3 and 6 are hydraulically connected to groundwater. Wetlands 4 and 5 are small perched wetlands, less than 0.5 acres each, respectively, which are regulated due to their proximity to Wetland 1.

Since mining activity will cease 10 feet above the uppermost aquifer, impacts to groundwater elevation due to sand and gravel mining are not anticipated. This fact is confirmed by a hydro-geologic study of the Project Site ground water that was conducted by Hydro Logic & Associates, which is summarized in the next section of this report. Since there are no anticipated impacts on the elevation of the upper aquifer as a result of mining, the hydrology of the wetlands that are hydraulically connected to the groundwater will not be impacted

For the two perched wetlands on the Project Site (4 & 5), the primary sources of hydrology are direct precipitation and storm water from overland flow. The watershed feeding wetland 4 lies completely within the setback, therefore, the drainage area will remain exactly the same and there are no anticipated impacts. Wetland 5's watershed is modified slightly. Given that, in current conditions a rain event of over 4 inches is required to stimulate overland flow of stormwater into the wetland, it is clear that the perched wetlands are dependent on direct precipitation more than stormwater runoff to sustain their water balance. The proposed mining activity will have no impact on this direct precipitation as the main source of water to these wetlands. In conclusion, changes to stormwater drainage patterns related to the proposed mining is not anticipated to impact the regulated wetlands on the Project Site. Changes to the land cover and topography of the Project Site will not result in changes to the off-site storm water drainage patterns, and therefore should not negatively impact adjacent properties, overall ground water recharge and flow, or hydrology of adjacent wetlands.

### 5.5.3 Storm Water Management Measures

As discussed in the prior sections, the primary impact of the proposed mining operation on the hydrology of the Project Site is a slight increase in the volume of storm water runoff during major storm events (greater than 3 inches of precipitation). This slight increase will be managed with a series of wet meadows built adjacent to the 50' buffer of the regulated wetlands. As shown in Figure 11: Typical Wet Meadow Section, during the 100-year storm, any excess stormwater will be directed to the wet meadow area to allow for infiltration into the groundwater. In addition to supplying additional groundwater for the groundwater fed wetlands, it will trap any sediments that are carried in the stormwater. And keep sediments out of adjacent properties.



*Figure 11. Typical Wet Meadow Section*

In conclusion, mining activity is not anticipated to have measurable impacts to the regulated wetlands on the Project Site. Stormwater from smaller, more regular storm events will show no significant increase in stormwater runoff. There is an increase in runoff during very large and infrequent (100-year) storm events. The following list of measures will be implemented to manage the stormwater on the Project Site:

- Reclamation occurring during mining to limit exposed bare soil
- Containing stormwater on the Project Site with topographic grading
- Buffers along regulated wetlands to mimic existing drainage patterns
- Wet meadow construction which promotes infiltrations and traps sediments



## 5.6 Groundwater Hydrology

Hydro-Logic Associates, Inc. of Brighton, Michigan was retained by AAOM to perform a geologic, hydro-geologic, and environmental investigation of the Project Site. The special goals of this investigation included the following:

- Confirm the geology of the Project Site and the immediately surrounding area
- Evaluate and establish baseline hydro-geological conditions and characteristics for the Project Site and the surrounding area
- Assess the general groundwater quality of the local water-bearing (aquifer) units
- Provide professional opinions regarding any potential impacts to the Project Site and the surrounding area as a direct result of the aggregates extraction activities proposed by AAOM
- Recommend an annual work plan to collect the data necessary to adequately monitor, evaluate, and protect the groundwater and surface water quality of the Project Site

To investigate the groundwater on the Project Site, a series of nine groundwater monitoring wells were installed (July 6 through 21, 2015) within and immediately adjacent to the proposed mining activity on the Project Site. This exercise also provided nine continuous soil borings for geological evaluation. A horizontal and vertical survey of each of the nine groundwater monitoring wells was completed to determine accurate groundwater elevations and identify aquifer depths. According to the report prepared by Hydrologic Associates, Inc. (Submittal Document II.D. Hydrogeological and Environmental Assessment Report) “the uppermost unconsolidated glacial-drift groundwater aquifer system was encountered at elevations of approximately 1,000 feet above mean sea level (MSL) in the southwestern corner of the Project Site to approximately 938 feet above MSL in the northeastern corner.” Utilizing the surveyed elevation of groundwater levels in the monitoring wells, and the elevations of lakes on site, the flow direction and elevation of the groundwater was determined (as indicated on Figure 12. Groundwater Flow Map). Within the Project Site the study indicates that groundwater flows in a north-northeast direction, toward the south branch of the Flint River.

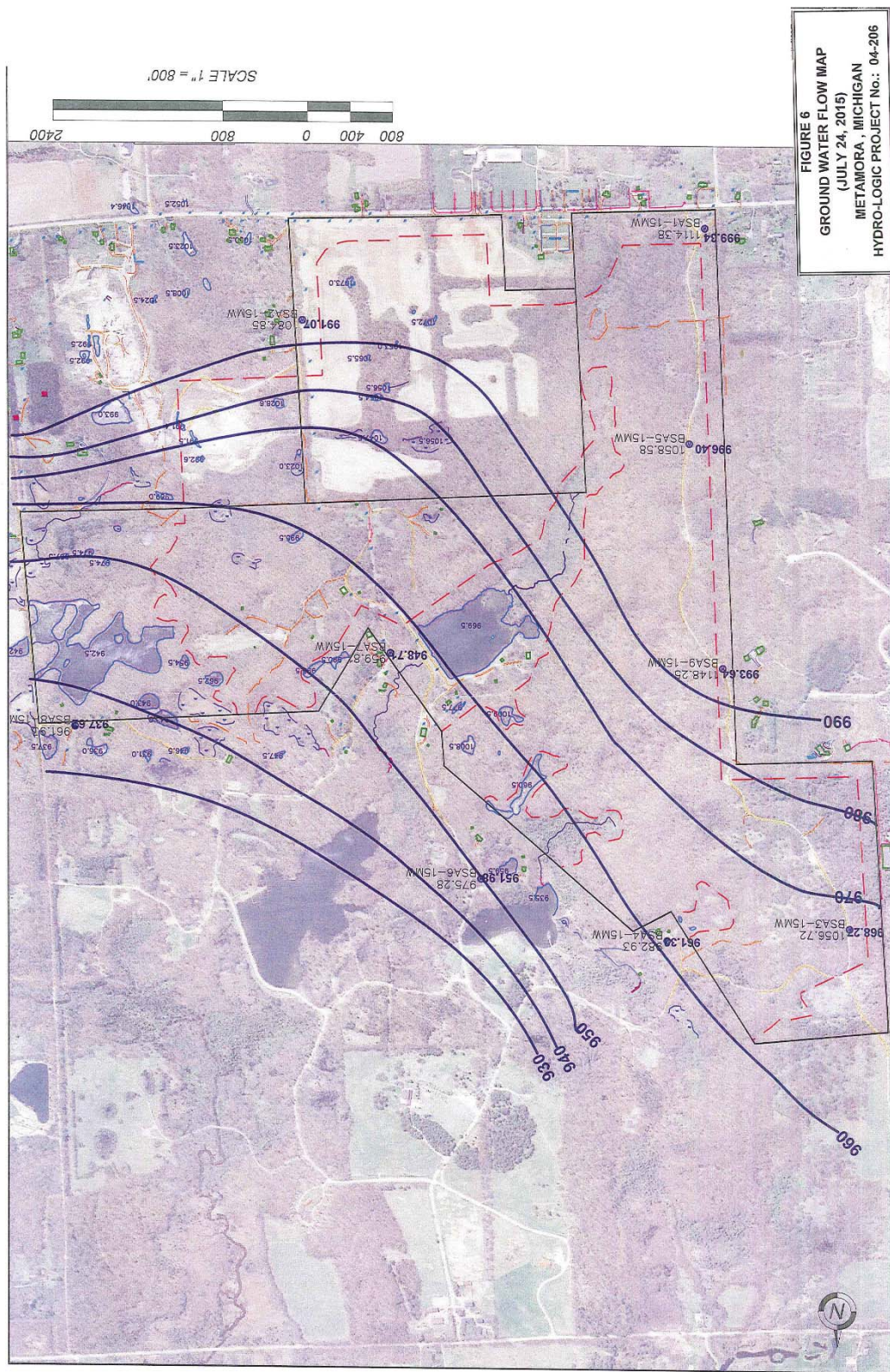
The study examined groundwater flow patterns of the upper aquifer summarized graphically on Figure 12. Groundwater Flow Map. “Assuming an average hydraulic conductivity value of 40 feet/day, an average hydraulic gradient of 0.011 feet/foot, and an average effective soil porosity for slightly silty sand of 27%; the average linear groundwater velocity for the fine-grained to coarse-grained, slightly silty sand, with variable amounts of gravel identified beneath the Project Site was calculated to be approximately 1.6 feet/day.” This calculation is important to understand the flow of groundwater in the upper aquifer, the role of groundwater in supporting wetlands on-site, and how changes to the site topography may or may not impact the recharge of surface water features and groundwater wetlands. The majority of wetlands on the Project Site are fed from the groundwater of the upper aquifer, while the remainder are “perched” above the upper aquifer and are therefore more dependent on storm water as their source of water.

Three case studies are outlined in the hydro-geologic report, citing long-term investigations of groundwater monitoring on similar sand and gravel operations, for which Hydro-Logic Associates, Inc. was responsible. These case studies, coupled with an evaluation of the proposed mining practices and site characteristics, led Hydro-Logic Associates, Inc. to conclude that the mining activity can be conducted with no measurable impact to the elevation, quantity, and quality of the groundwater at the Project Site.

The study also investigated the location and depth of water supply wells in the vicinity of the Mining Area to determine if the mining activity would impact the availability and supply of groundwater to these wells.

A total of 174 residential water wells were investigated and records obtained. The study concluded that because of the distance from the Project Site and the proposed depth of mining, the mining activity will have no detrimental impact on local wells. The proposed mining project will require a production well, which will be installed into the lower bedrock aquifer, located near the processing plant to provide water to wash the sand and gravel during the processing of products. The aggregate wash water will be recycled in a closed looped system and not released from the site via surface flow; the production well will be used to supplement the water in the closed looped recycling process. In evaluating the proposed production well, the hydro-geologic study concluded that the use of the well will not negatively impact area residential wells or the surface water features of the site.

Based on these investigations, AAOM does not anticipate any impacts to 1) the upper aquifer groundwater elevation and flow, 2) area residential wells, or 3) the natural resources which are dependent on groundwater (e.g. lakes and wetlands).





## 5.7 Environmental Contamination

### 5.7.1 Environmental Conditions

A Phase I Environmental Site Assessment (ESA) has been performed on both the Lease Parcel owned by the BSA and the Guy Parcel. The primary purpose of these studies was to identify any Recognized Environmental Conditions (REC) at the Project Site and to establish a baseline of the Project Site's environmental conditions. ESAs are prepared as a matter of standard practice when property ownership is transferred or significant lease arrangements are executed. The ESAs completed on the Project Site were completed consistent with federal regulations and the ASTM standard for all appropriate inquiry.

The ESA for the Lease Parcel identified several RECs within the Project Site, including a former gun range (which may have the potential for lead related to the use of fire arms), and several open pit latrines, which may contain harmful bacteria. These RECs are within the Mining Area, and AAOM will remove the potential hazards prior to these areas being impacted by mining activity. A third REC, an adjacent pair of former dump areas, has been identified within the Project Site, but outside of the Mining Area. The mining plan provides for a buffer between the identified dump sites and mining activity to avoid any impact on, or from, the landfills.

The ESA for the Guy Parcel also identified RECs within the Mining Area, including a segment of land previously used as an orchard, and the potential for farm debris and waste considered typical for agricultural land. The former orchard was investigated further in 2006, including soil samples obtained as part of a Phase II investigation, and the concerns are considered to be investigated and eliminated as a potential environmental contamination issue. Site recognition was unable to detect any residual farm debris and waste. As AAOM conducts mining activity in this area, if any debris or waste is discovered it will be brought to the attention of the environmental engineering staff of the Edw. C. Levy Co., who will manage the handling and/or removal of this waste in conformance with current laws and regulations.

Both ESAs prepared for the Project Site noted the presence of the Metamora Landfill as an off-site REC, and reported the following:

"The former Metamora Landfill is located approximately 4,500 feet west of the Project Site. This privately-owned property operated from 1966 to 1980 and consisted of a 25-acre landfill and two drum disposal areas. Contamination has been identified within the soil and groundwater on this property. The cleanup progress to date (1986-1994) included the excavation and incineration of the two drum disposal areas and consolidation and capping of the entire 25- acre landfill. Groundwater contamination is identified to have migrated off-site from this property, and is being monitored by both the USEPA and the MDEQ."

Recognizing this condition, AAOM installed nine groundwater monitoring wells located at the perimeter of the Project Site, and tested the groundwater quality, as described below.

### 5.7.2 Water Quality Testing

On August 5 and 6, 2015, Hydro-Logic Associates, Inc. collected a representative groundwater sample from each of the nine new groundwater monitoring wells on the Project Site (described and referenced above). The groundwater samples were collected to establish a baseline for typical groundwater quality conditions across the Project Site and to investigate the potential impact of the former Metamora Landfill on groundwater conditions. The samples were analyzed for the following contaminant and water quality parameters utilizing the MDEQ approved methodologies:



- Full-scan volatile organic compounds (VOCs)
- 1,4-Dioxane
- Ethane, Ethylene, Methane
- Totals Metals: arsenic, calcium, copper, iron, magnesium, manganese, sodium
- Inorganic Parameters: ammonia, chloride, hardness, nitrate, nitrite, pH, sulfates

The complete analytical results for groundwater samples collected August 5 and 6, 2015 can be found in Submittal Document II.D. Hydrogeological and Environmental Assessment Report. As was anticipated, very low concentrations of 1,4-Dioxane were detected in groundwater samples collected from monitoring wells in two of the nine wells in the western and northern parts of the Project Site. These results are consistent with testing results from adjacent properties down gradient from the Metamora landfill. The detected results are well below the Residential Drinking Water Standards. These parameters were analyzed to investigate for the potential of the former Metamora Landfill to have had any impact to the groundwater conditions or quality at the Project Site. Mining activity on the site is not projected to exacerbate the spread of 1,4-Dioxane from the Metamora Landfill. AAOM will continue to collect water samples from the nine groundwater monitoring wells and test them for the parameters noted above to closely monitor water quality conditions at the Project Site.

### 5.7.3 Product Storage and Emergency Planning

AAOM will store diesel fuel, lubricating oil, hydraulic oil and other petroleum products near the processing plant and administrative office for use and maintenance of mobile and plant equipment. To protect the environment from accidental release of petroleum products, as required by the EPA's Oil Pollution Prevention Act and Michigan's Part 5 Spillage of Oil and Polluting Materials rules, AAOM shall develop and implement a combined Spill Prevention Control and Countermeasure (SPCC) Plan and Pollution Incident Prevention Plan (PIPP). The primary purpose of these plans is to identify and implement strategies to prevent the release of oil products and to ensure that in the event of a release that a response plan is in place to minimize any environmental damage.

Other than the oil products discussed above, AAOM will not store bulk quantities of hazardous materials at the Project Site. AAOM will use and store common vehicle batteries that are used in mobile equipment. While in storage, these batteries shall be stored on secondary containment.

AAOM and their affiliates in the sand and gravel industry have a strong track record of managing the use of hazardous materials at their operations, and of responsibly managing environmental issues proactively. The Edw. C. Levy Co. maintains its own staff of environmental engineers who are responsible for permitting the use of hazardous materials and monitoring site conditions.

In summary, mining activity at the Project Site are not expected to cause or exacerbate conditions related to environmental contamination on the site or on adjacent properties.

## 5.8 Soils and Agricultural Farmlands

Soils representing 15 different soil series, as identified in the USDA Web Soil Survey, are found on this site. These soils include: Adrian Muck, Boyer Loamy Sand, Carlisle Muck, Colwood Loam, Conover Loam, Edwards Muck, Fabius- Wasepi Sandy Loam, Gravel Pits, Houghton Muck, Kibbie Loam, Lapeer Sandy Loam, Miami Loam, Miami Clay Loam, and Spinks-Boyer Loam Sand. The majority of the soils on the site are comprised of Boyer Loamy Sand and Lapeer Sandy Loam. There are a few areas of muck

**Custom Soil Resource Report**

**Soil Map**

Map Scale: 1:21,000 if printed on a landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

8

Ad: Adrian muck	FaA: Fabius-Wasepi	LoA: Loccke sandy loam
BrD: Boyer loamy sand	Gr: Gravel Pits	MoB: Miami loam
BrE: Boyer loamy sand	Ho: Houghton muck	MoB2: Miami loam
BrF: Boyer loamy sand	KbB: Kibbie loam	MoC2: Miami loam
BsB: Boyer sandy loam	LaB: Lapeer sandy loam	MoD2: Miami loam
BsC: Boyer sandy loam	LaC: Lapeer sandy loam	MoF: Miami loam
Cc: Carlisle muck	LaC2: Lapeer sandy loam	MpD3: Miami clay loam
Co: Colwood loam	LaD2: Lapeer sandy loam	MpE3: Miami clay loam
CvB: Conover loam	LaE2: Lapeer sandy loam	W: Water
Ed: Edwards muck	LaF: Lapeer sandy loam	

Prime farmland classification refer to soils that are especially suited for cultivation of food, feed, fiber, forage and oilseed crops. Of the 724 acre site, there are about 50 acres of prime farmland (see Figure 14). Prime Farmland Classification Map from the NRCS Web Soil Survey below. Of this 50 acres, about 75% of the prime farmland are located within the Mining Area, and about 27 acres are in current agricultural production. Lapeer County has about 69,000 acres of soils considered prime farmland enrolled in the Michigan Farmland and Open Space Preservation Program; the loss of approximately 27

[illegible]

## 5.9 Land Use and Zoning

Though rural in character and having low population density, the township is directly linked to the greater Detroit region and northern Oakland County. Oakland County is a regional economic and jobs center; coupled with close proximity to the City of Lapeer, the greater Flint area, Port Huron, and the metropolitan Detroit area. Most residents of Metamora Township commute to work outside of the township. For similar proximity reasons, the township is affected by suburban growth patterns in the region. The township is not served by public water or sewer outside the area of the Village. Consequently, the



density of development is much less in the township than other suburban fringe areas, such as Oxford Township to the south, which has experienced much greater growth in population and higher density development.

The Township's population from 1990 to 2000 grew from 3,094 to 4,184, a jump of 35.2 %; the rate of growth slowed considerably from 2000 to 2010, growing to 4,249 residents, a rate of 1.6% growth. This trend mirrors the limited growth rate in Lapeer County from 2000 to 2010 (1.0%) and the region, as a result of the economic stagnation experienced in the second half of the decade.

#### 5.9.1 Master Plan Considerations

The Metamora Township Master Plan outlines measures to maintain the low density development pattern by 1) limiting sewer district growth to the area directly adjacent to the Village and along the M-24 corridor, 2) maintaining low density land uses in other parts of the township, and 3) promoting open space and conservation style development patterns and policies. The Master Plan designates the Project Site and adjacent areas for Equestrian Estates (up to .1 residential units per acre), County Estates (up to .2 residential units per acre), and Recreation and Open Space. These designations are consistent with current zoning for the portions of the township surrounding the Project Site, and are consistent with the policies of the Lapeer County Comprehensive Development Plan (2006).

The proposed haul route, Dryden Road, is classified as a Class A, all-weather haul route by the Lapeer County Road Commission. This road classification allows for year round use by heavy trucks, including gravel trains. Improvements to the road to gain this classification were funded, in part, by the federal government. Dryden Road is also designated in the Thoroughfare Plan of the Metamora Township Master Plan as an Arterial Road. As noted in the master plan, Arterial Roads have a dual function-“to provide routes for through traffic while providing access to abutting properties and minor intersecting streets.”

Several of the community wide goals included in the Metamora Township Master Plan are relevant in the consideration of land use impacts related to the proposed sand and gravel mining operation. Below are the relevant goals and related objectives restated from the master plan, along with a discussion of these goals specific to the mining proposal.

***“Goal: Protect and enhance the unique community character of Metamora Township.***

***Objective:*** *Maintain and promote the rural, agricultural and equestrian characteristics of the community.” (Page 3-2 of the Metamora Township Master Plan)*

**Assessment:** The Project Site will remain undeveloped for the period of mining and reclamation activity, so it will not impact the character of the township through overdevelopment. Views of the mining activity from adjacent roads and properties will be screened through a combination of preserved natural wooded buffers, screening berms, and landscaping. Berms along Dryden Road, from which the site will be most often viewed, will be undulating in height and shape to appear as a more natural part of the native terrain. Reclamation of the site will yield woodlands, open agricultural fields, recreational facilities, and rolling grasslands, consistent with the desired land character.

***“Objective:*** *Protect and enhance the environmental assets in the Township, including clean air, water, and soils, as well as woodlands, wetlands, lakes, wildlife and viewsheds”. (Page 3-3 of the Metamora Township Master Plan)*

**Assessment:** This report documents the extensive assessment of the natural and visual resources of the Project Site, identifies potential impacts to these resources, and proposes key mitigative measures which are proposed by AAOM to address the potential impacts. AAOM has successfully mined and reclaimed sites in Michigan with similar resources and issues in compliance with local and state laws, and with sensitivity to the resources and the goals of the host community.

**“Goal: Improve the condition of environmentally sensitive and damaged areas.**

**Objective:** *Prevent the expansion of undesirable land uses.” (Page 3-3 of the Metamora Township Master Plan)*

**Assessment:** While some residents of the township may view the proposed sand and gravel mining operation as an undesirable use, the D-bar-A Ranch Project will comply with all conditions of a Special Land Use Permit and, with completion and submittal of this document, has provided a detailed assessment of community impacts and benefits for consideration by Metamora Township elected and appointed officials.

**“Objective:** *Clean up the land, air, and water that have been damaged by undesirable land uses.” (Page 3-3 of the Metamora Township Master Plan)*

**Assessment:** A key proposal of the D-Bar-A Ranch Project is the plan to concurrently mine and reclaim the Project Site so as to limit the amount of un-reclaimed land at any one point during the mining process. Further, the project includes key mitigation measures that will be implemented throughout the length of the project to ensure that substantial impacts to surrounding properties and natural resources do not occur.

**“Goal: Maintain a transportation network that facilitates efficient circulation while reinforcing the Township’s rural character.**

**Objective:** *Improve the roadways to enhance the efficiency and safety of transportation in the township and maintain Metamora’s unique character.” (Page 3-6 of the Metamora Township Master Plan)*

**Assessment:** Bergmann Associates has conducted a traffic study to assess potential traffic impacts to the local road network, and to establish a safe location for the entrance into the proposed mining operation. The study concluded that the additional truck traffic added to Dryden Road and its intersection with key area roads along this haul route would have very little impact to the flow of traffic. The study also concluded that the additional truck traffic did not pose a threat to pedestrians in the villages of Metamora and Dryden.

The engineers preparing this study selected an optimal location for the entrance to the Project Site which will provide for a safe entry and exit for the truck traffic and vehicles using Dryden Road. As part of the implementation of this project, the proposed location of the entrance will be reviewed and permitted by the Lapeer County Road Commission. AAOM intends to install a passing flare and deceleration taper to ensure safety for motorists, as recommended by the traffic consultants.

## 5.9.2 Zoning and Permitting Considerations

The Project Site contains two different zoning clarifications; the Lease Parcel is zoned as RC Recreation, while the Guy Parcel is zoned for A-2 Agricultural (refer to Figure 15. Metamora Township Zoning Map). The RC Recreation districts in the township are typically privately held sites that include recreation as a primary use, such as the D-bar-A Ranch and the camp previously owned by the Girl Scouts in the western part of the township. The Lease Parcel was previously used for agriculture prior to the purchase of the land by the BSA.

As noted in this report, AAOM intends to request the Conditional Rezoning of the Lease Parcel to the A-2 Agricultural designation for the purposes of establishing a sand and gravel mining operation, and concurrently apply for a Special Land Use Permit for the Lease Parcel and Guy Parcel, (together referred to as the Project Site) under a single permit for sand and gravel mining.

The mining of sand and gravel is a land use that is not permitted as a “principal” use under any zoning ordinance in Metamora. Unlike Oxford Township to the south, Metamora Township has not designated gravel resource areas on zoning maps. Metamora Township ordinances consider mining a “special use,” subject to review and approval by the township, based on specific criteria and conditions. The mining of sand and gravel is allowed as a special use under the zoning classifications of A-1 Agricultural and A-2 Agricultural, which includes the lowest development densities allowed in the township. One could assume from this set of facts that mining is allowed as a special use in agricultural zoning areas because these classifications of use are the most compatible with mining as a land use. In the long-term, the use of the Conditional Rezoning and Special Land Use mechanisms allow for a return to the current zoning and uses at the conclusion of mining. Post-mining, long-term uses for the Project Site contemplated at this time are consistent with the current zoning designations.

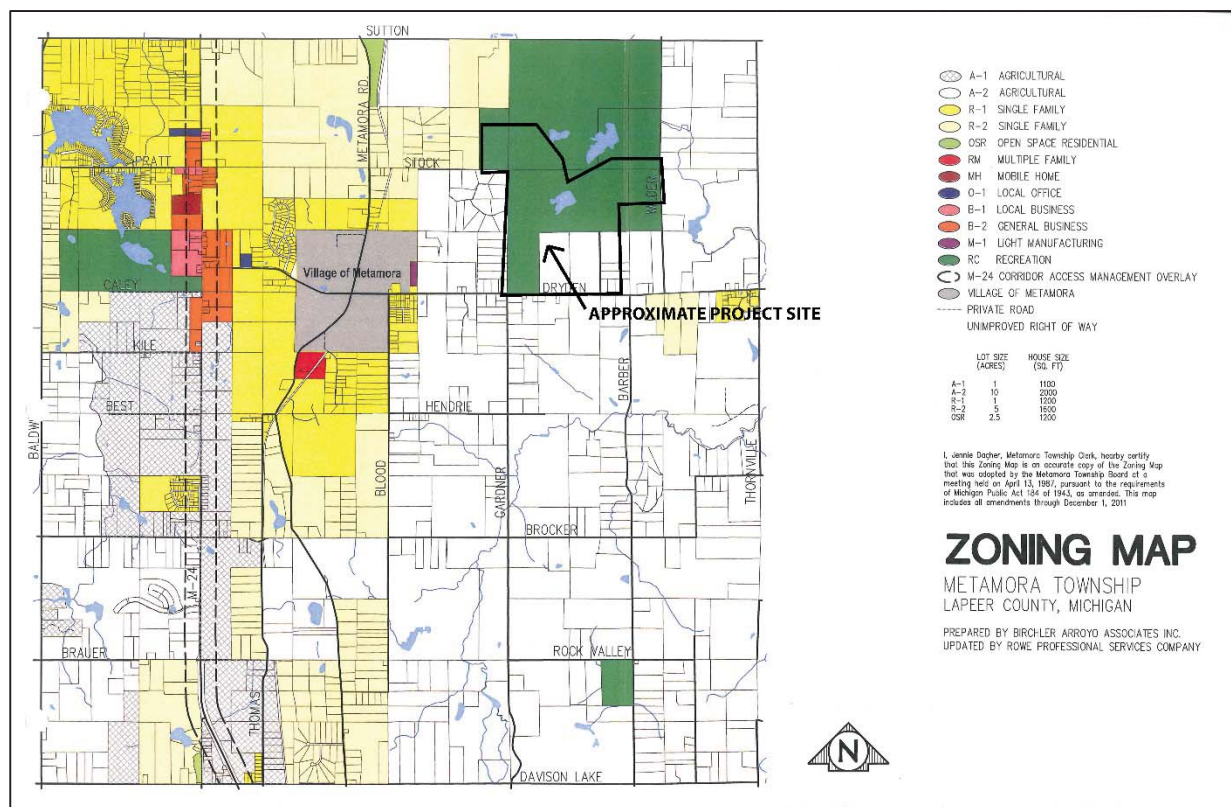


Figure 15. Metamora Township Zoning Map



Properties adjacent to the Project Site are zoned RC Recreation (to the north), A-2 Agricultural (to the east, south, and west), and R-2 Single Family at the northwest segment of the Project Site. These designations generally call for low density uses and development patterns.

A common issue with respect to extractive sand and gravel mining is the appropriateness of the mining operation within the context of surrounding land uses, which in this case are the relatively low number of single family residences, existing extractive operations, recreation uses, woodlots, wetlands, and agricultural fields. Abutting the western edge of the Project Site are ten single family residences, located on large lots, which are typically wooded. Four of the homes are located within 200 feet of the Project Site (but not less than 125 feet), while the remaining six homes are at least 250 feet from the Project Site boundary. Seven homes are adjacent to the Project Site on the southern side of Dryden Road. Additionally, five homes are located to the east of the Project Site along Ribble and Wilder Roads, two of which will be substantially set back from mining activity. The Project Site has over 32,000 linear feet of boundary which is adjacent to property zoned A-2 Agricultural; given that there are 22 homes adjacent to the site on this boundary, the density of development and number of potentially impact homes is limited.

The operations managers of the D-bar-A Ranch have assessed their utilization of the overall ranch and have determined that the use of the Lease Parcel for recreation is not required for the duration of the mining activity. As mining activity is phased across the Project Site the D-bar-A Ranch will regain use of the reclaimed areas in order to commence the long-term uses of the land. Once the mining and reclamation of the site are completed, the D-bar-A Ranch will use the site for agricultural and recreational activities.

### 5.9.3 Land Use Conclusions

The Project Site contains a significant sand and gravel deposit, is accessible from an all-weather truck route, and is in working proximity to construction materials markets. At the same time, the site's adjacent low density land use and the absence of significant environmental impacts are notable. The size and configuration of the site and the distribution of the aggregate resources are such that the mining and reclamation activities can be conducted in compliance with the dimensional regulations established by the township. These criteria are the most critical in the determination if a particular piece of property is a reasonable and rational use of the property.

While it might be expected that some degree of conflict may exist between mining operations and adjacent residential and local community interests, it has been AAOM's experience with other similar projects in Michigan that sand and gravel operations and residential communities can coexist without significant adverse changes in quality of life. Developing a positive coexistence requires that the mining company address key issues related to quality of life, such as visual quality, air quality, noise levels and additional traffic. These issues will be addressed through mitigative and operational measures by AAOM (and are discussed elsewhere in this report), which will help ensure that the proposed mining operations, while being a new, non-recreational or recreational use for the Project Site, are compatible with surrounding uses.

The Conditional Rezoning and Special Use Permit will allow the extraction of sand and gravel to meet the needs of the market, and will provide economic support for the BSA at D-bar-A Ranch and throughout the State. The site's attributes, including access to regional transportation, proximity to market demand, and the low density of surrounding uses, contribute to its appropriateness as a sand and gravel site from a land use perspective. Finally, the planned reclamation of the site will enhance its recreational character for the long-term benefit of the BSA.

## 5.10 Real Estate Valuation

Though low in development density, residential properties are adjacent to both the Project Site and the truck haul route. A study was commissioned by AAOM to evaluate the potential impacts to the value of residential properties adjacent to the site and haul route. This study was completed by Stout Risius Ross (SRR), experts in property valuation. The study is summarized below, and the full study is provided as Submittal Document II.E. Impact Study (Real Estate Evaluation).

The study utilized two primary methodologies in the assessment of property value impacts; 1) the use of control groups in which the sale value of comparable lots and homes could be compared, and 2) the use of assessment data on a township wide scale to measure the assessed values of homes adjacent to mining haul routes with comparable homes that are not on mining haul routes.

### 5.10.1 Home Sales Value Evaluation

As a first step, the investigators identified a set of control group developments which were adjacent to either haul routes and/or mine sites. Five different control groups from across the state of Michigan were identified for assessment. Critical to the level of accuracy of this type of assessment is the ability to compare the sale value of lots and homes that are comparable in terms of home size, features, and amenities. To accomplish this, the study identified homes that are within developed subdivisions, so that comparable homes that are adjacent to the haul route or mine site could be directly evaluated against homes in the middle of the subdivision, where the noise and visual impacts would be significantly diminished. Comparing single homes on large lots was determined to be infeasible for this study, given the wide variation in lot size, home site, site amenities, and home features and finishes.

The sale value of homes, and in some cases, developed but vacant lots, was evaluated within a set of years during which comparable homes were sold based on size, number of stories, size of garage, and other basic features. For example, within a given subdivision, the sale value of ranches during 2010 were put into two distinct categories—those adjacent to a haul route or mine site, and those on the interior of the development. In this manner, the value difference of homes impacted by trucking or mining could be assessed. For each of the five control groups the study includes maps and aerial photographs to document the setting and locations of the subjects evaluated.

In each of the five control groups evaluated, there was no correlation found between the location of a home adjacent to a mine site or truck haul route and a reduction in home sale value.

### 5.10.2 Home Assessment Evaluation

The second method of evaluating impacts focused on using the assessed value of homes over time, and comparing homes along truck haul routes, roads with higher traffic volumes that are not specifically gravel haul routes, and other homes in the community (excluding lakefront homes). Two Oakland County townships were selected for this evaluation, Milford and Highland, as both include current and past mining operations with reasonably distinct and predictable truck hauling patterns.

The assessed values were measured over a six year period. The study found very little variation between typical homes, homes on a truck route, and homes on comparable busy roads. Furthermore, two local assessors were interviewed for the study, and they confirmed the study's findings that no difference in assessed value exist between homes on truck routes and homes on comparable busy roads with more limited trucking.

In conclusion, based on the evidence found in the SRR study, there is no significant impact to property values for homes that are adjacent to sand and gravel mining sites or gravel truck haul routes as a result of mining and trucking. In addition, the long-term presence of mining and trucking in the vicinity of the Project Site would indicate that even if such impacts were to exist, those impacts would have already been experienced by local property owners.

### **5.11 Community Services**

There are no sanitary sewers or water utilities present on site. The D-bar-A Ranch utilizes septic tanks and groundwater wells for their sanitary and drinking water needs. During mining operations water will be supplied to the administrative office by way of a new drinking water well located near the office. Sanitary sewer needs will be met with a new septic tank. The proposed project will not impact local community utilities.

Currently, electric and telephone utilities are provided to the D-bar-A Ranch. During the mining operation, electric and telephone services will need to be supplied to the administrative office, and new electrical service will be required by the processing plant and related equipment. This work will be coordinated directly between the private utility providers and AAOM.

During mining, fencing pursuant to township standards will be used to deter trespassing in the mining area. AAOM will communicate with Township officials, including the Metamora Township Police Department and the Metamora Township Fire Department, as the project continues to inform the officials as to the progress of the project and any public safety issues being experienced. The parent company of AAOM, the Edw. C. Levy Co., maintains its own security employees who regularly patrol their sites and proactively reduce potential property crime and nuisances. While the presence of the mining operation can create an interest in the status of the property from local community members, in the experience of AAOM this heightened interest does not result in significant increases of trespassing or property crime. Impacts to community service related to public safety are anticipated to be minimal.

Processing plants and related facilities on the site are largely open steel frame structures with limited potential for sustaining a damaging fire. Fuel storage to supply mining equipment on site may slightly increase the potential for fire protection on site. All fuel storage facilities will be installed and maintained to meet regulatory guidelines and will be limited to above ground storage tanks with secondary containment. In addition, a spill prevention program will be implemented to educate employees and ensure any spill is managed safely and with minimal environmental impacts. Impacts to community services related to fire safety are anticipated to be minimal.

The mining operation will not cause an increase in township population, therefore, there will be no impacts to the public education or recreation systems.

### **5.12 Socioeconomic Environment**

As noted in previous sections of this report, the population of Metamora Township grew significantly during the period of 1990-2000, and less vigorously between 2000 and 2010, indicating population growth in the township is reflective of the past economic trends of the larger region. Recent census estimates for Lapeer County from 2010 through 2014 indicate that population change is currently quite stable, and is not currently growing in response to the recent economic recovery.

The township is largely rural in nature, and the predominate land uses are large lot single family, agriculture, sand and gravel mining and recreation. Job sustaining industries and businesses are a much smaller part of the township's land use matrix, indicating that most of the residents of Metamora Township commute to places in larger metropolitan region for employment. As estimated in the American Community Survey (conducted by the U.S. Census Bureau), the average commute in 2013 for Metamora Township residents is over 34 minutes, or more than 10 minutes longer than the average Michigan worker. According to that same data source, over 62% of Metamora based workers commute out of the Lapeer County for employment.

Median household income in Metamora Township is approximately 40% higher than the average for the State of Michigan; home ownership rates are 15% higher; and the percentage of households in poverty is less than half the state average. Lapeer County is ranked 8th out of 83 counties in Michigan in terms of median household income. Taken together, these facts indicate that Metamora Township is a reasonably prosperous community.

AAOM estimates ten people will be employed at the start of the first phase of mining activity. Most of these positions will be filled with people currently working at the company; however, some opportunities will be available to residents of Metamora Township. AAOM does not intend to provide trucking services for this operation, however, the proposed mining operation will support local trucking businesses. With the volume of materials expected to be mined, the locally-based (Lapeer County) trucking community will likely experience a meaningful increase in job creation as a result of the mining operation.

Overall, the proposed project will not have any material impact on the socioeconomic environment of Metamora Township and the surrounding communities.

### **5.13 Air Quality**

The primary potential air pollutant associated with sand and gravel mining operations is particulate matter (PM), also known as dust. PM is one of six major pollutants regulated by the EPA and the Air Quality Division of the MDEQ. The U.S. EPA sets the National Ambient Air Quality Standards (NAAQS) for the six criteria air pollutants. These standards protect public health (including the health of sensitive populations such as asthmatics, children, and the elderly) and the public welfare, including protection against decreased visibility and damage to crops, vegetation, and buildings. The units of measure for the PM standard are micrograms per cubic meter of air.

The U.S. EPA classifies and regulates dust by the particle size, which is measured in microns. Dust or PM less than or equal to 10 microns in diameter is commonly referred to as PM10. One micron is equivalent to one millionth of a meter. Potential sources of PM in a sand and gravel operation include aggregate processing, topsoil and overburden stripping, trucks and equipment using internal gravel roads within a mine, and mining of the aggregates (which lie above the groundwater level). As the proposed processing operations will utilize water in the processing of the aggregate, dust generated by aggregate processing and related material stockpiles is limited.

Dust and fine particulate matter from processing equipment and other sources is often measured by opacity. Opacity is a measurement of how dense the dust particles are in the air and takes into account how much light is obscured by the dust. Opacity is measured in percentages from 0% to 100% and measurement is performed by visible observation. When there is no visible dust, the opacity is 0%, meaning all light is able to pass through. Therefore, when the statement is made that an activity is

operating at a “25% opacity” level, it means the PM is blocking only 25% of the visual background light, leaving 75% of the background light visible.

The EPA regulates the emissions of particulate matter from nonmetallic mineral crushing facilities through the New Source Performance Standards (NSPS), Subpart OOO. 40 CFR 60.670(a) which defines, in part, an affected facility as each individual piece of equipment, crusher, screen and conveyor. Based on this definition, the requirements of Subpart OOO apply to individual pieces of equipment and include, but are not limited to, equipment specific opacity limits, notification of equipment startup, and reporting and recordkeeping provisions.

The DEQ enforces the Michigan Air Pollution Control Rules, which restrict the level of PM that can be emitted into the air. The Michigan Air Pollution Control Rules require owners/operators of crushing facilities to obtain a pre-construction air pollution control permit, which is known as a Permit to Install. This permit contains a set of general and special conditions for the operation of a crushing facility and incorporates the testing, monitoring, and recordkeeping requirements from the NSPS. Together, both the state and federal regulations set the maximum levels of dust which can be emitted from a crushing facilities.

MDEQ provides two options for permitting sand and gravel crushing facilities, a Permit to Install and a General Permit to Install. The General Permit to Install was established to streamline the permitting process for sand and gravel (e.g. nonmetallic mineral) crushing operations because these operations are relatively consistent and simple. To qualify for a General Permit to Install, the sand and gravel crushing operation must meet several criteria, including:

- Crushing less than 2 million tons per year at any one site,
- Locating crushing equipment 500 feet from any residential or commercial establishment, or place of public assembly, and
- Implementing a fugitive dust control program.

The proposed sand and gravel crushing operation for The Project Site qualifies for coverage under the General Permit to Install for Nonmetallic Mineral Crushing Facilities. A copy of the General Permit to Install for Nonmetallic Mineral Crushing Facilities is included for reference in Submittal Document II.H. MDEQ Permit Requirements.

The General Permit to Install for Nonmetallic Mineral Crushing Facilities contains the following requirements, which will be met by AAOM.

- Installing and maintaining water sprays on all crushers and screens to control PM emissions,
- Implementing a fugitive dust plan as specified in the General Permit to Install to control PM emissions from vehicle traffic, stock piles and other sources,
- Labeling crushing equipment within 45 days of startup,
- Notifying MDEQ of crusher startup within 15 days of startup,
- Submitting to MDEQ the performance test procedure 14 days prior to conducting performance testing, allowing MDEQ the time to approve the test plan,
- Notifying MDEQ 7 days prior to conducting performance testing of the date of testing, allowing MDEQ the opportunity to participate or monitor testing,
- Maintaining PM emissions from each piece of equipment below the opacity limits listed in The General Permit to Install, (e.g. 15% for crushers, 10% for screens, 10% for conveyors),

- Conducting performance testing within 60 days of achieving maximum production rate, or no later than 180 days after initial startup,
- Maintaining a copy of the General Permit to Install on site,
- Limiting production to 2 million tons of crushed material per year, and
- Locating the crusher at least 500 feet from any residential or commercial establishment, or place of public assembly.

AAOM will comply with these permit requirements, and will implement a series of mitigation measures related to air quality to ensure compliance. These measures include 1) sequential reclamation to limit the amount of disturbed land, 2) management of topsoil/overburden stripping and reclamation earthmoving operations (typically through the use of water trucks), 3) maintenance of on-site gravel haul roads (e.g. grading and the application of water and chloride), and 4) the use of water in the processing of materials.

It should also be noted that the existing agricultural lands covering a portion of those areas proposed for mining operations also have the potential to generate dust because of farming activity. Impacts to local air quality will be minor, short-term and limited to the mining season.

#### **5.14 Noise**

Metamora Township ordinance has standards for acceptable limits of noise from operations and activities that may be of nuisance to the community based on land use zone. Specifically, Zoning Ordinance No. 23 Section 1517 states:

“No operation or activity shall cause or created noise that has any annoying or disruptive effect on adjoining properties, that becomes a nuisance to adjacent uses and/or that exceeds the sound levels prescribed below, using an A-weighted decibel scale dB(A), when measured at the lot line of any adjoining use, based upon the following maximum allowable levels for each use district”

The Project Site is zoned R-2 and A-1, therefore, the maximum allowed noise levels are as follows:

- 6 AM to 9PM: 60 dB (A)
- 9 PM to 6AM: 45 dB (A)

To accurately predict the noise levels at the Project Site, AAOM engaged a sound engineer to evaluate the potential impact. Kolano and Saha Engineers Inc. utilized a three dimensional software package to develop a computer model of the proposed mining activity. Typical mining equipment such as excavators, dozers, washing plants, etc. were studied to determine the acoustic effects of their use. The equipment was analyzed at the AAOM Highland Plant, which is a plant that utilizes mining and extraction equipment very similar to the proposed operation at the Project Site.

The model was constructed using topographical data of the Project Site. In addition, the noise producing equipment were positioned to produce a maximum noise output and more equipment was added than might be typically used in order to create a conservative, worst case approximation. The noise levels for each Phase were studied. The findings are summarized below based on the report by Kolano and Saha Engineers Inc. (Submittal Document II.F Noise Impact Investigation of Mining Operation).

The mining operations in Phase I are expected to meet the township ordinance because of the utilization of 10-16 foot earthen berm along the eastern and southern edge of the Phase I. Mining during Phases II, III and IV along the west side of the Lease Parcel will also meet township standards because the source



of noise will be generated from elevations much lower than the adjacent residences, and the mining face itself will act as a noise buffer. Some pre-mining operations will be on the existing surface elevations. Therefore, 12-16 foot berms along the Lease Parcel are recommended to minimize the noise during this period of time when operations are within 600-800 feet of the western property line. At distances greater than 600-800 feet from the property line (depending on topography and density of trees) the noise study indicates that sound from pre-mining activities (typically earthmoving construction equipment) on the existing surface elevations will be within township standards. With the berm implementation and management of mining operations, the mining activity during Phases II, III, and IV are expected to comply with the township noise ordinance. Phase V activities are proposed for the Guy Parcel area of the Project Site. With the berms in place, as mentioned previously, the mining activity is expected to be in compliance with the township noise ordinance. Trucks entering and leaving the Project Site via Dryden Road will cause some noise to this area of the Project Site. The aforementioned berms will help to alleviate this impact with the trucking as it does the mining operation.

In conclusion, the proposed sand and gravel mining operation will generate additional noise in the area from earthmoving equipment for the installation of berms and topsoil stripping and from mining activity. Maintaining existing buffers and the proposed earth berms will aid in the minimizing of noise from the mining activity and will meet noise level standards established in the Metamora Township Ordinance.

## **5.15   Vibration**

Vibrations caused by the extraction and processing of the sand and gravel are limited to those associated with standard earth moving and processing equipment. Vibration from this type of sources typically dissipates through the soils immediately surrounding the source, and do not impact adjacent properties.

No explosives will be used or blasting undertaken at the proposed mine site.

## **5.16   Traffic**

### **5.16.1   Scope**

Bergmann Associates was retained by AAOM to conduct a traffic impact study to determine current and projected traffic conditions and impacts of the proposed mining activity. The study focused on the following roads within the Village of Metamora and the Village of Dryden:

- Dryden Road
- M-24 (Lapeer Road)
- Oak Street
- John R. Sand and Gravel Commercial Access Drive
- Ribble Road
- Mill Road
- M-53 (Van Dyke Road)

The following intersections were accessed to study traffic volumes:

- Dryden Road/ M-24
- Dryden Road/ Oak Street
- Dryden Road/ John R. Sand and Gravel Commercial Driveway
- Dryden Road/ Ribble Road

- Dryden Road/ Mill Road
- Dryden Road/ M-53

The preceding roads and intersections were evaluated to document the traffic conditions as they are today as well as to make predictions as a result of the proposed mining activity. The traffic study, (Submittal Document II.G. D-bar-A Project, Traffic Impact Study), assumes the proposed mine will be fully operational in the year 2022 and uses this schedule to project traffic volumes.

The ability of the intersections/ roadways to accommodate traffic are measured using the level of service (LOS) methodology for signalized and non-signalized intersections as documented in the Highway Capacity Manual (HCM). LOS rating ranges from A to F with LOS A describing operations with little or no delay and LOS F describes highly congested conditions with substantial delays. LOS D or better is considered acceptable for peak hour conditions.

#### 5.16.2 Methodology

Manual turning movement counts were performed by Bergmann Associates at the six intersections on May 20, 2015, May 21, 2015 and June 2, 2015. The counts were recorded in 15-minute intervals to enable the identification of the peak hour and also the characteristics of the peaking hour and heavy vehicle activity in that hour. Morning and evening counts lasted from 7:00 to 9:00 AM and from 2:00 to 6:00 PM, respectively, each count day. The weekday morning and evening peak occurred around 7:45-8:45 AM and between 4:30- 5:30 PM, respectively.

To accurately assess the impacts to traffic volumes as a result of the proposed mining activity, Bergmann Associates had to project a No Build Alternative to predict what the traffic volumes might be in the future and compare that volume with the projected volume with the proposed mining activity.

A background growth rate of 0.50% per year for the traffic volumes in the area was used as the No Build condition in 2022. For the proposed mining activity scenario, trip generation for the proposed facility was calculated by utilizing the anticipated yearly aggregate production volume (1,000,000 tons per year) and truck capacity to determine the number of trucks the site would generate daily throughout the peak production period of April to mid-November. Operating hours for the facility are anticipated to be 6:00 AM to 6:00 PM Monday through Friday and 6:00 AM to 12:00 PM on Saturday. To determine the number of trucks that were generated in the peak AM and PM hours, existing production data from AAOM's Highland Aggregate Facility in Highland Township from June 1, 2015 and June 15, 2015 was utilized to determine the percentage of total truck trips that left the facility within a given 15 minute time period.

#### 5.16.3 Results

A LOS analysis for peak AM and PM hours based on traffic counts, traffic volume projections, traffic peaking characteristics and intersection geometry was calculated for the following conditions:

- Existing (2015)
- Future No Build (2022, without new mining operation)
- Future Build Phase (2022, with new mining operation)

For the existing condition, all the intersection approaches within the study area are currently operating at acceptable LOS during both the morning and evening peak hours with the exceptions of the westbound Dryden Road left-turn and right-turn movements at M-24 (Lapeer Road). The left-turn movement operates

at LOS E for the morning peak and the right-turn movement operates at LOS F for both the morning and evening peak hours.

For the No Build condition, all of the intersection approaches within the study area are projected to continue to operate at the same LOS as existing conditions with the exception of M-24/ Dryden Road (westbound left-turn movement, PM peak) and M-53/Dryden Road (northbound left-turn movement, PM peak). The M-24/Dryden Road intersection goes from a LOS D to E and M-53/Dryden Road intersection goes from a LOS A to B.

For the Future Build condition, all of the intersection approaches within the study area are projected to continue to operate at the same LOS as the No Build condition. Therefore, the mitigation recommendations will be the same as the future No Build condition.

#### 5.16.4 Proposed Driveway Location

As part of the traffic impact study, Bergmann and Associates recommended a location for the driveway into the Project Site. The recommendation is in reference to guidelines set forth in the Board of Lapeer County Road Commissioners Policy on Construction of Commercial Driveways, Private Road Approaches, and Public Roadways. A preferred location was identified approximately 900 feet west of Ribble Road along Dryden Road (see Figure 16. Bergmann Associates Proposed Driveway Location).

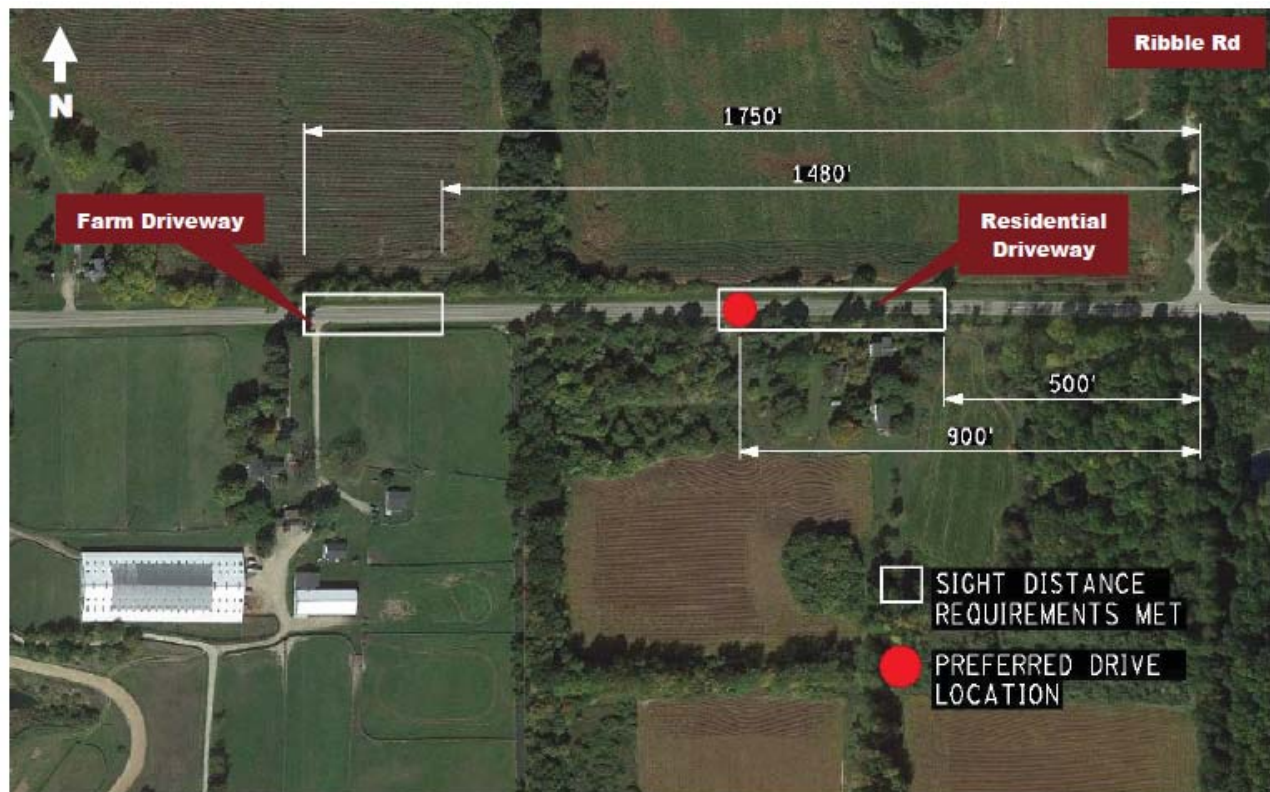


Figure 16. Bergmann Associates Proposed Driveway Location

#### 5.16.5 Crash Analysis

A crash analysis was completed by Bergmann and Associates for the Village of Metamora and the Village of Dryden to determine if “the existing commercial vehicles that travel through these areas are significantly impacting crashes.” During the 5 year study period of January 1, 2010 to December 31, 2014 there were 8 crashes in the Village of Metamora and 11 crashes in the Village of Dryden. Of those 19 crashes, 1 of them involved a commercial vehicle. In that accident, a car was backing up to accommodate a turning commercial vehicle and backed up into a trailing vehicle. The crash report only includes the two private vehicles as being involved in the collision as the commercial vehicle did not strike a vehicle.

#### 5.16.6 Pedestrian Safety

The traffic engineers also considered the potential impacts to pedestrian safety as a result of additional large trucks using Dryden Road. Pedestrian walks are provided along Dryden Road within the villages of Metamora and Dryden, and the signalized intersections of Dryden Road and Mill Street (in Dryden) and Oak Road (in Metamora) both have sidewalks, crosswalks and ramps. The segments of Dryden Road outside of the villages do not include sidewalks. The crash analysis referenced above did not identify any incidents between trucks and pedestrians along the haul route.

The engineers also referenced data provided by the National Highway Traffic and Safety Administration (NHTSA) which evaluated, on a nation-wide level for the year 2013, the traffic accidents which resulted in the death of a pedestrian. The NHTSA study concluded that the overwhelming majority of pedestrian fatalities occur in urban areas (73%) and in the dark (72%), typically outside of the hours of operation for the proposed mine. Further, incidents between large trucks and pedestrians account for less than 7% of all pedestrian traffic deaths.

Given the availability of pedestrian walks and crossings in areas of higher pedestrian activity (i.e., the two villages), the lack of reported traffic incidents involving pedestrians in the study area, and the statistical evaluation of pedestrian traffic incidents noted above, the traffic study concludes that “it is unlikely that the increase in truck traffic on the haul route poses a substantial threat to pedestrian safety in the community.”

### 5.17 Visual Quality

As noted in this report, the rural character of Metamora Township is highly valued by residents, as reflected in township zoning ordinances and the Master Plan. The desire for maintaining the rural character indicates, to an extent, what the community would consider the most important elements and indicators of the visual quality of the Township (e.g. rolling topography, open farm fields, wooded areas and tree rows, and lakes, wetlands and water features).

The Project Site contains many of the typical elements of the rural landscape in Lapeer County noted above, and contributes to the rural character and visual quality of the area. Views of the site landscape can be described as follows:

The western edge of the Project Site is largely wooded on both sides of the boundary between the Project Site and adjacent rural residential home sites. As discussed in the Land Use Analysis, abutting the western edge of the Project Site are ten single family residences, located on large lots which are typically nearly fully wooded. Four of the homes are located within 200 feet of the Project Site boundary (but not



less than 125 feet), while the remaining six homes are at least 250 feet from the Project Site boundary. Views into the Project Site from the homes are blocked or significantly diminished by a dense tree canopy (with the exception of the home immediately north of Dryden Road), and in some areas, a dense understory of shrubby brush. While a view of the woodlands is visually rewarding, the depth of the view shed is limited by the density of the trees, and few, if any, vistas are available to observe the larger wooded qualities of the Project Site.

Along the southern side of Dryden Road there are seven residential homes adjacent to the Project Site with views of the north side of the road. A cemetery and residence are located on the north side of Dryden Road and directly adjacent to the Project Site; however, these are owned by the Edw. C. Levy Co. Views along Dryden Road include a reasonably open view into the agricultural fields on the eastern third of the Guy Parcel; views of the farm fields are partially obscured by trees and brush on the middle third of the Guy Property, and the residential home and cemetery on the western third. The frontage along the Lease Parcel is woodland and scrubby shrub growth, with limited views into the interior of the site. Screening berms will be installed to prevent the visual intrusion of the mining activity and manage sound levels; however, they will also prevent visual access (for a limited number of residents and for travelers on Dryden Road) to the agricultural fields which contribute to the rural character of the area.

Three homes are located to the east of the site along Ribble Road. Given the topography of the road and the presence of dense woodland on the home sites and a mature tree line growth on the west side of Ribble Road, these homes have a fairly limited view of the Guy Parcel. The proposed placement of berms along the west side of Ribble Road will further obscure views into the Project Site. Two homes exist near the eastern boundary of the Project Site along Wilder Road. These two homes are adjacent to buffers within the Project Site, and will be buffered from mining activity by woodlands, as well as berms that will be placed on the south and east sides of Mining Phase I.

Inherent in the nature of extracting sand and gravel resources is altering the visual environment of the mining site. Most local ordinances and mining operators recognize the potential for impacting the visual character of the host community, and require mitigation measures which reduce these impacts.

Mitigating factors at the proposed site and proposed mitigation actions by AAOM include the following:

- AAOM has proposed the install earthen berms at the perimeter of the mining area, where the mining area is adjacent to other properties and public roads. The berms will vary in height from 10-16 feet and will be located within the (150 foot wide minimum) mining setback.
- With the installation of screening berms any views of the mining operation will be limited to a distant glimpse of the top of the processing plant (located at the center of the site), and of construction equipment building the screening berms.
- To retain some of the rural character along adjacent roads, AAOM proposes to preserve trees along adjacent road ways such as Ribble and Dryden Roads.
- The typical approach to be utilized for placement of screening berms in the mining setback will be to preserve trees in the mining setback closest to residential homes and public roads, and constructing berms on the interior side of the setback.
- Overlapping berms will be constructed at the site entrance to minimize views into the mining area from Dryden Road.

The Project Site is near four existing sand and gravel mining operations, most of which are still actively producing and selling aggregate products. Sand and gravel mine sites are not a new visual element in the landscape of Metamora Township, and are part of the existing rural character of the region.

The overall impact to the township's rural ambience as a result of the change in character of the central area of the Project Site is considered minor given the low density land use of the area and the above-mentioned mitigating factors.



## **SECTION 6     MITIGATIVE MEASURES**

This section summarizes the mitigative measures and factors that have been proposed by AAOM as part of this sand and gravel mining operation, most of which have been discussed in previous section of this report.

### **6.1     Safety and Materials Handling**

AAOM establishes specific Safety and Materials Handling policies and procedures for each of its active mining sites, including:

- Use of double walled fuel storage tanks and/or secondary containment facilities in compliance with State of Michigan requirements.
- The careful use and storage of any hazardous materials which may be utilized from time to time at the site, such as motor oil.
- Procedures for responding to emergency situations properly and expeditiously.

### **6.2     Soils**

As mining operations proceed and mining of a particular area is completed, stockpiled overburden will be spread to achieve desirable grade for surface drainage and to blend with existing adjacent topography. Once the appropriate subgrade has been established, topsoil will be spread in accordance with township zoning ordinances and then seeded with an appropriate grass seed mix. Stockpiles of overburden and topsoil will be temporarily seeded to prevent dust generation and loss due to erosion.

Soils placed in reclamation areas intended for future agricultural production will be initially seeded to stabilize underlying soils, and then put into agricultural production to support the D-bar-A Ranch.

No topsoil will be removed from the site, either through the sale of the topsoil or through erosion and sedimentation. The mining and reclamation plans propose a buffer between the active Mining Area and the edge of regulated wetland and water bodies. This buffer will prevent eroded sediments from leaving the mining area and damaging regulated natural features. Further, sedimentation and erosion control measures will be installed as necessary to prevent damage to adjacent properties and wetlands.

### **6.3     Storm Water Management and Wetlands**

Management of storm water throughout the mining and reclamation process is an important part of limiting impacts to the existing water bodies and wetlands on and adjacent to the Project Site.

AAOM proposes that the mining and reclamation shape the land such that storm water on site is directed to drain to low areas within the mining area where it is collected, temporarily stored, and then allowed to infiltrate into the groundwater. This approach encourages the recharge of groundwater levels, minimizes storm surges into adjacent wetland and water bodies, filters sediment from the storm water flow, and creates new wet meadow habitat.

### **6.4     Terrestrial Systems**

The loss of woodlands on the site and the habitat values they bring will be mitigated in part through the following measures:

1. Woodlands will be removed incrementally over the life of the mining operation.
2. Woodlands removal will be scheduled during the fall and winter (October 1 through March 31) when impacts to bat and migratory bird populations are minimized.
3. Reclamation activities will be ongoing through the period of mining operations, limiting the amount of exposed land and stabilizing soils.
4. The BSA will participate in the reclamation of the site through the mass planting of seedlings, effectively creating new woodlands as the site is reclaimed.
5. No protected species were observed during the 2015 Project Site evaluations. However, if protected wildlife species are identified on the site during the mining period, mitigating measures can include seasonal limitations on mining activities, protective barriers or physical relocation of protected wildlife under permit from the Michigan Department of Environmental Quality or the U.S. Fish and Wildlife Service.

## **6.5 Air Quality**

It is the intent of AAOM to practice protective and mitigative measures to minimize the generation of air pollutants and dust from mining operations. These measures include the following:

- Appropriate use of dust palliatives such as calcium chloride and water as necessary, on internal haul routes, the plant area, and the extractive area.
- Timely reclamation of mined areas to prevent wind borne dust due to soil erosion.
- Paving the site route for 300 feet from its intersection with Dryden Road, consistent with AAOM standard practice for new operations.
- Use of process equipment, machinery and transport vehicles which are in compliance with Federal and State emission regulations.

## **6.6 Noise**

Noise levels generated by the mining operations are not anticipated to have a significant impact on the community, and AAOM has proposed measures to minimize noise levels to keep them within Township standards and requirements. AAOM intends to organize its mining activity such that the working face of the mine will be oriented away from the nearest adjacent residences, so that the mining face acts as a barrier to noise. With the noise generating equipment working at the base of the pit, the face of the mine acts as a buffer to deflect noise. Additionally, AAOM proposes to construct earth berms where required using the height standards established by local ordinances as a minimum, and following the recommendations of the Noise Assessment. These berms will act as noise barriers and visual barriers, and add to the grade separation between mining operations and adjacent lands.

The proposed boundary of the processing plant site is approximately 1,200 feet from the closest residences located on the west side of Wilder Road, 1,500 feet north of the nearest home on Ribble Road, 2,900 feet from property on the south side of Dryden Road, and 3,400 feet from the homes located west of the Project site. The placement of the processing plant this far from adjacent residences, and the construction of earthen screening berms, will result in significant reductions in noise impacts to nearby homes as discussed previously in this report.

Back-up alarms on operations vehicles (e.g., front end loaders) are required by state law. Because of their intermittent nature and high pitch, these alarms appear to be particularly audible. To alleviate this problem, AAOM will use state-of-the-art back-up alarms ("Smart Alarms") on all equipment. These alarms continually measure the ambient sound level in the immediate environment and automatically adjust the

warning signal to be five decibels louder, which meets MIOSHA Safety Standards and minimizes noise impacts.

Proper equipment maintenance measures contribute to minimizing noise impacts, and AAOM regularly inspect and repairs conveyors, loaders, and plant equipment as part of their routine plant operations.

## **6.7 Traffic**

The efficiency of traffic movement is measured with a matrix referred to as “Level of Service” (LOS). As stated previously in this report, the only intersection that will not meet the (LOS) requirement of a D (as established by MDOT) or better is the M-24/ Dryden Road intersection, which does not meet the MDOT standard in both the Future No-Build (i.e., future traffic even without mining activity) and the Future Build (i.e., future traffic plus anticipate truck traffic generated by mining) scenarios. The traffic engineer and author of the analysis for this proposed operation, Bergmann and Associates, recommends a signal timing adjustment as a potential solution to improve the westbound traffic at this location. This adjustment will bring each movement at the intersection to a LOS D or better.

The traffic report further recommended intersection improvements where the Project Site entrance road meets Dryden Road. Consistent with the standards of the Lapeer County Road Commission, AAOM will implement improvements at the Project Site entrance including:

1. Locating the Project Site entrance to maximize sight distance and safety.
2. Construction of a lane on the south side of Dryden Road at the Project Site entry so that east bound vehicles may safely go around trucks turning into the Project Site.
3. Construction of a taper lane on the north side of Dryden Road, east of the Project Site entrance, so that trucks can have additional road space to slow themselves when entering the Project Site from the east, minimizing interference with west bound through traffic.

In addition, it is standard practice at AAOM sand and gravel operations to pave the initial length of the entrance road with bituminous asphalt to reduce dust, noise, and the tracking of mud and sediment onto the county road. For the proposed project, AAOM anticipates paving approximately 300 feet from the point where the entrance meets Dryden Road.

It should be noted that the Project Site is near four existing sand and gravel mining operations, most of which are still actively producing and selling aggregate products. Commercial and gravel truck traffic has been utilizing Dryden Road as a haul route for a number of decades, such that the truck traffic to be generated by the proposed project does not represent a significant change or new impact to the traffic patterns of the region.

## **6.8 Visual Quality**

Most of the change in the visual environment will be visible only to people who are within the BSA property and Project Site. Since these impacts will only be directly experienced by the BSA and their invited guests, the focus of mitigation measures for visual impacts is the adjacent residences and users of public roads. Mitigation measures will be installed and maintained by AAOM to reduce the visual impact of the mining activity through the use of screening terms, preservation of existing trees and woodlands, and the planting of trees.

The height of the berms will vary along the length of the property perimeter to provide a more naturalistic and pleasing appearance. Minimum berm height will be ten (10) feet as recommended by the noise study, which exceeds the eight (8) feet tall requirement noted in the township ordinance. The berm will be taller where the property is adjacent to residential structures to better screen views and reduce sound levels.

The mining operations will be nearly completely screened from view from adjacent homes and public roadways. Proposed berms will be located in the mining setback as required by ordinance (i.e., within the 150 foot buffer at the perimeter of the mining.) Where possible, the berms will be located on two-thirds of the 150 foot buffer such that existing trees can be preserved in a 50 foot wide edge (closest to neighboring properties) to reduce the visual presence of the berm. Where proposed buffer areas are wide enough to provide substantial screening of the operations, no berms are proposed along the perimeter of the Project Site. For instance, no berm is proposed along Wilder Road; rather a 1,000 foot wide buffer is proposed, with the required berm to be located directly adjacent to the mining activity.

No mining equipment will be used within the 150 foot buffer except as needed to construct the berms and reclaim the site.

As with noise, any adverse visual impacts will lessen as mining operations proceed and begin to occur at progressively lower elevations than the surrounding grade of adjacent roadways and residences. Additionally, the proposed berms will further screen views into the Project Site from roadway and residences.

## **6.9 Information on Preparers**

This Community Impact Statement has been prepared by, and under the direct supervision of, Robert Doyle, a Principal of the planning, engineering, and design firm SmithGroupJJR. Mr. Doyle is a landscape architect in the State of Michigan with over 30 years of experience working with the aggregate industry in preparing impact assessments, mining plans, reclamation plans, and post-mining development plans across the United States.

Mr. Doyle works out of the Ann Arbor office of SmithGroupJJR, which is located at 201 Depot Street, Ann Arbor, MI 48104; phone number is (734) 662-4457.

Geologic investigations, mining and operations planning, and estimates of materials have been prepared by, and under the direct supervision of, Mathew Van Slembrouck, a professional engineer (State of Michigan license number 6201058391) employed by the Edw. C. Levy Co. Mr. Van Slembrouck has 9 years of professional experience, 5 of which are at his current position.

Mr. Van SlemBrouck's office is at 51445 West 12 Mile Road, Wixom, MI 48393; phone number is (313) 429-2000.