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September 4, 2026

Irish Hills Concerned Citizens
c/o Andy Buchsbaum
P.O. Box 72
Brooklyn, MI 49230

RE: Preliminary Environmental Assessment, Proposed American Aggregates of Michigan, Inc. (a.k.a. Edw. C. Levy Co.), Brooklyn, Parcel Nos. 000-20-13-400-001-01 (71 acres), 000-20-13-251-001-00 (104 acres), 000-20-13-301-001-00 (84.75 acres), 000-20-13-151-001-01 (15.75 acres), 000-20-14-400-001-01 (112 acres), 000-20-24-200-001-00 (240 acres), and 000-20-24-100-002-00 (40 acres), Sections 13, 14 & 24, T4S, R2E, Norvell Township, Jackson County, Michigan.

Dear Irish Hills Concerned Citizens,

Per your request, please find this public comment and preliminary environmental review/assessment of the proposed American Aggregates of Michigan, Inc.'s proposed Levy-Norvell Gravel Mine and evaluation of the Norvell Township zoning ordinance and master plan.

1.0 Qualifications

I am the President of Grobbel Environmental & Planning Associates of Lake Leelanau, Michigan. I hold a Ph.D. from Michigan State University, Resource Development Department in the field of Environmental Policy and Law. I also obtained a Master of Science degree from Michigan State University with an emphasis in the study of environmental impact assessment, hydrology, soils, fluvial geomorphology, watershed management, land use, and hydrogeology. I have had ongoing formal training in hydrologic, hydrogeologic, and wetland science, and contamination fate and transport, including many courses at the University of Wisconsin and the Wetland Training Institute. My *curriculum vitae* is attached to this report, *Ex. 1*.

I have worked for the Michigan Department of Environmental Quality (now the Department of Environment, Great Lakes and Energy or “EGLE”) in the Gaylord District Office and Lansing headquarters, in the Water Resources and Remediation and Redevelopment Divisions (known during my tenure as the Land and Water Management and Environmental Response/ Groundwater Quality Divisions, respectively), including providing litigation support and expert testimony for the Michigan Department of the Attorney General, specializing in environmental impact and water quality assessment, hydrology/hydrogeology, and the investigation and remediation of air, soil, surface water, and groundwater contamination, among other things. For more than 35 years I have worked as an environmental professional and ecological consultant, which has included cumulative environmental impact assessment; water quality analysis; ecological assessment, hydrology/hydrogeology; soils investigation; wetland delineation, permitting and restoration; property remediation and redevelopment; surface and groundwater contamination investigation and remediation; contaminant movement/fate and transport, and expert witness services, etc. I have been previously qualified as an expert in cumulative environmental impact assessment, water quality and soil assessment, wetland science and regulation, geomorphology, contaminant fate and transport, land use/zoning, and hydrogeology in Michigan and federal courts. I have been qualified as an expert in hydrogeology, geomorphology, hydrology, and wetland characterization and delineation by EGLE administrative law judges and stipulated as such by EGLE, Water Resources Division’s wetland protection program.

2.0 Methods

To complete this public comment and environmental assessment and develop findings and recommendations, I reviewed publicly available information including but not limited to expert reports, site property data, publicly available climate, topography, land cover, hydrologic, hydrogeologic, soils maps, and relevant state and local regulations. I have also visited public areas within the vicinity of the proposed project, including the Watkins Lake State Park and County Preserve and surrounding areas. Having performed these tasks and reviewed these data, I used weight-of-the-evidence methods to formulate findings and recommendations disclosed in this report as summarized below. These findings are offered to a reasonable degree of scientific certainty, the scientific and policy bases for these are provided within this report - together with explanations of the methods that I used to perform this study. In completing my work I used customarily accepted scientific methods and

followed procedures that I commonly employ in my profession to evaluate land uses and associated environmental matters. I understand that if called upon, I may revise or augment these opinions based on new data and information.

3.0 Summary of Findings

Finding 1: Given the Township's near surface geology, i.e, the presence of a shallow near surface groundwater, likely pit de-watering will lower the water table and thereby threaten nearby wetlands, water bodies, and residential drinking water wells, and should be a primary focus of the Township and in the review of this proposal. (See pp. 6, 8 & 16).

Finding 2: Given site soils, near surface hydrogeology and hydrology, there is a high likelihood for AAOM operations to alter groundwater chemistry and impair adjacent wetlands and nearby surface waters, and clearly represent "very serious consequences." (See pp. 8 & 16). These likely impacts must be fully explored within the AAOM application and fully understood by the Township prior to any final decision-making in the the review of this matter.

Finding 3: The development and operation of the proposed aggregate mining and processing facility is inherently incompatible with the Township's Master Plan, and will have a serious deleterious impact on the community character and values stated in the Master Plan, and the valued natural resources of the Township - especially those in the immediate vicinity of the proposed project. (See pp. 13-17).

Finding 4: The development and operation of the proposed aggregate mine facility will have direct and indirect unacceptable impact to the citizens' uses, including bird and wildlife observation and other peaceful enjoyment, of the Watkins Lake State Park & County Preserve. (See p. 14).

Finding 5: The development and operation of the proposed aggregate facility will unreasonably interfere with non-motorized modes of resident use of the Township's rural roads, proposed haul routes lack adequate shoulders for such pedestrian use, is incompatible with the intended public uses of nearby hiking trails, and will create an unacceptable risk to public safety from heavy duty truck traffic. (See pp. 24 & 28).

Finding 6: Based on known site conditions and criteria with Michigan's Part 303: Wetland Protection Act, both Wetlands U and ZZ are very likely state-regulated, irrespective of their size. (See p. 9).

Finding 7: It is highly recommended that a qualified third party working on behalf of the Township definitively investigate and confirm or deny the potential occurrence of prairie fen wetlands at and/or downgradient of the proposed AAOM north pit. (See p. 18 & 20-22).

Finding 8: Additional hydrogeological study including baseline water quality assessment, near surface/perched groundwater study, and near surface aquifer pump tests should be performed and reported to the Township at each planned excavation pit and processing location before any final Township decision. (See p. 16).

Finding 9: The direct and indirect impacts to near surface groundwater, wetlands and nearby surface waters from likely pit de-watering and process water and waste water disposal should be fully detailed and disclosed by AAOM before any final Township decision-making. (See p. 6 & 16).

Finding 10: We strongly urge that the Township exercise its discretion to require a 1,600 feet setback from any parcels zoned for future residential subdivision development; and sensitive receptors and natural resources including but not limited to wetlands, lakes, streams and other waterbodies, and special concern, threatened, and endangered species present at the subject parcels or their habitat. (See p. 18).

Finding 11: Direct and indirect impacts of the proposed mining operation on wetlands, including rare prairie fens, and associated state and federally-protected plants, animals and insect species must be understood by the Township before any final decision, and it is incumbent upon the Applicant to fully inventory, assess and disclose such impacts. (See pp. 18-19).

Finding 12: It is strongly recommended that the Township require a robust impact study, including air quality, noise, lighting and vibration impacts, from the operation of the heavy equipment at the proposed mining site(s) and from heavy duty truck travel along haul routes. (See p. 24).

Finding 13: It is recommended that the Township require valid and reliable studies of the expected human health impacts from the project to nearby sensitive receptors, i.e., children, the elderly, and people with compromised health conditions such as chronic obstructive pulmonary disease, asthma, etc. Such studies should evaluate impacts on pedestrians, runners, bicyclists, and other non-motorized modes of transportation of proposed haul routes, and expected impacts to residents' health. (See pp. 23-24).

Finding 14: Article 13 of the Township Zoning Ordinance, Section 13.6.D. requires that the AAOM application address and the Township review the proposed project's potential impact of all future land uses within the AG-1 zoning district. (See p. 29).

Finding 15: Noise generated from the aggregate operation will very likely result in the unreasonable interference with the comfortable use and enjoyment of nearby residential uses, will not be harmonious in this setting to the intended character of the general vicinity of the Township, will likely exceed the Township's noise ordinance standards at nearby property lines, and will certainly violate the intent and expressed goals, policies and actions of the Norvell Township Master Plan. (See p. 27).

Finding 16: Based on information and belief, the results of these Phase II Environmental Site Assessment activities have not been disclosed to the Township, or at a minimum have not been provided to the public through the AAOM application material at the Norvell Township website. (See p. 11).

Finding 17: The lack of comprehensive Phase II environmental investigation addressing all six (6) recognized environmental conditions identified in the Phase I Environmental Site

Assessment report renders the AAOM application administratively incomplete, and precludes the Township's review and any final decision-making in this matter. (See pp. 11-12).

Finding 18: As required by Section 12.7(B)(9) the application lacks required EGLE permits including Part 303 (wetland impact from likely dewatering and use for stormwater disposition), Part 31 Spill Prevention, Control and Countermeasures (SPCC) plan/permit, etc. Thereby the AAOM application administratively incomplete, and precludes the Township's review and any final decision-making in this matter. (See p. 16).

Finding 19: As required by Section 12.7(B)(9) the Township should rebore on-site surveys for the Mitchell satyr butterfly and its specific wetland habitats, including prairie fen wetlands. Thereby the AAOM application is incomplete as submitted, precluding Township review at this time. (See pp. 18-20 & 22).

Finding 20: It is strongly recommended that the Township require a robust dust control plan, light management plan, a meaningful air quality plan, vibration monitoring plan, and anticipated impacts to residents' health. Such valid and reliable studies should be completed and provided to the Township prior to any final decision. (See pp. 23-24).

Finding 21: The lack of detail and adequate noise, light and dust control plans renders the application administratively incomplete, precluding Township review and/or any final decision-making in this matter of the application as submitted. (See p. 24).

Finding 22: The lack of an adequate traffic study including peak travel times/days/seasons renders the application administratively incomplete, precluding Township review and/or any final decision-making in this matter of the application as submitted. (See p. 28).

Finding 23: The required mixture of anti-fouling chemical additives needed to keep a closed-loop waste water management system operational has not been disclosed, and thereby the application is administratively incomplete precluding Township final action. (See p. 15).

4.0 Proposed Project Description

American Aggregates of Michigan, Co, (a.k.a. Edw. C. Levy), hereinafter referred to as "AAOM," has proposed an aggregate mining, processing, storage and hauling operation at six (6) parcels within Sections 13, 14 and 24 of Norvell Township, Jackson County, Michigan totaling 626.4 acres.¹ The project intends to provide local and regional construction industry demand for construction-grade sand and gravel within ten (10) project phases over twenty (20) years.² A project site north of Horning Road consists of 384.7 acres, and a south project property totals 241.7 acres. AAOM estimates that the

¹ Township Receives Application for Proposed Aggregate Mine, The Township of Norvell, Press Release dated November 20, 2025, p. 1.

² American Aggregates of Michigan's Application for Site Plan Approval, Conditional Use Permit and Mining Permit under Section 7 for a proposed sand and gravel mining operation, Zausmer, P.C., November 17, 2025, pp. 1-3.

proposed mining site contains 12,500,000 cubic yards (or ~ 17 million tons) of marketable sand and gravel.³ Notably, AAOM's application states that "(m)ining activity is not proposed, at this time, to go below the water table...and no impact on public or private wells is anticipated."⁴ *This statement beggars belief as: 1) the AAOM application's focused noise assessment disclosed and relied upon 25 to 30 foot high vertical excavation pit walls,⁵ 2) each of the future site reclamation/development plan examples provided by AAOM consist of residential developments surrounding artificial inland lakes created through sand and gravel mining⁶ and very likely representing a key component of AAOM's overall project finance plan's return on investment; and 3) AAOM's hydrogeological study documents the groundwater table exists at as little as five (5) feet below the ground surface at portions of the project site.⁷*

AAOM's application is for a zoning/mining operation permit, site plan review, and conditional use permit for the proposed mining and processing operation.

5.0 Site and Vicinity Hydrogeology

U.S.G.S. topographic map (7.5 Minute Series Manchester Quadrangle), residential water well logs, and soil survey maps for Norvell Township, Jackson County were reviewed to determine the geomorphology and interpret hydrologic conditions at and in the area of the subject parcels. Refer to Figure 1 below for a copy of a topographic and site features map.

³ Ibid., p. 3. Anticipated aggregate products include commercial asphalt, basement floors and walls, paver bricks, septic tanks (sic) and pipe bedding. Also see American Aggregates of Michigan's Application for Site Plan Approval, Conditional Use Permit and Mining Permit under Section 7 for a proposed sand and gravel mining operation, Zausmer, P.C., November 17, 2025, p. 24.

⁴ Ibid., and American Aggregates of Michigan's Application for Site Plan Approval, Conditional Use Permit and Mining Permit under Section 7 for a proposed sand and gravel mining operation, Zausmer, P.C., November 17, 2025, p. 20.

⁵ Focused Noise Estimate Report, Proposed Crushing Operation, 14435 Horning Road, Brooklyn, Michigan GZA, File No. 20.0158691.01, February 28, 2025, pp. 1 & 4.

⁶ Project Report: Norvell Sand and Gravel Site, American Aggregates of Michigan, Smith Group, November 14, 2025, pp. 11-13.

⁷ I.e., Island Lake of Novi, Maple Lake Farms of Milford, and Kensington Ridge of Milford, Michigan. See also 2024 Hydrogeological Evaluation Report, Norvell Township Site, Norvell Township, Michigan, American Aggregates of Michigan, Inc., ASTI Environmental, November 6, 2025, pp. 1.

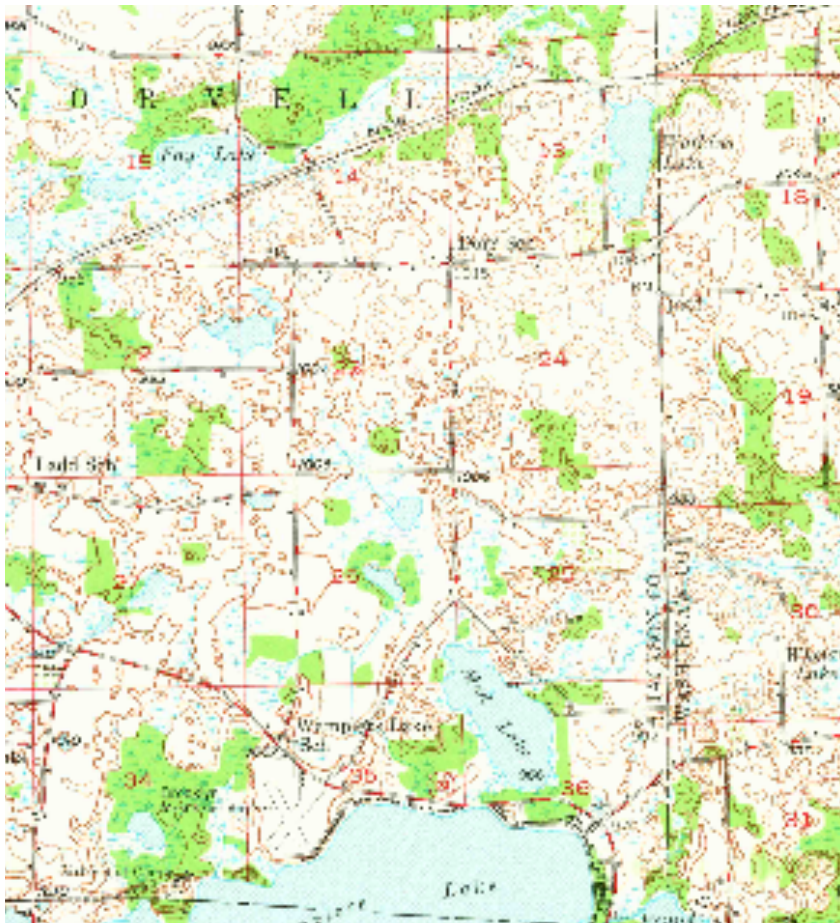


Figure 1: Topographic map, site and vicinity features - Sections 13, 14 & 24, T4S, R3E, Norvell Township, Washtenaw, Michigan. Manchester Quadrangle.

The proposed project area consists of rolling hills and relatively flat areas, sloping gently to east-northeast. Wampers Lake exists south of the project area and discharges to Mud Lake, both at 965 feet above mean sea level (a.m.s.l.) Mud Lake in turn discharges to the east via the Iron Creek to the Iron Mill Pond at 915 feet a.m.s.l. Iron Creek then runs easterly approximately 7 miles to its confluence with the River Raisin at 815 feet a.m.s.l. Watkins Lake north-northeast of the proposed project area and Fay Lake north-northwest of the project area are hydrologically connected to a very broad wetland complex generally discharging to the north-northeast within the River Raisin watershed (29 Raisin).

AAOM's application included a hydrogeological study of shallow groundwater at proposed project sites, and documented groundwater elevations between 5 and 40 feet below ground surface (b.g.s.), a northerly flow direction, and clear groundwater connection to nearby surface water bodies on AAOM's properties. Importantly, this report found that "surface water bodies on the Property are hydraulically

connected to the groundwater and are generally surface expressions of the groundwater elevation...(i)n addition to Watkins Lake, wetlands and other surface water features in the north property appear to be hydrologically connected to the groundwater system...showing a strong correlation with nearby groundwater elevation (and) surface water elevations...evidenced by simultaneous rises and declines in water levels”⁸ *In short and according to AAOM, near surface groundwater at the project site north of Horning Road is directly connected to Watkins Lake, wetlands adjacent to the north, and other surface water features at that location.* Also, it is noted that AAOM’s hydrogeological report failed to provide the groundwater flow velocity, the logs of all 85 soil borings performed,⁹ any geological cross-sections, and importantly failed to adequately assess potential drawdown (i.e., from pit de-watering) or water quality impacts to near the surface groundwater, adjacent wetlands, Watkins Lake and other surface waters. *Although finding a direct interconnection between near surface groundwater and nearby wetlands, lakes and surface waters, agents for AAOM did not conduct a well slug test or an aquifer pump test as is customary and industry practice in performing such hydrogeological investigation.*

Agents for AAOM also documented the presence of nine (9) state-regulated wetlands and two (2) state-regulated waterbodies on the project property, i.e., Watkins Lake and an unnamed waterbody (referred to as “Lake R”).¹⁰ AAOM in its application states that “while seven regulated wetlands and two lakes are located on the North Property of the Project, none of them are located within the mining site and none will be disturbed as part of the mining operations or construction screening berms...no direct impact to wetlands or lakes will occur...”¹¹ *The likely and very real indirect impact to these hydrologically connected wetlands and surface water features through likely pit dewatering should be the primary focus of the Township and others in the reasoned review of this proposal.*

⁸ See 2024 Hydrogeological Evaluation Report, Norvell Township Site, Norvell Township, Michigan, American Aggregates of Michigan, Inc., ASTI Environmental, November 6, 2025, pp. 5-7. Also see GEI Review of Proposed Aggregate Mine: Norvell Township Board and Planning Commission, Pangea Environmental, LLC, Mike Wilczynski, February 11, 2026, p. 1., and Project Report: Norvell Sand and Gravel Site, American Aggregates of Michigan, Smith Group, November 14, 2025, p. 30.

⁹ Project Report: Norvell Sand and Gravel Site, American Aggregates of Michigan, Smith Group, November 14, 2025, p. 25.

¹⁰ Wetland Delineation and Jurisdictional Assessment with GPS Survey - Revised Norvell Township Property, Sections 13, 14 and 24, Norvell Township, Jackson County, Michigan, ASTI Environmental, File No. A23-2691.02, November 12, 2025, p. 1

¹¹ American Aggregates of Michigan’s Application for Site Plan Approval, Conditional Use Permit and Mining Permit under Section 7 for a proposed sand and gravel mining operation, Zausmer, P.C., November 17, 2025, p. 26.

AAOM's wetland delineation report also concluded that emergent Wetlands U (0.04 acres) and ZZ (0.06 acres) were not state-regulated as being "isolated and less than 5 acres" in size. Importantly, this report failed to analyze or disclose if either Wetland U or ZZ exist within 500 feet of federally-regulated waters, are exceptional, or rare or imperiled wetlands (specifically including prairie fens), have a documented presence of endangered or threatened species, and/or are directly hydraulically-connected to nearby surface water features.¹² Each of these represent additional categories of state-regulated wetlands pursuant to Michigan's Part 303: Wetland Protection Act, and the draining, dredging, filling or construction within wetlands require a permit under Part 303.¹³ *Michigan's EGLE, Water Resources Division is the final decision-maker regarding wetland jurisdictional determinations, and EGLE decisions regarding whether Wetlands U and ZZ are regulated, and the likelihood of wetland impact from likely pit dewatering as is customary should be obtained through a pre-application meeting between agents of AAOM and EGLE. Such an EGLE wetland jurisdictional finding should be required by the Township prior to review of or any final-decision-making in this matter.*

It is noted that the direct or indirect draining of wetlands and the direct and indirect disposition of waste waters into wetlands are prohibited by Michigan's Part 303 without an approved EGLE, WRD permit. *Based on known site conditions, it is highly likely that both Wetlands U and ZZ are indeed state-regulated, irrespective of their size. Also, note that Section 12.7 (B)(9) of the Township's Zoning Ordinance requires all site plans conform with EGLE and other relevant state and local agency permits requirements and standards.*

Potential quantitative and qualitative impacts to shallow groundwater and subsequent impacts to nearby shallow water wells, wetlands, Watkins Lake, and other surface waters is critical, and should be a primary focus of the Township's review of this proposal.

In addition to the review of AAOM's groundwater study, copies of residential water well logs were obtained and reviewed from the EGLE water well retrieval system website on June 20, 2026. The review

¹² See Part 303: Wetland Protection Act, P.A. 451 of 1994, as amended, MCL 324.30301 Definitions; technical review standards, Section 303301(l)(xi), (n)(i), (n)(iv) and (n)(v).

¹³ See Part 303: Wetland Protection Act, P.A. 451 of 1994, as amended, MCL 324.30304 Prohibited activities.

of sixteen (16) available residential well logs was undertaken from Sections 13, 14 & 24 of Norvell Township, Jackson County. Vicinity residential wells that are relatively shallow are entirely completed within glacial drift with an average total depth of 39.7 feet below ground surface. (b.g.s.). The shallowest vicinity residential well is 37 feet b.g.s. Area well logs suggest that glacial stratigraphy at and near the subject project vicinity consists of a surficial clay layer, i.e., 7 feet average b.g.s. which is underlain by a relatively shallow water bearing sand and gravel aquifer. The average water table or “static water level” within the area shallow aquifer is 8.7 feet b.g.s, and demonstrates significant hydrostatic pressure upward, toward the ground surface. For example, a residential well log near the intersection of Arnold and Fay Lake Roads documents clay and sand from the ground surface to 18 feet b.g.s., exists above a 19 feet thick water bearing sand and gravel, and possesses a static water level of 1 feet b.g.s.

These near surface hydrogeologic conditions in turn result in the presence of an extensive wetland complex that trends south-southwest to north-northeast south of Arnold Road and north Horning Road immediately adjacent to the proposed gravel mine project, and the numerous lakes and smaller water bodies in this area.

6.0 Site and Vicinity Soils

According to the U.S. Department of Agriculture, Natural Resources Conservation Service Web Soil Survey for Jackson County, project site soils southwest of Horning and Watkins Roads are typified by Riddles sandy loam, 1% to 18% slope. However, project and vicinity soils south of Arnold Road, north of Horning Road and west of Fay Lake Road, are “hydric” or wetland soils typified by Houghton muck (HgtahA) at 0 to 1% slope, Palms muck (PmsacA) at 0-1% slope, and open water areas and features.

Given site soils, near surface hydrogeology and hydrology, there is a high likelihood for AAOM pit dewatering operations to to impair adjacent wetlands and nearby surface waters, and clearly represent “very serious consequences” from proposed mining operations and allows local governmental denial of the project under the Michigan’s Zoning Enabling Act (MZEA).¹⁴

¹⁴ See Section of the the Michigan Zoning Enabling Act, P.A. 110 of 2006, as amended, and “Silva Test” per Michigan Supreme Court case *Silva v. Ada Township*, 416 Mich 153 (1982) “very serious consequences” threshold.

7.0 AAOM's Phase I and II Environmental Site Assessments

Agents for AAOM performed Phase I and II Environmental Site Assessments (ESA) of AAOM properties to identify potential recognized environmental conditions (RECs) as required to establish a defense to potential liability in owning or operating contaminated properties in accordance with state and federal law and protocols by achieving “due diligence” and “all appropriate inquiry.”¹⁵ Importantly, the Phase I ESA report identified six (6) recognized or potential recognized environmental conditions (RECs) including: 1) a leaking underground diesel storage tank system at 14950 Horning Road; 2) a borrow pit with with railroad ties, and three (3) drums - two (2) containing unknown liquid substances, and other discarded materials at 15302 Herman Road; 3) a 2,000-gallon rusting fertilizer tank resting on the ground surface at a14950 Horning Road and evidencing enhanced vegetative growth around its base; 4) former fruit orchards at parcels on Horning Road and Arnold Road likely possessing elevated lead and arsenic concentration from historic lead arsenate-based pesticide applications; 5) a barn at 14950 Horning Road with a floor drain to the ground, evidencing staining from spills, an above-ground storage tank (AST), multiple drums and small containers of hazards materials; and 6) 250-gallon fuel oil ASTs lacking spill protection/prevention at dwellings at 13720 and 14950 Horning Road, and 14155 Austin Road within the project study area.¹⁶ Remarkably, while the Phase I ESA identified and opined that these 6 RECs “pos(e) elevated environmental risk,” the report did not recommend subsequent Phase II ESA, i.e., consisting of soil and/or groundwater sampling for chemicals of concern for AAOM to achieve due diligence and all appropriate inquiry, and establish a defense to state and federal pollution liability.¹⁷ Based on information, Phase II ESA activities consisting of five (5) soil borings and two (2) groundwater monitoring wells were completed by Hydrologic and Associates, Inc., and reported on June 24, 2025.¹⁸ *Based on information and belief, the results of these Phase II ESA activities have not been disclosed to the Township, or at a minimum have not been provided to the public through the AAOM application material at the Norvell Township website.*

¹⁵See also GEI Review of Proposed Aggregate Mine: Norvell Township Board and Planing Commission, Pangea Environmental, LLC, Mike Wilczynski, February 11, 2026, p. 3.

¹⁶ Phase I Environmental Site Assessment, 14 Parcels, +/- 1,080 Acres of Rural Land, Norvell Township, Jackson County/ Manchester Township, Washtenaw County, Michigan, ASTI Project No. A23-2691.01, February 14, 2025, pp. 2-3.

¹⁷ Ibid., pp. 31-35.

¹⁸ Project Report: Norvell Sand and Gravel Site, American Aggregates of Michigan, Smith Group, November 14, 2025, p. 37.

Further, the Phase I ESA did report April 14, 2015 soil sample results from UST system removal at the GT Ranch, LLC at 14950 Horning Rd., Section 13, Norvell Township and documented the presence of purgeable aromatic hydrocarbons (PAHs) Benzene up to 1,049 parts per billion (ppb) exceeding EGLE's soil criterion protective of groundwater used for drinking water of 100 ppb; Ethylbenzene up to 1,045 ppb exceeding EGLE's soil criterion for the groundwater/surface water interface of 360 ppb; elevated concentrations of Toluene up to 1,036 ppb; and Xylene isomers up to 3,114 ppb exceeding EGLE's soil criterion for the groundwater/surface water interface of 980 ppb.¹⁹

*The lack of comprehensive Phase II ESA environmental investigation addressing all six (6) Recognized Environmental Conditions identified in the Phase I Environmental Site Assessment report renders the AAOM application administratively incomplete, and precludes the Township's review and any final decision-making in this matter. It is noted that Michigan's Part 201: Environmental Remediation Act prohibits the exacerbation of existing environmental contamination by any subsequent owner or operator's use of contaminated land.*²⁰

*Finally, Section 7.12.B.14. of the Township Zoning Ordinance prohibits such operations from "caus(ing) the pollution by any material of any surface or subsurface watercourse, or body of water," and AAOM committed to comply with this standard.*²¹

¹⁹ EGLE, RRD Table 2: Residential Part 201 Generic Cleanup Criteria and Screening Levels/ Pat 213 Risk-Based Screening Levels, effective October 12, 2023, and Phase I Environmental Site Assessment, 14 Parcels, +/- 1,080 Acres of Rural Land, Norvell Township, Jackson County/Manchester Township, Washtenaw County, Michigan, ASTI Project No. A23-2691.01, February 14, 2025, appendices.

²⁰ Section 20107a(1)(a) of the Michigan Environmental Remediation Act, Part 201 of NREPA, P.A. 451 of 1994, as amended.

²¹ See Norvell Township Zoning Ordinance Section 7.2.B.14., and American Aggregates of Michigan's Application for Site Plan Approval, Conditional Use Permit and Mining Permit under Section 7 for a proposed sand and gravel mining operation, Zausmer, P.C., November 17, 2025, p. 15.

8.0 Norvell Township Master Plan²²

Under Michigan law, communities that choose to regulate land uses and direct future growth through enacting a zoning ordinance, must do so based on a valid community plan or “Master Plan.”²³ Master Plans in turn are required by Michigan law to be a 20-year vision statement of community values in guiding land uses, economic development, transportation, community-funded projects, natural and cultural resources protection, water quality and environmental stewardship, and regulatory priorities and zoning approaches, among other things. Master Plans must be audited every 5 years, and up-dated as necessary to lawfully regulate land uses through zoning ordinances.

The Norvell Township Master Plan strongly values farmland preservation, the protection of existing rural character, water quality and environmental protection, maintenance and enhancement of recreational opportunities, and natural resources conservation. Exemplary of Norvell Township’s 20-year community vision is this passage regarding Community Character:

“Norvell Township and its residents take great pride in the peaceful, rural character the Township has preserved since its inception in 1859. The Township is fortunate to consist of large amounts of lakes, streams, farmland, forests and wetlands providing invaluable and limited resources. . .it should be noted that while the preservation of rural character with the Township is a top priority, the Township is still open for future development in clearly defined areas that would bring additional jobs and benefits to the community while still preserving the natural resources of the Township.”²⁴

Based upon information and as belief and as detailed in the Township’s Master Plan, the development and operation of the proposed aggregate mine and processing facility is inherently incompatible with and will have a serious deleterious noise, light, dust and traffic impacts and valued natural resources of the Township - especially those in the immediate vicinity of the proposed project.

²² Norvell Township Master Plan, adopted July 10, 2024.

²³ Michigan Planning Enabling Act, as amended, P.A. 33 of 2008, as amended, MCL 125.3803(g)(ii), and see also MZEA, MCL 125.3203(1).

²⁴ Norvell Township Master Plan, Chapter 4: Community Character and Development, 2024, p. 25.

More specifically, the Township’s Master Plan recognizes the 1,133 acre Watkins Lake State Park and County Preserve established in 2015 as being “known for its quiet serenity, peaceful recreational opportunities, 8.25-miles (*sic*) of hiking trails, waterfowl and other bird-watching opportunities, and may other draws...(including existing as a) popular watchable wildlife destination,...large numbers of waterfowl during the spring and fall migration.”²⁵ Watkins State Park & County Preserve is state-designated wildlife refuge with heightened potential to observe rare, threatened or endangered species such as the Eastern massasauga rattle snake, Mitchell’s satyr butterfly (i.e., North America’s rarest insect), and rare and declining grassland birds.

Based upon information and belief, the development and operation of the proposed aggregate mining facility will have direct and indirect unacceptable impacts to the citizens’ many uses of the Watkins Lake State Park & County Preserve, including bird and wildlife observation and other peaceful enjoyment, through its generation of noise, dust, lights, and heavy duty truck traffic.

Regarding the Township’s transportation network, the Master Plan highly values pedestrian-oriented community planning and development known as “complete streets,” and values uses of local streets for local travel, commuting to neighborhoods, etc.²⁶

Based upon information and belief, the development and operation of the proposed aggregate facility will unreasonably interfere with non-motorized modes of resident transportation on the Township’s rural roads, proposed haul roads lack adequate shoulders,²⁷ is incompatible with the intended public uses of nearby hiking trail networks, and will create an unacceptable risk to public safety from heavy duty truck traffic.

²⁵ Ibid., p 27, and Watkins Lake State Park & County Preserve: General Management Plan, approved October 10, 2018, p. 11.

²⁶ Ibid., pp. 33-34, and 26.

²⁷ Impacts of a Proposed Sand and Gravel Operation in Norvell Township, Norvell Township, Jackson County, Michigan, McKenna, August 31, 2026, pp. 9- 12.

The Master Plan also deeply values the Township's wetlands, lakes, streams, and groundwater. Groundwater is the primary source of drinking water in the Township, most whose residents rely upon private drinking water wells. A near surface and a number of deeper bedrock groundwater/drinking water "aquifers" exist in the Township including the Coldwater, Dundee and Marshall bedrock formations. It is typical and is likely that the aggregate mining operation will de-water gravel pits for the recovery of marketable products. Given the Township's near surface geology, i.e., a shallow semi-confined near surface aquifer, such de-watering could cause a cone of depression extending broadly distant from the pumping operations. Such de-watering activities have recently caused the drying up of numerous residential drinking water wells in Byron Township, Kent County in conjunction with a Township-funded sanitary sewer project.

The application suggests that a closed-loop process and waste water management system will be utilized at the AAOM operation, obviating concern for potential groundwater and surface water impacts from waste water handling and disposal. It is common industry knowledge that such closed-loop waste water systems readily bio-foul, if used, and thereby require the addition of numerous chemical additives, many of them hazardous and/or polluting, to keep such a system operational. *This required mixture of closed-loop waste water management system anti-fouling chemical additives has not been disclosed, and thereby the application is administratively incomplete precluding Township final action.*

Secondly, having served as an expert in a 2003-2004 sand mining case in Muskegon County, I testified about a sand mining operation near Norton Shores that utilized a chemical called PAMAK to process and wash mineral sands to remove excess calcium, known as "aggregate beneficiation." As is common in the industry, this mining operation then discharged the waste wash waters to the ground surface. PAMAK is a commercially available tall oil, fatty acid detergent. The infiltration of spent PAMAK detergent into groundwater resulted in the heavy metal contamination of nearby, down-gradient residential groundwater drinking waters. In summary, beneficial bacteria naturally occurring in that aquifer broke down waste PAMAK, and as a consequence depleted the groundwater of naturally-occurring dissolved oxygen. This in turn resulted in the "liberation" and mobilization of naturally-occurring metals, and the contamination of drinking water well in excess of Michigan public

health groundwater/drinking water criteria.

Consequently if conditions for approval are eventually considered by the Township, it is critical that the proposed aggregate mining and processing plan detail such processing methods and locations; the secondary containment of polluting materials including fuels, lubricants, aggregate beneficiation chemicals, etc.; waste water collection, treatment and disposal methods and locations; and the quarterly monitoring of sentinel groundwater and reporting to the Township for pollutants of concern; and the development and provision of an EGLE-approved Spill Prevention, Control and Countermeasure (SPCC) Plan pursuant to Michigan's Part 31: Water Quality Protection of Michigan's Natural Resources and Environmental Protection Act (NREPA), P.A. 451 of 1994, as amended, and its administrative rules.²⁸

If AAOM's plan is to infiltrate process waste water to near surface groundwater, an EGLE permit pursuant to Part 31 is required, and the Township should not review or make a final decision in the review of this matter absent AAOM's submittal of state permits for process and waste water treatment and disposal.²⁹ It is noted that Section 12.7 (B)(9) of the Township's Zoning Ordinance requires all site plans conform with EGLE and other relevant state and local agency permits requirements and standards.

It is also recommended that the Township in its review of this project require additional valid hydrogeological study including baseline water quality assessment and near surface groundwater slug or pump tests at each planned excavation pit and processing location. Also, potential impacts from necessary mine de-watering and disposal activities should be evaluated in detail to for the Township to understand direct and indirect impacts on near surface groundwater, wetlands and surface waters, i.e., through excavation, filling, and/or likely pit de-watering. Part 31: Water Quality Protection, Part 303: Wetland Protection, and Part 301: Inland Lakes and Streams Act permits should also be sought by AAOM prior to Township review and final decision-making in this matter. It is noted that Section 12.7 (B)(9)

²⁸ See also GEI Review of Proposed Aggregate Mine: Norvell Township Board and Planing Commission, Pangea Environmental, LLC, Mike Wilczynski, February 11, 2026, p. 2.

²⁹ Ibid.

of the Township's Zoning Ordinance requires all site plans conform with EGLE and other relevant state and local agency permits requirements and standards.

The Township's Master Plan heavily promotes the conservation and active production of farmland in the Township, with 86.12% of survey respondents indicating that the preservation of open space was "important or very important."³⁰

Based on information and belief, active or recently active farmland within the proposed mining operation total 611.75 acres. Norvell Township possesses 3,695 acres of active or fallow agricultural land. This project alone could result in the loss of 16.5 percent, or more, of the Township's total farmland.³¹ Finally, it is noted that 82% of Township survey respondents valued the preservation of agricultural lands as "important or very important."³²

9.0 Norvell Township Zoning Ordinance

Parcels owned by AAOM (and Edw. C. Levy) in the Township are zoned as Agricultural (AG-1).³³ Quarrying and mining is listed as a conditional use (a.k.a., a special land use) in the AG-1 District, and is primarily reviewed under the Zoning Ordinance's Article 7: Mining Activities and Operations. Any zoning application when submitted is first required to be reviewed by the Township Zoning Administrator for "administrative completeness," and only then be placed on the agenda for review by the Township Planning Commission. The Planning Commission in turn reviews the site plan and conditional use permit application at public meetings, holds at least one public hearing, and then a public vote of recommendation to the Township Board of Trustees for final review for approval, denial, or approval with conditions.³⁴

³⁰ Ibid., p. 41.

³¹ For example American Aggregates of Michigan, Inc.'s 240 acre Parcel No. 000-20-24-200-001-00; 112 acre Parcel No. 000-20-14-400-001-00; portions of the 71 acre Parcel No. 000-20-13-400-001-00; 104 acre Parcel No. 000-20-13-251-001-00; and 84.75 acre Parcel No. 000-20-13-301-001-00 were under active cultivation in recent aerial photographs. See also Norvell Township Master Plan, 2024, p. 16.

³² Ibid., p. 49.

³³ Norvell Township Zoning Map, as revised November 2, 2005.

³⁴ See Norvell Township Zoning Ordinance Article 12: Site Plan Review and Article 13: Conditional Use Review.

The entirety of project zoning application must be available to the public for review upon receipt by the Township. The following provisions of Article 7: Mining Activities and Operations of the Township's Zoning Ordinance are relevant in the review of this proposal:

- a) Mining activity shall be setback at least 1,600 feet from existing residential developments and other natural resources as determined at the sole discretion of the Township.

We strongly urge that the Township exercise its discretion to require a 1,600 feet setback from any parcels zoned for future residential subdivision development; and sensitive receptors and natural resources, including but not limited to wetlands, lakes, streams and other waterbodies, and special concern, threatened, and endangered species present at the subject parcels or their habitat. Wetlands, whether state-regulated or not, exist in close proximity to the proposed north mining pit. Watkins State Park and County Preserve and properties within 1.5 miles north of the AAOM site are also known to possess the rare and imperiled wetland type "prairie fens."³⁵ Prairie fens are cold, groundwater-fed, calcium and magnesium rich (i.e., possessing neutral to alkaline pH), peat-accumulating wetlands dominated by sedges, wetland grasses, low wetland shrubs and typically sparse wetland trees such as tamarack (*Larix laricina*). Prairie fens are found in poorly drained glacial outwash plains and drainage ways. Importantly, these such prairie fens support twenty (20) rare plants and eighteen (18) rare animal and insect species, including the state and federally endangered Mitchell's satyr butterfly (*Neonympha mitchelli mitchellii*). Moreover, prairie fens are state-listed rare and imperiled wetland types in Jackson County, Michigan.³⁶ *It is highly recommended that a qualified third party working on behalf of the Township definitively investigate the potential occurrence of prairie fen wetlands at and/or downgradient of the proposed AAOM north pit.*

³⁵See Part 303: Wetland Protection Act, P.A. 451 of 1994, as amended, MCL 324.30301 Definitions; technical review standards, Section 303301(l)(xi). Also, nine percent (9%) of the Watkins Lake State Park and County Preserve are managed as an ecologically sensitive zone, including prairie fen, see Watkins Lake State Park & County Preserve: General Management Plan, approved October 10, 2018, p. 12; and Michigan Natural Features Inventory, Michigan State University Extension, Prairie Fen, <https://mnfi.anr.msu.edu/communities/description/10667/Prairie-Fen>; and MNFI County Element List, Jackson County, <https://mnfi.anr.msu.edu/resources/county-element-data>, July 5, 2026.

³⁶ Michigan Natural Features Inventory, Michigan State University Extension, Prairie Fen, <https://mnfi.anr.msu.edu/communities/description/10667/Prairie-Fen>; and MNFI County Element List, Jackson County, <https://mnfi.anr.msu.edu/resources/county-element-data>, July 5, 2026.

As documented by the AAOM application, site groundwater, surface water features and wetlands north of the proposed north sand and gravel pit are directly interconnected, i.e., exist as a single hydrologic system. *As detailed above, the proposed AAOM operation will very likely qualitatively impair and quantitatively degrade groundwater, surface water and wetlands north of this proposed AAOM north pit. These likely impacts represent very serious consequences, and must be fully explored and understood by the Township prior to any final decision-making in the the review of the AAOM application.*

Called “North America’s rarest butterfly” the federal government is presently implementing a 20-year, multi-million dollar project to reintroduce the Mitchell’s satyr butterfly to southwest Michigan near Augusta in Kalamazoo County.³⁷ Very importantly, as fens are groundwater-fed, impacts to nearby groundwater quantity and/or quality can severely impact fens. Specifically, a 22-year long study published in 2026 documented the negative impacts from aggregate mining to groundwater quantity and quality, and the resultant impact to down-gradient fens in northeastern Illinois.³⁸ As stated in this empirical study, “the fen complex has experienced alterations in both water flow and chemistry... including elevated concentrations of chloride, sulfate and nitrate...despite the fen complex being protected as an Illinois nature preserve since 1990.”³⁹ Also, as noted in 2026 by University of Illinois Urbana-Champaign researchers commenting on a proposed sand and gravel mining operation in McHenry County, Illinois, “there is (also) the potential for chloride, petrochemicals, and other contaminants to enter surface water and groundwater from dust control, vehicle operation (fueling, washing, and maintenance), on-site fuel and oil storage and handling...”⁴⁰

As stated by the MSU Extension’s Michigan Natural Features Inventory, “land use planning to protect groundwater reserves in areas surrounding prairie fens are critical to maintaining the natural

³⁷ “Federally Endangered Mitchell’s Satyr Butterflies are Being Reintroduced at Fort Custer This Week,” WCMU, by Annabella Tetner, July 3, 2026.

³⁸ Changes in Groundwater Chemistry Over Two Decades in a Fen Complex Impacted by Surface Mining In Northeastern Illinois, USA, Environmental Earth Sciences, by H. Shao, J. Monson, E. Plankell, R. Locke, A. Iranmanesh, and B. Wimmer, January 16, 2026.

³⁹ Ibid., Abstract, p. 1.

⁴⁰ Review of Lake Woodstock Development Plan, McHenry County, Illinois, University of Illinois Urbana-Champaign, Prairie Research Institute, E. Plankell and R. Locke, January 12, 2026.

community,”⁴¹ and the plant, animal and insect species its supports. *Importantly, AAOM’s site plan shows proposed aggregate excavation/mining in very close proximity and immediately south of wetlands at the north project property,⁴² and the AAOM project hydrogeologically clearly threatens to unlawfully drain regulated and unregulated wetlands in this location.*

Agents for AAOM performed a threatened and endangered (T&E) species survey and habitat assessment of the project area from May to August of 2023.⁴³ Following state and federal database searches and on-line T&E species analyses, agents of AAOM focused on four (4) state and federally endangered or threatened animal and plant species. Importantly, the T&E report does not assess or address the potential presence of prairie fens, a state-identified natural community of concern and critical habitat for the Mitchell satyr butterfly habitat on the project property, or in its immediate vicinity.⁴⁴ Specifically, the T&E species report states, “Mitchell’s satyr butterfly (*Neonympha mitchelli mitchelli*)... is found in the following wetland types: calcareous prairie fens, tamarack swamps, wet prairies, sedge meadows and shrub-carr wetlands. This species was not identified in the original IPaC species list and therefore, a survey was not done. ASTI believes suitable habitat exists in wetland found in the northwestern portion of the Property. If impacts to those wetlands are anticipated, a species-specific survey for the Mitchell’s satyr butterfly should be done.” *This represents a circular argument as direct or indirect wetland impact from likely pit de-watering has not been adequately evaluated by AAOM and/or not disclosed to the Township, and on-site surveys for T&E species did not look for Mitchell satyr butterflies or its specific wetland habitats, including prairie fen wetlands.*

Michigan’s Natural Features Inventory’s Environmental Review Specialist/Zoologist, Michael A. Sanders has written “(r)ecords in the (T&E Species) database indicate that a qualified observer has documented the presence of special natural features (i.e., prairie fens). *The absence of records in the database for a site may mean that the site has not been surveyed. The only way to obtain definitive state*

⁴¹ Michigan Natural Features Inventory, Michigan State University Extension, Prairie Fen, <https://mnfi.anr.msu.edu/communities/description/10667/Prairie-Fen>, p. 9.

⁴² Norvell Mining Project Site Plan, Norvell, Michigan, Smith Group, Issued for Conditional Use Permit Application, Smith Group Project Number 14324, November 14, 2025, Sheets G101-102, G110-G111, CG101, and CG103-CG105.

⁴³ See Threatened and Endangered Species Survey & Habitat Assessment, Novel Township Property, Norvell Township, Jackson County, Michigan, ASTI File No. (A23-2691.02), November 2, 2025, 17 pp.

⁴⁴ *Ibid.*, pp. 12.

on the status of natural features is to have a competent biologist perform a complete field survey.”⁴⁵

Agents for AAOM maintain that “(m)ining will cease 5 to 10 feet above the water table, with the aim to be consistently at 10 feet above. Please note there are not prairie fens documented on the Property...

ASTI did a wetland study on-site, and the wetlands outside the impact area to the northwest are common emergent wetlands, not a prairie fen.”⁴⁶ *Based on review, ASTI’s wetland study was not sufficiently detailed to rule out the presence of prairie fens (i.e., used only the National Wetland Inventory’s Cowardin Wetland Classification System which does not specifically identify prairie fens,⁴⁷ no soil pH analysis was performed, and no data sample point location map provided), and based on ASTI’s*

⁴⁵Rare Species Review #3431 - Site Assessment, Jackson and Washtenaw Counties, MI, Michael A. Sanders, Michigan Natural Features Inventory, MSU Extension, March 28, 202, p. 1.

⁴⁶ Email from Bradley Kassuba, ASTI to Tameka Dandridge, USFWS January 29, 2025.

⁴⁷ NWI’s Cowardin, et al. Wetland Classification System:
U, Upland, Not a wetland
SYSTEM R-RIVERINE (rivers, streams, washes, arroyos, etc...)
SUBSYSTEM 2-LOWER PERENNIAL (low gradient)
3-UPPER PERENNIAL (high gradient)
4-INTERMITTENT (flows part of year)
CLASS RB-Rock Bottom
UB-Unconsolidated Bottom
AB-Aquatic Bed
SB-Streambed
RS-Rocky Shore
US-Unconsolidated Shore
SYSTEM P-PALUSTRINE (marshes, swamps, ponds, bottomlands, wet prairies, etc...)
SUBSYSTEM (None)
CLASS RB-Rock Bottom
UB-Unconsolidated Bottom
US-Unconsolidated Shore
AB-Aquatic Bed
EM-Emergent (sedges, grasses, etc...)
SS-Scrub/Shrub
FO-Forested
CLASS SS-Scrub/Shrub and FO-Forested
SUBCLASS 1 Broad-leaved Deciduous (ex. willow, cottonwood)
2 Needle-leaved Deciduous (ex. Salt cedar)
3 Broad-leaved Evergreen
4 Needle-leaved Evergreen
5 Dead
6 Deciduous
7 Evergreen
MODIFIERS
WATER REGIME
A Temporarily Flooded
B Saturated
C Seasonally Flooded
E Seasonally Flooded/Saturated
F Semi-permanently Flooded
H Permanently Flooded
J Intermittently Flooded
K Artificially Flooded
SPECIAL MODIFIERS
b Beaver
d Partially drained/Ditched
f Farmed
h Diked/Impounded
x Excavated

hydrogeological report the water table is little as 5 feet beneath the ground surface in project areas.⁴⁸ Such a definitive statement by agents for the Applicant regarding the absence of prairie fen wetlands, or the indirect impact on wetland from likely pit de-watering should not be accepted by the Township without additional valid and reliable investigation as recommended by an expert within Michigan's Natural Features Inventory program.

It is recommended that the Township require that such an enhanced T&E species inventory and habitat assessment be performed by a competent biologist working for the Township during mid-June through mid-July of 2027. Thereby precluding Township review at this time of AAOM's incomplete permit application.

Direct and indirect impacts of the proposed mining operation on wetlands, including prairie fens, and associated state and federally-protected plants, animals and insect species must also be clearly understood the the Township in the review of this project, and further research to assess the presence of state-designated rare prairie fens (i.e., Mitchell satyr butterfly habitat). It is incumbent upon the Applicant to fully inventory, assess and disclose potential impacts to prairie fens, and the Mitchell satyr butterfly and its habitat.

- b) Hours, days and dates of operation and truck loading/shipping.
- c) Excavation area setbacks from public right-of-ways (i.e., 150 feet), and lot lines and non-residential parcels (i.e., 300 feet).
- d) Prohibitions against causing erosion; and the polluting surface waters, groundwater or wetlands.
- e) Prohibition of causing nuisance from noise and on-site measures for noise, vibration, odor, smoke and fugitive dust control including an earthen berm, road treatment for dust control, surrounding the site(s), and effective visual screening of any and all aggregate operations.

⁴⁸2024 Hydrogeological Evaluation Report, Norvell Township Site, Norvell Township, Michigan, American Aggregates of Michigan, Inc., ASTI Environmental, November 6, 2025, p. 1.

Recent scientific study documents the connection between heavy duty trucks and air pollution with fine and ultra fine particulate matter (i.e., black carbon/soot, PM_{2.5}, etc.), carbon monoxide, nitrogen oxides (NO_x), heavy metals, and volatile organic compounds (VOCs). While medium and heavy duty vehicles make up only a fraction of on road vehicles within the U.S., they generate 59% of ozone and fine and ultra-fine particulate matter (UFPM) pollutants and 55% of PM pollution.⁴⁹ NO_x and VOCs are precursors to ground-level ozone (O₃). Pollutant concentrations have been found to highest within 10 meters (i.e., 32.8 feet) of heavily traveled roadways in Detroit and the Detroit metro area, and arsenic concentrations in Detroit were found to exceed a one in a million cancer risk level within this near road zone along heavily traveled routes.⁵⁰ Ozone can cause the development of and worsening of asthma; coughing; shortness of breath; heart ailments including hypertension, heart attack and stroke; and the inflammation and permanent damage to the lungs.⁵¹ Such health risks from exposure to traffic related air pollution is of course highest for those traveling in vehicles, working or living near busy roads, and those outdoors near heavy duty traffic routes.⁵² Researchers also found that in 2023 that heavy duty truck and equipment emissions led to more than 8,800 deaths, 3,700 heart attacks, hundreds of thousands of respiratory illnesses, and approximately \$100 billion in health damages across the U.S.⁵³ Medium to heavy duty vehicles are also the second largest domestic contributor to green house gas emissions in the transportation sector, emitting 417.1 million metric tons of CO₂e (i.e., Carbon Dioxide equivalent) annually in the U.S., and such emissions are expected to increase with rising miles-traveled.

Importantly, AAOM's application primarily focuses on inhalation by on-site workers, and states that "(a)n increase in dust levels generated by the site activities, which will be controlled within regulatory

⁴⁹ Heavy Duty Vehicles Emit A Lot of Air Pollution. EPA Can Change That, Policy, Transportation, Clean Air Task Force, by V. Saltzman, January 18, 2024.

⁵⁰ Evaluation of Near Road Air Pollution at Environmental Justice and Non-Environmental Justice Communities in the Greater Detroit Area, Final Report to the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Sonoma technology, Inc., J. DeWinter, M. Dunn, M. McCarthy, and S. Brown, October 11, 2019.

⁵¹ Traffic Related Air Pollutants and Outdoor Physical Activity: The Issue and Action Steps for Community Members, University of Michigan, School of Public Health, Lifestage Environmental Exposures and Disease Center, April 2025. It is recommended that the air quality index (AQI) be checked by those in traffic related air pollution areas, and that human exposure be limited when the AQI is 151 or higher and those that are pregnant or possessing health issues avoid or take protective measures when outdoor conditions above 51 AQI.

⁵² Ibid.

⁵³ Ibid.

requirements through standard mitigation practices utilized by AAOM.”⁵⁴ AAOM has also committed to complying with any Township Zoning Ordinance requirements for dust control for “any digging, excavating, processing, stockpiling, or transportation operation and borne to or able to be borne by the wind...so as not to cause a nuisance or hazard to any adjoining lot or public road,” but AAOM provides little to no detail of planned dust control methods to assess the likelihood of success in such controls.⁵⁵

It is strongly recommended that the Township require a robust dust control plan, light control plan, a meaningful air quality plan, and vibration monitoring plan from the operation of the heavy equipment at the proposed mining site(s), on-site aggregate processing and stockpiling, and from loaded heavy trucks along haul routes (and return trips).⁵⁶ It is also strongly recommended that the Township require studies of the expected human health impacts from the project to nearby sensitive receptors, i.e., children, the elderly, and people with compromised health conditions such chronic obstructive pulmonary disease, asthma, etc. It is also extremely important that such studies evaluate impacts on pedestrians, runners, bicyclists and other non-motorized modes of transportation and residents lawful co-use or uses of proposed haul routes, and expected impacts to residents’ health. Such valid and reliable studies should be completed and provided to the Township prior to any final decision.

- f) Top soil and overburden on-site staging, and stabilization.
- g) Site access, signage, truck weighing, fencing requirements/standards, excavation surcharge and performance bond requirements.
- h) A valid site reclamation/restoration plan must be submitted and paroled prior to site plan or conditional use permit approval.

⁵⁴ Project Report: Norvell Sand and Gravel Site, American Aggregates of Michigan, Smith Group, November 14, 2025, pp. 3 & 50-51.

⁵⁵ See Norvell Township Zoning Ordinance Section 7.2.B.6., and American Aggregates of Michigan’s Application for Site Plan Approval, Conditional Use Permit and Mining Permit under Section 7 for a proposed sand and gravel mining operation, Zausmer, P.C., November 17, 2025, p. 13.

⁵⁶ See also GEI Review of Proposed Aggregate Mine: Norvell Township Board and Planning Commission, Pangea Environmental, LLC, Mike Wilczynski, February 11, 2026, pp. 2 & 3.

10.0 Conditional Land Use Review - Norvell Township

Norvell Township/s Zoning Ordinance, Article 13: Conditional Use Review details the discretionary standards that the Township is to utilize in reviewing this proposal. Importantly, a finding of fact document should be developed by Township staff or legal counsel and follow the Township through the review process, including both non-discretionary standards (i.e., ministerial standards as found in site plan requirements) and discretionary standards within the conditional use review. Township official must address every elevation zoning ordinance standard and individually state their reasons for decisions by relevant standards. This must all be accurately summarized in this findings of fact document. Very importantly, the Township must look to the Master Plan and its stated values and priorities in the review of these conditional use standards.

Section 13.6 lists the conditional use review standards and each of the following must be found to be met by the Township:

1. Will be harmonious with and in accordance with the general objectives, intent and purpose of the Ordinance.

As noted on Pages 13 through 17 above, the Zoning Ordinance is based on the Master Plan, additionally requiring the harmony with the purpose, intent, and objectives of the Master Plan.

2. Will be defined, constructed, operated, maintained and managed so as to be harmonious and appropriate in appearance with existing or intended character of the general vicinity.

The Norvell Township Master Plan and Zoning Ordinance require an affirmative finding by the Township that the AAOM operation will be harmonious with the existing and intended character of the Township, especially at locations near the proposed AAOM facility and along proposed haul routes.

The site and surrounding area are typified by low density rural residential uses, farmland, woodlands and publicly-owned and operated conservation, wildlife refuge, and outdoor recreation land uses. In land use planning and zoning practice, noise can be defined as an unwanted sound that someone considers unreasonably disturbing, objectionable, obnoxious, etc. Based on my professional experience, nuisance

noise associated with aggregate mining and processing and similar uses include: truck noise at ingress to egress from public roads; downshift braking or “jack braking” of heavy duty trucks entering such facilities empty; the low, nearly constant drone of on-site heavy equipment and high pitched safety backup alarms or excavator “beepers” during hours of operation; periodic and jarring sounds and low droning noise from processing equipment, including the loading and running crushers, sorters, conveyors, and operation of loading equipment. As noted in footnote 56 below, typical sound measurements for heavy duty trucks is 88 dBA at 35 mph and 96 dBA at highway speeds. Such truck noise is known to easily travel for distances up to 1/2 mile, depending on topography, weather and other ambient conditions.⁵⁷ The Norvell Township Master Plan strongly stresses the importance of preserving the Township’s rural character, especially its peace and quiet.

AAOM’s application states that “noise levels in the vicinity of the Project Site will increase as the result of the proposed mining activity due to the operation of mining equipment and trucks. It is anticipated that the impacts will be minor, short-term limited to the hours of operation and mining season, and will be with the requirements of the Township ordinance for both agricultural and residential districts. As

⁵⁷ “Sound” is a vibration that propagates as a typically audible mechanical wave of pressure and displacement, through a medium such as air or water. The properties of sound include: frequency; wavelength; wave number; amplitude; sound pressure; sound intensity; speed of sound; and direction. The decibel scale used to measure sound for the human ear is the dB A-scale (dBA). Importantly, dBA is a logarithmic scale typified by the following:

Whisper Quiet Library at 6 feet	30dBA
Normal conversation at 3 ft	60-65dBA
City Traffic (inside car)	85dBA
Heavy trucks (35 mph-60 mph)	88 - 96dBA
Train whistle at 500 ft/Truck Traffic	90dBA
Jackhammer at 50 ft	95dBA
Level at which sustained exposure may result in hearing loss	90 - 95dBA
Hand Drill	98dBA
Power mower at 3 ft	107dBA
Snowmobile/Motorcycle	100dBA
Power saw at 3 ft	110dBA
Sandblasting/Loud Rock Concert	115dBA
Pain begins	125dBA
Loudest recommended exposure WITH hearing protection (even short term exposure can cause permanent damage)	140dBA
Jet engine at 100 ft	140dBA
12 Gauge Shotgun Blast	165dBA
Death of hearing tissue	180dBA
Loudest sound possible	194dBA

such, the will not produce any serious consequences.”⁵⁸ Additionally, AAOM provided a “focused noise estimation report,”⁵⁹ and commits to controlling noise and dust generated by on-site aggregate crushing and other processing while not providing adequate detail methods for doing so other than “housing (crushing) equipment in a structure adequate to control noise an dust” as required by Section 12.7.B.7. of the Township’s Zoning Ordinance.⁶⁰ *The lack of detail and an adequate noise and dust control plan renders the application to be administratively incomplete, precluding Township review and/or any final decision-making in this matter of the application as submitted.*

The noise generated from the proposed aggregate mine operation will very likely result in the unreasonable interference with the comfortable use and enjoyment of nearby residents, will not be harmonious in this setting to the intended character of the general vicinity, will likely exceed the Township’s noise ordinance at nearby property lines,⁶¹ and will certainly violate the intent and expressed goals, policies and actions of the Norvell Township Master Plan. Consequently, the application as provided does not comply with this Section of the Township Zoning Ordinance or the Master Plan.

Also, the proposed mining operation would exist in close proximity to the Watkins Lake State Park and County Preserve’s established ecologically sensitive zone, ecologically sensitive overlay, and scenic overlay management zones.⁶² It is very likely that the proposed project will unreasonably interfere with the goals and purposes of these management zones. Special care must also be taken in the assessment of these environmental and ecological impacts relative to proposed truck haul routes.

⁵⁸ Project Report: Norvell Sand and Gravel Site, American Aggregates of Michigan, Smith Group, November 14, 2025, p. 55.

⁵⁹ Focused Noise Estimate Report, Proposed Crushing Operation, 14435 Horning Road, Brooklyn, Michigan GZA, File No. 20.0158691.01, February 28, 2025.

⁶⁰ See Norvell Township Zoning Ordinance Section 7.2.B.7., and American Aggregates of Michigan’s Application for Site Plan Approval, Conditional Use Permit and Mining Permit under Section 7 for a proposed sand and gravel mining operation, Zausmer, P.C., November 17, 2025, p. 14, and Project Report: Norvell Sand and Gravel Site, American Aggregates of Michigan, Smith Group, November 14, 2025, pp. 52-55.

⁶¹ See Section III(A), B(5), B(9), and B(12), Norvell Township Ordinance No. 22, Anti-Noise and Public Nuisance Ordinance, effective June 10, 1987.

⁶² Watkins Lake State Park & County Preserve: General Management Plan, approved October 10, 2018, p.p. 12-13, 32, and 34.

3. Will be served adequately by essential public facilities and services, such as highways, streets, police and fire protection, drainage structures, refuse disposal, or that person or agencies responsible for the establishment of the proposed use shall be able to provide.

Agents for AAOM state that “the proposed project will not result in any significant operational impact to the adjacent road network and to the minimal agricultural residential neighborhoods located in the areas adjacent to the Project.”⁶³ Importantly and in accordance with the Zoning Ordinance, the Township must assess not only the physical impacts of the proposed project on the Township road network, but the reasonably foreseeable risks to public safety from the proposed heavy truck traffic along proposed aggregate haul routes.⁶⁴ Also, it has been noted by consultants for the Township and others that the dates of AAOM’s traffic study does not reflect peak and summertime road use in the area, and recommended that additional data be provided by AAOM to reflect such peak and near-peak traffic conditions, including motorized and non-motorized and pedestrian travel and safety.⁶⁵ *Consequently, the likely damage to Township roads, impact on traffic and the potential risk for public safety from aggregate hauling/truck traffic cannot be adequately assessed by the Township without the performance of an enhanced traffic study and its disclosure to the Township.*

4. Will not be hazardous or disturbing to existing or planned neighborhood uses.

Importantly, this standard requires the Township to review this plan in light of likely impacts to all permitted and conditional land uses allowed in the AG-1 District, i.e., future allowable land uses. Permitted uses in the AG-1 include: single-family dwellings, state licensed residential facilities, adult foster care family homes, family child care homes, short-term rental units, bed and breakfasts, general and specialized farming, raising or growing of plants, public and private conservation areas, and public

⁶³American Aggregates of Michigan’s Application for Site Plan Approval, Conditional Use Permit and Mining Permit under Section 7 for a proposed sand and gravel mining operation, Zausmer, P.C., November 17, 2025, p. 12.

⁶⁴ Impacts of a Proposed Sand and Gravel Operation in Norvell Township, Norvell Township, Jackson County, Michigan, McKenna, August 24, 2026, pp. 9-12.

⁶⁵ Technical Memorandum: American Aggregates of Michigan Application for Site Plan Approval, Conditional Use Permit and Mining Permit, Norvell Township, Michigan, GEI Consultants Review Notes - Addendum No. 1, February 25, 2026, p. 3, and Impacts of a Proposed Sand and Gravel Operation in Norvell Township, Norvell Township, Jackson County, Michigan, McKenna, August 24, 2026, pp. 9-12.

or private parks. Conditional uses within the AG-1 include: two-family dwellings, adult foster care small and large group homes, group child care homes, child care centers, quarrying and mining, campgrounds, public or private country clubs, airports, hospitals and. Tower emergency medical facilities, golf course and golf-related facilities, RV and travel trailer parks, feedlots, animal hospital and clinics, entertainment establishments/outdoor commercial amusement Centers, and commercial alternative energy facilities.

To comply with Article 13: Conditional Use Review, Section 13.6.D. the AAOM application must address and the Township must review and document decision-making of the proposed project's potential impact of all future land uses allowed within the AG-1 listed above.

5. Will not create excessive additional requirement at public cost for public facilities and services.

We will review and provide additional detailed environmental planner's comments upon the submission of an administratively complete site plan and conditional use review application once submitted. Based on the above, we strongly encourage Norvell Township to deny the AAOM aggregate mining and processing operation as proposed.

If you have any questions regarding this assessment, please contact me at 231-499-7165 or grobbelenvironmental@gmail.com.

Sincerely,
Grobbe Environmental & Planning Associates



Christopher P. Grobbel, Ph.D.
Sr. Project Manager

References

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GEI Review of Proposed Aggregate Mine: Norvell Township Board and Planing Commission, Pangea Environmental, LLC, Mike Wilczynski, February 11, 2026.

Heavy Duty Vehicles Emit A Lot of Air Pollution. EPA Can Change That, Policy, Transportation, Clean Air Task Force, by V. Saltzman, January 18, 2024.

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List of Threatened and Endangered Species That May Occur in Your Proposed Project Location or May Be Affected by Your Proposed Project, U.S. Department of Interior, Fish and Wildlife Service, 14:41:21 UTC, January 14, 2025.

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Norvell Mining Project Site Plan, Norvell, Michigan, Smith Group, Issued for Conditional Use Permit Application, Smith Group Project Number 14324, November 14, 2025.

Norvell Site Traffic Impact Study, Prepared for Varnum, LLP representing the Edw. C. Levy Co., Fishbeck, Project No. 230234, February 26, 2025.

Norvell Township Zoning Ordinance, Ordinance No. 2025-058, adopted August 18, 2025, and Norvell Township Zoning Map revised November 2, 2005.

NRCS, Web Soil Survey, National Cooperative Soil Survey, 7/5/26, <https://websoilsurvey.nrcs.usda.gov/app/>.

Phase I Environmental Site Assessment, 14 Parcels, +/- 1,080 Acres of Rural Land, Norvell Township, Jackson County/Manchester Township, Washtenaw County, Michigan, ASTI Project No. A23-2691.01, February 14, 2025.

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Review of Lake Woodstock Development Plan, McHenry County, Illinois, University of Illinois Urbana-Champaign, Prairie Research Institute, E. Plankell and R. Locke, January 12, 2026.

Technical Assistance Letter for 'Norvell Township' for Specified Federally Threatened and Endangered Species and Designated Critical Habitat That May Occur in Your Proposed Project Area Consistent with the Michigan Determination Key for Project Review and Guidance for Federally Listed Species, U.S. Department of Interior, Fish and Wildlife Service, 17:36:57 UTC, January 15, 2025.

Technical Memorandum: American Aggregates of Michigan Application for Site Plan Approval, Conditional Use Permit and Mining Permit, Norvell Township, Michigan, GEI Consultants Review Notes - Addendum No. 1, February 25, 2026.

Threatened and Endangered Species Survey & Habitat Assessment, Novel Township Property, Norvell Township, Jackson County, Michigan, ASTI File No. (A23-2691.02), November 2, 2025.

Township Receives Application for Proposed Aggregate Mine, The Township of Norvell, Press Release dated November 20, 2025, including Book 1: Proposed Extractive Operation and Conditional Use, Norvell Sand and Gravel Site, American Aggregates of Michigan, Book 1 and Book 2.

Traffic Related Air Pollutants and Outdoor Physical Activity: The Issue and Action Steps for Community Members, University of Michigan, School of Public Health, Lifestage Environmental Exposures and Disease Center, April 2025.

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Watkins Lake State Park & County Preserve: General Management Plan, approved October 10, 2018, and Appendices A-D.

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Wetland Delineation and Jurisdictional Assessment with GPS Survey - Revised Norvell Township Property, Sections 13, 14 and 24, Norvell Township, Jackson County, Michigan, ASTI Environmental, File No. A23-2691.02, November 12, 2025.

Wetlands Research Program, Technical Report Y-87-1, Corps of Engineers Wetlands Delineation Manual, by Environmental Laboratory, Department of Army, January 1987, Final Report, 143 pp.

Wetlands Regulatory Assistance Program, Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: North-central and Northeast Region, Version 2.0, U.S. Army Corps of Engineers, Environmental Laboratory, January 2012, ERDC/EL TR-12-1, Final Report, 159 pp.

Ex. 1

CHRISTOPHER P. GROBBEL

EDUCATION

Ph. D. Environmental Policy and Law, Michigan State University, Resource Development Department, College of Agriculture and Natural Resources, 1998, GPA 3.96.

M.S. Environmental Policy and Law / Hydrogeology - Michigan State University, Resource Development Department, College of Agriculture and Natural Resources, 1986, GPA 3.93.

B.S. Environmental Science / Forestry with High Honor - Michigan State University, Resource Development Department, College of Agriculture and Natural Resources, 1983, GPA 3.82.

PROFESSIONAL EXPERIENCE

Principal/Senior Associate – Grobbel Environmental & Planning Associates, Traverse City, Michigan.

1998 to Present Founder and president of the environmental consulting and land use planning firm, Grobbel Environmental & Planning Associates. Project experience includes watershed management and protection planning; community master planning, police power and zoning ordinance development; land use and environmental planning; ecological assessment; wetland determination, restoration and delineation; soil/groundwater investigation and remediation; risk assessment, management and communication; brownfield redevelopment; innovative stormwater treatment system design and construction; litigation support and expert witness; and all aspects of business development, media relations, financial management, marketing and administration.

Advisor – Michigan Department of Environment, Great Lakes & Energy (EGLE), Remediation & Redevelopment Division (RRD), Lansing, Michigan.

2025 to Present Member of EGLE, RRD's statewide response activity review panel regarding environmental remediation project adequacy pursuant to Michigan's Part 201: Remediation and Redevelopment, Part 201, NREPA, P.A. 491 of 1994, as amended.

Assistant/Adjunct Professor – Department of Community Sustainability/CARRS/Resource Development Department, College of Agriculture & Natural Resources, Michigan State University, Traverse City and East Lansing, Michigan.

1992 to 2016 Design and teaching of college undergraduate courses entitled: CSUS 425 Environmental Impact Assessment; CSUS 465 Environmental and Natural Resources Law; CSUS 200 Introduction to Sustainability; CSUS 320 Environmental Planning and Management; ESA 225 Land and Environmental Issues in Law; RD 336 State Environmental Law; RD 491 Environmental Ethics; and RD 430 Natural Resources Law. Director of MSU undergraduate environmental studies program at the University Center in Traverse City, Michigan

Land Use Programs Consultant – Tip of the Mitt Watershed Council, Petoskey/Traverse City, Michigan.

2002 - 2004 Land use programs consultant undertaking master planning, zoning ordinance audit and development, site conservation design/development and land use training and education programs. Duties also include environmental planning; wetland determination, delineation and restoration; risk assessment, management and communication; brownfield redevelopment; litigation support and expert witness.

CHRISTOPHER P. GROBBEL

Page 2

Northwest Michigan Land Use Agent – MSU Extension, Grand Traverse County, Michigan.

1999 - 2003 Developer, co-author and coordinator of MSUE's award winning Citizen Planner statewide land use training program in Michigan. Design and teaching of college credit and adult learner non-credit courses in land use planning and law, environmental law and policy, community development, wetlands and watershed management, *etc.* Member of Leelanau County Agricultural Alliance, Antrim-Grand Traverse County farmland preservation task force involved in undertaking surveys and geographic information system mapping toward county administered farmland preservation programs.

Director of Education and Land Stewardship – Leelanau Conservancy, Leland, Michigan.

1998 - 1999 Design and delivery of land use, conservation and environmental education programs for school children, landowners, professionals and local and regional units of government. Implementation of the Leelanau Geography Project, including the training of middle school teachers from ten (10) area public and private schools. Communication and outreach to visual, print, audio and electronic media. Design and implementation of web pages for Leelanau Conservancy and regional environmental education consortium. Writing and administration of numerous grants.

Co-owner/Senior Project Manager - Compliance, Inc. Environmental Engineering, Traverse City and Detroit, Michigan.

1996 - 1998 Founder of Southwest Detroit office for Compliance, Inc. Regulatory specialist and senior project manager for the investigation and remediation of sites of environmental contamination, brownfield redevelopment, air permitting, emergency response, expert witness and leaking underground storage tank programs. Recipient of Kresge Foundation brownfield redevelopment project grant, and board member for Cluster 5 (Southwest Detroit) of Detroit's Community Reinvestment Strategy initiative.

Regulatory Specialist/Project Manager - Environmental Solutions, Inc., Traverse City, Michigan.

1992 - 1996 Regulatory specialist and project manager for the investigation and remediation of sites of environmental contamination.

Environmental Enforcement Specialist - Michigan Department of Environmental Quality, Environmental Response Division, Lansing, Michigan.

1991 - 1992 Liaison to the Department of the Attorney General in the enforcement and litigation of state environmental regulations.

Environmental Quality Analyst - Michigan Department of Environmental Quality, Environmental Response Division, Gaylord, Michigan.

1989 - 1991 Compliance and enforcement of state hazardous waste, solid waste and leaking underground storage tank (LUST) regulations for eight county region. Responsible for coordination of Part 201 and LUST programs for the eight (8) county Gaylord District.

CHRISTOPHER P. GROBBEL

Page 3

Water Quality Specialist - Michigan Department of Natural Resources, Land and Water Management Division, Lansing, Michigan.

1988 - 1989 Production supervisor and design assistant for the Michigan Statewide Groundwater Data Base geographic information system.

U.S. Peace Corps – Returned Peace Corps Volunteer.

1987 - 1988 Worked in the development of agro-forestry systems, soil conservation and environmental education projects in Guayas Province, Ecuador.

Consultant - Michigan Department of Natural Resources, Groundwater Quality and Land and Water Management Divisions, Lansing, Michigan.

1986 - 1987 Staff planner and development specialist for the prototype computerized Michigan Statewide Groundwater Data Base.

SELECT PROFESSIONAL PUBLICATIONS & PRESENTATIONS

The Rap Sheets: Paying for Pollution. The Misuse of Public Resources for Manure-to-Energy Projects at Industrial Dairies in Wisconsin, Socially Responsible Agriculture Project and Kewaunee CARES, May, 2019.

Delaware CAFO Guide, Socially Responsible Agriculture Project, May 2019.

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Local Governmental Role in Oil and Gas Regulation, WMEAC Conference, Fracking in Michigan, December 3, 2014, Kellogg Center, E. Lansing, Michigan.

Environmental Issues in Natural Gas Production, Harrison, W.B. III, Peters, J., Poll, J., Grobbel, C., VanDyke, A., and Sadler, S., Foxmoor Continuing Education, a Division of Half Moon Education, Inc., publication, 2014.

What is a Taking? Exploring the Boundary between Public Interest and Private Property, Kohler, Ellen, Esq. and Grobbel, Christopher, Ph.D., Tip of the Mitt Watershed Council publication, 2004.

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Citizen Planner Program Curriculum, training course series for non-professionals involved in local land use decision-making, Michigan State University Extension, 175 pp., copyright 2000. Legal Foundations of Planning and Zoning; Private Property Rights and the Takings Issue; Zoning for Water Quality; Farmland Preservation Tools and Techniques; Principles of the New Urbanism; Brownfield Redevelopment; Wetland Science and Regulation; and Riparian Rights.

An Examination Of Indicators Of Social Equity In Michigan Environmental Policy: The Case Of The Michigan Environmental Response Program, Ph.D. dissertation for the College of Agriculture and Natural Resources, Resource Development Department, Michigan State University, 200 pp., 1998.

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Page 4

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Environmental Equity and U.S. Policy, Community News & Views, Vol. 6, No. 4, Urban Affairs Programs, Michigan State University, Winter 1994.

Wellkey: User Documentation, Christopher P. Grobbel and Bruce Morrison, 69 pp., 1989.

Water Well Record Location Verification and Automation: A Pilot Project for Isabella County, Michigan, M.N. Beaulac and Christopher P. Grobbel, 50 pp., 1987.

State v.s. Federal Rights in the Regulation of Natural Resources: Legal Issues Surrounding Great Lakes Water Diversion, A Master's Thesis for the College of Agricultural and Natural Resources, Michigan State University, Christopher P. Grobbel, 120 pp., 1986.

Water Management in Michigan: Legal Issues in Michigan Water Planning, Dan Bronstein, Leighton Leighty, John Vincent and Christopher Grobbel, 214 pp., 1985.

Presenter of “**Environmental Issues with Hydraulic Fracturing: Unconventional Natural Gas Development of Collingwood Shale**” numerous conferences and presentations through-out Michigan, 2010 – 2014.

Panelist: “**Risks of Hydraulic Fracturing: Unconventional Natural Gas Development of Collingwood Shale**,” Michigan State University Extension, Traverse City, Michigan, June 24, 2010.

Instructor of “**Planning and Zoning Essentials**” Michigan Association of Planning, February 25, 2010, Perry Davis Hotel, Petoskey, Michigan.

Presenter of “**Role of Local Government in Protecting Wetlands**” at the Planning Michigan Conference, Michigan Association of Planning's 2009 Planning Conference, October 2, 2009, Mt. Pleasant, Michigan.

Presenter of “**Role of Local Government in Michigan Wetland Regulation**” at the Michigan Wetlands: Celebrating the 25th Anniversary of the Wetland Protection Act Conference, Michigan Department of Environmental Quality, Michigan Department of Natural Resources, Northwestern Michigan College, Water Studies Institute, and U.S. Environmental Protection Agency, May 20-22, Traverse City Michigan.

Presenter of “**Groundwater Disputes: Case Studies and Solutions**” at the 10th Annual Michigan Environmental Health Professionals Conference, October 12-15, 2003, Shanty Creek, Bellaire, Michigan.

Presenter of “**Water Quality Protection Tools for Local Government**,” Kellogg Foundation/People and Land Project, September 30, 2003, Inland Lakes Education Center, Indian River, Michigan.

Presenter of “**Water Quality Protection Tools for Local Government**,” Kellogg Foundation/People and Land Project, August 22, 2003, Grand Traverse Bay Watershed Conference, Holiday Inn, Traverse City, Michigan.

Presenter of “**Farmland Preservation Tools and Techniques and Landowner Options**” at the 52nd Annual Benzie-Manistee Horticultural Show, March 18-20, 2003, Crystal Mountain, Thompsonville, Michigan.

CHRISTOPHER P. GROBBEL

Page 5

Presenter **“Riparian Rights”** for HARBOR, Inc. at the Little Traverse Township Hall, Emmet County, Michigan, March 25, 2003.

Panelist **“The Legalities of Land Use”** for MSU Extension/HARBOR, Inc. at the Little Traverse Township Hall, Emmet County, Michigan, December 10, 2002.

Presenter **“Planning and Zoning - How to Stay Out of Court”** at the Annual Michigan Society of Planning Conference, Community, Culture, Change: Planning Michigan, Kalamazoo, October 2 through 5, 2002.

Presenter of **“Michigan’s Environmental Regulatory Legacy”** at the 2001 Kickoff: Michigan Groundwater Stewardship Program, Michigan Department of Agriculture, Michiganiana, Boyne City, Michigan, October 25, 2000.

Presenter of **“Hydrogeology, Contaminant Monitoring, Fate and Transport, and Contaminant Remediation”** at the Chemical Applications: Pesticide/Fertilizer Application Workshop, Michigan State University, East Lansing, Michigan, March 30 – 31, 2000.

Presenter at the 2000 Envirothon, **“Renewable Energy: Taking Another Look”**, Northwest Michigan Horticulture Research Station, Michigan State University Extension, February 18, 2000.

Co-presenter **“Land Use Conflict: When City and Country Clash”**, A project of the National Public Policy Education Committee in Cooperation with the Farm Foundation, Northwest Michigan Orchard Show, Grand Traverse Resort, Acme, Michigan, January 25, 2000.

Panelist **“Building Consensus in Land Use and Growth”**, Council of Michigan Foundations annual conference, Grand Traverse Resort, Acme, Michigan, October 4, 2000.

Panelist at **“A Community Forum of Brownfield Redevelopment along Boardman Lake”**, Traverse City, Michigan, October 13 and 27, 1998.

Panelist on **“Impact of the Michigan Environmental Response Act”** at the Michigan Department of Treasury's 8th Annual Directions in Public Finance Conference at the Grand Traverse Resort, Acme Michigan on June 2, 1995.

Presented an **Environmental Regulatory Update: Issues Related to Commercial Lender Liability** for Old Kent Bank, March 11, 1994 and June 7, 1995.

Presented Guidelines for the **Purchasing, Handling and Disposal of Hazardous Materials** with Benson, McCurdy & Wotila, P.C. for Northern Michigan Purchasing Agents in Kalkaska, Michigan on March 9, 1994.

Presenter - **An Overview of Michigan Environmental Response Act and Other Environmental Regulations** for Grand Traverse Area Certified Public Accounts and Attorneys at the Grand Traverse Resort, Traverse City, December 10, 1991.

Guest Lecturer in **Wetland Law** – Detroit College of Law, Michigan State University, East Lansing, Michigan, Spring 2002.

CHRISTOPHER P. GROBBEL

Page 6

Guest Lecturer in **Environmental Justice Studies** – University of Michigan, School of Natural Resources, Ann Arbor, Michigan, Spring 1998.

Guest Lecturer in **Environmental Justice and the Law** – Cooley Law School, Lansing, Michigan, Fall 1997.

Guest Lecturer in **Environmental Studies** – Western Michigan University, Kalamazoo, Michigan, 1994 through 1999.

FURTHER EDUCATION

Seminar - **New Digital Joint Permit Application (JPA) in MiWaters: Submitting Wetlands, Lakes and Streams Applications**, Water Resources Division of the Michigan Department of Environmental Quality, March 5, 2019.

Training – **Understanding the Depth of Deep Well Injection**, North Central Michigan College, Petoskey, Michigan, May 20, 2010.

Training – **Design for Rain Gardens: Stormwater and Runoff Control**, North Carolina State University and Tetra Tech, April 16, 2009.

Training – **Wetland Plant Identification**, Wetland Training Institute, Dr. Mollenberg, Lansing, Michigan, May 21-24, 2002.

Training - **Planning Hydrology for Constructed Wetlands**, Wetland Training Institute, Dr. Gary Pierce, Pierce Cedar Creek Institute, Hastings, Michigan, July 9 - 13, 2001.

Training - **U.S. Army Corps of Engineers Wetland Delineation and Management Training**, Richard Chinn Environmental Training, Inc., Chicago, Illinois, October 9 - 13, 2000.

Training – **Special Wetland Area Management Project**, Geographic Information System Wetland Data Northwest Michigan Council of Governments, Traverse City, Michigan, August 31, 2000.

Training – **Web Site Design Course**, Michigan State University Extension, University Center, Traverse City, Michigan May 4, 2000.

Training - **American Institute of Certified Planners (AICP) Comprehensive Exam Preparatory Course**, February through April 17, 2000.

Training - **Computer Technologies and Groundwater Resource Data Management**, U.S. EPA, Atlanta, Georgia, August 1986.

Seminar - **Hazardous Waste Management under the Resource Conservation and Recovery Act**, Waste Management Division of the Michigan Department of Natural Resources, February 1989.

Training - **Soil and Groundwater Sampling and Analysis** - Michigan Department of Natural Resources, April 1989.

CHRISTOPHER P. GROBBEL

Page 7

Training - **Innovative Remedial Action Technologies**, Environmental Response Division, Michigan Department of Natural Resources, 1989.

Seminar - **Underground Storage Tank Management**, Department of Engineering Professional Development, University of Wisconsin, 1989.

Training - **Amendments to the Michigan Environmental Response Act, 1988 P.A. 307**, Michigan Department of Natural Resources, 1990.

Seminar - **Leak Detection and Corrective Action for Underground Storage Tanks**, Department of Engineering Professional Development, University of Wisconsin, 1990.

Seminar - **Groundwater Flow and Well Hydraulics**, Department of Engineering Professional Development, University of Wisconsin, 1991.

Cleaning The Air in West Michigan #4: Recognizing and Dealing with Non-compliance, Varnum, Riddering, Schmidt and Howlett, and Grand Valley State University - Water Resources Institute, Grand Rapids, Michigan, September 1994.

ASTM - Environmental Site Assessment Up-date, Chicago, Illinois, August 1994.

Seminar - **IBM PC Applications in Groundwater Pollution and Hydrology**, Groundwater Modeling and Computer Technologies for Groundwater Quality Management - National Ground Water Association, Boston, Massachusetts, August 1994.

Workshop - **Waste Minimization and Energy Efficiency Workshop** - American Automobile Manufacturers Association, Michigan Departments of Commerce and Natural Resources and the U.S. EPA, Detroit, Michigan, December 1994.

Seminar - **Clean Air Act Amendments, Sec. 112(R) - Process Safety Management and Risk Management Compliance**, Michigan Association of Environmental Professionals Howell, Michigan, December 1994.

Workshop - **Waste Minimization and Energy Efficiency Workshop** - Michigan Departments of Commerce and Natural Resources, Traverse City, Michigan, May 1995.

Training - **Risk-Based Corrective Action (RBCA) Applied at Petroleum Sites (ASTM E38-94)**, ASTM by Foster Wheeler Environmental Corporation, Bellevue, Washington, July 14-15, 1995.

Conference – **Restructuring Rural Society and Rural Sociology**, Environmental Justice, 58th Annual Meeting, Rural Sociological Society, Ritz-Carlton Hotel, Pentagon City, Virginia, August 17-20, 1995.

Conference – **Michigan Chapter of the American Planning Association and the Michigan Society of Planning Officials**, 4th Annual Joint Conference, “Planning Michigan For the People, By the People”, Amway Grand Plaza, Grand Rapids, Michigan, September 22-25, 1999.

Seminar - **Innovative Septic Technologies**, Michigan State University Engineering Department, Michigan State University Extension and Northwest Michigan Council of Governments, Traverse City Library, Traverse City, Michigan, August 25, 2000.

CHRISTOPHER P. GROBBEL

Page 8

Academic Achievement:

Phi Theta Kappa National Honor Society
Golden Key National Honor Society
Alpha Zeta Agriculture and Natural Resources Honor Society
Numerous MSU scholarships and assistantships – 3/84 through 3/86.
MSU graduate student fellowship – 9/92 through 8/98.

Professional Certifications:

OSHA 40-Hour Site Safety Training
OSHA 8-Hour Site Safety Training
OSHA Hazardous Waste Site Supervisory Safety Training
Qualified Underground Storage Tank Professional #190, State of Michigan, Department of Environmental Quality.
Michigan Association of Planning, certified instructor.

Professional Associations:

Michigan Association of Environmental Professionals, member.
National Association of Environmental Professionals, member.
National Ground Water Association, member.
Society of Wetland Scientists, member.
Michigan Association Planning, certified instructor and former education committee member.
American Planning Association, member.