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July 26, 2026

Harrisville Township
c/o Charles Spitznagel, Supervisor
114 S. Poor Farm Rd.
Harrisville, MI 49740
Via Email

RE: Land Use Planner's Comments, Proposed Gustin Solar Energy Center, Parcel Nos. 060-018-300-012-00 (68.94 acres), 060-018-400-015-01 (137.32 acres), 060-019-100-020-00 (80.43 acres), 060-019-200-010-00 (40 acres), 060-019-300-004-00 (80 acres), 060-019-400-005-00 (102 acres), 060-019-400-010-01 (74.06 acres), 060-030-100-011-00 (162.14 acres), 060-030-300-005-01 (150 acres), and 060-030-400-010-00 (120 acres), Sections 18, 19 & 30, Harrisville Township, T26N, R9E, Alcona County, Michigan.

Dear Supervisor Spitznael,

Please find this public comment and preliminary land use planner's review of the proposed Consumers Energy Gustin Solar Energy Center and its evaluation under the Harrisville Township zoning ordinance.

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 Michigan Department of Environment, Great Lakes and Energy or “ELGE”) 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 land use evaluation, and to develop findings and recommendations, I reviewed publicly available information including but not limited to the Gustin Solar Energy Center site plan review (SPR) and special land use (SLU) application, site property data, topography, land cover, hydrologic, hydrogeologic, soils maps, and relevant local regulations. 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 use and 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: Based on information and belief, Harrisville Township is implementing zoning regulations in the absence of a Master Plan, which is a violation of Michigan’s Zoning Enabling Act.

Finding 2: Wetlands and surface water drains exist with the project site. Based on information and belief, wetland delineation and reporting and agricultural drain/surface water evaluations have not been undertaken and/or not submitted to Harrisville Township as required for adequate Township SPR and SLU review, and Township zoning ordinance’s Section 3.22.A.1. Therefore, the Gustin Solar Energy Center application is administratively incomplete, precluding Township consideration and final decision-making.

Finding 3: If filling (e.g., roads, driveways, staging areas, etc.), grading (e.g., roads, driveways, staging areas, etc.), or construction (including solar array rows, and the burial of cables and optic fiber lines, etc.) are proposed in regulated wetlands, a Part 303 permit is required from Michigan’s EGLE *prior* to Township site plan and/or special land use reviews. Therefore, the Gustin Solar Energy Center application is administratively incomplete, precluding Township consideration in its current form and final decision-making.

Finding 4: Valid hydrogeological study(-ies) including baseline water quality assessment should be performed and reported to the Township from the project site before any final Township decision.

Finding 5: The project’s solar glare study should be re-run with more realistic solar array receptor height assumptions.¹

Finding 6: The project’s sound study should be re-run with more realistic receptor height assumptions, to be protective of nearby residences.²

Finding 7: To adequately review the SLU standard within Section 16.04.3., the application should include and the Township should review a valid and reliable traffic study.

Finding 8: The application should address and the Township should review the proposed project’s potential impact on all future land uses within the Ag. District.

¹ The use of solar panel array height of 5.5 feet is invalid, and very likely downplays actual glare impact at public roadways and nearby properties. Moreover, glare path receptors were assumed at a 6 feet above ground at nearby residences, and 4 feet and 8 feet at roadways. It is strongly recommended that glare receptor height used for residences reflect residence height allowed by the Harrisville Zoning Ordinance, i.e., a two story home at 35 feet, and reflect heavy truck cab height at roadways, i.e., up to 10 feet tall.

² Similar to the solar glare model discussed above, the noise study utilizes a computer model to estimate intensity of noise from 25 noise sources including the solar inverters at solar panel arrays and collector investor skids. Importantly, one model assumption/input parameter is a “receptor height” at 5.0 feet above ground level. The use of 5.0 feet noise receptor height is invalid, and very likely underestimates the actual noise impact at nearby properties. It is strongly highly that the modeled noise receptor height used for nearby residences reflect home heights allowed by the Harrisville Zoning Ordinance, i.e., two story homes at 35 feet.

Finding 9: To ensure compliance with Section 3.22.C.10., the Township should condition any land use, SPR or SUP permits, if approved, upon the provision of the required decommission bond, and find that such permits be revoked and considered null and void if this bond is not provided prior to any aspect project construction.

Finding 10: Based on Michigan law, the application must comply and the Township is required to review the project's compliance with the provisions of Michigan's Part 17: Environmental Protection Act of NREPA, P.A. 451 of 1994, as amended.

4.0 Proposed Project Description

Consumers Energy, a subsidiary of CMS Energy Corporation of Jackson, Michigan, has proposed a very large solar farm project would be located in Austin and Harrisville Township, Alcona County, Michigan. The project portion within Harrisville Township is proposed to consist of a tracking solar array containing 523 fenced acres with 165,321 solar panels to generate 116.5 megawatts direct current (DC) and 94 megawatts alternating current electricity, connected via underground electric cables to a 34.5 to 138 kilovolt collector substation located in Gustin Township.³ The company has signed easement agreements with the landowners of ten (10) parcels within Harrisville Township, totaling 1,015 acres (+/-), and has proposed a with a thirty (30) year commercial operation period.⁴

5.0 Michigan Zoning Authority

Municipalities within Michigan may choose to regulate the use of land through the enactment of zoning regulations. Under Michigan law, communities that regulate land uses and direct future growth through zoning, must do so based on a valid community plan or "Master Plan."⁵ 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. Community Master Plans must be audited every 5 years, and updated as necessary to lawfully regulate land uses through zoning regulation.

³ In total, Gustin Solar Energy Center components proposed in Harrisville Township include: 165, 321 PV modules; 32,380 support racks; 2,175 racks; 3 MET stations; 25 inverter skid assemblies; 25 PCS transformers; 1,772,139 lineal feet of above grade cable, 606,491 lineal feet of under ground cable; 67,771 lineal feet of fence; and 30,863 lineal feet of gravel roads. See Gustin Solar Harrisville Township, Exhibit G: Decommissioning Plan, Black & Veatch, June 15, 2026, p. 3.

⁴ Gustin Solar Energy Center, Special Use Permit - Harrisville Township, 14 pp., undated, p. 1.

⁵ Michigan Zoning Enabling Act, as amended, P.A. 110 of 2006, as amended, MCL 125.3201(1) through (4), 125.3203 (1); and see also Michigan Planning Enabling Act, as amended, P.A. 33 of 2008, as amended, MCL 125.3803(g)(ii).

Based on information and belief, Harrisville Township is implementing zoning regulations without having adopted a Master Plan, which is a violation of Michigan's Zoning Enabling Act. As such, it may be unlawful for the Township to be applying or enforcing its zoning ordinance .

6.0 Site and Vicinity Hydrogeology

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



Figure 1: Topographic map, site and vicinity features - Sections 18, 19 & 30, T26N, R9E, Harrisville Township, Alcona County, Michigan.

The proposed project area is relatively flat, sloping gently to the south-southeast from 750 feet to 700 feet above mean sea level (m.s.l.). An agricultural drain exists within the proposed project area the centers of Sections 18 and 19 which drain wetlands to the south beneath Clemens Road to Van Etten Creek. A drain and wetland complex also exists with Section 30, and drains to the south beneath Dellar Rd. This surface water drainage feature joins Van Etten Creek to the south, which in turn flows generally southerly to its confluence with the East Branch of the Pine River. The

East Branch of the Pine River in turn flows southerly to the Pine River, which then flows south-southeasterly to Van Etten Lake in Oscoda. *Based on information and belief, wetland delineation and reporting have not been undertaken and/or not submitted to Harrisville Township, and should be*

required by the Township for meaningful SPR and SLU review. Therefore, the Gustin Solar Energy Center application is administratively incomplete, which precludes the Township's consideration and final decision-making of the application as submitted.

Copies of residential water well logs were obtained and reviewed from the EGLE water well retrieval system website on July 25, 2026. The review of eight (8) available residential well logs was undertaken from Sections 18, 19 & 30 of Harrisville Township, Alcona County. Vicinity residential wells that are relatively shallow are entirely completed within glacial drift with an average total depth of 74.4 feet below ground surface. (b.g.s.). The shallowest vicinity residential well is 44 feet b.g.s. Area well logs suggest that glacial stratigraphy at and near the subject project vicinity consists of surficial sand layer, i.e., 31.1 feet average b.g.s. which is underlain by a clay layer/aquitard averaging 33.4 feet thick. The average water table or “static water level” within the area shallow aquifer is 34.1 feet b.g.s, and demonstrates some hydrostatic pressure upward, toward the ground surface. These near surface hydrogeologic conditions in turn result in the presence of wetland complexes within the proposed solar farm project area.

7.0 Site and Vicinity Soils

According to the U.S. Department of Agriculture, Natural Resources Conservation Service Web Soil Survey for Alcona County, project site soils are typified by Negwegon silt loam, 2% to 6% slope; Algonquin silt loam, 0% to 3% slope, Hoist sandy loam, 0% to 6% slope, Springport clay loam, 0% to 2% slope, Algonquin-Springport complex, 0% to 6% slope, Klacking-McGinn loamy sands, 0% to 6% slopes, and Wakeley mucky sand 0% slope in wetland areas. *Importantly, wetlands exist within the project area.* Michigan's Part 303 of the Natural Resources and Environmental Protection Act (NREPA), P.A. 451 of 1994, as amended, prohibits dredging, draining, filling or construction within regulated wetlands without a Part 303 permit from the Michigan Department of Environment, Great Lakes and Energy (EGLE), and a Part 303 permit evaluation requires a prior valid wetland delineation and report.⁶ As detailed above, the proposed project within Harrisville Township contains 165, 321 PV modules; 32,380 support racks; 2,175 racks; 3 meteorological (Met) stations; 25 inverter skid assemblies; 25 PCS transformers; 1,772,139 lineal feet of above grade cable; 606,491 lineal feet of underground cable;

⁶ See U.S. Army Corps of Engineers (U.S. ACE) 1987 Wetland Delineation Manual, and the 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2).

67,771 lineal feet of fence; and 30,863 lineal feet of gravel roads. *Based on information and belief, wetland delineation and reporting has not been undertaken and/or not submitted to Harrisville Township, and should be required for Township SPR and SLU review. Therefore, the Gustin Solar Energy Center application is administratively incomplete, precluding Township consideration and final decision-making.*

8.0 Harrisville Township Zoning Ordinance

Parcels within the proposed Gustin Solar Energy Center in Harrisville township are each zoned Agricultural (A).⁷ Commercial solar systems are not listed within the Agricultural District as permitted or special land uses (see Sections 8.02A & 8.02B)⁸ However, Section 3.22 of the Township zoning ordinance allows commercial solar energy systems as a SLU in the Agricultural (A), Residential (R-1) and Industrial (I) zoning districts. An application for SPR and SLU review, when submitted is first required to be reviewed by the Township Zoning Administrator for “administrative completeness,” and then only placed on the agenda for review by the Township Planning Commission once the Zoning Administrator has made a written finding that the application is administratively complete. The Planning Commission in turn reviews the site plan and special land use permit application at properly noticed 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.⁹

Section 3.22.A. General Requirements of the zoning ordinance requires that all Solar Energy Systems are subject to the following:

1. All Solar Energy Systems must conform to the provisions of this Ordinance and all County, State, and Federal regulations and safety requirements as well as applicable industry standards.

The proposed project covers 523 fenced acres with 165, 321 PV modules; 32,380 support racks; 2,175 racks; 3 Met stations; 25 inverter skid assemblies; 25 PCS transformers; 1,772,139 lineal feet of above

⁷ Harrisville Township, Alcona County Zoning Map, effective February 14, 2014.

⁸ The SLU list in the Ag District in Section 8.02B is noted as not being inclusive of all SLUs.

⁹ See Harrisville Township Zoning Ordinance Article 15: Site Plan Review and Article 16: Special Land Use review.

grade cable, 606,491 lineal feet of under ground cable; 67,771 lineal feet of fence; and 30,863 lineal feet of gravel roads. *As noted above, the application's compliance with Michigan's Part 303: Wetland Protection Act cannot be evaluated without the performance and disclosure of valid wetland delineation report(s). The application as provided thereby does not meet the above requirement of Section 3.22.A.1.*

2. Solar Energy Systems shall be located or placed so that concentrated solar glare shall not be directed toward or onto nearby properties or roadways at any time of the day.

Exhibit C within the application is a solar glare study for the Gustin Solar project within Harrisville Township.¹⁰ The glare study utilizes a software model to estimate intensity of glare for proposed solar arrays and modules for potential recipients on 8 public thoroughfares and at 32 surrounding private properties. Importantly, one such input parameter is an average solar panel array height of 5.5 feet above ground level.¹¹ According to the project site plans, actual maximum solar array height is 9 feet, 10.5 inches,¹² nearly twice the height used in the application's glare model. As with any model, the validity and robustness of the results are largely based on input assumptions and model sensitivity, i.e., "garbage in, garbage out." *The use of 5.5 feet solar panel array height is invalid, and very likely down-plays the actual glare impact at public roadways and nearby properties. Once the model is re-run with actual solar panel array heights, the Township can reasonably evaluate the severity and locations of the solar glare model's findings of "consequential" and/or "inconsequential" glare.*

Moreover, glare path receptors were assumed at 6 feet above ground for nearby residences, and 4 feet and 8 feet above ground at public roadways. It is strongly recommended that glare receptor height used for residences reflect home heights allowed by the Harrisville Zoning Ordinance, i.e., a two story home at 35 feet, and reflect heavy truck cab height at roadways, i.e., up to 10 feet high. Similarly, the glare model should not rely upon the current existence of 10 woodlots serving as obstructions to glare as deciduous trees shed their leaves from fall to spring each year, and landowners' possess the right to

¹⁰ Gustin Solar Energy Center, Special Use Permit - Harrisville Township, 14 pp., Exhibit C: Solar Glare Study: Consumers Energy Company, 1898 & Co., Part of Burns & McDonnell, June 15, 2026.

¹¹ Ibid., Table 2-1: Parameters for PV Arrays and Modules, P. 2-2

¹² See Consumers Energy Gustin Solar Energy Center Site Plan, Exhibit B - Gustin Solar Energy Center, Special Use Permit - Harrisville Township, Collector System CAB Details, drawing 8-EP-350, Rev. A.

remove such woodlots in whole in part in the future during the project's intended 30 year period. If such woodlots are to be used as glare obstacles in the glare model, the prohibition of obstacle tree removal must be included in landowner easement agreements for the proposed project.

Section 3.22.C. specifically addresses Commercial Solar Energy Systems and requires that Commercial Solar Energy Systems shall be ground mounted and meet the following requirements:

1. The property owner or applicant for a Commercial Solar Energy System shall provide the Planning Commission with proof of ownership of the subject property, a copy of any lease agreement for a commercial solar energy system, together with an operations agreement, which shall set forth the operations parameters, the name and contact information of the certified operator, inspection protocol, emergency procedures and general safety documentation.
 - a) Ground water test submitted to Zoning Administrator prior to installation, upon completion of installation and annually until site restoration is completed.

The application states that this requirement (i.e., Section 3.22.C.1.a.) is “superceded by the application provision of (Michigan’s) Part 31 and Part 201 ...as described in the Exhibit F Groundwater Memo...,” and relies heavily upon the provision to the Township of a future EGLE-approved Spill Prevention Controls and Countermeasures (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.¹³ Based on information and belief, no such EGLE-approval SPCC Plan has been submitted to the Township, and thereby the application is administratively incomplete precluding Township review and final decision-making.

A groundwater test, or valid hydrological study, typically includes the determination of the depth to

¹³ See also Gustin Solar Energy Center, Special Use Permit - Harrisville Township, Exhibit E: Solar PV Station Emergency Response Plan, Consumers Energy Company, dated August 21, 2025, p. 15.

groundwater, groundwater flow direction and velocity (i.e., flow gradient), hydraulic conductivity, and baseline water quality assessment, and aquifer pump tests. As required by Section 3.22.C.1.a. such a valid groundwater test should be performed and reported to the Township before the commencing of SPR and SLU review and any final Township decision.

Moreover, state environmental regulation and program do not “supercede” local zoning authority, rather such regulations rather are considered supplemental to local zoning pursuant to Michigan’s Part 17: Environmental Protection Act of NREPA, P.A. 451 of 1994, as amended. Michigan’s part 17 requires the Township’s affirmative and documented finding in SPR and SLU review that the proposed solar farm will not pollute, impair or destroy the air, water and other natural resources of the site vicinity and/or Harrisville Township.

2. The Commercial Solar Energy System, all Photovoltaic (PV) systems and support structures associated with such facilities (excluding perimeter fencing) shall be setback a minimum of forty (40) feet from a side or rear property line and a minimum of fifty (50) feet from any road right-of-way. Setbacks should be measured when the panel is at minimum tilt.
3. The height of the Commercial Solar Energy System and any mounts shall not exceed fifteen (15) feet when oriented at maximum tilt.
4. Solar devices shall be screened year-round from view from any existing residential use and the public right-of-way by use of a screening wall of native shrubbery, trees, or other native, non-invasive plant species that provide a visual screen of effectiveness and quality, as determined by the Planning Commission. Screening shall be installed which screens the facility fully from view from the time of planting or installation. Screening shall be maintained throughout the life of the facility including replacing dead vegetation within six (6) months or at the earliest feasible time of the year dependent on the weather.

See comments under Section 3.22.A.2. above.

5. The sound pressure level of a solar energy facility and all ancillary solar equipment shall not exceed forty-five (45) dBA (Leq (1 hour)) at the property line of an adjacent non-participating lot at 2 a.m. The site plan shall include modeled sound isolines extending from the sound source to the property lines to demonstrate compliance with this standard. The applicant is responsible for testing dBA levels annually and submitting the results to the Zoning Administrator.

The application also includes a preconstruction sound study.¹⁴ Similar to the solar glare model discussed above, the noise study utilizes a computer model to estimate intensity of noise from 25 noise sources including the solar inverters at solar panel arrays, 25 collector inverter skids, and 25 PCS transformers. Importantly, a model input parameter use in the noise study is a “receptor height” of 5.0 feet above ground level.¹⁵ The use of 5.0 feet noise receptor height is invalid, and very likely underestimates the actual noise impact at nearby properties. It is strongly recommended that the model noise receptor height used for nearby residences reflect home heights allowed by the Harrisville Zoning Ordinance, i.e., two story homes at 35 feet, and the nose model be re-run and the results submitted to the Township.

The noise generated from the proposed solar array inverters or inverter collector skids could also result in the non-quantitative (i.e., measured on the dBA scale) but qualitative unreasonable interference with the comfortable use and enjoyment of nearby residential uses at nearby property lines. Consequently, the application as provided does not adequately demonstrate compliance with this Section of the Ordinance.

6. Prior to installation, the applicant shall submit a descriptive site plan (reference Article 15 for site plan requirements) to the Planning Commission which includes where and how the Commercial Solar Energy System will connect to the power grid.
7. No Commercial Solar Energy System shall be installed until evidence has been given to the Planning Commission that the electric utility company has agreed to

¹⁴ See Gustin Solar Energy Center, Special Use Permit - Harrisville Township, Exhibit F: Preconstruction Sound Study, Consumers Energy Company, Burns & McDonnell, June 15, 2026.

¹⁵ Ibid., Table 3-1: Sound Monitoring Parameters, p. 3-1.

an interconnection with the electrical grid or a power purchase agreement. Any such agreement shall be furnished to the Planning Commission.

The application reads that “Consumers Energy will provide interconnection updates and evidence of a final interconnection agreement once received.”¹⁶ To ensure compliance with Section 3.22.C.7., the Township should condition any land use, SPR or SUP permits, if approved, upon the provision of such required power purchase agreement, and find such permits null and void if this agreement is not provided prior to any aspect project construction.

8. Developer/applicant shall provide verification of operation (solar energy used by or purchased by utility company) annually to the zoning administrator.
9. A condition of every approval of a Commercial Solar Energy System shall have an adequate provision for the removal of the system whenever it ceases to be used for one (1) year or more. In the event that a system has been abandoned (meaning not having been in operation for a period of one (1) year). Either the zoning administrator or the property owner and developer/applicant shall notify the Township that the SES is abandoned, and the property owner and developer/applicant shall remove the system within one (1) year from the date of abandonment. Removal includes the proper receipt of a demolition permit from the Building Official and proper restoration of the site to the satisfaction of the Zoning Administrator. The site shall then be filled and covered with topsoil and restored to a state compatible with the surrounding vegetation.
10. To ensure proper removal of a Commercial Solar Energy System upon discontinued use or abandonment, applications shall include a description of the financial security guaranteeing removal of the system which must be posted with the Township within fifteen (15) days after approval or before a construction permit is issued for the facility. The financial security shall be a performance bond (surety bond), in a form approved by the Township. The amount of such a guarantee shall be no less than

¹⁶ See Gustin Solar Energy Center, Special Use Permit - Harrisville Township, p. 7, undated.

150% of the estimated cost of removal and may include a provision for inflationary cost adjustments. The estimate shall be prepared by the engineer for the developer and shall be approved by the Township. The applicant shall be responsible for the payment of any costs or attorney fees incurred by the Township in securing removal.

- a. The financial resources for decommissioning shall be 150% of the estimated removal and restoration cost. The Planning Commission shall require independent verification of the adequacy of this amount from a professional engineer annually.
- b. The Planning Commission shall annually review the amounts deposited for removal, site restoration, and administration costs are adequate for these purposes. If the Planning Commission determines that these amounts are not adequate, the Board shall require the owner/operator to make additional deposits to increase the amount of the surety bond to secure such inadequacy.
- c. The County shall have access to the surety bond funds for the express purpose of completing decommissioning. If decommissioning is not completed by the applicant within one (1) year of the end of project life, inoperability of Commercial SES or facility abandonment, the surety bond funds may be used for administrative fees and costs associated with decommissioning.
- d. The applicant will notify the Zoning Administrator no less than 14 days prior to any changes to the Surety Bond. Failure to supply such notification may result in termination of approval to operate by the Harrisville Township Board.

The application reads that “Consumers Energy will provide a decommissioning bond ...”¹⁷ To ensure compliance with this Section, the Township should condition any land use, SPR or SUP permits upon the provision of such required decommission bond, and find such permits should be revoked and considered

¹⁷ Gustin Solar Energy Center, Special Use Permit - Harrisville Township, Consumers Energy, p. 8, see also Gustin Solar Harrisville Township, Exhibit G: Decommissioning Plan, Black & Veatch, June 15, 2026.

null and void if this bond is not provided prior to any aspect project construction.

9.0 Special Land Use Review - Harrisville Township

Harrisville Township's Zoning Ordinance, Article 16: Special Use Permit Procedures 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 review process, including both non-discretionary standards (i.e., ministerial standards as found in site plan requirements) and the discretionary standards within the special land use review. Township officials must address every relevant zoning ordinance standard, and individually state their reasons for decisions by relevant standard, and this must all be accurately reported in this findings of fact document. *Very importantly, the Township must look to its Master Plan and its stated values and priorities in the review of these conditional use standards, and Harrisville Township apparently lacks a Master Plan.*

Section 16.04 lists the special land use standards, and each of the following should found to be met by the Township:

1. All standards applicable to the district in which the development is to be located.

See comments regarding Section 16.04.1. below.

2. Any additional standards applicable under Article Seventeen-Development Standards for Special Permit Uses.”

A review of Article 17 did not evidence additional SLU review standards specific to commercial solar array systems.

3. Adequate location and design of driveways to provide vehicular ingress to and egress from the site.

To adequately review the above SLU standard, the Township should require the submittal of a valid

traffic study.

4. Traffic circulation features within the site and location of automobile parking areas which ensure safety and convenience of both vehicular and pedestrian traffic.

It is noted that likely damage to roads and streets, and the potential risk for public safety from project truck traffic cannot be adequately assessed by the Township without the performance of a valid traffic study, and its disclosure to the Township.

5. Safe and adequate sewage disposal facilities, water supply, storm water drainage, fire protection and other utility provisions.

6. Any development modifications necessary to ensure the nature of the operation will not be in conflict with the primary permitted uses in the district or neighborhood.

All of the parcels within the proposed project in Harrisville Township are zoned as Agricultural (A), and commercial solar systems are not listed in the Agricultural District as permitted or special land uses - perhaps signaling the inherent incompatibility of such land uses and agriculture.

Importantly, this standard requires the Township to review this plan in light of likely impacts to all permitted and special land uses allowed in the Ag. District, i.e., including future allowable land uses. Permitted uses in the Ag District include: agriculture, one and two-family dwellings, roadside stands, plant nurseries and greenhouses, home occupations, bed and breakfasts, and associated accessory buildings and uses. Special land uses allowed in the Ag. District include cemeteries, commercial kennels, veterinary clinics, animal hospitals, township and county administration buildings, fires control structures, non-domestic fur-bearing animal husbandry, commercial mines, quarries and gravel pits, private airports and landing strips, telecommunication towers, and associated accessory buildings and uses. To comply with standard 6 above, the application must also address and the Township must review and document decision-making of the proposed project's potential impact of all future land uses within the Ag. District listed above.

7. Adequate mitigation of any conditions objectionable to adjacent and nearby properties by reason of traffic, noise, vibration, dust, fumes, erosion, pollution, or negative effects upon significant environmental features.

The project site and surrounding area are typified by active agriculture and low density rural residential 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. Nuisance noise associated with the proposed large-scale solar farm include: truck noise at ingress to egress from public roads; downshift braking or “jack braking” of heavy duty trucks entering project facilities, especially during construction; the low, nearly constant drone of on-site heavy equipment and high pitched safety backup alarms or excavator “beepers” during construction; constant high pitched noise from solar farm equipment, including the array inverters at 165,321 PV modules, and 25 inverter skid assemblies. As noted in footnote 19 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.¹⁸

¹⁸ “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 - 96 dBA
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

The noise generated from the proposed solar farm could also result in the unreasonable interference with the comfortable use and enjoyment of nearby residential uses, and certainly will not be harmonious in this setting due to the agricultural/rural character of the general vicinity.

8. That the use will not discourage or hinder appropriate development and use of adjacent premises and neighborhood.

As noted in comment 7 above, a lawful Township zoning ordinance is to be based on a valid master plan, which typically additionally requires the adequate protection of neighboring properties from nuisances and the harmonious relationship between adjacent and vicinity land uses

10.0 Conclusions

Finally it is noted that local units of government in zoning review are required by law to also comply with the provisions of Michigan's Part 17: Environmental Protection Act of NREPA, P.A. 451 of 1994, as amended, which requires the Township's affirmative and documented finding that the approval or approval with conditions of the proposed project will not pollute, impair or destroy the air, water and other natural resources of the site, its vicinity and/or Harrisville Township. *Based on the above, we strongly urge Harrisville Township to deny the Gustin solar farm operation as proposed within Harrisville Township.*

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

Sincerely,
Grobbel Environmental & Planning Associates



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

References

Gustin Solar Energy Center, Special Use Permit - Harrisville Township, 14 pp. with Appendices A through G, June 15, 2026.

Hydric Soils of Michigan, U.S. Department of Agriculture, Soil Conservation Service, East Lansing, MI, January 1993.

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Michigan Planning Enabling Act, as amended, P.A. 33 of 2008, as amended, MCL 125.3801, *et seq.*

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Wetlands Regulatory Assistance Program, Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Northcentral 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.

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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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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.