



GOODHUE COUNTY MINNESOTA

TO EFFECTIVELY PROMOTE THE SAFETY, HEALTH, AND WELL-BEING OF OUR RESIDENTS

Goodhue County Planning Commission
Government Center - Board Room
509 West 5th St, Red Wing MN 55066

May 14, 2018 Planning Advisory Commission Meeting PACKET

Documents:

[PLANNING ADVISORY COMMISSION MEETING PACKET.PDF](#)

Anyone interested is invited to attend. Agenda items may be subject to change.

Goodhue County Land Use Management

♦ Goodhue County Government Center ♦ 509 West Fifth Street ♦ Red Wing ♦ Minnesota ♦ 55066 ♦
♦ Building ♦ Planning ♦ Zoning ♦ Telephone: 651/385-3104 ♦ Fax: 651/385-3106 ♦



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TO EFFECTIVELY PROMOTE THE SAFETY, HEALTH, AND WELL-BEING OF OUR RESIDENTS

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Planning Advisory Commission

Call Meeting To Order

Approval Of Current Agenda

Approval Of Previous Month's Meeting Minutes

1. April 16, 2018 PAC Meeting Minutes

Documents:

[MINUTES_APRIL2018_PAC_DRAFT.PDF](#)

Conflict/Disclosure Of Interests

Public Hearings:

1. PUBLIC HEARING: Request For CUP For A Utility Scale Solar Energy System (SES)
Request for a CUP submitted by Nokomis Hiawatha LLC (applicant) and Douglas Stegemann (owner) for a Utility Scale Photovoltaic Ground 1 Megawatt Solar Energy System (SES) occupying approximately 5 acres. Parcel 28.016.0300. TBD HWY 19 BLVD, Cannon Falls, MN 55009. Part of the SW ¼ of NE ¼ in Sect 16 Twp 112 Range 17 in Cannon Falls Township. A2 Zoned District.

Documents:

[PACPACKET_SOLAR_BYLLESBYGARDEN_WEBSITE.PDF](#)

2. PUBLIC HEARING: Request For Map Amendments (Rezones)
Request for map amendments submitted by Stanton Township to rezone 39 parcels from A3 (Urban Fringe District), A2 (Agriculture District) and A1 (Agriculture Protection District) to R1 (Suburban Residence District). Parts of the SE ¼ of Section 30, NE ¼ of Section 36, NE ¼ of Section 24, NW ¼ and SE ¼ of Section 13 all located in Township 112 Range 18 in Stanton Township.

Documents:

[PACREPORT_STANTONREZONES.PDF](#)

3. PUBLIC HEARING: Request For CUP For Non-Metallic Mineral Extraction Facility
Request by Doug Mahoney (applicant/owner) for CUP for a Non-Metallic Mineral Extraction Facility. Proposed mining includes a limestone quarry and sand/gravel pit and associated processing/transport equipment and facilities. The total site area is 61.5 acres. The area to be mined is approximately 13.4 acres. This CUP proposes to reopen an inactive/lapsed non-metallic mining operation located at 32245 296th Street, Red Wing, MN 55066. Parcel 32.009.1201. Part of the S1/2 of NW1/4 and the N ½ of the SW 1/4, Sect 09 Twp 112 Range 13 in Florence Township. A2 Zoned District.

Documents:

[PACPACKET_MAHONEY.PDF](#)
[MAHONEY_NONMETALLIC_MINING_RECLAMATION_PLAN_OPTIMIZED.PDF](#)

Other-Discussion

Staff Updates

Adjourn

Anyone interested is invited to attend. Agenda items may be subject to change.

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The meeting of the Goodhue County Planning Advisory Commission was called to order at 5:30 PM by Chair Darwin Fox at the Goodhue County Government Center 3rd Floor Court Room in Red Wing, Minnesota.

Roll Call

Commissioners Present: Ron Allen, Tom Drazkowski, Len Feuling, Tom Gale, Darwin Fox, Marc Huneke, Richard (Dick) Nystuen, Sarah Pettit

Commissioners Absent: None (Commissioner Huneke arrived at 5:42 PM – see below)

Staff Present: Land Use Management Director Lisa Hanni, Zoning Administrator Mike Wozniak, Zoning Assistant Ryan Bechel

1. Approval of Agenda

¹Motion by Commissioner Feuling; seconded by Commissioner Drazkowski to approve the meeting agenda. Motion carried 7:0 (*Huneke absent*)

2. Approval of Minutes

²Motion by Commissioner Feuling; seconded by Commissioner Nystuen to approve the previous month's meeting minutes. Motion carried 7:0 (*Huneke absent*)

3. Conflict/Disclosure of Interest

There were no reported conflicts of interest.

4. PUBLIC HEARINGS: Request for amendments to Article 11, Section 24 (Preservation of Farming Practices)

Request submitted by Circle "K" Farms (Michael, Yon, & Jeff Kohlnhofer) to consider proposed text amendments to Goodhue County Zoning Ordinance Article 11, Section 24 (Preservation of Farming Practices).

The applicant was present to represent the application.

5:42 PM: Commissioner Huneke enters

Lisa Hanni (Hanni) presented the staff report and attachments. Hanni detailed the County's application process, public noticing requirements and further clarified the request before the PAC was not an amendment to the County's existing Feedlot Ordinance (Article 13).

Jack Perry (Applicant's representative) discussed the importance of agriculture, particularly animal agriculture, citing it accounts for a third of Minnesota's economy. He conveyed concerns with nuisance claims for agricultural uses that are in compliance with all applicable state, local, and federal regulations that are brought on by neighboring parties after significant financial resources have been put into a site. Perry detailed a legal case he was a part of in Todd County, MN and discussed outside interests that have provided financial resources for neighboring parties to bring legal actions against feedlot operators. He feels there is a need for stronger ordinance language, similar to those enacted by Todd County, to protect agricultural operators from nuisance claims lacking proximate cause. Mr. Perry stated that he was in favor of Staff's recommended wording for the proposed amendments. He added that Staff's suggested wording clarified the County's position regarding nuisance claims against agricultural operators that are complying with all specified requirements.

Hanni added clarification of the proposed staff changes stating the wording is to clarify that the County's position: if a feedlot is following all of the rules and requirements placed upon

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them by state and local authority, the County will not consider the operation to be a nuisance. Hanni reminded the PAC and attendants of the hearing that the proposed amendments apply to all agricultural operators in the county, not any one specific feedlot.

Chair Fox opened the Public Hearing.

Beth Slocum 31005 CTY 7 BLVD Welch, MN provided a written statement (see attachment 1) She stated the proposed amendment language doesn't serve the best interests of all Goodhue County residents adding that it removes exemptions to feedlot operators exceeding 1000 animal units. She stated the current ordinance is clear, concise, and adequate to protect the public interest. The proposed ordinance changes are vague and add ambiguity to the language. She conveyed concerns regarding changes to feedlot operations over time that are not present at the initial permit issuance. She further added concerns that the Applicants are attempting to preempt themselves from future air quality nuisance concerns. She suggested the PAC either deny the request or table the item and form a study group to further evaluate the proposal.

Kristi Rosenquist 42883 228th Ave, Mazeppa, MN provided various documentation regarding feedlot air emissions (see attachment 2). She stated she believes the proposed changes are detrimental to property owner rights and may even be unconstitutional. She further added that Jack Perry has submitted similar changes to the legislature which have failed to gain traction and she is worried that he is now working to impose his desired changes at the local level. She stated the Right-to-Farm language was originally intended to protect existing operators from nuisance claims, not newly proposed feedlots moving in near established residences. She feels the existing language has been effective and does not need to be updated and that, statewide, nuisance claims against feedlot operators are a rarity. She added that the Staff's proposed changes are not adequate to protect existing property owner's rights and don't provide enough explanation as to why they are necessary. She cited 3M's recent legal case as an example of a business that was in compliance with regulations but was found to be a nuisance through a lawsuit. She suggested the PAC either deny the request or table the item and form a study group to further evaluate the proposal as has been done with other requests such as wind and mining.

Bob Rosenquist 42883 228th Ave, Mazeppa, MN provided a written summary of comments and documentation regarding air monitoring emissions studies (see attachment 3). He cited various studies that suggest air emissions coming from hog feedlot operations exceed recommended levels and are harmful to public health and safety. He stated the hog industry should face the challenge of odor emissions head-on rather than attempting to modify existing regulations to suit their needs. He stated there is not adequate evidence provided by staff to support agricultural operations have been impacted by nuisance claims and urged the PAC to deny the request and leave the existing language in place.

Keith Allen lives in an A1 zone where he operates a goat dairy farm near Kenyon, MN. He is in full support of the proposed changes. He discussed how the agricultural industry has adapted over time to address issues. He stated he has had the opportunity to visit numerous ag operations during his life and believes the vast majority of agricultural operators are good stewards of the land and are cognizant of the importance of preserving it for future generations.

Marie Mcnamara 35815 165th Ave, Goodhue, MN stated she farms in Goodhue County. She mentioned that the ordinance should protect the interests of all people and avoid unintended consequences. She stated that a lot of time and energy went into developing the feedlot ordinance earlier and that the proposed changes are premature. She questions whether the

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proposed changes are protective of all citizens of the County. She submitted documentation regarding the Wendinger family vs Wakefield Pork Inc. (see attachment 4). She stated the case found that compliance with all applicable requirements does not preclude an operator from a negligence lawsuit. She was concerned that the staff recommended wording didn't address potential operational issues after a permit had been issued. She stated the wording proposed to be removed from subd. 3 should not be removed. She further added she was concerned about environmental impacts to the County's Karst features.

Darwyn Tri of Zumbrota Township grew up on a local dairy farm and is a neighboring landowner to the Kohlnhofer's newest proposed swine facility. He provided a written summary of comments (see attachment 5). He stated he has experience in air quality monitoring and has conducted air quality monitoring of hog feedlots and has serious concerns with feedlot odor emissions and existing data being utilized by the MPCA. He detailed various air emissions studies and contaminants. He recommended that the request is put in front of a committee for further study.

Dan Forsythe of Welch Township state he believes the intent of the Applicant's submitted language is to deny the rights of citizens to due process. He stated the request should be denied because it gives business an unfair advantage over others. He feels Staff's suggested wording would limit and deny the rights of Goodhue County citizens. He suggested the PAC either deny the request or study it further prior to making a decision.

Sharon Pagel 41567 CTY 42 BLVD Mazeppa, MN provided a written statement and "Explosion of CAFOs" study (see attachment 6). She stated she lives on her family farm that has been established since 1877. She relayed concerns regarding pollutants in odor emissions from hog feedlot operations. She stated that the Kohlnhofers are establishing a new hog operation near her residence and is very concerned about air pollution impacts to the health and well-being of citizens in the vicinity of these types of operations. She recommended the PAC delay amending existing ordinances until the MPCA completes current odor emissions studies. She is opposed to the requested changes.

Josh Betcher County 42 BLVD Mazeppa, MN stated he lives on a 5th generation family farm. He feels the debate needs to be refocused to the proposed amendments as they would apply to all agricultural operators in the County, not specific rules that would apply to one farm or hog operation alone. He feels the proposed changes add clarity to existing rules and allow agricultural operators to have a clearer understanding of regulations when applying for permits and making investments within the County. He noted a lot of work and review had been completed by Staff regarding the proposed amendments and agreed with the proposed language. He added that there are a number of agricultural operations aside from feedlots that this language applies to such as shrimp producers.

Susan Johnson lives in Red Wing city limits. She questioned whether existing language has been problematic for the County. She asked if examples were available of past problems with the existing language. She was concerned that the proposed amendments removed language regarding injury to neighbors and pollution of water resources. She believes the existing ordinance is already working and should be left alone.

Shelly Nygard of Belle Creek Township stated she is a lifelong resident of Goodhue County. She suggested the prepared staff reports provide no account of how changes could affect rural residents. She is concerned the proposed language limits citizen's avenues of redress for future problems with agricultural operations. She feels inadequate explanation has been provided regarding impacts to rural residents. She stated the proposed changes could allow entities to operate uninhibited with no accountability. She noted the Kohlnhofers are going to be studied

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for air emissions issues currently. She recommends the request be put in front of a committee for further study or be denied, but either way, she doesn't believe modifications are necessary.

Dale Post lives on an A1 zoned farm in Zumbrota Township. He is opposed to both the Applicant's wording and Staff's suggested language. He feels the amendments treat residences as if they are intruders in the agricultural area. He feels that residences shouldn't be considered a conflict to farming. He noted that a feedlot of the Kohlnhofers will be subject to air emissions monitoring after testing indicated levels exceeding standards. He stated he would like 3 things included in the record: 1. At risk communities may citizen report hydrogen sulfide emissions in Minnesota; 2. MPCA Commissioner John Stein issued a statement regarding concerns of potential air quality issues at 2 Kohlnhofer hog facilities; 3. The MPCA did not use the air quality monitoring equipment available to them to address emissions concerns at the Kohlnhofers farms. He also mentioned the county Comprehensive Plan has goals regarding feedlots and environmental concerns for adjacent landowners. He recommends no change to the ordinance at this time.

Jack Perry requested a petition including 18 signatures supporting the Applicant's request be included in the record (see attachment 7).

Sonya Trom-Eayrs is from Dodge County, MN. She is a member of Dodge County Concerned Citizens. Her parents are longtime members of the community and have many feedlots surrounding their longtime family farm that have caused odor issues. She stated her parents and pets have suffered health issues in response to hog odor in the area surrounding their property. She fears that the pork has a history of changing local ordinances in response to lawsuits. She asserted that local planning commissions can be biased due to members being involved in the pork industry. She suggested the pork industry is trying to take advantage of the elderly and rural citizens.

Allan Muller of the city of Red Wing submitted written comments (see attachment 8). He stated he felt the proposed changes were an attempt by the Applicant to reduce the rights and powers of people to challenge their operations. The amendments could curtail County efforts to address feedlot issues in the future. Particularly, the removal of the exemption for 1000 animal units is undesirable to the public interest. He also has concerns about public notice requirements not being met. He recommends there be an advisory committee and additional research conducted prior to any decisions being made. He stressed concerns regarding the limitations of regulations to address environmental concerns such as odor emissions. He also mentioned that if higher authorities opt for reduced regulations, that it would also impact permits then at the local level. He is opposed to any amendments being approved.

Douglas Eayrs is from Dodge County, MN. He is a member of Dodge County Concerned Citizens. He provided documentation regarding 2 nitrate monitoring reports (see attachment 9). He conveyed concerns regarding feedlot contamination of groundwater in areas with Karst geography. He reminded the PAC that they have the power to create a standard higher than state standards. He posited that the hog industry wants free water from county aquifers, space to spread untreated animal manure and that they have their own "agenda" which doesn't care for county residents. He is against the proposed amendments and recommends the PAC consider the impacts to rural residents.

Jed Post of Belle Creek Township stated he recently purchased a dairy farm in Goodhue County. He raised concerns regarding the effectiveness of the existing odor offset model. He questioned how many residents of Goodhue County are in favor of the proposed amendments. He would encourage the PAC to take into consideration all rural residents. He also stated he felt the notification process for hog facility public hearings is inadequate.

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Melissa Post stated her husband put his retirement into the farm and they have been directly impacted by feedlot odors surrounding their property.

Fredrick Frederickson is a dairy farmer located in Zumbrota Township. He stated he is a neighbor of the Kohlnhofers and is against the proposed changes. He recommends that a more thorough study of the changes be done prior to further consideration.

Sara Freed is a farmer located in southeastern Goodhue County. She is not supportive of the change. She has no issues with the rules and regulations and feels that the ordinance is being changed only as a result of the Kohlnhofer's lawsuit. She believes the amendments are too vague and reduce the ability of citizens to address issues with agricultural operators.

Elvie Day is a new resident of Goodhue County. She stated she no longer eats pork because of the impacts of hog farming to the local environment. She raised concerns about health risks to humans from hog waste. She stressed that the needs of the many should outweigh the wants of a few.

Kristi Rosenquist reappeared to discuss the aforementioned Todd County feedlot facility. She mentioned that the owners of the facility do not live in the vicinity and that locals in the area moved away as a result of its establishment. She feels it is a concerning trend in the industry that owners of the facility no longer live at the facilities and are exposed to the impacts those in the surrounding properties may be subject to. She mentioned the process of drafting the current version of the Goodhue County Feedlot ordinance and stressed not to change it without further study.

Sonya Trom-Eayrs reappeared and encouraged the PAC to visit her website "dodge.cc.org" for additional information regarding "factory farms." She raised concerns regarding the pork industries business model which displaces people for profits.

Josh Betcher reappeared to mention that he feels a lot of effort has been put into this review. He stated he felt that the industry has done a good job of innovating to address problems and would be concerned about increasing regulations that could stifle that innovation.

Brandon Shafer of Belvidere Township stated he was a previous member of the Goodhue County Planning Commission. He made a point of clarification that the proposed changes are not an amendment to the existing feedlot ordinance. He stated that the feedlot ordinance has been a very effective ordinance which has done a good job at balancing the needs of all citizens of the county. He stressed that this amendment request is not about one project but rather public interaction as it relates to agriculture and farming practices. He does not believe the intent is to weaken any existing regulations, but rather clarify how perceived nuisances can be addressed in the future. He stated he is supportive of the amendment.

³After Chair Fox asked three times for comments. It was moved by Commissioner Feuling and seconded by Commissioner Pettit to close the public hearing. Motion carried 8:0

Commissioner Allen questioned the Applicant if the existing ordinance has hindered their operations.

Jack Perry responded on behalf of the Applicant. He stated the request is in response to the implications of the Todd County legal case which demonstrated that an operator can be sued for negligence or nuisance despite compliance with all applicable regulations. He also stated feedlot owners are concerned with the financial investments of outside interests to support nuisance lawsuits against feedlot operators. He also stated that if an operator is found liable as a temporary nuisance, the owner can be subjected to perpetual lawsuits. He added there is

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a real concern that even if a feedlot operator is in conformance with all imposed requirements they may still be stripped of their ability to operate after investments have been made.

Commissioner Allen asked Goodhue County Attorney Steve Betcher (Attorney Betcher) if he felt there was a need to amend the existing ordinance language.

Attorney Betcher responded that the request before the PAC was originated by the Applicant based on their perceived need. He stated the Staff's recommended changes are not reflective of the County's feeling that changes are necessary. He clarified that given the request was submitted by an applicant, and not generated by request of the PAC, staff followed the alternative process to propose recommended changes to the language. Staff's proposed language is an attempt to limit the liability of the county in the event that a party was to challenge what did or did not constitute a nuisance as determined by the county. The new language simply states that unless you are violating a requirement, the county will not consider you a nuisance. An aggrieved party still has the opportunity to bring a nuisance action against an operator. We did not agree with the Applicant's language which sought to limit the ability of a party to bring an action against an operator. If there is no violation of any regulation required of the operator, the county will not consider the operation to be a nuisance. If you do violate any terms of a permit or regulations, this language does not preclude the county from pursuing a nuisance claim. The proposed language prevents the county from attempting to mediate nuisance claims amongst neighbors.

Commissioner Drazkowski asked Attorney Betcher for clarification about the language regarding an operation not being a nuisance on the date of establishment or permit issuance. What happens later?

Attorney Betcher replied the date is only used to determine if it may qualify as a nuisance. If you are operating a legal farming operation in Goodhue County and your neighbors decide that they don't like it, the county will not look at it as a nuisance as long as it continues to comply with all the requirements. If the requirements change, the operator will still be required to come into compliance with the new requirements. It simply means that opinions will continue to be private opinions and the county will not insert itself to determine what will be considered a nuisance.

Commissioner Drazkowski questioned Attorney Betcher why he would suggest requiring existing sections "A" through "E" regarding other regulations.

Lisa Hanni responded that those items are still covered in Staff's proposed wording. If an individual causes harm to a person or pollutes, they would not be considered to be following the rules and therefore could still be considered a nuisance.

Attorney Betcher added that there is often disagreement by those opposed to feedlot projects regarding the standards administered by the MPCA. The county has been repeatedly requested to interpret these other agencies regulations. The County does not have expertise or jurisdiction to reinterpret the interpretations of regulations put forth by the other state agencies.

Commissioner Drazkowski asked what the role of the Goodhue County Feedlot Officer is.

Attorney Betcher replied that the County Feedlot Officer is responsible for administering the county feedlot ordinance and the state has delegated the authority to enforce the state feedlot regulations to Goodhue County.

Commissioner Drazkowski questioned if we are opening up Goodhue County citizens to future injury by changing regulations for one specific industry or operator.

Attorney Betcher responded that the commission has the option to recommend the proposal for

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further review. He stated that the Staff recommended changes are a result of our experience of how the existing ordinance has been interpreted. He mentioned that the County is currently in a multiple-year lawsuit for a permit that was ultimately reviewed and permitted by the state based on the county interpretation of the state rules. The proposed changes seek to reduce the county's liability in interpreting the rules of other agencies involved in agricultural operations.

Commissioner Drazkowski questioned the need to amend the ordinance preemptively when it appears the existing ordinance has been effective in serving the public.

Attorney Betcher replied it is the PAC's position to determine what is in the best interests of the county moving forward. Staff proposed the amended language as an alternative to the applicant's proposal that offered the county an opportunity to clarify its legal stance in the event of a future court challenge. There is nothing that requires the PAC to act on it in any such way.

Commissioner Gale asked if an additional public hearing would be needed to decide on Staff's proposed language.

Attorney Betcher responded that due to the "60 Day Rule," the PAC needs to make a decision regarding the proposed language put forth by the Applicant. The PAC may go one step further and make a decision regarding Staff's recommended amendments.

Lisa Hanni added that the Applicant has expressed that they are in agreement with Staff's proposed changes. She also reiterated the language is not about one specific project, this is not the feedlot ordinance, and that this language covers all agricultural operations in the County. This language is a rewording of existing language that clarifies that if you are permitted and following all the rules and regulations required for the operation the County will not view you as a nuisance. If you are not following the rules, the County still has the ability and authority to pursue enforcement action.

⁴Motion by Commissioner Drazkowski seconded by Commissioner Gale, for the Planning Advisory Commission to recommend the County Board to

- adopt the staff report into the record;
- accept the application, testimony, exhibits, and other evidence presented into the record; and;

Recommend the County Board of Commissioners **DENY** Staff's recommended wording for the text amendment request and **DENY** the language changes requested by the applicants to the extent they are inconsistent with staff recommendations.

Commissioner Fueling commented that the language is an opportunity to affirm the County's position as an agricultural community.

Commissioner Allen stated he felt the County has been an agricultural County and that the existing language has been sufficient to support agriculture in the community.

Commissioner Nystuen stated he felt it was important to reinforce the County's position regarding nuisance claims given the amount of investment required in modern agricultural operations.

Commissioner Huneke echoed Commissioner Nystuen's comments and added that it would be good to limit the County's liability as it is not the County's responsibility to be a mediator in nuisance claims. He is supportive of Staff's proposed amendment.

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Commissioner Pettit stated that Staff's proposed changes cover the items proposed to be struck. She stated that ultimately operators will still be required to follow all the rules but are provided improved clarity with regards to nuisance claims at the county level.

Motion to Deny Failed 3:5

⁵Motion by Commissioner Pettit seconded by Commissioner Nystuen, for the Planning Advisory Commission to recommend the County Board to

- adopt the staff report into the record;
- accept the application, testimony, exhibits, and other evidence presented into the record; and;

Recommend the County Board of Commissioners **APPROVE** Staff's recommended wording for the text amendment request and **DENY** the language changes requested by the applicants to the extent they are inconsistent with staff recommendations.

Commissioner Gale asked if the proposed language was going to stop nuisance actions similar to the ones mentioned in Todd County.

Commissioner Fox responded that all it was going to do was stop the County from having to be the mediator in a nuisance complaint.

Commissioner Gale asked if the County would be vulnerable to a lawsuit by not referring the proposed language for further study.

Hanni replied the County cannot know who may bring future actions against it.

Motion Carried 5:3

PUBLIC HEARINGS: Request for Map Amendment (Rezone)

Request for map amendment submitted by Blake Thompson to rezone 38 acres from A3 (Urban Fringe District) to R1 (Suburban Residence District). Parcels 31.001.6100 and 31.001.6200. Part of the SW ¼ of SE ¼ and GOVT Lot 2 in Sect 01 Twp 112 Range 15 in Featherstone Township. A3 Zoned District.

Michael Wozniak (Wozniak) presented the staff report and appendixes.

Blake Thompson (Applicant) commented that he desires to build a house on an available flat spot across a steep ravine on his property. The Applicant added that the township indicated this particular property is one of a few the Township has identified for future residential districts. He added that there is natural gas service currently available in the northwest corner of his property that he would like to utilize. He also added that the ability to sell some property would help to offset the costs necessary to construct the necessary infrastructure to access the site.

Chair Fox opened the Public Hearing.

Jay McClary 2471 Hay Creek Trail, Featherstone Township stated he understands R1 zone means residential only and not future business or commercial traffic moving past his property. He has concerns about the future use of the roads in the vicinity being capable of supporting additional residences.

Wayne Allar 28670 Hay Creek Trail, Featherstone Township is an adjacent landowner and stated he is very concerned about erosion issues with the highly-erodible soils on the property.

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He referenced the Crop Productivity Index provided by the Applicant which indicates 24 of the 38 acres have slopes approaching 45%. He added there is a small stream on the property that drains into Hay Creek that is concerning. He is opposed to allowing additional residential sites on the property.

Rebecca Jansen 23700 289th ST Featherstone Township read a statement on behalf of Tony and Sara Poole. She stated they were against the rezone due to County not requesting landowner input prior to the meeting, the soils of the property are not stable enough for development, they are concerned of potential future septic runoff affecting their well water, and have concerns with traffic safety and road maintenance. They added that development should be directed to areas already zoned for such uses rather than rezoning for one landowner.

Ted Vajgrt lives on 289th ST and is a neighbor to the Applicant. He questioned how many lots the Applicant was requesting. Hanni responded "4." Mr. Vagert asked who is responsible for maintenance and repair of the existing private drive along 289th ST. He has concerns that widening of 289th ST in the future could lead to increased traffic through his property.

Wozniak clarified that the development proposal is a 2 step process. If the rezone request were to be granted, the Applicant would be required to Plat the property through a second public process where things like access and road standards as well as lot configurations would be examined. He added that Featherstone Township would be a signatory of any proposed Plat within their jurisdiction.

Hanni read comments received from Eugen Reitmann (see attachment 10)

After Chair Fox asked three times for comments. It was moved by Commissioner Feuling and seconded by Commissioner Huneke to close the public hearing.

Motion carried 8:0

Commissioner Pettit stated she was concerned with changing the zoning just to accommodate an individual wanting to put additional dwellings on a property. She indicated that R1 seemed to be too high of a density for the property and that this property seemed better suited for a "Conservation Subdivision" type of design which is in the initial stages of development.

Hanni commented Staff has encouraged citizens wishing to add density to go through a rezone process to avoid having people request variances. She added that even with a zone change, given the properties topography, setbacks, and access issues, the site will not be able to accommodate more dwelling sites than the applicant has indicated (4).

Wozniak added the only option the County currently has available for higher density non-agricultural development is R1. Staff is currently developing a proposal for a "Conservation Subdivision Design" ordinance which may lend itself to this type of development but is simply not available to the Applicant at this time. He added that many of the conservation type standards could easily still be applied through the Platting process.

Commissioner Allen questioned how the Applicant's proposal fits with annexation activities of the city of Red Wing.

Hanni responded that a review of city planning documents did not reveal any information indicating the city has future annexation plans for the Applicant's property.

Wozniak added that the terrain and topography severely limit annexation potential for the property both from a practical and economic standpoint for the city. A low-density solution such as the Applicants makes sense given the physical constraints of the property.

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Commissioner Nystuen asked if the SWCD has any oversight in the process.

Commissioner Fox responded that the SWCD would need to be involved in the Plat process to review soil erosion and water concerns.

The Applicant added that Featherstone Township has a minimum frontage requirement of 200 feet on a public road. He added that he has had conversations with civil engineers ahead of time to ensure it was physically feasible to negotiate the slopes to create access.

Commissioner Drazkowski commented that if the township is supportive of the area to be zoned R1 it wouldn't make sense for the County to be opposed.

7Motion by Commissioner Nystuen seconded by Commissioner Huneke, for the Planning Advisory Commission to:

- adopt the staff report into the record;
- accept the application, testimony, exhibits, and other evidence presented into the record; and

Recommend the County Board of Commissioners **APPROVE** the map amendment request from Blake Thompson to rezone 38 acres from A3 (Urban Fringe District) to R1 (Suburban Residence District).

Motion Carried 7:1

PUBLIC HEARING: Request for CUP for a Veterinary Clinic

Request submitted by Nicholas and Krystyna Stoffel for CUP to establish a Veterinary Clinic at 26336 130th Ave Welch, MN 55089. Parcel 46.029.0303. Part of the NW ¼ of NW ¼, SW ¼ of NW ¼, and SE ¼ of NW ¼, Sect 29 Twp 113 Range 16 in Welch Township. A2 Zoned District.

The Applicants were present to represent their application.

Wozniak presented the staff report and appendixes.

The Applicant stated she has been a mobile equine practitioner for over 11 years. Her clientele has expanded to greater a distance which prompted the desire to allow people to bring horses to her property to reduce their travel time. She added she does not do emergency veterinarian services at this time.

Chair Fox opened the Public Hearing.

Aaron Bauer 26469 130th Ave Welch, MN stated he is the closest neighbor to the Applicants and is supportive of their request. He believes no additional traffic will be created as a result of the request.

8After Chair Fox asked three times for comments. It was moved by Commissioner Feuling and seconded by Commissioner Allen to close the public hearing.

Motion carried 8:0

Commissioner Nystuen asked if there was a condition limiting the transfer of the CUP to a third party.

Hanni replied, no, that is the township's requirement.

9Motion by Commissioner Allen seconded by Commissioner Pettit, for the Planning Advisory Commission to:

- adopt the staff report into the record;

**PLANNING COMMISSION
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April 16, 2018 MEETING MINUTES
DRAFT**

- adopt the findings of fact;
 - accept the application, testimony, exhibits, and other evidence presented into the record;
- and

Recommend the County Board of Commissioners **APPROVE** the request from Nicholas and Krystyna Stoffel for a CUP to establish a Veterinary Clinic.

Subject to the following conditions:

1. Activities shall be conducted according to submitted plans, specifications, and narrative unless modified by a condition of this CUP;
2. Hours of operation shall be Monday through Friday, 8:00 AM to 6:00 PM, and Saturdays from 9:00 AM to 1:00 PM (excluding holidays);
3. On-street parking shall be prohibited;
4. On-street loading or off-loading shall be prohibited;
5. Applicants' shall obtain Building Permit approvals for change of use for the existing structure from the Goodhue County Building Permits Department prior to establishing the use;
6. Applicants' shall work with Goodhue County Environmental Health to achieve compliance with the Goodhue County SSTS Ordinance;
7. Compliance with Goodhue County Zoning Ordinance including, but not limited to Article 22 A-2 (Agriculture District);
8. Compliance with all necessary State and Federal registrations, permits, licensing, and regulations.

Motion Carried 8:0

PUBLIC HEARINGS: Simanski Metals LLC (Kevin Simanski)

29409 HWY 58 BLVD, Red Wing, MN 55066. Parcels 34.008.1400 and 34.008.1500. Part of the SE ¼ of NW ¼, Sect 08 Twp 112 Range 14 in Hay Creek Township. A2 and B2 Zoned District.

A. Map Amendment (Rezone)

Request for map amendment to rezone part of Parcel 34.008.1500 from B2 to A2.

B. CUP for a Junk/Salvage Reclamation Yard

Request for a conditional use permit (CUP) to establish a Junk/Salvage Reclamation Yard for storage, loading, and processing of recyclable materials.

The applicant was present to represent the application.

Wozniak presented the staff report and attachments. He read an e-mail provided by the Applicants that detailed plans to alter the proposal to remove the transfer facility component (see attachment 11).

Hanni commented that Applicant should clarify what exactly they are requesting and the PAC should determine if they are comfortable with the proposal or if they feel it is necessary to table the item and have the Applicant resubmit their application.

Kevin Simanski (Applicant) stated that the transfer station is secondary to their original purpose of the site so they are removing it given the issues the neighbors have had with it. He stated that removal of the transfer station component should address many of the concerns with traffic, trash, and noise at the site. He stated he would like to move forward with the rezone as requested and the CUP request as amended.

Hanni reviewed the Applicant's application to clarify which components of the application were being struck from the proposal (see attachment 12).

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Hanni asked the Applicant to clarify the overall plan for the site.

The Applicant replied they need a place to store their containers, trucks, and trailers and a shop/yard to work on their equipment. They also would like a place to store a loaded container that may need to be stored overnight or over the weekend occasionally. He added that the trucks leave in the morning and are primarily off-site throughout the day servicing accounts in the Twin Cities and Red Wing which greatly reduces truck traffic at the site.

Commissioner Gale asked if loads arriving at the site would be tarped.

The Applicant replied that anything that legally needs to be tarped would be tarped to comply with state law.

Commissioner Allen asked the Applicant to detail their long-range plan.

The Applicant responded he currently has 5 trucks and doesn't envision growing beyond 10 trucks.

Chair Fox opened the Public Hearing.

Jim Maybach is a resident of Hay Creek Township and lives about 2 miles from the site. He submitted written remarks (see attachment 13). He stated Hay Creek Township had hosted a meeting regarding the request and residents were not in favor of the proposal. He mentioned drainage and groundwater contamination concerns with the Applicants proposal. In particular, he detailed concerns regarding grading and impervious surfaces increasing runoff to neighboring properties. He added that even if containers are only being stored there, pollutants could still leach out of the containers and contaminate groundwater resources.

Commissioner Allen asked what the Township's position was.

Jim Maybach responded that the Township does not have an ordinance regulating the use but elected to have a Township Planning Commission meeting to review the proposal. The minutes from that meeting have been submitted to the PAC for review. The Town Board does not have an official position regarding the request.

Brad Johnson 29126 HWY 58 BLVD is a half mile from the proposed facility. He stated that the use is not compatible with existing residential uses in the vicinity. He questioned if there are more appropriate locations in the county to suit the Applicant's request. He stated he was concerned about industrial noises associated with the proposed operations (tools, backup alarms, metal bins etc.). He was concerned about impacts to property values and future enforcement of violations by the Applicants or subsequent owners of the property. He is opposed to the request.

Scott Reed lives on Hay Creek Hills DR a mile away from the property. He stated that the neighbors are opposed to a junkyard. He is also concerned automobile salvage will be brought on site. He stated the Township should have a chance to review the Applicant's alternative proposal prior to a decision being made. He raised concerns regarding access to the site and the condition of the existing road to support heavy truck traffic. He recommends the Applicants be required to resubmit their application with the proposed changes.

Teresa Gadiant 29407 HWY 58 BLVD has lived on their property for 35 years. She raised concerns of light and noise disturbances to animals on her property. Her property adjoins the site on 2 sides and she is opposed to the Applicant's request. She stated the site is surrounded by numerous residences that would be impacted by the use. She feels the request is inharmonious with the uses already established in the area. She also raised concerns about

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containers and equipment the Applicants are currently storing on site without appropriate permits. Teresa submitted a written statement (see attachment 14).

John Tittle 30619 Hay Creek Hills DR stated even though MnDOT has approved the Applicants access request, it doesn't represent their approval of the plan. They are generally just trying to limit the number of accesses to the road which they accomplished by removing the second access to the property. He raised concerns with semis blocking the road when attempting to enter HWY 58.

Sue Reed lives on Hay Creek Hills DR is concerned about the impacts to property values in the area if the use is established. She is opposed to the request.

Denny Tebbe lives 2 miles north of the site on HWY 58 stated he was a prior member of the Wacouta Town board and also served on a number of county and city committees. He stated it is important to respect the opinions of the residents even if you don't agree with what they have to say. He added he believed the use is an industrial use and belonged in an industrial zone. He stated there may be other options available for recycling materials in the city. He commented about high groundwater sensitivity in the area with the local trout stream. He stated he believes the use needs an industrial stormwater permit. Denny submitted written comments via e-mail (see attachment 15).

Kathleen Bibus lives on Hay Creek Hills DR. She noted concerns with the sharp turn along the access route. She stated there is over 5000 vehicle per day on HWY 58 and it is not a good place for semi traffic. The site would be an "eyesore" to neighbors and passers-by. She encouraged the PAC to deny both the rezone request and the CUP.

Pat Oneill 29380 HWY 58 BLVD lives across the street from the property and is concerned with the hours of operation and the number of trucks at the site. He stated the Applicant appears out of compliance now so how can we expect the Applicant to be compliant if a permit is approved. He asked who would regulate the use if approved.

¹⁰After Chair Fox asked three times for comments. It was moved by Commissioner Pettit and seconded by Commissioner Nystuen to close the public hearing. Motion carried 8:0

Commissioner Allen questioned Staff if the Applicant compliant currently.

Wozniak stated no and referenced a violation letter sent to the Applicant requiring the operations to cease. He added that Staff has been working with the Applicants to achieve compliance which included requiring them to obtain appropriate permits. He noted that the B2 zone on site does allow a range of administratively permitted uses which could include the Applicants proposed shop area.

Commissioner Nystuen asked what would happen if the rezone request was denied.

Hanni replied that a CUP would still be needed on the A2 portion of the property for the activities but the site plan would have to be reconfigured to accommodate the existing zoning.

Wozniak discussed business development goals and objectives outlined in the Goodhue County Comprehensive Plan and Staff's recommended findings and decisions. He recommended if the PAC would like to entertain approval of the proposal as stated he would recommend they table the issue and request additional information be submitted by the Applicants.

Commissioner Fox noted that another similar business was permitted for a trucking use but denied an expansion request due to traffic and access issues which could not be overcome due to its location. The Applicants proposal appears to be similar and is located on a high access

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corridor, unlike the other situation.

Commissioner Drazkowski stated that it is important for developers to get together with their neighbors to work out how to address potential impacts and resolve conflicts. He stated the PAC is hesitant to come up with how to resolve those conflicts and would prefer the Applicants work with their neighbors to find solutions that are agreeable to both sides.

11 Motion by Commissioner Nystuen seconded by Commissioner Huneke, for the Planning Advisory Commission to recommend the County Board to

- adopt the staff report into the record;
- adopt the findings of fact;
- accept the application as amended, testimony, exhibits, and other evidence presented into the record; and;

Recommend the County Board of Commissioners **DENY** the map amendment request from Simanski Metals LLC to reconfigure Zone Districts for Parcel 340081400 and Parcel 340081500 resulting in amendment of the Official Zoning Map to result in 3.20 acres to be included in the A2 (Agriculture) District and 0.84 acres to be included in the B2 (Highway Business) District.

Part of the SE ¼ of NW ¼ of Sect 8 Twp 112 Range 14 in Hay Creek Township. As legally described on the attached "Rezoning Exhibit.

Motion carried 6:2

There was discussion of future uses on the existing B2 zoned district.

12 Motion by Commissioner Nystuen seconded by Commissioner Drazkowski, for the Planning Advisory Commission to recommend the County Board to

- adopt the staff report into the record;
- adopt the findings of fact;
- accept the application as amended, testimony, exhibits, and other evidence presented into the record; and;

Recommend the County Board of Commissioners **DENY** the Conditional Use Permit request from Simanski Metals LLC to construct and operate a Junk/Salvage Reclamation Yard as proposed on Parcel 340081400 and Parcel 340081500.

Part of the SE ¼ of NW ¼ of Sect 8 Twp 112 Range 14 in Hay Creek Township.

Motion carried 7:1

13 Adjourn: Moved by Commissioner Feuling, second by Commissioner Drazkowski, to adjourn the Planning Commission meeting at 9:18 PM.

Motion carried 8:0

Respectfully Submitted,

Ryan Bechel; Recording Secretary

¹ APPROVE the PAC meeting agenda.

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Motion Carried 7:0.

² APPROVE the previous month's meeting minutes.

Motion Carried 7:0.

³ Motion to close the Public Hearing.

Motion Carried 8:0

⁴ Recommend the County Board of Commissioners DENY staff's recommended wording and DENY language changes requested by the Applicant:

Motion Denied 3:5

⁵ Recommend the County Board of Commissioners APPROVE staff's recommended wording and DENY language changes requested by the Applicant:

Motion Carried 5:3

⁶ Motion to close the Public Hearing.

Motion Carried 8:0

⁷ Recommend the County Board of Commissioners APPROVE the rezone request submitted by Blake Thompson

Motion Carried 7:1

⁸ Motion to close the Public Hearing.

Motion Carried 8:0

⁹ Recommend the County Board of Commissioners APPROVE the CUP request for a vet clinic by Nicholas and Krystyna Stoffel

Motion Carried 8:0

¹⁰ Motion to close the Public Hearing.

Motion carried 8:0

¹¹ Recommend the County Board of Commissioners DENY the rezone request be Simanski Metals LLC:

Motion Carried 6:2

¹² Recommend the County Board of Commissioners DENY the CUP request for a junk/salvage yard by Simanski Metals LLC:

Motion Carried 7:1

¹³ ADJOURN the Planning Commission meeting:

Motion Carried 8:0

UNOFFICIAL UNTIL APPROVED BY THE PAC

Goodhue County Land Use Management

Goodhue County Government Center | 509 West Fifth Street | Red Wing, Minnesota 55066

Lisa M. Hanni, L.S. Director

Building | Planning | Zoning
Telephone: 651.385.3104
Fax: 651.385.3106



County Surveyor / Recorder

Environmental Health | Land Surveying | GIS
Telephone: 651.385.3223
Fax: 651.385.3098

To: Planning Commission
From: Land Use Management
Meeting Date: May 14, 2018
Report date: May 4, 2018

PUBLIC HEARING: Request for CUP for a Utility Scale Solar Energy System (SES)

Request for a CUP submitted by Nokomis Hiawatha LLC (applicant) and Douglas Stegemann (owner) for a Utility Scale Photovoltaic Ground 1 Megawatt Solar Energy System (SES) occupying approximately 5 acres. Parcel 28.016.0300. TBD HWY 19 BLVD, Cannon Falls, MN 55009. Part of the SW ¼ of NE ¼ in Sect 16 Twp 112 Range 17 in Cannon Falls Township. A2 Zoned District.

Application Information:

Applicant: Nokomis Hiawatha LLC (applicant) and Douglas Stegemann (owner)
Address of zoning request: TBD HWY 19 BLVD, Cannon Falls, MN 55009
Parcel(s): Part of the SW ¼ of NE ¼ in Sect 16 Twp 112 Range 17 in Cannon Falls Township
Township Information: Cannon Falls Township approved a CUP (with conditions) for the applicant's request on 4/11/18.
Zoning District: A2 (Agriculture District)

Attachments and links:

Application and submitted project summary
Site Map(s)
Goodhue County Zoning Ordinance (GCZO):
<http://www.co.goodhue.mn.us/DocumentCenter/View/2428>

Background:

The applicant has submitted a CUP request to establish a one (1) Megawatt photovoltaic (PV) utility scale solar garden on approximately 5 acres of leased land located in Cannon Falls Township that is currently owned by Douglas Stegemann. The project would be developed in conjunction with the State of Minnesota Solar Garden program and Xcel Energy's Solar Rewards Community Program. The program allows developers to design, permit, own, and operate solar energy systems and sell the generated power directly to consumers. Upon completion, the "Byllesby Solar Garden" would connect to Xcel Energy's distribution grid and generate a projected 1.8 million kWh of energy annually over the next 25 or more years.

Per Goodhue County regulations, Solar Energy Systems (SES) that are the primary use of the land and are designed to primarily provide energy to off-site users or export to the wholesale market may be conditionally permitted as a "Utility-Scale SES" within the County's A2 zoned districts.

Goodhue County Zoning Ordinance: Article 4 Conditional/Interim Uses

No CUP/IUP shall be recommended by the County Planning Commission unless said Commission specifies facts in their findings for each case which establish the proposed CUP/IUP will not be injurious to the use and enjoyment of other property in the immediate vicinity for the purposes already permitted, will not substantially diminish and impair property values within the immediate vicinity, will not impede the normal and orderly development and improvement of surrounding vacant property for uses predominant to the area, that adequate measures have been, or will be, taken to provide utilities, access roads, drainage and other necessary facilities, to provide sufficient off-street parking and loading space, to control offensive odor, fumes, dust, noise and vibration so that none of these will constitute a nuisance, and to control lighted signs and other lights in such a manner that no disturbance to neighboring properties will result.

Project Summary:

- The approximately 5-acre site to be leased by the applicant is currently used for row-crop agriculture (corn and soybeans) by the owner.

Adjacent land uses include agriculture, low-density residential and undeveloped forest-land.

The nearest residence is located approximately 500 feet north of the proposed facility.

- All adjacent zoning districts are A2 (Agriculture District).
- The solar array would consist of 4,140 solar modules arranged in 25 rows with 26 feet of space between each row.

Panels will be mounted at a fixed angle atop steel driven posts embedded in the ground and will rise approximately 7 feet from grade at the highest point. The array will interconnect to the power grid via a pad mounted transformer located at the north end of the site.

- The site is proposed to be accessed off the owner's existing driveway access which connects to State HWY 19 in the northwest corner of the subject parcel.

A recorded ingress/egress easement is not required for the property given the site is to be leased and all land to be crossed to access the site will remain under common ownership.

A separate fire number will be required for the site.

- Adequate emergency vehicle access is available to service the location.

The access route would be composed of crushed aggregate to facilitate emergency vehicle access in inclement weather conditions.

- Once constructed, traffic to the site would be limited to 1-4 visits per year by maintenance personnel and groundskeepers.

- The solar garden is sited to comply with all GCZO setback requirements for solar energy systems.

Per the request of Cannon Falls Township, the solar garden was moved north to be 64 feet from the edge of the State HWY 19 R-O-W to improve screening of the site from an existing residence to the east.

- The site has relatively minor relief and the soils appear adequate to support the proposed use without creating future erosion issues.

The applicant is proposing to hydroseed the site in the spring following construction to ensure soils are stable post-construction. The cover crop inside the footprint of the system will be a combination of low growth native crops and a "pollinator friendly" seed mix.

- The submitted drainage plan indicates the applicants will install a storm water retention basin in the southwest corner of the site.

An erosion control and storm water management plan is proposed to be submitted for review at the time of building permit application.

Existing drainage patterns are expected to be consistent with current conditions given surfaces below the panels will remain pervious.

- An intermittent stream/wetland feature has been identified along the eastern boundary of the subject parcel. The application indicates the site will not be located within any protected wetland features or water resources and has low flooding potential.
- The applicants are proposing to install vegetative screening in the spring of the year following construction of the solar array along the eastern edge of the site to limit visual impacts to neighboring residences east of the site. Trees would consist of Black Hills Spruce or an equivalent species.

An existing forested "oasis" east of the site will provide additional screening of the solar garden.

- A six-foot tall wood agricultural fence will enclose the site to secure the area and further reduce the visual impacts of the site to surrounding property owners.

- Ample room exists on the property to fulfill GCZO off-street parking requirements.
- This project utilizes silicon based solar panels with an anti-glare coating. There are no moving parts or hazardous materials in the system. No noise other than typical transformer humming is anticipated.
- Construction is targeted for the late summer of 2018 and proposed working times would be between the hours of 8AM-5PM.
- Byllesby Garden LLC will have a long-term maintenance plan to ensure safety, reliable operation, and production of the system. Monitoring and metering equipment installed on site will alert the maintenance team in real time of a system performance issue.
- The applicants have offered to provide a financial surety to cover the anticipated cost (\$42,300) of decommissioning the site.

Per GCZO Article 19, the applicant may be required to provide a financial surety at up to 125% of the estimated decommissioning cost. The county has not typically exercised the right to financial assurance requirements for similar solar installations.

- The provided decommissioning plan states all equipment (modules, inverters, wiring, electrical equipment, racking and foundations, fencing, underground wires and conduit and concrete pads) will be removed within one (1) year from the day the system is no longer in service or discontinued and the project site will be restored to a condition comparable to its pre-construction use excluding topography or original cover crop.

Unless requested otherwise, permanent access roads constructed for the project will be removed.

- The applicant completed a Phase 1 Environmental Site Assessment (ESA) as part of their review. The report indicates no Recognized Environmental Conditions (RECs), Controlled Recognized Environmental Conditions (CRECs), or Historical Recognized Environmental Conditions (HRECs) exist on the property.
- The Cannon Falls Planning Commission reviewed the request on 4/5/18 and the Township Board approved a Conditional Use Permit for the applicants' request on 4/11/18; subject to the following conditions:
 - 1) *“Visual barriers (2-3 year old pines) along CTY RD 8 side of project”*
 - 2) *“Move Community Solar Garden project up to Goodhue County zoning setback requirements to HWY 19”*

Draft Findings of Fact:

The following staff findings shall be amended to reflect concerns conveyed during the PAC meeting and public hearing.

1. The proposed Solar Garden does not appear injurious to the use and enjoyment of properties in the immediate vicinity for uses already permitted, nor would it substantially diminish and impair property values in the immediate vicinity. The use appears harmonious with the established uses in the vicinity.
2. The establishment of the proposed Solar Garden is not anticipated to impede the normal and orderly development and improvement of surrounding vacant property for uses predominant to the area. The use is proposed to meet all development standards of the Goodhue County Zoning Ordinance and is does not appear incompatible with adjacent land uses.
3. A review of the applicants submitted project summary indicates adequate utilities, access roads, drainage and other necessary facilities are available to accommodate the proposed use.
4. The submitted plans identify means to provide sufficient off-street parking and loading space to serve the proposed use and meet the Goodhue County Zoning Ordinance's parking requirements.
5. The submitted plans detail adequate measures to prevent or control offensive odor, fumes, dust, noise, and vibration so that none of these will constitute a nuisance. Furthermore, the applicants' lighting plans appear capable of controlling lights in such a manner that no disturbance to neighboring properties will result.

Staff recommendation is based on the review of the submitted application and project area prior to the public hearing.

Staff Recommendation:

LUM Staff recommends the Planning Advisory Commission

- adopt the staff report into the record;
- adopt the findings of fact;
- accept the application, testimony, exhibits, and other evidence presented into the record; and

Recommend that the County Board of Commissioners **APPROVE** the request for a CUP submitted by Nokomis Hiawatha LLC (applicant) and Douglas Stegemann (owner) for a Utility Scale Photovoltaic Ground 1 Megawatt Solar Energy System (SES) occupying approximately 5 acres.

Subject to the following conditions:

1. Activities shall be conducted according to submitted plans, specifications, and narrative unless modified by a condition of this CUP;
2. The project shall be decommissioned according to Article 19 Section 6 of the Goodhue County Zoning Ordinance and submitted plans;
3. A decommissioning agreement between the landowner and the solar energy system company shall be maintained to ensure reclamation of the area;
4. LUM staff shall be notified by the landowner or solar company 30 days prior to ownership transfer or operator changes;
5. A stormwater management and erosion control plan shall be submitted for administrative review and approval prior to construction of the facility;
6. Vegetative screening shall be established according to submitted plans within 1 year of completion of the facility;
7. Applicants' shall work with the Goodhue County Soil and Water Conservation District to determine an appropriate seed mix of native vegetation to establish on disturbed areas of the site;
8. Applicants' shall obtain Building Permit approvals from the Goodhue County Building Permits Department prior to establishing the use;
9. Compliance with Goodhue County Zoning Ordinance including, but not limited to, Article 19 Solar Energy Systems (SES) and Article 22 (Agricultural District);
10. Compliance with all necessary State and Federal registrations, permits, licensing, and regulations;
11. This CUP shall expire 25 years from the date of approval unless terminated prior to that date.

Planning Advisory Commission

Public Hearing
May 14, 2018

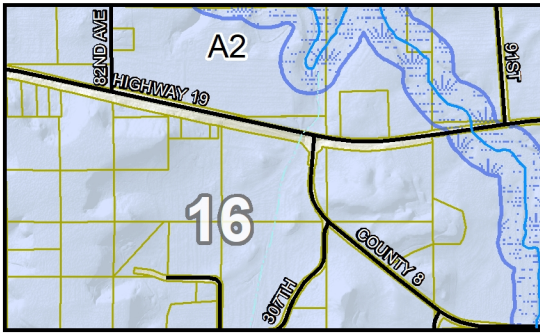
Nokomis Hiawatha LLC
Douglas Stegemann
HWY 19 BLVD
Cannon Falls, MN 55009
A2 Zoned District

Parcel 28.016.0300
SW ¼ NE ¼,
Sect 16 Twp 112 Range 17
in Cannon Falls Township

Request for CUP for
Utility Scale Solar Garden

Legend

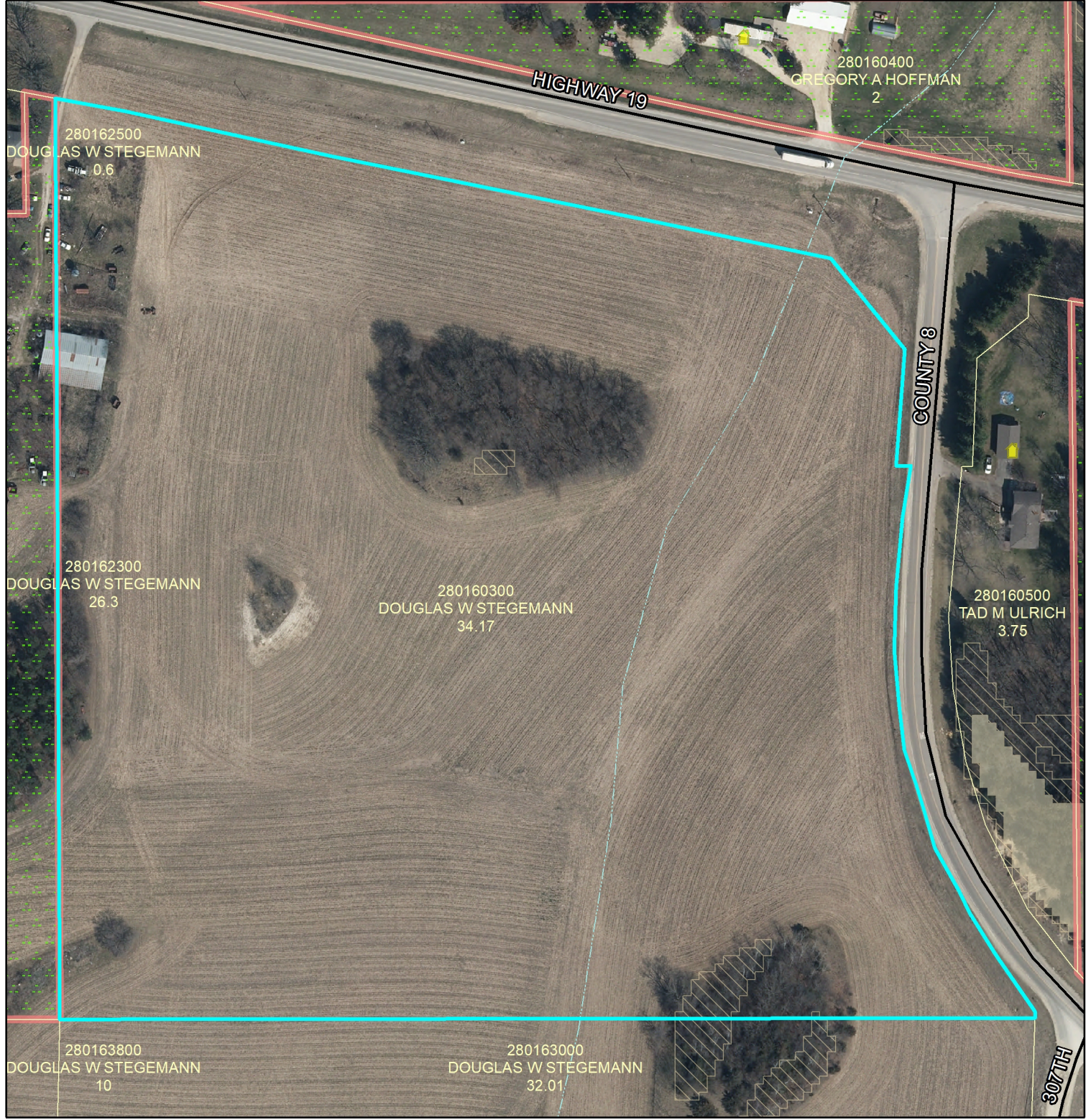
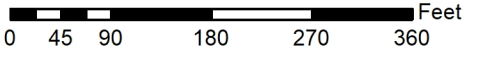
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|----------------------------|---------------------------------|
| Intermittent Streams | Bluff Impact Zones (% slope) 20 |
| Protected Streams | Bluff Impact Zones (% slope) 30 |
| Lakes & Other Water Bodies | FEMA Flood Zones |
| Shoreland | 2% Annual Chance |
| Historic Districts | A |
| Parcels | AE |
| Registered Feedlots | AO |
| Dwellings | X |
| Municipalities | |



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2016 Aerial Imagery

Map Created April, 2018, Ryan Bechel



Rendering of view from residence east of CTY RD 8 looking westward to the project site.



Solar Conditional Permit Application

1MW Solar PV System

Ground Mounted

Douglas Stegemann Property

8510 Highway 19 Boulevard

Cannon Falls, MN 55009

Parcel ID 28.016.0300

A2 Zoning District

Cannon Falls Township

Submitted to Goodhue County

By Nokomis Energy LLC

818 West 46th Street, Suite 204

Minneapolis, MN 55419

April 17, 2018

Board of Commissioners
Goodhue County

Dear Members of the Staff, Planning Commission and Board:

Nokomis Partners is pleased to present this application for Byllesby Garden LLC to Goodhue County for developing and operating a solar garden as part of Xcel Energy's Solar*Rewards Community Program supported by the state of Minnesota. This project is ~5 acres in size (1MWac). Once operating, this project will deliver ~1,800,000 kWh of clean, local energy annually to the surrounding community for 25+ years with only the sun as feedstock.

As a Minnesota based company, we care deeply about the impact this project has on the community. This approach is evidenced in our land-owner partnership, township approval, and the community outreach we perform prior to permit submittal. We have also sited the project to best conform with our land-owner's desired land usage.

Nokomis was founded to partner with communities to accelerate the adoption of local, clean energy. We believe that local energy is the future of our electricity system because it gives the community a choice. Through community solar, individuals, businesses and municipalities can choose solar as their energy resource, an option that has not existed until now and benefit from the low cost, improved infrastructure and local economic development.

On behalf of our land-owner partner, the local trades that will build our project and the subscribers that will choose solar for their energy we ask that you approve our application and support local, clean energy choice.

Sincerely,



Dan Rogers
Director, Byllesby Garden LLC

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14. Manufacturer Data Sheets



Solar Energy System

Information Packet

Land Use
Management
509 W 5th Street
Suite 103
Red Wing, MN
55066

T: 651-385-3104
F: 651-385-3106

Solar Energy Systems could require more than one application approval:
Residential-Building Permit
Commercial-SES Zoning Permit and Building Permit
Utility Scale and all reflective-Conditional or Interim Use Permit and Building Permit

Land Use Management Department staff are available to advise you in the preparation of this application. Call (651) 385-3104 for further information.

Solar Application Fees*	
Residential	\$50
Commercial (Zoning Permit)	\$200
Utility (CUP/IUP)	\$1,000

*SES permit type determined by staff

*All fees are in addition to building permit fees

SOLAR ENERGY SYSTEM (SES)

A device set of devices, or structural design feature, a substantial purpose of which is to provide for the collection, storage and distribution of sunlight for space heating or cooling, generation of electricity, water heating, or providing daylight for interior lighting.

- A. **Residential SES.** Accessory to the primary use of the land, designed to supply energy for onsite residential use; excess energy produced may be sold back to the grid through net metering.
- B. **Commercial SES.** Accessory to a permitted farm or business use of the land, designed to generate energy to offset utility costs or as an additional revenue stream.
- C. **Utility Scale SES.** An energy system that is the primary use of the land, designed to provide energy primarily to off-site uses or export to the wholesale market.

WHEN IS A SOLAR ENERGY SYSTEM ZONEING PERMIT NECESSARY?

Approval Required: All Solar energy systems greater than 200 watt (2 kW) capacity shall require a building permit and a zoning approval in the form of an administrative review, SES Zoning Permit, or a Conditional /Interim Use Permit (see Section 7 of this Article).

- A. **Residential SES** may be approved administratively with a Building Permit.
- B. **Commercial SES** may be approved through a SES Zoning Permit or a Conditional/Interim Use Permit.
- C. **Utility Scale Photovoltaic (PV) SES** Systems require a conditional/interim use permit

APPLICATION FOR

Solar Energy System Application

1. Owner/Applicant Information

PROPERTY OWNER'S NAME:

Douglas Stegemann

PROPERTY OWNER'S ADDRESS:

8510 Highway 19 Boulevard, Cannon Falls, MN 55009

TELEPHONE:

(507) 263-3304

EMAIL:

APPLICANT OR AUTHORIZED AGENT'S NAME:

Nokomis Energy LLC

Same as Above

APPLICANT'S ADDRESS:

818 West 46th Street, Suite 204, Minneapolis, MN 55409

TELEPHONE:

(612) 470-3223

EMAIL:

CONTACT FOR PROJECT INFORMATION:

Dan Rogers

Same as Above

ADDRESS:

818 West 46th Street, Suite 204, Minneapolis, MN 55409

TELEPHONE:

(952) 393-7721

EMAIL:

dan@nokomis.partners

2. Location and Classification

STREET ADDRESS OF PROJECT:

8510 HWY 19 BLVD, Cannon Falls, MN

ZIP CODE:

55009

LEGAL DESCRIPTION:

Attached

Please see attached Plan Set Sheet C-100.

3. Supporting information

NUMBER OF SOLAR COLLECTORS TO BE INSTALLED

4140 fixed tilt moduls

TOTAL SIZE OF PROJECT

5 acres

DESCRIBE METHOD OF CONNECTING THE ARRAY TO A BUILDING OR SUBSTATION

Attach signed interconnection agreement

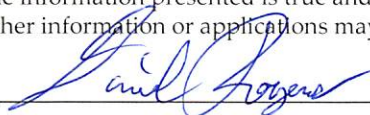
Please see attached General Electrical Layout and LV Single Line plans.

4. Applicant's Affidavit

Under penalty of perjury the following declarations are made:

1. The undersigned is the owner or authorized agent of the owner of this property.
2. The information presented is true and correct to the best of my knowledge.
3. Other information or applications may be required.

Signature:



Date:

4/19/18

Print name:

Dan Rogers

owner or authorized agent (circle one)

Application Submittal Checklist

Applications listed below submitted to the Planning Department must be accompanied by this checklist and all required materials. **The checklist is to be completed and signed by a Land Use Management department staff person.**

APPLICATION MATERIALS	CHECKLIST
Application, with all blanks completed	<input checked="" type="checkbox"/>
Township approval form completed with township signature	<input checked="" type="checkbox"/>
Site Plan (as defined in Art 10, Section 2 with additional information listed below):	<input checked="" type="checkbox"/>
Location and spacing of solar panels	<input checked="" type="checkbox"/>
If ground mounted, identify existing vegetation on installation site	<input checked="" type="checkbox"/>
Location of underground or overhead electric lines connecting SES to building, substation or other electric load	<input checked="" type="checkbox"/>
New electrical equipment other than at the existing building or substation that is the connection point for the SES	<input checked="" type="checkbox"/>
Existing and proposed (if altering grade) topography at 2 foot contours	<input checked="" type="checkbox"/>
Manufacturer's specifications and recommended installation methods for all major equipment including solar panels, mounting systems and foundations for poles or racks	<input type="checkbox"/>
Additional information if Commercial or Utility Scale Roof or Ground Mounted, and all reflective solar energy systems	CHECKLIST
Commercial Scale as determined by Planning and Zoning Office	<input type="checkbox"/>
Utility Scale as determined by Planning and Zoning Office	<input checked="" type="checkbox"/>
Visual Impact Analysis: Potential visual effects	<input checked="" type="checkbox"/>
Storm water management measures	<input checked="" type="checkbox"/>
Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction	<input checked="" type="checkbox"/>
Screening or buffering plan include site grading and/or landscape plantings proposed along public roads or abutting residential properties	<input checked="" type="checkbox"/>
Maintenance plan for grounds surrounding the systems	<input checked="" type="checkbox"/>
A plan outlining the use, storage and disposal of chemicals used in the cleaning of the collectors and/or reflectors unless certified organic cleaning products are used	<input type="checkbox"/>
Identify the onsite location and measures that will be taken to avoid, minimize, or mitigate adverse effects to existing historical, cultural, and archeological features identified by SHPO, the county's databases, and those discovered onsite	<input checked="" type="checkbox"/>

Solar Energy System Determination*	
Residential	<input type="checkbox"/>
Commercial	<input type="checkbox"/>
Utility	<input type="checkbox"/>
Ground	<input type="checkbox"/>
Roof	<input type="checkbox"/>
Reflective	<input type="checkbox"/>

*As determined by Zoning Administrator or designee

Permit NUMBER:
For Staff Use only

Additional information if Utility Scale roof or ground mounted, and all reflective solar energy systems		CHECKLIST
Criteria to determine potential impacts on agricultural production		
Number of acres of Prime Agricultural Soils to be impacted		<input type="checkbox"/>
Number of acres in A-1 District to be impacted		<input type="checkbox"/>
Proposed duration of SES		<input type="checkbox"/>
Criteria to evaluate potential environmental impacts		
EAW determination if required		<input type="checkbox"/>
Review of Goodhue County Environmental Constraints Land Use Model		<input type="checkbox"/>
Proximity to existing Electric Utility Lines and Substations for grid-intertie and existing SES projects		<input type="checkbox"/>

Township Information Township Zoning Permit Attached? If no please have township complete below:

By signing this form, the Township acknowledges being made aware of the request stated above. In no way does signing this application indicate the Township's official approval or denial of the variance request.

Signature	Title	Date

Comments:

County Section

SES Application Fee	SES Residential: \$50	SES Zoning Permit: \$200	SES CUP/IUP: \$1000	Receipt Number	Date
	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	16237	4-23-18

What is the formal wording of the request?

Shoreland _____ Lake/Stream Name _____ Zoning District Select one

Date Received _____ Date of Public Hearing _____ DNR Notice _____ City Notice _____

Action Taken: ___ Approve ___ Deny Conditions:

Zoning Administrator Signature

PERMITTED USES, CONDITIONAL USES OR INTERIM USES FOR SOLAR ENERGY SYSTEMS

Solar Energy Systems will be permitted, conditionally permitted or not permitted based on the generating capacity and land use district as established in the table below (P=Permitted, ZP= Zoning Permit, C=Conditionally Permitted, I=Interim Permitted, NP=Not Permitted):

District	Utility Scale Solar SES	Commercial Scale SES	Residential Scale SES
Agriculture Protection (A-1)	C or I	ZP	P
Agriculture (A-2)	C or I	ZP	P
Urban Fringe (A-3)	C or I	ZP	P
Suburban Residence (R-1)	NP	ZP	P
General Business (B-1)	C or I	ZP	P
Mixed Use Hamlet (MXH)	NP	ZP	P
Highway Business (B-2)	C or I	ZP	P
Industry (I)	C or I	ZP	P
Wild and Scenic River (WS)	NP	C or I	P
Commercial Recreation (CR)	NP	C or I	P
Shoreland (S)	NP	C or I	P
Floodplain Management (FP)	NP	C or I*	ZP*
Wetlands (W)	NP	NP	NP

*All provisions of Article 31 (Floodplain Regulations) must be met.

INSTRUCTIONS:

First: What zoning district is the property located in. Visit <http://www.co.goodhue.mn.us/524/Maps> to find out or call Goodhue County Land Use Management Department ♦ Building ♦ Planning ♦ Zoning ♦ Telephone: 651/385-3104.

Next: Please review the instructions in this application and ask Zoning staff if you have any questions. After filling out the application and collecting the required materials and plans, please contact the Land Use Management Department for an intake appointment to process your application. At this appointment staff will review your application to ensure that it is complete. The assigned staff will review the application in accordance with the Goodhue County Comprehensive Plan, the Ordinance, and department policies.

P: HOW DOES THE SES ADMINSTRATIVE ZONING APPROVAL PERMITTING PROCESS WORK?

Please review and complete the Goodhue County building permit application.

ZP: HOW DOES THE SES ZONING PERMITTING PROCESS WORK?

Please review and complete the Goodhue County SESZP which includes the building permit application.

C or I: HOW DOES THE SES CONDITIONAL /INTERIM USE PERMITTING PROCESS WORK?

Please review and complete the Goodhue County ...

Please provide the following materials with this application:

1. **SESZP Application:** Completed application form with all required fees. Please refer to the Goodhue County Land Use Management Department Fee Schedule available at <http://www.co.goodhue.mn.us> or at the Land Use Management offices Located in the Government center at 509 West 5th Street Suite 103, Red Wing, MN 55066.
2. **Drawings:** The application must be accompanied by plans sufficient for proper determination of the request. In most cases a **site plan** will be required, as defined in Article 10 Section 2 Subd. 95, showing all pertinent dimensions, buildings and significant natural features having an influence on the CUP; The application may be accompanied by un-mounted photographs, large enough to show the nature of the property but not over 11 X 17 inches;
3. **Township:** Township signature of acknowledgment and awareness of the request.
4. **Manufacturer's information:** Provide Specifications sheet, including industry certifications and wattage capacity and manufacturer photographs or renderings
5. **Zoning:** Provide written responses to questions about the proposal's compliance with the county zoning ordinance to which the application relates;
6. **Performance Standards:**
 - a. Letter from a professional engineer indicating the roof is able to support the load of the system
 - b. Plan/drawing showing where the system is located on the roof
 - c. A cost and control affidavit, which is generally completed by a licensed construction professional and attests that they will oversee and verify system construction in accordance with local engineering and code specifications
 - d. Drawings of the mounting system, which are typically provided by the manufacturer
 - e. Proof of workman's compensation insurance
 - f. A copy of the contract with the building owner
7. **Septic Compliance:** When the septic system of the parcel on which the request was made is located within the shoreland overlay district, a septic system certification must be completed. (Note: Noncompliant septic systems are required to be upgraded regardless of the outcome of application proceedings).
8. **Additional Criteria:** For certain types of SES, the Planning Code sets out additional criteria for approval in the Code section under which authorization is sought. If any such criteria apply in this case, state in detail the manner in which you believe they will be met. The referenced Code sections are available on-line and may be explained to you at the Land Use Management counter or by phone.
9. **"grid-tied" (interconnected) systems:** Although it is not required to be submitted with the initial application, city staff will need to have a copy of a signed "interconnection agreement," in hand, prior to issuing a Solar Energy System Zoning Permit. For thermal (non-electric) systems, this requirement does not apply.

All plans and other exhibits submitted with this application will be retained as part of the permanent record in this case.

TOWNSHIP ZONING APPLICATION

TOWNSHIP NAME Cannon Falls

Goodhue County

Parcel # 28.016.0300

APPLICANT INFORMATION

Last Name Dillon First Brendan M.I. _____
 Street Address 818 W. 46th Street, #204 Phone 6124703223
 City Minneapolis State MN ZIP 55419
 Email Address Julian@nokomis.partners
 Township 2 Range 017 Section 16

PROJECT INFORMATION

Site Address 8510 Highway 19 Blvd, Cannon Falls, MN 55009
 Zoning District Ag Land Lot Size 34.17 acres Structure Dimensions 4 acres
 Type of Project Solar Proposed Use Solar Community Garden
 Structure Type Fixed Arrays Replacement? YES NO
 Variance # _____ Conditional Use Permit # _____

GPS Coordinates 44.50902, -92.85681

DISCLAIMER AND SIGNATURE

I hereby apply for a zoning permit and I acknowledge that the information above is complete and accurate, that the work will be in conformance with the ordinances and codes of Goodhue County. The applicant also understands by signing this application he / she could be held responsible as representative of this project for any violation of compliance with all applicable laws and ordinances of Goodhue County. This permit may be suspended or revoked if the permit has been issued in error or on the basis of incorrect information supplied or in violation of any ordinance or regulation of Goodhue County. All provisions of law and ordinances governing this type of work will be complied with whether specified herein or not

Signature Brendan Dillon Date 02/22/2018

TOWNSHIP APPROVALS

I hereby certify that the above described project has been approved by the Township Board, and the structure and use will meet all Township Codes and Ordinances if constructed as indicated.

Signature [Signature] Title [Signature] Date 4-11-18

Signature _____ Title _____ Date _____

Application fee 350.- pd. Receipt Number _____

3-1-18 Planning Comm.
4-5-18 Public Hearing
4-11-18 CUP passed at Town Board mtg.

Conditions: 1) Visual barrier planted along Co Rd 8 side of project
 2) Entire solar project moved to Co. Co. setback requirement from Hwy 19.

**BOARD OF SUPERVISORS
TOWNSHIP OF CANNON FALLS**

DECISION

The Town Board of Cannon Falls Township sitting as the Town Board, pursuant to ordinance, has reviewed the following application.

Byllesby Garden LLC/ Nokomis Partners request for approval of
(Name of applicant)
Conditional Use Permit IMWac Comm. Solar Garden
(specify permit, variance, etc.)

is hereby: ✓ granted _____ denied

in accordance with and subject to the conditions of plans, maps, designs, and all other documents referenced in or listed as provisions of this application.

Conditions of approval ✓ _____ Reasons for denial _____

1) Visual barriers (2-3 yr. old pine trees) along Co. Rd. 8 side of project.

2) Move Comm. Solar garden project up to Goodhue County zoning & setback requirements to Hwy 19.

Adopted this 11 day of April, 2018

[Signature]
Chairman

[Signature]
Supervisor

Keith Mahoney
Supervisor

ATTEST:

[Signature] Clerk

Project Overview

This request is for a Utility Scale Solar Energy System conditional use permit (CUP) for a Photovoltaic Ground 1MWac Solar Energy System. This community solar garden (CSG) will consist of 4140 panels on approximately 5 acres of land. The CSG, part of Xcel Energy's Solar*Rewards Community Program, will have a contract life of 25 years and a useful life of 35 years.

The CSG consists of steel driven posts embedded in the ground, with solar modules attached to the top of the posts at a fixed angle, sitting approximately 7ft off the ground at the highest point. This project utilizes silicon based solar panels which have an anti-glare coating. There are no moving parts nor hazardous materials in the system, and no noise other than typical transformer humming would be present onsite. Ongoing operation and maintenance would consist of 1-4 visits a year from an electrician, as well as a groundskeeper to ensure the system is operating safely and the landscaping is properly maintained. A decommissioning bond is posted as to ensure that at the end of the project life all elements of the system are removed and the land returned to its original state.

Nokomis Energy has commissioned Westwood professional services to perform wetland, hydrology, historical, ecological and an environmental survey to ensure the site is suitable for development. Preliminary review indicates there are no major issues that would impact development inherent to the site. Construction is targeted for the late summer of 2018 and proposed working times would be between the hours of 8pm-5pm. These hours are flexible and we intend to work with the community to control noise and disturbance. On February 20th of this year, Nokomis Energy reached out to the neighbors closest to the project to solicit feedback and give points of contact for questions or concerns.

The conflicts to land use are minimal and will have no impact to previously permitted activities in the surrounding area. The only conflict possible would be the visual impact of the system. To reduce this impact, we are planning to enclose the system with a 6-foot-tall agricultural fence to minimize the visual impact but restrict access to the system from unqualified personnel. The cover crop inside the footprint of the system will be a combination of low growth native crops and a seed mix that promotes pollinator friendly habitats. Additionally, the CSG has been placed on the land such that it would maintain the Goodhue County setback requirements for solar energy systems and therefore the system should be mostly out of view.

The Byllesby Garden LLC Conditional Use Permit was approved by Cannon Falls Township on April 11, 2018.

Site Location and Description

The location of the proposed solar garden site is the Douglas Stegemann property located at 8510 Highway 19 Boulevard in Cannon Falls. The parcel is south of HWY 19 and west of CTY RD 8. See Figure 1 and 2.

Parcel ID 28.016.0300

Section 16 Township 112N Range 17W

Legal Description:

Sect-16 Twp-112 Range-017 34.17 AC
ID# 28-0000-16300 DOC #325625
SW 1/4 OF NE 1/4 SEC 16 112 17
EX 8/100 AC N OF HWY 19 AND
EX PART S OF EX 2 08/100 AC N
OF HWY 19 AND EX PT S OF CEN
C S A H 8 3 64/100 AC HWY EASE

Figure 1 – Stegemann Property and CSG Area

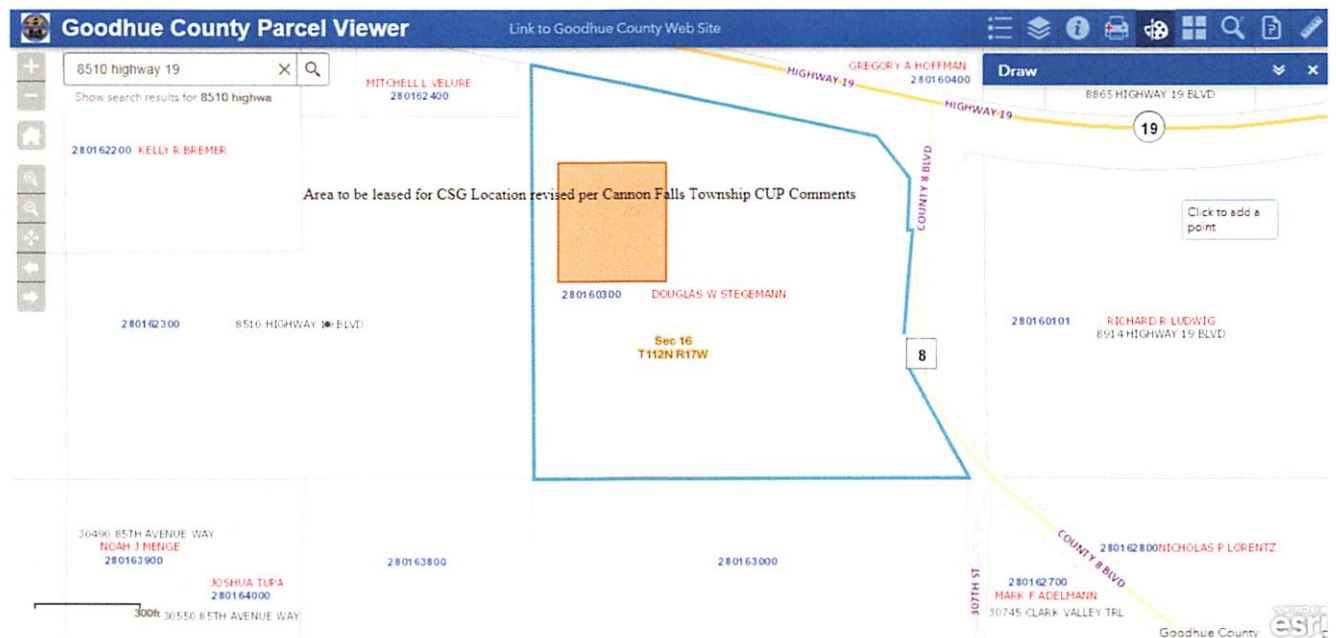
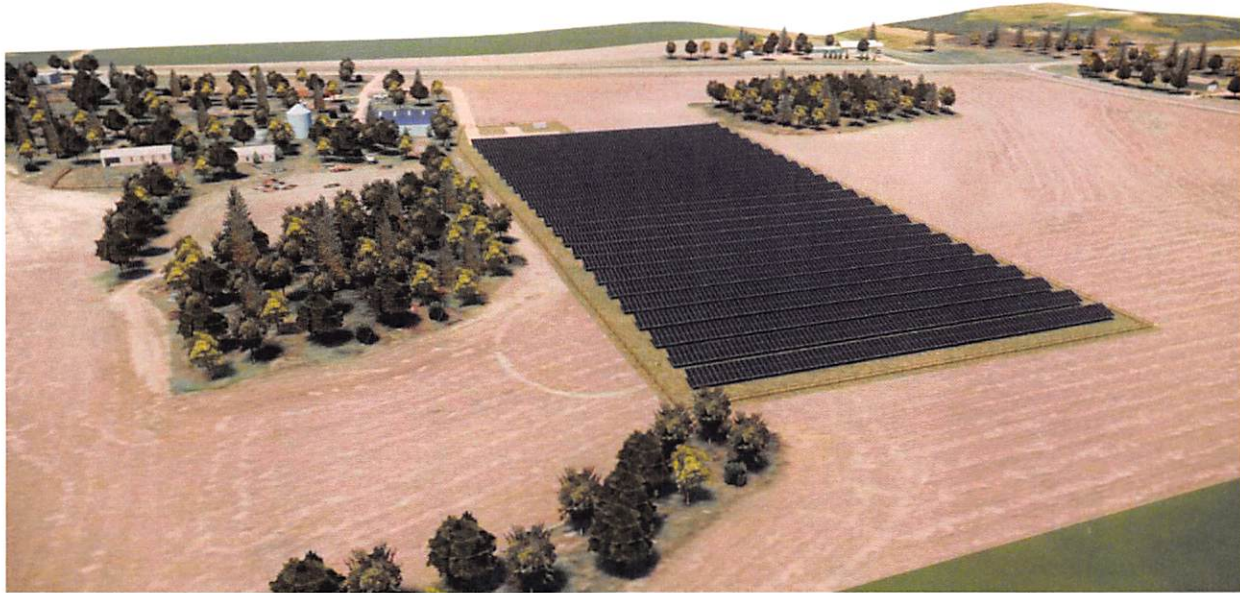


Figure 2 – Rendering of Proposed Solar Garden View North



Property Taxes

Per the Goodhue Property Tax Website, property taxes are current on the parcel. See Chart 1.

Table 1 - Property Taxes

Payable Year	Tax	Special Assessment	Penalty Interest & Fees	Amount Paid	Total Due	Add To cart
2017	\$522.00	\$0.00	\$20.88	\$542.88	\$0.00	Paid
2016	\$548.00	\$0.00	\$0.00	\$548.00	\$0.00	Paid
2015	\$536.00	\$0.00	\$0.00	\$536.00	\$0.00	Paid
2014	\$538.00	\$0.00	\$0.00	\$538.00	\$0.00	Paid
2013	\$522.00	\$0.00	\$0.00	\$522.00	\$0.00	Paid
2012	\$528.00	\$0.00	\$0.00	\$528.00	\$0.00	Paid
2011	\$496.00	\$0.00	\$0.00	\$496.00	\$0.00	Paid
2010	\$516.00	\$0.00	\$0.00	\$516.00	\$0.00	Paid
2009	\$432.00	\$0.00	\$0.00	\$432.00	\$0.00	Paid

Zoning and Land Use

The Stegemann parcel of land is classified as Agricultural (A2) with a row of crop agriculture recently dedicated to corn and soybean production. The site is flat with little vegetation. There is a house and driveway on the property's northwest corner. The proposed access road will connect to the driveway which leads to Highway 19.

Soils are suited to support the solar arrays. Hydroseeding in spring will promote soil stabilization. Details RD01, RD02, and EC05 on Sheet C-300 denote activities planned to stabilize the entrance and access road areas.

Existing drainage patterns will not be affected by the development. Runoff can infiltrate the ground beneath the raised solar panels. An erosion control and storm water management plan will be submitted prior to receiving a Building Permit. See Site Plan E-300 Detail EC42.

Per the Commercial Solar Siting Guidance distributed by the Minnesota Department of Natural Resources in May 2016, our CSG will be mindful of high value resources. The Natural Heritage Information System (NHIS) Data Request is attached for your review.

There is an identified stream/wetland feature on the east side of the parcel. See Figure 3. Based on our engineer's review, the array area does not meet the BWSR and USFWS threshold and is at low risk for flooding. The Desktop Wetland Report and Hydrology Study are attached for your review. Moreover, our engineer has assessed there are no ASTM Recognized

Environmental Conditions (RECs), no Controlled Recognized Environmental Conditions (CRECs) and no Historical Recognized Environmental Conditions (HRECs) about the parcel. The Phase 1 ESA Report is attached for review.

Figure 3 – National Wetland Inventory Image



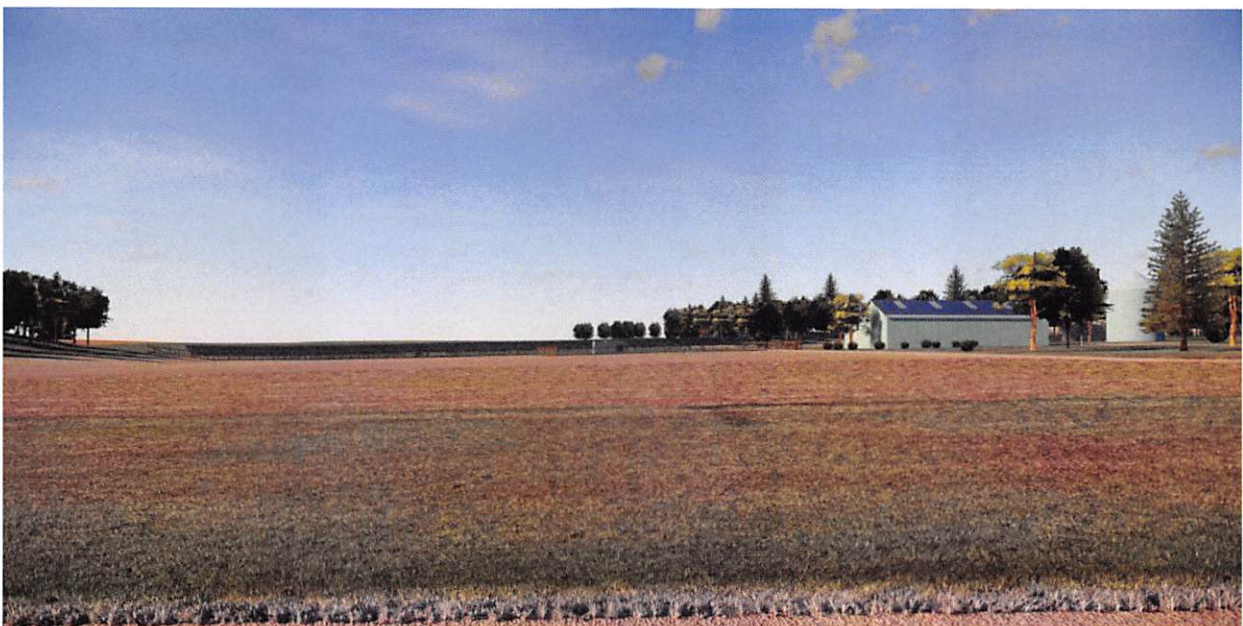
Visual Impact Analysis

The CSG has been placed on the land such that it would maintain the Goodhue County setback requirements for solar energy systems. The array area meets setback requirements. Per the request of Cannon Falls, trees will be added to the east elevation. These trees will be planted in Spring of the following year. See Figure 3 and Figure 4.

Figure 4 - Rendering of Proposed Solar Garden Neighbor's View



Figure 5 – Rendering of Proposed Solar Garden from Right of Way



The visual impact of the arrays is tempered by the surrounding area's rolling hills and oases of trees. See Figure 5. The cover crop inside the footprint of the system will be a combination of low growth native crops and a seed mix that promotes pollinator friendly habitats.

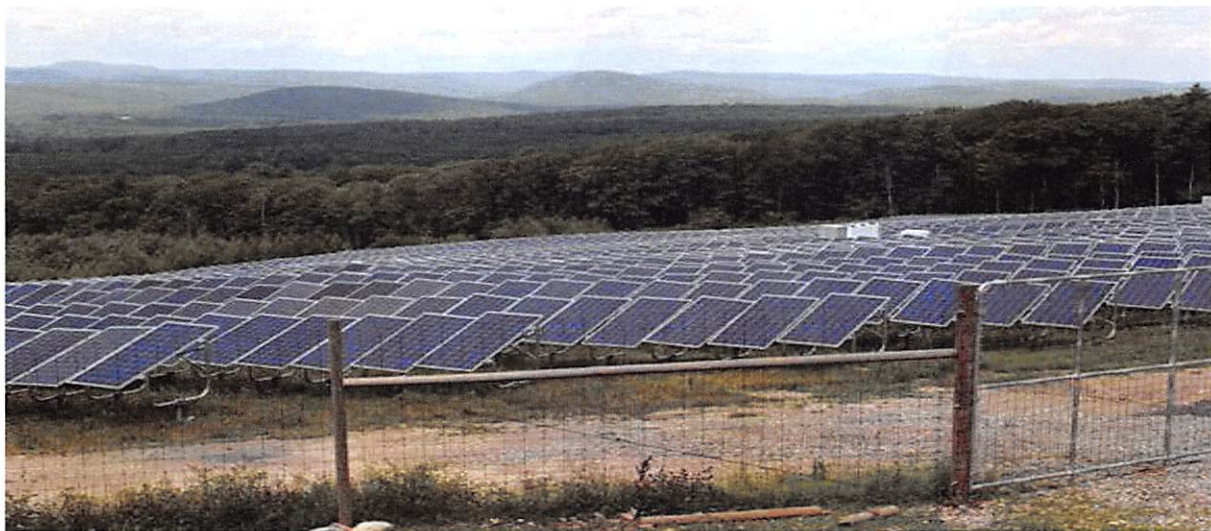
Figure 6 – Rendering of Proposed Solar Garden Driving West



Screening and Buffer Plan

To reduce impact, the system will be enclosed with a 6-foot-tall agricultural fence to minimize the visual impact. Additionally, the interconnection point will be made via pad mounted transformer, so electrical poles will be reduced if not eliminated. See Figure 5.

Figure 7 – Wood Agricultural Fence Approximately 6' Tall with Gate



Maintenance Plan

Byllesby Garden LLC will have a long-term maintenance plan to ensure safety, reliable operation, and production of the system. Monitoring and metering equipment installed on site will alert the maintenance team in real time of a system performance issue. Maintenance teams are required to have proper safety plans and equipment in place to perform all work. Details of the plan are finalized at construction once final system design is complete. The final plan for the site can be requested at any time after construction.

Figure 8 – Community Solar Garden



Maintenance of systems can be broadly defined in two buckets:

Preventative Maintenance

The following items are performed on a routine basis.

Mechanical verification – one to two times per year a technician visits the site. While on site the technician checks bolts and piers for any loosening or corrosion. When an issue is discovered a set of corrective actions is defined, executed and a full report is logged.

Electrical - one to two times per year a technician visits the site. While on site the technician checks the major electrical components (panels, inverters, safety switches) and connections to ensure proper working order. When an issue is discovered a set of corrective actions is defined, executed and a full report is logged.

Grounds keeping – three to six times per year a technician visits the site. While onsite, the technician mows, manages vegetation, and verifies storm water management is properly working. During winter months the technician may perform snow removal, placing snow in designated areas.

Reactive Maintenance

Monitoring equipment and preventative maintenance are used to identify potential system safety and performance issues. Once an issue is identified a technician is assigned to the issue and corrective actions are executed.

Table 2 - List of Commonly Performed Operations and Maintenance Activities

<i>Item</i>	<i>Activity</i>
Monitoring	On-going tracking and verification of system performance, weather and equipment alerts.
Grounds Keeping	Manage all vegetation including mowing. Maintain all vegetative screening.
Solar Module Inspection	Inspect for cracks and general damage. Inspect for dirt, vegetation and other potential shading issues. Perform electrical checks for proper performance characteristics. Cleaning will utilize only water from a sprinkler/hose head.
Racking & Mounting Inspection	Inspect for damage, corrosion and loose connections.
Inverter Inspection & Maintenance	Inspect for corrosion and general damage. Confirm proper ventilation and environmental seals. Inspect all electrical connections and wires coming into and out of the units. Complete manufacturer recommended maintenance activities.
DC Electrical Inspection	Inspect DC runs from solar panels to inverters for damaged/loose wires and debris.
AC Electrical Inspection	Inspect AC runs from inverter to switchgear for damage/loose wires and debris.
Switchgear Inspection	Inspect switches for proper functionality. Inspect connections for appropriate torque. Inspect latches and environmental seals.
Monitoring Inspection	Inspect existing monitoring systems for functionality. Complete manufacturer recommended maintenance activities.
System Repair	Perform all necessary work as determined by inspections.
Warranty Administration	Administer defective components and file warranty claims.

Decommissioning & Site Restoration

Byllesby Garden LLC commits to both our land owners and permitting authorities that we will decommission and restore the site at the end of the system's serviceable life or the system becomes a discontinued use. This is the expectation we set with our landowner partner, and our expectation is that the Conditional Use Permit with the AHJ will as well.

To ensure we can execute this successfully, a financial surety will be posted for the local permitting authority. This surety covers the cost of decommissioning the site. The project owner will be responsible for all costs associated with decommissioning.

All equipment will be removed within one (1) year from the day the system is no longer in service or discontinued. A system shall be considered out of service at the end of the project's useful life (35 years) unless a plan is submitted to the Zoning Administrator outlining the steps and schedule for repowering the system. And, per Article 19 Section 6 Subd. 3, if a system does not produce energy after one (1) year, a system shall be deemed discontinued.

Decommissioning will take no more than ninety (90) days. Removal of modules, inverters, wiring, electrical equipment, racking and foundations, fencing, underground wires and conduit and concrete pads will be removed and recycled or disposed of in a suitable manner. After all equipment is removed, the Project site will be restored to a condition comparable to its pre-construction use excluding topography or original cover crop, if the Project site will once again be used for agricultural. If holes are created when infrastructure is removed, they will be back-filled and covered with topsoil. Unless requested otherwise, permanent access roads constructed on the Project will be removed.

Future use may determine the decommissioning scope. It may be advantageous to maintain roads, drainage features, and transmission facilities. Therefore, the plan will be updated regularly as understanding of removal costs and the equipment's residual value evolves over time.

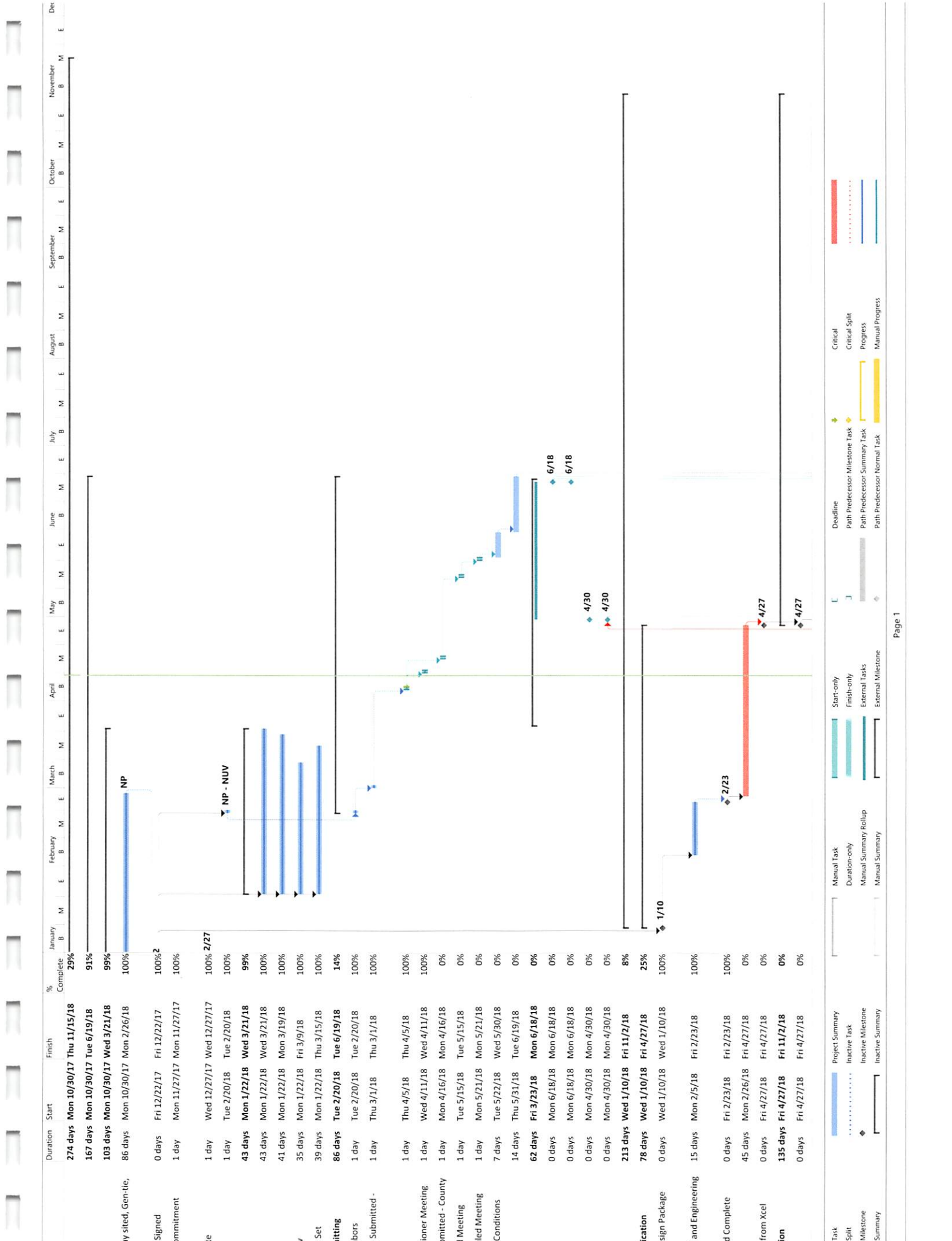
Please see our cost estimate, included with this application for pricing. The pricing assumes labor rates inflated for 25 years. Salvage values are assumed to be minimal. Although not assumed in our estimate, if the solar panels can be re-used, which we expect to be the case, this would dramatically lower the overall decommissioning costs.



Project Proposal

Customer: Nokomis Partner Holdings, LLC	Date: 04-18-2018
Customer Contact: Julian White julian@nokomis.partners 818 W 46th St. Minneapolis, MN 55419	Job Number: N/A
	Job Title: Byllesby Garden Solar Decommissioning
Project Location: Cannon Falls, MN	Proposal: Pricing valid for 30 days from above date.
	Terms: Net due 30 days from receipt of invoice date.
Project Description:	
<u>Remove and Dispose of the Following Components:</u>	
<ul style="list-style-type: none"> • Fencing • Electrical Switchgear – Panels, Transformers, Conduit & Wire • Inverters • Modules • Racking and Pile • Concrete Pads • Driveway Aggregate 	
Total labor and materials: \$42,300.00	
Acceptance of Proposal	
The prices, specifications and conditions are satisfactory and are hereby accepted. Knobelsdorff Electric Inc. is authorized to do the work as specified. Payment will be made as outlined in "Terms" above.	

	Date: _____	<div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;"> <small>DocuSigned by:</small> <small>C74D6DBA0BA849B...</small> </div>	Date: 4/18/2018
Signature		Signature	
		Karl von Knobelsdorff – president & CEO	



Byllesby Garden, LLC

1 MW-AC Community Solar Garden

Goodhue County, MN

Conditional Use Permit Plans

Westwood

Phone (480) 747-6558 6909 East Greenway Parkway, Suite 250
 Fax (480) 367-8025 Scottsdale, AZ 85254
 westwoodps.com

Westwood Professional Services, Inc.

Designed: WFS

Checked: WFS

Drawn: WFS

Record Drawing by/date:

Revisions #	DATE	DESCRIPTION
A	03/14/18	ISSUED FOR REVIEW
B	03/26/18	REV. PER CLIENT COMMENTS
C	04/18/18	ADD INTERCONNECTION EQUIP. DETAILS

Prepared for:

Nokomis Energy, LLC

Sheet List Table	
Sheet Number	Sheet Title
T-100	Cover Sheet
C-100	EXISTING CONDITIONS
C-200	CIVIL SITE PLAN
C-201	CIVIL SITE PLAN
C-202	DRAINAGE PLAN
C-300	CONSTRUCTION DETAILS
C-301	INTERCONNECTION DETAILS

Project Contact Information			
Consultant	Company	Name	Phone
DEVELOPER	NOKOMIS ENERGY, LLC	DAN ROGERS	(952) 393-7721
CIVIL ENGINEER	WESTWOOD PROFESSIONAL SERVICES, INC.	MATTHEW GAARDER, PE	(952) 906-7416
LAND SURVEYOR	WESTWOOD PROFESSIONAL SERVICES, INC.	VIRGINIA WINBERG, RLS	(952) 697-5750

Project Data Sets			
Data Set	Filename	Provider	Date
PV ARRAY	0013987-PVSITE.DWG	NOKOMIS ENERGY, LLC	02/13/2018
EXISTING TOPOGRAPHY	0013987-ECON.DWG	MN LIDAR	02/21/2018

Host Property Description

PARCEL 280160300
 LAND OWNER DOUGLAS W. STEGEMANN
 ZONING A2
 LATITUDE 44.507958°
 LONGITUDE -92.860296°

Host Property Legal Description

SEE SHEET C-100.

Lease Area Legal Description

TBD

Project Description

BYLLESBY GARDEN, LLC IS A 5 ACRE, 1 MEGAWATT COMMUNITY SOLAR GARDEN. THE PROJECT WILL BE CONTRACTED WITH XCEL ENERGY THROUGH THEIR SOLAR*REWARDS COMMUNITY PROGRAM WHICH IS SUPPORTED BY THE STATE OF MINNESOTA. ONCE OPERATING, THE PROJECT WILL DELIVER ANNUALLY ~1,800,000 KWH OF CLEAN, LOCAL ENERGY TO THE SURROUNDING COMMUNITY FOR 25+ YEARS. XCEL WILL PURCHASE ALL OF THE ENERGY PRODUCED AND COMPENSATE THE SYSTEM OWNER AND GARDEN SUBSCRIBERS IN THE FORM OF XCEL BILL CREDITS. OPERATED BY NOKOMIS ENERGY, THIS GARDEN WILL ABIDE BY ALL TOWNSHIP, CITY, COUNTY AND STATE REQUIREMENTS.

Project Coordinate System

HORIZONTAL DATUM, BEARINGS, AND DIMENSIONS ARE BASED ON NAD83 GOODHUE COUNTY COORDINATES, US SURVEY FEET. CONTOURS AND ELEVATIONS SHOWN WERE GENERATED FROM PUBLICLY AVAILABLE LIDAR DATA FROM THE STATE OF MINNESOTA.

Project Benchmarks

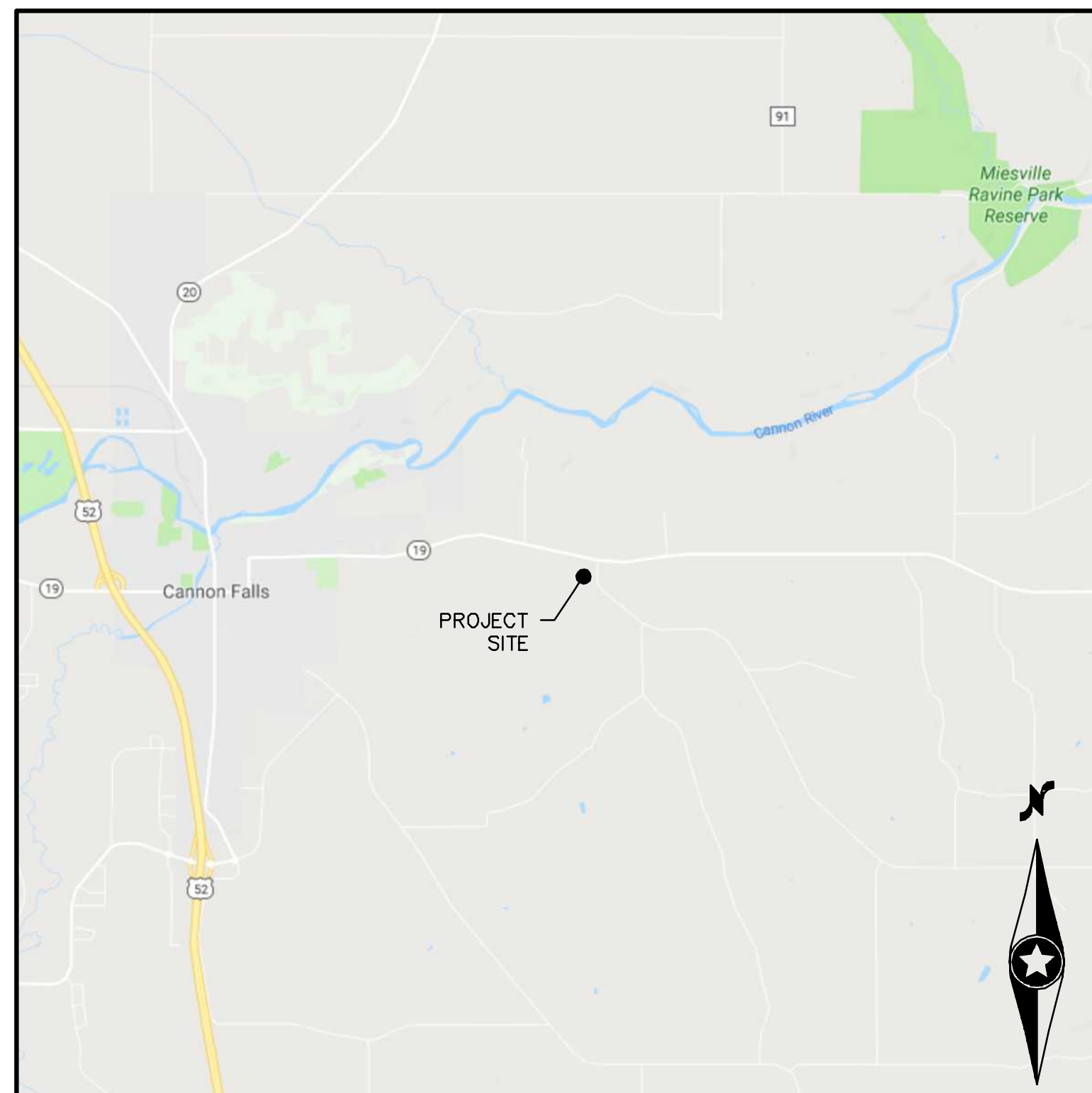
MNDOT NAME: 2503 Y ELEV. 914.375
 2.0 MILES EAST OF CANNON FALLS, 1.85 MILES EAST ALONG TRUNK HIGHWAY 19 FROM THE JUNCTION OF TRUNK HIGHWAY 19 AND TRUNK HIGHWAY 20 IN CANNON FALLS, AT TRUNK HIGHWAY 19 MILEPOINT 193.0, 47.1 FEET SOUTH OF TRUNK HIGHWAY 19, 21.4 FEET NORTHEAST OF A POWER POLE NUMBER 35, 1.0 FOOT NORTH OF A WITNESS POST.

MNDOT NAME: 8 GAF ELEV. 892.219
 2.1 MILES EAST OF CANNON FALLS, 2.8 MILES EAST ALONG TRUNK HIGHWAY 19 FROM THE JUNCTION TRUNK HIGHWAY 19 AND TRUNK HIGHWAY 20 IN CANNON FALLS, AT TRUNK HIGHWAY 19 MILEPOINT 194.15, 124.5 FEET WEST-SOUTHWEST OF THE SOUTHWEST CORNER OF A BOX CULVERT, 69 FEET SOUTH OF TRUNK HIGHWAY 19, 1.0 FOOT NORTH OF A WITNESS POST.

STATION NOTES: THE MARK IS LOCATED IN THICKET OF THORNY BRUSH AND POISON IVY, IT IS TIPPED 10 DEGREES TO THE EAST, BUT IS SOLID, 11-28-2005.

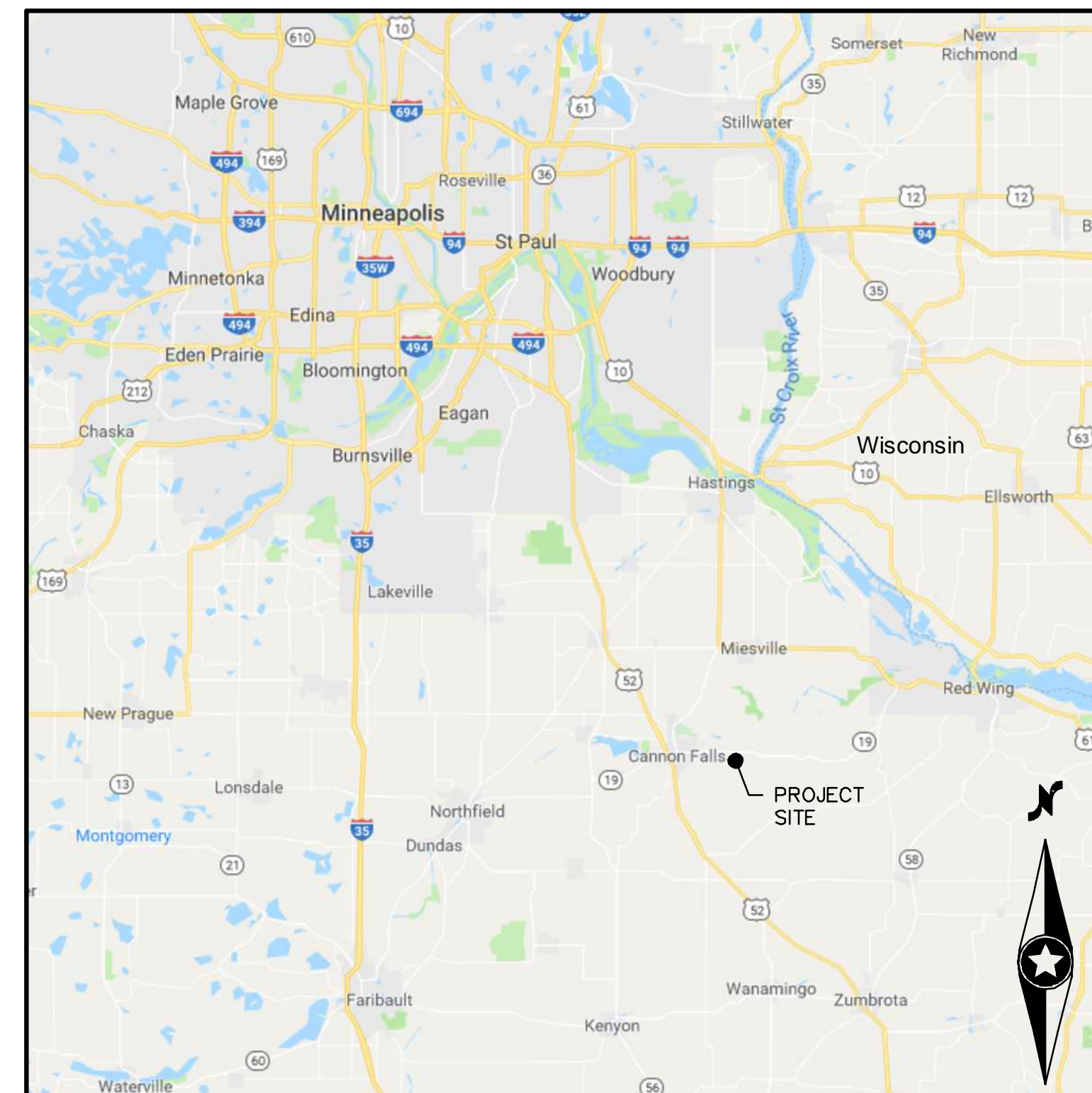
VERTICAL DATUM: NAVD88 (GEOID 12B)

Vicinity Map

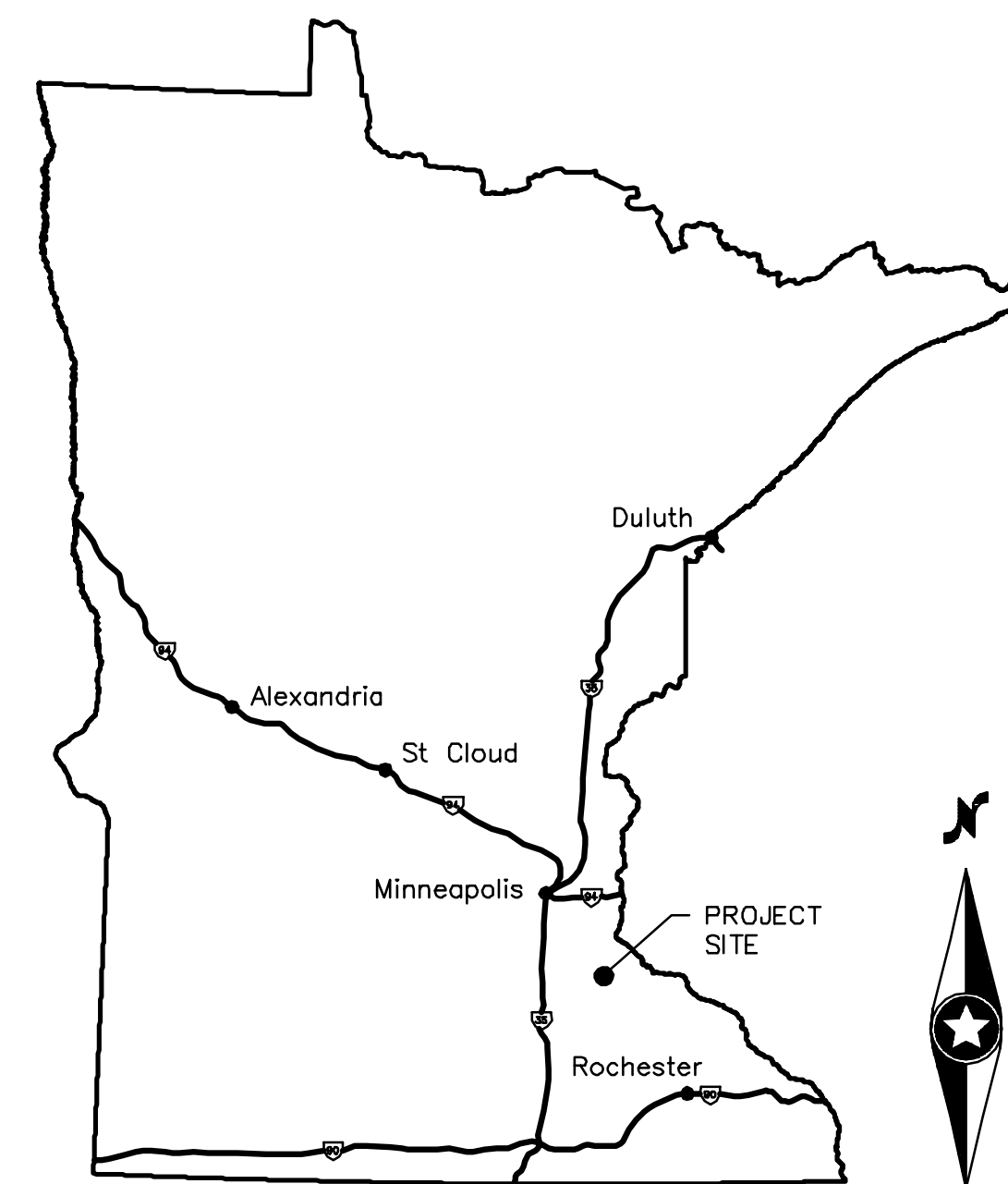


MAP DATA ©2018 GOOGLE. NOT TO SCALE.

Regional Map



MAP DATA ©2018 GOOGLE. NOT TO SCALE.



State Map
NOT TO SCALE

Byllesby Garden, LLC

Goodhue County, MN

Cover Sheet

Issued for Review
Not for Construction

Date: **05/04/2018**

Drawing No: **T-100**

Designed: WFS

Checked: WFS

Drawn: WFS

Record Drawing by/date:

Revision #	DATE	DESCRIPTION
A	03/14/18	ISSUED FOR REVIEW
B	03/26/18	REV. PER CLIENT COMMENTS
C	04/18/18	ADD INTERCONNECTION EQUIP. DETAILS

Prepared for:

Nokomis Energy, LLC

**Byllesby Garden,
LLC**

Goodhue County, MN

Existing Conditions

**Issued for Review
Not for Construction**

Date: **05/04/2018**

Drawing No: **C-100**

LEGEND & ABBREVIATIONS

- EX. BOUNDARY LINE
- EX. SECTION LINE
- EX. RIGHT-OF-WAY LINE
- EX. EASEMENT LINE
- EX. PARCEL LINE
- EX. SETBACK LINE
- EX. OVERHEAD POWER LINE
- EX. UNDERGROUND TELEPHONE LINE
- EX. INDEX CONTOUR LINE
- EX. INTERVAL CONTOUR LINE
- EX. DRAINAGE AREA BOUNDARY
- EX. UTILITY POLE
- EX. SLOPE
- ESMT. EASEMENT
- EX. EXISTING
- PROP. PROPOSED
- R/W RIGHT OF WAY
- S/B SETBACK

Host Property Legal Description

The following legal description is shown per Schedule A, as described in Commitment No. 40852-17-22831 prepared by North American Title Company having an effective date of November 16, 2017 at 8:00 A.M..

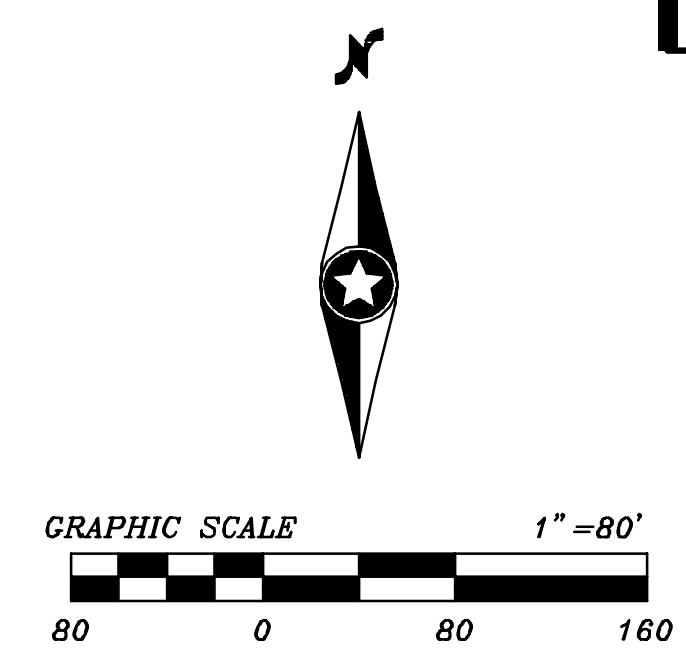
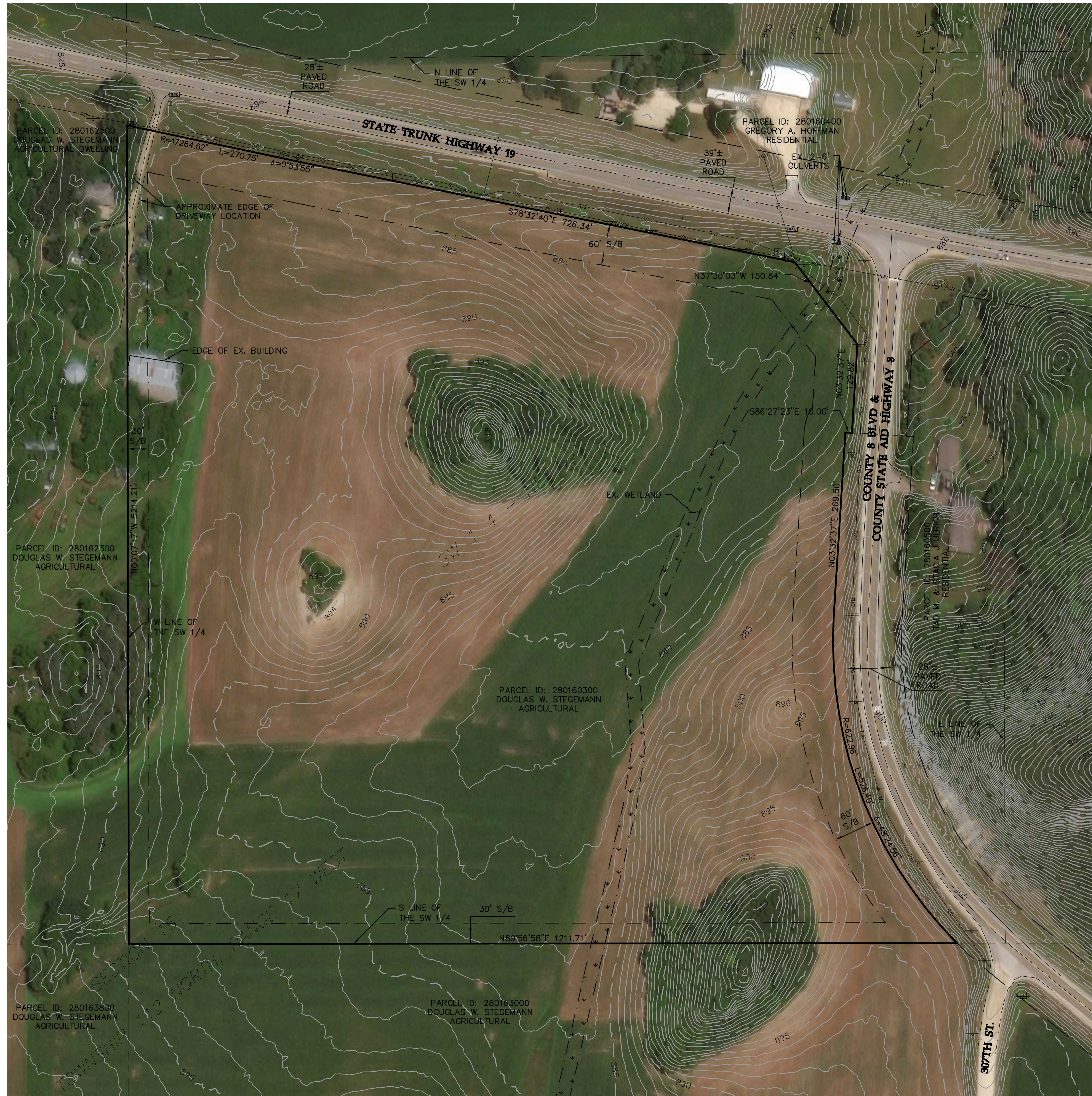
The Southwest Quarter (SW 1/4) of the Northeast Quarter (NE 1/4) in Section Sixteen (16) in Township One Hundred Twelve (112) North of Range Seventeen (17) West.

Excepting therefrom that part of the Southwest Quarter (SW 1/4) of the Northeast Quarter of said Section 16, Township 112, North Range 17 West; that lies North of State Highway #19 as well as that part lying between two lines run parallel with and distant respectively 75 feet and 106 feet on each side of the following described line:

Beginning at a point on the east line of Section 15, Township 112 North, Range 17 West, distant 3948.0 feet North of the Southeast corner of said Section 15; thence run westerly at an angle of 90° 22' with said east section line (when measured from north to west) for 3613.0 feet; thence deflect to the left on a 1° 00' curve (delta angle 14° 53') for 743.3 feet; thence on tangent to said curve for 1173.8 feet; thence deflect to the right on a ten chord spiral curve of decreasing radius (spiral angle 3° 00') for 300 feet; then deflect to the right on a 2° 00' circular curve (delta angle 13° 24') for 670 feet; thence deflect to the right on a ten chord spiral curve of increasing radius (spiral angle 3° 00') for 300 feet and there terminating.

Excepting also: Part of the Southwest Quarter (SW 1/4) of the Northeast Quarter (NE 1/4) of Section 16, Township 112 North, Range 17 West, described as follows: Beginning at a point on the east line of said Southwest Quarter (SW 1/4) of said Northeast Quarter (NE 1/4) of Section 16 where said east line intersects the center line of that certain State Highway now numbered 19 - from this point of beginning, run westerly along the center line of said Highway No. 19 to the point of intersection of said center line with the center line of that certain County Highway known as the Cannon Falls - White Rock Road and now numbered Goodhue County Highway No. 8 - running thence southerly and easterly along the center line of said County Highway No. 8 to the east line of said Southwest Quarter (SW 1/4) of the Northeast Quarter (NE 1/4) of said Section 16 - running thence North to the point of beginning.

Excepting from the above all highway easements and right-of-ways as they now exist or as they now appear of record.



LEGEND & ABBREVIATIONS

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- EX. SECTION LINE
- EX. RIGHT-OF-WAY LINE
- EX. EASEMENT LINE
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- EX. SETBACK LINE
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- EX. UNDERGROUND TELEPHONE LINE
- EX. INDEX CONTOUR LINE
- EX. INTERVAL CONTOUR LINE
- EX. DRAINAGE AREA BOUNDARY
- EX. UTILITY POLE
- EX. SLOPE
- ESMT. EASEMENT
- EX. EXISTING
- PROP. PROPOSED
- R/W RIGHT OF WAY
- S/B SETBACK
- PROP. INDEX CONTOUR LINE
- PROP. INTERVAL CONTOUR LINE
- PROP. ACCESS ROAD CENTERLINE
- PROP. UNDERGROUND POWER LINE
- PROP. FENCE LINE WITH RUN LENGTH
- PROP. SILT FENCE
- PROP. ACCESS ROAD
- EX. UTILITY POLE
- EX. SLOPE
- ESMT. EASEMENT
- EX. EXISTING
- PROP. PROPOSED
- R/W RIGHT OF WAY
- S/B SETBACK

Project Data Sets		
Item	Required	Designed
FRONT YARD/RIGHT OF WAY	60'	64' (MIN.)
SIDE YARD	50'	89' (MIN.)
REAR YARD	30'	418' (MIN.)

Designed: WFS

Checked: WFS

Drawn: WFS

Record Drawing by/date:

Revisions #	DATE	DESCRIPTION
A	03/14/18	ISSUED FOR REVIEW
B	03/26/18	REV. PER CLIENT COMMENTS
C	04/18/18	ADD INTERCONNECTION EQUIP. DETAILS

Prepared for:

Nokomis Energy, LLC

Byllesby Garden, LLC

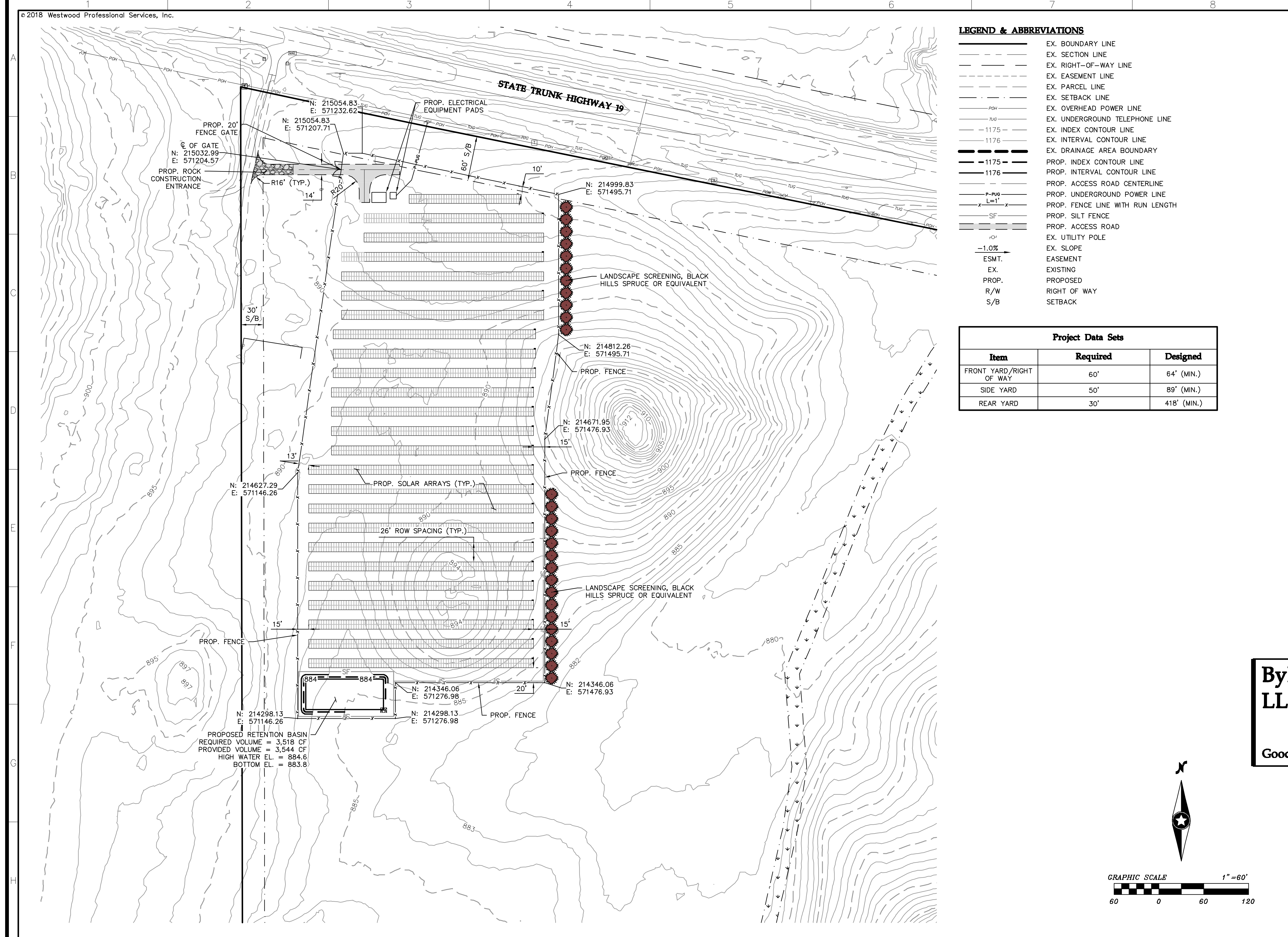
Goodhue County, MN

Civil Site Plan

Issued for Review
 Not for Construction

Date: 05/04/2018

Drawing No: C-200





LEGEND & ABBREVIATIONS

- EX. BOUNDARY LINE
- EX. SECTION LINE
- EX. RIGHT-OF-WAY LINE
- EX. EASEMENT LINE
- EX. PARCEL LINE
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- EX. INDEX CONTOUR LINE
- EX. INTERVAL CONTOUR LINE
- EX. DRAINAGE AREA BOUNDARY
- PROP. INDEX CONTOUR LINE
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- PROP. ACCESS ROAD CENTERLINE
- PROP. UNDERGROUND POWER LINE
- PROP. FENCE LINE WITH RUN LENGTH
- PROP. SILT FENCE
- PROP. ACCESS ROAD
- EX. UTILITY POLE
- EX. SLOPE
- ESMT. EASEMENT
- EX. EXISTING
- PROP. PROPOSED
- R/W RIGHT OF WAY
- S/B SETBACK

Project Data Sets		
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FRONT YARD/RIGHT OF WAY	60'	64' (MIN.)
SIDE YARD	50'	89' (MIN.)
REAR YARD	30'	418' (MIN.)

Designed: WFS
 Checked: WFS
 Drawn: WFS

Record Drawing by/date:

Revisions #	DATE	DESCRIPTION
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C	04/18/18	ADD INTERCONNECTION EQUIP. DETAILS

Prepared for:

Nokomis Energy, LLC

Byllesby Garden, LLC

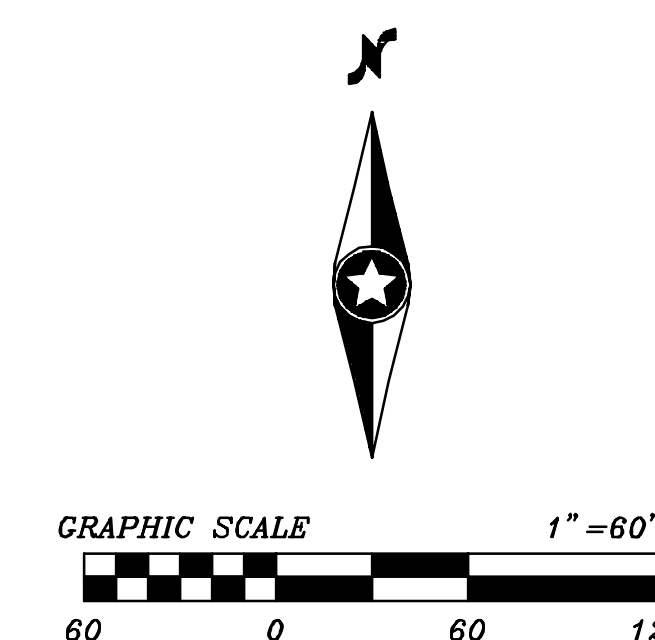
Goodhue County, MN

Civil Site Plan

Issued for Review
 Not for Construction

Date: 05/04/2018

Drawing No: C-201



LEGEND & ABBREVIATIONS

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	EX. SECTION LINE
	EX. RIGHT-OF-WAY LINE
	EX. EASEMENT LINE
	EX. PARCEL LINE
	EX. SETBACK LINE
	EX. OVERHEAD POWER LINE
	EX. UNDERGROUND TELEPHONE LINE
	EX. INDEX CONTOUR LINE
	EX. INTERVAL CONTOUR LINE
	EX. DRAINAGE AREA BOUNDARY
	PROP. INDEX CONTOUR LINE
	PROP. INTERVAL CONTOUR LINE
	PROP. ACCESS ROAD CENTERLINE
	PROP. UNDERGROUND POWER LINE
	PROP. FENCE LINE WITH RUN LENGTH
	PROP. SILT FENCE
	PROP. ACCESS ROAD
	EX. UTILITY POLE
	EX. SLOPE
	EASEMENT
	EXISTING
	PROPOSED
	RIGHT OF WAY
	SETBACK
	IMPERVIOUS SURFACE AREA

NOTES:

- EXISTING OVERALL DRAINAGE PATTERNS WILL NOT BE ALTERED WITH SOLAR DEVELOPMENT.
- THE GROUND BENEATH THE RAISED SOLAR PANELS ALLOWS RUNOFF TO INFILTRATE. THE AREA BENEATH THE PANELS IS NOT CONSIDERED IMPERVIOUS.

Designed: **WFS**

Checked: **WFS**

Drawn: **WFS**

Record Drawing by/date:

Revisions #	DATE	DESCRIPTION
A	03/14/18	ISSUED FOR REVIEW
B	03/26/18	REV. PER CLIENT COMMENTS
C	04/18/18	ADD INTERCONNECTION EQUIP. DETAILS

Prepared for:

Nokomis Energy, LLC

Byllesby Garden, LLC

Goodhue County, MN

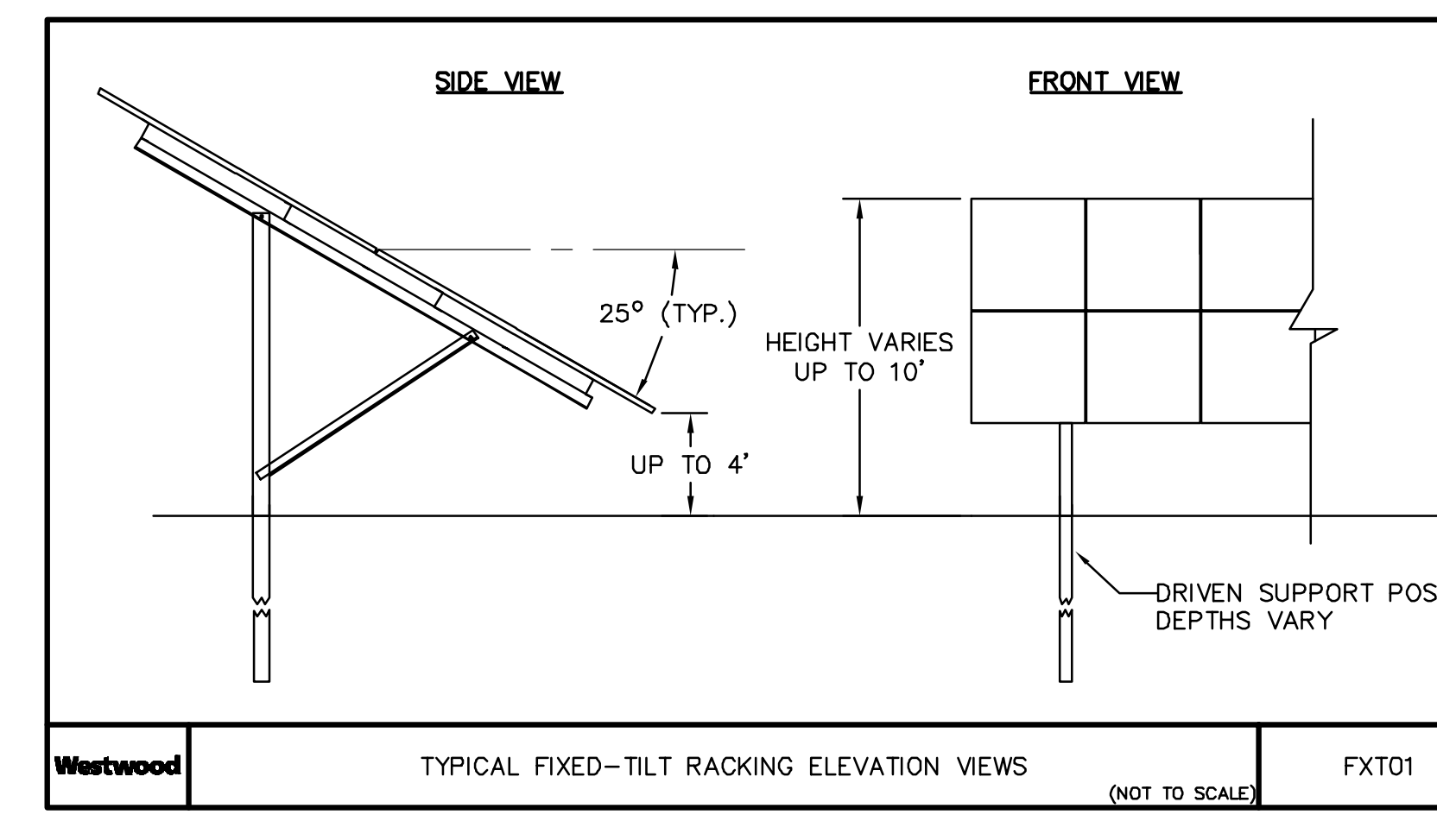
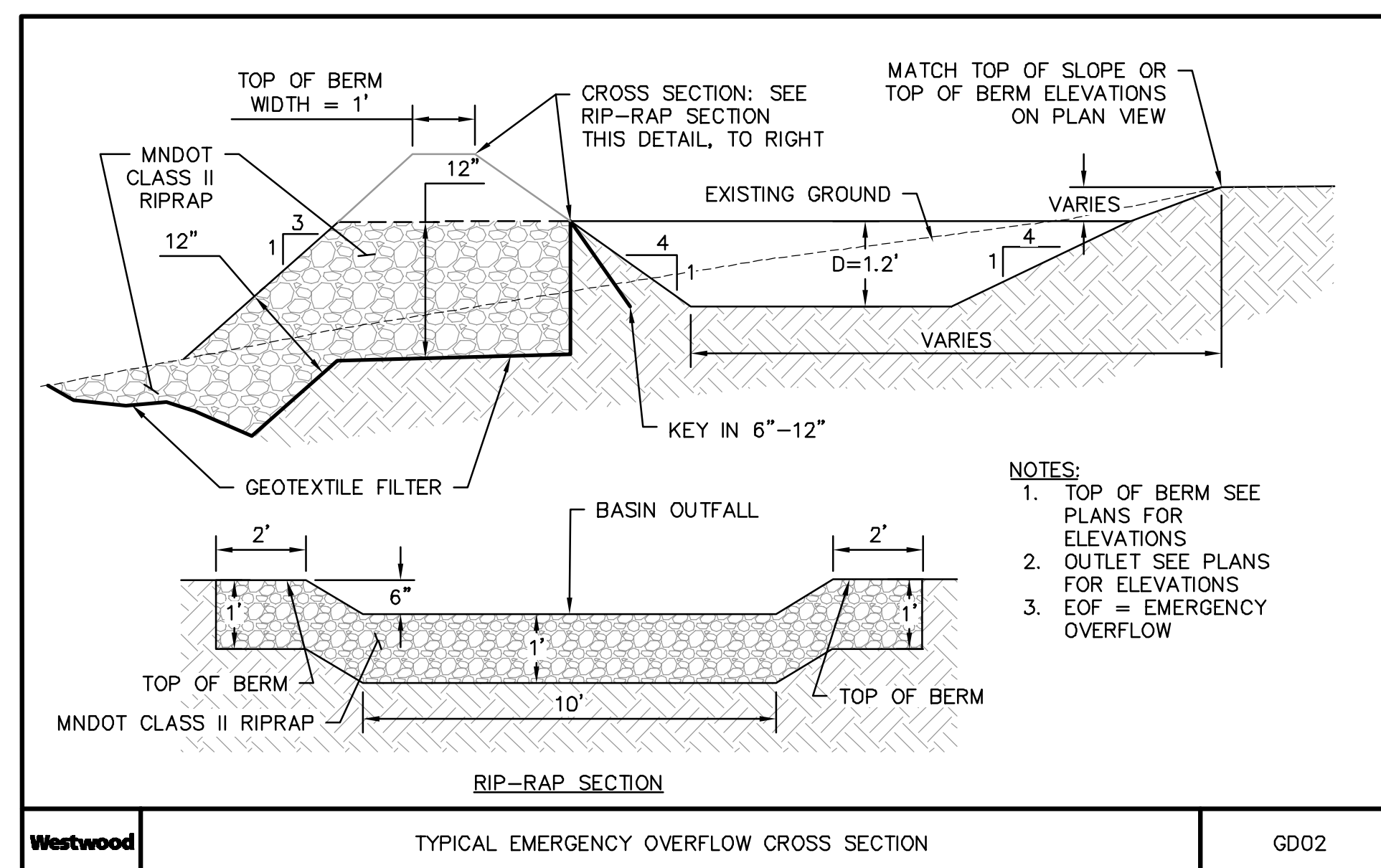
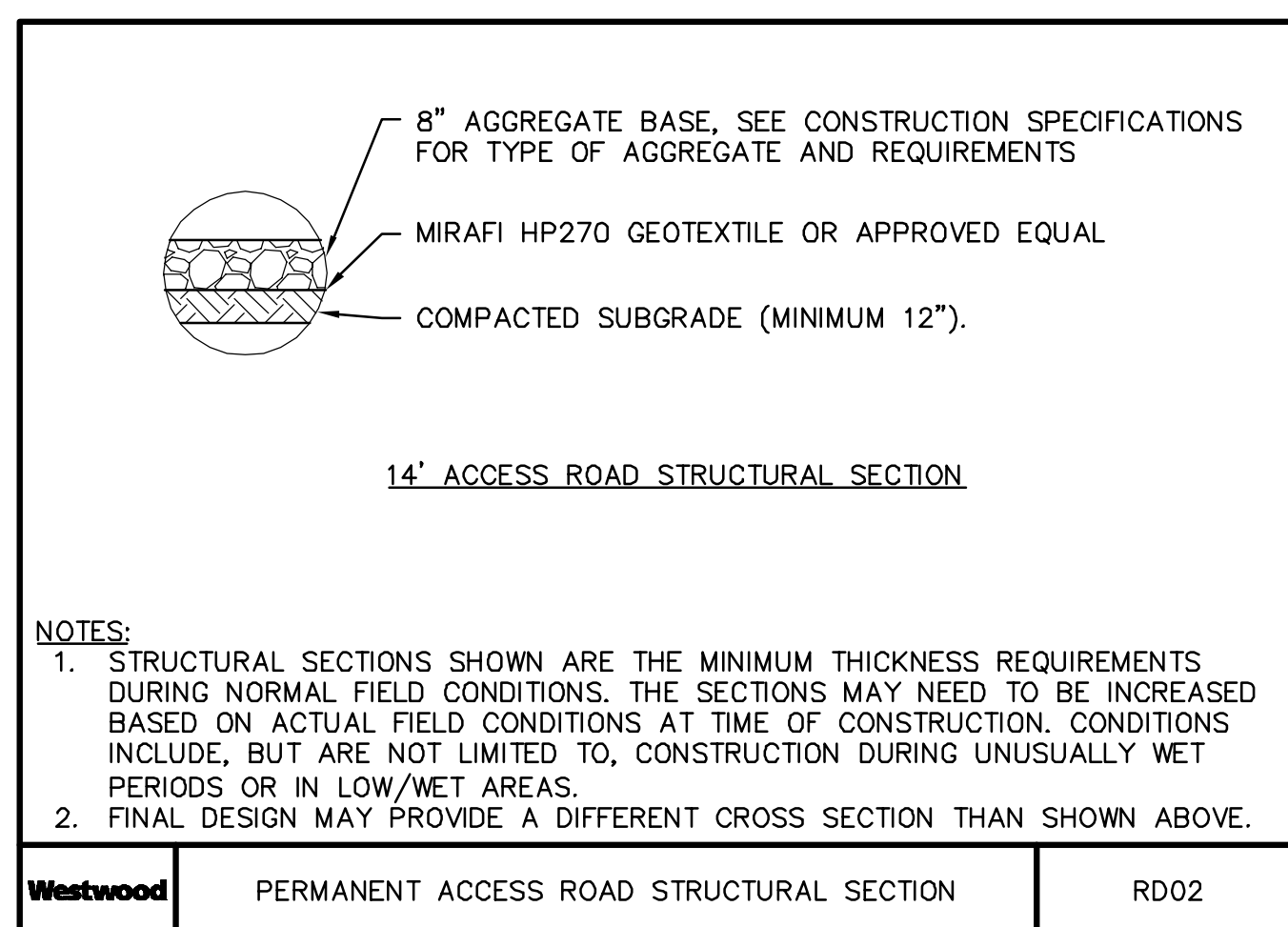
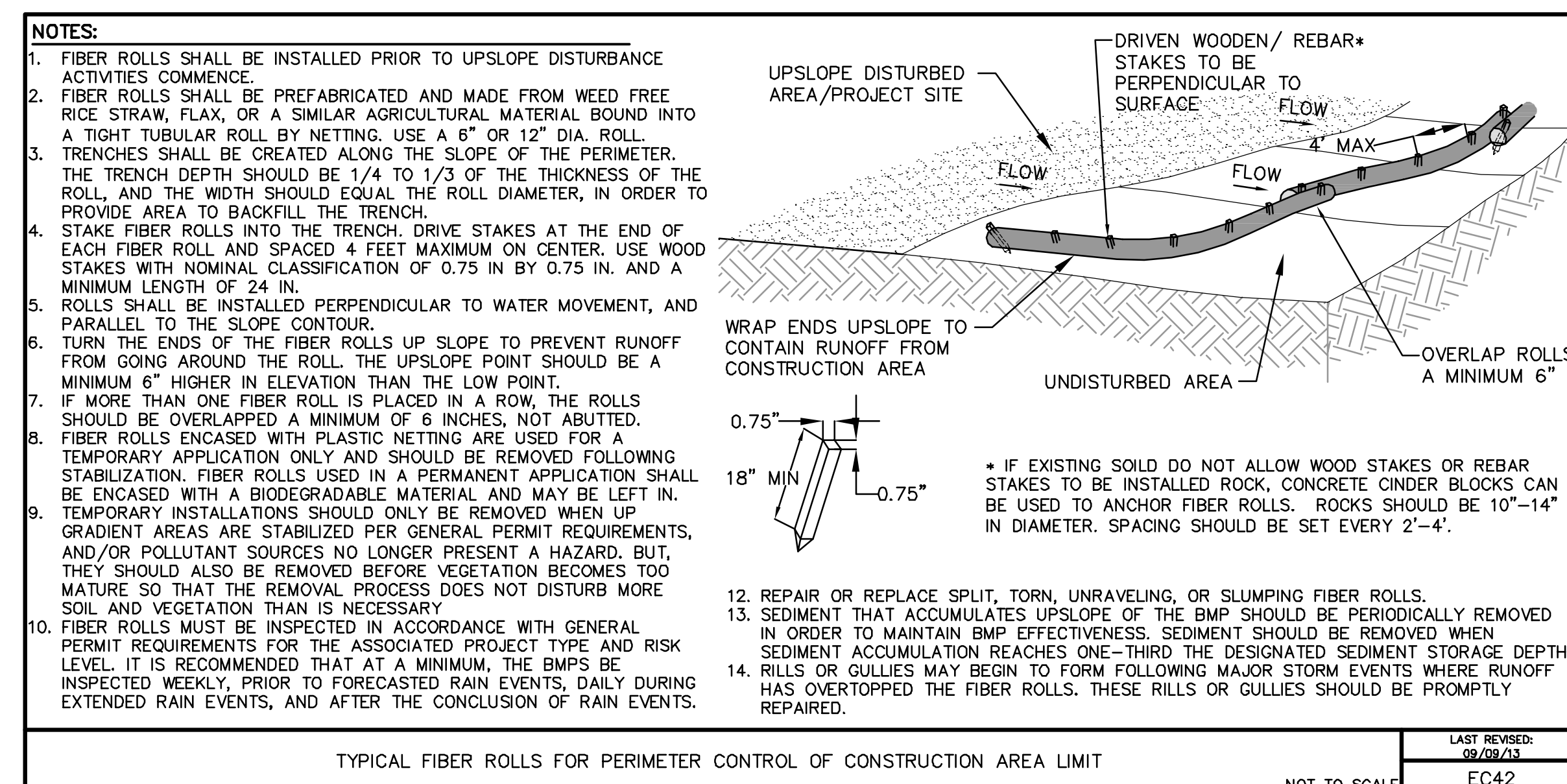
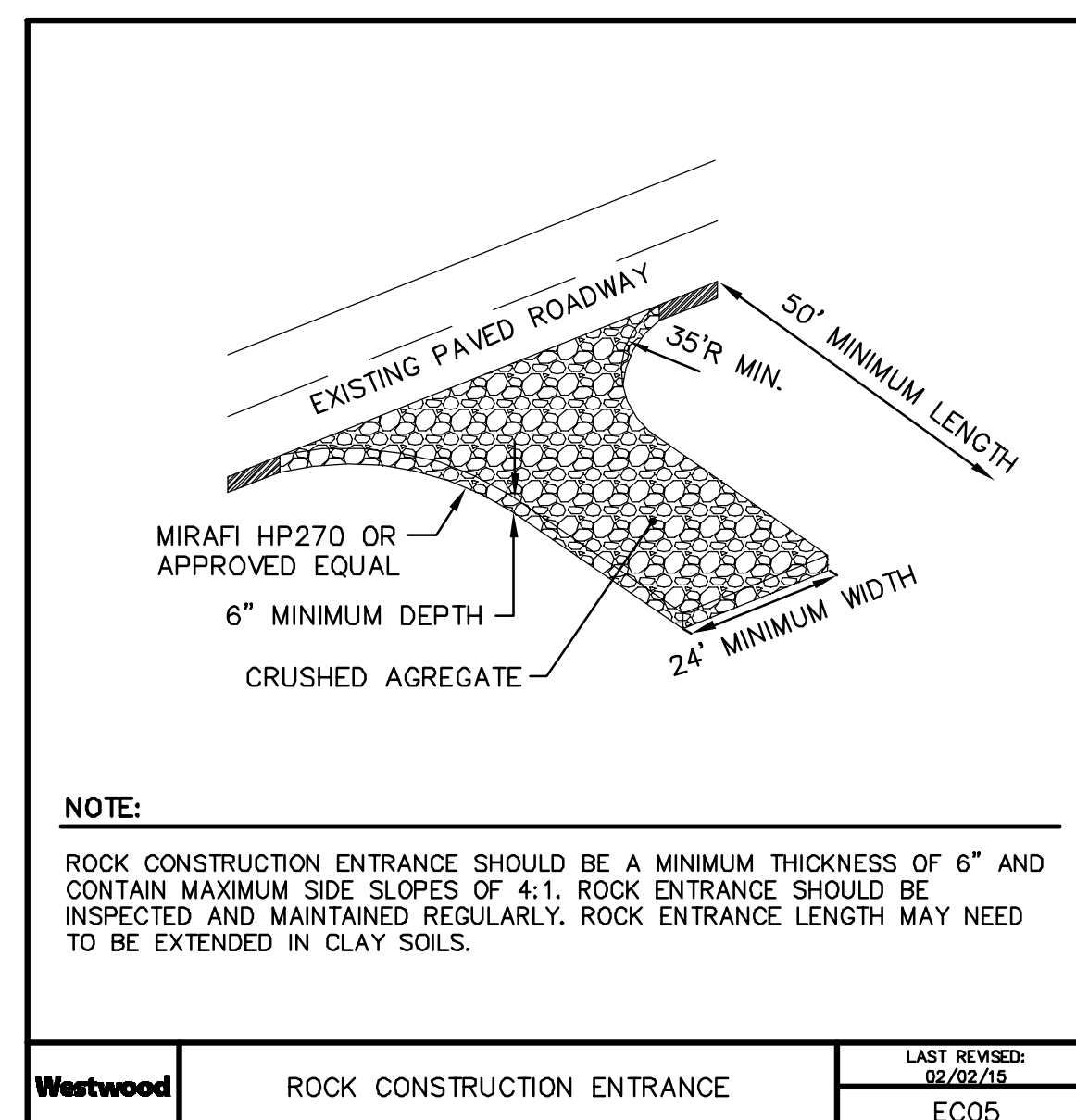
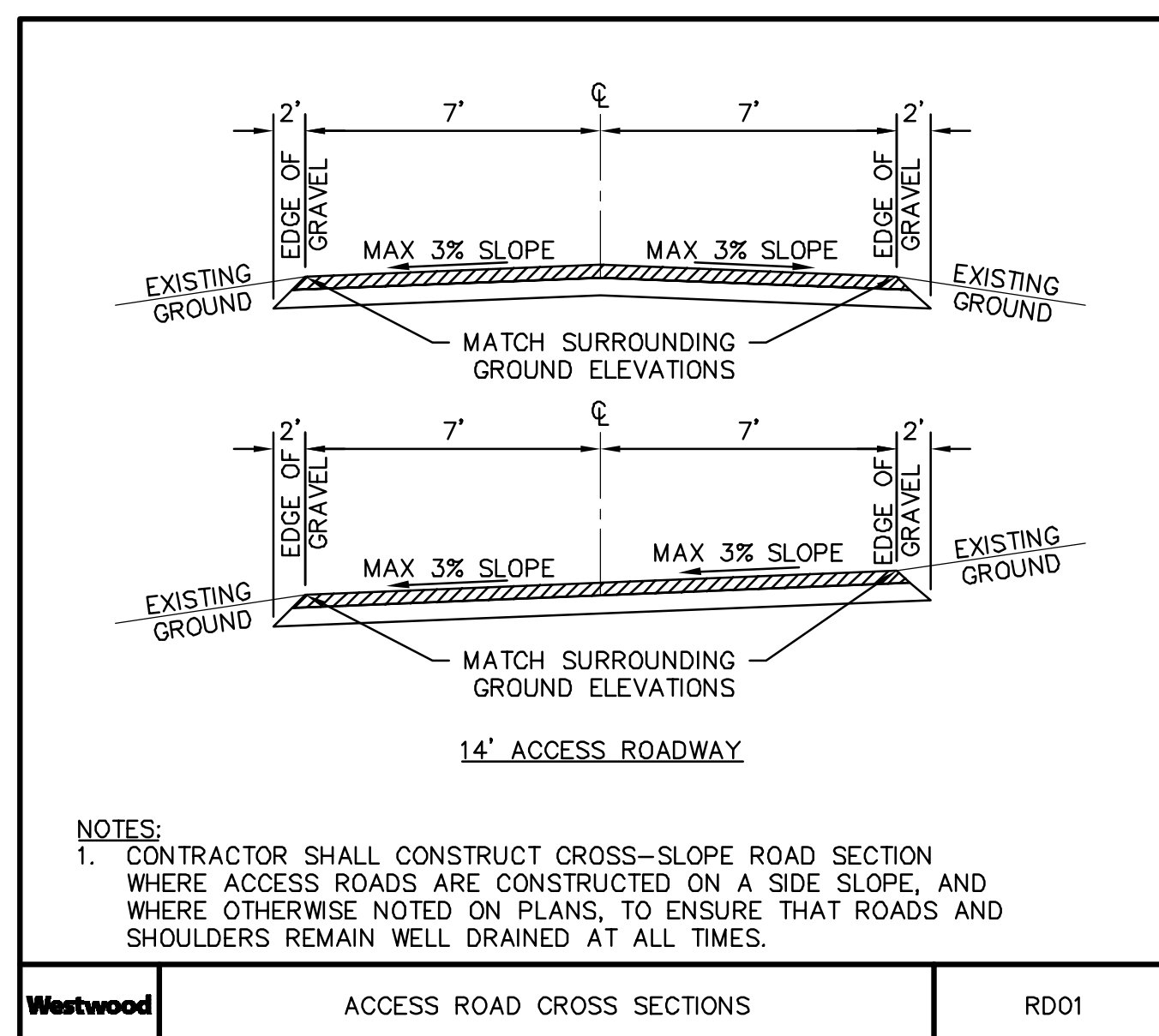
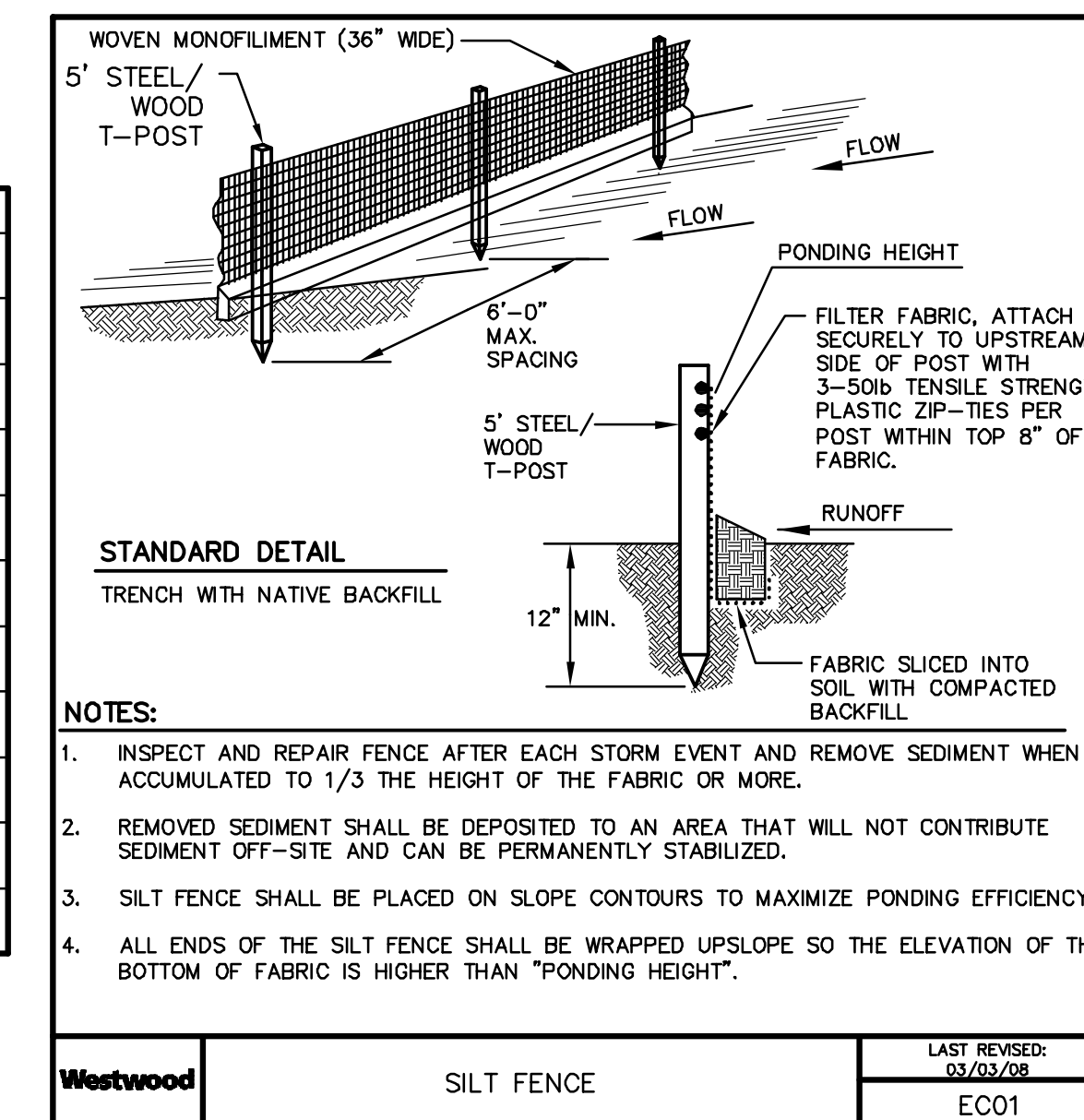
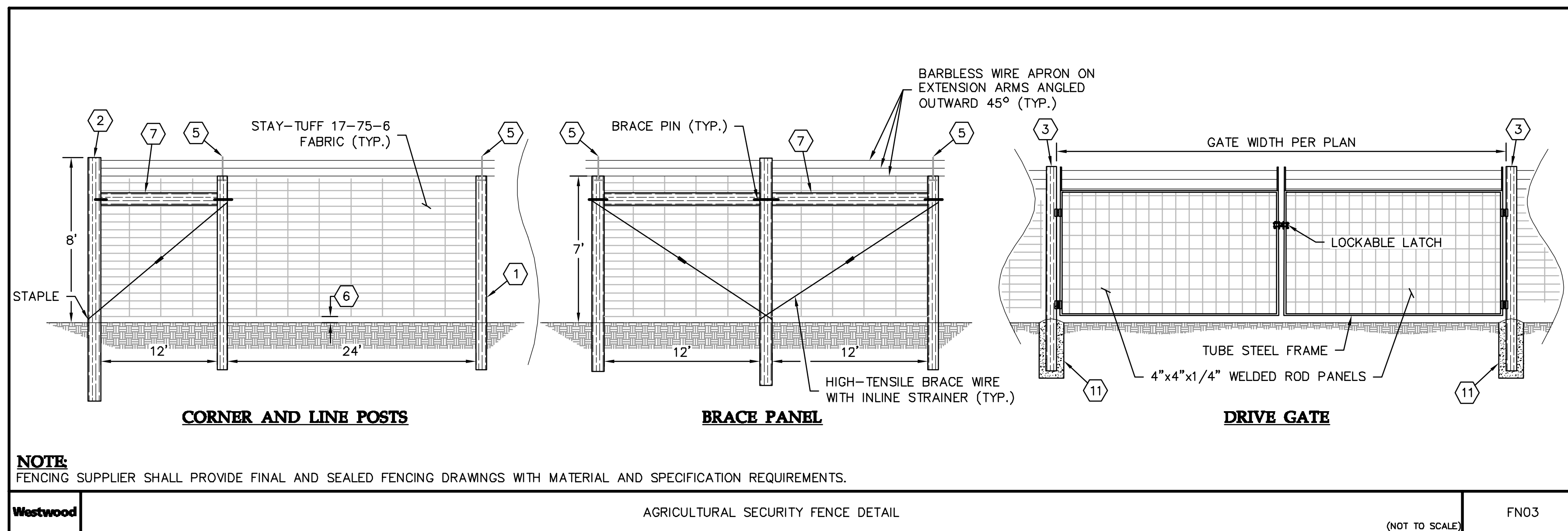
Drainage Plan

Issued for Review
 Not for Construction

Date: **05/04/2018**

Drawing No: **C-202**





Designed: WFS
Checked: WFS
Drawn: WFS

Record Drawing by/date:

Revisions:

#	DATE	DESCRIPTION
A	03/14/18	ISSUED FOR REVIEW
B	03/26/18	REV. PER CLIENT COMMENTS
C	04/18/18	ADD INTERCONNECTION EQUIP. DETAILS

Prepared for:

Nokomis Energy, LLC

Byllesby Garden, LLC

Goodhue County, MN

Construction Details

**Issued for Review
 Not for Construction**

Date: 05/04/2018
 Drawing No: C-300

Designed: WFS

Checked: WFS

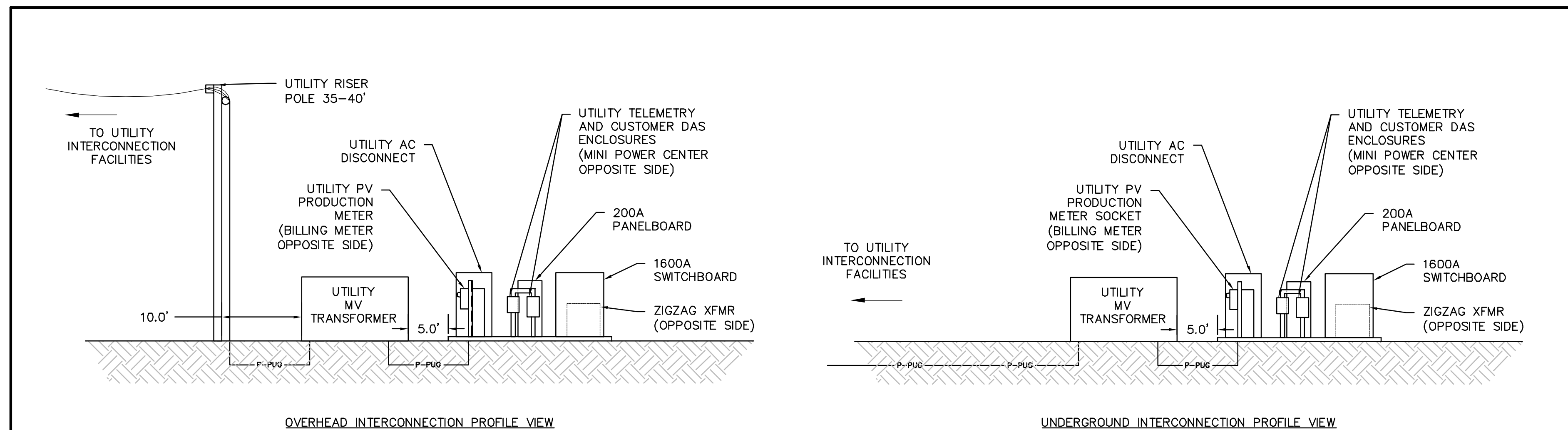
Drawn: WFS

Record Drawing by/date:

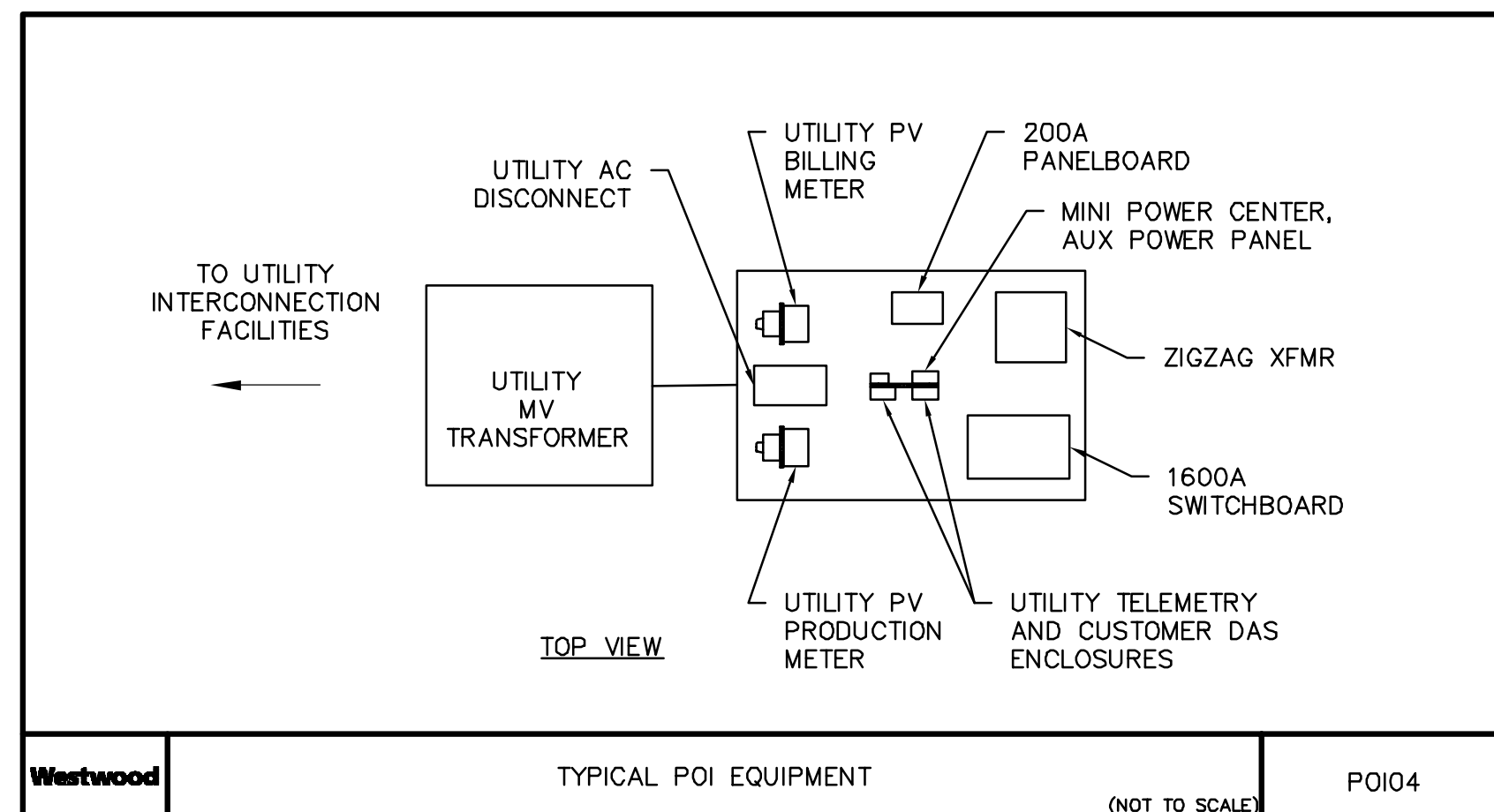
Revisions #	DATE	DESCRIPTION
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B	03/26/18	REV. PER CLIENT COMMENTS
C	04/18/18	ADD INTERCONNECTION EQUIP. DETAILS

Prepared for:

Nokomis Energy, LLC



Westwood TYPICAL POI EQUIPMENT (NOT TO SCALE) POI03 LAST REVISED: 04/12/18



Westwood TYPICAL POI EQUIPMENT (NOT TO SCALE) POI04

Byllesby Garden, LLC

Goodhue County, MN

Interconnection Details

Issued for Review
 Not for Construction

Date: 05/04/2018

Drawing No: C-301

NI POWER SYSTEMS, INC. JXIL... P...
 SHARED WITH CUSTOMER
 IN EVENT CONTROL CIRCUIT POWER IS
 TRIGGER ALARM.

****Zigzag XFMR Zero Sequence Res**

**REQUIREMENT #3 - GROUNDING XFMR SI
 VOLTAGE AND REMAIN CONNECTED**

$I_{0,pu} \approx V_0 / Z_0$ (approximate) =
 $I_0 = I_{base} \times I_{0,pu} =$

****Zigzag XFMR Per Phase Current**

$I_{neut} = 3 \times I_0 =$

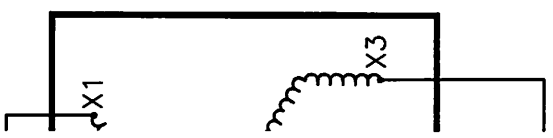
****Zigzag XFMR Continuous Neutr**

**REQUIREMENT #4 - GROUND REFERENCIN
 THAT EXCEED MAXIMUM AVAILABLE SHC**

****Find worst case zero sequence v**
#2. Theoretical worst case zero seq
sequence impedances are assumed
by ground XFMR zero sequence im
 $Z_0,xfmr = \sqrt{X_0, dg^2 + R_0, dg^2}$
 $I_{slg} = V_{base} / Z_0,xfmr =$
Safety Factor

I_{slg} w/ Safety Factor

****Zigzag 5-sec Fault Withstand V**



CONTROL
 FROM
 BREAKER
 PANEL

MATIC

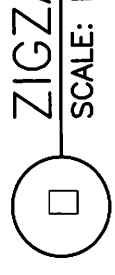


Exhibit A

Legal Description of Property

The Southwest Quarter (SW 1/4) of the Northeast Quarter (NE 1/4) in Section Sixteen (16) in Township One Hundred Twelve (112) North of Range Seventeen (17) West. Excepting therefrom that part of the Southwest Quarter (SW 1/4) of the Northeast Quarter of said Section 16, Township 112, North Range 17 West; that lies North of State Highway #19 as well as that part lying between two lines run parallel with and distant respectively 75 feet and 106 feet on each side of the following described line: Beginning at a point on the east line of Section 15, Township 112 North, Range 17 West, distant 3948.0 feet North of the Southeast corner of said Section 15; thence run westerly at an angle of 90° 22' with said east section line (when measured from north to west) for 3613.0 feet; thence deflect to the left on a 1° 00' curve (delta angle 14° 53') for 743.3 feet; thence on tangent to said curve for 1173.8 feet; thence deflect to the right on a ten chord spiral curve of decreasing radius (spiral angle 3° 00') for 300 feet; then deflect to the right on a 2° 00' circular curve (delta angle 13° 24') for 670 feet; thence deflect to the right on a ten chord spiral curve of increasing radius (spiral angle 3° 00') for 300 feet and there terminating. Excepting also: Part of the Southwest Quarter (SW 1/4) of the Northeast Quarter (NE 1/4) of Section 16, Township 112 North, Range 17 West, described as follows: Beginning at a point on the east line of said Southwest Quarter (SW 1/4) of said Northeast Quarter (NE 1/4) of Section 16 where said east line intersects the center line of that certain State Highway now numbered 19 – from this point of beginning, run westerly along the center line of said Highway No. 19 to the point of intersection of said center line with the center line of that certain County Highway known as the Cannon Falls - White Rock Road and now numbered Goodhue County Highway No. 8 - running thence southerly and easterly along the center line of said County Highway No. 8 to the east line of said Southwest Quarter (SW 1/4) of the Northeast Quarter (NE 1/4) of said Section 16 - running thence North to the point of beginning. Excepting from the above all highway easements and right-of-ways as they now exist or as they now appear of record.

Westwood

Threatened and Endangered Species Database Review

Byllesby Garden LLC Solar Garden

Goodhue County, Minnesota

4/10/2018



Prepared For:

Nokomis Energy LLC
818 West 46th Street, Suite 204
Minneapolis, MN 55407

Threatened and Endangered Species Database Review

Byllesby Garden LLC Solar Garden

Goodhue County, Minnesota

Prepared for:

Nokomis Energy LLC
818 West 46th Street, Suite 204
Minneapolis, MN 55407

Prepared by:

Westwood Professional Services
12701 Whitewater Drive, Suite 300
Minnetonka, MN 55343
(952) 937-5150

Project Number: 0013987.00

Date: 4/10/2018

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CONTENTS

1.0 PURPOSE 1

2.0 PROJECT DESCRIPTION..... 1

3.0 MINNESOTA DNR NATIVE PLANT COMMUNITIES 1

4.0 MINNESOTA DNR NATIONAL HERITAGE INFORMATION SYSTEM DATA 2

5.0 FEDERALLY LISTED SPECIES 2

6.0 LITERATURE CITED 5

TABLES

Table 1: Summary of Minnesota DNR NHIS Records Within One Mile of the Project 2

EXHIBITS

- Exhibit 1: Location
- Exhibit 2: Rare Resources
- Exhibit 3: Water Resources

1.0 PURPOSE

This memo is a Threatened and Endangered Species Database Review for a five acre site (**Exhibit 1**). It is based on a desktop study that reviewed and analyzed the Minnesota Department of Natural Resources (DNR) Natural Heritage Information System (NHIS) database licensed to Westwood and endangered and threatened species lists from the Minnesota DNR and USFWS (MN DNR 2017; USFWS 2017). This memo will serve to document listed, threatened, or endangered species, animal assemblages, or native plant communities documented within a one-mile buffer of the Project and discuss the likelihood of listed species to be found within or utilize the Project (**Exhibit 2**).

The NHIS endangered and threatened species data is confidential and not to be shared with the public.

2.0 PROJECT DESCRIPTION

Byllesby Garden Solar Garden is a 1MW ground mounted photovoltaic solar generating facility will be constructed and operated on the five acre site. A series of solar arrays consisting of solar panels will be installed over a foundation of driven metal posts. Underground electrical cabling connecting the solar arrays will be installed. Cabling will connect to electrical inverters and transformer equipment that is typically mounted on skids. The solar facility will typically be connected to the existing electrical distribution system via an overhead wooden pole mounted interconnection. Gravel access roads will be constructed as needed.

The Project Area is comprised entirely of agricultural land. Surrounding land use consists of row crop agriculture, forests, and rural home sites. No water resources are mapped within the Project. Some National Wetland Inventory (NWI) wetlands are mapped in the surrounding area, which are mostly stream features and wet meadows (**Exhibit 3**).

3.0 MINNESOTA DNR NATIVE PLANT COMMUNITIES

Minnesota DNR native plant communities are assigned ecological condition ranks on a continuum from A to D, where A represents communities of the highest ecological integrity and D represents those with the lowest. A ranking of NR indicates no ranking has been assigned. Conditions of C, CD, and D indicate the communities have fair to poor ecological integrity and have been significantly altered and degraded by human activity or invasive species (MN DNR 2014).

There are no Minnesota DNR native plant community types mapped within the Project (**Exhibit 2**). Although not in the Project area, there is a large native plant community complex immediately west and south of the Project. This complex is comprised of several types of plant communities including southern dry-mesic oak forest, red oak-white oak-(sugar maple) forest, and oak-shagbark hickory woodland, all of which have community condition rankings of NR. Another southern dry-mesic oak forest is found within one mile north of the Project boundary. No impacts to these area are anticipated as a result of Project development.

4.0 MINNESOTA DNR NATIONAL HERITAGE INFORMATION SYSTEM DATA

Westwood reviewed the licensed 2017 Minnesota DNR NHIS database for records of federal or state-listed rare, threatened or endangered species in, and within one-mile of the Project (**Table 1**). Results from the NHIS database review for the Project indicated no records within the Project Boundary and seven records of rare plants and animals within one mile of the Project (MN DNR 2017; Exhibit 2). As noted by the Minnesota DNR, the absence of rare species records in the Project cannot be construed to mean lack of occurrence. Instead, it may mean the area has not been surveyed.

Westwood also corresponded with the Minnesota DNR for a review of potential effects from the Project on known occurrences of rare features (**Appendix**). The DNR does not believe the Project will negatively affect known occurrences of rare features. The Project name in the NHIS review is different than this report, due to an update in the Project name, but covers the same area.

Table 1: Summary of Minnesota DNR NHIS Records Within One Mile of the Project

Category	Mapped Occurrences within one mile of Project	State/Federal Status
Vascular Plants	3	THR
Vertebrate Animals	1	Watch list
Terrestrial Community	3	N/A
Total NHIS Mapped Occurrences: 7		

END = Endangered, THR = Threatened, SPC = Special concern (Rare, but with no regulatory listing status), DL = De-listed, None = No status

5.0 FEDERALLY LISTED SPECIES

Federally listed species include those characterized by USFWS under the authority of the Endangered Species Act (ESA) of 1973 (16 United States Code [USC] 1531–1544) as threatened or endangered, as well as those proposed for listing (i.e., candidate species). The ESA mandates the protection of federally listed threatened or endangered species, as well as habitat designated as critical habitat. Additionally, under the Bald and Golden Eagle Protection Act (BGEPA) (16 USC 668-668d, 54 Stat. 250), USFWS has the authority to review proposed actions with respect to impacts to the bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*). Review of the USFWS' Information Planning and Conservation System (IPaC) and the USFWS' species list for Goodhue County identified five federally listed threatened or endangered species as potentially occurring within the Project and surrounding region including the northern long-eared bat (*Myotis septentrionalis*), rusty patched bumble bee (*Bombus affinis*) (RPBB), dwarf trout lily (*Erythronium propullans*), prairie bush clover (*Lespedeza leptostachya*), and Higgins eye pearly mussel (*Lampsilis higginsii*). Of the Federally listed species found in Goodhue County, most are unlikely to be found within the Project due to lack of specified habitat, degraded habitat, and/or the Project is located outside of typical ranges.

Northern Long-eared Bat

The USFWS listed the northern long-eared bat (NLEB) under the Endangered Species Act (ESA) as threatened due to declines caused by white-nose syndrome (WNS). The USFWS Final 4(d) rule for the NLEB identifies the following restrictions (USFWS 2016(c)):

Purposeful Take

- For all areas within the range of the northern long-eared bat, all purposeful take is prohibited except:
 - Removal of northern long-eared bats from human structures.
 - Defense of human life (e.g., public health monitoring for rabies).
 - Removal of hazardous trees for the protection of human life and property.

Incidental Take

- For areas of the country not affected by white-nose syndrome (WNS) (i.e., areas outside the WNS zone), there are no prohibitions on incidental take.
- For areas of the country impacted by WNS (i.e., areas inside the WNS zone), incidental take is prohibited under the following circumstances:
 - If it occurs within a hibernacula.
 - If it results from tree removal activities and
 - the tree removal activity occurs within 0.25 mile (0.4 km) of a known, occupied hibernacula; or,
 - the tree removal activity cuts or destroys a known, occupied maternity roost tree or other trees within a 150 foot radius from the maternity roost tree during the pup season from June 1 through July 31.”

According to the USFWS (2018(b)), suitable winter hibernacula habitat for the NLEB includes caves and mines. In the summer, NLEBs roost underneath bark and in crevices of trees; males and non-reproductive females may also roost in caves and mines. NLEBs forage by flying through the understory of forested areas and near water sources feeding on a variety of insects.

Goodhue County falls within the WNS zone and two known NLEB hibernacula are located within the county (T112N, R15W and T113N, R14W), at least nine miles from the Project (MN DNR 2018(b)). Wooded patches and water resources in the surrounding area may offer potential roosting habitat and adequate foraging areas for NLEB. However, the Project is not presently cropped agricultural fields, and is unlikely to provide suitable habitat for the NLEB. Adverse effects to potential NLEB populations in the surrounding area are not anticipated as a result of Project development.

Rusty Patched Bumble Bee

Due to habitat loss and fragmentation, intensive farming practices, disease, and pesticide use, the RPBB is listed under the Endangered Species Act (ESA) as endangered. The USFWS Final Rule for the RPBB was published January 11, 2017; however, the rule's effective date was delayed until March 21, 2017, and critical habitat for the RPBB has not yet been published. If the Project falls within the to-be-determined RPBB critical habitat area or near known occurrences of RPBB, consultation with the USFWS may be triggered and an obligation to "implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat" may be required (USFWS 2017).

According to the USFWS, RPBB historically inhabit grasslands and tallgrass prairie of the upper Midwest and Northeast, as they require abundant and diverse floral resources to support nutritional needs throughout their relatively long foraging and reproductive season. Although, RPBB has also been found in woodlands, marshes, parks, gardens, and agricultural settings. The RPBB utilizes underground cavities such as abandoned rodent nests or occasionally clumps of grasses for nesting. Diapause (hibernating) queens overwinter in underground chambers; typically in areas of undisturbed, uncompacted soil (USFWS 2016(d)).

Aerial photography and NWI mapping review suggest the potential for some grasslands and woodland within the surrounding area and may provide adequate habitat for RPBB. The Project area is agricultural and unlikely to support the habitat diversity RPBB requires. The Project is also located outside USFWS designated High or Low Potential Zones. There is the potential with Project development to provide additional habitat for the RPBB with the planting of pollinator friendly plant species as an understory to the Project.

Dwarf Trout Lily

Dwarf Trout Lily (DTL) is a plant species endemic to Minnesota, and the state's only federally endangered plant species (USFWS 2016a). The habitat of DTL most commonly include wooded floodplains or river terraces, or north-facing slopes above or near streams and floodplains. Because the Project and surrounding area is agricultural and the woodlands are not floodplain forests, potential DTL habitat is low. Also, Project development is unlikely to affect potential populations that may be present in the surrounding area, such as the Cannon River valley, one mile north of the Project.

Prairie Bush Clover

Prairie bush clover (PBC) is found only in 100 tallgrass prairie sites in Iowa, Illinois, Minnesota, and Wisconsin. It is typically found in mesic to dry-mesic tallgrass prairie with coarse loam or colluvium soils on north, northeast, or northwest facing slopes (MN DNR 2017). Loss of this habitat to agriculture, grazing, urbanization and other anthropogenic impacts are the primary reasons for its decline. Based on aerial photography and mapping data, the Project appears devoid of grassland, grazed land, or native plant communities. Adverse effects to potential PBC populations in the surrounding area are not anticipated as a result of Project development.

Higgins Eye Pearly Mussel

Due to invasive species, habitat loss, and degradation of rivers, the Higgins eye pearly mussel is listed as federally endangered. It is found in the St. Croix and Mississippi Rivers. No watercourses are mapped within the Project Premises, and the only watercourse found in the Subject Parcel is a farmed drainage in an agricultural field. Consequently, Project development is not likely to affect potential populations of the Higgins eye that may be present in streams or rivers in the surrounding area.

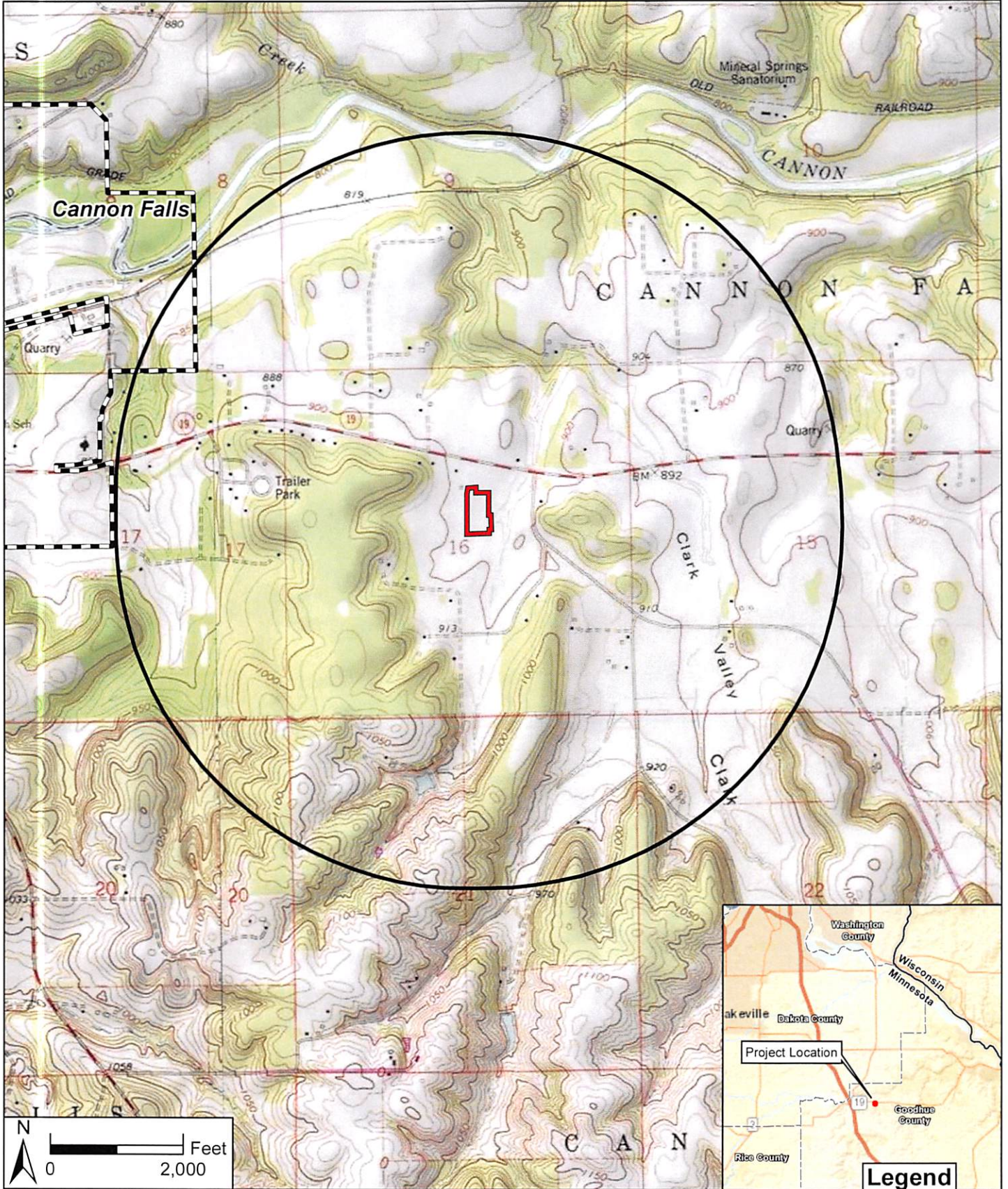
Bald Eagle

Bald eagles are no longer protected under the federal ESA, but still protected under the Bald and Golden Eagle Protection Act (USFWS 2016a). Bald eagles may utilize the Project for foraging or stopover given the Project's proximity to lakes and rivers and the adjacent woodlands may provide adequate habitat for nesting, however, the Project is located in agricultural field and it is unlikely that the proposed Project would impact eagles.

6.0 LITERATURE CITED

- Minnesota Department of Natural Resources. 2013. Minnesota's List of Endangered, Threatened, and Special Concern Species, accessed April 2018.
http://files.dnr.state.mn.us/natural_resources/ets/endlist.pdf
- Minnesota Department of Natural Resources, Division of Ecological Resources. 2017. MNDNR Native Plant Communities Dataset.
- Minnesota Department of Natural Resources, Division of Ecological Resources. 2016. Rare Natural Features Dataset.
- Minnesota Department of Natural Resources, Division of Ecological Resources. 2017. Rare Species Guide: An online encyclopedia of Minnesota's rare native plants and animals.
- U.S. Fish and Wildlife Service. 2016. Endangered Species Resource Materials Fact Sheets. Accessed April 2018. <http://www.fws.gov/midwest/endangered/saving/outreach.html>
- U.S. Fish and Wildlife Service. 2016. County Distribution of Minnesota's Federally Threatened, Endangered, and Candidate Species. Accessed April 2018.
<http://www.fws.gov/midwest/endangered/lists/pdf/minnesota10cty.pdf>.

Exhibits



Data Source(s): Westwood (2018) ESRI WMS
 USA Topo Basemap Imagery (Accessed 2018);
 Census Bureau (2017).

Legend
 Project Boundary
 1-Mile Project Buffer
 City/Civil Township Boundary
 County Boundary

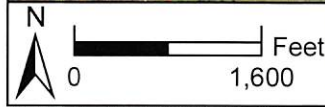
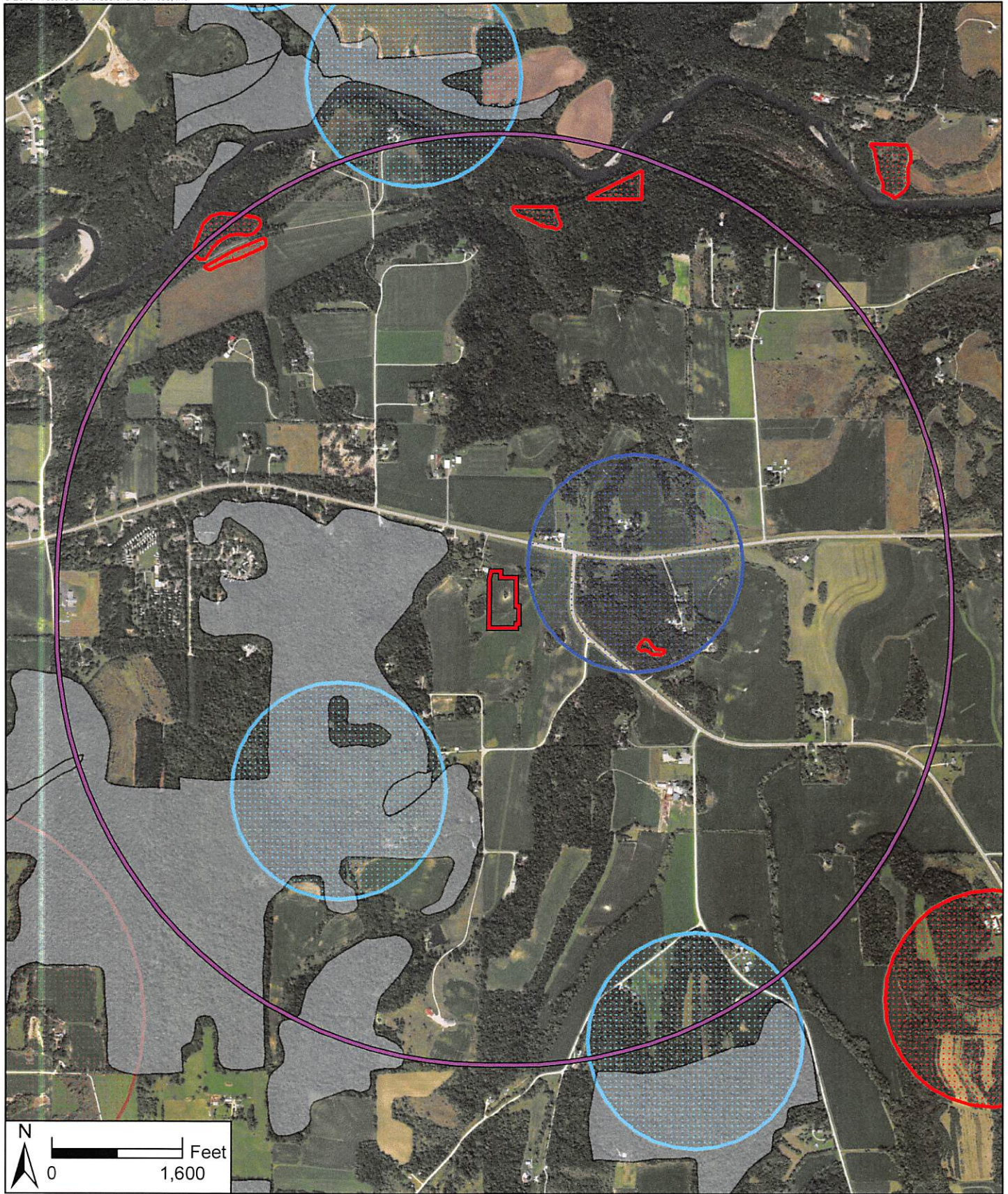
Westwood
 Toll Free (888) 937-5150 westwoodps.com
 Westwood Professional Services, Inc.



Legend
Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

Project Location & USGS Topography
 EXHIBIT 1

Map Document: N:\0013987\GIS\Welland Exhibits\Byllesby_Ex1_SiteLocation_180213.mxd 3/30/2018 10:58:44 AM ARCahlander



Data Source(s): Westwood (2018); Minnesota NAIP Imagery (2017); MNDNR (Various Dates); The Minnesota County Biological Survey; MNDNR, Division of Ecological Resources (2015); NCEd and Partners (2016); U.S. Fish and Wildlife Service (Various Dates)
 Note: NHIS data included here were provided by the Minnesota Department of Natural Resources (DNR), and were current as of August 2017. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present.

- Legend**
- Project Boundary
 - Byllesby 1milebuffer
 - MN DNR Native Plant Communities

- NHIS Rare Resources**
- Vertebrate Animal
 - Community
 - Invertebrate Animal
 - Vascular Plant
 - Nonvascular Plant; Fungus
 - Animal Assemblage
 - Geologic

**Byllesby Garden LLC
 Solar Garden**
 Cannon Falls Township
 Goodhue County, Minnesota







Rare Resources

Map Document: N:\0013987\00\GIS\NHIS\Exhibits\Byllesby_Ex2_rare_180409.mxd 4/9/2018 12:00:52 PM ARCahlander



Data Source(s): Westwood (2018); Minnesota NAIP Imagery (Accessed 2018); MnDNR (2008); U.S. Fish and Wildlife Service (2013); Ducks Unlimited (2013); USGS NHD Dataset (2013)

Legend

-  Project Boundary
-  NWI Wetland
-  PWI Watercourse
-  PWI Basin
-  NHD Flowline
-  NHD Waterbody

**Byllesby Garden LLC
Solar Garden**
Cannon Falls Township
Goodhue County, Minnesota

Water Resources

EXHIBIT 3

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Map Document: N:\0013987_00\GIS\Wetland Exhibits\Byllesby_E+2_WaterResources_180213.mxd 3/30/2018 11:06:37 AM ARCAhlander

Appendix



Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

March 26, 2018

Correspondence # ERDB 20180346

M. Alex Cahlander-Mooers
Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

RE: Natural Heritage Review of the proposed Stegemann Community Solar Garden,
T112N R17W Section 16; Goodhue County

Dear M. Cahlander-Mooers,

As requested, the above project has been reviewed for potential effects to known occurrences of rare features. Given the project details provided with the data request form, I do not believe the proposed project will negatively affect any known occurrences of rare features.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. **If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.**

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location (noted above) and the project description provided on the NHIS Data Request Form. Please contact me if project details change or for an updated review if construction has not occurred within one year.

The Natural Heritage Review does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. If needed, please contact your [DNR Regional Environmental Assessment Ecologist](#) to determine whether there are other natural resource concerns associated with the proposed project. Please be aware that additional site assessments or review may be required.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. Please include a copy of this letter in any state or local license or permit application. An invoice will be mailed to you under separate cover.

Sincerely,

A handwritten signature in black ink that reads "Samantha Bump". The signature is written in a cursive style with a large, prominent "S" and "B".

Samantha Bump
Natural Heritage Review Specialist
Samantha.Bump@state.mn.us

Links: DNR Regional Environmental Assessment Ecologist Contact Info
http://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html

MEMORANDUM

Date: March 30, 2018

Re: **Byllesby Garden LLC– Desktop Hydrology Study**

File: 0013987.00; Nokomis Energy LLC # MN-14-00039

To: Nokomis Energy LLC

From: Joe Fox, PE, Water Resources Engineer

The Byllesby Garden LLC project is a proposal by Nokomis Energy LLC to build a solar electric generating facility in Goodhue County, MN (Attachment 1). The site is located approximately 2 miles east of the City of Cannon Falls, MN. The 100-year, 24-hour rainfall depth is 7.50 inches (Attachment 2).¹

Jurisdictions and Regulations

The site is in the following jurisdictions:

- State of Minnesota (NPDES permit)
- Goodhue County
 - Subdivision Ordinance Section 8 Subd. 8.C

Hydrology

The 5.02-acre site is undeveloped agricultural cropland. Stormwater runs off to the northeast. Based on 1-meter surface (MN-Topo), there are 97 acres of off-site area that drain onto the site. The off-site drainage area extends into the hills to the west-southwest. On-site slopes average approximately 3.6%.

The soils are classified as hydrologic soil groups (HSG) A and C (Attachment 3). Soils in group A have very good infiltration rates. Soils in group C have low infiltration rates.² Approximately 75% of the site has C soils. This means the site will have high discharge in storm events. A culvert off the northeast corner of the site carries water north under State Highway 19.

¹ NOAA. Atlas 14, Volume 9, Version 2. Accessed February 7, 2018.
https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=mn

² Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey.

There are no wetlands present within the project boundary according to the National Wetlands Inventory (Attachment 4).³

The FEMA FIRM panel that covers this site is 27049C0140E.⁴ There are no mapped floodplains in the proposed project area.

Based on the information above, the project site has a low risk which means a low risk of flooding. If the project moves toward construction, a detailed hydrologic study is recommended and may be required by the government agency with jurisdiction in this area. The extent of offsite runoff impacts should be analyzed in detail. If overland flows are found, the site should be modeled to determine flow depths, velocities, and scour depths. Soil borings are also required to get an accurate description of site soils for structural design.

Attachments:

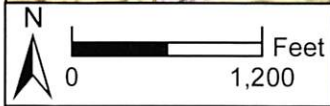
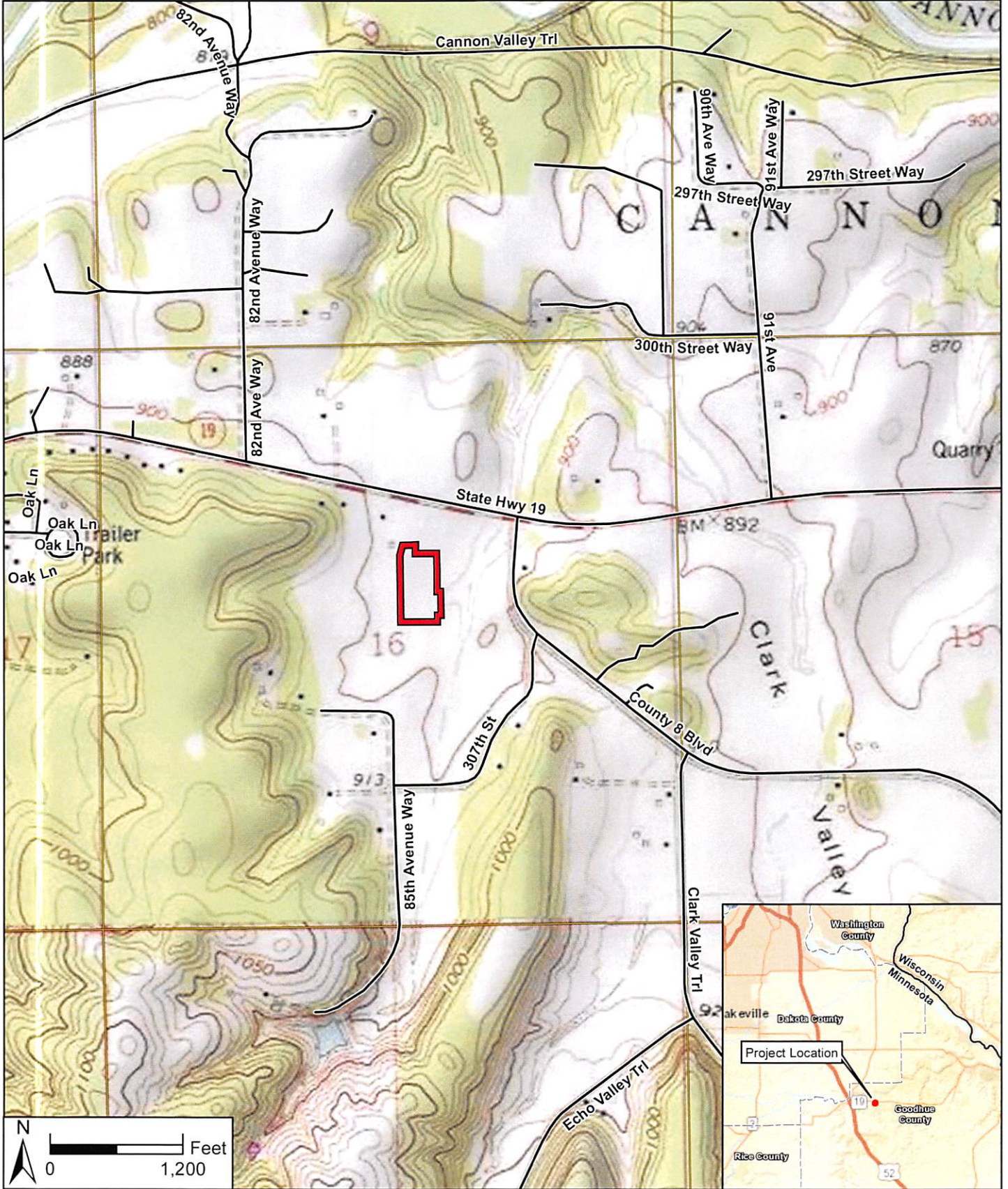
1. Location Map
2. Precipitation Report
3. Soil Report
4. Drainage Map

Citations:

1. Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffrey Bonnin (2013). NOAA Atlas 14 Volume 8 Version 2, *Precipitation-Frequency Atlas of the United States, Midwestern States*. NOAA, National Weather Service, Silver Spring, MD.
2. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/>. Accessed March 2018.
3. National Wetlands Inventory (NWI) Wetlands Mapper, U.S. Fish and Wildlife Service. Available online at <http://www.fws.gov/wetlands/data/mapper.HTML>. Accessed March 2018.
4. FEMA Map Service Center, FEMA Flood Maps, Federal Emergency Management Agency. Available online at <https://msc.fema.gov/portal>. Accessed March 2018.

³ National Wetlands Inventory (NWI) U.S. Fish and Wildlife Service

⁴ FEMA Flood Map Center. FEMA Flood Maps, Federal Emergency Management Agency.



Data Source(s): Westwood (2018), ESRI WMS USA Topo Basemap Imagery (Accessed 2018), Census Bureau (2017).

Legend

- Project Boundary
- County Boundary
- City/Civil Township Boundary
- PLS Section Boundary

Westwood

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Westwood Professional Services, Inc.

Byllesby Garden Solar

Cannon Falls Township
Goodhue County, Minnesota

**Project Location &
USGS Topography**

ATTACHMENT 1

Map Document: N:\0019587\00\GIS\Byllesby-Garden_Ex1_SiteLocation_water_180212.mxd 3/30/2018 8:24:37 AM jwfox



NOAA Atlas 14, Volume 8, Version 2
Location name: Cannon Falls, Minnesota, USA*
Latitude: 44.5085°, Longitude: -92.8575°
Elevation: 879.39 ft**



* source: ESRI Maps
 ** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk,
 Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.356 (0.276-0.461)	0.424 (0.328-0.549)	0.542 (0.418-0.703)	0.646 (0.495-0.841)	0.798 (0.596-1.08)	0.922 (0.672-1.25)	1.05 (0.742-1.46)	1.19 (0.807-1.69)	1.39 (0.903-2.00)	1.54 (0.976-2.24)
10-min	0.522 (0.404-0.675)	0.621 (0.481-0.804)	0.794 (0.612-1.03)	0.946 (0.725-1.23)	1.17 (0.872-1.58)	1.35 (0.984-1.84)	1.54 (1.09-2.14)	1.75 (1.18-2.47)	2.03 (1.32-2.93)	2.25 (1.43-3.28)
15-min	0.637 (0.493-0.823)	0.758 (0.586-0.981)	0.968 (0.746-1.26)	1.15 (0.884-1.50)	1.43 (1.06-1.92)	1.65 (1.20-2.24)	1.88 (1.33-2.61)	2.13 (1.44-3.01)	2.47 (1.61-3.58)	2.75 (1.74-4.00)
30-min	0.904 (0.700-1.17)	1.08 (0.837-1.40)	1.39 (1.07-1.80)	1.66 (1.27-2.16)	2.06 (1.54-2.77)	2.38 (1.73-3.24)	2.72 (1.92-3.77)	3.08 (2.09-4.36)	3.59 (2.34-5.18)	3.99 (2.53-5.81)
60-min	1.18 (0.915-1.53)	1.41 (1.09-1.83)	1.82 (1.41-2.37)	2.20 (1.69-2.86)	2.77 (2.08-3.76)	3.25 (2.38-4.45)	3.77 (2.66-5.25)	4.33 (2.94-6.15)	5.13 (3.35-7.44)	5.77 (3.66-8.41)
2-hr	1.46 (1.14-1.87)	1.74 (1.36-2.23)	2.26 (1.75-2.90)	2.74 (2.12-3.54)	3.49 (2.65-4.72)	4.12 (3.05-5.61)	4.82 (3.44-6.67)	5.58 (3.83-7.88)	6.67 (4.41-9.62)	7.56 (4.84-10.9)
3-hr	1.63 (1.27-2.08)	1.93 (1.51-2.47)	2.51 (1.96-3.21)	3.06 (2.38-3.94)	3.94 (3.01-5.33)	4.70 (3.49-6.38)	5.53 (3.98-7.65)	6.46 (4.46-9.11)	7.80 (5.19-11.2)	8.91 (5.74-12.8)
6-hr	1.90 (1.50-2.41)	2.24 (1.77-2.84)	2.91 (2.29-3.69)	3.56 (2.78-4.53)	4.60 (3.56-6.20)	5.52 (4.15-7.46)	6.54 (4.76-9.00)	7.68 (5.37-10.8)	9.35 (6.29-13.4)	10.7 (6.99-15.3)
12-hr	2.15 (1.72-2.70)	2.53 (2.02-3.18)	3.26 (2.59-4.10)	3.96 (3.13-5.00)	5.07 (3.96-6.76)	6.05 (4.58-8.09)	7.13 (5.22-9.71)	8.32 (5.87-11.6)	10.1 (6.83-14.3)	11.5 (7.57-16.3)
24-hr	2.48 (1.99-3.08)	2.84 (2.28-3.53)	3.55 (2.84-4.43)	4.25 (3.38-5.32)	5.38 (4.24-7.12)	6.38 (4.89-8.48)	7.50 (5.56-10.1)	8.75 (6.24-12.1)	10.6 (7.27-14.9)	12.1 (8.05-17.0)
2-day	2.88 (2.33-3.55)	3.21 (2.60-3.96)	3.89 (3.14-4.81)	4.58 (3.68-5.68)	5.71 (4.55-7.50)	6.73 (5.21-8.88)	7.89 (5.91-10.6)	9.19 (6.62-12.6)	11.1 (7.71-15.5)	12.7 (8.54-17.8)
3-day	3.15 (2.57-3.87)	3.48 (2.84-4.28)	4.16 (3.38-5.13)	4.86 (3.92-6.00)	6.00 (4.80-7.83)	7.03 (5.47-9.22)	8.20 (6.17-11.0)	9.51 (6.89-13.0)	11.5 (8.00-15.9)	13.1 (8.84-18.2)
4-day	3.38 (2.76-4.13)	3.72 (3.04-4.56)	4.42 (3.60-5.43)	5.13 (4.15-6.32)	6.28 (5.04-8.15)	7.32 (5.71-9.55)	8.48 (6.41-11.3)	9.79 (7.12-13.3)	11.7 (8.21-16.2)	13.3 (9.04-18.5)
7-day	3.94 (3.24-4.78)	4.37 (3.59-5.31)	5.17 (4.24-6.30)	5.93 (4.84-7.25)	7.12 (5.72-9.09)	8.15 (6.38-10.5)	9.28 (7.04-12.2)	10.5 (7.69-14.1)	12.3 (8.69-16.9)	13.8 (9.44-19.0)
10-day	4.45 (3.68-5.38)	4.96 (4.09-6.00)	5.86 (4.82-7.10)	6.68 (5.47-8.13)	7.91 (6.35-9.99)	8.94 (7.01-11.4)	10.0 (7.64-13.1)	11.2 (8.24-15.0)	12.9 (9.16-17.6)	14.3 (9.85-19.6)
20-day	6.02 (5.02-7.22)	6.72 (5.60-8.06)	7.89 (6.55-9.48)	8.87 (7.33-10.7)	10.3 (8.25-12.7)	11.3 (8.94-14.2)	12.5 (9.53-16.0)	13.6 (10.0-17.8)	15.1 (10.8-20.3)	16.3 (11.4-22.2)
30-day	7.42 (6.22-8.84)	8.28 (6.93-9.88)	9.68 (8.08-11.6)	10.8 (8.98-13.0)	12.4 (9.95-15.2)	13.5 (10.7-16.8)	14.7 (11.2-18.6)	15.8 (11.7-20.5)	17.3 (12.4-23.0)	18.4 (12.9-24.9)
45-day	9.26 (7.80-11.0)	10.4 (8.71-12.3)	12.1 (10.1-14.3)	13.4 (11.2-16.0)	15.2 (12.2-18.4)	16.4 (13.0-20.2)	17.6 (13.6-22.2)	18.8 (14.0-24.2)	20.2 (14.5-26.7)	21.1 (14.9-28.5)
60-day	10.9 (9.20-12.9)	12.2 (10.3-14.4)	14.2 (11.9-16.8)	15.7 (13.2-18.7)	17.7 (14.3-21.3)	19.0 (15.1-23.3)	20.3 (15.7-25.4)	21.4 (16.0-27.5)	22.8 (16.4-29.9)	23.6 (16.8-31.8)

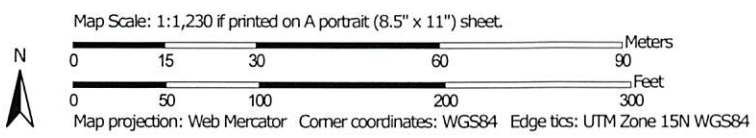
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
 Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
 Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

Hydrologic Soil Group—Goodhue County, Minnesota
(2018-03-30_Boundary)



Soil Map may not be valid at this scale.



MAP LEGEND

- Area of Interest (AOI)
 - Area of Interest (AOI)
- Soils
 - Soil Rating Polygons
 - A
 - A/D
 - B
 - B/D
 - C
 - C/D
 - D
 - Not rated or not available
 - Soil Rating Lines
 - A
 - A/D
 - B
 - B/D
 - C
 - C/D
 - D
 - Not rated or not available
 - Soil Rating Points
 - A
 - A/D
 - B
 - B/D
- Water Features
 - Streams and Canals
- Transportation
 - Rails
 - Interstate Highways
 - US Routes
 - Major Roads
 - Local Roads
- Background
 - Aerial Photography
- C
- C/D
- D
- Not rated or not available

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Goodhue County, Minnesota
 Survey Area Data: Version 13, Oct 4, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 1, 2013—Nov 15, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
N581B	Rockton-Atkinson complex, strath terrace, 2 to 6 percent slopes	C	3.8	75.5%
N605C2	Rasset sandy loam, strath terrace, 6 to 12 percent slopes, moderately eroded	A	1.2	24.5%
Totals for Area of Interest			5.0	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

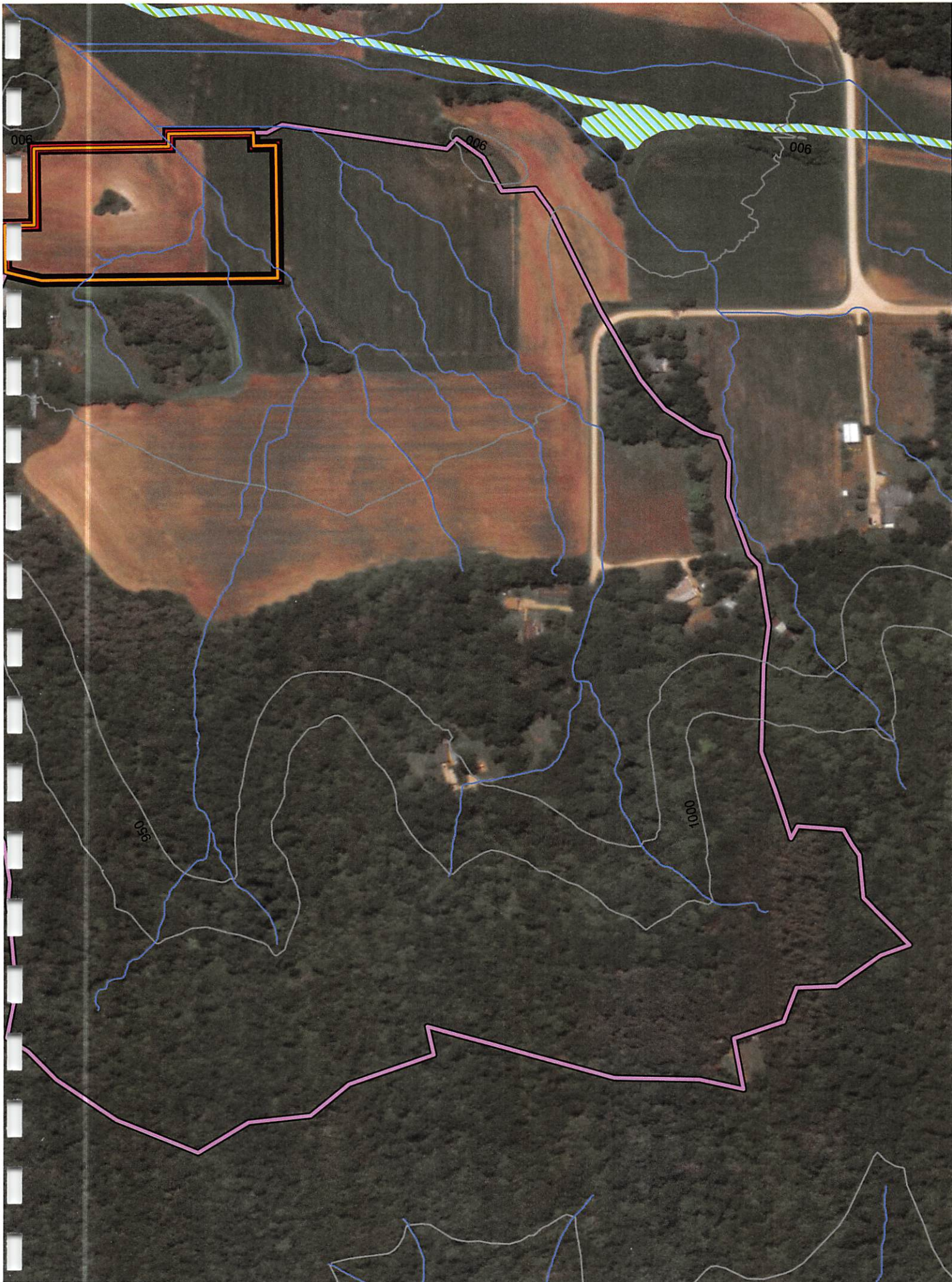
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



February 13, 2018

Daniel Rogers
Nokomis Energy LLC
818 West 46th Street, Suite 204
Minneapolis, MN 55407

(via email: dan@nokomis.partners)

Re: Byllesby Garden LLC Solar Project Desktop Wetland Determination, Goodhue County, Minnesota

Dear Mr. Rogers,

Westwood Professional Services (Westwood) completed a desktop wetland determination for the approximately 5.5 acre Byllesby Garden LLC Solar Garden site (hereafter, "Project" or "Site") located in the NE ¼ of S116, T112N, R17W, Cannon Falls Township, Goodhue County, Minnesota with (PIN # 280160300) (**Exhibit 1**). The land use is agricultural with row crop agriculture recently dedicated to corn and soybean production.

Methods

Westwood used ArcGIS and a series of data layers including: the National Wetlands Inventory (NWI), National Hydrography Dataset (NHD), Minnesota Department of Natural Resources Public Waters Inventory (DNR PWI), overlain on a series of aerial photographs to review water resources (**Exhibit 2**); the National Resources Conservation Service (NRCS) County Soil Survey (**Exhibit 3**); Several years of georeferenced aerial photographs from 1991 to 2017 were used to determine if wetlands were visible, mapped, or suspected on the Site (**Appendix A**). Westwood used 2016 guidance methods outlined by the Minnesota Board of Water and Soil Resources (BWSR) and the U.S. Army Corps of Engineers (USACE) titled *Guidance for Offsite Hydrology/Wetland Determinations* and populated the fields on the attached Hydrology Assessment with Aerial Imagery-Recording Form. The source photos are also included within the Appendix.

Findings

One suspect wetland area was identified and subsequently mapped with publically available LiDAR contours (**Exhibit 4**).

One intermittent stream/wetland feature was identified on a USGS quad map, NWI wetland data, and NHD flowline data. The soils survey showed the entire Site has non-hydric soils. A watercourse signature was identified from the review of readily available historic aerial photography of the Site.

The suspect area (Area 1) is 0.55 acres in size and slopes south to north through the length of the site (**Exhibit 4**). The watercourse signature appeared distinct in the 1991 aerial photograph and less apparent twice in more recent aerial photographs. The area exhibited zero hydrological signatures in normal years of aerial imagery. Therefore, the suspect area did not exhibit consistent wetland or watercourse hydrology characteristics to meet the threshold to be determined a wetland. It appears that conditions on the site may have resulted in a change in hydrology sometime after 1991 that eliminated the watercourse. Also, the area where the watercourse was is now tilled, showing no signs of a bed and bank.

Conclusions and Recommendations

Based on Westwood’s review of the above-mentioned information, Westwood has determined that the suspect area does not meet the BWSR and USFWS threshold required for an off-site wetland determination and therefore, no wetlands or water resources were confirmed on the Byllesby Garden LLC Site.

A field wetland delineation conducted during the growing season is recommended to confirm the absence or presence of wetland hydrology, hydric soils, and hydrophytic plant communities on the site. It will also provide opportunity for regulatory review of the wetland delineation on-site.


Please let us know if you have any questions about our findings and thank you for the opportunity to work with you on this project.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



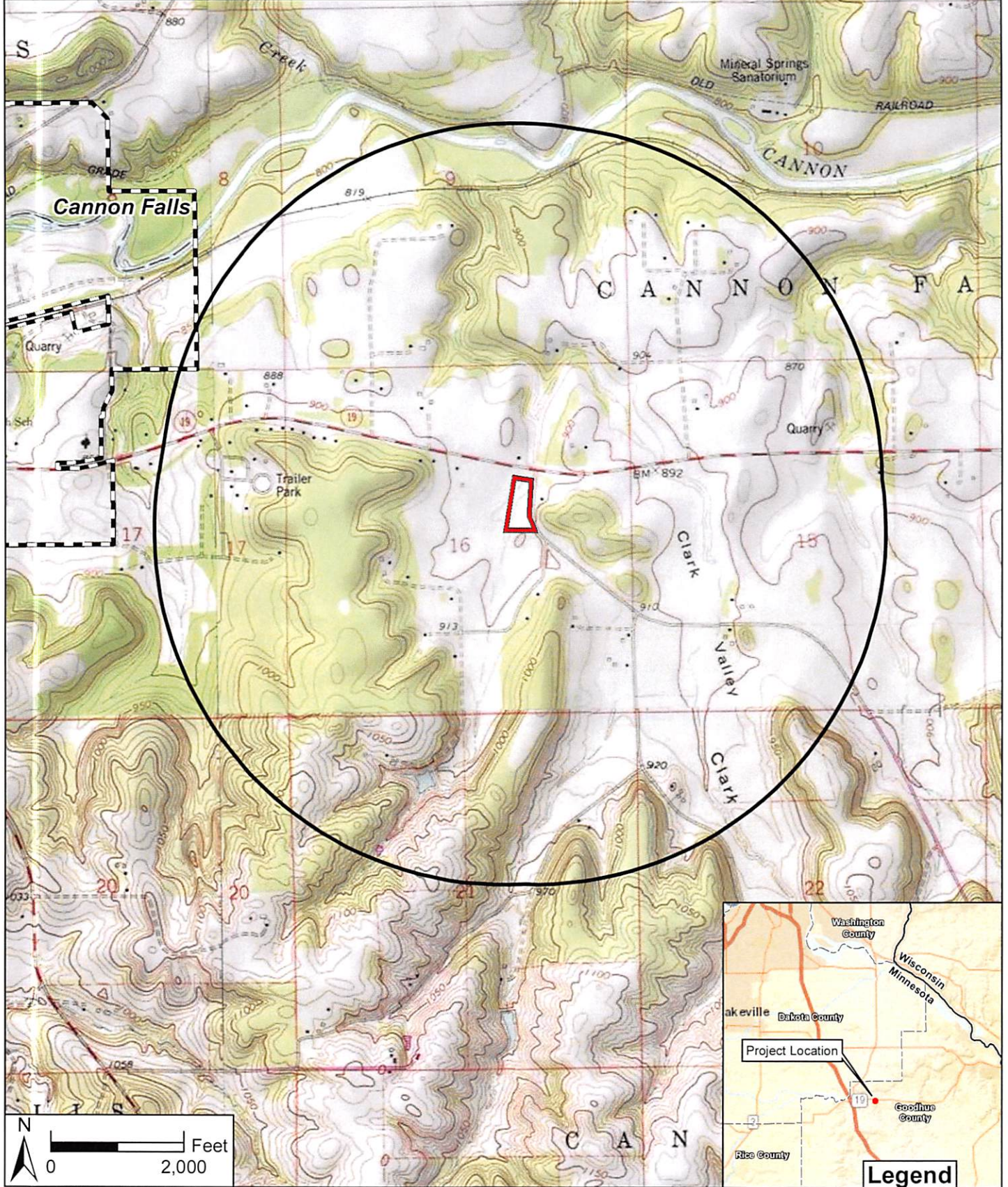
Thomas Braman
Senior Environmental Scientist / Project Manager
MN Certified Wetland Delineator No. 1112



Alex Cahlander-Mooers
Environmental Scientist
MN Certified Wetland Delineator No.1293

Attachments: Exhibits 1-4; Appendix 1

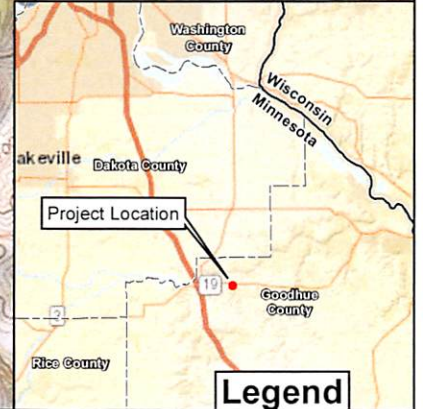
Exhibits



Data Source(s): Westwood (2018), ESRI WMS USA Topo Basemap Imagery (Accessed 2018), Census Bureau (2017).

Legend

- Project Boundary
- City/Civil Township Boundary
- 1-Mile Project Buffer
- County Boundary



Legend

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

Project Location & USGS Topography

Westwood







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 Westwood Professional Services, Inc.

Map Document: N:\0013987\00GIS\Welland Exhibit\Byllesby_Ex1_SiteLocation_180213.mxd 2/13/2018 11:45:54 AM ARCanlander



Data Source(s): Westwood (2018); Minnesota NAIP Imagery (Accessed 2018); MnDNR (2008) U.S. Fish and Wildlife Service (2013); Ducks Unlimited (2013); USGS NHD Dataset (2013)

Legend

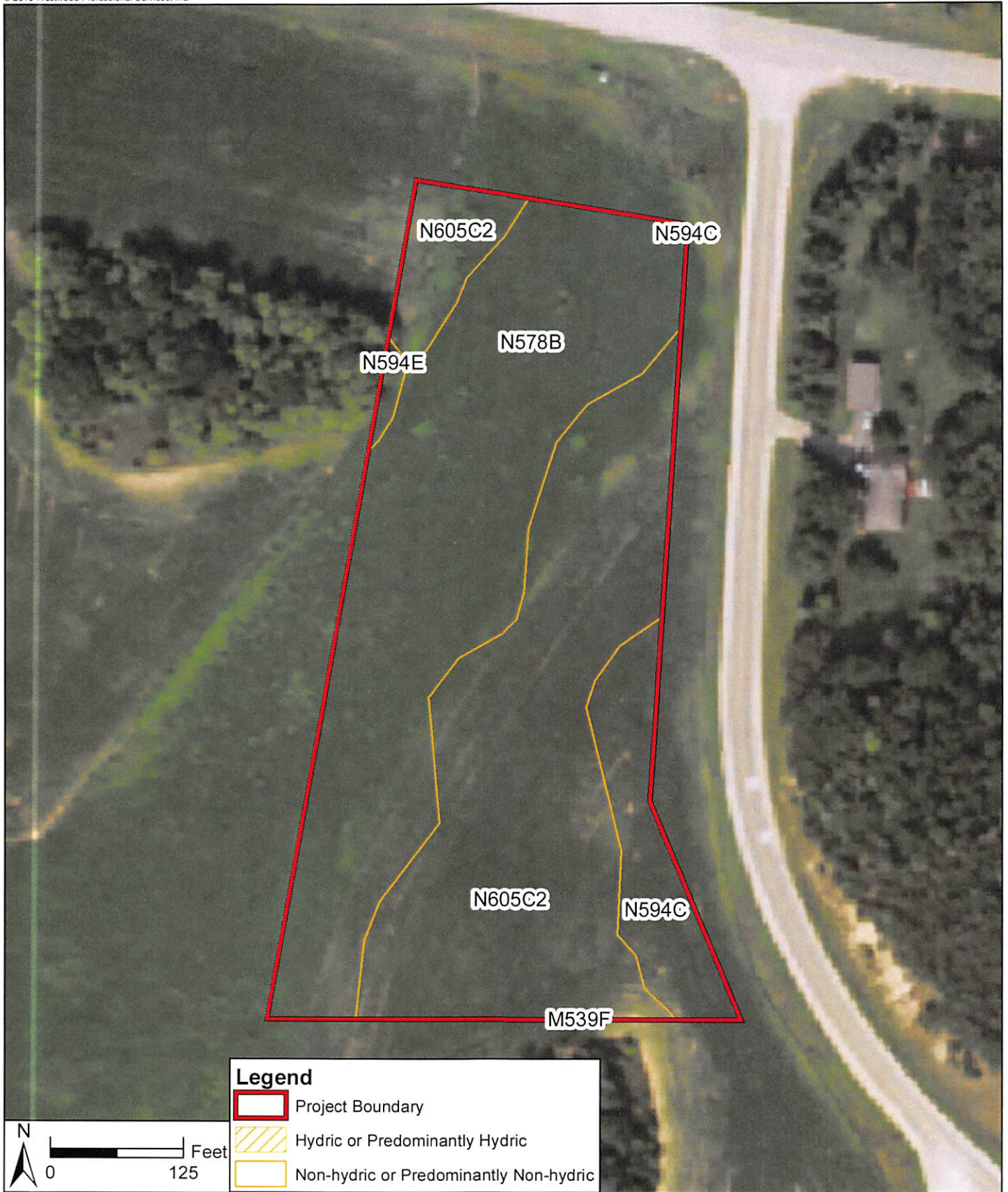
-  Project Boundary
-  NWI Wetland
-  PWI Watercourse
-  PWI Basin
-  NHD Flowline
-  NHD Waterbody

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

Water Resources

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Map Document: N:\0013987_00\GIS\Wetland Exhibit\Byllesby_Ex2_WaterResources_180213.mxd 2/13/2018 11:49:42 AM ARCAhlander



Legend

- Project Boundary
- Hydric or Predominantly Hydric
- Non-hydric or Predominantly Non-hydric



Data Source(s): Westwood (2018); Minnesota NAIP Imagery (Accessed 2018); U.S. Department of Agriculture, Natural Resources Conservation Service (2018)

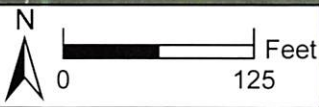
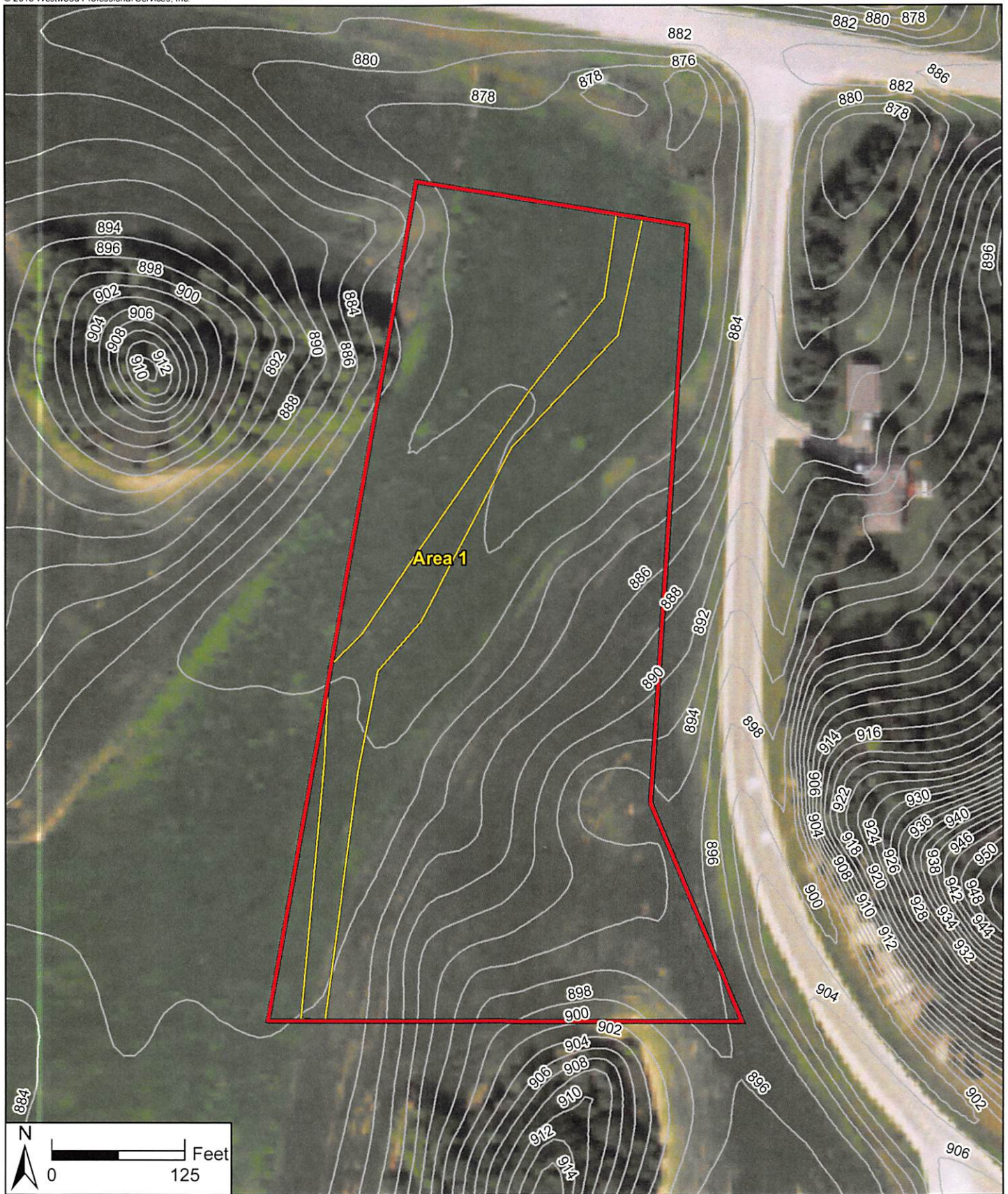
Map Symbol	Map Unit Name	Percent Hydric Soil
M539F	Bellechester loamy sand, 18 to 45 percent slopes	0
N578B	Barremills silt loam, drainageway, 1 to 5 percent slopes, occasionally flooded	0
N594E	Chelsea loamy sand, 12 to 35 percent slopes	0
N605C2	Rasset sandy loam, strath terrace, 6 to 12 percent slopes, moderately eroded	0
N605C2	Rasset sandy loam, strath terrace, 6 to 12 percent slopes, moderately eroded	0
N594C	Chelsea loamy sand, 6 to 12 percent slopes	0

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Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

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Soils

Map Document: N:\0013987\00\GIS\Wetland Exhibit\Byllesby_Ex3_Soils_180213.mxd 2/13/2018 11:51:54 AM ARCaahlander



Data Source(s): Westwood (2018); Minnesota NAIP Imagery (Accessed 2018); MnTopo (2018)

Legend

- Project Boundary
- Suspect Area
- 2ft Contour

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota
Suspect Wetland Areas
 With LiDAR Contours

Westwood

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Appendix A

Hydrology Assessment with Aerial Imagery-Recording Form¹

Project Name: Byllesby Garden LLC Solar Garden Date: 02/12/2018 County: Goodhue

Investigator: A. Cahlander-Mooers Legal Description (S, T, R): S16, T112N, R17W

Summary Table

Photo Year ²	Image Source ²	Actual/ Estimated Photo Date ³	Climate condition (wet, dry, normal) ^{4,5}	Interpretation (list hydrology indicators observed, e.g. crop stress, drowned out, etc.) ⁶				
				Area 1				
2017	USDA NAIP server	8/31	Normal	NV				
2016	WMS (Met Council)	4/15	Normal	NV				
2015	WMS (FSA)	10/11	Normal	NV				
2013	WMS (FSA)	7/18	Wet	NV				
2010	WMS (FSA)	7/02	Normal	NV				
2009	WMS (FSA)	8/18	Dry	NV				
2008	WMS (FSA)	7/08	Wet	DP (sm)				
2006	WMS (FSA)	7/15	Dry	DP (sm)				
2003	WMS (FSA)	7/18	Normal	NV				
2000	WMS (Met Council)	5/02	Dry	NV				
1997	WMS (Met Council)	4/14	Dry	NV				
1991*	WMS (USGS)	4/16	Wet	DP				

Summary Table

	Area 1			
# Years of aerial photography	12			
# Normal Years (1991-2017)	5			
# signatures in Normal years	0			
# signatures in Wet years	2/3			
# Signatures in Dry years	1/4			
# signatures in all years	3			
% Usable Yrs with wet signatures ⁷	0/5 – 0%			

(sm)= smaller area than whole area showed signature

¹ Form adapted from BWSR/USACE Technical Guidance, July 1, 2016.

²Photo selection for historical aerial photography review are from the MnGEO WMS GIS server, Google Earth, and GIS sources such as County, watersheds, or cities.

³July 1 was used as the date for aerial photographs when determining antecedent precipitation when an actual date could not be determined. Other aerial photography from County GIS, Google imagery, NAIP, etc. was dated based on available information.

⁴MN State Climatology website used to produce three-prior-month (NRCS) method for parcel being investigated.

⁵Photo dates at the end of the month were advanced to the next month to determine climate conditions using the NRCS/3-prior-month method if the daily precipitation data from that month warranted it.

⁶Key below is used label photo interpretations. It is imperative the reviewer read and understand the guidance associated with the use of the labels.

⁷Equal number of most recent wet and dry years used if 5 normal years were not available. Otherwise only Normal years.

*Base photo for suspect areas

Definitions

WS-wetland signature CS-crop stress SGO-something going on	DO-drowned out NC-not cropped SS- soil wetness signature	SW-standing water AP-altered pattern DP-drainage pattern	NV-normal vegetative cover DNC-dry not cropped NSS- no soil wetness (sm)- smaller area
WS is typically used for interpretation in non-cropped areas or green areas in dry conditions			

Field data sheet reference (if applicable): _____

Wetland Determination from Aerial Imagery – Recording Form

Project Name: Byllesby Garden LLC Date: 02/12/18 County: Goodhue
 Investigator: A. Cahlander-Mooers Legal Description (T, R, S): T112 R17 S16

Use the Decision Matrix below to complete Table 1.

Hydric Soils present ¹	Identified on NWI or other wetland map ²	Percent with wet signatures from Exhibit 1	Field verification required ³	Wetland?
Yes	Yes	>50%	No	Yes
Yes	Yes	30-50%	No	Yes
Yes	Yes	<30%	Yes	Yes, if other hydrology indicators present
Yes	No	>50%	No	Yes
Yes	No	30-50%	Yes	Yes, if other hydrology indicators present
Yes	No	<30%	No	No
No	Yes	>50%	No	Yes
No	Yes	30-50%	No	Yes
No	Yes	<30%	No	No
No	No	>50%	Yes	Yes, if other hydrology indicators present
No	No	30-50%	Yes	Yes, if other hydrology indicators present
No	No	<30%	No	No

¹The presence of hydric soils can be determined from the “Hydric Rating by Map Unit Feature” under “Land Classifications” from the Web Soil Survey. “Not Hydric” is the only category considered to not have hydric soils. Field sampling for the presence/absence of hydric soil indicators can be used in lieu of the hydric rating if appropriately documented by providing completed field data sheets.

²At minimum, the most updated NWI data available for the area must be reviewed for this step. Any and all other local or regional wetland maps that are publically available should be reviewed.

³Area should be reviewed in the field for the presence/absence of wetland hydrology indicators per the applicable 87 Manual Regional Supplement, including the D2 indicator (geomorphic position).

Table 1.

Area	Hydric Soils Present	Identified on NWI or other wetland map	Percent with wet signatures from Exhibit 1	Other hydrology indicators present ¹	Wetland?
1	No	Yes	0%	N/A	No

¹ Answer “N/A” if field verification is not required and was not conducted.



Data Source(s): Westwood (2018), Minnesota NAIP Imagery (2017)

- Legend**
- Project Boundary
 - Suspect Area

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

8/31/2017 - FSA NAIP



Westwood
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 Westwood Professional Services, Inc.

Map Document: N:\0013987\00\GIS\Weland Exhibits\Byllesby_A1_AerialReview_190213.mxd 2/13/2018 12:21:06 PM ARChandler



Data Source(s): Westwood (2018); Met Council (2016)

Legend

-  Project Boundary
-  Suspect Area

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

4/15/2016 - Met Council

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Data Source(s): Westwood (2018); USDA (NAIP) (2015)

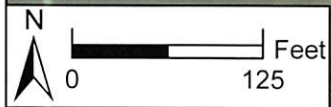
- Legend**
- Project Boundary
 - Suspect Area

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

10/11/2015 - FSA NAIP

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Map Document: N:\0013987_00\GIS\Weldand Exhibits\Byllesby_A3_AerialReview_180213.mxd 2/13/2018 12:42:55 PM ARCallander



Data Source(s): Westwood (2018); USDA (NAIP) (2013)

- Legend**
-  Project Boundary
 -  Suspect Area

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

7/18/2013 - FSA NAIP

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 Westwood Professional Services, Inc.

Map Document: N:\0013957\00\GIS\Wetland Exhibit\Byllesby_A4_AerialReview_180213.mxd 2/13/2018 12:46:01 PM ARCahlander



Data Source(s): Westwood (2018); USDA (NAIP) (2010)

Legend

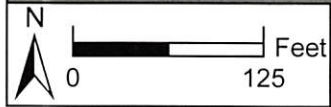
- Project Boundary
- Suspect Area

**Byllesby Garden LLC
Solar Garden**
Cannon Falls Township
Goodhue County, Minnesota

7/2/2010 - FSA NAIP

Westwood

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Westwood Professional Services, Inc.



Data Source(s): Westwood (2018); USDA (NAIP) (2009)

- Legend**
-  Project Boundary
 -  Suspect Area

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

8/18/2009 - FSA NAIP

Westwood
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Map Document: N:\0013987_00\GIS\Welland Exhibits\Byllesby_A6_AerialReview_180213.mxd 2/13/2018 12:40:54 PM ARCgISLoader



Data Source(s): Westwood (2018); USDA (NAIP) (2008)



Legend

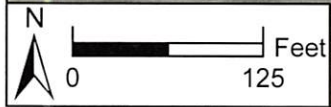
-  Project Boundary
-  Suspect Area

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

7/8/2008 - FSA NAIP

Westwood
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Map Document: N:\0013987\00\GIS\Wetland Exhibits\Byllesby_A7_AerialReview_180213.mxd 2/13/2018 12:52:36 PM ARCAhlander



Data Source(s): Westwood (2018); USDA (NAIP) (2006)

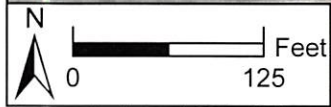
- Legend**
- Project Boundary
 - Suspect Area

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

7/15/2006 - FSA NAIP



Westwood
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 Westwood Professional Services, Inc.

Map Document: N:\0013987\00\GIS\Wetland Exhibits\Byllesby_A8_AerialReview_190213.mxd 2/13/2018 12:59:16 PM ARCAHlander



Data Source(s): Westwood (2018); USDA (NAIP) (2003)

Legend

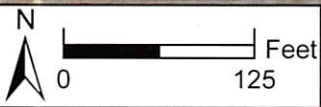
-  Project Boundary
-  Suspect Area

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

7/18/2003 - FSA NAIP



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Map Document: N:\0013987\00GIS\Welland Exhibits\Byllesby_A9_AerialReview_190213.mxd 2/13/2018 12:57:25 PM ARCAhlander



Data Source(s): Westwood (2018); Met Council (2000)

Legend

-  Project Boundary
-  Suspect Area

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

5/2/2000 - Met Council



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Westwood Professional Services, Inc.



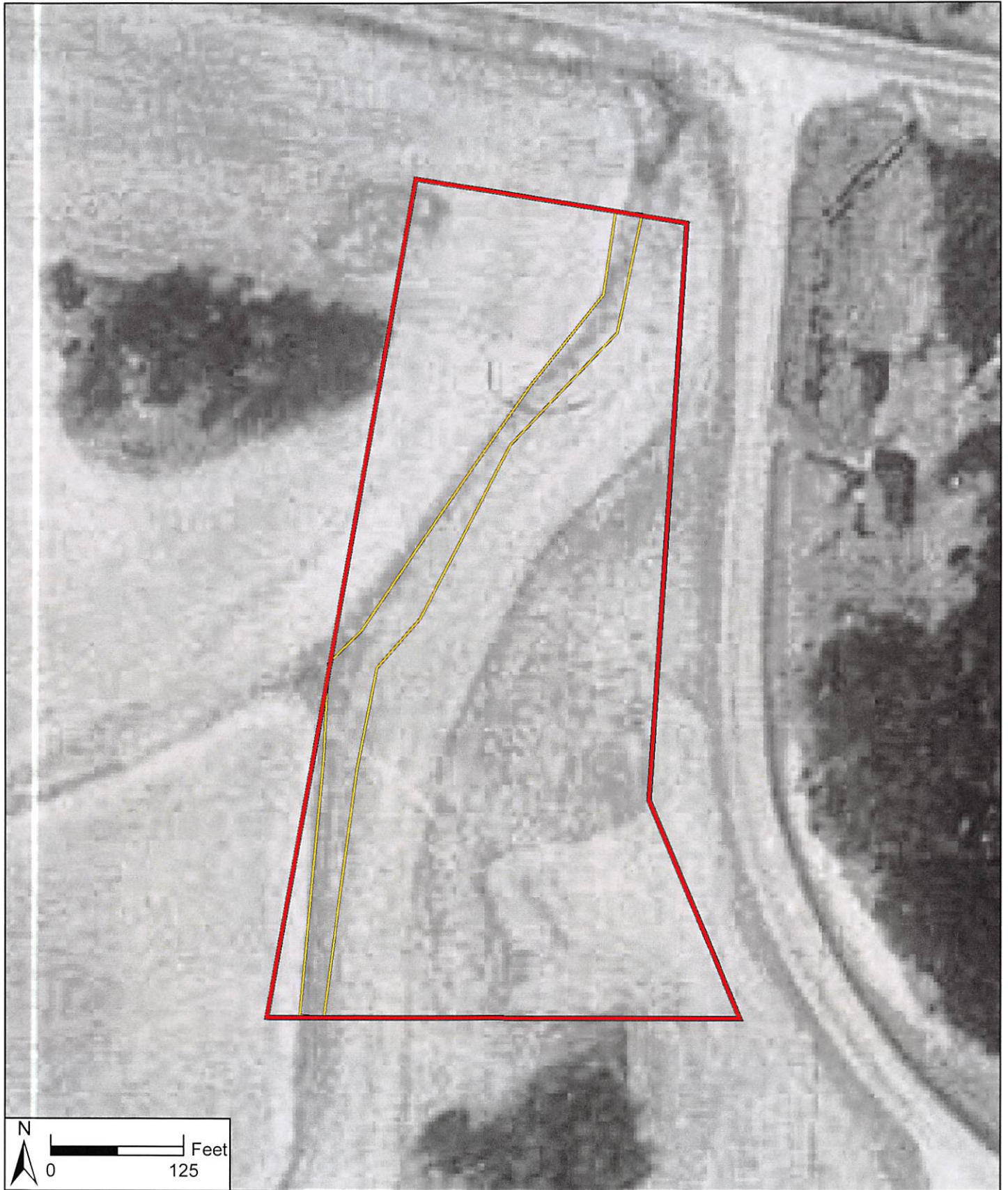
Data Source(s): Westwood (2018); Met Council (1997)

Legend

-  Project Boundary
-  Suspect Area



Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

4/14/1997 - Met Council



Data Source(s): Westwood (2018); USGS (1991)

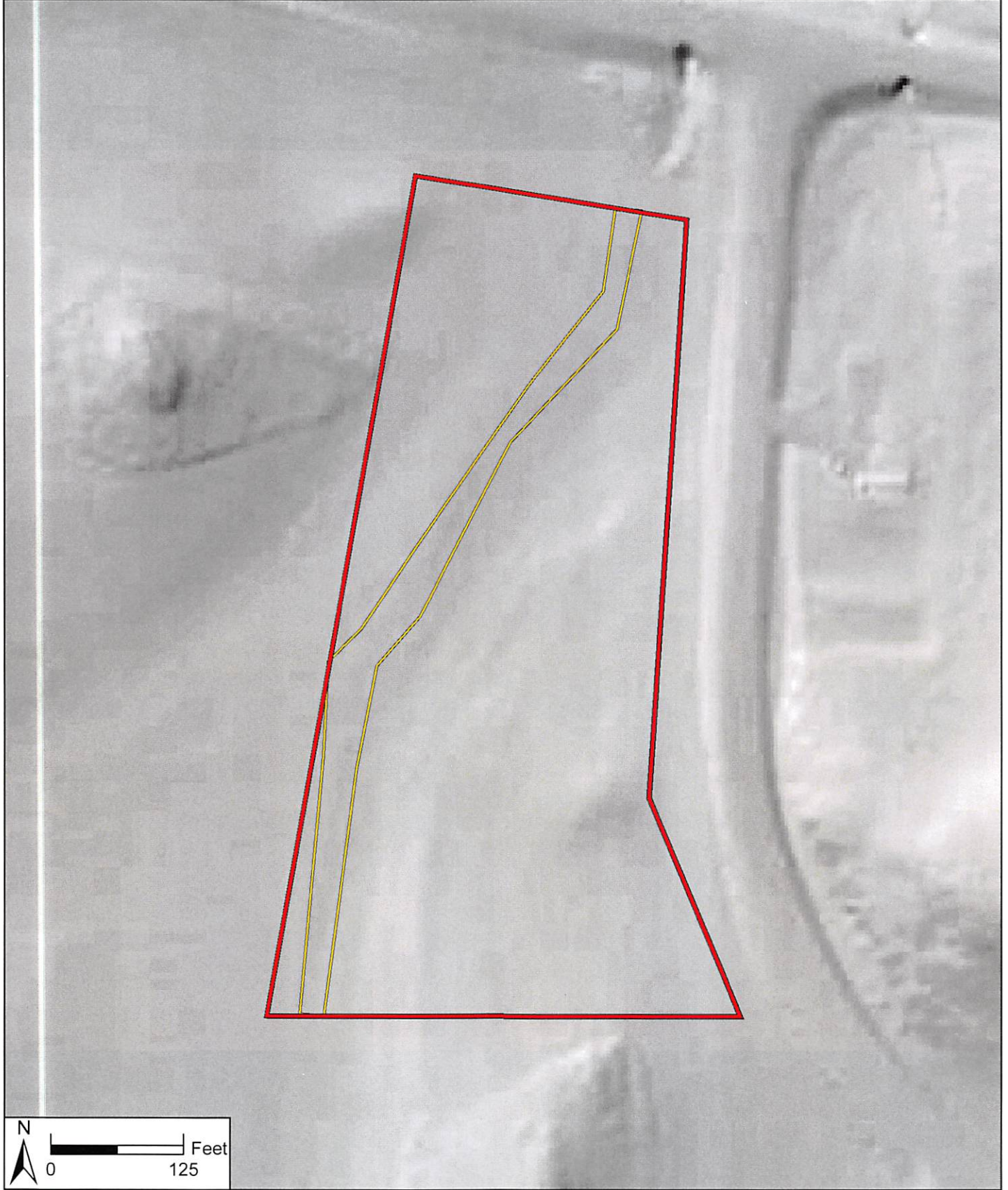
Legend

-  Project Boundary
-  Suspect Area

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

4/16/1991 - USGS

Map Document: N:\0013987\00\GIS\Welland Exhibits\Byllesby_A12_AerialReview_180213.mxd 2/13/2018 1:09:53 PM ARCAhlander



Data Source(s): Westwood (2018); MnDNR (Accessed 2018)



- Legend**
- Project Boundary
 - Suspect Area

Byllesby Garden LLC
Solar Garden
 Cannon Falls Township
 Goodhue County, Minnesota

Hillshade - MN DNR

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 Westwood Professional Services, Inc.

Map Document: N:\0013987\00\GIS\Welland Exhibit\Byllesby_A13_AerialReview_180213.mxd 2/13/2018 1:14:05 PM ARCAhlander

Precipitation data for target wetland location:	
county: Goodhue	township number: 112N
township name: Cannon Falls	range number: 17W
nearest community: Cannon Falls	section number: 16

Aerial photograph or site visit date:

Thursday, August 31, 2017

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: July 2017	second prior month: June 2017	third prior month: May 2017
estimated precipitation total for this location:	4.81R	3.36	6.38
there is a 30% chance this location will have less than:	2.82	3.02	2.87
there is a 30% chance this location will have more than:	4.95	4.59	5.01
type of month: dry normal wet	normal	normal	wet
monthly score	3 * 2 = 6	2 * 2 = 4	1 * 3 = 3
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)			
13 (Normal)			

Aerial photograph or site visit date:

Friday, April 15, 2016

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: March 2016	second prior month: February 2016	third prior month: January 2016
estimated precipitation total for this location:	2.15	0.65	0.49
there is a 30% chance this location will have less than:	1.13	0.48	0.60
there is a 30% chance this location will have more than:	2.30	0.94	1.16
type of month: dry normal wet	normal	normal	dry
monthly score	3 * 2 = 6	2 * 2 = 4	1 * 1 = 1
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)			
11 (Normal)			

Aerial photograph or site visit date:

Sunday, October 11, 2015

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month:	second prior month: August 2015	third prior month: July 2015
--	--------------------	---	--

	September 2015		
estimated precipitation total for this location:	4.24	3.57	6.62
there is a 30% chance this location will have less than:	1.69	3.36	2.82
there is a 30% chance this location will have more than:	4.90	5.95	4.95
type of month: dry normal wet	normal	normal	wet
monthly score	3 * 2 = 6	2 * 2 = 4	1 * 3 = 3
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)			
13 (Normal)			

Aerial photograph or site visit date:
Thursday, July 18, 2013

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: June 2013	second prior month: May 2013	third prior month: April 2013
estimated precipitation total for this location:	5.28	7.15	4.72
there is a 30% chance this location will have less than:	3.02	2.87	1.94
there is a 30% chance this location will have more than:	4.59	5.01	3.87
type of month: dry normal wet	wet	wet	wet
monthly score	3 * 3 = 9	2 * 3 = 6	1 * 3 = 3
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)			
18 (Wet)			

Aerial photograph or site visit date:
Friday, July 2, 2010

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: June 2010	second prior month: May 2010	third prior month: April 2010
estimated precipitation total for this location:	6.05	3.27	1.53
there is a 30% chance this location will have less than:	3.02	2.87	1.94
there is a 30% chance this location will have more than:	4.59	5.01	3.87
type of month: dry normal wet	wet	normal	dry
monthly score	3 * 3 = 9	2 * 2 = 4	1 * 1 = 1
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)			
14 (Normal)			

Aerial photograph or site visit date:
Tuesday, August 18, 2009

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: July 2009	second prior month: June 2009	third prior month: May 2009
estimated precipitation total for this location:	2.81	3.95	1.57
there is a 30% chance this location will have less than:	2.82	3.02	2.87
there is a 30% chance this location will have more than:	4.95	4.59	5.01
type of month: dry normal wet	dry	normal	dry
monthly score	3 * 1 = 3	2 * 2 = 4	1 * 1 = 1
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)			
8 (Dry)			

Aerial photograph or site visit date:
Tuesday, July 8, 2008

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: June 2008	second prior month: May 2008	third prior month: April 2008
estimated precipitation total for this location:	4.79	2.91	4.99
there is a 30% chance this location will have less than:	3.02	2.87	1.94
there is a 30% chance this location will have more than:	4.59	5.01	3.87
type of month: dry normal wet	wet	normal	wet
monthly score	3 * 3 = 9	2 * 2 = 4	1 * 3 = 3
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)			
16 (Wet)			

Aerial photograph or site visit date:
Saturday, July 15, 2006

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: June 2006	second prior month: May 2006	third prior month: April 2006
estimated precipitation total for this location:	1.94	2.77	3.63
there is a 30% chance this location will have less than:	3.02	2.87	1.94
there is a 30% chance this location will have more than:	4.59	5.01	3.87
type of month: dry normal wet	dry	dry	normal
monthly score	3 * 1 = 3	2 * 1 = 2	1 * 2 = 2

multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	7 (Dry)
--	----------------

Aerial photograph or site visit date:
Friday, July 18, 2003

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: June 2003	second prior month: May 2003	third prior month: April 2003
estimated precipitation total for this location:	2.82	5.34	2.97
there is a 30% chance this location will have less than:	3.02	2.87	1.94
there is a 30% chance this location will have more than:	4.59	5.01	3.87
type of month: dry normal wet	dry	wet	normal
monthly score	3 * 1 = 3	2 * 3 = 6	1 * 2 = 2
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)			
11 (Normal)			

Aerial photograph or site visit date:
Tuesday, May 2, 2000

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: April 2000	second prior month: March 2000	third prior month: February 2000
estimated precipitation total for this location:	1.24	1.19	0.93
there is a 30% chance this location will have less than:	1.94	1.13	0.48
there is a 30% chance this location will have more than:	3.87	2.30	0.94
type of month: dry normal wet	dry	normal	normal
monthly score	3 * 1 = 3	2 * 2 = 4	1 * 2 = 2
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)			
9 (Dry)			

Aerial photograph or site visit date:
Monday, April 14, 1997

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: March 1997	second prior month: February 1997	third prior month: January 1997
estimated precipitation total for this location:	0.66	0.39	1.41
there is a 30% chance this location will have less than:	1.13	0.48	0.60
there is a 30% chance this location will have more than:	2.30	0.94	1.16
type of month: dry normal wet	dry	dry	wet
monthly score	3 * 1 = 3	2 * 1 = 2	1 * 3 = 3
multi-month score:			
6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)		8 (Dry)	

Aerial photograph or site visit date:
Tuesday, April 16, 1991

Score using 1981-2010 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: March 1991	second prior month: February 1991	third prior month: January 1991
estimated precipitation total for this location:	2.70	1.05	0.33
there is a 30% chance this location will have less than:	1.13	0.48	0.60
there is a 30% chance this location will have more than:	2.30	0.94	1.16
type of month: dry normal wet	wet	wet	dry
monthly score	3 * 3 = 9	2 * 3 = 6	1 * 1 = 1
multi-month score:			
6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)		16 (Wet)	

March 22, 2018

Mr. Daniel Rogers and Julian White
Nokomis Energy LLC
818 West 46th Street, Suite 204
Minneapolis, Minnesota 55419

**Re: Phase I Environmental Site Assessment for Byllesby Garden LLC,
Cannon Falls Township, Goodhue County, Minnesota
Project No. 0013987.00**

Dear Mr. Rogers and White,

Westwood Professional Services (Westwood) completed a Phase I Environmental Site Assessment (Phase I ESA) in conformance with the scope and limitations of ASTM Practice E 1527-13. Any exceptions to or deletions from this practice are described in Section 8.0 of this report. The Subject Property is located in Cannon Falls Township, Goodhue County, Minnesota, and carries the Goodhue County parcel identification number (PIN) 280160300. The Subject Property is approximately 25-acres in size and composed of agricultural land and wooded hilltops.

This assessment has revealed no ASTM Recognized Environmental Conditions (RECs), no Controlled Recognized Environmental Conditions (CRECs) and no Historical Recognized Environmental Conditions (HRECs) in connection with the Subject Property.

If you have any questions or wish to discuss any particular aspect of the project, please feel free to call me at (952) 697-5763. We look forward to being of continued service to you.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Andrew J. Brummer
Environmental Due Diligence Lead

PHASE I ENVIRONMENTAL SITE ASSESSMENT

FOR:

Byllesby Garden LLC
Cannon Falls Township,
Goodhue County, Minnesota

PREPARED FOR:

Nokomis Energy LLC
818 West 46th Street, Suite 204
Minneapolis, Minnesota 55419

PREPARED BY:

WESTWOOD PROFESSIONAL SERVICES, INC.
12701 WHITEWATER DRIVE, SUITE 300
MINNETONKA, MINNESOTA 55343

WESTWOOD PROJECT NUMBER: 0013987.00

March 22, 2018

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EXHIBITS

- Exhibit 1 Project Location
- Exhibit 2 Project Area and Subject Property

APPENDICES

- Appendix A User Questionnaire
- Appendix B EDR Datamap Area Study
- Appendix C Historical Aerial Photographs
- Appendix D Site Photographs

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1.0 EXECUTIVE SUMMARY

Westwood Professional Services (Westwood) performed this Phase I Environmental Site Assessment (Phase I ESA) for Nokomis Energy LLC (User) in support of the lease of approximately 25-acres of land in Cannon Falls Township, Goodhue County, Minnesota. The Subject Property is composed of a portion of parcel identification number (PIN) 280160300 (**Exhibit 1**). This Phase I ESA conforms to the scope and limitations of American Society for Testing and Materials (ASTM) Standard E 1527-13 and 40 CFR § 312 Subp. C., All Appropriate Inquiries (AAI) Standards and Practices.

Based on the findings of this report, no recognized environmental conditions (RECs), controlled recognized environmental conditions (CRECs) or historical recognized environmental conditions (HRECs) were identified in preparation of this Phase I ESA.

2.0 INTRODUCTION

Westwood's scope of work for this Phase I ESA generally conforms to the American Society for Testing and Materials (ASTM) Practice E 1527-13: Standard Practice for Environmental Site Assessments: Phase I ESA Process and the AAI. The purpose of this standard practice is to define good commercial and customary practice for conducting a Phase I ESA of a parcel of real estate with respect to the range of contaminants within the scope of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and petroleum products. As such, this practice is intended to permit a user to satisfy one of the requirements for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on CERCLA liability, i.e. landowner liability protections. The ASTM standard is designed to meet the criteria mandated by CERCLA for AAI into the previous ownership and uses of the property consistent with good commercial or customary practice.

In defining a standard of good commercial and customary practice for conducting a Phase I ESA of a parcel of property, the goal of the ASTM practice is to identify Recognized Environmental Conditions (RECs). The term RECs means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate government agencies. As defined in ASTM E1527-13, the term Controlled Recognized Environmental Condition (CREC) means a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls. Historical Recognized Environmental Conditions (HRECs) are those that were or would have been

considered to be RECs in the past, but because of additional information or a change in conditions, may no longer be considered a REC.

2.1 Purpose

According to the User, the Phase I ESA was conducted in association with the lease of the Subject Property as a solar energy development project.

Westwood performed the Phase I ESA according to ASTM Practice E1527-13 to determine if the Subject Property is known to contain an existing release, past release, or a material threat of a release of hazardous substances or petroleum products into structures or into the ground, groundwater, or surface water. The Phase I ESA process does not include sampling, which may verify or evaluate the extent of suspected environmental impacts.

2.2 Scope of Services

The User authorized Westwood Professional Services, Inc. to conduct a Phase I ESA, which was performed in general accordance with Westwood Professional Services proposal, and considered the following:

Records Review – Westwood obtained and reviewed available records to identify RECs in connection with the Subject Property. Availability of records information varies from information source to information source, including government jurisdictions. The ASTM standard identifies record information from standard sources and the User. The Environmental Professional is required to review only record information that is reasonably ascertainable or practically reviewable. Westwood researched the operations of the Subject Property back to 1938.

Site Reconnaissance – Westwood performed a site reconnaissance to visually observe RECs in connection with the Subject Property during one or more site visit(s). Westwood observed structures on the Subject Property to the extent that the view of such structures was not obstructed by water bodies, adjacent buildings, or other obstacles. If applicable, limitations are noted within the Phase I ESA report.

Interviews – Westwood conducted landowner interviews to obtain additional information indicating RECs in connection with the Subject Property. Westwood also conducted interviews with representatives from state and/or local governmental agencies such as the Department of Health, Fire Department, Planning Department, Building Permit Department, and/or Local Utility Departments.

Report – Westwood prepared this Phase I ESA report to generally follow the recommended report format of ASTM Practice E1527-13. This Phase I ESA report includes a scope of services, findings, opinions, and conclusions, which are supported by documentation collected during the assessment.

2.3 Significant Assumptions

Landowner contact information, Site boundaries and other information pertaining to the Site was provided to Westwood by the User. Westwood assumes that all information supplied is true and accurate and that the boundaries of the Subject Property is accurate based on information supplied by the User. The identification of geologic or geotechnical hazards is beyond the scope of this project.

2.4 User Reliance

Westwood’s findings and opinions in this Phase I ESA are exclusively for the use by the User and Byllesby Garden LLC (Users). Westwood will not distribute or publish the Phase I ESA report without the consent of the User, except as required by law or court order. No other party may rely on the Phase I ESA report without Westwood’s written consent. The findings and opinions contained herein are limited to use by the Users. Westwood’s services for this project have been performed in a manner consistent with normal standards of the profession. No other warranty or guarantee, expressed or implied, is made.

3.0 SUBJECT PROPERTY DESCRIPTION

3.1 Location and Legal Descriptions

The Subject Property is located south of Minnesota Trunk Highway (TH) 19 and west of County State Aid Highway (CSAH) 8, approximately 1.5 miles east of Cannon Falls in Cannon Falls Township, Goodhue County, Minnesota. The Subject Property is associated with Goodhue County PIN 280160300; however, Westwood removed the farmyard that is located within the parcel from the Subject Property. The Subject Property is located in the southwest quadrant of the northeast quadrant of Section 16, Township 112 North, and Range 17 West.

3.2 Subject Property and Area Characteristics

The Subject Property is located within an area dominated by forested hillsides, agricultural cropland, and rural residences. The Subject Property generally consists of agricultural land used for row crop production and isolated, forested hilltops.

3.3 Hydrogeological and Topographical Conditions

Based on the University of Minnesota Geological Survey, Geologic Atlas of Goodhue County, Minnesota – County Atlas Series (Atlas C-12), Plates 1-6, dated 1998, the Subject Property is underlain by nonglacial alluvium deposits, bedrock outcrops, and Colluvium. Colluvium, a deposit indirectly related to glaciation, is described as a hillslope deposit derived from bedrock and loess upslope. It consists of two subunits, a rocky lower unit of angular carbonate clasts in a silty to sandy matrix, and an upper unit that is primarily silt. Bedrock formations on the Subject Property include the Shakopee Formation and St. Peter Sandstone. St. Peter sandstone is described as very fine grained to medium-grained, poorly cemented sandstone. The Shakopee formation consists of the

Willow River and the New Richmond Members. The Willow River Member is described as thin-to medium-bedded dolostone, sandstone, sandy dolostone, and minor amounts of shale, while the New Richmond Member is described as quartzose sandstone that overlies intraclastic, oolitic dolostone and sandy dolostone. Depth to bedrock is expected to range from 0 to 100 feet below ground surface (bgs).

Elevation on the Subject Property ranges from approximately 888 to 914 feet above mean sea level (amsl). Based on the topographic map contours, land generally slopes downward to the north towards the Cannon River. Similarly, groundwater flow is expected to be in a northeasterly direction towards the Cannon River. However, the local direction of groundwater flow may be affected by nearby streams, lakes, wells, and/or wetlands and may vary seasonally.

Property-specific groundwater flow direction was not determined through direct measurement during this Phase I ESA. Additional field investigation, beyond the Scope of Services of this Phase I ESA, would be required to determine this information.

3.4 Current Uses of Subject Property

The Subject Property generally consists of agricultural land used for row crop production and isolated, forested hilltops. The west edge of the Subject Property includes a small wooded area.

3.5 Structures, Roads, and Improvements

The Subject Property's north edge is improved with an overhead electrical transmission line. No other structures, roads, or improvements were observed on the Subject Property.

3.6 Current Uses of Adjoining Properties

Current uses of the adjoining properties to the north include agricultural land, a sheep farm, and TH 19, and to the east by CSAH 8, one rural residence, and a forested hillside with limestone outcroppings. The southern boundary of the Subject Property is bordered entirely by agricultural land and the western boundary by agricultural land and a farm that includes multiple sheds, a residence, and scattered machinery.

4.0 INFORMATION PROVIDED BY USER

4.1 Title Records

No historic title records were made available for Westwood's review during the completion of this Phase I ESA.

4.2 Environmental Liens and Activity and Use Limitations

The User communicated no knowledge of environmental liens or activity or use limitations encumbering the Subject Property.

4.3 Valuation Reduction for Environmental Issues

The User was not aware of any reduction in value of the Subject Property due to past or present environmental issues.

4.4 Subject Property Location Information

The PIN was provided for the Subject Property by the User.

See **Appendix A** for a copy of the User Questionnaire.

5.0 RECORDS REVIEW

5.1 Sources of Environmental Records

Environmental Data Resources, Inc. (EDR) provided regulatory record sources listed in Section 8.2.1 of the ASTM Standard. The EDR Radius Map™ Report with GeoCheck® is included in **Appendix B**. The records review identified records of known sites located within the ASTM minimum search distances from the Subject Property. EDR also provided Westwood with certain supplemental environmental database records that surpass the ASTM minimum standards government database lists. Any facilities identified by Westwood within the immediate vicinity of the Subject Property are discussed in the appropriate database section. The ASTM prescribed search radius for each database searched for records by EDR, the number of listings located on each database searched, and their appropriate locations with respect to the Subject Property, are summarized in the following table. The listings are located as shown in the EDR report. Refer to the EDR report in **Appendix B** for a detailed description of each database that is searched in their evaluation, and the date of the last revision for each source searched by EDR.

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
<i>Federal NPL site list</i>								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	0.001		0	NR	NR	NR	NR	0
<i>Federal Delisted NPL site list</i>								
Delisted NPL	1.000		0	0	0	0	NR	0
<i>Federal CERCLIS list</i>								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
<i>Federal CERCLIS NFRAP site list</i>								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
<i>Federal RCRA CORRACTS facilities list</i>								
CORRACTS	1.000		0	0	0	0	NR	0
<i>Federal RCRA non-CORRACTS TSD facilities list</i>								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
<i>Federal RCRA generators list</i>								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
<i>Federal institutional controls / engineering controls registries</i>								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
<i>Federal ERNS list</i>								
ERNS	0.001		0	NR	NR	NR	NR	0
<i>State- and tribal - equivalent NPL</i>								
MN PLP	1.000		0	0	0	0	NR	0
<i>State- and tribal - equivalent CERCLIS</i>								
SHWS	1.000		0	0	0	0	NR	0
<i>State and tribal landfill and/or solid waste disposal site lists</i>								
UNPERM LF	0.500		0	0	0	NR	NR	0
SWF/LF	0.500		0	0	0	NR	NR	0
LCP	0.500		0	0	0	NR	NR	0
<i>State and tribal leaking storage tank lists</i>								
LAST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LUST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
<i>State and tribal registered storage tank lists</i>								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
<i>State and tribal institutional control / engineering control registries</i>								
INST CONTROL	0.500		0	0	0	NR	NR	0
<i>State and tribal voluntary cleanup sites</i>								
VIC	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
<i>State and tribal Brownfields sites</i>								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
<i>Local Brownfield lists</i>								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
<i>Local Lists of Landfill / Solid Waste Disposal Sites</i>								
SWRCY	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
<i>Local Lists of Hazardous waste / Contaminated Sites</i>								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
SRS	0.500		0	0	0	NR	NR	0
CDL	0.001		0	NR	NR	NR	NR	0
MN DEL PLP	1.000		0	0	0	0	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
<i>Local Land Records</i>								
LIENS	0.001		0	NR	NR	NR	NR	0
LIENS 2	0.001		0	NR	NR	NR	NR	0
<i>Records of Emergency Release Reports</i>								
HMIRS	0.001		0	NR	NR	NR	NR	0
SPILLS	0.001		0	NR	NR	NR	NR	0
AGSPILLS	0.001		0	NR	NR	NR	NR	0
SPILLS 90	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SPILLS 80	0.001		0	NR	NR	NR	NR	0
<i>Other Ascertainable Records</i>								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	0.001		0	NR	NR	NR	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.001		0	NR	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AGVIC	0.500		0	0	0	NR	NR	0
AIRS	0.001		0	NR	NR	NR	NR	0
BULK	0.250		0	0	NR	NR	NR	0
COAL ASH	0.500		0	0	0	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
ENF	0.001		0	NR	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
MN HWS Permit	1.000		0	0	0	0	NR	0
MANIFEST	0.250		0	0	NR	NR	NR	0
MDA LIS	0.250		0	0	NR	NR	NR	0
MN LS	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
TIER 2	0.001		0	NR	NR	NR	NR	0
VAPOR	0.500		0	0	0	NR	NR	0
WIMN	0.500		3	1	2	NR	NR	6
NPDES	0.001		0	NR	NR	NR	NR	0
<u>EDR HIGH RISK HISTORICAL RECORDS</u>								
<i>EDR Exclusive Records</i>								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
<u>EDR RECOVERED GOVERNMENT ARCHIVES</u>								
<i>Exclusive Recovered Govt. Archives</i>								
RGA HWS	0.001		0	NR	NR	NR	NR	0
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		0	3	1	2	0	0	6

NOTES:

- TP = Target Property
- NR = Not Requested at this Search Distance
- Sites may be listed in more than one database

5.1.1 Subject Property

The Subject Property is not listed in the EDR report on any of the standard environmental record sources as specified in the ASTM Standard.

5.1.2 Adjoining Properties

Two adjoining properties are listed in the EDR report and include the Hoffman property at 8638 Highway 19 Boulevard and the Stegemann property at 8510 Highway 19 Boulevard, Cannon Falls. Both sites' listings are associated with active feedlots. However, no violations are listed with either of the properties and therefore are considered unlikely to pose an environmental concern to the Subject Property.

5.1.3 Surrounding Areas

Westwood reviewed the EDR Report for facilities located beyond adjoining properties that may indicate a release or likely release of hazardous substances and/or petroleum products that may impact the Subject Property. Based on factors that include regulatory status, distance from the Subject Property, and/or location relative to the regional groundwater flow direction, no facilities are identified in the EDR report that warrant further consideration as potential recognized environmental conditions.

5.2 Historical Use Information for the Subject Property

5.2.1 Aerial Photographs

Westwood received historical aerial photographs associated with the Subject Property from EDR for the years 1938, 1949, 1957, 1970, 1974, 1980, 1991, 1997, 2006, 2010, and 2015 and are included in **Appendix C**. Westwood also reviewed Google Earth aerial imagery from 2003, 2004, 2006, 2008, 2009, 2010, and 2011.

Based on the earliest available photograph (1938), the Subject Property consisted primarily of agricultural land with a converging, intermittent stream flowing northeast from the south-central and west-central regions of the Subject Property. In 1949, the first evidence of avoidance on the hilltops within the Subject Property is visible based on row crop patterns, and in 1997 evidence of the stream channels disappear, likely due to agricultural field tiling. No other notable changes to the Subject Property were observed through the most recent aerial photograph from 2015.

5.2.2 USGS Topographic Maps

Historical United States Geological Survey (USGS) Topographic maps received from EDR for the years of 1957, 1974, and 2013 were reviewed for the Subject Property. Maps reviewed included the 1:24,000 Cannon Falls (1974, 2013), Sogn (2013), White Rock (2013), and Miesville (2013, 1974) maps, and the 1:62,500 Hastings map (1953). According to the historical topographic maps, no features were depicted on the Subject Property from 1957 through 2013.

5.3 Historical Use Information for Adjoining Properties

5.3.1 Aerial Photographs

Westwood utilized the aerial photographs noted in Section 5.2.1 to determine the past uses of the adjoining properties. In the 1938 photograph, land use is heavily dominated by row crop agriculture. MN TH 19 and CSAH 8 are visible to the north and east as is the existing farm adjoining the Subject Property to the west. By 1970, one building is visible within the footprint of the current sheep farm to the northeast of the Subject Property. The existing rural residence located to the east of the Subject Property is also visible in the 1970 aerial photograph. No other notable changes were observed through the 2015 aerial photograph.

5.3.2 USGS Topographic Maps

Westwood utilized the topographic maps noted in Section 5.2.2 to determine the past uses of the adjoining properties. These maps generally parallel the results of the aerial photo review, displaying the adjacent farm to the west of the Subject Property in the 1953 historical topographic map, and the two additional structures to the north and east of the Subject Property in the 1974 topographic map.

6.0 SITE RECONNAISSANCE

An environmental scientist from Westwood conducted a site reconnaissance of the Subject Property on February 27, 2018, in accordance with the ASTM Standard. It included review of the elements listed in Section 9 of the ASTM Standard. The objective of the site reconnaissance was to obtain information indicating the likelihood of identifying RECs in connection with the Subject Property. The following observations were visually observed and recorded. Photographs from the site reconnaissance are included in **Appendix D**. Westwood was unaccompanied during the Site reconnaissance.

6.1 Methods and Limiting Conditions

Westwood reviewed publicly available aerial photography prior to conducting the site reconnaissance to identify areas of special concern. The Subject Property was reviewed and accessed by vehicle and by walking the property.

6.2 Use of Prior Environmental Assessments

No previous environmental reports were available for the Subject Property.

6.3 General Description of Structures

The Subject Property is improved with overhead electrical transmission lines along the north boundary. No other structures were observed on the Subject Property.

6.4 Potable Water Supply

No private wells were reported or observed on the Subject Property.

6.5 Sewage Disposal System

No sewage disposal system was observed on the Subject Property.

6.6 Hazardous Substances and Petroleum Products

No evidence of hazardous substances and/or petroleum products were observed on the Subject Property by Westwood during the Site reconnaissance.

6.7 Storage Tanks

Two empty, detached automobile fuel tanks were observed along the west edge of the Subject Property. There was no evidence of leaks associated with the fuel tanks.

6.8 Odors

No noxious and/or pungent odors on the Subject Property were detected during the site reconnaissance.

6.9 Pools of Liquid

No pools of liquid likely to contain hazardous substances or petroleum products on the Subject Property were observed during the site reconnaissance.

6.10 Drums

Empty drums were observed in two distinct areas of the Subject Property; within a small wetland area in the southwest portion of the Subject Property, and scattered throughout the Subject Property's wooded western edge. No signs of leaks or spillage was detected.

6.11 Electrical or Hydraulic Equipment

Overhead electrical transmission lines and one pole-mounted transformer were observed along the northern edge of the Subject Property. No other electrical or hydraulic equipment was observed on the Subject Property. At the time of the reconnaissance, the transformer appeared in good condition with no signs of leaks or spillage.

6.12 Exterior Observations

The exterior of the Subject Property consisted of agricultural land with small wooded hilltops.

6.12.1 Pits, Ponds, or Lagoons

One wetland area was located along the southwest edge of the Subject Property. Within this wetland there was evidence of solid waste dumping as described in Sections 6.10 and 6.12.5.

6.12.2 Stained Soil or Pavement

No stained soil or pavement was observed on the Subject Property.

6.12.3 Stressed Vegetation

No areas of chemically stressed vegetation were observed on the Subject Property.

6.12.4 Possible Fill Material or Buried Solid Waste

No signs of fill material or buried solid waste were apparent during the site reconnaissance.

6.12.5 Solid Waste and Unidentified Substance Containers

Solid waste was located along the western edge of the Subject Property in the wooded area and in the wetland located along the southwest edge of the Subject Property. These areas contained tires, scrap metal, empty 5 gallon plastic containers, and wood. No leaks, stains, or odors were observed in relation to these areas. A small area of solid waste was also observed on the northernmost wooded hilltop. The solid waste included tires, scrap metal, and cinderblocks.

6.12.6 Wastewater

There was no observations of surficial wastewater discharge on the Subject Property during the site reconnaissance.

6.12.7 Wells

No evidence of injection wells, dry wells, geo-thermal wells, or groundwater monitoring wells were observed on the Subject Property during the site reconnaissance.

6.12.8 Septic Systems

No septic systems were observed or reported on the Subject Property.

6.13 Interior Observations

No interior observations of structures were completed on the Subject Property.

6.14 Adjoining Property Observations

Based on the site reconnaissance, no adjoining properties are of environmental concern.

7.0 INTERVIEWS

7.1 Landowners

The owner of the Subject Property, Mr. Douglas Stegmann, was interviewed on March 21, 2018. Mr. Stegmann stated that he was unaware of any environmental concerns, wells, or spills associated with the Subject Property (**Appendix A**).

7.2 Client

Westwood received a completed questionnaire from Nokomis Energy, LLC on March 5, 2018, in which they were not aware of any environmental conditions associated with the Subject Property (**Appendix A**).

7.3 Local Government Officials

Westwood contacted the Goodhue Zoning Department on March 7, 2018, for the purpose of conducting a records search of past or current environmental concerns associated with the Subject Property. According to Mr. Michael Wozniak, Planner/Zoning Administrator, no records were identified for the Subject Property. Mr. Wozniak did state that a septic system is mapped within the parcel, but is located directly south of the residence and outside of the Subject Property.

8.0 LIMITATIONS, DEVIATIONS, AND DATA GAPS

Westwood based the findings and conclusions of this Phase I ESA on the procedures described in ASTM Standard E1527-13, information and observations collected during those procedures, and Westwood's interpretation of that information. The findings of this Phase I ESA are limited to the specific Subject Property described in this report, and by the accuracy and completeness of information provided by others.

A Phase I ESA does not entirely eliminate uncertainty regarding the potential for RECs in connection with the Subject Property. Performance of ASTM Standard E1527-13 is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs in connection with the Subject Property within reasonable limits of time and cost. For this Phase I ESA, Westwood applied the degree of care and skill ordinarily exercised under similar conditions by reputable members of the environmental profession within the Subject Property. No warranty or guarantee, expressed or implied, is made.

Several caveats are inherent in conducting this or any other environmental due diligence examination:

1. It is difficult to predict which, if any, identified potential problems will become actual problems in the future. Federal and state regulations continually change as do the enforcement priorities of the applicable government agencies involved.

2. There is always the possibility that sources of future environmental liability have yet to manifest themselves to the point where they are reasonably identifiable through an external investigation such as the one conducted for this assessment.
3. The results of Westwood’s investigation represent the applications of a variety of technical disciplines to material facts and conditions associated with the Subject Property. Many of these facts and conditions are subject to change over time. Therefore, the findings and opinions expressed within this document must be viewed in this context.
4. Westwood is not responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed.
5. Properties adjoining the Subject Property were only unobtrusively and visually inspected. Westwood cannot be held responsible for identifying conditions on adjoining properties that were not conspicuous at the time of the site reconnaissance.

The following limiting conditions were encountered:

- Observation of the Subject Property was limited due to snow cover, limiting ground visibility.
- Dense vegetation limited visibility in portions of the Subject Property.

No data gaps were identified during the Phase I ESA process, with the exception of the following:

- Historical resources were not readily available for 5-year-or-less intervals from the time of the first developed use.

The identified limiting conditions and data gap did not affect the environmental professional’s ability to render opinions regarding conditions indicative of a release or threatened release.

The following information is not contained in the ASTM Standard E 1527-13 and is not included in this Phase I ESA report:

- Asbestos Containing Building Materials
- Wetlands
- Industrial Hygiene
- Radon
- Regulatory Compliance
- Health and Safety
- Lead-Based Paint
- Cultural and Historic Resources

- Ecological Resources
- Lead in Drinking Water
- Indoor Air Quality
- Endangered Species
- Biological Agents
- High Voltage Power Lines
- Mold

This Phase I ESA does not include any testing or sampling of materials (e.g., soil, water, air, or building materials).

9.0 FINDINGS

Westwood’s findings identify all potential RECs, CRECs and HRECs through information uncovered during site reconnaissance or provided by the User, landowner, government official, EDR report, or other sources. All findings listed in Section 9.0 that require further discussion are elaborated upon in Section 10.0 to either dismiss the finding or label it as a REC (10.1), CREC (10.2), HREC (10.3), *De Minimis* Condition (10.4) or an Additional Consideration (10.5).

Westwood makes the following findings based on this Phase I ESA:

- The government database records review identified regulated facilities within the vicinity of the Subject Property.
- The Subject Property has been used for agricultural purposes since at least 1938.
- The Subject Property is occupied by overhead electrical transmission lines and a pole-mounted transformer along the northern property boundary.
- Three areas of solid waste dumping was observed at the Subject Property and included a combination of empty drums, detached and empty automobile fuel tanks, scrap metal, tires, and wood.

10.0 OPINIONS

According to the User, the Phase I ESA was conducted in association with lease of the Subject Property. Opinions expressed herein are influenced by the stated reason for conducting the Phase I ESA. Furthermore, the expressed opinions might not be applicable to alternate reasons for reliance on the content of the Phase I ESA.

10.1 Recognized Environmental Conditions

The term RECs means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate government agencies.

No RECS were identified in preparation of this Phase I ESA.

10.2 Historical Recognized Environmental Conditions

HRECs are those that were or would have been considered to be RECs in the past, but because of additional information or a change in conditions, may no longer be considered a REC.

No HRECS were identified in preparation of this Phase I ESA.

10.3 Controlled Recognized Environmental Conditions

A controlled recognized environmental condition is defined by ASTM Practice E1527-13 as “a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls.”

No CRECS were identified in preparation of this Phase I ESA.

10.4 De Minimis Conditions

A *de minimis* condition is one that generally does not pose a threat to human health or the environment and that would generally not trigger an enforcement action if brought to the attention of an applicable regulatory agency. Conditions determined to be *de minimis* are not RECs. The following findings are considered *de minimis* conditions:

- The Subject Property has been used for agricultural purposes since at least 1938. The use of the Subject Property for agricultural purposes would be considered a *de minimis* condition.
- The Subject Property is occupied by electrical transmission lines and a pole-mounted transformer along the northern property boundary. The existence of the electrical lines and a transformer would be considered a *de minimis* condition for the Subject Property.

- The government database records review identified several regulated facilities on the surrounding properties. Based on mitigating factors that affect the apparent significance of the identified facilities on the Site, such as regulatory status, distance from the Site, location of the facility in relation to the groundwater flow direction, and/or the database(s) the identified regulated facilities are listed on, it is our opinion that the identified regulated facilities are considered *de minimis* conditions.
- Three areas of solid waste dumping was observed at the Subject Property and included a combination of empty drums, detached and empty automobile fuel tanks, scrap metal, tires, and wood. No indications of a release, including odors or staining, were visible during the site visit, and most materials appeared to be inert. For these reasons, it is our opinion that the solid waste dumping would be considered to be *de minimis* conditions.

10.5 Additional Considerations

An additional consideration is a condition that does not meet the definition of a REC, CREC, or HREC, but, in our opinion, should be brought to the attention of the User.

- No additional considerations were noted based on the finding of this report.

11.0 CONCLUSIONS

Westwood performed a Phase I ESA of the Subject Property. This Phase I ESA was conducted in conformance with the scope and limitations of ASTM Standard E1527-13. Exceptions to, or deletions from, this practice are described in Section 8.0 of the Phase I ESA. Our assessment did not reveal any RECs, CRECs or HRECs in connection with the Subject Property.

12.0 REFERENCES

ASTM International. 2013. ASTM Practice E Practice E 1527-13. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.

EDR (Environmental Data Resources Inc.) 2018. Environmental EDR Report, Certified Sanborn Map Report, City Directory, Historic Topo Map Report, and Aerial Photo Decade Package, Byllesby Garden, Cannon Falls, MN 55009 <http://www.edrnet.com>.

Minnesota Department of Health. County Well Index. Accessed February 28, 2018.

USDA (United States Department of Agriculture). 2006. MLRA Explorer Custom Report. <http://apps.cei.psu.edu/mlra/>.

USGS (U.S. Geological Survey). 1974. National Hydrography Dataset, <http://nhd.usgs.gov>

United States Environmental Protection Agency. “All Appropriate Inquiries” Final Rule, 40 C.F.R. Part 312 (2014).

University of Minnesota Geological Survey, Geologic Atlas of Goodhue County, Minnesota – County Atlas Series (Atlas C-12), Plates 1-6, dated 1998.

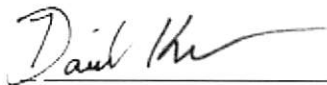
13.0 ENVIRONMENTAL PROFESSIONAL STATEMENT AND QUALIFICATIONS

We declare that, to the best of our knowledge and belief, we meet the definition of Environmental Professionals as defined in 40 CFR Part 312.10. We have the specific qualifications, education, training, and experience to assess the nature and histories of properties in conformance with the standards and practices set forth in 40 CFR Part 312. Resumes are available on request.

Table 14.1: Qualifications of Environmental Professionals

Name	Degrees	Years of Experience	Licenses and Certifications	Role on Project
David Kuhlmann	BA, Biology	4	MN Wetland Delineation Certified #1315	Site Reconnaissance Report Preparation
Andrew Brummer	BS, Biology	17	MN Asbestos	Peer Review Quality Assurance

Prepared and Reviewed by:



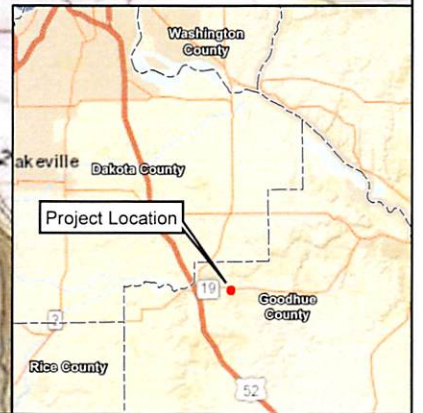
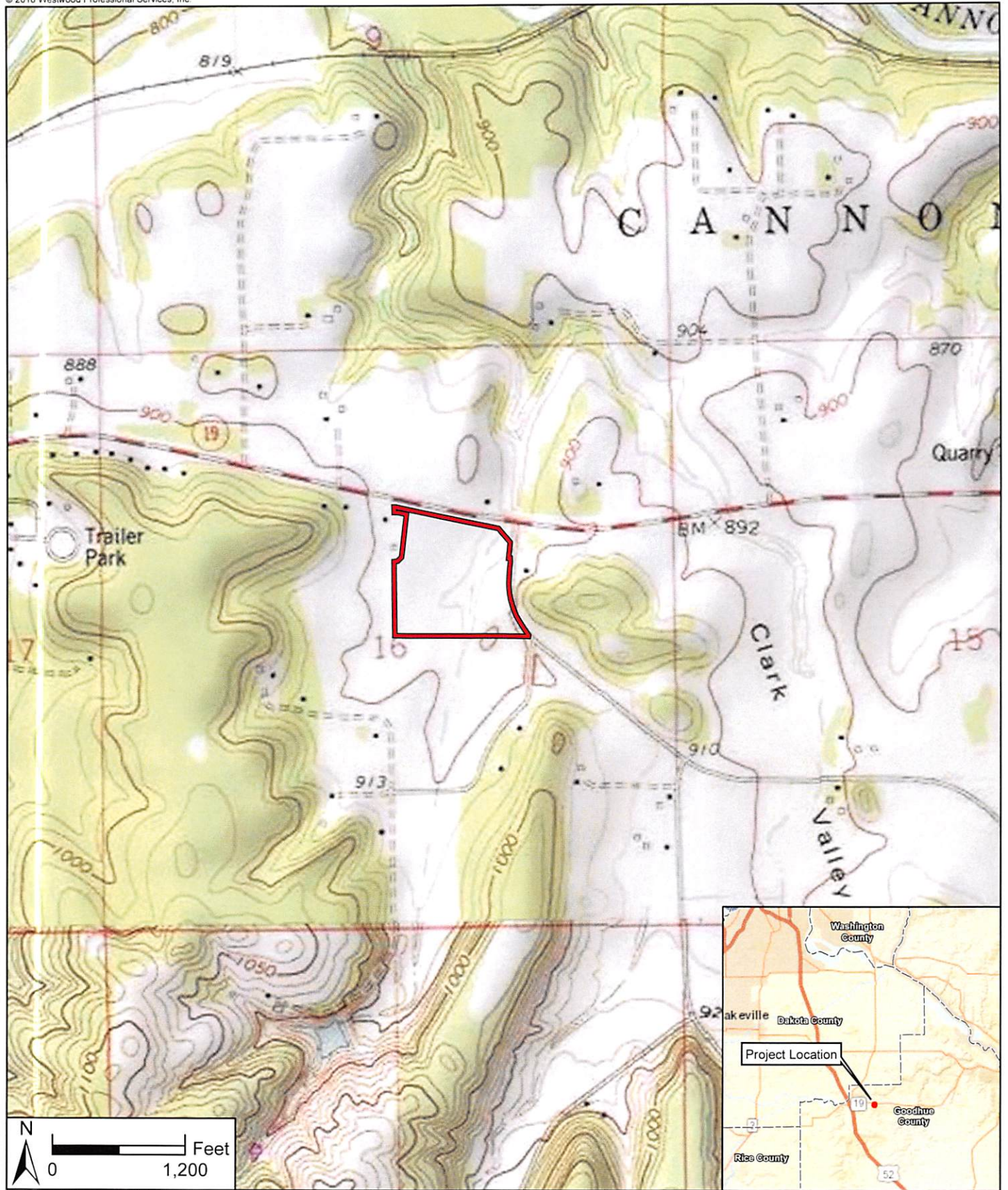
David Kuhlmann
Environmental Scientist



Andrew J. Brummer
Environmental Due Diligence Lead

Exhibit 1

Project Location



Data Source(s): Westwood (2018); ESRI WMS USA Topo Basemap Imagery (Accessed 2018); Census Bureau (2017).

Legend

-  Subject Property
-  County Boundary
-  City/Civil Township Boundary
-  PLS Section Boundary

Byllesby Garden Solar

Cannon Falls Township
Goodhue County, Minnesota

**Project Location &
USGS Topography**

Exhibit 1

Westwood

Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Exhibit 2

Project Area



Data Source(s): Westwood (2018).ESRI WMS (Accessed 2018).

Legend

 Subject Property



Byllesby Solar

Cannon Falls Township,
Goodhue County, Minnesota

Project Area and Subject Property

EXHIBIT 2

Westwood

Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Appendix A

Landowner and Client Questionnaires

PHASE I ENVIRONMENTAL SITE ASSESSMENT

OWNER/AGENT QUESTIONNAIRE

Westwood Professional Services

Project Information

Project Name: Byllesby Garden **Project No:** MN-17-00039
Owner: Nokomis Hiawatha LLC **Interviewer:** Brendan Dillon
Name: Douglas Stegmann **(If applicable)**
Title: Property Owner
Phone: (507) 263-3304
Email: _____
Date: 3/21/2018

INSTRUCTIONS

Please make your answers as specific as feasible and answer the questions in good faith and to the extent of your knowledge. The word "property" refers to the land that will be purchased or leased for the project.

1. Do you know of past or current uses of the property that might be associated with risks of environmental contamination? If YES, describe those uses, the environmental contamination risks, and the location(s) within the property.

Answer: No

2. Do you know of specific hazardous chemicals or materials that are present or once were present at the property? If YES, describe the type of material(s), their locations, the time when they were present, and their use on the property.

Answer: No

3. Are you aware of any chemical, petroleum product, or hazardous material spills or releases at the property (such as oil, gas, diesel, herbicide, pesticide, other farm chemicals, lead-based paint, or asbestos) recently or in the past? If YES, please describe the material spilled or released, how much was involved, what happened, when it happened, and where it happened.

Answer: No

4. Do you know if any hazardous substance or petroleum products, tires, automotive batteries, or any other waste materials have been dumped above ground, buried and/or burned on the property? If YES, what occurred, where, and when?

Answer: No

Westwood

5. Do you know of any environmental cleanups that have taken place on the property? If YES, please list and describe them and their location(s).

Answer: No

6. Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law? If YES, please list and describe them.

Answer: No

7. Are you aware of any activity and use limitations, such as engineering controls or institutional controls, which have been filed or recorded under federal, tribal, state or local law? If YES, please list and describe them and their location(s). (Activity and use limitations are legal or physical restrictions or limitations that affect access or use of a site. They can be restrictions of record on titles, zoning restrictions, easements, covenants, or physical barriers that reduce potential exposure to hazardous substances or petroleum products.)

Answer: No

8. Do you have any specialized knowledge or experience related chemical or material use at the property or nearby properties? If YES, please describe your knowledge or experience.

Answer: No

9. Does the purchase price of the property or the property leases reasonably reflect the fair market value of the property or leases? If the purchase price is lower than the fair market value, have you considered whether the lower purchase price may relate to contamination known or believed to be present at the property?

Answer: Yes

10. Based on your knowledge and experience of the property, are there obvious indicators that point to the presence or likely presence of contamination at the property? If YES, please list and describe the indicator(s) and their location(s).

Answer: No

11. Can you identify additional people, other than the property owners, who would be available to answer these questions and who would know more about the land use, history, and environmental condition of the property? If YES, please list name(s), phone number(s), and email(s).

Answer: No

Client/Firm: Nokomis Energy LLC
 Name: Daniel Rogers
 Title:
 Phone: (612) 470-3223
 Email: dan@nokomis.partners
 Date: 3/5/18

Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Question 10	Question 11	Notes:
Current or past uses associated with risk of environmental contamination	Hazardous chemicals or materials present or historically present	Know occurrence of chemical, petroleum product, or hazardous material spills	Dumps or burn pits with hazardous substances (auto batteries, petroleum products, etc)	Environmental cleanups onsite	Environmental cleanup liens against property	Activity and use limitations	Chemical or material use at or near property	Purchase price reflects fair market value	Presence or likely presence of contamination	Any additional people with knowledge of sites land use and history	
No	No	No	No	No	No	No	No	N/A	No	No	

Appendix B

EDR Datamap Area Study

Byllesby Garden

Not Reported

Cannon Falls, MN 55009

Inquiry Number: 5193063.2s

February 20, 2018

The EDR Radius Map™ Report with GeoCheck®



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
 Please contact EDR at 1-800-352-0050
 with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

NOT REPORTED
CANNON FALLS, MN 55009

COORDINATES

Latitude (North): 44.5083380 - 44° 30' 30.01"
Longitude (West): 92.8588740 - 92° 51' 31.94"
Universal Transverse Mercator: Zone 15
UTM X (Meters): 511217.9
UTM Y (Meters): 4928128.5
Elevation: 881 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5962797 MIESVILLE, MN
Version Date:	2013
Southeast Map:	5962821 WHITE ROCK, MN
Version Date:	2013
Southwest Map:	5962807 SOGN, MN
Version Date:	2013
Northwest Map:	5964031 CANNON FALLS, MN
Version Date:	2013

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from: 20150927, 20151011, 20150930
Source: USDA

MAPPED SITES SUMMARY

Target Property Address:
 NOT REPORTED
 CANNON FALLS, MN 55009

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	GREGORY A HOFFMAN FA	8683 HIGHWAY 19 BLVD	WIMN	Higher	226, 0.043, NNE
2	DOUGLAS W STEGEMANN	8510 HIGHWAY 19 BLVD	WIMN	Higher	587, 0.111, West
3	ROBERT SWANSON FARM	8415 HIGHWAY 19 BLVD	WIMN	Higher	621, 0.118, NW
4	RICHARD R LUDWIG FAR	8914 HIGHWAY 19 BLVD	WIMN	Higher	823, 0.156, East
5	RAYMOND W OTTO FARM	30855 CLARK VALLEY T	WIMN	Higher	2416, 0.458, SE
3	GERALD AUGUST KUHN F	30150 91ST AVE	WIMN	Higher	2494, 0.472, ENE

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY..... Federal Facility Site Information listing
SEMS..... Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE..... Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG..... RCRA - Large Quantity Generators
RCRA-SQG..... RCRA - Small Quantity Generators
RCRA-CESQG..... RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS..... Land Use Control Information System
US ENG CONTROLS..... Engineering Controls Sites List

EXECUTIVE SUMMARY

US INST CONTROL..... Sites with Institutional Controls

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent NPL

MN PLP..... Permanent List of Priorities

State- and tribal - equivalent CERCLIS

SHWS..... Superfund Site Information Listing

State and tribal landfill and/or solid waste disposal site lists

UNPERM LF..... Unpermitted Facilities

SWF/LF..... Permitted Solid Waste Disposal Facilities

LCP..... Closed Landfills Priority List

State and tribal leaking storage tank lists

LAST..... Leaking Aboveground Storage Tanks

LUST..... Leak Sites

INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

FEMA UST..... Underground Storage Tank Listing

UST..... Underground Storage Tank Database

AST..... Aboveground Storage Tanks

INDIAN UST..... Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

INST CONTROL..... Site Remediation Section Database

State and tribal voluntary cleanup sites

VIC..... Voluntary Investigation and Cleanup Program

INDIAN VCP..... Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS..... Petroleum Brownfields Program Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY..... Recycling Facilities

EXECUTIVE SUMMARY

INDIAN ODI.....	Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9.....	Torres Martinez Reservation Illegal Dump Site Locations
ODI.....	Open Dump Inventory
IHS OPEN DUMPS.....	Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL.....	Delisted National Clandestine Laboratory Register
SRS.....	Site Remediation Section Database
CDL.....	Clandestine Drug Labs
MN DEL PLP.....	Delisted Permanent List of Priorities
US CDL.....	National Clandestine Laboratory Register

Local Land Records

LIENS.....	Environmental Liens
LIENS 2.....	CERCLA Lien Information

Records of Emergency Release Reports

HMIRS.....	Hazardous Materials Information Reporting System
SPILLS.....	Spills Database
AGSPILLS.....	Department of Agriculture Spills
SPILLS 90.....	SPILLS 90 data from FirstSearch
SPILLS 80.....	SPILLS 80 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR.....	RCRA - Non Generators / No Longer Regulated
FUDS.....	Formerly Used Defense Sites
DOD.....	Department of Defense Sites
SCRD DRYCLEANERS.....	State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR.....	Financial Assurance Information
EPA WATCH LIST.....	EPA WATCH LIST
2020 COR ACTION.....	2020 Corrective Action Program List
TSCA.....	Toxic Substances Control Act
TRIS.....	Toxic Chemical Release Inventory System
SSTS.....	Section 7 Tracking Systems
ROD.....	Records Of Decision
RMP.....	Risk Management Plans
RAATS.....	RCRA Administrative Action Tracking System
PRP.....	Potentially Responsible Parties
PADS.....	PCB Activity Database System
ICIS.....	Integrated Compliance Information System
FTTS.....	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS.....	Material Licensing Tracking System
COAL ASH DOE.....	Steam-Electric Plant Operation Data
COAL ASH EPA.....	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER.....	PCB Transformer Registration Database
RADINFO.....	Radiation Information Database
HIST FTTS.....	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS.....	Incident and Accident Data
CONSENT.....	Superfund (CERCLA) Consent Decrees
INDIAN RESERV.....	Indian Reservations

EXECUTIVE SUMMARY

FUSRAP.....	Formerly Utilized Sites Remedial Action Program
UMTRA.....	Uranium Mill Tailings Sites
LEAD SMELTERS.....	Lead Smelter Sites
US AIRS.....	Aerometric Information Retrieval System Facility Subsystem
US MINES.....	Mines Master Index File
ABANDONED MINES.....	Abandoned Mines
FINDS.....	Facility Index System/Facility Registry System
UXO.....	Unexploded Ordnance Sites
ECHO.....	Enforcement & Compliance History Information
DOCKET HWC.....	Hazardous Waste Compliance Docket Listing
FUELS PROGRAM.....	EPA Fuels Program Registered Listing
AGVIC.....	Agricultural Voluntary Investigation & Cleanup Listing
AIRS.....	Permit Contact List
BULK.....	Bulk Facilities Database
COAL ASH.....	Coal Ash Disposal Site Listing
DRYCLEANERS.....	Registered Drycleaning Facilities
ENF.....	Generators Associated with Enforcement Logs
Financial Assurance.....	Financial Assurance Information Listing
MN HWS Permit.....	Active TSD Facilities
MANIFEST.....	Hazardous Waste Manifest Data
MDA LIS.....	Licensing Information System Database Listing
MN LS.....	List of Sites
TIER 2.....	Tier 2 Facility Listing
VAPOR.....	Vapor Intrusion
NPDES.....	Wastewater Permits Listing

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP.....	EDR Proprietary Manufactured Gas Plants
EDR Hist Auto.....	EDR Exclusive Historical Auto Stations
EDR Hist Cleaner.....	EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS.....	Recovered Government Archive State Hazardous Waste Facilities List
RGA LF.....	Recovered Government Archive Solid Waste Facilities List
RGA LUST.....	Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property. Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in *bold italics* are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

WIMN: Since 2003, the PCA's "What's in My Neighborhood?" database provides information about air quality, hazardous waste, remediation, solid waste, tanks and leaks, and water quality around Minnesota.

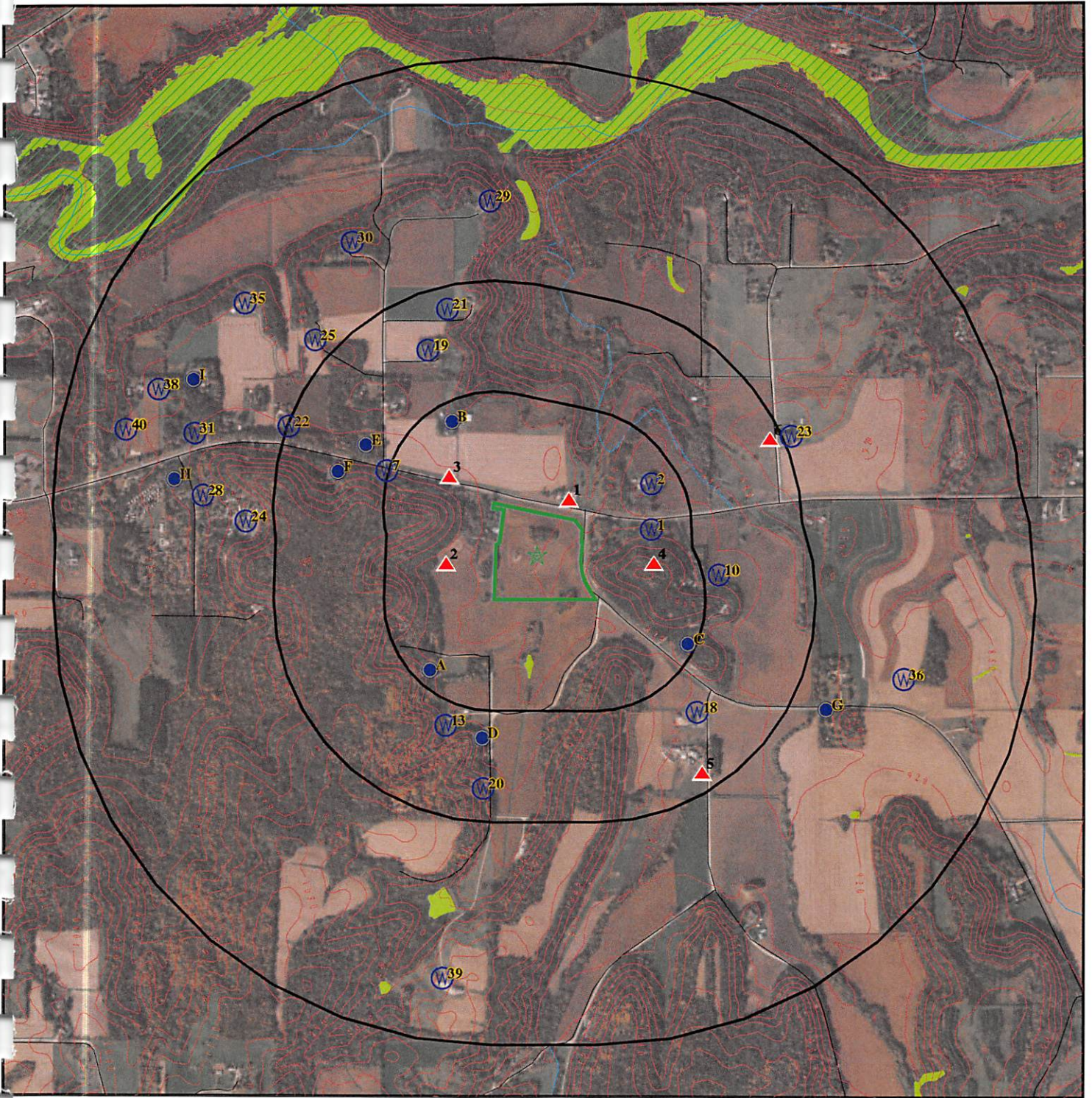
A review of the WIMN list, as provided by EDR, and dated 01/06/2018 has revealed that there are 6 WIMN sites within approximately 0.5 miles of the target property.

<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
GREGORY A HOFFMAN FA Status: Y	8683 HIGHWAY 19 BLVD	NNE 0 - 1/8 (0.043 mi.)	1	8
DOUGLAS W STEGEMANN Status: Y	8510 HIGHWAY 19 BLVD	W 0 - 1/8 (0.111 mi.)	2	9
ROBERT SWANSON FARM Status: Y	8415 HIGHWAY 19 BLVD	NW 0 - 1/8 (0.118 mi.)	3	10
RICHARD R LUDWIG FAR Status: Y	8914 HIGHWAY 19 BLVD	E 1/8 - 1/4 (0.156 mi.)	4	11
RAYMOND W OTTO FARM Status: Y	30855 CLARK VALLEY T	SE 1/4 - 1/2 (0.458 mi.)	5	13
GERALD AUGUST KUHN F Status: Y	30150 91ST AVE	ENE 1/4 - 1/2 (0.472 mi.)	6	14

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 5193063.2S



✓ Target Property

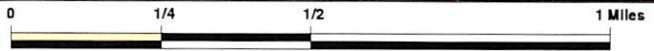
▲ Sites at elevations higher than or equal to the target property

▼ Sites at elevations lower than the target property

▲ Manufactured Gas Plants

■ National Priority List Sites

■ Dept. Defense Sites



■ Indian Reservations BIA

■ 100-year flood zone

■ 500-year flood zone

■ National Wetland Inventory

■ State Wetlands

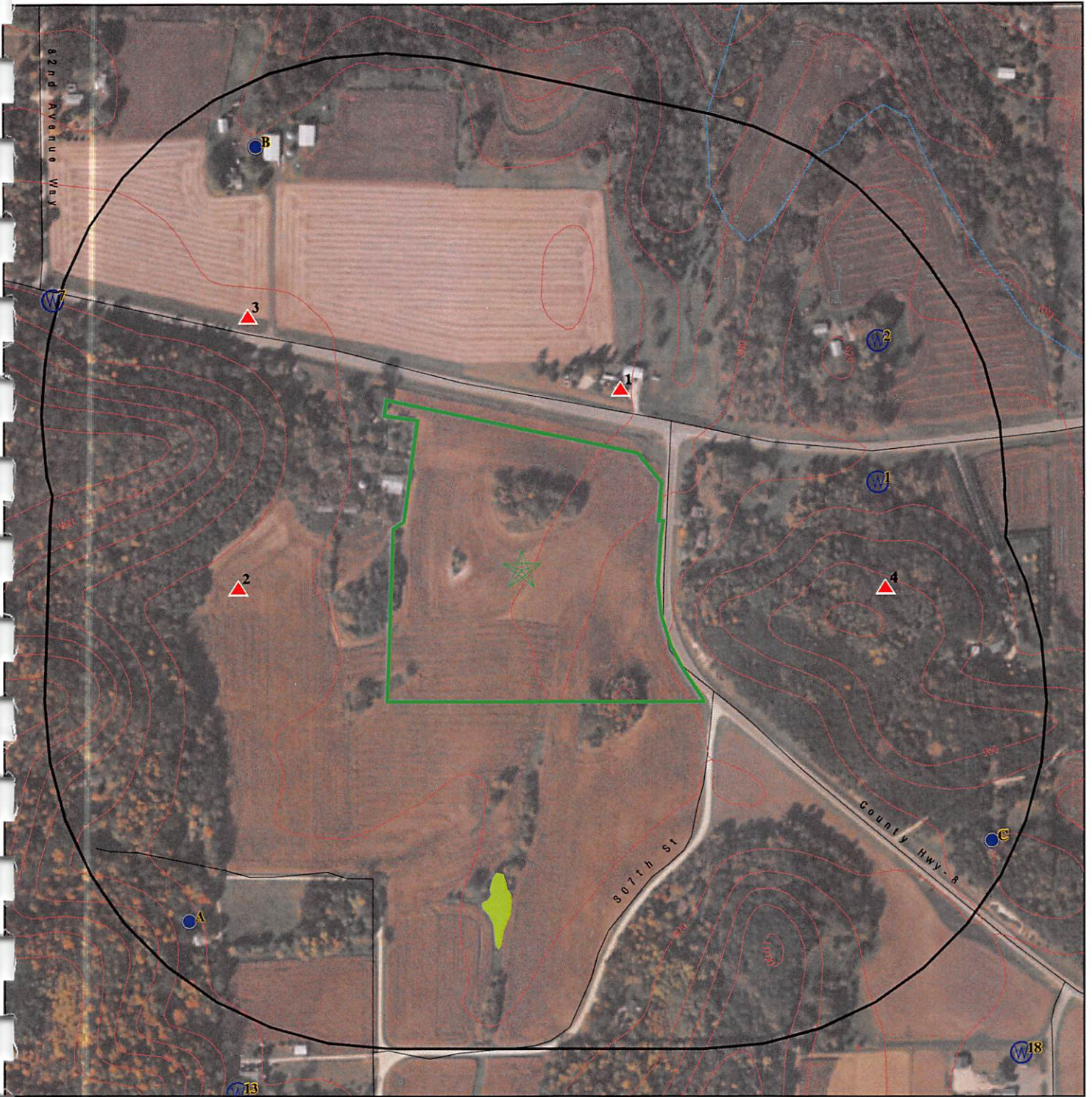
■ Upgradient Area

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Bylesby Garden
 ADDRESS: Not Reported
 Cannon Falls MN 55009
 LAT/LONG: 44.508338 / 92.858874

CLIENT: Westwood Professional Services
 CONTACT: David Kuhlmann
 INQUIRY #: 5193063.2s
 DATE: February 20, 2018 11:24 am

DETAIL MAP - 5193063.2S



- ✓ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- ⚡ Sensitive Receptors
- ☒ National Priority List Sites
- ☒ Dept. Defense Sites

- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands



This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

<p>SITE NAME: Byllesby Garden ADDRESS: Not Reported Cannon Falls MN 55009 LAT/LONG: 44.508338 / 92.858874</p>	<p>CLIENT: Westwood Professional Services CONTACT: David Kuhlmann INQUIRY #: 5193063.2s DATE: February 20, 2018 11:25 am</p>
--	---

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
<u>STANDARD ENVIRONMENTAL RECORDS</u>								
<i>Federal NPL site list</i>								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	0.001		0	NR	NR	NR	NR	0
<i>Federal Delisted NPL site list</i>								
Delisted NPL	1.000		0	0	0	0	NR	0
<i>Federal CERCLIS list</i>								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
<i>Federal CERCLIS NFRAP site list</i>								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
<i>Federal RCRA CORRACTS facilities list</i>								
CORRACTS	1.000		0	0	0	0	NR	0
<i>Federal RCRA non-CORRACTS TSD facilities list</i>								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
<i>Federal RCRA generators list</i>								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
<i>Federal institutional controls / engineering controls registries</i>								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
<i>Federal ERNS list</i>								
ERNS	0.001		0	NR	NR	NR	NR	0
<i>State- and tribal - equivalent NPL</i>								
MN PLP	1.000		0	0	0	0	NR	0
<i>State- and tribal - equivalent CERCLIS</i>								
SHWS	1.000		0	0	0	0	NR	0
<i>State and tribal landfill and/or solid waste disposal site lists</i>								
UNPERM LF	0.500		0	0	0	NR	NR	0
SWF/LF	0.500		0	0	0	NR	NR	0
LCP	0.500		0	0	0	NR	NR	0
<i>State and tribal leaking storage tank lists</i>								
LAST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LUST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
VIC	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
SWRCY	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
SRS	0.500		0	0	0	NR	NR	0
CDL	0.001		0	NR	NR	NR	NR	0
MN DEL PLP	1.000		0	0	0	0	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
Local Land Records								
LIENS	0.001		0	NR	NR	NR	NR	0
LIENS 2	0.001		0	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0
SPILLS	0.001		0	NR	NR	NR	NR	0
AGSPILLS	0.001		0	NR	NR	NR	NR	0
SPILLS 90	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SPILLS 80	0.001		0	NR	NR	NR	NR	0
<i>Other Ascertainable Records</i>								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	0.001		0	NR	NR	NR	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.001		0	NR	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AGVIC	0.500		0	0	0	NR	NR	0
AIRS	0.001		0	NR	NR	NR	NR	0
BULK	0.250		0	0	NR	NR	NR	0
COAL ASH	0.500		0	0	0	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
ENF	0.001		0	NR	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
MN HWS Permit	1.000		0	0	0	0	NR	0
MANIFEST	0.250		0	0	NR	NR	NR	0
MDA LIS	0.250		0	0	NR	NR	NR	0
MN LS	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

<u>Database</u>	<u>Search Distance (Miles)</u>	<u>Target Property</u>	<u>< 1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>> 1</u>	<u>Total Plotted</u>
TIER 2	0.001		0	NR	NR	NR	NR	0
VAPOR	0.500		0	0	0	NR	NR	0
WIMN	0.500		3	1	2	NR	NR	6
NPDES	0.001		0	NR	NR	NR	NR	0

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS	0.001		0	NR	NR	NR	NR	0
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0

- Totals --		0	3	1	2	0	0	6
-------------	--	---	---	---	---	---	---	---

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID
 Direction
 Distance
 Elevation

Site

Database(s) EDR ID Number
 EPA ID Number

1
 NNE
 < 1/8
 0.043 mi.
 226 ft.

GREGORY A HOFFMAN FARM
8683 HIGHWAY 19 BLVD
CANNON FALLS, MN 55009

WIMN S110200712
 N/A

Relative:
 Higher

WIMN:

Actual:
 883 ft.

Status:	Y
Latitude:	44.508743639999999
Longitude:	-92.85851796
Item ID:	67260-AISI0000067260
AI ID:	67260
Document ID:	0
Subject Item Type Code:	CON
Subject Item Category Code:	AISI
Subject Item ID:	67260
Subject Item Category Description:	Agency Interest
Subject Item Type Description:	Conventional Site
Description:	Not reported
Subject Item Designation:	Not reported
MPCA Program:	Feedlots
Program List:	FE
City, Township or Unorganized code:	663744
City, Township or Unorganized Name:	Cannon Falls Township
Congressional District Code:	2
House District:	21A
Senate District:	21
USGS 8-digits:	07040002
USGS 8-digits Name:	Cannon River
USGS 10-digits:	0704000209
USGS 12-digits:	070400020903
USGS 12-digits Name:	Town of Welch-Cannon River
MDH Drinking Water Management Code:	Not reported
MDH Drinking Water Management Name:	Not reported
Location Description:	Not reported
Township, Range, Direction, Section QQ:	11217216ac
PLS Township:	112
Range:	17
Range Direction:	W
Section:	16
Quarters:	ac
Collection Method Code:	Q2
Method Description:	Public Land Survey-Two Quarter
Ref Code:	GEN
Ref Description:	General Location
Location Verified Flag:	N
Collection Date:	09/28/2015
Timestamp of Creation:	03/12/2002
User Name of Creator:	DELTA_M_R1
Timestamp of Last Update:	04/26/2016
User Name of Last Update:	spatial_
Status Date:	Not reported
The Delta Spatial ID:	67677
Activity:	Feedlots
Activity List:	Feedlots
MPCA ID:	049-72544
MPCA List:	049-72544
Program List:	Feedlots
Classification:	Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

GREGORY A HOFFMAN FARM (Continued)

S110200712

Site URL: <http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=67260>

WIMN:

Legislative District: 21A
Latitude: 44.50874389
Longitude: -92.85851730
Activity: Feedlot
MPCA ID: 04972544
Major Watershed: Cannon River
Site URL: <http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=93937>
Coordinate Collection Method: Public Land Survey-Two Quarter
Status: Active

2
West
< 1/8
0.111 mi.
587 ft.

DOUGLAS W STEGEMANN FARM
8510 HIGHWAY 19 BLVD
CANNON FALLS, MN 55009

WIMN S110193626
N/A

Relative:
Higher

WIMN:

Actual:
913 ft.

Status: Y
Latitude: 44.508733460000002
Longitude: -92.86351071
Item ID: 67262-AISI0000067262
AI ID: 67262
Document ID: 0
Subject Item Type Code: CON
Subject Item Category Code: AISI
Subject Item ID: 67262
Subject Item Category Description: Agency Interest
Subject Item Type Description: Conventional Site
Description: Not reported
Subject Item Designation: Not reported
MPCA Program: Feedlots
Program List: FE
City, Township or Unorganized code: 663744
City, Township or Unorganized Name: Cannon Falls Township
Congressional District Code: 2
House District: 21A
Senate District: 21
USGS 8-digits: 07040002
USGS 8-digits Name: Cannon River
USGS 10-digits: 0704000209
USGS 12-digits: 070400020903
USGS 12-digits Name: Town of Welch-Cannon River
MDH Drinking Water Management Code: Not reported
MDH Drinking Water Management Name: Not reported
Location Description: Not reported
Township, Range, Direction, Section QQ: 11217216bd
PLS Township: 112
Range: 17
Range Direction: W
Section: 16
Quarters: bd
Collection Method Code: Q2
Method Description: Public Land Survey-Two Quarter
Ref Code: GEN

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

DOUGLAS W STEGEMANN FARM (Continued)

S110193626

Ref Description: General Location
Location Verified Flag: N
Collection Date: 09/28/2015
Timestamp of Creation: 03/12/2002
User Name of Creator: DELTA_M_R1
Timestamp of Last Update: 04/26/2016
User Name of Last Update: spatial_
Status Date: Not reported
The Delta Spatial ID: 67679
Activity: Feedlots
Activity List: Feedlots
MPCA ID: 049-72546
MPCA List: 049-72546
Program List: Feedlots
Classification: Not reported
Site URL: <http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=67262>

WIMN:

Legislative District: 21A
Latitude: 44.50873365
Longitude: -92.86351007
Activity: Feedlot
MPCA ID: 04972546
Major Watershed: Cannon River
Site URL: <http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=93939>
Coordinate Collection Method: Public Land Survey-Two Quarter
Status: Active

3
NW
< 1/8
0.118 mi.
621 ft.

ROBERT SWANSON FARM
8415 HIGHWAY 19 BLVD
CANNON FALLS, MN 55009

WIMN S110227011
N/A

Relative:
Higher

WIMN:

Actual:
906 ft.

Status: Y
Latitude: 44.512302300000002
Longitude: -92.863500419999994
Item ID: 67264-AISI0000067264
AI ID: 67264
Document ID: 0
Subject Item Type Code: CON
Subject Item Category Code: AISI
Subject Item ID: 67264
Subject Item Category Description: Agency Interest
Subject Item Type Description: Conventional Site
Description: Not reported
Subject Item Designation: Not reported
MPCA Program: Feedlots
Program List: FE
City, Township or Unorganized code: 663744
City, Township or Unorganized Name: Cannon Falls Township
Congressional District Code: 2
House District: 21A
Senate District: 21
USGS 8-digits: 07040002
USGS 8-digits Name: Cannon River

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

ROBERT SWANSON FARM (Continued)

S110227011

USGS 10-digits: 0704000209
USGS 12-digits: 070400020903
USGS 12-digits Name: Town of Welch-Cannon River
MDH Drinking Water Management Code: Not reported
MDH Drinking Water Management Name: Not reported
Location Description: Not reported
Township, Range, Direction, Section QQ: 11217216ba
PLS Township: 112
Range: 17
Range Direction: W
Section: 16
Quarters: ba
Collection Method Code: Q2
Method Description: Public Land Survey-Two Quarter
Ref Code: GEN
Ref Description: General Location
Location Verified Flag: N
Collection Date: 09/28/2015
Timestamp of Creation: 03/12/2002
User Name of Creator: DELTA_M_R1
Timestamp of Last Update: 04/26/2016
User Name of Last Update: spatial_
Status Date: Not reported
The Delta Spatial ID: 67681
Activity: Feedlots
Activity List: Feedlots
MPCA ID: 049-82725
MPCA List: 049-82725
Program List: Feedlots
Classification: Not reported
Site URL: <http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=67264>

WIMN:

Legislative District: 21A
Latitude: 44.51230251
Longitude: -92.86349979
Activity: Feedlot
MPCA ID: 04982725
Major Watershed: Cannon River
Site URL: <http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=93941>
Coordinate Collection Method: Public Land Survey-Two Quarter
Status: Active

4
East
1/8-1/4
0.156 mi.
823 ft.

RICHARD R LUDWIG FARM
8914 HIGHWAY 19 BLVD
CANNON FALLS, MN 55009

WIMN S110225670
N/A

Relative:
Higher

WIMN:

Status: Y
Latitude: 44.508753720000001
Longitude: -92.853525219999995
Item ID: 67256-AISI0000067256
AI ID: 67256
Document ID: 0
Subject Item Type Code: CON

Actual:
966 ft.

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

RICHARD R LUDWIG FARM (Continued)

S110225670

Subject Item Category Code: AISI
Subject Item ID: 67256
Subject Item Category Description: Agency Interest
Subject Item Type Description: Conventional Site
Description: Not reported
Subject Item Designation: Not reported
MPCA Program: Feedlots
Program List: FE
City, Township or Unorganized code: 663744
City, Township or Unorganized Name: Cannon Falls Township
Congressional District Code: 2
House District: 21A
Senate District: 21
USGS 8-digits: 07040002
USGS 8-digits Name: Cannon River
USGS 10-digits: 0704000209
USGS 12-digits: 070400020903
USGS 12-digits Name: Town of Welch-Cannon River
MDH Drinking Water Management Code: Not reported
MDH Drinking Water Management Name: Not reported
Location Description: Not reported
Township, Range, Direction, Section QQ: 11217216ad
PLS Township: 112
Range: 17
Range Direction: W
Section: 16
Quarters: ad
Collection Method Code: Q2
Method Description: Public Land Survey-Two Quarter
Ref Code: GEN
Ref Description: General Location
Location Verified Flag: N
Collection Date: 09/28/2015
Timestamp of Creation: 03/12/2002
User Name of Creator: DELTA_M_R1
Timestamp of Last Update: 04/26/2016
User Name of Last Update: spatial_
Status Date: Not reported
The Delta Spatial ID: 67673
Activity: Feedlots
Activity List: Feedlots
MPCA ID: 049-72540
MPCA List: 049-72540
Program List: Feedlots
Classification: Not reported
Site URL: <http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=67256>

WIMN:

Legislative District: 21A
Latitude: 44.50875397
Longitude: -92.85352457
Activity: Feedlot
MPCA ID: 04972540
Major Watershed: Cannon River
Site URL: <http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=93933>
Coordinate Collection Method: Public Land Survey-Two Quarter
Status: Active

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
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5
 SE
 1/4-1/2
 0.458 mi.
 2416 ft.

WIMN S110224717
 N/A

Relative:
Higher

WIMN:

Actual:
912 ft.

Status:	Y
Latitude:	44.501596900000003
Longitude:	-92.853476099999995
Item ID:	67126-AISI0000067126
AI ID:	67126
Document ID:	0
Subject Item Type Code:	CON
Subject Item Category Code:	AISI
Subject Item ID:	67126
Subject Item Category Description:	Agency Interest
Subject Item Type Description:	Conventional Site
Description:	Not reported
Subject Item Designation:	Not reported
MPCA Program:	Feedlots
Program List:	FE
City, Township or Unorganized code:	663744
City, Township or Unorganized Name:	Cannon Falls Township
Congressional District Code:	2
House District:	21A
Senate District:	21
USGS 8-digits:	07040002
USGS 8-digits Name:	Cannon River
USGS 10-digits:	0704000209
USGS 12-digits:	070400020903
USGS 12-digits Name:	Town of Welch-Cannon River
MDH Drinking Water Management Code:	Not reported
MDH Drinking Water Management Name:	Not reported
Location Description:	Not reported
Township, Range, Direction, Section QQ:	11217216dd
PLS Township:	112
Range:	17
Range Direction:	W
Section:	16
Quarters:	dd
Collection Method Code:	A1
Method Description:	Address Matching House Number
Ref Code:	GEN
Ref Description:	General Location
Location Verified Flag:	N
Collection Date:	09/28/2015
Timestamp of Creation:	03/12/2002
User Name of Creator:	DELTA_M_R1
Timestamp of Last Update:	04/26/2016
User Name of Last Update:	spatial_
Status Date:	Not reported
The Delta Spatial ID:	68190
Activity:	Feedlots
Activity List:	Feedlots
MPCA ID:	049-73099
MPCA List:	049-73099
Program List:	Feedlots
Classification:	Not reported

Map ID
 Direction
 Distance
 Elevation

MAP FINDINGS

EDR ID Number
 EPA ID Number

Site

Database(s)

RAYMOND W OTTO FARM (Continued)

S110224717

Site URL: <http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=67126>

WIMN:
 Legislative District: 21A
 Latitude: 44.50168707
 Longitude: -92.85110059
 Activity: Feedlot
 MPCA ID: 04973099
 Major Watershed: Cannon River
 Site URL: <http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=94451>
 Coordinate Collection Method: Address Matching House Number
 Status: Active

6
 ENE
 1/4-1/2
 0.472 mi.
 2494 ft.

GERALD AUGUST KUHN FARM
30150 91ST AVE
CANNON FALLS, MN 55009

WIMN S110199211
 N/A

Relative:
 Higher

WIMN:
 Status: Y
 Latitude: 44.512339760000003
 Longitude: -92.848548809999997
 Item ID: 67348-AISI0000067348
 AI ID: 67348
 Document ID: 0
 Subject Item Type Code: CON
 Subject Item Category Code: AISI
 Subject Item ID: 67348
 Subject Item Category Description: Agency Interest
 Subject Item Type Description: Conventional Site
 Description: Not reported
 Subject Item Designation: Not reported
 MPCA Program: Feedlots
 Program List: FE
 City, Township or Unorganized code: 663744
 City, Township or Unorganized Name: Cannon Falls Township
 Congressional District Code: 2
 House District: 21A
 Senate District: 21
 USGS 8-digits: 07040002
 USGS 8-digits Name: Cannon River
 USGS 10-digits: 0704000209
 USGS 12-digits: 070400020903
 USGS 12-digits Name: Town of Welch-Cannon River
 MDH Drinking Water Management Code: Not reported
 MDH Drinking Water Management Name: Not reported
 Location Description: Not reported
 Township, Range, Direction, Section QQ: 11217215bb
 PLS Township: 112
 Range: 17
 Range Direction: W
 Section: 15
 Quarters: bb
 Collection Method Code: Q2
 Method Description: Public Land Survey-Two Quarter
 Ref Code: GEN

Actual:
 906 ft.

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

GERALD AUGUST KUHN FARM (Continued)

S110199211

Ref Description:	General Location
Location Verified Flag:	N
Collection Date:	09/28/2015
Timestamp of Creation:	03/12/2002
User Name of Creator:	DELTA_M_R1
Timestamp of Last Update:	04/26/2016
User Name of Last Update:	spatial_
Status Date:	Not reported
The Delta Spatial ID:	68204
Activity:	Feedlots
Activity List:	Feedlots
MPCA ID:	049-73113
MPCA List:	049-73113
Program List:	Feedlots
Classification:	Not reported
Site URL:	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=67348

WIMN:

Legislative District:	21A
Latitude:	44.51233935
Longitude:	-92.84854862
Activity:	Feedlot
MPCA ID:	04973113
Major Watershed:	Cannon River
Site URL:	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=94465
Coordinate Collection Method:	Public Land Survey-Two Quarter
Status:	Active

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
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NO SITES FOUND

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/11/2017	Source: EPA
Date Data Arrived at EDR: 12/22/2017	Telephone: N/A
Date Made Active in Reports: 01/05/2018	Last EDR Contact: 02/06/2018
Number of Days to Update: 14	Next Scheduled EDR Contact: 04/16/2018
	Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/11/2017	Source: EPA
Date Data Arrived at EDR: 12/22/2017	Telephone: N/A
Date Made Active in Reports: 01/05/2018	Last EDR Contact: 02/06/2018
Number of Days to Update: 14	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991	Source: EPA
Date Data Arrived at EDR: 02/02/1994	Telephone: 202-564-4267
Date Made Active in Reports: 03/30/1994	Last EDR Contact: 08/15/2011
Number of Days to Update: 56	Next Scheduled EDR Contact: 11/28/2011
	Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

Defisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/11/2017	Source: EPA
Date Data Arrived at EDR: 12/22/2017	Telephone: N/A
Date Made Active in Reports: 01/05/2018	Last EDR Contact: 02/06/2018
Number of Days to Update: 14	Next Scheduled EDR Contact: 04/16/2018
	Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/05/2017	Telephone: 703-603-8704
Date Made Active in Reports: 04/07/2017	Last EDR Contact: 01/05/2018
Number of Days to Update: 92	Next Scheduled EDR Contact: 04/16/2018
	Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 12/11/2017	Source: EPA
Date Data Arrived at EDR: 12/22/2017	Telephone: 800-424-9346
Date Made Active in Reports: 01/12/2018	Last EDR Contact: 02/06/2018
Number of Days to Update: 21	Next Scheduled EDR Contact: 04/30/2018
	Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 12/11/2017	Source: EPA
Date Data Arrived at EDR: 12/22/2017	Telephone: 800-424-9346
Date Made Active in Reports: 01/12/2018	Last EDR Contact: 02/06/2018
Number of Days to Update: 21	Next Scheduled EDR Contact: 04/30/2018
	Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/11/2017	Source: EPA
Date Data Arrived at EDR: 12/26/2017	Telephone: 800-424-9346
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 45	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/11/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/26/2017	Telephone: 312-886-6186
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 45	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/11/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/26/2017	Telephone: 312-886-6186
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 45	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/11/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/26/2017	Telephone: 312-886-6186
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 45	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/11/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/26/2017	Telephone: 312-886-6186
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 45	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/22/2017	Source: Department of the Navy
Date Data Arrived at EDR: 06/13/2017	Telephone: 843-820-7326
Date Made Active in Reports: 09/15/2017	Last EDR Contact: 02/09/2018
Number of Days to Update: 94	Next Scheduled EDR Contact: 05/28/2018
	Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 11/13/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/27/2017	Telephone: 703-603-0695
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 74	Next Scheduled EDR Contact: 03/12/2018
	Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 11/13/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/27/2017	Telephone: 703-603-0695
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 74	Next Scheduled EDR Contact: 03/12/2018
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/18/2017
Date Data Arrived at EDR: 09/21/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 22

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Quarterly

State- and tribal - equivalent NPL

MN PLP: Permanent List of Priorities

The list identifies hazardous waste sites where investigation and cleanup are needed, cleanup is underway, or cleanup has been completed and long-term monitoring or maintenance continues.

Date of Government Version: 11/30/2017
Date Data Arrived at EDR: 12/05/2017
Date Made Active in Reports: 01/25/2018
Number of Days to Update: 51

Source: Pollution Control Agency
Telephone: 651-296-6139
Last EDR Contact: 12/05/2017
Next Scheduled EDR Contact: 03/19/2018
Data Release Frequency: Semi-Annually

State- and tribal - equivalent CERCLIS

SHWS: Superfund Site Information Listing

The SRS database includes all sites that the State Superfund Program is dealing with or has dealt with. The Superfund Program identifies, investigates and determines appropriate cleanup plans for abandoned or uncontrolled hazardous waste sites where a release or potential release of a hazardous substance poses a risk to human health or the environment.

Date of Government Version: 11/30/2017
Date Data Arrived at EDR: 12/05/2017
Date Made Active in Reports: 01/25/2018
Number of Days to Update: 51

Source: Minnesota Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 12/05/2017
Next Scheduled EDR Contact: 03/19/2018
Data Release Frequency: Semi-Annually

State and tribal landfill and/or solid waste disposal site lists

UNPERM LF: Unpermitted Facilities

These are facilities that have solid waste disposal yet are not permitted.

Date of Government Version: 11/01/2017
Date Data Arrived at EDR: 11/08/2017
Date Made Active in Reports: 01/03/2018
Number of Days to Update: 56

Source: Pollution Control Agency
Telephone: 651-757-2665
Last EDR Contact: 02/07/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Semi-Annually

SWF/LF: Permitted Solid Waste Disposal Facilities

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 11/01/2017
Date Data Arrived at EDR: 11/08/2017
Date Made Active in Reports: 01/03/2018
Number of Days to Update: 56

Source: Minnesota Pollution Control Agency
Telephone: 651-296-7276
Last EDR Contact: 02/07/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

LCP: Closed Landfills Priority List

The Minnesota Legislature enacted a law to manage and clean up the state's closed Mixed Municipal Solid Waste Landfills. Under that law, the MPCA is required to create and periodically revise a priority list of qualified landfills, based on the relative health and environmental risks they present. The MPCA established the first such priority list in December, 1994.

Date of Government Version: 01/31/2017
Date Data Arrived at EDR: 03/01/2017
Date Made Active in Reports: 05/30/2017
Number of Days to Update: 90

Source: Minnesota Pollution Control Agency
Telephone: 651-296-9543
Source: Pollution Control Agency, GIS Section
Telephone: 651-296-7266
Last EDR Contact: 02/15/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Annually

State and tribal leaking storage tank lists

LAST: Leaking Aboveground Storage Tanks

A listing of leaking aboveground storage tanks.

Date of Government Version: 11/03/2017
Date Data Arrived at EDR: 11/08/2017
Date Made Active in Reports: 01/04/2018
Number of Days to Update: 57

Source: Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 02/07/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Semi-Annually

LUST: Leak Sites

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 11/03/2017
Date Data Arrived at EDR: 11/08/2017
Date Made Active in Reports: 01/04/2018
Number of Days to Update: 57

Source: Minnesota Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 02/07/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Semi-Annually

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 04/13/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 05/01/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/14/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 04/24/2017	Source: EPA Region 6
Date Data Arrived at EDR: 07/27/2017	Telephone: 214-665-6597
Date Made Active in Reports: 10/06/2017	Last EDR Contact: 01/23/2018
Number of Days to Update: 71	Next Scheduled EDR Contact: 05/07/2018
	Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 10/14/2016	Source: EPA Region 4
Date Data Arrived at EDR: 01/27/2017	Telephone: 404-562-8677
Date Made Active in Reports: 05/05/2017	Last EDR Contact: 01/19/2018
Number of Days to Update: 98	Next Scheduled EDR Contact: 05/07/2018
	Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/14/2017	Source: EPA Region 1
Date Data Arrived at EDR: 07/27/2017	Telephone: 617-918-1313
Date Made Active in Reports: 10/06/2017	Last EDR Contact: 01/23/2018
Number of Days to Update: 71	Next Scheduled EDR Contact: 05/07/2018
	Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/26/2017	Source: EPA, Region 5
Date Data Arrived at EDR: 07/27/2017	Telephone: 312-886-7439
Date Made Active in Reports: 10/13/2017	Last EDR Contact: 01/23/2018
Number of Days to Update: 78	Next Scheduled EDR Contact: 05/07/2018
	Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 04/25/2017	Source: EPA Region 10
Date Data Arrived at EDR: 11/07/2017	Telephone: 206-553-2857
Date Made Active in Reports: 12/08/2017	Last EDR Contact: 01/23/2018
Number of Days to Update: 31	Next Scheduled EDR Contact: 05/07/2018
	Data Release Frequency: Varies

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 05/15/2017	Source: FEMA
Date Data Arrived at EDR: 05/30/2017	Telephone: 202-646-5797
Date Made Active in Reports: 10/13/2017	Last EDR Contact: 01/09/2018
Number of Days to Update: 136	Next Scheduled EDR Contact: 04/23/2018
	Data Release Frequency: Varies

UST: Underground Storage Tank Database

Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 11/03/2017
Date Data Arrived at EDR: 11/08/2017
Date Made Active in Reports: 01/03/2018
Number of Days to Update: 56

Source: Minnesota Pollution Control Agency
Telephone: 651-649-5451
Last EDR Contact: 02/07/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Semi-Annually

AST: Aboveground Storage Tanks
Registered Aboveground Storage Tanks.

Date of Government Version: 11/03/2017
Date Data Arrived at EDR: 11/08/2017
Date Made Active in Reports: 01/03/2018
Number of Days to Update: 56

Source: Minnesota Pollution Control Agency
Telephone: 651-296-0930
Last EDR Contact: 02/07/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/26/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 04/13/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 05/02/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 05/01/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 10/14/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 98

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 04/14/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 04/25/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 04/24/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 134

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

INST CONTROL: Site Remediation Section Database

Sites that have an Institutional Control event.

Date of Government Version: 11/30/2017
Date Data Arrived at EDR: 12/05/2017
Date Made Active in Reports: 01/25/2018
Number of Days to Update: 51

Source: Pollution Control Agency
Telephone: 512-296-6300
Last EDR Contact: 12/05/2017
Next Scheduled EDR Contact: 03/19/2018
Data Release Frequency: Semi-Annually

State and tribal voluntary cleanup sites

VIC: Voluntary Investigation and Cleanup Program

Voluntary Investigation and Cleanup (VIC) Program List.

Date of Government Version: 11/30/2017
Date Data Arrived at EDR: 12/05/2017
Date Made Active in Reports: 01/25/2018
Number of Days to Update: 51

Source: Minnesota Pollution Control Agency
Telephone: 651-296-7291
Last EDR Contact: 12/05/2017
Next Scheduled EDR Contact: 03/19/2018
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN VCP R7: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008	Source: EPA, Region 7
Date Data Arrived at EDR: 04/22/2008	Telephone: 913-551-7365
Date Made Active in Reports: 05/19/2008	Last EDR Contact: 04/20/2009
Number of Days to Update: 27	Next Scheduled EDR Contact: 07/20/2009
	Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015	Source: EPA, Region 1
Date Data Arrived at EDR: 09/29/2015	Telephone: 617-918-1102
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 12/20/2017
Number of Days to Update: 142	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Petroleum Brownfields Program Sites

Purchasing, selling, or developing property can present a special set of obstacles if the property is contaminated with chemicals. The Petroleum Brownfields Program is one of several programs within the Minnesota Pollution Control Agency (MPCA) designed to help people address these obstacles. The purpose of the Petroleum Brownfields Program is to provide the technical assistance and liability assurance needed to expedite and facilitate the development, transfer, investigation and/or cleanup of property that is contaminated with petroleum.

Date of Government Version: 11/30/2017	Source: Pollution Control Agency
Date Data Arrived at EDR: 12/05/2017	Telephone: 651-296-7999
Date Made Active in Reports: 01/25/2018	Last EDR Contact: 12/05/2017
Number of Days to Update: 51	Next Scheduled EDR Contact: 03/19/2018
	Data Release Frequency: Semi-Annually

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 01/19/2018	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/19/2018	Telephone: 202-566-2777
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 21	Next Scheduled EDR Contact: 04/02/2018
	Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY: Recycling Facilities

A listing of companies that accept commercial quantities of recyclable materials.

Date of Government Version: 12/23/2016	Source: Pollution Control Agency
Date Data Arrived at EDR: 12/27/2016	Telephone: 651-296-6300
Date Made Active in Reports: 04/05/2017	Last EDR Contact: 02/02/2018
Number of Days to Update: 99	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 01/30/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land

A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Services, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 02/02/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 01/19/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 16

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 03/12/2018
Data Release Frequency: No Update Planned

SRS: Site Remediation Section Database

The database contains site information for sites monitored by the Site Remediation Section.

Date of Government Version: 11/30/2017
Date Data Arrived at EDR: 12/05/2017
Date Made Active in Reports: 01/25/2018
Number of Days to Update: 51

Source: Pollution Control Agency
Telephone: 651-282-5988
Last EDR Contact: 12/05/2017
Next Scheduled EDR Contact: 03/19/2018
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CDL: Clandestine Drug Labs

This data was passively gathered. That is, the DOH asks law enforcement and other agencies to notify them of Clandestine Drug Labs (CDLs). They do not require reporting of events. Therefore the data represents only a subset of all CDLs. This data has not been verified. The DOH has made no attempt to verify that reported CDLs actually occurred. They have no knowledge if the CDL was involved in cooking or just consisted of chemicals associated with Meth production. The reports they receive are that a suspected CDL was seized.

Date of Government Version: 01/02/2018	Source: Department of Health
Date Data Arrived at EDR: 01/02/2018	Telephone: 651-215-5800
Date Made Active in Reports: 01/25/2018	Last EDR Contact: 01/02/2018
Number of Days to Update: 23	Next Scheduled EDR Contact: 04/16/2018
	Data Release Frequency: Quarterly

MN DEL PLP: Delisted Permanent List of Priorities

This generally means that either no more cleanup at a site is needed or that no state superfund funding is needed for long term monitoring activities.

Date of Government Version: 11/30/2017	Source: Pollution Control Agency
Date Data Arrived at EDR: 12/05/2017	Telephone: 651-296-6139
Date Made Active in Reports: 01/25/2018	Last EDR Contact: 12/05/2017
Number of Days to Update: 51	Next Scheduled EDR Contact: 03/19/2018
	Data Release Frequency: Semi-Annually

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 01/09/2018	Source: Drug Enforcement Administration
Date Data Arrived at EDR: 01/24/2018	Telephone: 202-307-1000
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 16	Next Scheduled EDR Contact: 03/12/2018
	Data Release Frequency: Quarterly

Local Land Records

LIENS: Environmental Liens

Sites included in the Site Remediation System Database that have Environmental Liens.

Date of Government Version: 02/16/2016	Source: Pollution Control Agency
Date Data Arrived at EDR: 03/09/2016	Telephone: 602-282-5988
Date Made Active in Reports: 04/06/2016	Last EDR Contact: 12/01/2017
Number of Days to Update: 28	Next Scheduled EDR Contact: 03/19/2018
	Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 12/11/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/22/2017	Telephone: 202-564-6023
Date Made Active in Reports: 01/12/2018	Last EDR Contact: 02/06/2018
Number of Days to Update: 21	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 09/21/2017	Source: U.S. Department of Transportation
Date Data Arrived at EDR: 09/21/2017	Telephone: 202-366-4555
Date Made Active in Reports: 10/13/2017	Last EDR Contact: 01/19/2018
Number of Days to Update: 22	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Quarterly

SPILLS: Spills Database

Spills reported to the Pollution Control Agency.

Date of Government Version: 11/03/2017	Source: Minnesota Pollution Control Agency
Date Data Arrived at EDR: 11/08/2017	Telephone: 651-649-5451
Date Made Active in Reports: 01/04/2018	Last EDR Contact: 02/07/2018
Number of Days to Update: 57	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Semi-Annually

AG SPILLS: Department of Agriculture Spills

This data is a list of pesticide/fertilizer incidents reported to have occurred in Minnesota.

Date of Government Version: 11/02/2017	Source: Department of Agriculture
Date Data Arrived at EDR: 11/08/2017	Telephone: 651-297-3997
Date Made Active in Reports: 01/02/2018	Last EDR Contact: 02/07/2018
Number of Days to Update: 55	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 11/01/2012	Source: FirstSearch
Date Data Arrived at EDR: 01/03/2013	Telephone: N/A
Date Made Active in Reports: 02/11/2013	Last EDR Contact: 01/03/2013
Number of Days to Update: 39	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

SPILLS 80: SPILLS80 data from FirstSearch

Spills 80 includes those spill and release records available from FirstSearch databases prior to 1990. Typically, they may include chemical, oil and/or hazardous substance spills recorded before 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 80.

Date of Government Version: 11/20/2001	Source: FirstSearch
Date Data Arrived at EDR: 01/03/2013	Telephone: N/A
Date Made Active in Reports: 03/06/2013	Last EDR Contact: 01/03/2013
Number of Days to Update: 62	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/11/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 12/26/2017	Telephone: 312-886-6186
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 45	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015	Source: U.S. Army Corps of Engineers
Date Data Arrived at EDR: 07/08/2015	Telephone: 202-528-4285
Date Made Active in Reports: 10/13/2015	Last EDR Contact: 11/22/2017
Number of Days to Update: 97	Next Scheduled EDR Contact: 03/05/2018
	Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005	Source: USGS
Date Data Arrived at EDR: 11/10/2006	Telephone: 888-275-8747
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 10/13/2017
Number of Days to Update: 62	Next Scheduled EDR Contact: 01/22/2018
	Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005	Source: U.S. Geological Survey
Date Data Arrived at EDR: 02/06/2006	Telephone: 888-275-8747
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 10/11/2017
Number of Days to Update: 339	Next Scheduled EDR Contact: 01/22/2018
	Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/03/2017	Telephone: 615-532-8599
Date Made Active in Reports: 04/07/2017	Last EDR Contact: 02/16/2018
Number of Days to Update: 63	Next Scheduled EDR Contact: 05/28/2018
	Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 10/17/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/01/2017	Telephone: 202-566-1917
Date Made Active in Reports: 12/08/2017	Last EDR Contact: 01/19/2018
Number of Days to Update: 37	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 01/31/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 02/08/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/21/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 198

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 12/22/2017
Next Scheduled EDR Contact: 04/02/2018
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 01/10/2018
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 2

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 01/10/2018
Next Scheduled EDR Contact: 03/05/2018
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 01/25/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 21

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 03/19/2018
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/02/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/17/2017	Telephone: 202-564-8600
Date Made Active in Reports: 12/08/2017	Last EDR Contact: 01/19/2018
Number of Days to Update: 21	Next Scheduled EDR Contact: 05/07/2018
	Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995	Source: EPA
Date Data Arrived at EDR: 07/03/1995	Telephone: 202-564-4104
Date Made Active in Reports: 08/07/1995	Last EDR Contact: 06/02/2008
Number of Days to Update: 35	Next Scheduled EDR Contact: 09/01/2008
	Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013	Source: EPA
Date Data Arrived at EDR: 10/17/2014	Telephone: 202-564-6023
Date Made Active in Reports: 10/20/2014	Last EDR Contact: 02/06/2018
Number of Days to Update: 3	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2017	Source: EPA
Date Data Arrived at EDR: 06/09/2017	Telephone: 202-566-0500
Date Made Active in Reports: 10/13/2017	Last EDR Contact: 01/12/2018
Number of Days to Update: 126	Next Scheduled EDR Contact: 04/23/2018
	Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/23/2016	Telephone: 202-564-2501
Date Made Active in Reports: 02/10/2017	Last EDR Contact: 01/09/2018
Number of Days to Update: 79	Next Scheduled EDR Contact: 04/23/2018
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009	Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 08/18/2017
Number of Days to Update: 25	Next Scheduled EDR Contact: 12/04/2017
	Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009	Source: EPA
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 08/18/2017
Number of Days to Update: 25	Next Scheduled EDR Contact: 12/04/2017
	Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016	Source: Nuclear Regulatory Commission
Date Data Arrived at EDR: 09/08/2016	Telephone: 301-415-7169
Date Made Active in Reports: 10/21/2016	Last EDR Contact: 01/19/2018
Number of Days to Update: 43	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005	Source: Department of Energy
Date Data Arrived at EDR: 08/07/2009	Telephone: 202-586-8719
Date Made Active in Reports: 10/22/2009	Last EDR Contact: 12/05/2017
Number of Days to Update: 76	Next Scheduled EDR Contact: 03/19/2018
	Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/10/2014	Telephone: N/A
Date Made Active in Reports: 10/20/2014	Last EDR Contact: 12/08/2017
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/19/2018
	Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 05/24/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/30/2017	Telephone: 202-566-0517
Date Made Active in Reports: 12/15/2017	Last EDR Contact: 01/26/2018
Number of Days to Update: 15	Next Scheduled EDR Contact: 05/07/2018
	Data Release Frequency: Varies

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 10/02/2017
Date Data Arrived at EDR: 10/05/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 8

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/04/2018
Next Scheduled EDR Contact: 04/16/2018
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transportation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transportation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 11/10/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 63

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 01/04/2018
Next Scheduled EDR Contact: 04/02/2018
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 09/28/2017
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 11/20/2017
Next Scheduled EDR Contact: 03/05/2018
Data Release Frequency: Biennially

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014	Source: USGS
Date Data Arrived at EDR: 07/14/2015	Telephone: 202-208-3710
Date Made Active in Reports: 01/10/2017	Last EDR Contact: 01/09/2018
Number of Days to Update: 546	Next Scheduled EDR Contact: 04/23/2018
	Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 12/23/2016	Source: Department of Energy
Date Data Arrived at EDR: 12/27/2016	Telephone: 202-586-3559
Date Made Active in Reports: 02/17/2017	Last EDR Contact: 01/19/2018
Number of Days to Update: 52	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 06/23/2017	Source: Department of Energy
Date Data Arrived at EDR: 10/11/2017	Telephone: 505-845-0011
Date Made Active in Reports: 11/03/2017	Last EDR Contact: 11/22/2017
Number of Days to Update: 23	Next Scheduled EDR Contact: 03/05/2018
	Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 10/10/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/03/2017	Telephone: 703-603-8787
Date Made Active in Reports: 12/15/2017	Last EDR Contact: 02/06/2018
Number of Days to Update: 42	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931 and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001	Source: American Journal of Public Health
Date Data Arrived at EDR: 10/27/2010	Telephone: 703-305-6451
Date Made Active in Reports: 12/02/2010	Last EDR Contact: 12/02/2009
Number of Days to Update: 36	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 10/29/2017
Date Data Arrived at EDR: 11/28/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 45

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 11/28/2017
Next Scheduled EDR Contact: 03/12/2018
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 12/01/2017
Next Scheduled EDR Contact: 03/12/2018
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 12/01/2017
Next Scheduled EDR Contact: 03/12/2018
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 09/25/2017
Date Data Arrived at EDR: 09/26/2017
Date Made Active in Reports: 10/20/2017
Number of Days to Update: 24

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 12/19/2017
Next Scheduled EDR Contact: 03/26/2018
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/23/2017	Source: EPA
Date Data Arrived at EDR: 09/06/2017	Telephone: (312) 353-2000
Date Made Active in Reports: 09/15/2017	Last EDR Contact: 01/19/2018
Number of Days to Update: 9	Next Scheduled EDR Contact: 03/19/2018
	Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 09/30/2016	Source: Department of Defense
Date Data Arrived at EDR: 10/31/2017	Telephone: 703-704-1564
Date Made Active in Reports: 01/12/2018	Last EDR Contact: 01/02/2018
Number of Days to Update: 73	Next Scheduled EDR Contact: 04/30/2018
	Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 09/02/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/06/2017	Telephone: 202-564-2280
Date Made Active in Reports: 10/20/2017	Last EDR Contact: 01/19/2018
Number of Days to Update: 44	Next Scheduled EDR Contact: 03/19/2018
	Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 06/27/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/21/2017	Telephone: 202-564-0527
Date Made Active in Reports: 01/12/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 52	Next Scheduled EDR Contact: 03/12/2018
	Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 11/20/2017	Source: EPA
Date Data Arrived at EDR: 11/20/2017	Telephone: 800-385-6164
Date Made Active in Reports: 01/12/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 53	Next Scheduled EDR Contact: 03/05/2018
	Data Release Frequency: Quarterly

AGVIC: Agricultural Voluntary Investigation & Cleanup Listing

A listing of agricultural voluntary investigation & cleanup site locations.

Date of Government Version: 11/02/2017	Source: Department of Agriculture
Date Data Arrived at EDR: 11/08/2017	Telephone: 651-201-6400
Date Made Active in Reports: 01/02/2018	Last EDR Contact: 02/07/2018
Number of Days to Update: 55	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

AIRS: Permit Contact List

A listing of permitted AIRS facilities.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 11/02/2017
Date Made Active in Reports: 11/13/2017
Number of Days to Update: 11

Source: Pollution Control Agency
Telephone: 651-296-7351
Last EDR Contact: 11/02/2017
Next Scheduled EDR Contact: 03/05/2018
Data Release Frequency: Varies

BULK: Bulk Facilities Database

Facilities that use bulk pesticides and fertilizers

Date of Government Version: 11/06/2017
Date Data Arrived at EDR: 11/08/2017
Date Made Active in Reports: 01/03/2018
Number of Days to Update: 56

Source: Department of Agriculture
Telephone: 651-297-3997
Last EDR Contact: 02/07/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

COAL ASH: Coal Ash Disposal Site Listing

A listing of coal ash disposal site locations.

Date of Government Version: 02/09/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 03/07/2017
Number of Days to Update: 25

Source: Pollution Control Agency
Telephone: 651-757-2740
Last EDR Contact: 02/05/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Varies

DRYCLEANERS: Registered Drycleaning Facilities

A listing of coin-operated laundries and drycleaning; drycleaning plants, except rug cleaning; and industrial launderers.

Date of Government Version: 09/22/2017
Date Data Arrived at EDR: 09/22/2017
Date Made Active in Reports: 10/25/2017
Number of Days to Update: 33

Source: Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 12/20/2017
Next Scheduled EDR Contact: 03/26/2018
Data Release Frequency: Semi-Annually

ENFORCEMENT: Generators Associated with Enforcement Logs

Regulatory Compliance, Hazardous Waste Enforcement Log and Hazardous Waste Permit Unit Project Identification List.

Date of Government Version: 08/14/2017
Date Data Arrived at EDR: 08/15/2017
Date Made Active in Reports: 10/17/2017
Number of Days to Update: 63

Source: Minnesota Pollution Control Agency
Telephone: 651-297-8332
Last EDR Contact: 12/20/2017
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 08/01/2016
Date Data Arrived at EDR: 08/10/2016
Date Made Active in Reports: 11/02/2016
Number of Days to Update: 84

Source: Pollution Control Agency
Telephone: 651-297-8220
Last EDR Contact: 02/05/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

Financial Assurance 2: Financial Assurance Information listing

A listing of financial assurance information for solid waste facilities.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 09/13/2017
Date Data Arrived at EDR: 09/15/2017
Date Made Active in Reports: 10/25/2017
Number of Days to Update: 40

Source: Pollution Control Agency
Telephone: 651-296-6066
Last EDR Contact: 02/05/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Annually

Financial Assurance 3: Financial Assurance Information Listing

A listing of financial assurance information for hazardous waste facilities.

Date of Government Version: 09/13/2017
Date Data Arrived at EDR: 09/15/2017
Date Made Active in Reports: 10/24/2017
Number of Days to Update: 39

Source: Pollution Control Agency
Telephone: 651-296-7258
Last EDR Contact: 12/20/2017
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Varies

MN HWS PERMIT: Active TSD Facilities

Active TSD Facilities.

Date of Government Version: 12/09/2017
Date Data Arrived at EDR: 12/13/2017
Date Made Active in Reports: 01/25/2018
Number of Days to Update: 43

Source: Minnesota Pollution Control Agency
Telephone: 651-297-8470
Last EDR Contact: 12/13/2017
Next Scheduled EDR Contact: 03/26/2018
Data Release Frequency: Annually

MANIFEST: Hazardous Waste Manifest Data

Hazardous waste manifest data.

Date of Government Version: 06/30/2016
Date Data Arrived at EDR: 02/07/2017
Date Made Active in Reports: 04/05/2017
Number of Days to Update: 57

Source: Pollution Control Agency
Telephone: 651-296-7258
Last EDR Contact: 12/15/2017
Next Scheduled EDR Contact: 03/26/2018
Data Release Frequency: Annually

MDA LIS: Licensing Information System Database Listing

Information provided lists all individuals or companies who hold licenses, certificates and/or permits required by state law and regulated by the Department. Additionally, the LIS lists all companies who must register products with the Department before being used or sold in commercial channels within our state.

Date of Government Version: 11/06/2017
Date Data Arrived at EDR: 11/08/2017
Date Made Active in Reports: 01/03/2018
Number of Days to Update: 56

Source: Department of Agriculture
Telephone: 651-201-6000
Last EDR Contact: 02/07/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

LS: List of Sites

The List of Sites includes: Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), No Further Remedial Action Planned (NFRAP), National Priorities List (NPL), Permanent List of Priorities (PLP), sites delisted from the Permanent List of Priorities (DPLP), Hazardous Waste Permit Unit Project Facilities (HW PERM), List of Permitted Solid Waste Facilities (SW PERM), 1980 Metropolitan Area Waste Disposal Site Inventory (METRO), 1980 Statewide Outstate Dump Inventory (ODI), Voluntary and Investigation Program (VIC), and Closed Landfill Sites Undergoing Cleanup (LCP).

Date of Government Version: 04/22/2009
Date Data Arrived at EDR: 07/14/2009
Date Made Active in Reports: 07/24/2009
Number of Days to Update: 10

Source: Minnesota Pollution Control Agency
Telephone: 651-297-2731
Source: Pollution Control Agency, GIS Section
Telephone: 651-297-2731
Last EDR Contact: 12/21/2011
Next Scheduled EDR Contact: 04/09/2012
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

TIER 2: Tier 2 Facility Listing

A listing of facilities which store or manufacture hazardous materials that submit a chemical inventory report.

Date of Government Version: 12/31/2016	Source: Department of Public Safety
Date Data Arrived at EDR: 05/11/2017	Telephone: 651-296-2233
Date Made Active in Reports: 10/11/2017	Last EDR Contact: 01/31/2018
Number of Days to Update: 153	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Annually

VAPOR: Vapor Intrusion

A listing of sites with potential or identified vapor risk. Vapor intrusion occurs when chemical vapors migrate from a source of contamination through the soil into the basements or foundations of buildings. These chemical vapors can sometimes pose risks to human health.

Date of Government Version: 11/06/2017	Source: Pollution Control Agency
Date Data Arrived at EDR: 11/08/2017	Telephone: 651-757-2040
Date Made Active in Reports: 01/24/2018	Last EDR Contact: 02/15/2018
Number of Days to Update: 77	Next Scheduled EDR Contact: 06/04/2018
	Data Release Frequency: Varies

WIMN: What's In My Neighborhood

Since 2003, the PCA's "What's in My Neighborhood?" database provides information about air quality, hazardous waste, remediation, solid waste, tanks and leaks, and water quality around Minnesota.

Date of Government Version: 01/06/2018	Source: Pollution Control Agency
Date Data Arrived at EDR: 01/09/2018	Telephone: 651-757-2593
Date Made Active in Reports: 01/26/2018	Last EDR Contact: 01/09/2018
Number of Days to Update: 17	Next Scheduled EDR Contact: 04/23/2018
	Data Release Frequency: Semi-Annually

NPDES: Wastewater Permits Listing

A listing of facilities that have a wastewater permit.

Date of Government Version: 12/09/2017	Source: Minnesota Pollution Control Agency
Date Data Arrived at EDR: 12/13/2017	Telephone: 651-296-6300
Date Made Active in Reports: 01/26/2018	Last EDR Contact: 12/13/2017
Number of Days to Update: 44	Next Scheduled EDR Contact: 03/26/2018
	Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Minnesota Pollution Control Agency in Minnesota.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 186

Source: Minnesota Pollution Control Agency
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Minnesota Pollution Control Agency in Minnesota.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Minnesota Pollution Control Agency
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Minnesota Pollution Control Agency in Minnesota.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/24/2013
Number of Days to Update: 176

Source: Minnesota Pollution Control Agency
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 11/11/2017
Date Data Arrived at EDR: 11/14/2017
Date Made Active in Reports: 12/18/2017
Number of Days to Update: 34

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 02/14/2018
Next Scheduled EDR Contact: 05/28/2018
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 04/11/2017
Date Made Active in Reports: 07/27/2017
Number of Days to Update: 107

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 01/05/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 10/01/2017
Date Data Arrived at EDR: 11/01/2017
Date Made Active in Reports: 11/13/2017
Number of Days to Update: 12

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 01/31/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 07/25/2017
Date Made Active in Reports: 09/25/2017
Number of Days to Update: 62

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 01/16/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Annually

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/19/2015
Date Made Active in Reports: 07/15/2015
Number of Days to Update: 26

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 11/16/2017
Next Scheduled EDR Contact: 03/05/2018
Data Release Frequency: Annually

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 04/13/2017
Date Made Active in Reports: 07/14/2017
Number of Days to Update: 92

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 12/11/2017
Next Scheduled EDR Contact: 03/26/2018
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Oil/Gas Pipelines

Source: PennWell Corporation

Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data

Source: PennWell Corporation

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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:

Source: American Hospital Association, Inc.

Telephone: 312-280-5991

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services

Telephone: 410-786-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes

Source: National Institutes of Health

Telephone: 301-594-6248

Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Child Care Centers

Source: Department of Human Services

Telephone: 651-296-3971

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.

Source: FEMA

Telephone: 877-336-2627

Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory

Source: Land Management Information Center

Telephone: 617-297-3281

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK® - PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

BYLLESBY GARDEN
NOT REPORTED
CANNON FALLS, MN 55009

TARGET PROPERTY COORDINATES

Latitude (North): 44.508338 - 44° 30' 30.02"
Longitude (West): 92.858874 - 92° 51' 31.95"
Universal Transverse Mercator: Zone 15
UTM X (Meters): 511217.9
UTM Y (Meters): 4928128.5
Elevation: 881 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map: 5962797 MIESVILLE, MN
Version Date: 2013

Southeast Map: 5962821 WHITE ROCK, MN
Version Date: 2013

Southwest Map: 5962807 SOGN, MN
Version Date: 2013

Northwest Map: 5964031 CANNON FALLS, MN
Version Date: 2013

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

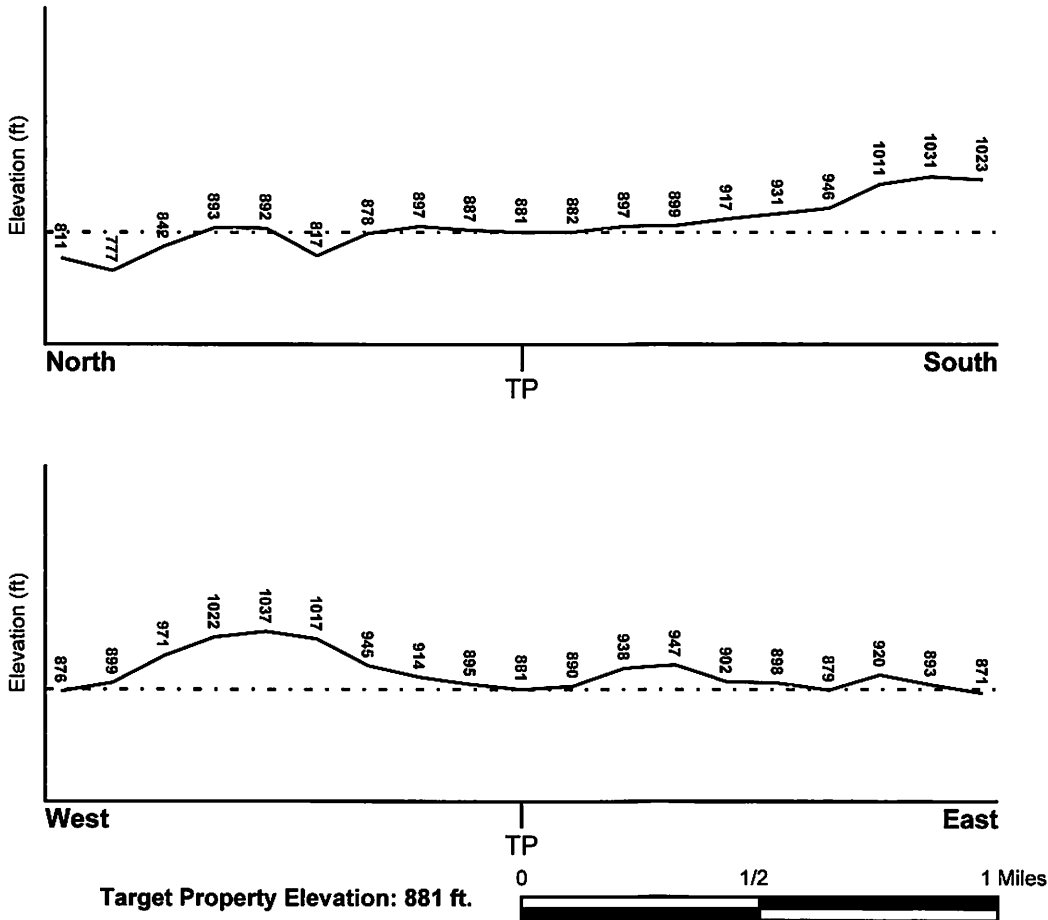
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General West

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

<u>Flood Plain Panel at Target Property</u>	<u>FEMA Source Type</u>
27037C0440E	FEMA FIRM Flood data
<u>Additional Panels in search area:</u>	<u>FEMA Source Type</u>
27037C0420E	FEMA FIRM Flood data
27049C0119E	FEMA FIRM Flood data
27049C0140E	FEMA FIRM Flood data
2701400150A	FEMA Q3 Flood data
27049C0285E	FEMA FIRM Flood data
2701400125A	FEMA Q3 Flood data

NATIONAL WETLAND INVENTORY

<u>NWI Quad at Target Property</u>	<u>NWI Electronic Data Coverage</u>
MIESVILLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data:*
 Search Radius: 1.25 miles
 Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

<u>MAP ID</u>	<u>LOCATION FROM TP</u>	<u>GENERAL DIRECTION GROUNDWATER FLOW</u>
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

GEOLOGIC AGE IDENTIFICATION

Era:	Paleozoic	Category:	Stratified Sequence
System:	Ordovician		
Series:	Lower Ordovician (Canadian)		
Code:	O1		<i>(decoded above as Era, System & Series)</i>

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name: ESTHERVILLE

Soil Surface Texture: loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Somewhat excessive. Soils have high hydraulic conductivity and low water holding capacity. Depth to water table is more than 6 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel: LOW

Depth to Bedrock Min: > 60 inches

Depth to Bedrock Max: > 60 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
Layer	Boundary		Soil Texture Class	Classification		Permeability Rate (in/hr)	Soil Reaction (pH)
	Upper	Lower		AASHTO Group	Unified Soil		
1	0 inches	13 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 6.00 Min: 2.00	Max: 7.30 Min: 5.60
2	13 inches	18 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 6.00 Min: 2.00	Max: 7.30 Min: 5.60
3	18 inches	60 inches	coarse sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 20.00 Min: 6.00	Max: 8.40 Min: 6.60

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures: silt loam
silty clay loam
loamy sand
loamy fine sand
sandy loam
gravelly - coarse sand

Surficial Soil Types: silt loam
silty clay loam
loamy sand
loamy fine sand
sandy loam
gravelly - coarse sand

Shallow Soil Types: fine sandy loam

Deeper Soil Types: gravelly - coarse sand
silty clay loam
stratified sand
silt loam

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

very gravelly - coarse sand

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

<u>DATABASE</u>	<u>SEARCH DISTANCE (miles)</u>
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 0.001 miles
State Database	1.000

FEDERAL USGS WELL INFORMATION

<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
A3	USGS40000496107	1/4 - 1/2 Mile SW
B6	USGS40000496205	1/4 - 1/2 Mile NNW
C8	USGS40000496113	1/4 - 1/2 Mile ESE
D11	USGS40000496087	1/4 - 1/2 Mile SSW
E14	USGS40000496195	1/4 - 1/2 Mile WNW
F16	USGS40000496184	1/4 - 1/2 Mile WNW
G27	USGS40000496092	1/2 - 1 Mile ESE
30	USGS40000586485	1/2 - 1 Mile NNW
H32	USGS40000496183	1/2 - 1 Mile WNW
I37	USGS40000496221	1/2 - 1 Mile WNW

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

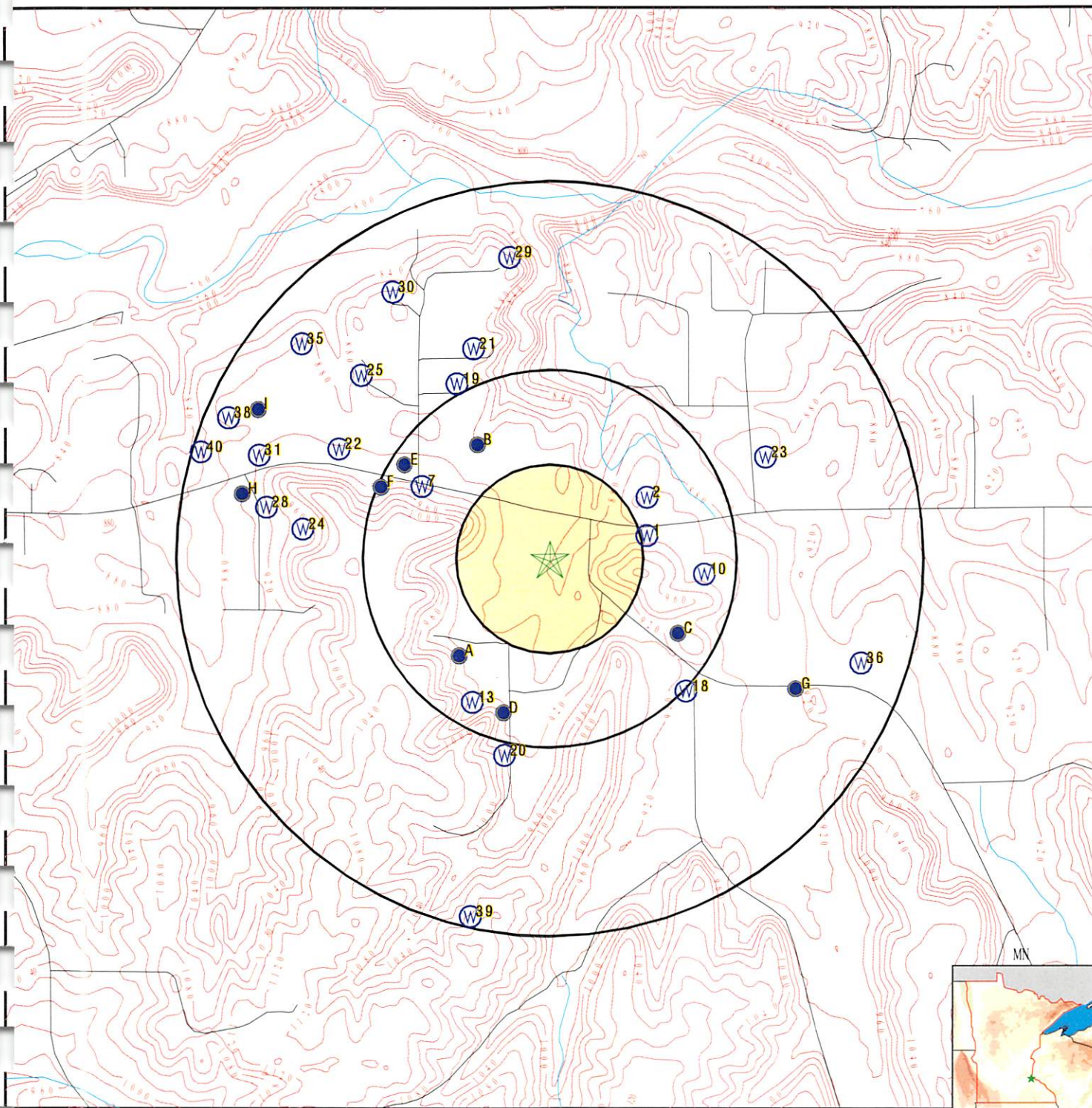
<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
1	MN5000000098250	1/4 - 1/2 Mile ENE
2	MN5000000159336	1/4 - 1/2 Mile ENE
A4	MN5000000077758	1/4 - 1/2 Mile SW
B5	MN5000000108397	1/4 - 1/2 Mile NNW
7	MN5000000012541	1/4 - 1/2 Mile WNW
C9	MN5000000127051	1/4 - 1/2 Mile ESE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

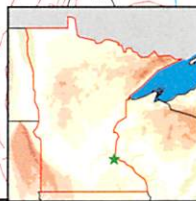
MAP ID	WELL ID	LOCATION FROM TP
10	MN500000044145	1/4 - 1/2 Mile East
D12	MN5000000133528	1/4 - 1/2 Mile SSW
13	MN5000000041613	1/4 - 1/2 Mile SSW
E15	MN5000000190735	1/4 - 1/2 Mile WNW
F17	MN5000000151634	1/2 - 1 Mile WNW
18	MN5000000055598	1/2 - 1 Mile SE
19	MN5000000114454	1/2 - 1 Mile NNW
20	MN5000000076819	1/2 - 1 Mile SSW
21	MN5000000062206	1/2 - 1 Mile NNW
22	MN5000000162101	1/2 - 1 Mile WNW
23	MN5000000143425	1/2 - 1 Mile ENE
24	MN5000000165878	1/2 - 1 Mile West
25	MN5000000042390	1/2 - 1 Mile NW
G26	MN5000000153031	1/2 - 1 Mile ESE
28	MN5000000090062	1/2 - 1 Mile West
29	MN5000000094374	1/2 - 1 Mile North
31	MN5000000164610	1/2 - 1 Mile WNW
H33	MN5000000110306	1/2 - 1 Mile WNW
I34	MN5000000112743	1/2 - 1 Mile WNW
35	MN5000000140887	1/2 - 1 Mile NW
36	MN5000000107425	1/2 - 1 Mile ESE
38	MN5000000050173	1/2 - 1 Mile WNW
39	MN5000000173237	1/2 - 1 Mile SSW
40	MN5000000158324	1/2 - 1 Mile WNW

PHYSICAL SETTING SOURCE MAP - 5193063.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons

- Groundwater Flow Direction
- Indeterminate Groundwater Flow at Location
- Groundwater Flow Varies at Location
- Closest Hydrogeological Data



<p>SITE NAME: Bylesby Garden ADDRESS: Not Reported Cannon Falls MN 55009 LAT/LONG: 44.508338 / 92.858874</p>	<p>CLIENT: Westwood Professional Services CONTACT: David Kuhlmann INQUIRY #: 5193063.2s DATE: February 20, 2018 11:25 am</p>
---	---

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
 Direction
 Distance
 Elevation

Database EDR ID Number

1
ENE **MN WELLS** **MN500000098250**
1/4 - 1/2 Mile
Higher

Relateid:	0000464092	County c:	Goodhue
Unique no:	00464092	Wellname:	LUDWIG, RICHARD
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	ADBDDA	Mgsquad c:	87D
Elevation:	918		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Kimmes-bauer
Depth drll:	360		
Depth comp:	360		
Date drll:	19901114		
Case diam:	4		
Case depth:	340		
Grout:	Well grouted, type unknown	Pollut dst:	100
Pollut dir:	N	Pollut typ:	SDF
Strat date:	19951121		
Strat upd:	19951121		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	45		
First bdrk:	OPDC	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910813		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	511635		
Utmn:	4928444		
Geoc entry:	0		
Geoc date:	19960528		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	464092	Swlcount:	1
Swldate:	19901114		
Swlavgmeas:	140		
Swlavgelev:	778		
Site id:	MN500000098250		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000464092	Name:	LUDWIG, RICHARD
Addtype c:	Both	House no:	8914
Street:	305TH	Road type:	Street
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19910813		
Updt date:	19951121		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000464092	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1		
Drive shoe:	Y	Case type:	Step down
Screen:	N		
Ohtopfeet:	340		
Ohbotfeet:	360		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	WHITEWATER	Ptlss mdl:	SU4X5.5
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19901114		
Pump mfg:	JACUZZI	Pump model:	Not Reported
Pump hp:	1		
Pump volts:	230		
Dropp len:	127		
Dropp mat:	G		
Pump cpcty:	10		
Pump type:	Submersible	Variance:	Not Reported
Drlr name:	ANDERSON, L.		
Entry date:	19910813		
Updt date:	19951121		

Historic Water Level Information:

Relateid:	0000464092	Meas type:	Well installation
Meas date:	19901114		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	140		
Meas elev:	778		
Data src:	Kimmes-bauer	Program:	CWI
Entry date:	19910813		
Updt date:	0		

Pump Test Information:

Relateid:	0000464092
Pumptestid:	1
Test date:	19901114
Start meas:	140
Flow rate:	20
Duration:	Not Reported
Pump meas:	170

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
 Direction
 Distance
 Elevation

Database EDR ID Number

2
ENE
1/4 - 1/2 Mile
Higher

MN WELLS MN5000000159336

Relateid:	0000495128	County c:	Goodhue
Unique no:	00495128	Wellname:	TRIEMERT, RUSS & ELAINE
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	AACDDD	Mgsquad c:	87D
Elevation:	915		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Carlson Well Drill
Depth drll:	340		
Depth comp:	340		
Date drll:	19911029		
Case diam:	4		
Case depth:	315		
Grout:	Well grouted, type unknown	Pollut dst:	100
Pollut dir:	E	Pollut typ:	SDF
Strat date:	19951121		
Strat upd:	19951121		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	10		
First bdrk:	OSTP	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19911226		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	511635		
Utmn:	4928608		
Geoc entry:	0		
Geoc date:	19960528		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	495128	Swlcount:	1
Swldate:	19911021		
Swlavgmeas:	85		
Swlavgelev:	830		
Site id:	MN5000000159336		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000495128	Name:	TRIEMERT, RUSS & ELAINE
Addtype c:	Both	House no:	8865
Street:	305TH	Road type:	Street
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19911226		
Updt date:	19951121		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000495128	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1.5		
Drive shoe:	Y	Case type:	Step down
Screen:	N		
Ohtopfeet:	315		
Ohbotfeet:	340		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	MAASE	Ptlss mdl:	Not Reported
Bsmt ofst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19911021		
Pump mfg:	GOULDS	Pump model:	Not Reported
Pump hp:	.5		
Pump volts:	230		
Dropp len:	105		
Dropp mat:	G		
Pump cpcty:	10		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	CARLSON, P.		
Entry date:	19911226		
Updt date:	19951121		

Historic Water Level Information:

Relateid:	0000495128	Meas type:	Well installation
Meas date:	19911021		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	85		
Meas elev:	830		
Data src:	Carlson Well Drill	Program:	CWI
Entry date:	19911226		
Updt date:	0		

A3
SW
1/4 - 1/2 Mile
Higher

FED USGS USGS40000496107

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-443017092514901		
Monloc name:	112N17W16CACADD01	0000145811	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07040002	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.5047222
Longitude:	-92.8638889	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	922
Vert measure units:	feet	Vertacc measure val:	5.
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NAVD88	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19771114	Welldepth:	175
Welldepth units:	ft	Wellholeddepth:	175
Wellholeddepth units:	ft		

Ground-water levels, Number of Measurements: 0

**A4
SW
1/4 - 1/2 Mile
Higher**

MN WELLS MN5000000077758

Relateid:	0000145811	County c:	Goodhue
Unique no:	00145811	Wellname:	HOLMS, VIRGIL
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	CACADD	Mgsquad c:	87D
Elevation:	922		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Other, note in remarks
Loc src:	Minnesota Geological Survey	Data src:	Mahe Well Co.
Depth drll:	175		
Depth comp:	175		
Date drll:	19771114		
Case diam:	4		
Case depth:	154		
Grout:	Well grouted, type unknown	Pollut dst:	80
Pollut dir:	E	Pollut typ:	SDF
Strat date:	19941122		
Strat upd:	19941122		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	4		
First bdrk:	OSTP	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19871104		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Updt date:	20140214	Gcm code:	A
Geoc type:	WW	Geoc prg:	CWI
Geoc src:	MGS		
Utme:	510836		
Utmn:	4927924		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	145811	Swlcount:	1
Swldate:	19771114		
Swlavgmeas:	95		
Swlavgelev:	827		
Site id:	MN5000000077758		

Address Information:

Relateid:	0000145811	Name:	HOLMS, VIRGIL
Addtype c:	Both	House no:	Not Reported
Street:	Not Reported	Road type:	Not Reported
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19871104		
Updt date:	19941122		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000145811	Drill meth:	Non-specified Rotary
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	154		
Ohbotfeet:	175		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptiss mfg:	Not Reported	Ptiss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19771202		
Pump mfg:	FAIRBANKS	Pump model:	4C 7511
Pump hp:	.75		
Pump volts:	230		
Dropp len:	126		
Dropp mat:	G		
Pump cpcty:	15		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	RANISATE, J.		
Entry date:	19871104		
Updt date:	19941122		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Historic Water Level Information:

Relateid:	0000145811	Meas type:	Well installation
Meas date:	19771114		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measurement:	95		
Meas elev:	827		
Data src:	Maier Well Co.	Program:	CWI
Entry date:	19871104		
Updt date:	0		

Pump Test Information:

Relateid:	0000145811
Pumptestid:	1
Test date:	19771114
Start meas:	95
Flow rate:	15
Duration:	Not Reported
Pump meas:	95

**B5
NNW
1/4 - 1/2 Mile
Higher**

MN WELLS MN5000000108397

Relateid:	0000425275	County c:	Goodhue
Unique no:	00425275	Wellname:	SWANSON, ROBERT
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	BAACDB	Mgsquad c:	87D
Elevation:	884		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Information from owner
Loc src:	Minnesota Geological Survey	Data src:	Kimmes-bauer
Depth drll:	320		
Depth comp:	320		
Date drll:	19861022		
Case diam:	4		
Case depth:	284		
Grout:	Well grouted, type unknown	Pollut dst:	100
Pollut dir:	SW	Pollut typ:	SDF
Strat date:	19941122		
Strat upd:	19941122		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	15		
First bdrk:	OPDC	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19901030		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Updt date: 20140214
 Geoc type: WW
 Geoc src: MGS
 Utme: 510905
 Utmn: 4928828
 Geoc entry: 0
 Geoc date: 19950626
 Geocupd en: 0
 Geocupd da: 0
 Rcvd date: 0
 Well label: 425275
 Swldate: 19861022
 Swlavmeas: 50
 Swlavgelev: 834
 Site id: MN5000000108397

Gcm code: A
 Geoc prg: CWI

Swlcount: 1

Address Information:

Relateid: 0000425275
 Addtype c: Both
 Street: BOX 2
 Road dir: Not Reported
 State: MN
 Entry date: 19901030
 Updt date: 19941122
 Other: Not Reported

Name: SWANSON, ROBERT
 House no: RR 2
 Road type: Not Reported
 City: CANNON FALLS
 Zipcode: 55009

Construction 1 Information:

Relateid: 0000425275
 Drill fluid: Bentonite
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Steel (black or low carbon)
 Case top: 1
 Drive shoe: Not Reported
 Screen: N
 Ohtopfeet: 284
 Ohbotfeet: 320
 Screen mfg: Not Reported
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: Not Reported
 Pump date: 19861027
 Pump mfg: GRUNDFOS
 Pump hp: 1
 Pump volts: 230
 Dropp len: 105
 Dropp mat: G
 Pump cpcty: 15
 Pump type: Submersible
 Drllr name: HELGESON, J.
 Entry date: 19901030
 Updt date: 19941122

Drill meth: Non-specified Rotary
 Hydrofrac: Not Reported

Case joint: W

Case type: Step down

Screen typ: Not Reported
 Ptlss mdl: Not Reported
 Csg top ok: Not Reported
 Plstc prot: Not Reported
 Pump inst: Y

Pump model: SP-2-18

Variance: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Historic Water Level Information:

Relateid:	0000425275	Meas type:	Well installation
Meas date:	19861022		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measurement:	50		
Meas elev:	834		
Data src:	Kimmes-bauer	Program:	CWI
Entry date:	19901030		
Updt date:	0		

Pump Test Information:

Relateid:	0000425275
Pumpstestid:	1
Test date:	19861022
Start meas:	50
Flow rate:	40
Duration:	Not Reported
Pump meas:	80

**B6
NNW
1/4 - 1/2 Mile
Higher**

FED USGS USGS40000496205

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-443046092514501		
Monloc name:	112N17W16BAACDB01	0000425275	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07040002	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.5127778
Longitude:	-92.8627778	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refs:	NAD83	Vert measure val:	884
Vert measure units:	feet	Vertacc measure val:	5.
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refs:	NAVD88	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Jordan Sandstone		
Aquifer type:	Not Reported		
Construction date:	19861022	Welldepth:	320
Welldepth units:	ft	Wellholedepth:	320
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

**7
WNW
1/4 - 1/2 Mile
Higher**

MN WELLS MN5000000012541

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Relateid:	0000437891	County c:	Goodhue
Unique no:	00437891	Wellname:	SWANSON, HENRY
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	BACCBC	Mgsquad c:	87D
Elevation:	925		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Kimmes-bauer
Depth drll:	360		
Depth comp:	360		
Date drll:	19871103		
Case diam:	4		
Case depth:	336		
Grout:	Well grouted, type unknown	Pollut dst:	75
Pollut dir:	E	Pollut typ:	SDF
Strat date:	19951121		
Strat upd:	19951121		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	10		
First bdrk:	OSTP	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Y
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19901030		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	510667		
Utmn:	4928654		
Geoc entry:	0		
Geoc date:	19960528		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	437891	Swlcount:	1
Swldate:	19871103		
Swlavgmeas:	120		
Swlavgelev:	805		
Site id:	MN5000000012541		

Address Information:

Relateid:	0000437891	Name:	SWANSON, HENRY
Addtype c:	Both	House no:	8256
Street:	305TH	Road type:	Street
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19901030		
Updt date:	19951121		
Other:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Construction 1 Information:

Relateid:	0000437891	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1		
Drive shoe:	Not Reported	Case type:	Step down
Screen:	N		
Ohtopfeet:	336		
Ohbotfeet:	360		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	WHITEWATER	Ptlss mdl:	SU4X5.5
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19871125		
Pump mfg:	GRUNDFOS	Pump model:	SP-2-15
Pump hp:	.75		
Pump volts:	230		
Dropp len:	140		
Dropp mat:	G		
Pump cpcty:	10		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	ANDERSON, L.		
Entry date:	19901030		
Updt date:	19951121		

Historic Water Level Information:

Relateid:	0000437891	Meas type:	Well installation
Meas date:	19871103		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	120		
Meas elev:	805		
Data src:	Kimmes-bauer	Program:	CWI
Entry date:	19901030		
Updt date:	0		

Id Information:

Relateid:	0000437891	Identifier:	28-016-0800
Id type:	Not Reported	Id prog:	Not Reported

Id Information:

Relateid:	0000437891	Identifier:	25
Id type:	Not Reported	Id prog:	Not Reported

Pump Test Information:

Relateid:	0000437891
Pumptestid:	1
Test date:	19871103
Start meas:	120
Flow rate:	30
Duration:	Not Reported
Pump meas:	220

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Remarks Information:

Relateid: 0000437891
 Seq no: 1
 Remarks: WELL GROUTED ON TWO SEPERATE DAYS 871110 7YDS,871111 5.75YDS

C8
ESE
 1/4 - 1/2 Mile
 Higher

FED USGS USGS40000496113

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-443020092510601		
Monloc name:	112N17W16DAADCC01	0000218719	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07040002	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.5055556
Longitude:	-92.8519444	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	940
Vert measure units:	feet	Vertacc measure val:	5.
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NAVD88	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19740427	Welldepth:	150
Welldepth units:	ft	Wellholedepth:	150
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

C9
ESE
 1/4 - 1/2 Mile
 Higher

MN WELLS MN5000000127051

Relateid:	0000218719	County c:	Goodhue
Unique no:	00218719	Wellname:	REINARDY, RONALD
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	DAADCC	Mgsquad c:	87D
Elevation:	940		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Name on mailbox
Loc src:	Minnesota Geological Survey	Data src:	Cannon Well Co.
Depth dril:	150		
Depth comp:	150		
Date dril:	19740427		
Case diam:	5		
Case depth:	64		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19941122		
Strat upd:	19941122		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Prairie Du Chien Group
First bdrk:	OSTP	Ohbotunit:	OPDC
Ohtopunit:	OPDC	Cuttings:	Not Reported
Aquifer:	OPDC	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Not Reported
Obwell:	Not Reported	Input src:	Minnesota Geological Survey
Igwis:	Not Reported		
Unused:	Not Reported		
Entry date:	19871104		
Updt date:	19941122		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	511769		
Utmn:	4928022		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	218719	Swlcount:	0
Swldate:	0		
Swlavgmeas:	0		
Swlavgelev:	0		
Site id:	MN5000000127051		

Address Information:

Relateid:	0000218719	Name:	REINARDY, RONALD
Addtype c:	Both	House no:	Not Reported
Street:	Not Reported	Road type:	Not Reported
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19871104		
Updt date:	19941122		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000218719	Drill meth:	Not Reported
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	Not Reported
Case top:	0	Case type:	Single casing
Drive shoe:	Not Reported		
Screen:	N		
Ohtopfeet:	64	Screen typ:	Not Reported
Ohbotfeet:	150	Ptiss mdl:	Not Reported
Screen mfg:	Not Reported	Csg top ok:	Not Reported
Ptiss mfg:	Not Reported	Plstc prot:	Not Reported
Bsmt offst:	Not Reported	Pump inst:	Not Reported
Csg at grd:	Not Reported		
Disinfectd:	Not Reported		
Pump date:	Not Reported	Pump model:	Not Reported
Pump mfg:	Not Reported		
Pump hp:	0		
Pump volts:	Not Reported		
Drpp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat:	Not Reported		
Pump cpcty:	Not Reported		
Pump type:	Not Reported	Variance:	Not Reported
Drllr name:	Not Reported		
Entry date:	19871104		
Updt date:	19941122		

10
East
1/4 - 1/2 Mile
Higher

MN WELLS MN500000044145

Relateid:	0000608588	County c:	Goodhue
Unique no:	00608588	Wellname:	LORENTZ, BOB & ROBYNN
Township:	112	Range:	17
Range dir:	W	Section:	15
Subsection:	BCCCCB	Mgsquad c:	87D
Elevation:	916		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Not Reported
Loc src:	Winona State University	Data src:	Carlson Well Drill
Depth drll:	380		
Depth comp:	380		
Date drll:	19980610		
Case diam:	4		
Case depth:	0		
Grout:	Well grouted, type unknown	Pollut dst:	85
Pollut dir:	NW	Pollut typ:	SDF
Strat date:	20000925		
Strat upd:	20001116		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	25		
First bdrk:	OSTP	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	N		
Entry date:	20000925		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	DS1
Geoc src:	WSU	Geoc prg:	SMWRC
Utme:	511882		
Utmn:	4928280		
Geoc entry:	1003		
Geoc date:	20000807		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well label:	608588	Swlcount:	1
Swldate:	19980603		
Swlavgmeas:	78		
Swlavgelev:	838		
Site id:	MN500000044145		
 Address Information:			
Relateid:	0000608588	Name:	LORENTZ, BOB & ROBYNN
Addtype c:	Both	House no:	30564
Street:	COUNTY ROAD 8	Road type:	Boulevard
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	Not Reported		
Updt date:	20050311		
Other:	Not Reported		
 Construction 1 Information:			
Relateid:	0000608588	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	Not Reported		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	355		
Ohbotfeet:	380		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlls mfg:	MAASE	Ptlls mdl:	41J
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Y	Pump inst:	Not Reported
Pump date:	19980603		
Pump mfg:	RED JACKET	Pump model:	100CNS1-CNS14
Pump hp:	1		
Pump volts:	230		
Dropp len:	147		
Dropp mat:	Not Reported		
Pump cpcty:	10		
Pump type:	Submersible	Variance:	N
Drllr name:	KROOK, J.		
Entry date:	20000925		
Updt date:	20001129		
 Historic Water Level Information:			
Relateid:	0000608588	Meas type:	Well installation
Meas date:	19980603		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	78		
Meas elev:	838		
Data src:	Carlson Well Drill	Program:	CWI
Entry date:	20000925		
Updt date:	20011026		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Id Information:			
Relateid:	0000608588	Identifier:	98-030C
Id type:	CNTY	Id prog:	PERMIT

Id Information:			
Relateid:	0000608588	Identifier:	28.015.1101
Id type:	CNTY	Id prog:	PID

D11
SSW
 1/4 - 1/2 Mile
 Higher

FED USGS USGS40000496087

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-443009092514001		
Monloc name:	112N17W16CDADAA01	0000218679	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07040002	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.5025
Longitude:	-92.8613889	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refs:	NAD83	Vert measure val:	920
Vert measure units:	feet	Vertacc measure val:	5.
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refs:	NAVD88	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19740327	Welldepth:	125
Welldepth units:	ft	Wellholedepth:	125
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

D12
SSW
 1/4 - 1/2 Mile
 Higher

MN WELLS MN5000000133528

Relateid:	0000218679	County c:	Goodhue
Unique no:	00218679	Wellname:	LINDAHL, DON
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	CDADAA	Mgsquad c:	87D
Elevation:	920		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Information from neighbor
Loc src:	Minnesota Geological Survey	Data src:	Cannon Well Co.
Depth drll:	125		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth comp:	125		
Date drll:	19740327		
Case diam:	6		
Case depth:	35		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19941122		
Strat upd:	19941122		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	28		
First bdrk:	OPDC	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Not Reported
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19871104		
Updt date:	19941122		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	511019		
Utmn:	4927683		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	218679	Swlcount:	0
Swldate:	0		
Swlavgmeas:	0		
Swlavglev:	0		
Site id:	MN5000000133528		

Address Information:

Relateid:	0000218679	Name:	LINDAHL, DON
Addtype c:	Both	House no:	Not Reported
Street:	Not Reported	Road type:	Not Reported
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19871104		
Updt date:	19941122		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000218679	Drill meth:	Non-specified Rotary
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	Not Reported
Case top:	0		
Drive shoe:	Not Reported	Case type:	Single casing
Screen:	N		
Ohtopfeet:	35		
Ohbotfeet:	125		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	.5		
Pump volts:	Not Reported		
Dropp len:	120		
Dropp mat:	Not Reported		
Pump cpcty:	Not Reported		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	Not Reported		
Entry date:	19871104		
Updt date:	19941122		

13
SSW
1/4 - 1/2 Mile
Higher

MN WELLS MN500000041613

Relateid:	0000625824	County c:	Goodhue
Unique no:	00625824	Wellname:	HARKINS, MARY
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	CDABBD	Mgsquad c:	87D
Elevation:	930		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Not Reported
Loc src:	Winona State University	Data src:	Carlson Well Drill
Depth dril:	355		
Depth comp:	355		
Date dril:	19991201		
Case diam:	4		
Case depth:	335		
Grout:	Well grouted, type unknown	Pollut dst:	115
Pollut dir:	N	Pollut typ:	SDF
Strat date:	20000705		
Strat upd:	20001116		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	25		
First bdrk:	OSTP	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20000705		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Updt date:	20140214	Gcm code:	G60
Geoc type:	WW	Geoc prg:	SMWRC
Geoc src:	WSU		
Utme:	510885		
Utmn:	4927734		
Geoc entry:	1003		
Geoc date:	20000807		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	625824	Swlcount:	1
Swldate:	19991117		
Swlavgmeas:	42		
Swlavgelev:	888		
Site id:	MN5000000041613		

Address Information:

Relateid:	0000625824	Name:	HARKINS, MARY
Addtype c:	Both	House no:	30765
Street:	85TH	Road type:	Avenue
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	20000705		
Updt date:	20050311		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000625824	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	N
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	Not Reported		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	335		
Ohbotfeet:	355		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	MAASS	Ptlss mdl:	41J
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Y	Pump inst:	Not Reported
Pump date:	19991117		
Pump mfg:	STA-RITE	Pump model:	20P4E02J-02
Pump hp:	1		
Pump volts:	230		
Dropp len:	105		
Dropp mat:	Not Reported		
Pump cpcty:	20		
Pump type:	Submersible	Variance:	N
Drllr name:	CARLSON, P.		
Entry date:	20000705		
Updt date:	20001116		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Historic Water Level Information:

Relateid:	0000625824	Meas type:	Well installation
Meas date:	19991117		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	42		
Meas elev:	888		
Data src:	Carlson Well Drill	Program:	CWI
Entry date:	20000705		
Updt date:	20011026		

Id Information:

Relateid:	0000625824	Identifier:	28.016.5300
Id type:	CNTY	Id prog:	PERMIT

Remarks Information:

Relateid:	0000625824
Seq no:	1
Remarks:	101 FT., 5" WELL SEALED ON PROPERTY NO. H-117733.

Remarks Information:

Relateid:	0000625824
Seq no:	2
Remarks:	GOODHUE PERMIT NO. 99-073A.

E14
WNW
1/4 - 1/2 Mile
Higher

FED USGS USGS40000496195

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-443043092515901		
Monloc name:	112N17W16BBDABD01	0000156912	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07040002	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.5119444
Longitude:	-92.8666667	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refs:	NAD83	Vert measure val:	906
Vert measure units:	feet	Vertacc measure val:	5.
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refs:	NAVD88	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Jordan Sandstone		
Aquifer type:	Not Reported		
Construction date:	19790327	Welldepth:	370
Welldepth units:	ft	Wellholedepth:	370
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
 Direction
 Distance
 Elevation

Database EDR ID Number

E15
 WNW
 1/4 - 1/2 Mile
 Higher

MN WELLS MN5000000190735

Relateid:	0000156912	County c:	Goodhue
Unique no:	00156912	Wellname:	GIANOLI, DENNIS
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	BBDABD	Mgsquad c:	87D
Elevation:	906		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Information from neighbor
Loc src:	Minnesota Geological Survey	Data src:	Cannon Well Co.
Depth drll:	370		
Depth comp:	370		
Date drll:	19790327		
Case diam:	4		
Case depth:	345		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19941122		
Strat upd:	19941122		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	9		
First bdrk:	OSTP	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Not Reported
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19871104		
Updt date:	19941122		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	510585		
Utmn:	4928749		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	156912	Swlcount:	0
Swldate:	0		
Swlavgmeas:	0		
Swlavgelev:	0		
Site id:	MN5000000190735		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000156912	Name:	GIANOLI, DENNIS
Addtype c:	Both	House no:	RR 2
Street:	Not Reported	Road type:	Not Reported
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19871104		
Updt date:	19941122		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000156912	Drill meth:	Non-specified Rotary
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	0		
Drive shoe:	Not Reported	Case type:	Single casing
Screen:	N		
Ohtopfeet:	345		
Ohbotfeet:	370		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Pt1ss mfg:	Not Reported	Pt1ss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19790327		
Pump mfg:	FLINT & WALLING	Pump model:	Not Reported
Pump hp:	.75		
Pump volts:	230		
Dropp len:	Not Reported		
Dropp mat:	S		
Pump cpcty:	Not Reported		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	OTTO, F.		
Entry date:	19871104		
Updt date:	19941122		

**F16
WNW
1/4 - 1/2 Mile
Higher**

FED USGS USGS40000496184

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-443040092520301		
Monloc name:	112N17W16BBDC 01	0000437891	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07040002	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.5111111
Longitude:	-92.8677778	Sourcemap scale:	24000

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	920
Vert measure units:	feet	Vertacc measure val:	5.
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NAVD88	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19871103	Welldepth:	360
Welldepth units:	ft	Wellholedepth:	360
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

**F17
WNW
1/2 - 1 Mile
Higher**

MN WELLS MN5000000151634

Relateid:	0000618391	County c:	Goodhue
Unique no:	00618391	Wellname:	SANDY, DAVID
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	BBDCBB	Mgsquad c:	87D
Elevation:	923		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Not Reported
Loc src:	Winona State University	Data src:	Kimmes-bauer
Depth dril:	400		
Depth comp:	400		
Date dril:	19981023		
Case diam:	4		
Case depth:	0		
Grout:	Well grouted, type unknown	Pollut dst:	60
Pollut dir:	W	Pollut typ:	SDF
Strat date:	20000925		
Strat upd:	20001129		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	15		
First bdrk:	OSTP	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	N		
Entry date:	20000925		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	G60
Geoc src:	WSU	Geoc prg:	SMWRC
Utme:	510469		
Utmn:	4928650		
Geoc entry:	1003		
Geoc date:	20000807		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well label: 618391
 Swldate: 19981023
 Swlavgmeas: 60
 Swlavgelev: 863
 Site id: MN5000000151634

Swlcount: 1

Address Information:

Relateid: 0000618391
 Addtype c: Both
 Street: HWY 19
 Road dir: Not Reported
 State: MN
 Entry date: Not Reported
 Updt date: 20050311
 Other: Not Reported

Name: SANDY, DAVID
 House no: 8126
 Road type: Boulevard
 City: CANNON FALLS
 Zipcode: 55009

Construction 1 Information:

Relateid: 0000618391
 Drill fluid: Foam
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Steel (black or low carbon)
 Case top: Not Reported
 Drive shoe: Y
 Screen: N
 Ohtopfeet: 357
 Ohbotfeet: 400
 Screen mfg: Not Reported
 Pt1ss mfg: WHITEWATER
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: Y
 Pump date: 19981028
 Pump mfg: Not Reported
 Pump hp: 1
 Pump volts: 230
 Dropp len: 126
 Dropp mat: Not Reported
 Pump cpcty: 10
 Pump type: Submersible
 Drllr name: MILLER, M.
 Entry date: 20000925
 Updt date: 20001129

Drill meth: Non-specified Rotary
 Hydrofrac: Not Reported
 Case joint: W
 Case type: Step down
 Screen typ: Not Reported
 Pt1ss mdl: SU4X5 1/2
 Csg top ok: U
 Plstc prot: Not Reported
 Pump inst: Not Reported
 Pump model: Not Reported
 Variance: N

Historic Water Level Information:

Relateid: 0000618391
 Meas date: 19981023
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measurement: 60
 Meas elev: 863
 Data src: Kimmes-bauer
 Entry date: 20000925
 Updt date: 20011026

Meas type: Well installation
 Program: CWI

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Pump Test Information:

Relateid: 0000618391
 Pumpstetid: 1
 Test date: 19981023
 Start meas: 60
 Flow rate: 30
 Duration: 2
 Pump meas: 120

Remarks Information:

Relateid: 0000618391
 Seq no: 1
 Remarks: POSSIBLE ST. PETER SANDSTONE AT 15 TO 36 FT.

18
 SE
 1/2 - 1 Mile
 Higher

MN WELLS MN5000000055598

Relateid:	0000460182	County c:	Goodhue
Unique no:	00460182	Wellname:	CANNON FALLS TWP
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	DDAAAB	Mgsquad c:	87D
Elevation:	916		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Name on mailbox
Loc src:	Minnesota Geological Survey	Data src:	Maher Well Co.
Depth dril:	350		
Depth comp:	350		
Date dril:	19900827		
Case diam:	4		
Case depth:	322		
Grout:	Well grouted, type unknown	Pollut dst:	100
Pollut dir:	S	Pollut typ:	VOC
Strat date:	19960419		
Strat upd:	19960419		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	3		
First bdrk:	OSTP	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910813		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	511804		
Utmn:	4927783		
Geoc entry:	0		
Geoc date:	19960528		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well label: 460182
 Swldate: 19900827
 Swlavgmeas: 60
 Swlavgelev: 856
 Site id: MN5000000055598

Swlcount: 1

Address Information:

Relateid: 0000460182
 Addtype c: Both
 Street: Not Reported
 Road dir: Not Reported
 State: MN
 Entry date: 19910813
 Updt date: 19960419
 Other: Not Reported

Name: CANNON FALLS TWP
 House no: RR 4
 Road type: Not Reported
 City: CANNON FALLS
 Zipcode: 55009

Construction 1 Information:

Relateid: 0000460182
 Drill fluid: Foam
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Steel (black or low carbon)
 Case top: 1
 Drive shoe: Y
 Screen: N
 Ohtopfeet: 322
 Ohbotfeet: 350
 Screen mfg: Not Reported
 Ptiss mfg: WHITEWATER
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: Not Reported
 Pump date: 19900830
 Pump mfg: GRUNDFOS
 Pump hp: 1
 Pump volts: 220
 Dropp len: 126
 Dropp mat: G
 Pump cpcty: 10
 Pump type: Submersible
 Drllr name: CARLSON, P.
 Entry date: 19910813
 Updt date: 19960419

Drill meth: Non-specified Rotary
 Hydrofrac: Not Reported
 Case joint: W
 Case type: Single casing
 Screen typ: Not Reported
 Ptiss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Not Reported
 Pump inst: Y
 Pump model: 10015
 Variance: Not Reported

Historic Water Level Information:

Relateid: 0000460182
 Meas date: 19900827
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: 0
 Measuremt: 60
 Meas elev: 856
 Data src: Maher Well Co.
 Entry date: 19910813
 Updt date: 0

Meas type: Well installation
 Program: CWI

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Pump Test Information:

Relateid: 0000460182
 Pumpstetid: 1
 Test date: 19900827
 Start meas: 60
 Flow rate: 10
 Duration: Not Reported
 Pump meas: 80

19
NNW
1/2 - 1 Mile
Higher

MN WELLS MN5000000114454

Relateid: 0000534369	County c: Goodhue	
Unique no: 00534369	Wellname: DORSCHNER, DICK	
Township: 112	Range: 17	
Range dir: W	Section: 9	
Subsection: CDCDBA	Mgsquad c: 87D	
Elevation: 888		
Elev mc: 7.5 minute topographic map (+/- 5 feet)		
Status c: Active		
Use c: Domestic	Loc mc: Information from neighbor	
Loc src: Minnesota Geological Survey	Data src: Kimmes-bauer	
Depth dril: 340		
Depth comp: 340		
Date dril: 19931215		
Case diam: 4		
Case depth: 315		
Grout: Well grouted, type unknown	Pollut dst: 95	
Pollut dir: W	Pollut typ: SDF	
Strat date: 19951121		
Strat upd: 19951121		
Strat src: Minnesota Geological Survey	Strat geol: Bruce Bloomgren	
Strat mc: Geologic study 1:24k to 1:100k		
Depth2bdrk: 12		
First bdrk: OPDC	Last strat: Jordan	
Ohtopunit: CJDN	Ohbotunit: CJDN	
Aquifer: CJDN	Cuttings: Not Reported	
Core: Not Reported	Bhgeophys: Not Reported	
Geochem: Not Reported	Waterchem: Not Reported	
Obwell: Not Reported	Swl: Y	
Igwis: Not Reported	Input src: Minnesota Geological Survey	
Unused: Not Reported		
Entry date: 19940504		
Updt date: 20140214		
Geoc type: WW	Gcm code: A	
Geoc src: MGS	Geoc prg: CWI	
Utme: 510817		
Utmn: 4929091		
Geoc entry: 0		
Geoc date: 19960528		
Geocupd en: 0		
Geocupd da: 0		
Rcvd date: 0		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well label: 534369
 Swldate: 19931215
 Swlavgmeas: 80
 Swlavgelev: 808
 Site id: MN5000000114454

Swlcount: 1

Address Information:

Relateid: 0000534369
 Addtype c: Both
 Street: 82ND
 Road dir: Not Reported
 State: MN
 Entry date: 19940504
 Updt date: 19951121
 Other: Not Reported

Name: DORSCHNER, DICK
 House no: 29970
 Road type: Avenue
 City: CANNON FALLS
 Zipcode: 55009

Construction 1 Information:

Relateid: 0000534369
 Drill fluid: Foam
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Steel (black or low carbon)
 Case top: 0
 Drive shoe: Y
 Screen: N
 Ohtopfeet: 315
 Ohbotfeet: 340
 Screen mfg: Not Reported
 Ptiss mfg: WHITEWATER
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: Not Reported
 Pump date: 19931216
 Pump mfg: GRUNDFOS
 Pump hp: .75
 Pump volts: 230
 Dropp len: 126
 Dropp mat: G
 Pump cpcty: 10
 Pump type: Submersible
 Drllr name: MILLER, M.
 Entry date: 19940504
 Updt date: 19951121

Drill meth: Non-specified Rotary
 Hydrofrac: Not Reported
 Case joint: W
 Case type: Step down
 Screen typ: Not Reported
 Ptiss mdl: SU4X5.5
 Csg top ok: Not Reported
 Plstc prot: Not Reported
 Pump inst: Y
 Pump model: 10S07-12
 Variance: Not Reported

Historic Water Level Information:

Relateid: 0000534369
 Meas date: 19931215
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: 0
 Measuremt: 80
 Meas elev: 808
 Data src: Kimmes-bauer
 Entry date: 19940504
 Updt date: 0

Meas type: Well installation
 Program: CWI

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Pump Test Information:

Relateid: 0000534369
 Pumpstetid: 1
 Test date: 19931215
 Start meas: 80
 Flow rate: 30
 Duration: Not Reported
 Pump meas: 90

20
 SSW
 1/2 - 1 Mile
 Higher

MN WELLS MN5000000076819

Relateid:	0000218718	County c:	Goodhue
Unique no:	00218718	Wellname:	LAMBERTY, GEORGE
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	CDDDA	Mgsquad c:	87D
Elevation:	960		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Name on mailbox
Loc src:	Minnesota Geological Survey	Data src:	Cannon Well Co.
Depth dril:	107		
Depth comp:	107		
Date dril:	19720617		
Case diam:	5		
Case depth:	87		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19941122		
Strat upd:	19941122		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	0		
First bdrk:	OSTP	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Not Reported
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19871104		
Updt date:	19941122		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	511023		
Utmn:	4927507		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well label: 218718
 Swldate: 0
 Swlavgmeas: 0
 Swlavgelev: 0
 Site id: MN500000076819

Swlcount: 0

Address Information:

Relateid: 0000218718
 Addtype c: Both
 Street: Not Reported
 Road dir: Not Reported
 State: MN
 Entry date: 19871104
 Updt date: 19941122
 Other: Not Reported

Name: LAMBERTY, GEORGE
 House no: Not Reported
 Road type: Not Reported
 City: CANNON FALLS
 Zipcode: 55009

Construction 1 Information:

Relateid: 0000218718
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Steel (black or low carbon)
 Case top: 0
 Drive shoe: Not Reported
 Screen: N
 Ohtopfeet: 87
 Ohbotfeet: 107
 Screen mfg: Not Reported
 Ptiss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: Not Reported
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: 0
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: Not Reported
 Entry date: 19871104
 Updt date: 19941122

Drill meth: Not Reported
 Hydrofrac: Not Reported
 Case joint: Not Reported
 Case type: Single casing
 Screen typ: Not Reported
 Ptiss mdl: Not Reported
 Csg top ok: Not Reported
 Plstc prot: Not Reported
 Pump inst: Not Reported
 Pump model: Not Reported
 Variance: Not Reported

21
 NNW
 1/2 - 1 Mile
 Higher

MN WELLS MN500000062206

Relateid: 0000625834
 Unique no: 00625834
 Township: 112
 Range dir: W
 Subsection: CDACAD
 Elevation: 886
 Elev mc: 7.5 minute topographic map (+/- 5 feet)
 Status c: Active
 Use c: Domestic
 Loc src: Winona State University
 Depth drll: 340

County c: Goodhue
 Wellname: ERICKSON, DOUG
 Range: 17
 Section: 9
 Mgsquad c: 87D

Loc mc: Not Reported
 Data src: Carlson Well Drill

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth comp:	340		
Date drill:	20000104		
Case diam:	4		
Case depth:	315		
Grout:	Well grouted, type unknown	Pollut dst:	58
Pollut dir:	NW	Pollut typ:	SDF
Strat date:	20000705		
Strat upd:	20001116		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	7		
First bdrk:	OPDC	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	N		
Entry date:	20000705		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	G60
Geoc src:	WSU	Geoc prg:	SMWRC
Utme:	510888		
Utmn:	4929240		
Geoc entry:	1003		
Geoc date:	20000807		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	625834	Swlcount:	1
Swldate:	19991109		
Swlavgmeas:	75		
Swlavgelev:	811		
Site id:	MN5000000062206		

Address Information:

Relateid:	0000625834	Name:	ERICKSON, DOUG
Addtype c:	Both	House no:	39670
Street:	82ND	Road type:	Avenue
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	20000705		
Updt date:	20050311		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000625834	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	N
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	Not Reported		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	315		
Ohbotfeet:	340		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptiss mfg:	MAASS	Ptiss mdl:	4J1
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Y	Pump inst:	Not Reported
Pump date:	19991215		
Pump mfg:	FLINT & WALLING	Pump model:	4F19507301
Pump hp:	.75		
Pump volts:	230		
Dropp len:	105		
Dropp mat:	Not Reported		
Pump cpcty:	19		
Pump type:	Submersible	Variance:	N
Drllr name:	STATE, M.		
Entry date:	20000705		
Updt date:	20010208		

Historic Water Level Information:

Relateid:	0000625834	Meas type:	Well installation
Meas date:	19991109		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	75		
Meas elev:	811		
Data src:	Carlson Well Drill	Program:	CWI
Entry date:	20000705		
Updt date:	20011026		

Id Information:

Relateid:	0000625834	Identifier:	28.009.0400
Id type:	CNTY	Id prog:	PERMIT

Id Information:

Relateid:	0000625834	Identifier:	99-078C
Id type:	CNTY	Id prog:	PERMIT

Pump Test Information:

Relateid:	0000625834
Pumpstestid:	1
Test date:	19991109
Start meas:	75
Flow rate:	Not Reported
Duration:	Not Reported
Pump meas:	Not Reported

**22
WNW
1/2 - 1 Mile
Higher**

MN WELLS MN5000000162101

Relateid:	0000494803	County c:	Goodhue
Unique no:	00494803	Wellname:	QUAM, KERRY & LYNN
Township:	112	Range:	17
Range dir:	W	Section:	16
Subsection:	BBCCD	Mgsquad c:	87D
Elevation:	904		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Kimmes-bauer
Depth drill:	340		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth comp:	340		
Date drill:	19910712		
Case diam:	4		
Case depth:	215		
Grout:	Well grouted, type unknown	Pollut dst:	100
Pollut dir:	NE	Pollut typ:	SDF
Strat date:	19951121		
Strat upd:	19951121		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	40		
First bdrk:	OPDC	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19911226		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	510309		
Utmn:	4928813		
Geoc entry:	0		
Geoc date:	19960528		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	494803	Swlcount:	1
Swldate:	19910712		
Swlavgmeas:	130		
Swlavgelev:	774		
Site id:	MN5000000162101		

Address Information:

Relateid:	0000494803	Name:	QUAM, KERRY & LYNN
Addtype c:	Both	House no:	8000
Street:	305TH	Road type:	Street
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19911226		
Updt date:	19951121		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000494803	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	Not Reported
Case top:	0	Case type:	Step down
Drive shoe:	Y		
Screen:	N		
Ohtopfeet:	315		
Ohbotfeet:	340		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	WHITEWATER	Ptlss mdl:	SU4X5.5
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19910724		
Pump mfg:	GRUNDFOS	Pump model:	10S10-1S
Pump hp:	1		
Pump volts:	230		
Dropp len:	126		
Dropp mat:	G		
Pump cpcty:	10		
Pump type:	Submersible	Variance:	Not Reported
Drlr name:	ANDERSON, L.		
Entry date:	19911226		
Updt date:	19951121		

Historic Water Level Information:

Relateid:	0000494803	Meas type:	Well installation
Meas date:	19910712		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	130		
Meas elev:	774		
Data src:	Kimmes-bauer	Program:	CWI
Entry date:	19911226		
Updt date:	0		

Pump Test Information:

Relateid:	0000494803
Pumptestid:	1
Test date:	19910712
Start meas:	130
Flow rate:	30
Duration:	Not Reported
Pump meas:	180

23
ENE
1/2 - 1 Mile
Higher

MN WELLS MN5000000143425

Relateid:	25W0000050	County c:	Goodhue
Unique no:	W0000050	Wellname:	KUHN, GERALD
Township:	112	Range:	17
Range dir:	W	Section:	15
Subsection:	BBDA	Mgsquad c:	87D
Elevation:	910		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Not Reported	Loc mc:	Not Reported
Loc src:	Minnesota Geological Survey	Data src:	Not Reported
Depth drill:	110		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth comp:	110		
Date drll:	0		
Case diam:	0		
Case depth:	0		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	0		
Strat upd:	0		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	OPCJ	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Y
Obwell:	Not Reported	Swl:	Not Reported
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19900530		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	512145		
Utmn:	4928781		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	25W0000050	Swlcount:	1
Swldate:	0		
Swlavgmeas:	0		
Swlavgelev:	910		
Site id:	MN5000000143425		
Historic Water Level Information:			
Relateid:	25W0000050	Meas type:	Well installation
Meas date:	Not Reported		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	0		
Meas elev:	910		
Data src:	Not Reported	Program:	CWI
Entry date:	19900530		
Updt date:	0		

24
West
1/2 - 1 Mile
Higher

MN WELLS MN5000000165878

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Relateid:	0000218925	County c:	Goodhue
Unique no:	00218925	Wellname:	STEHR, ELMER
Township:	112	Range:	17
Range dir:	W	Section:	17
Subsection:	ADACAA	Mgsquad c:	87D
Elevation:	950		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Not Reported	Loc mc:	Information from owner
Loc src:	Minnesota Geological Survey	Data src:	Thein Well Co.
Depth drll:	410		
Depth comp:	410		
Date drll:	19720926		
Case diam:	10		
Case depth:	42		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19941122		
Strat upd:	19941122		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	30		
First bdrk:	OSTP	Last strat:	Jordan
Ohtopunit:	OSTP	Ohbotunit:	CJDN
Aquifer:	MTPL	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Not Reported
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19871104		
Updt date:	19941122		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	510153		
Utmn:	4928470		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	218925	Swlcount:	0
Swldate:	0		
Swlavgmeas:	0		
Swlavglev:	0		
Site id:	MN5000000165878		

Address Information:

Relateid:	0000218925	Name:	STEHR, ELMER
Addtype c:	Both	House no:	Not Reported
Street:	Not Reported	Road type:	Not Reported
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19871104		
Updt date:	19941122		
Other:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Construction 1 Information:

Relateid:	0000218925	Drill meth:	Non-specified Rotary
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	Not Reported
Case top:	0		
Drive shoe:	Not Reported	Case type:	Single casing
Screen:	N		
Ohtopfeet:	42		
Ohbotfeet:	410		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Not Reported
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	0		
Pump volts:	Not Reported		
Dropp len:	Not Reported		
Dropp mat:	Not Reported		
Pump cpcty:	Not Reported		
Pump type:	Not Reported	Variance:	Not Reported
Drllr name:	HOOVER, R.		
Entry date:	19871104		
Updt date:	19941122		

Remarks Information:

Relateid: 0000218925
 Seq no: 1
 Remarks: NEW OWNER IS RICHARD JACOBSEN.

25
 NW
 1/2 - 1 Mile
 Higher

MN WELLS MN5000000042390

Relateid:	0000435222	County c:	Goodhue
Unique no:	00435222	Wellname:	SIBLEY, LARRY
Township:	112	Range:	17
Range dir:	W	Section:	9
Subsection:	CCCACC	Mgsquad c:	87D
Elevation:	882		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Information from owner
Loc src:	Minnesota Geological Survey	Data src:	Kimmes-bauer
Depth drill:	320		
Depth comp:	320		
Date drill:	19870629		
Case diam:	4		
Case depth:	294		
Grout:	Well grouted, type unknown	Pollut dst:	75
Pollut dir:	S	Pollut typ:	SDF
Strat date:	19951121		
Strat upd:	19951121		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Relateid:	0000162685	County c:	Goodhue
Unique no:	00162685	Wellname:	JOHNSON, KEITH
Township:	112	Range:	17
Range dir:	W	Section:	9
Subsection:	CAADDA	Mgsquad c:	87D
Elevation:	883		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Name on mailbox
Loc src:	Minnesota Geological Survey	Data src:	Cannon Well Co.
Depth dril:	339		
Depth comp:	339		
Date dril:	19781009		
Case diam:	4		
Case depth:	301		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19941122		
Strat upd:	19941122		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	4		
First bdrk:	OPDC	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19871104		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	511043		
Utmn:	4929629		
Geoc entry:	0		
Geoc date:	19980201		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	162685	Swlcount:	1
Swldate:	19781009		
Swlavgmeas:	78		
Swlavglev:	805		
Site id:	MN5000000094374		

Address Information:

Relateid:	0000162685	Name:	JOHNSON, KEITH
Addtype c:	Both	House no:	Not Reported
Street:	Not Reported	Road type:	Not Reported
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19871104		
Updt date:	19941122		
Other:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Construction 1 Information:

Relateid:	0000162685	Drill meth:	Non-specified Rotary
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	0		
Drive shoe:	Not Reported	Case type:	Step down
Screen:	N		
Ohtopfeet:	301		
Ohbotfeet:	339		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19780000		
Pump mfg:	FLINT & WALLING	Pump model:	Not Reported
Pump hp:	.75		
Pump volts:	230		
Dropp len:	126		
Dropp mat:	G		
Pump cpcty:	Not Reported		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	EMERY, K.		
Entry date:	19871104		
Updt date:	19941122		

Historic Water Level Information:

Relateid:	0000162685	Meas type:	Well installation
Meas date:	19781009		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	78		
Meas elev:	805		
Data src:	Cannon Well Co.	Program:	CWI
Entry date:	19871104		
Updt date:	0		

30
NNW
1/2 - 1 Mile
Higher

FED USGS USGS40000586485

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	USGS-443112092513901		
Monloc name:	PDCJ-U16 112N17W09CAADDA01	0000162685	
Monloc type:	Well		
Monloc desc:	NAWQA data entry com.&ver.11/30/2001 Menheer MA		
Huc code:	07040002	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.5185639
Longitude:	-92.867375	Sourcemap scale:	24000

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Horiz Acc measure:	.1	Horiz Acc measure units:	seconds
Horiz Collection method:	Differentially corrected Global Positioning System (DGPS)		
Horiz coord refs:	NAD83	Vert measure val:	883
Vert measure units:	feet	Vertacc measure val:	5.
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refs:	NAVD88	Countrycode:	US
Aquifername:	Cambrian-Ordovician aquifer system		
Formation type:	Jordan Sandstone		
Aquifer type:	Unconfined single aquifer		
Construction date:	19781009	Welldepth:	339
Welldepth units:	ft	Wellholedepth:	339
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 2

Date	Feet below Surface	Feet to Sealevel	Date	Feet below Surface	Feet to Sealevel
1996-08-29	68.23		1978-10-09	78.00	

31
WNW
1/2 - 1 Mile
Higher

MN WELLS MN5000000164610

Relateid:	0000506694	County c:	Goodhue
Unique no:	00506694	Wellname:	KNUTSON, ROGER
Township:	112	Range:	17
Range dir:	W	Section:	17
Subsection:	AABCDD	Mgsquad c:	87D
Elevation:	900		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Kimmes-bauer
Depth drll:	360		
Depth comp:	360		
Date drll:	19891114		
Case diam:	4		
Case depth:	240		
Grout:	Well grouted, type unknown	Pollut dst:	105
Pollut dir:	N	Pollut typ:	SDF
Strat date:	19951121		
Strat upd:	19951121		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	10		
First bdrk:	OSTP	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910813		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Updt date:	20140214	Gcm code:	A
Geoc type:	WW	Geoc prg:	CWI
Geoc src:	MGS		
Utme:	509965		
Utmn:	4928786		
Geoc entry:	0		
Geoc date:	19960528		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	506694	Swlcount:	1
Swldate:	19891114		
Swlavgmeas:	80		
Swlavgelev:	820		
Site id:	MN5000000164610		

Address Information:

Relateid:	0000506694	Name:	KNUTSON, ROGER
Addtype c:	Both	House no:	7849
Street:	305TH	Road type:	Street
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19910813		
Updt date:	19951121		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000506694	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1		
Drive shoe:	Y	Case type:	Step down
Screen:	N		
Ohtopfeet:	340		
Ohbotfeet:	360		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptss mfg:	WHITEWATER	Ptss mdl:	SU4X5.5
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19891204		
Pump mfg:	GRUNDFOS	Pump model:	10S10-15
Pump hp:	1		
Pump volts:	230		
Dropp len:	147		
Dropp mat:	G		
Pump cpcty:	10		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	ANDERSON, L.		
Entry date:	19910813		
Updt date:	19951121		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Historic Water Level Information:

Relateid:	0000506694	Meas type:	Well installation
Meas date:	19891114		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measurement:	80		
Meas elev:	820		
Data src:	Kimmes-bauer	Program:	CWI
Entry date:	19910813		
Updt date:	0		

Pump Test Information:

Relateid:	0000506694
Pumplestid:	1
Test date:	19891114
Start meas:	80
Flow rate:	20
Duration:	Not Reported
Pump meas:	120

H32
WNW
1/2 - 1 Mile
Higher

FED USGS USGS40000496183

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-443039092523101		
Monloc name:	112N12W17AACCDB01	0000162691	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07040002	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.5108333
Longitude:	-92.8755556	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refs:	NAD83	Vert measure val:	899
Vert measure units:	feet	Vertacc measure val:	5.
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refs:	NAVD88	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Jordan Sandstone		
Aquifer type:	Not Reported		
Construction date:	19790510	Welldepth:	377
Welldepth units:	ft	Wellholedepth:	377
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

H33
WNW
1/2 - 1 Mile
Higher

MN WELLS MN5000000110306

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Relateid:	0000162691	County c:	Goodhue
Unique no:	00162691	Wellname:	QUALLE, VIRGIL
Township:	112	Range:	17
Range dir:	W	Section:	17
Subsection:	AACCDB	Mgsquad c:	87C
Elevation:	899		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Name on mailbox
Loc src:	Minnesota Geological Survey	Data src:	Cannon Well Co.
Depth drll:	377		
Depth comp:	377		
Date drll:	19790510		
Case diam:	4		
Case depth:	341		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19960313		
Strat upd:	19960313		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	5		
First bdrk:	OSTP	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Not Reported
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19871104		
Updt date:	19960313		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	509891		
Utmn:	4928622		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	162691	Swlcount:	0
Swldate:	0		
Swlavgmeas:	0		
Swlavglev:	0		
Site id:	MN5000000110306		

Address Information:

Relateid:	0000162691	Name:	QUALLE, VIRGIL
Addtype c:	Both	House no:	Not Reported
Street:	Not Reported	Road type:	Not Reported
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19871104		
Updt date:	19960313		
Other:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Construction 1 Information:

Relateid:	0000162691	Drill meth:	Non-specified Rotary
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	0		
Drive shoe:	Not Reported	Case type:	Step down
Screen:	N		
Ohtopfeet:	341		
Ohbotfeet:	377		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlls mfg:	Not Reported	Ptlls mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19790507		
Pump mfg:	GOULDS	Pump model:	Not Reported
Pump hp:	.75		
Pump volts:	230		
Dropp len:	108		
Dropp mat:	S		
Pump cpcty:	Not Reported		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	Not Reported		
Entry date:	19871104		
Updt date:	19960313		

**I34
WNW
1/2 - 1 Mile
Higher**

MN WELLS MN5000000112743

Relateid:	0000218721	County c:	Goodhue
Unique no:	00218721	Wellname:	MCCUSKIE, LEROY
Township:	112	Range:	17
Range dir:	W	Section:	17
Subsection:	AABABB	Mgsquad c:	87D
Elevation:	890		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Other, note in remarks
Loc src:	Minnesota Geological Survey	Data src:	Cannon Well Co.
Depth drll:	137		
Depth comp:	137		
Date drll:	197308		
Case diam:	5		
Case depth:	82		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19960418		
Strat upd:	19960418		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	15	Last strat:	Prairie Du Chien Group
First bdrk:	OPDC	Ohbotunit:	OPDC
Ohtopunit:	OPDC	Cuttings:	Not Reported
Aquifer:	OPDC	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Not Reported
Obwell:	Not Reported	Input src:	Minnesota Geological Survey
Igwis:	Not Reported		
Unused:	Not Reported		
Entry date:	19871104		
Updt date:	19960418		
Geoc type:	WW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	509964		
Utmn:	4928972		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	619008		
Geocupd da:	20030217		
Rcvd date:	0		
Well label:	218721	Swlcount:	0
Swldate:	0		
Swlavgmeas:	0		
Swlavgelev:	0		
Site id:	MN5000000112743		

Address Information:

Relateid:	0000218721	Name:	MCCUSKIE, LEROY
Addtype c:	Both	House no:	Not Reported
Street:	Not Reported	Road type:	Not Reported
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19871104		
Updt date:	19960418		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000218721	Drill meth:	Not Reported
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	Not Reported
Case top:	0	Case type:	Single casing
Drive shoe:	Not Reported		
Screen:	N		
Ohtopfeet:	82	Screen typ:	Not Reported
Ohbotfeet:	137	Ptlss mdl:	Not Reported
Screen mfg:	Not Reported	Csg top ok:	Not Reported
Ptlss mfg:	Not Reported	Plstc prot:	Not Reported
Bsmt offst:	Not Reported	Pump inst:	Not Reported
Csg at grd:	Not Reported		
Disinfectd:	Not Reported	Pump model:	Not Reported
Pump date:	Not Reported		
Pump mfg:	Not Reported		
Pump hp:	0		
Pump volts:	Not Reported		
Drpp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat:	Not Reported	Variance:	Not Reported
Pump cpcty:	Not Reported		
Pump type:	Not Reported		
Drllr name:	Not Reported		
Entry date:	19871104		
Updt date:	19960418		

35
NW
1/2 - 1 Mile
Higher

MN WELLS MN5000000140887

Relateid:	0000558280	County c:	Goodhue
Unique no:	00558280	Wellname:	KUSILEK, DALE
Township:	112	Range:	17
Range dir:	W	Section:	8
Subsection:	DDACAD	Mgsquad c:	87D
Elevation:	883		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Tag on well
Loc src:	Minnesota Geological Survey	Data src:	Carlson Well Drill
Depth drll:	340		
Depth comp:	340		
Date drll:	19950608		
Case diam:	4		
Case depth:	320		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19960120		
Strat upd:	19960120		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	5		
First bdrk:	OPDC	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19950721		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	510148		
Utmn:	4929259		
Geoc entry:	0		
Geoc date:	19960528		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well label: 558280
 Swldate: 19950605
 Swlavgmeas: 57
 Swlavgelev: 826
 Site id: MN5000000140887

Swlcount: 1

Address Information:

Relateid: 0000558280
 Addtype c: Both
 Street: 82NDAVE.
 Road dir: Not Reported
 State: MN
 Entry date: 19950721
 Updt date: 19960120
 Other: Not Reported

Name: KUSILEK, DALE
 House no: 29999
 Road type: Way
 City: CANON FALLS
 Zipcode: 55009

Construction 1 Information:

Relateid: 0000558280
 Drill fluid: Water
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Steel (black or low carbon)
 Case top: 0
 Drive shoe: Y
 Screen: N
 Ohtopfeet: 320
 Ohbotfeet: 340
 Screen mfg: Not Reported
 Pt1ss mfg: MAASE
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: Not Reported
 Pump date: 19950605
 Pump mfg: FAIRBANKS MORSE
 Pump hp: 1
 Pump volts: 230
 Dropp len: 84
 Dropp mat: Not Reported
 Pump cpcty: 10
 Pump type: Submersible
 Drllr name: CARLSON, P.
 Entry date: 19950721
 Updt date: 19960120

Drill meth: Non-specified Rotary
 Hydrofrac: Not Reported
 Case joint: W
 Case type: Single casing
 Screen typ: Not Reported
 Pt1ss mdl: 41J
 Csg top ok: Y
 Plstc prot: Not Reported
 Pump inst: Y
 Pump model: 3D10015F12
 Variance: Not Reported

Historic Water Level Information:

Relateid: 0000558280
 Meas date: 19950605
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: 0
 Measuremt: 57
 Meas elev: 826
 Data src: Carlson Well Drill
 Entry date: 19950721
 Updt date: 0

Meas type: Well installation
 Program: CWI

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

36
ESE
1/2 - 1 Mile
Higher

MN WELLS MN5000000107425

Relateid:	0000587996	County c:	Goodhue
Unique no:	00587996	Wellname:	BICKMAN, LARRY
Township:	112	Range:	17
Range dir:	W	Section:	15
Subsection:	CADADC	Mgsquad c:	87D
Elevation:	906		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Not Reported
Loc src:	Winona State University	Data src:	Carlson Well Drill
Depth drll:	360		
Depth comp:	360		
Date drll:	19970429		
Case diam:	4		
Case depth:	0		
Grout:	Well grouted, type unknown	Pollut dst:	120
Pollut dir:	SE	Pollut typ:	SDF
Strat date:	20000925		
Strat upd:	20001116		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	17		
First bdrk:	OPDC	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	N		
Entry date:	20000925		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	DS1
Geoc src:	WSU	Geoc prg:	SMWRC
Utme:	512558		
Utmn:	4927905		
Geoc entry:	1003		
Geoc date:	20000807		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	587996	Swlcount:	1
Swldate:	19961017		
Swlavgmeas:	55		
Swlavgelev:	851		
Site id:	MN5000000107425		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000587996	Name:	BICKMAN, LARRY
Addtype c:	Contact address	House no:	10100
Street:	310TH	Road type:	Street
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	Not Reported		
Updt date:	20050311		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000587996	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	Not Reported		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	325		
Ohbotfeet:	360		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	MAASE	Ptlss mdl:	4J1
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Y	Pump inst:	Not Reported
Pump date:	19961214		
Pump mfg:	STARITE	Pump model:	10P4D02-J-02
Pump hp:	.75		
Pump volts:	230		
Dropp len:	105		
Dropp mat:	Not Reported		
Pump cpcty:	10		
Pump type:	Submersible	Variance:	N
Drllr name:	CARLSON, P.		
Entry date:	20000925		
Updt date:	20001129		

Historic Water Level Information:

Relateid:	0000587996	Meas type:	Well installation
Meas date:	19961017		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	55		
Meas elev:	851		
Data src:	Carlson Well Drill	Program:	CWI
Entry date:	20000925		
Updt date:	20011026		

Id Information:

Relateid:	0000587996	Identifier:	28.015.1600
Id type:	CNTY	Id prog:	PID

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Id Information:		Identifier:	96-115C
Relateid:	0000587996	Id prog:	PERMIT
Id type:	CNTY		

I37
WNW
1/2 - 1 Mile
Higher

FED USGS USGS40000496221

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-443051092522801		
Monloc name:	112N17W17AABABB01	0000218721	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07040002	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.5141667
Longitude:	-92.8747222	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	890
Vert measure units:	feet	Vertacc measure val:	5.
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NAVD88	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19730800	Welldepth:	137
Welldepth units:	ft	Wellholeddepth:	137
Wellholeddepth units:	ft		

Ground-water levels, Number of Measurements: 0

38
WNW
1/2 - 1 Mile
Higher

MN WELLS MN5000000050173

Relateid:	0000466823	County c:	Goodhue
Unique no:	00466823	Wellname:	ROBLE, DAN
Township:	112	Range:	17
Range dir:	W	Section:	17
Subsection:	ABAAAD	Mgsquad c:	87C
Elevation:	885		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Other, note in remarks
Loc src:	Minnesota Geological Survey	Data src:	Kimmes-bauer
Depth drll:	340		
Depth comp:	340		
Date drll:	19900829		
Case diam:	4		
Case depth:	322		
Grout:	Well grouted, type unknown	Pollut dst:	100
Pollut dir:	S	Pollut typ:	SDF
Strat date:	19960120		
Strat upd:	19960120		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	40	Last strat:	Jordan
First bdrk:	OPDC	Ohbotunit:	CJDN
Ohtopunit:	CJDN	Cuttings:	Not Reported
Aquifer:	CJDN	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Geological Survey
Igwis:	Not Reported		
Unused:	Not Reported		
Entry date:	19910813		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	509833		
Utmn:	4928945		
Geoc entry:	0		
Geoc date:	19960528		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	466823	Swlcount:	1
Swldate:	19900829		
Swlavgmeas:	120		
Swlavgelev:	765		
Site id:	MN5000000050173		

Address Information:

Relateid:	0000466823	Name:	ROBLE, DAN
Addtype c:	Both	House no:	7745
Street:	305TH	Road type:	Street
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19910813		
Updt date:	19960120		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000466823	Drill meth:	Air Rotary
Drill fluid:	Foam	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1	Case type:	Step down
Drive shoe:	Y		
Screen:	N		
Ohtopfeet:	322	Screen typ:	Not Reported
Ohbotfeet:	340	Ptlss mdl:	SU4X5.5
Screen mfg:	Not Reported	Csg top ok:	Not Reported
Ptlss mfg:	WHITEWATER	Plstc prot:	Not Reported
Bsmt offst:	Not Reported	Pump inst:	Y
Csg at grd:	Not Reported		
Disinfectd:	Not Reported		
Pump date:	19900910		
Pump mfg:	GRUNDFOS	Pump model:	10S09=12
Pump hp:	.75		
Pump volts:	230		
Dropp len:	147		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: G
 Pump cpcty: 10
 Pump type: Submersible Variance: Not Reported
 Drllr name: ANDERSON, L.
 Entry date: 19910813
 Updt date: 19960120

Historic Water Level Information:
 Relateid: 0000466823 Meas type: Well installation
 Meas date: 19900829
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: 0
 Measuremt: 120
 Meas elev: 765
 Data src: Kimmes-bauer Program: CWI
 Entry date: 19910813
 Updt date: 0

Pump Test Information:
 Relateid: 0000466823
 Pumpstetid: 1
 Test date: 19900829
 Start meas: 120
 Flow rate: 20
 Duration: Not Reported
 Pump meas: 180

39
 SSW
 1/2 - 1 Mile
 Higher

MN WELLS MN5000000173237

Relateid: 0000697833	County c: Goodhue	
Unique no: 00697833	Wellname: ERNST, STEVE & NANCY	
Township: 112	Range: 17	
Range dir: W	Section: 21	
Subsection: BDACCB	Mgsquad c: 70A	
Elevation: 1059		
Elev mc: 7.5 minute topographic map (+/- 5 feet)		
Status c: Active		
Use c: Domestic	Loc mc: Tag on well	
Loc src: Not Reported	Data src: Carlson Well Drill	
Depth drll: 520		
Depth comp: 520		
Date drll: 20031208		
Case diam: 4		
Case depth: 503		
Grout: Well grouted, type unknown	Pollut dst: 65	
Pollut dir: SW	Pollut typ: SEW	
Strat date: 20040827		
Strat upd: 20121024		
Strat src: Minnesota Geological Survey	Strat geol: Tony Runkel	
Strat mc: Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	21	Last strat:	Jordan
First bdrk:	ODCR	Ohbotunit:	CJDN
Ohtopunit:	CJDN	Cuttings:	Not Reported
Aquifer:	CJDN	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	0		
Updt date:	20140131	Gcm code:	G60
Geoc type:	WW	Geoc prg:	VNM
Geoc src:	C25		
Utme:	510877		
Utmn:	4926820		
Geoc entry:	2210002		
Geoc date:	20080115		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20031230		
Well label:	697833	Swlcount:	1
Swldate:	20031105		
Swlavgmeas:	178		
Swlavgelev:	881		
Site id:	MN5000000173237		

Address Information:

Relateid:	0000697833	Name:	ERNST, STEVE & NANCY
Addtype c:	Well address	House no:	31229
Street:	85TH AVENUE	Road type:	Way
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	20040827		
Updt date:	20120816		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000697833	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	N
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	Not Reported		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	503		
Ohbotfeet:	520		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	MONITOR	Ptlss mdl:	5PS-45
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Y	Pump inst:	Not Reported
Pump date:	20031121		
Pump mfg:	JACUZZI	Pump model:	15S41814XV-S2
Pump hp:	1.5		
Pump volts:	230		
Drapp len:	231		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Drop mat:	Not Reported		
Pump cpcty:	18		
Pump type:	Submersible	Variance:	N
Drllr name:	PAUL/MIKE		
Entry date:	Not Reported		
Updt date:	Not Reported		

Historic Water Level Information:

Relateid:	0000697833	Meas type:	Well installation
Meas date:	20031105		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measurement:	178		
Meas elev:	881		
Data src:	Carlson Well Drill	Program:	WELLOG
Entry date:	20040827		
Updt date:	20120816		

Id Information:

Relateid:	0000697833	Identifier:	25068
Id type:	SEJPB	Id prog:	VNM

Id Information:

Relateid:	0000697833	Identifier:	28.021.0800
Id type:	CNTY	Id prog:	PID

40
WNW
1/2 - 1 Mile
Lower

MN WELLS MN5000000158324

Relateid:	0000585133	County c:	Goodhue
Unique no:	00585133	Wellname:	LINDELL, ROY
Township:	112	Range:	17
Range dir:	W	Section:	17
Subsection:	ABACDC	Mgsquad c:	87C
Elevation:	852		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Not Reported
Loc src:	Winona State University	Data src:	Kimmes-bauer
Depth dril:	360		
Depth comp:	360		
Date dril:	19961127		
Case diam:	4		
Case depth:	336		
Grout:	Well grouted, type unknown	Pollut dst:	150
Pollut dir:	N	Pollut typ:	SDF
Strat date:	19970116		
Strat upd:	20001117		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	12	Last strat:	Jordan
First bdrk:	OPDC	Ohbotunit:	CJDN
Ohtopunit:	CJDN	Cuttings:	Not Reported
Aquifer:	CJDN	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Geological Survey
Igwis:	Not Reported		
Unused:	N		
Entry date:	19970116		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	DS1
Geoc src:	WSU	Geoc prg:	SMWRC
Utme:	509714		
Utmn:	4928799		
Geoc entry:	1003		
Geoc date:	20000807		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	585133	Swlcount:	1
Swldate:	19961031		
Swlavgmeas:	60		
Swlavglev:	792		
Site id:	MN5000000158324		

Address Information:

Relateid:	0000585133	Name:	LINDELL, ROY
Addtype c:	Both	House no:	7683
Street:	HWY.19	Road type:	Boulevard
Road dir:	Not Reported	City:	CANNON FALLS
State:	MN	Zipcode:	55009
Entry date:	19970116		
Updt date:	19970116		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000585133	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	Not Reported		
Drive shoe:	Y	Case type:	Step down
Screen:	N		
Ohtopfeet:	336		
Ohbotfeet:	360		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	WHITEWATER	Ptlss mdl:	SU4X5.5
Bsmt offst:	Not Reported	Csg top ok:	U
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Y	Pump inst:	Y
Pump date:	19961127		
Pump mfg:	GRUNDFOS	Pump model:	10S07-12
Pump hp:	.75		
Pump volts:	230		
Drop len:	105		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: Not Reported
Pump cpcty: 10
Pump type: Submersible Variance: N
Drllr name: MILLER, M.
Entry date: 19970116
Updt date: 20001130

Historic Water Level Information:

Relateid: 0000585133 Meas type: Well installation
Meas date: 19961031
Meas time: Not Reported
M pt code: Land surface
Meas point: Not Reported
Measuremt: 60
Meas elev: 792
Data src: Kimmes-bauer Program: CWI
Entry date: 19970116
Updt date: 20011026

Pump Test Information:

Relateid: 0000585133
Pumptestid: 1
Test date: 19961031
Start meas: 60
Flow rate: 20
Duration: 2
Pump meas: 80

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS RADON

AREA RADON INFORMATION

State Database: MN Radon

Radon Test Results

Zipcode	Num Tests	Minimum	Maximum	Average	# > 4 pCi/L	# < 4 pCi/L
55009	331	0.0	31.7	5.9	182	149

Federal EPA Radon Zone for GOODHUE County: 1

- Note: Zone 1 indoor average level > 4 pCi/L.
 : Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
 : Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 55009

Number of sites tested: 2

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	6.900 pCi/L	0%	100%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	10.950 pCi/L	0%	100%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)

Source: United States Geologic Survey

EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map

Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.

Source: FEMA

Telephone: 877-336-2627

Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory

Source: Land Management Information Center

Telephone: 617-297-3281

HYDROGEOLOGIC INFORMATION

AQUIFLOW^R Information System

Source: EDR proprietary database of groundwater flow information

EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit

Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)

The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)

Telephone: 800-672-5559

SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)

This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Minnesota Groundwater Database

Source: Minnesota Geological Survey County Water Well Index (CWI)

Telephone: 612-627-4780

OTHER STATE DATABASE INFORMATION

RADON

State Database: MN Radon

Source: Department of Health

Telephone: 651-215-0909

Radon Test Results

Area Radon Information

Source: USGS

Telephone: 703-356-4020

The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones

Source: EPA

Telephone: 703-356-4020

Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities

Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater

Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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Appendix C

Historical Aerial Photographs

Byllesby Garden

Not Reported

Cannon Falls, MN 55009

Inquiry Number: 5193063.9

February 22, 2018

The EDR Aerial Photo Decade Package



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

02/22/18

Site Name:

Byllesby Garden
Not Reported
Cannon Falls, MN 55009
EDR Inquiry # 5193063.9

Client Name:

Westwood Professional Services
7699 Anagram Drive
Eden Prairie, MN 55344
Contact: David Kuhlmann



Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

<u>Year</u>	<u>Scale</u>	<u>Details</u>	<u>Source</u>
2015	1"=500'	Flight Year: 2015	USDA/NAIP
2010	1"=500'	Flight Year: 2010	USDA/NAIP
2006	1"=500'	Flight Year: 2006	USDA/NAIP
1997	1"=500'	Flight Date: January 01, 1997	State\MN_1997
1991	1"=500'	Acquisition Date: April 17, 1991	USGS/DOQQ
1980	1"=500'	Flight Date: October 31, 1980	USGS
1974	1"=500'	Flight Date: January 01, 1974	USGS
1970	1"=500'	Flight Date: September 10, 1970	USDA
1957	1"=500'	Flight Date: September 24, 1957	USDA
1949	1"=500'	Flight Date: January 01, 1949	ASCS
1938	1"=500'	Flight Date: July 15, 1938	USGS

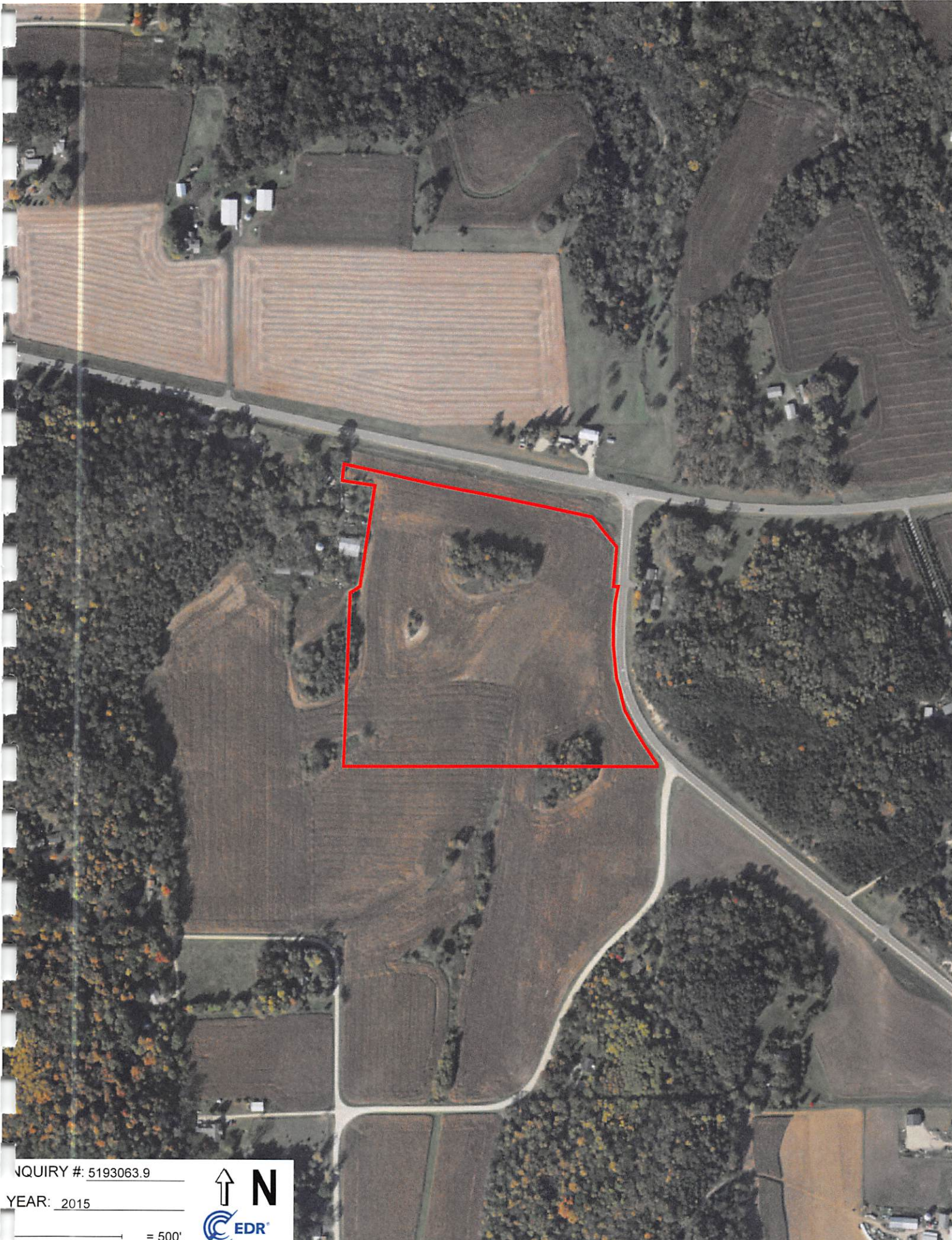
When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

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INQUIRY #: 5193063.9

YEAR: 2015

— = 500'





INQUIRY #: 5193063.9

YEAR: 2010

— = 500'





INQUIRY #: 5193063.9

YEAR: 2006

_____ = 500'



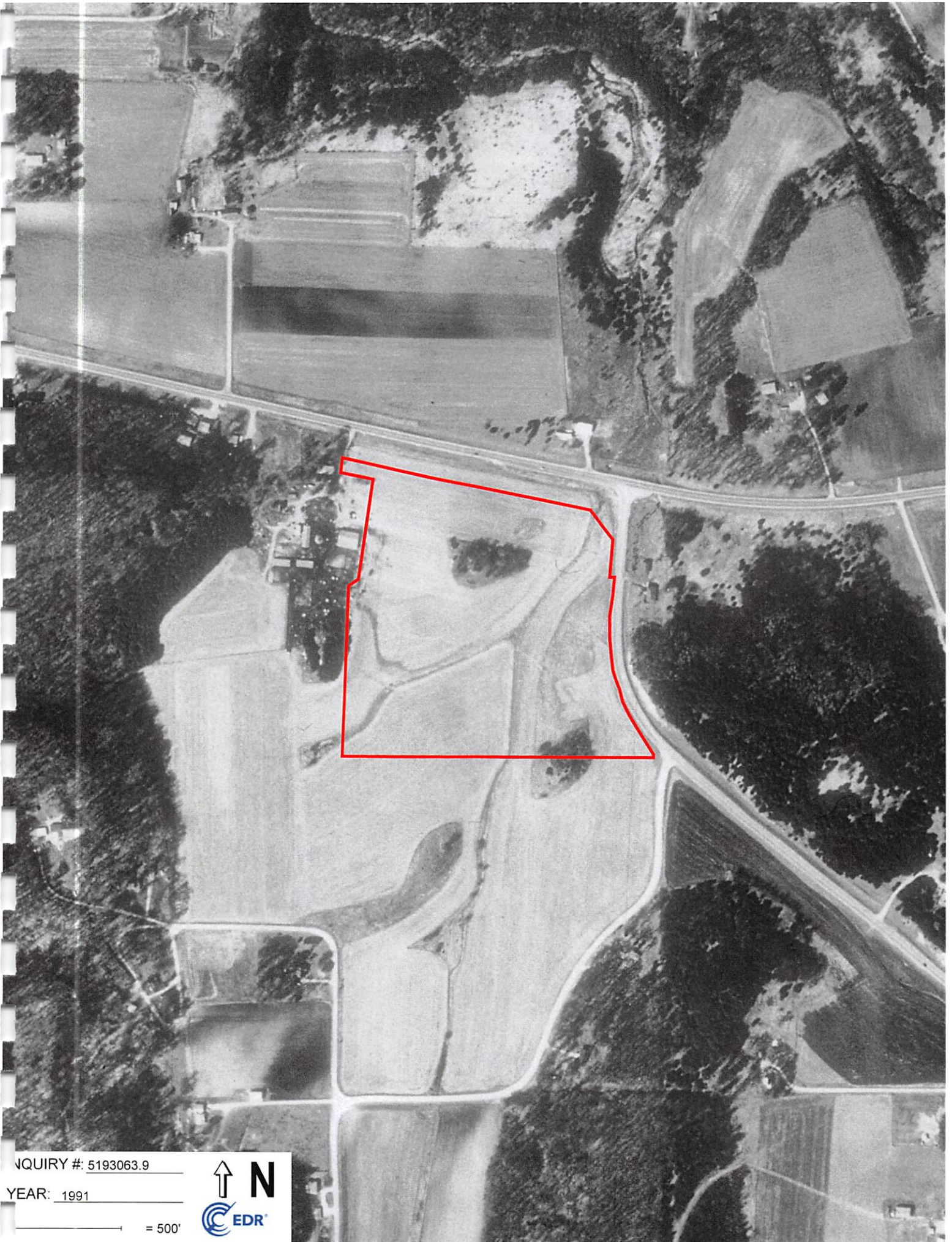


INQUIRY #: 5193063.9

YEAR: 1997

_____ = 500'





INQUIRY #: 5193063.9

YEAR: 1991

— = 500'





INQUIRY #: 5193063.9

YEAR: 1980

— = 500'





INQUIRY #: 5193063.9

YEAR: 1974

— = 500'



Subject boundary not shown because it exceeds image extent or image is not georeferenced.



INQUIRY #: 5193063.9

YEAR: 1970

← = 500'





INQUIRY #: 5193063.9

YEAR: 1957

— = 500'





INQUIRY #: 5193063.9

YEAR: 1949

_____ = 500'



Subject boundary not shown because it exceeds image extent or image is not georeferenced.



INQUIRY #: 5193063.9

YEAR: 1938

_____ = 500'



Byllesby Garden

Not Reported

Cannon Falls, MN 55009

Inquiry Number: 5193063.4

February 20, 2018

EDR Historical Topo Map Report

with QuadMatch™



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

02/20/18

Site Name:

Byllesby Garden
Not Reported
Cannon Falls, MN 55009
EDR Inquiry # 5193063.4

Client Name:

Westwood Professional Services
7699 Anagram Drive
Eden Prairie, MN 55344
Contact: David Kuhlmann



EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Westwood Professional Services were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDR's Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:**Coordinates:**

P.O.#	13987.00	Latitude:	44.508338 44° 30' 30" North
Project:	Byllesby Garden	Longitude:	-92.858874 -92° 51' 32" West
		UTM Zone:	Zone 15 North
		UTM X Meters:	511217.60
		UTM Y Meters:	4928345.03
		Elevation:	881.80' above sea level

Maps Provided:

2013
1974
1957

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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2013 Source Sheets



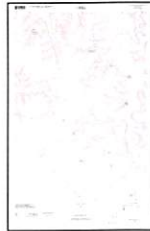
Cannon Falls

7.5-minute, 24000



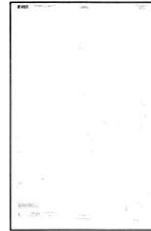
Sogn

7.5-minute, 24000



White Rock

7.5-minute, 24000



Miesville

7.5-minute, 24000

1974 Source Sheets



Cannon Falls

7.5-minute, 24000
Aerial Photo Revised 1973



Miesville

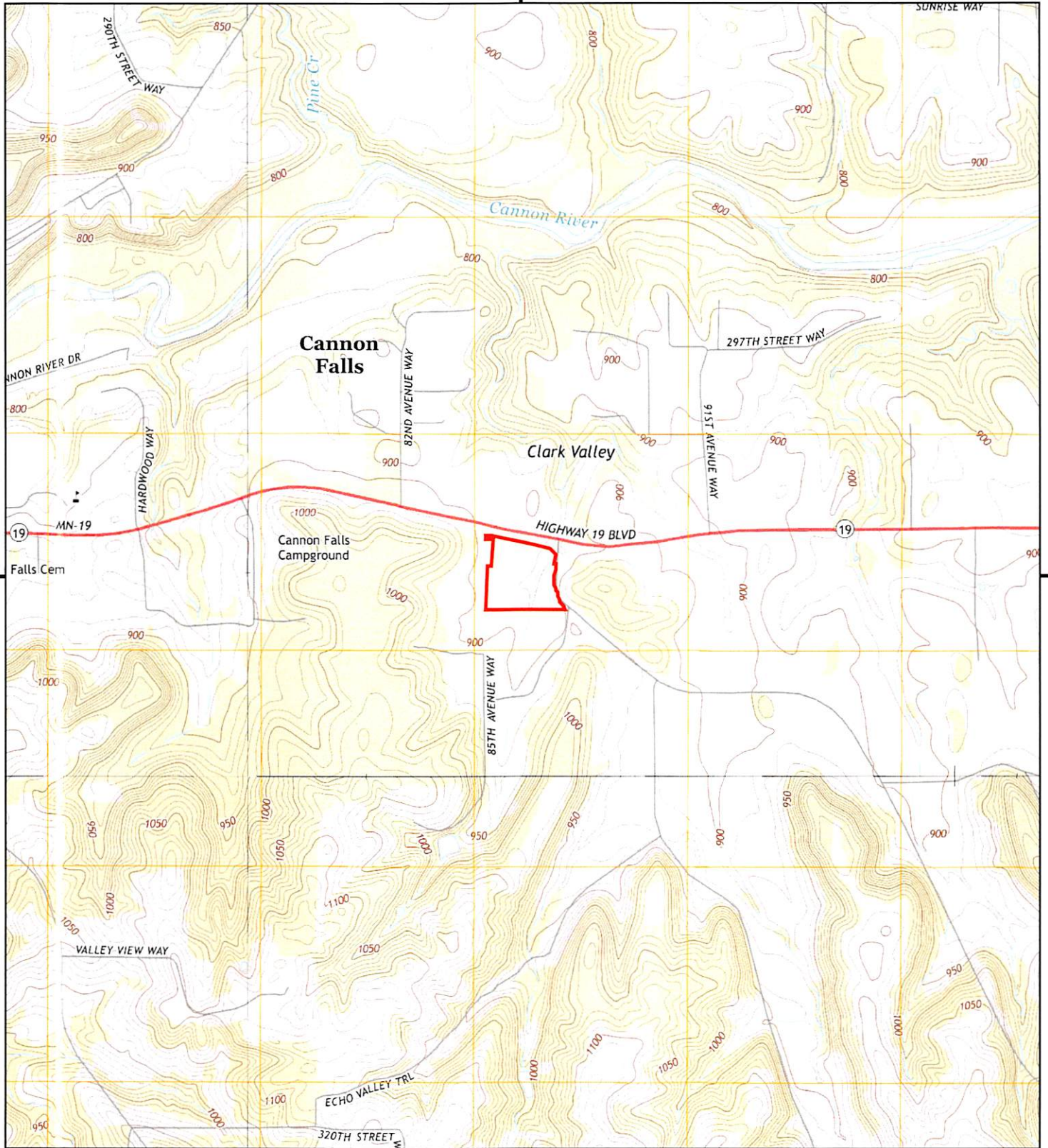
7.5-minute, 24000
Aerial Photo Revised 1974

1957 Source Sheets

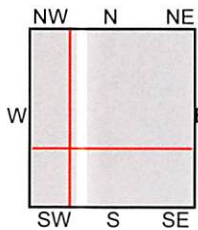


Hastings

15-minute, 62500
Aerial Photo Revised 1953



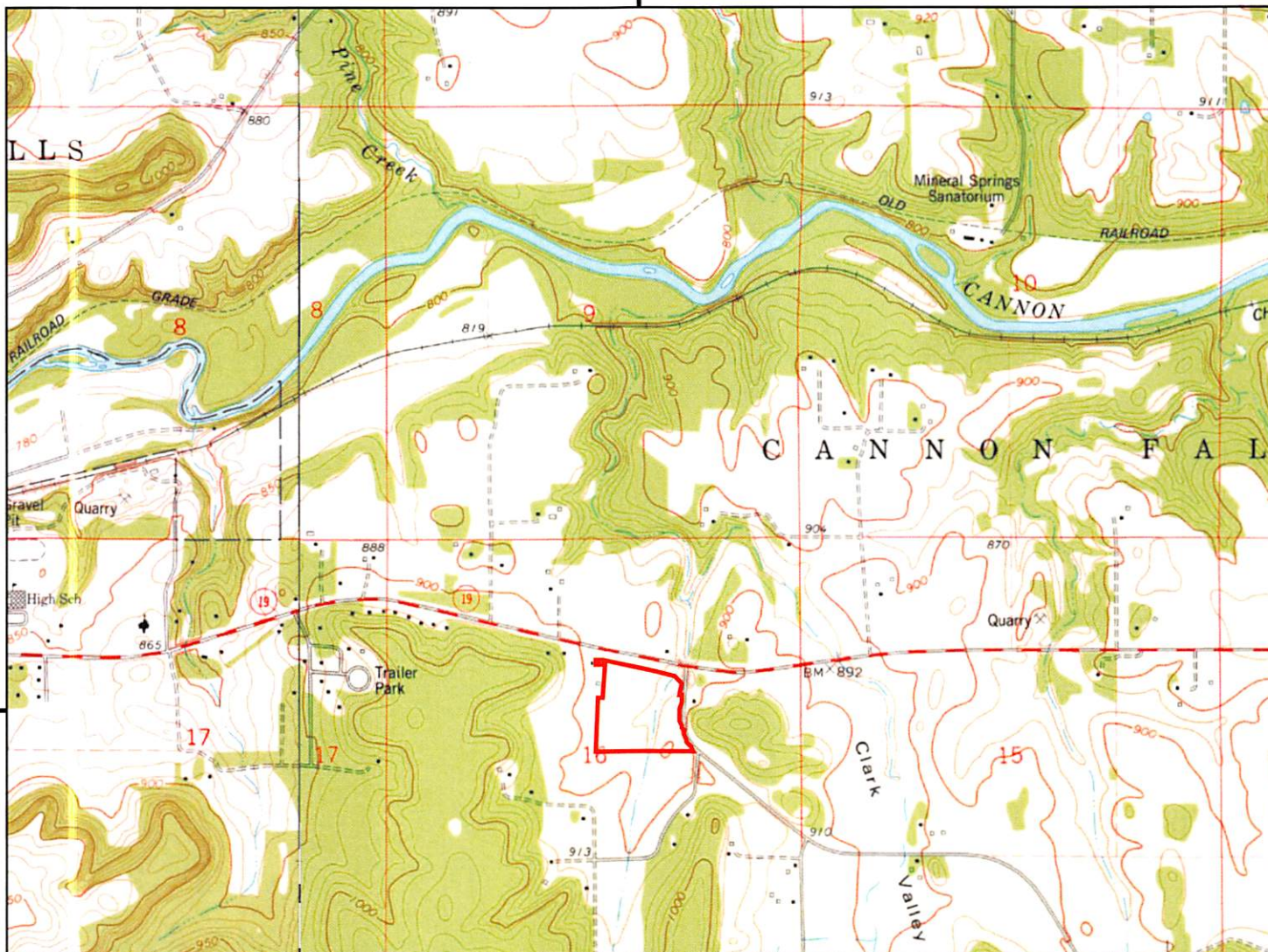
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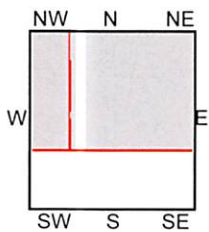
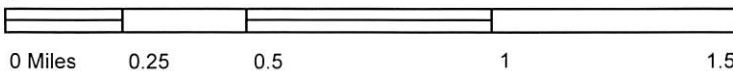
TP, Miesville, 2013, 7.5-minute
 SE, White Rock, 2013, 7.5-minute
 SW, Sogn, 2013, 7.5-minute
 NW, Cannon Falls, 2013, 7.5-minute

SITE NAME: Byllesby Garden
 ADDRESS: Not Reported
 Cannon Falls, MN 55009
 CLIENT: Westwood Professional Services





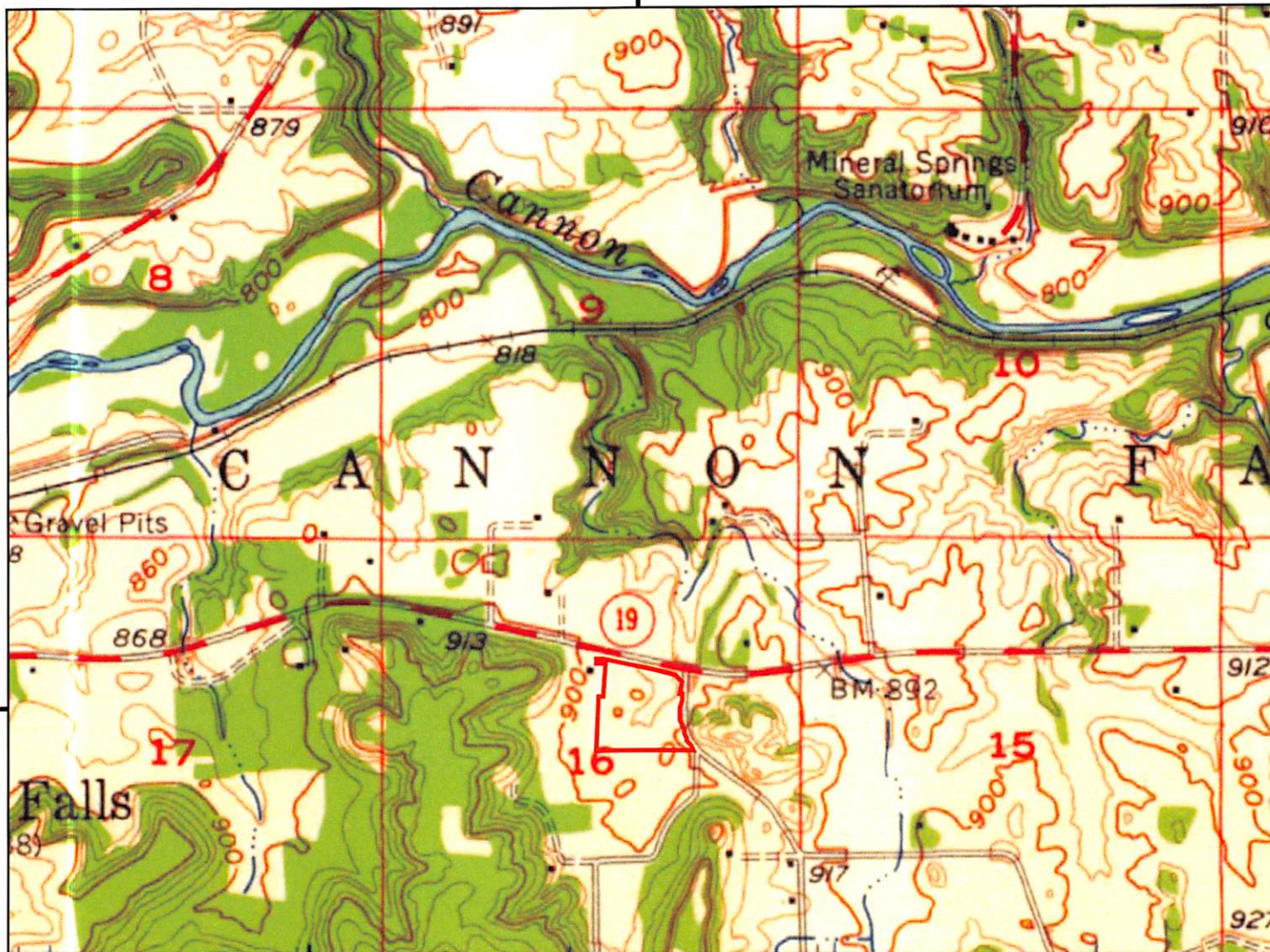
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 NW, Cannon Falls, 1974, 7.5-minute

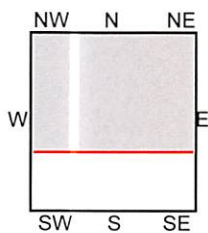
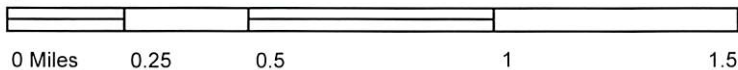
SITE NAME: Byllesby Garden
ADDRESS: Not Reported
 Cannon Falls, MN 55009
CLIENT: Westwood Professional Services





UN MAPPED	UNMAPPED	UNMAPPED	UNMAPPED	UNMAPPED	UNMAPPED
UN MAPPED	UNMAPPED	UNMAPPED	UNMAPPED	UNMAPPED	UNMAPPED
UN MAPPED	UNMAPPED	UNMAPPED	UNMAPPED	UNMAPPED	UNMAPPED
UN MAPPED	UNMAPPED	UNMAPPED	UNMAPPED	UNMAPPED	UNMAPPED

This report includes information from the following map sheet(s).



TP, Hastings, 1957, 15-minute

SITE NAME: Byllesby Garden
 ADDRESS: Not Reported
 Cannon Falls, MN 55009
 CLIENT: Westwood Professional Services



Byllesby Garden

Not Reported
Cannon Falls, MN 55009

Inquiry Number: 5193063.5
February 22, 2018

The EDR-City Directory Image Report

TABLE OF CONTENTS

SECTION

Executive Summary

Findings

City Directory Images

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

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Data by

infoUSA

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RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

<u>Year</u>	<u>Target Street</u>	<u>Cross Street</u>	<u>Source</u>
2014	<input type="checkbox"/>	<input checked="" type="checkbox"/>	EDR Digital Archive
2010	<input type="checkbox"/>	<input checked="" type="checkbox"/>	EDR Digital Archive
2005	<input type="checkbox"/>	<input checked="" type="checkbox"/>	EDR Digital Archive
2000	<input type="checkbox"/>	<input checked="" type="checkbox"/>	EDR Digital Archive
1995	<input type="checkbox"/>	<input type="checkbox"/>	EDR Digital Archive
1992	<input type="checkbox"/>	<input type="checkbox"/>	EDR Digital Archive
1987	<input type="checkbox"/>	<input type="checkbox"/>	EDR Digital Archive
1982	<input type="checkbox"/>	<input type="checkbox"/>	EDR Digital Archive
1977	<input type="checkbox"/>	<input type="checkbox"/>	EDR Digital Archive

FINDINGS

TARGET PROPERTY STREET

Not Reported
Cannon Falls, MN 55009

No Addresses Found

FINDINGS

CROSS STREETS

<u>Year</u>	<u>CD Image</u>	<u>Source</u>	
<u>307TH ST</u>			
2014	pg. A1	EDR Digital Archive	
2010	pg. A3	EDR Digital Archive	
2005	pg. A5	EDR Digital Archive	
2000	pg. A7	EDR Digital Archive	
1995	-	EDR Digital Archive	Target and Adjoining not listed in Source
1992	-	EDR Digital Archive	Target and Adjoining not listed in Source
1987	-	EDR Digital Archive	Target and Adjoining not listed in Source
1982	-	EDR Digital Archive	Target and Adjoining not listed in Source
1977	-	EDR Digital Archive	Target and Adjoining not listed in Source

HWY 19 BLVD

2014	pg. A2	EDR Digital Archive	
2010	pg. A4	EDR Digital Archive	
2005	pg. A6	EDR Digital Archive	
2000	pg. A8	EDR Digital Archive	
1995	-	EDR Digital Archive	Target and Adjoining not listed in Source
1992	-	EDR Digital Archive	Target and Adjoining not listed in Source
1987	-	EDR Digital Archive	Target and Adjoining not listed in Source
1982	-	EDR Digital Archive	Target and Adjoining not listed in Source
1977	-	EDR Digital Archive	Target and Adjoining not listed in Source

City Directory Images

✓
307TH ST 2014

8650 VALEK, DAVID G
8690 PEARSON, ERICH H
TRANSENERGY LLC

HWY 19 BLVD 2014

8410 WELLER DAVID
8415 SWANSON ROBERT
8683 ROCK RIDGE RANCH



307TH ST 2010

8650 VALEK, DAVID G
8690 ERICH, PEARSON H

✓
HWY 19 BLVD 2010

8410 WELLER DAVID
8415 SWANSON ROBERT
8683 HOFFMAN JACOB
ROCK RIDGE RANCH

✓
307TH ST 2005

8650 VALEK, DAVID G
8690 PEARSON, ERICH H

✓
-
HWY 19 BLVD 2005

8410 WELLER DAVID
8415 SWANSON ROBERT



307TH ST 2000

8650 VALEK, BECKY L
8690 HALFEN, PEGGY A

✓
HWY 19 BLVD 2000

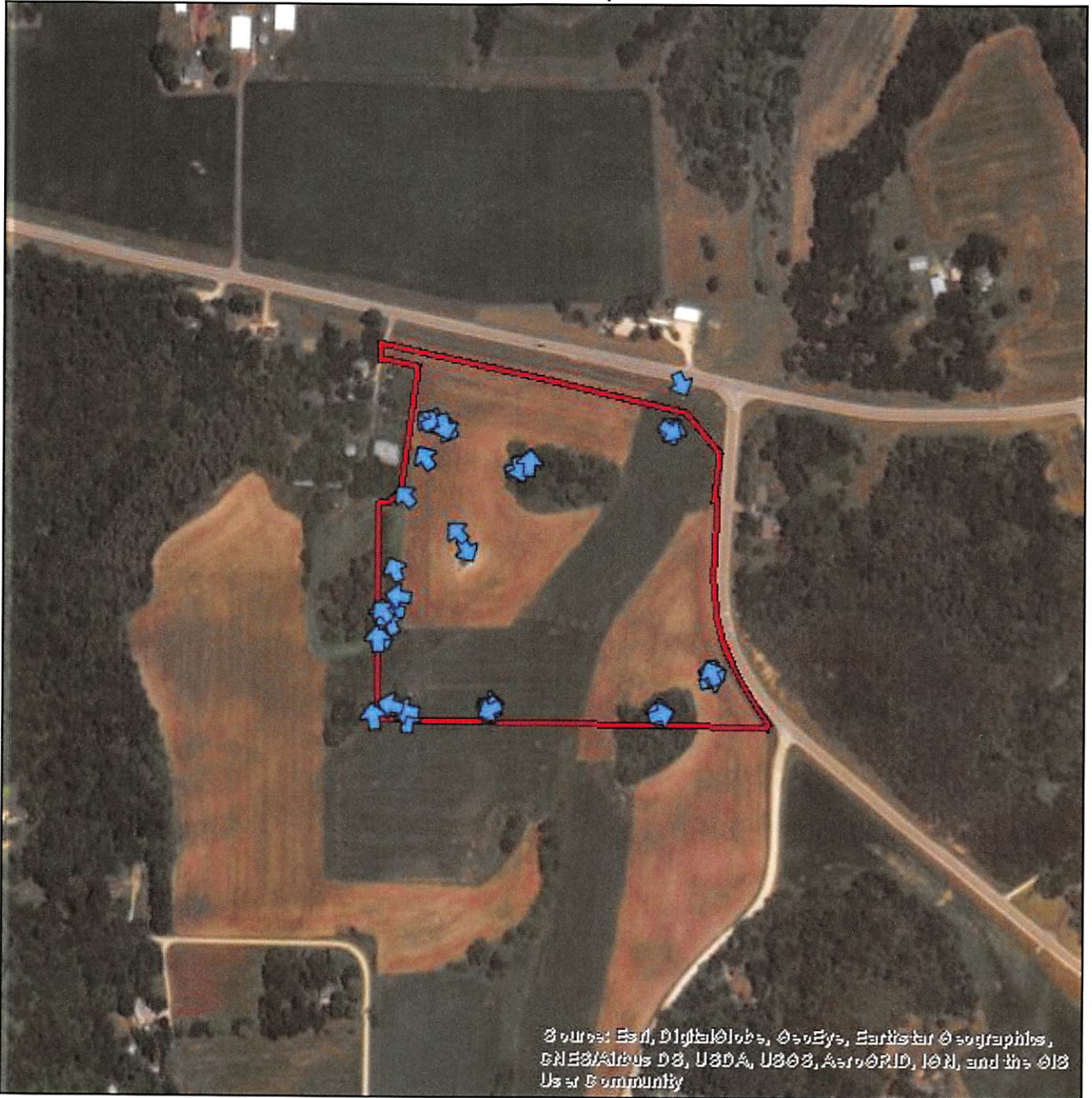
8415 SWANSON ROBERT

Appendix D

Site Photographs

Byllesby Solar

Overview Map





Attributes

Site Name	Byllesby
Note	Adjacent Property
REC Status	None



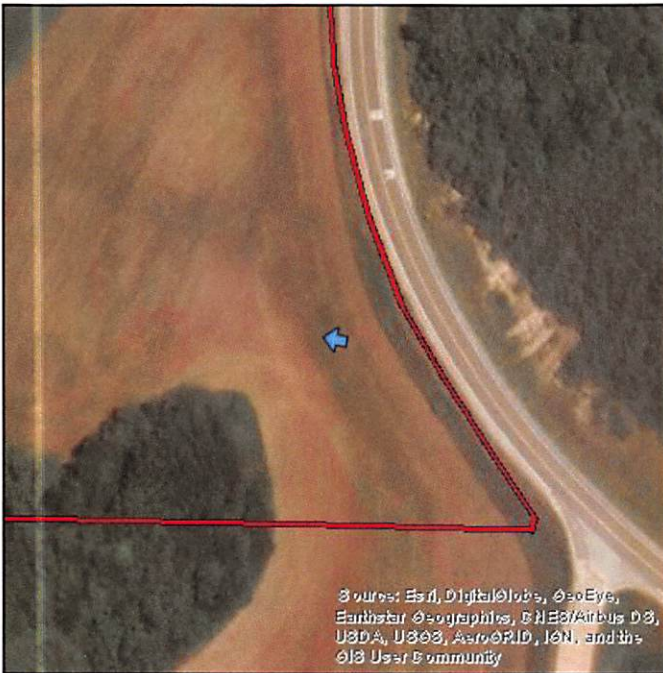
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Note	Adjacent Property
REC Status	None



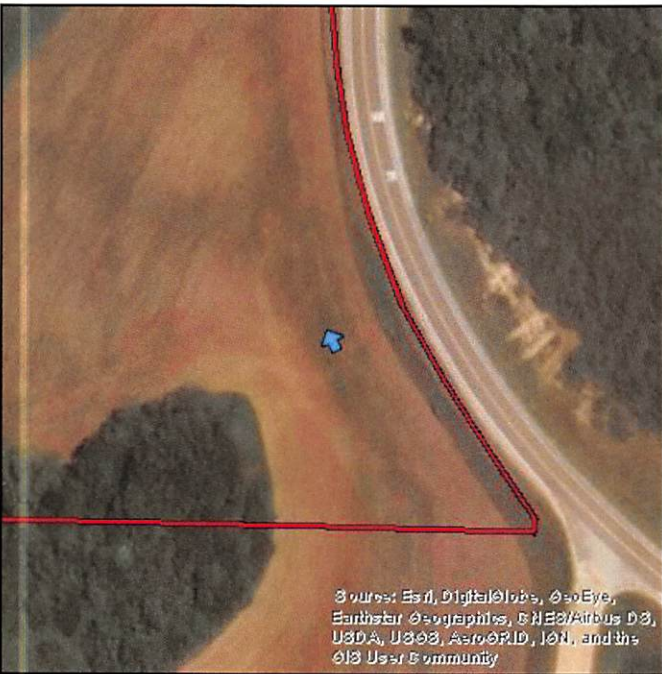
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Note	Adjacent Property
REC Status	None



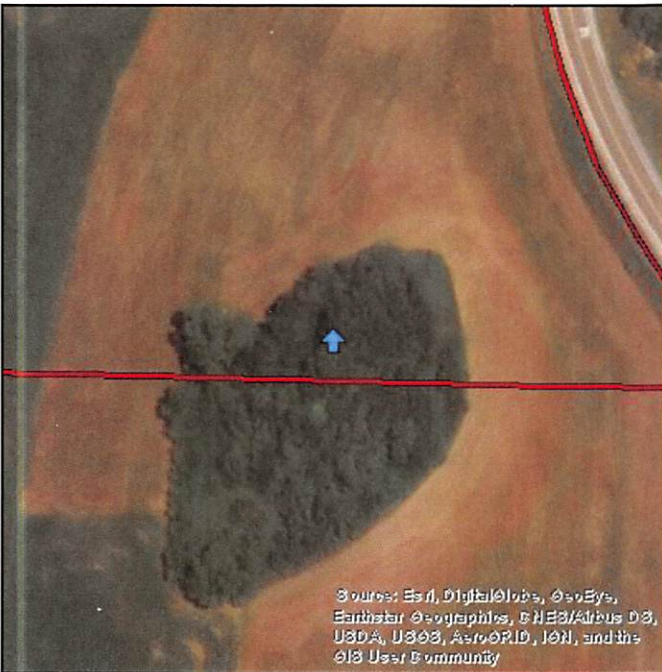
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Note	Subject Property
REC Status	None



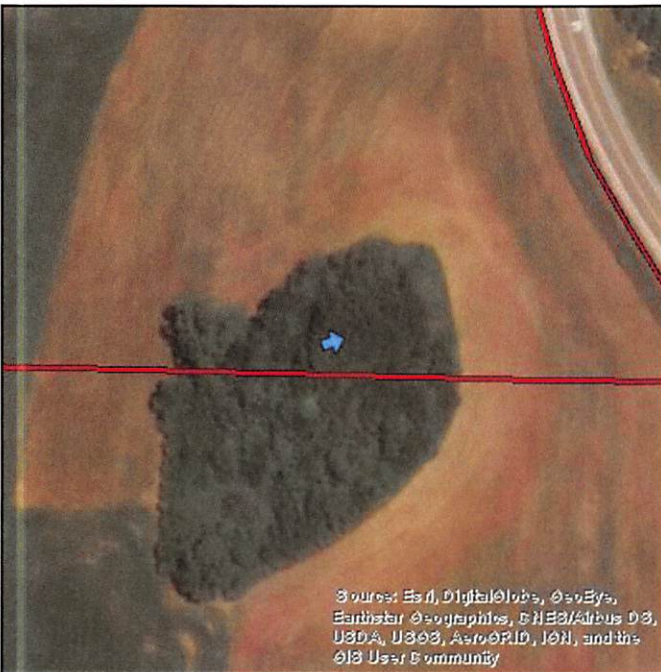
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Note	Subject Property
REC Status	None



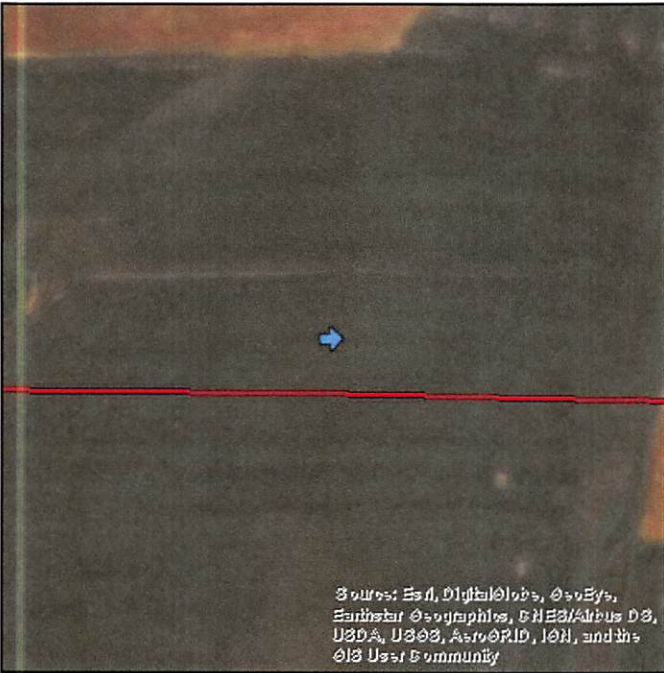
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Note	Subject Property
REC Status	None



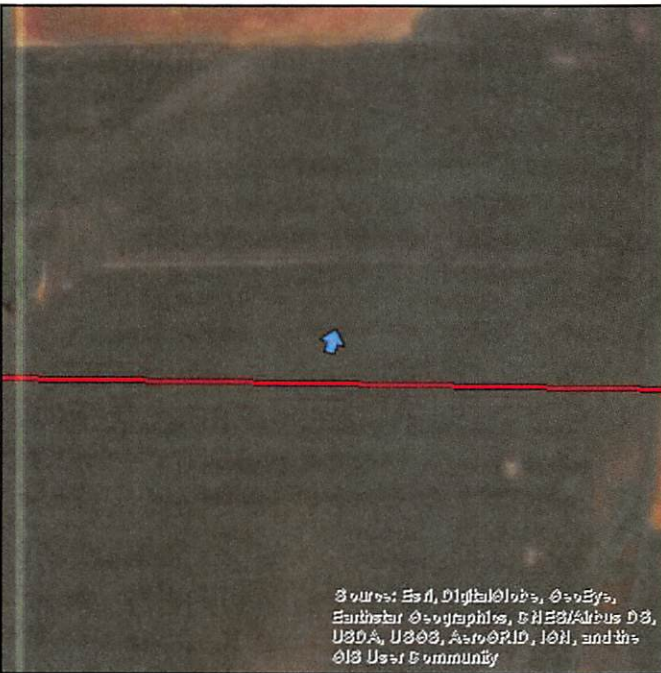
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Note	Subject Property
REC Status	None



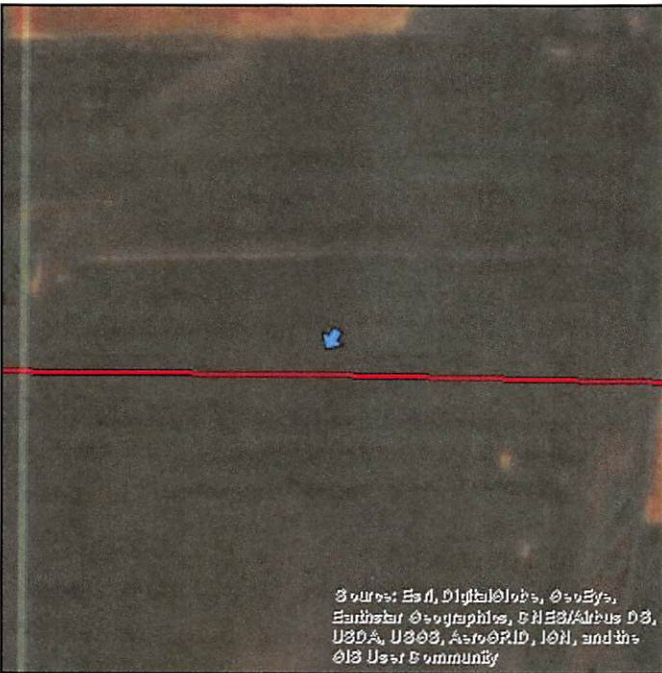
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Note	Subject Property
REC Status	None



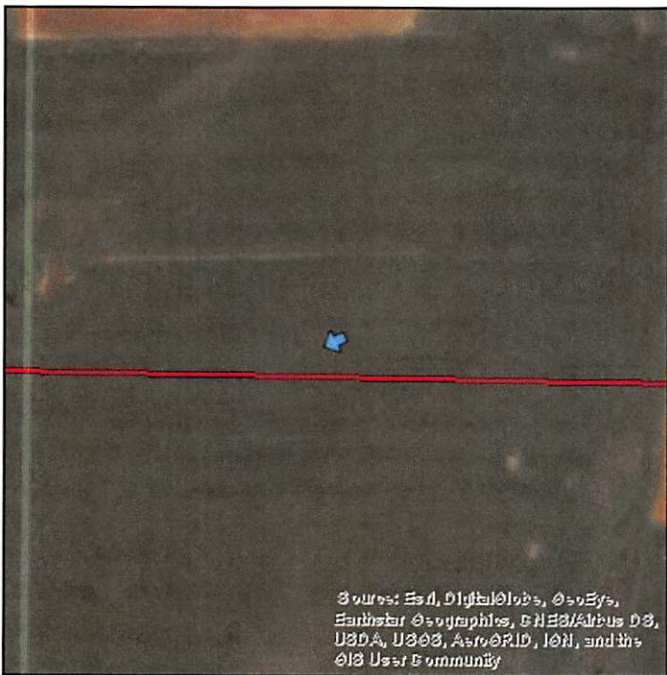
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Note	Subject Property
REC Status	None



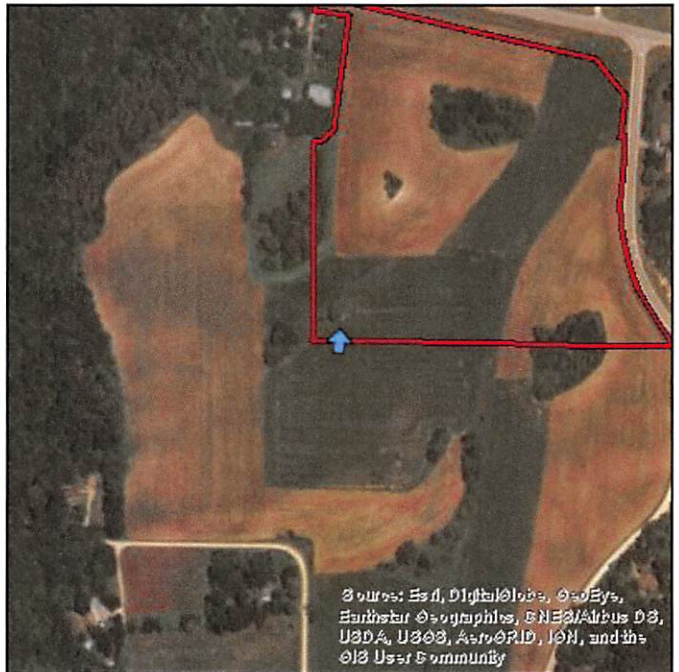
Attributes

Site Name	Byllesby
Note	Adjacent Property
REC Status	None



Attributes

Site Name	Byllesby
Note	Adjacent Property
REC Status	None



Attributes

Site Name	Byllesby
Note	Dump site
REC Status	de minimis



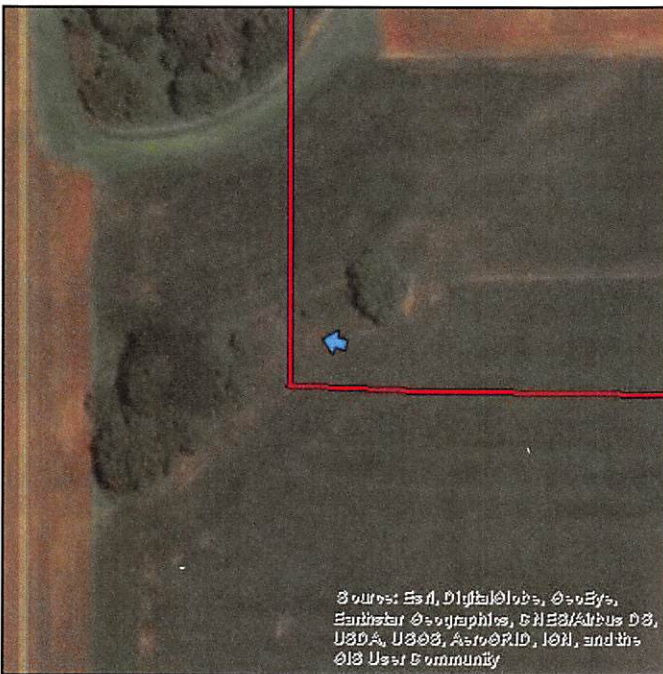
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

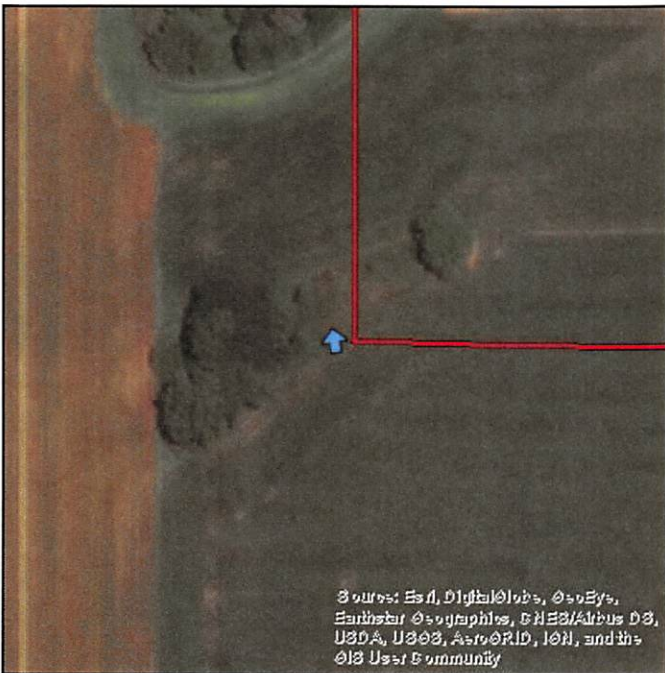
Attributes

Site Name	Byllesby
Note	Solid waste dump
REC Status	de minimis



Attributes

Site Name	Byllesby
Note	Solid waste dump- empty drums, metal scraps
REC Status	De Minimis



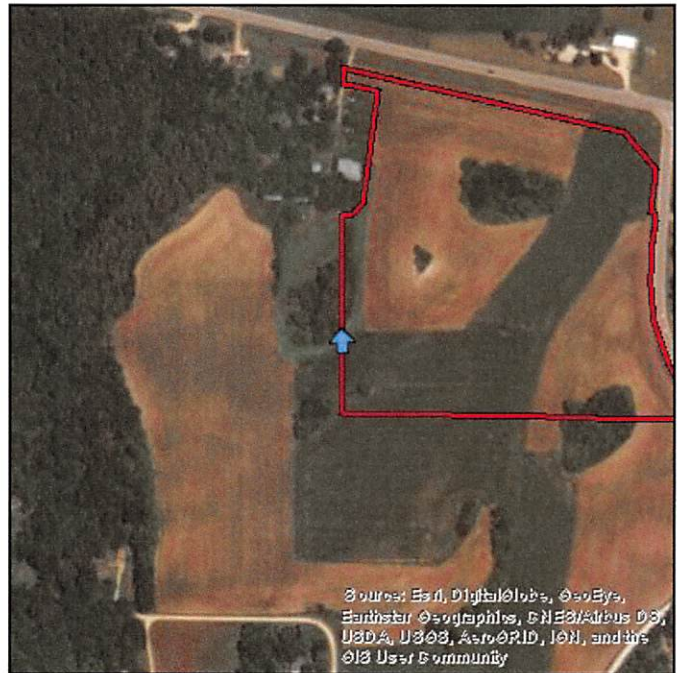
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Site Name	Byllesby
Note	Solid waste dump
REC Status	De Minimis



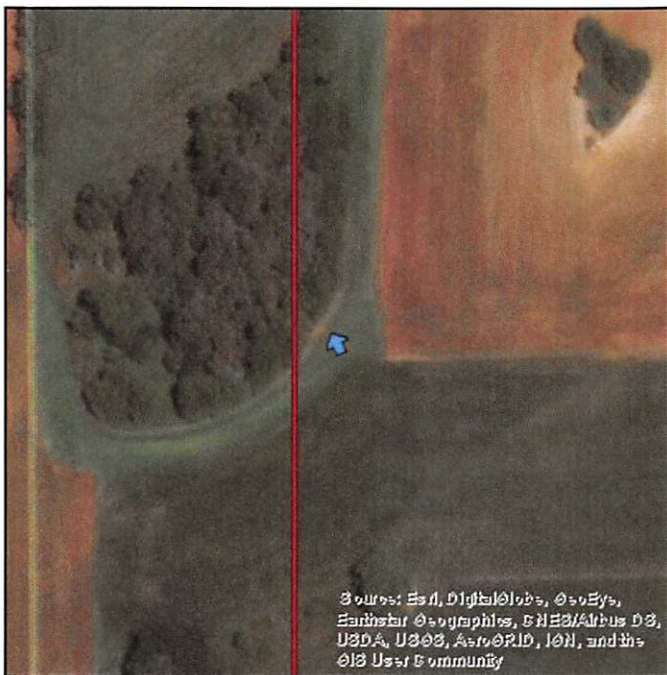
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Site Name	Byllesby
Note	Solid waste dump
REC Status	De Minimis



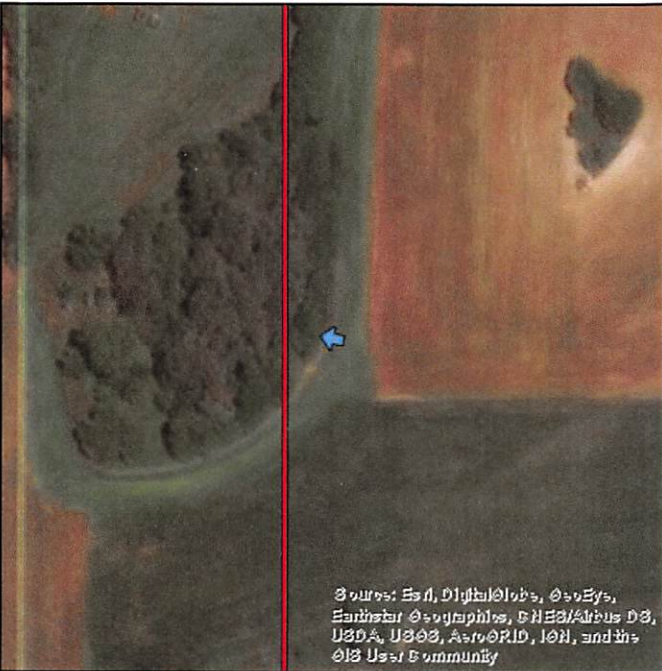
Attributes

Site Name	Byllesby
Note	Solid waste dump
REC Status	De Minimis



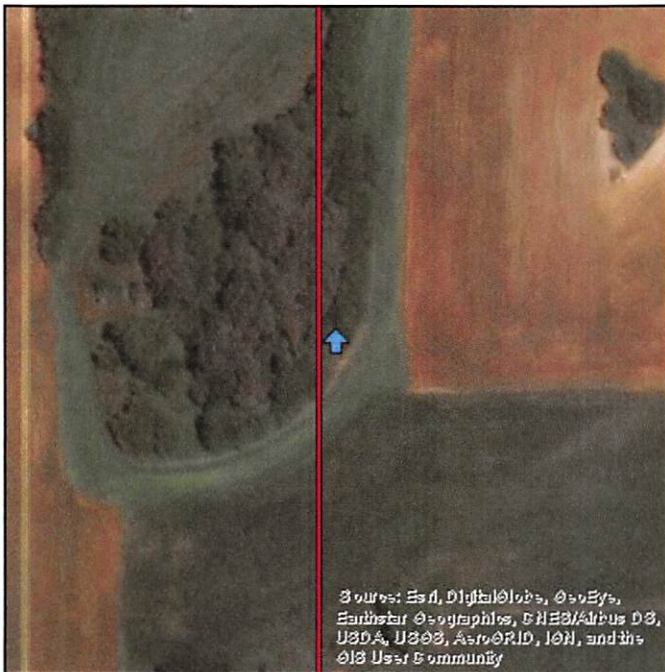
Attributes

Site Name	Byllesby
Note	Solid waste dump
REC Status	De Minimis



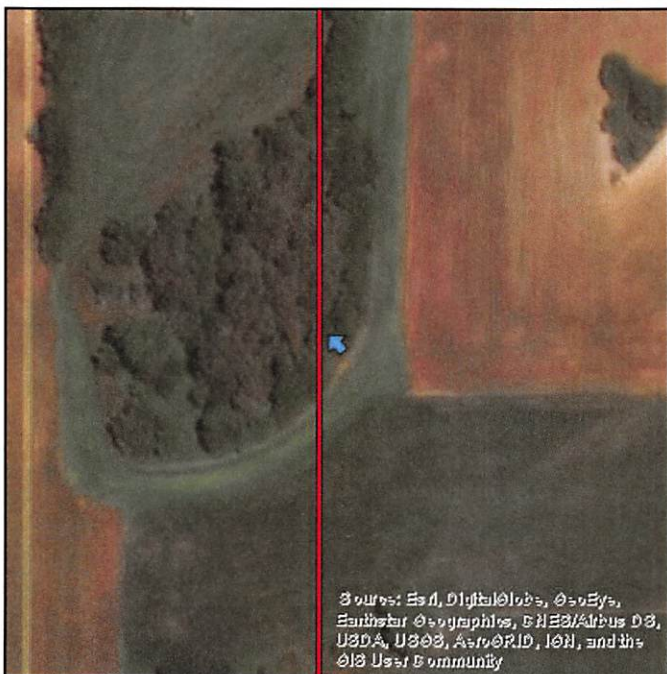
Attributes

Site Name	Byllesby
Note	Solid waste dump
REC Status	De Minimis



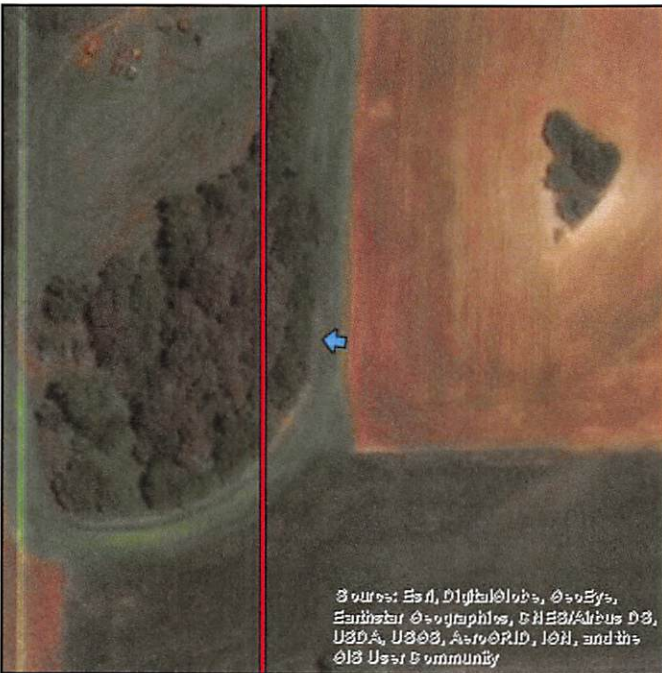
Attributes

Site Name	Byllesby
Note	Solid waste dump with vehicle gas tank
REC Status	De Minimis



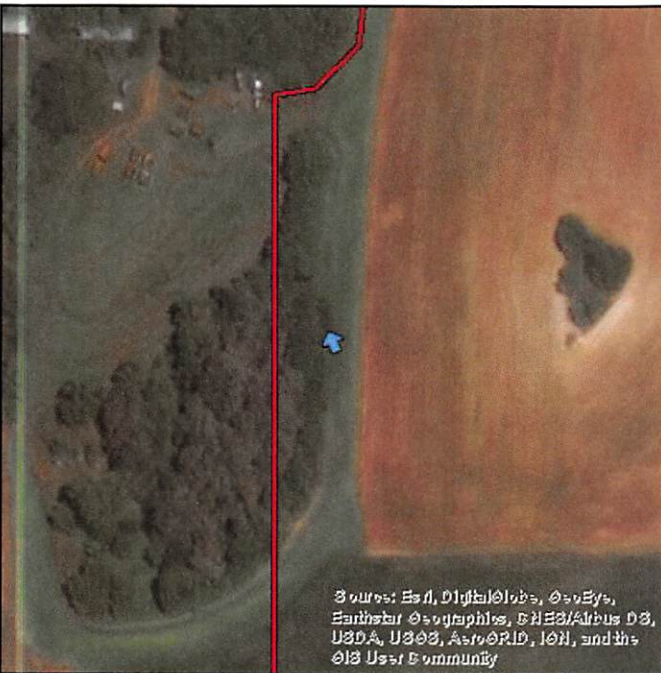
Attributes

Site Name	Byllesby
Note	Solid waste dump
REC Status	De Minimis



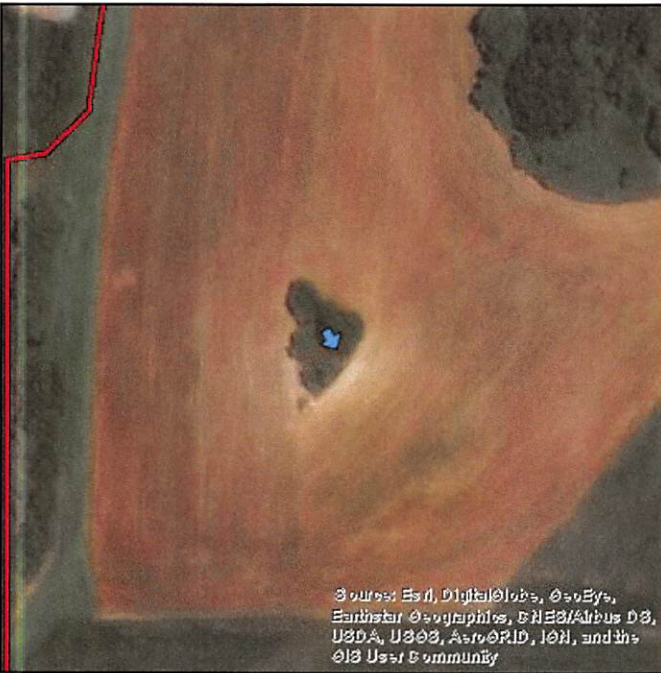
Attributes

Site Name	Byllesby
Note	Solid waste dump
REC Status	de minimis



Attributes

Site Name	Byllesby
Note	Solid waste dump
REC Status	de minimis



Attributes

Site Name	Byllesby
Note	Subject Property
REC Status	None



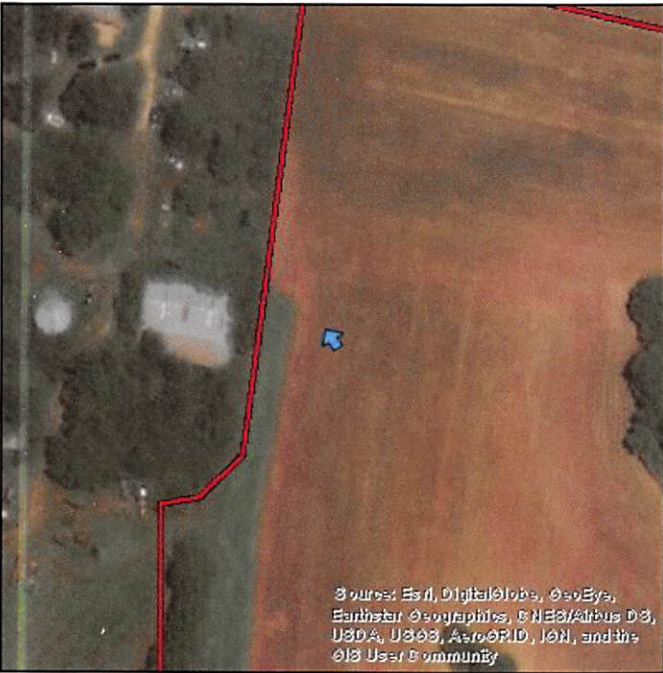
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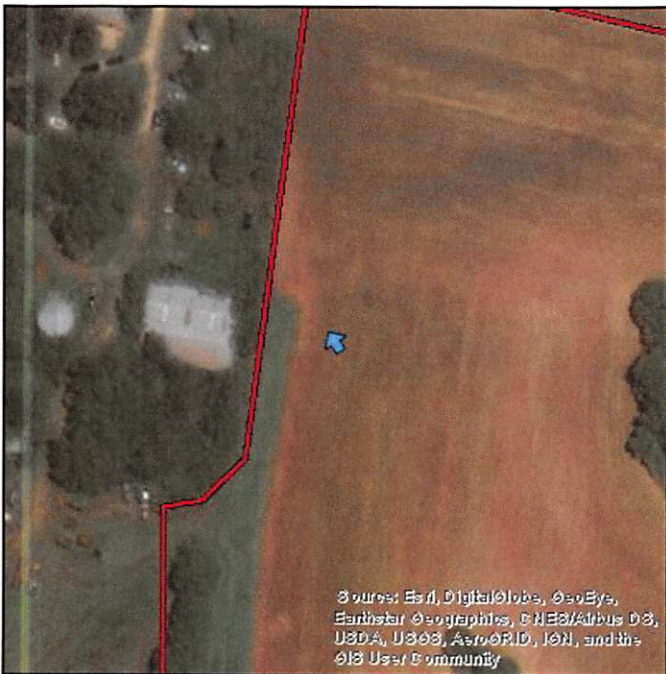
Attributes

Site Name	Byllesby
Note	Subject Property
REC Status	None



Attributes

Site Name	Byllesby
Note	Adjacent property
REC Status	None



Attributes

Site Name	Byllesby
Note	Adjacent property
REC Status	None



Attributes

Site Name	Byllesby
Note	Adjacent Property
REC Status	None



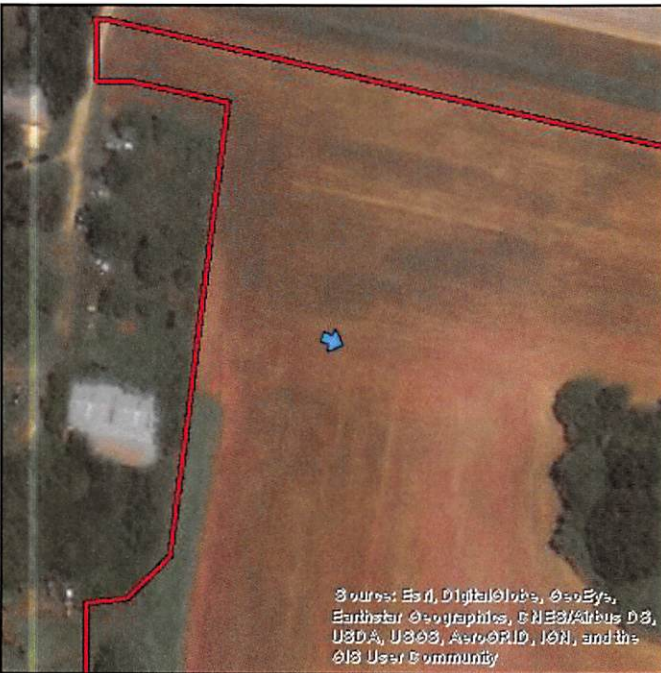
Attributes

Site Name	Byllesby
Note	Adjacent Property
REC Status	None



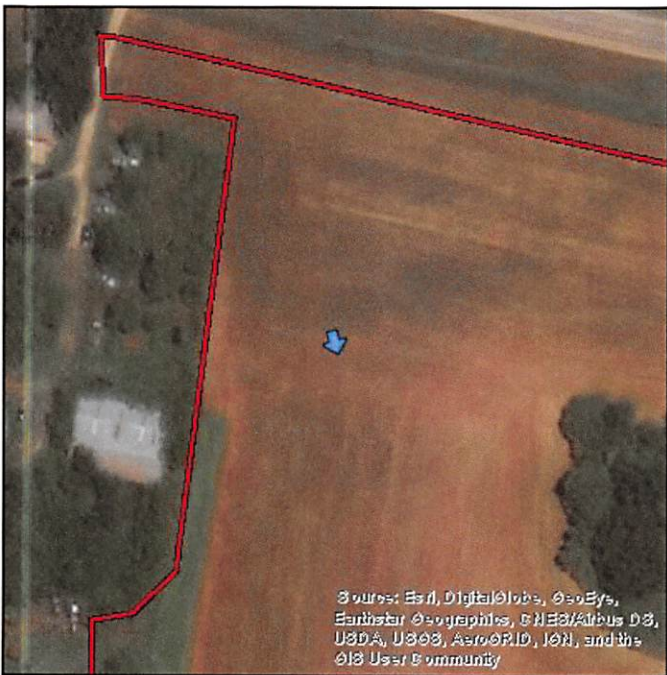
Attributes

Site Name	Byllesby
Note	Adjacent Property
REC Status	None



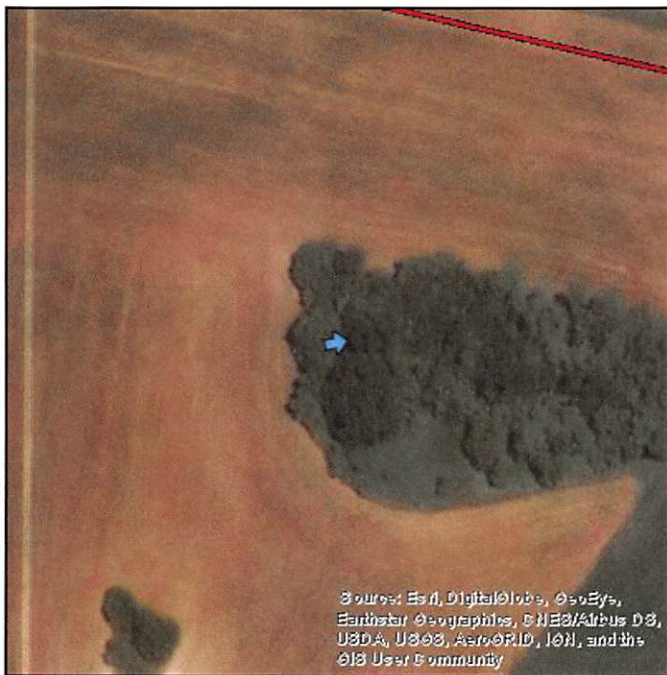
Attributes

Site Name	Byllesby
Note	Subject Property
REC Status	None



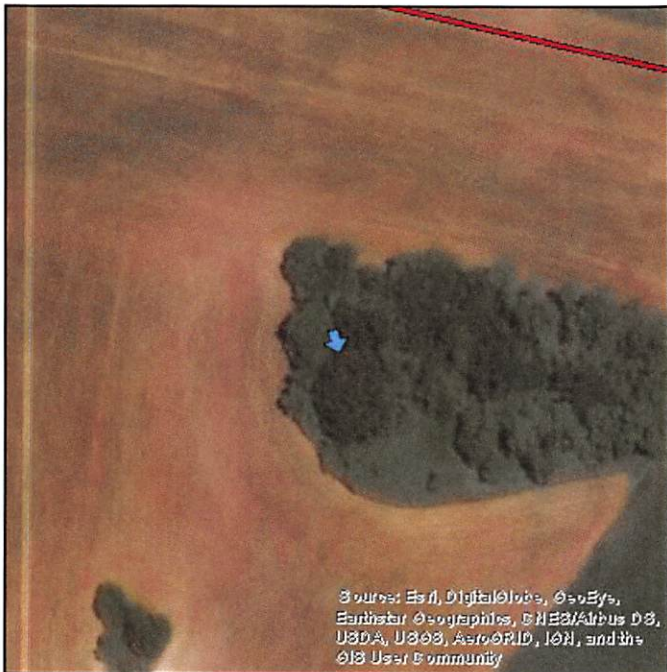
Attributes

Site Name	Byllesby
Note	Subject Property
REC Status	None



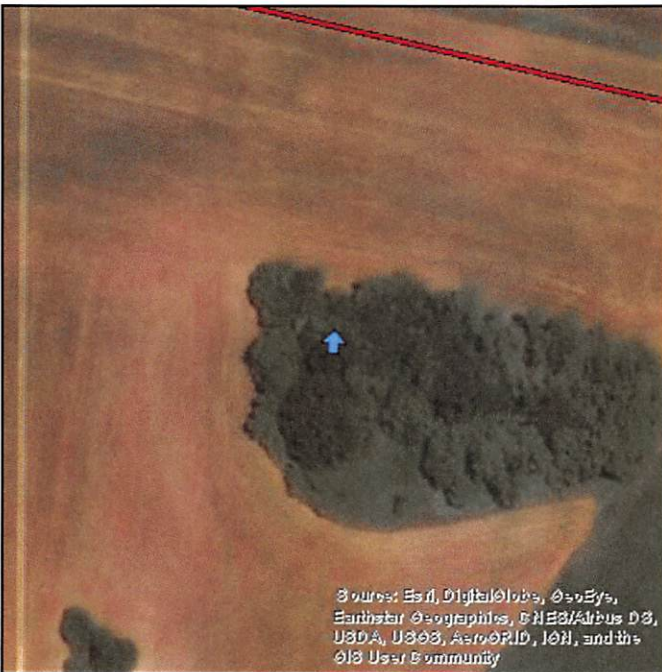
Attributes

Site Name	Byllesby
Note	Solid waste
REC Status	de minimis



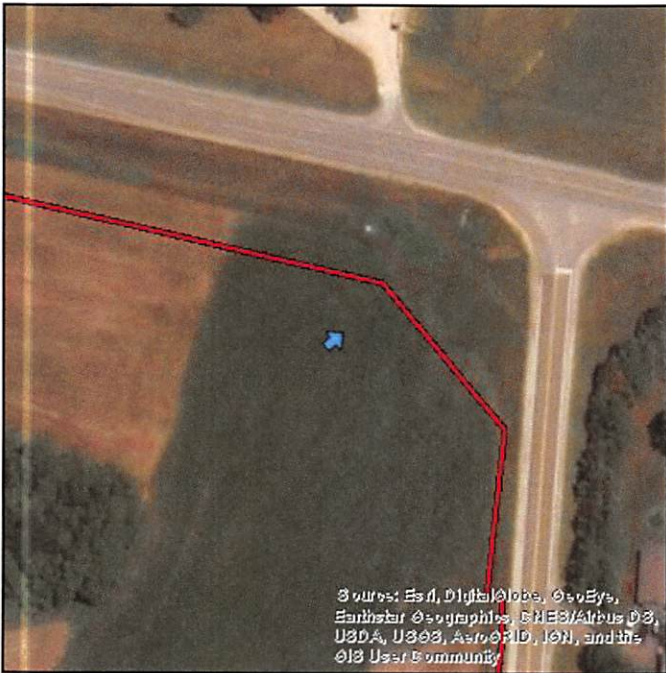
Attributes

Site Name	Byllesby
Note	Solid waste
REC Status	de minimis



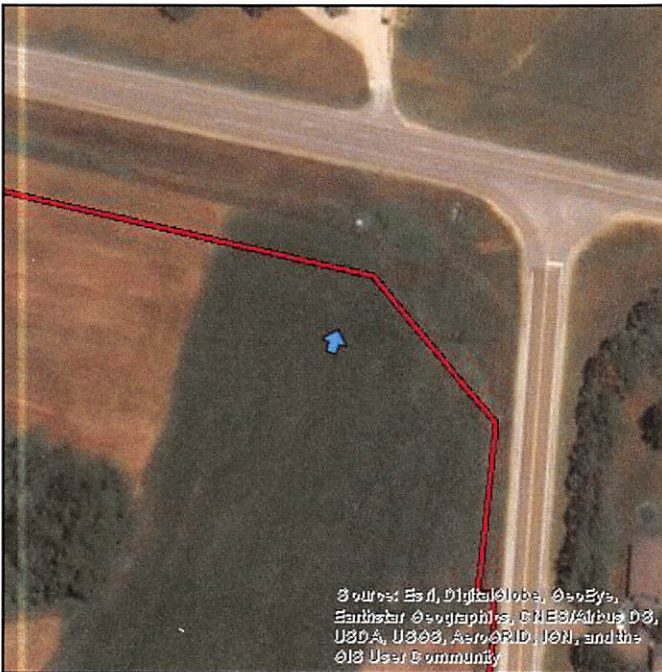
Attributes

Site Name	Byllesby
Note	Solid waste
REC Status	de minimis



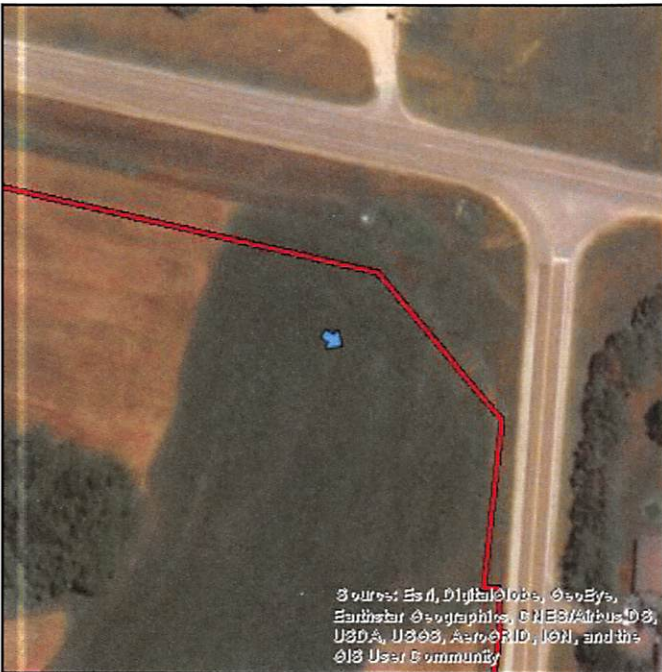
Attributes

Site Name	Byllesby
Note	Pole transformer
REC Status	de minimis



Attributes

Site Name	Byllesby
Note	Adjacent Property
REC Status	None



Attributes

Site Name	Byllesby
Note	Adjacent Property
REC Status	None

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401
MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

**DISTRIBUTED GENERATION STANDARD
INTERCONNECTION AND POWER PURCHASE TARIFF (Continued)**

Section No. 10
Original Sheet No. 102

APPENDIX B: Generation Interconnection Application Form

WHO SHOULD FILE THIS APPLICATION: Anyone expressing interest to install generation which will interconnect with Xcel Energy (Local electric utility). This application should be completed and returned to the Generation Interconnection Coordinator, in order to begin processing the request.

INFORMATION: This application is used by Xcel Energy to perform a preliminary interconnection review. The Applicant shall complete as much of the form as possible. The fields in BOLD are required to be completed to the best of the Applicant's ability. The Applicant will be contacted if additional information is required. The response may take up to 15 business days after receipt of all the required information.

COST: A payment to cover the application fee shall be included with this application. The application fee amount is outlined in the "State of Minnesota Interconnection Process for Distributed Generation Systems".

OWNER/APPLICANT		
Company / Applicant's Name: Byllesby Garden LLC		
Representative: Daniel Rogers	Phone Number: 6124703223	FAX Number:
Title: Partner		
Mailing Address: 818 W 46th St Ste 204, Minneapolis, MN 55419		
Email Address: dan@nokomis.partners		
LOCATION OF GENERATION SYSTEM INTERCONNECTION		
Street Address, legal description or GPS coordinates: 44.50902°, -92.85681°		
PROJECT DESIGN / ENGINEERING (if applicable)		
Company: AZTECH		
Representative: Tom Firstbrook	Phone: 3018755025	FAX Number: 6024540403
Mailing Address: 6000 E. Evans, #1-428, Denver, CO 80222		
Email Address: tfirstbrook@aztec.us		
ELECTRICAL CONTRACTOR (if applicable)		
Company:		
Representative:	Phone:	FAX Number:
Mailing Address:		
Email Address:		

(Continued on Sheet No. 10-103)

Date Filed: 11-02-05 By: Cynthia L. Lesher Effective Date: 02-01-07
President and CEO of Northern States Power Company
Docket No. E002/GR-05-1428 Order Date: 09-01-06

Northern States Power Company, a Minnesota corporation
and wholly owned subsidiary of Xcel Energy Inc.
Minneapolis, Minnesota 55401

MINNESOTA ELECTRIC RATE BOOK - MPUC NO. 2

**DISTRIBUTED GENERATION STANDARD
INTERCONNECTION AND POWER PURCHASE TARIFF (Continued)**

Section No. 10
Original Sheet No. 104

APPENDIX B: Generation Interconnection Application Form (Continued)

SIGN OFF AREA:

With this Application, we are requesting Xcel Energy to review the proposed Generation System Interconnection. We request that Xcel Energy identifies the additional equipment and costs involved with the interconnection of this system and to provide a budgetary estimate of those costs. We understand that the estimated costs supplied by Xcel Energy, will be estimated using the information provided. We also agree that we will supply, as requested, additional information, to allow Xcel Energy to better review this proposed Generation System interconnection. We have read the "State of Minnesota Distributed Generation Interconnection Requirements" and will design the Generation System and interconnection to meet those requirements.

Applicant Name (print):
Daniel Rogers

Applicant Signature: Daniel Rogers Digitally signed by Daniel Rogers
DN: C=US, E=dan@nokomis.partners, O=Nokomis Partners,
CN=Daniel Rogers
Reason: I am approving this document
Date: 2017.12.07 14:23:05-0500 **Date:** 12/7/17

**SEND THIS COMPLETED & SIGNED APPLICATION AND ATTACHMENTS TO THE
GENERATION INTERCONNECTION COORDINATOR**

(Continued on Sheet No. 10-105)

Date Filed: 11-02-05 By: Cynthia L. Lesher Effective Date: 02-01-07
President and CEO of Northern States Power Company
Docket No. E002/GR-05-1428 Order Date: 09-01-06



MAXPOWER CS6U-315 | 320 | 325 | 330P

Canadian Solar's modules use the latest innovative cell technology, increasing module power output and system reliability, ensured by 15 years of experience in module manufacturing, well-engineered module design, stringent BOM quality testing, an automated manufacturing process and 100% EL testing.

KEY FEATURES



Excellent module efficiency of up to 16.97 %



Outstanding low irradiance performance of up to 96.0 %



High PTC rating of up to 91.55 %



IP67 junction box for long-term weather endurance



Heavy snow load up to 5400 Pa, wind load up to 2400 Pa



linear power output warranty



product warranty on materials and workmanship

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2008 / Quality management system
ISO 14001:2004 / Standards for environmental management system
OHSAS 18001:2007 / International standards for occupational health & safety

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730: VDE / CE / CQC / MCS / INMETRO
UL 1703 / IEC 61215 performance: CEC listed (US)
UL 1703: CSA / IEC 61701 ED2: VDE / IEC 62716: VDE
UNI 9177 Reaction to Fire: Class 1
IEC60068-2-68: SGS
Take-e-way



* As there are different certification requirements in different markets, please contact your local Canadian Solar sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

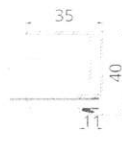
CANADIAN SOLAR INC. is committed to providing high quality solar products, solar system solutions and services to customers around the world. As a leading PV project developer and manufacturer of solar modules with over 16 GW deployed around the world since 2001, Canadian Solar Inc. (NASDAQ: CSIQ) is one of the most bankable solar companies worldwide.

ENGINEERING DRAWING (mm)

Rear View



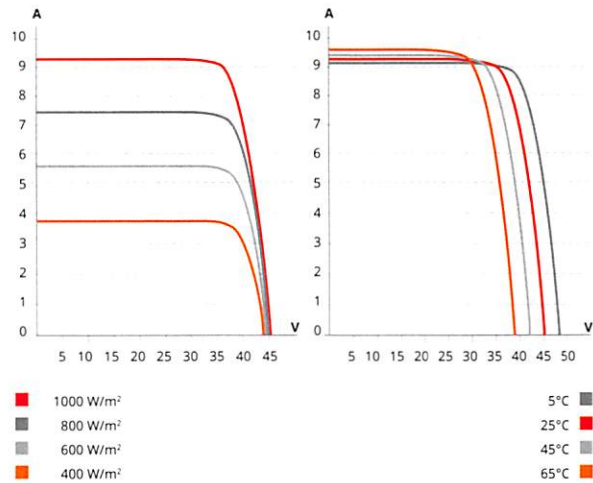
Frame Cross Section A-A



Mounting Hole



CS6U-320P / I-V CURVES



ELECTRICAL DATA | STC*

CS6U	315P	320P	325P	330P
Nominal Max. Power (P _{max})	315 W	320 W	325 W	330 W
Opt. Operating Voltage (V _{mp})	36.6 V	36.8 V	37.0 V	37.2 V
Opt. Operating Current (I _{mp})	8.61 A	8.69 A	8.78 A	8.88 A
Open Circuit Voltage (V _{oc})	45.1 V	45.3 V	45.5 V	45.6 V
Short Circuit Current (I _{sc})	9.18 A	9.26 A	9.34 A	9.45 A
Module Efficiency	16.20%	16.46%	16.72%	16.97%
Operating Temperature	-40°C ~ +85°C			
Max. System Voltage	1000 V (IEC) or 1000 V (UL)			
Module Fire Performance	TYPE 1 (UL 1703) or CLASS C (IEC 61730)			
Max. Series Fuse Rating	15 A			
Application Classification	Class A			
Power Tolerance	0 ~ + 5 W			

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

MECHANICAL DATA

Specification	Data
Cell Type	Poly-crystalline, 6 inch
Cell Arrangement	72 (6×12)
Dimensions	1960×992×40 mm (77.2×39.1×1.57 in)
Weight	22.4 kg (49.4 lbs)
Front Cover	3.2 mm tempered glass
Frame Material	Anodized aluminium alloy
J-Box	IP67, 3 diodes
Cable	4 mm ² (IEC) or 4 mm ² & 12 AWG 1000V (UL), 1160 mm (45.7 in)
Connector	T4 series or PV2 series
Per Pallet	26 pieces, 635 kg (1400 lbs)
Per container (40' HQ)	624 pieces

ELECTRICAL DATA | NOCT*

CS6U	315P	320P	325P	330P
Nominal Max. Power (P _{max})	228 W	232 W	236 W	239 W
Opt. Operating Voltage (V _{mp})	33.4 V	33.6 V	33.7 V	33.9 V
Opt. Operating Current (I _{mp})	6.84 A	6.91 A	6.98 A	7.05 A
Open Circuit Voltage (V _{oc})	41.5 V	41.6 V	41.8 V	41.9 V
Short Circuit Current (I _{sc})	7.44 A	7.50 A	7.57 A	7.66 A

* Under Nominal Operating Cell Temperature (NOCT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (P _{max})	-0.41 % / °C
Temperature Coefficient (V _{oc})	-0.31 % / °C
Temperature Coefficient (I _{sc})	0.053 % / °C
Nominal Operating Cell Temperature	45±2 °C

PERFORMANCE AT LOW IRRADIANCE

Outstanding performance at low irradiance, with an average relative efficiency of 96.0 % from irradiances, between 1000 W/m² and 200 W/m² (AM 1.5, 25°C).

The specification and key features described in this datasheet may deviate slightly and are not guaranteed. Due to on-going innovation, research and product enhancement, Canadian Solar Inc. reserves the right to make any adjustment to the information described herein at any time without notice. Please always obtain the most recent version of the datasheet which shall be duly incorporated into the binding contract made by the parties governing all transactions related to the purchase and sale of the products described herein.

Caution: For professional use only. The installation and handling of PV modules requires professional skills and should only be performed by qualified professionals. Please read the safety and installation instructions before using the modules.

PARTNER SECTION



YASKAWA

PVI 50TL & PVI 60TL

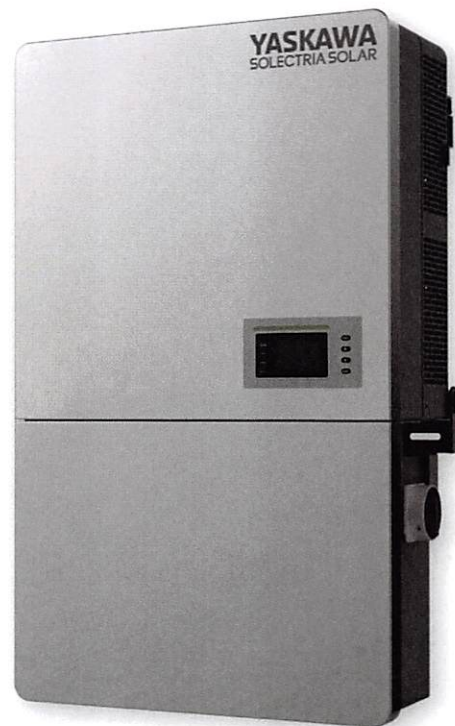
3-Ph Transformerless Commercial String Inverters

Features

- 55 & 66kVA Active Power ratings allow 0.91 PF leading/lagging
- NEC 2014 compliant (arc fault and rapid shutdown)
- Compliant with UL 1741SA
- 3 MPPTs with 5 inputs each
- Integrated DC and AC disconnects
- AC terminals compatible with copper and aluminum conductors
- Modbus communications
- Internal data logger
- 0 - 90° installation orientation
- Remote firmware upgrades
- Remote diagnostics

Options

- H4 wiring box
- Shade cover
- DC combiners bypass
- Web-based monitoring



Yaskawa Solectria Solar's PVI 50TL and PVI 60TL are grid-tied, transformerless three-phase inverters designed for ground mount, rooftop and carport arrays and can be installed from 0 - 90 degrees. The PVI 50/60TL inverters are NEC 2014 compliant and are the most reliable, efficient and cost effective in their class. They come standard with AC and DC disconnects, three MPPTs, a 15-position string combiner, remote diagnostics, remote firmware upgrades and various protection features. Options include H4 wiring box, shade cover, DC combiner fuse bypass, and web-based monitoring.

SOLECTRIA SOLAR

PVI 50TL & PVI 60TL

Specifications

	PVI 50TL	PVI 60TL
DC Input		
Absolute Maximum Open Circuit Voltage		1000 VDC
Maximum Power Input Voltage Range (MPPT)	480-850 VDC	540-850 VDC
Operating Voltage Range		200-950 VDC
MPP Trackers		3
Maximum Operating Input Current	36 A per MPPT (108 A)	38 A per MPPT (114 A)
Maximum Available PV Current (Isc x 1.25)		60 A per MPPT (180 A)
Maximum PV Power	75 kW (25 kW per MPPT)	90 kW (30 kW per MPPT)
Start Voltage		330 V
AC Output		
Nominal Output Voltage		480 VAC, 3-Ph/PE/N
AC Voltage Range (Standard)		-12/+10%
Continuous Output Power	50 kW	60 kW
Maximum AC Apparent Power	55 kVA	66 kVA
Maximum Output Current	66.2 A	79.4 A
Nominal Output Frequency		60 Hz
Output Frequency Range		57-63 Hz
Power Factor		Unity, >0.99 (Adjustable 0.8 leading to 0.8 lagging)
Fault Current Contribution (1 Cycle RMS)		55 A
Total Harmonic Distortion (THD) @ Rated Load		<3%
AC Surge Protection		Type II MOV, 1240Vc, 15kA I _{tm} (8/20 μ)
Performance		
Peak Efficiency		99.0%
CEC Efficiency		98.5%
Tare Loss		< 2 W
Ambient Temperature Range	-22°F to +140°F (-30°C to +60°C); Derating occurs over +122°F (+50°C)	
Storage Temperature Range	No low temp minimum to +158°F (+70°C)	
Relative Humidity (non-condensing)		0-95%
Audible Noise		< 60 dba @ 1 m at room temperature
Operating Altitude	13,123 ft (4,000 m) Derating occurs from 9,842.5 ft (3,000 m)	
Safety Listings & Certifications	UL 1741:2010, UL1699B, CSA-C22.2 #107.1, IEEE1547; FCC Part 15; UL 1741SA, CA Rule 21	
Testing Agency	ETL	
Mechanical		
15 Fused Positions (5 positions per MPPT)	15 A standard (20, 25, 30 A accepted*)	
AC/DC Disconnect	Standard, fully-integrated	
Enclosure Rating	NEMA Type 4X	
Enclosure Finish	Polyester Powder Coated Aluminum	
Mounting Method**	0-90° from horizontal (vertical, angled, flat)	
Dimensions (H x W x D)	39.4 in. x 23.6 in. x 10.2 in (1000 x 600 x 260 mm)	
Weight	Inverter: 123.5 lbs (56 kg); Wiring Box: 33 lbs (15 kg)	
Communications		
Data Logger Hardware	Standard, Internal	
SolrenView Web-Based Monitoring Service	Optional	
Revenue Grade Metering	Optional, External	
Communication Interface	RS-485 Modbus RTU	
Remote Firmware Upgrades	Standard	
Remote Diagnostics	Standard	
Features & Protections		
Arc-Fault Detection	Standard	
Smart Grid Features	L/HVRT, L/HFRT, Soft Start, Volt-Var, Frequency-Watt and Volt-Watt, Soft-Start, Soft-Step	
Warranty		
Standard	10 year	
Optional	15 or 20 year; Extended Service Agreement	

*Yaskawa Solectria Solar does not supply the optional fuses

**Shade cover accessory required for installation of 75° or less

SOLECTRIA SOLAR

Yaskawa Solectria Solar
360 Merrimack Street
Lawrence, MA 01843
solectria.com

1-978-683-9700
Email: inverters@solectria.com

DOCR-070642-K | January 2018
© 2018 Yaskawa Solectria Solar

YASKAWA

Goodhue County Land Use Management

Goodhue County Government Center | 509 West Fifth Street | Red Wing, Minnesota 55066

Lisa M. Hanni, L.S. Director



County Surveyor / Recorder

Building | Planning | Zoning
Telephone: 651.385.3104
Fax: 651.385.3106

Environmental Health | Land Surveying | GIS
Telephone: 651.385.3223
Fax: 651.385.3098

To: Planning Commission
From: Land Use Management
Meeting Date: May 14, 2018
Report date: May 7, 2018

PUBLIC HEARING: Request for Map Amendment (Rezone)

Request for map amendments for specific parcels in Stanton Township in Sections 13, 24,25,30 and 36, T112N, R18W; changing from County A2 and A3 districts to R1 district.

Attachments and links:

Stanton Request
Change of Zone Project Review
Table of Uses – General District Regulations
Goodhue County Zoning Ordinance
(GCZO): <http://www.co.goodhue.mn.us/DocumentCenter/View/2428>

Background:

Stanton Township Supervisors have requested that the County amend the zoning designation for a number of areas within the Township to be more in line with their residential zoning. The County has worked with Stanton Township in the past with a similar request for parcels in the Lake Byllesby West plat along Lake Byllesby.

Initially, Stanton was looking at a few parcels along Highway 19 and near Oxford Mill Road. LUM staff met with the Township Supervisors and discussed looking at the entire Township. The parcels presented in this request are based on the Township discussion. LUM prepared maps based upon areas that were already being used as dwelling sites, the size of the parcels, and the Township Residential zoned parcels.

Stanton Township invited all of the parcel owners to an informational meeting on March 20, 2018 to discuss the changes.

Staff Recommendation:

LUM Staff recommends the Planning Advisory Commission

- adopt the staff report into the record;
- accept the application, testimony, exhibits, and other evidence presented into the record; and

Recommend that the County Board of Commissioners **APPROVE** the map amendments in Stanton Township as listed:

PIN	ACRES	OWNER	Current Zone	New Zone
410300600	0.25	WALLACE J HAMP	A1	R1
410300800	0.26	GREGORY L ANDREWS	A1	R1
410301100 (southerly 304 feet)	10.37	GLEN EMERY	A1	R1
410301300	0.39	NICHOLAS C LARSON	A1	R1
410301600 (southerly 300 feet)	2	TROY D ARMSTRONG ET AL	A1	R1
410302100	0.75	STANTON TOWNSHIP	A1	R1
410302101	0.28	GREGORY L ANDREWS	A1	R1
410302200	1.4	BRIAN K VALEK	A1	R1
410302300	0.26	STANTON TOWNSHIP	A1	R1

PIN	ACRES	OWNER	Current Zone	New Zone
410361700	3.55	JOSEPH S CROSBY	A2	R1
410361800	6.49	BRUCE D SHOWEL	A2	R1
410361900	4.24	MITCH A OTTO	A2	R1
410252600	0.53	DANIEL C LUCE	A2	R1
410360200	1.49	JON C WERSAL	A2	R1
410360300	1.46	MITCH A OTTO	A2	R1
410360301	1.75	LOUISE M BOWMAN	A2	R1
410360500	11.57	TROY A ISENBERG	A2	R1
410360600	0.63	LOUISE M BOWMAN	A2	R1
410360601	0.71	LOUISE M BOWMAN	A2	R1
410360700	1.67	DEAN R CLARE	A2	R1
410360800	2.09	STEVEN M RICHTER	A2	R1
410360900	1.72	QUENTIN L GARLETS JR	A2	R1

PIN	ACRES	OWNER	Current Zone	New Zone
410133600	0.5	JOHN W HOGAN	A3	R1
410133700	2.46	DAVID A SCHULTZ	A3	R1
410133800	0.62	ARLENE B ERICKSON	A3	R1
410133900	1.15	BRETT K KLAVON	A3	R1
410134200	1.07	WALTER W PIERCE	A3	R1
410134300	1.38	JOSHUA T HUNEKE	A3	R1
410134600	0.53	CARRIE VOVK	A3	R1
410134700	0.91	CASEY T CARLSON	A3	R1
410134800	0.83	STEPHANIE HALBERT	A3	R1
410134900	3.37	BRYANT BECHTHOLDT	A3	R1
410135100	1.44	TIMOTHY M LANGDON	A3	R1
410135200	0.94	CHRISTOPHER STRICKLAND	A3	R1
410135400	1.14	LARRY L STRAIN	A3	R1
410240200	1.33	SCOTT OLSON	A3	R1
410240300	3.86	CHAD MILLER	A3	R1
410240400	5.18	DANIEL BANKS	A3	R1
410240500	5.18	KERRY R BANKS	A3	R1

July 14, 2017

Cheryle Peters, Clerk/Zoning Administrator Stanton Township
31186 40th Avenue Way
Cannon Falls, MN 55009

Lisa Hanni, Director Goodhue County Land Use Management
Goodhue County Government Center
509 West Fifth Street
Red Wing, MN 55066

Dear Ms. Hanni:

Stanton Township would like to express its appreciation for the recent density map and survey/questionnaire issued from Goodhue County's Land Management Office. The completed survey form regarding the general subject of "dwelling potential" is enclosed with this letter. The purpose of this letter is to supplement the completed survey by addressing persistent concerns associated with Goodhue County's A-3 zoning, in Stanton Township, particularly in the north east end of the township, near the intersection of Oxford Mill Road and State Highway 19.

In recent years, several property owners have submitted zoning requests, of Stanton Township, involving county A-3 zoning, in this area and other areas, as well. The snapshot density of this vicinity is consistently more concentrated than a 35 acre minimum. Currently, the neighborhood more closely resembles a Stanton Township Residential Zoning District: 5 acre minimums with overlays of 12 per section, one per quarter, quarter. Several smaller parcels exist, as well. The Woodland Heights Plat sites some lots, less than even one acre.

In process, the township defers to the county until applicants can secure county approval. Generally, this will create a delay for the property owner. Administratively, expectations can become unclear.

Regarding county zoning and dwelling potential, Stanton Township respectfully requests conversion of this A-3 area to an R-1 district. It would seem to be the least restrictive to administrate and the most compatible with the characteristics of Stanton Township's Residential Zoning District. Your consideration would be appreciated. Thank you, again, for the map.

On behalf of Stanton Township and the Board of Supervisors,

Cheryle A. Peters
Clerk/Zoning Administrator
Stanton Township

Enc. 1

Goodhue County Land Use Management

Goodhue County Government Center | 509 West Fifth Street | Red Wing, Minnesota 55066

Lisa M. Hanni, L.S. Director

Building | Planning | Zoning
Telephone: 651.385.3104
Fax: 651.385.3106



County Surveyor / Recorder

Environmental Health | Land Surveying | GIS
Telephone: 651.385.3223
Fax: 651.385.3098

Project Review per Article 3, Section 2, Subd. 5-10:

- Subd. 5
- A. The names and addresses of the petitioner or petitioners and their signatures to the petition. **Stanton Township – Goodhue County LUM**
 - B. Survey information: **See Maps 1-3**
 - C. The current and proposed district: **A1, A2, A3 to R1**
 - D. The current use and the proposed use of the land. **Goodhue County LUM staff have been working with Stanton Township Supervisors to change the zoning designations for specific parcels to reflect the actual current use of the parcels as residential.**
 - E. The reason for the requested change of zoning district. **Stanton Township has the parcels designated as Residential. The parcels range in size from approximately 0.25 -11.57 acres. They are all being used as residential properties and most are adjacent to existing R1 zoned properties.**
 - F. A copy of the soil map showing the soils types within the proposed boundary and the surrounding area. **See Map 4**
 - G. Prime Farmland Rating of the soil types in F. **See Map 4**
 - H. A statement of how the requested change is compatible with the Goodhue County Comprehensive Plan including but not limited to the following:
 1. The environmental impacts of the proposed use of land on the:
 - a. Groundwater
 - b. natural plant and animal communities
 - c. existing trees and vegetation
 - d. bluffland stability
 - e. shoreland stability

The properties are already established as residential. Any new structures or uses would need to comply with current County regulations.
 2. The compatibility with surrounding land uses.

Surrounding land uses include low-density residential and crop agriculture. There is a registered feedlot south of Hwy 19 in Sec 31, across from the parcels in Section 30. Both uses (residential and feedlot) have been established for many years.
 3. The physical and visual impacts on any scenic or historic amenities within or surrounding the proposed parcel.

No impacts to existing historic amenities are anticipated as a result of the proposed rezoning. There is a cemetery and Carleton Airport historic Airfield to the east of the parcels in Section 30; Byllesby Dam is over a half mile to the northwest of the parcels in Section 13 and over a mile to the northwest from the parcels in Section 24; Oxford Mill is over one half mile to the northwest of the parcels in Section 25 and 36.
- Subd. 6 The housing density of the affected Section
- Section 13: This section consists of A3 and R1 zoned properties, along with a small portion of the City of Cannon Falls. The 13 parcels all have dwellings on them and range in size from approximately 0.5 – 3.37 acres. The A3 minimum parcel size is 35 acres.**
- Section 24: This section consists of A3 and R1 zoned properties. The 4 parcels**

all have dwellings on them and range in size from approximately 1.33 – 5.18 acres. The A3 minimum parcel size is 35 acres.

Section 25: This section consists of A2 and R1 zoned properties. Changing the zoning to R1 would remove 1 dwelling from the section dwelling count (currently 27 in the A2 zone). The parcel is approximately 0.5 acres.

Section 30: This section consists of A1 and R1 zoned properties. Changing the zoning to R1 would remove 5 dwellings from the section dwelling count (currently 7 in the A1 zone). Syngenta owns approximately ¾ of the section. The parcels range in size from approximately 0.25 - .80 acres. Parcels 41-030-1600 and 41-030-1100 are larger parcels with a dwelling on them. We are proposing to have split zoning on these 2 parcels – putting the dwelling site in R1 and leaving the existing zoning designation of A2 on the remainder of the parcel.

Section 36: This section consists of A2 and R1 zoned properties. Changing the zoning to R1 would remove 4 dwellings from the section dwelling count (currently 18 in A2 zone). Of the 12 parcels proposed to be changed, 8 of the parcels are owned by an adjacent dwelling parcel and range in size from approximately 0.6 and 2.09 acres.

Subd. 7 The impact on any surrounding agricultural uses

The proposed rezone appears compatible with adjacent land uses in the immediate area, mainly due to the fact the parcels have existing dwellings on them, or in the case of Section 36, are parcels owned by adjacent dwelling parcels. Any change of use would require the appropriate approvals and permits.

Subd. 8 The impact on the existing transportation infrastructure

All of the parcels, with the exception of those mentioned in Section 36, currently have road access. There is no anticipated increase in traffic due to the zoning change.

Subd. 9 The impact on surrounding zoning districts

No substantial negative impacts to adjacent properties are anticipated as a result of the proposed rezone.

Subd. 10. A statement concerning the cumulative effect and compatibility of the requested zoning change on the affected Township and any cities located within 2 miles of the proposed parcel.

The rezone does not add any additional impacts to adjacent properties.

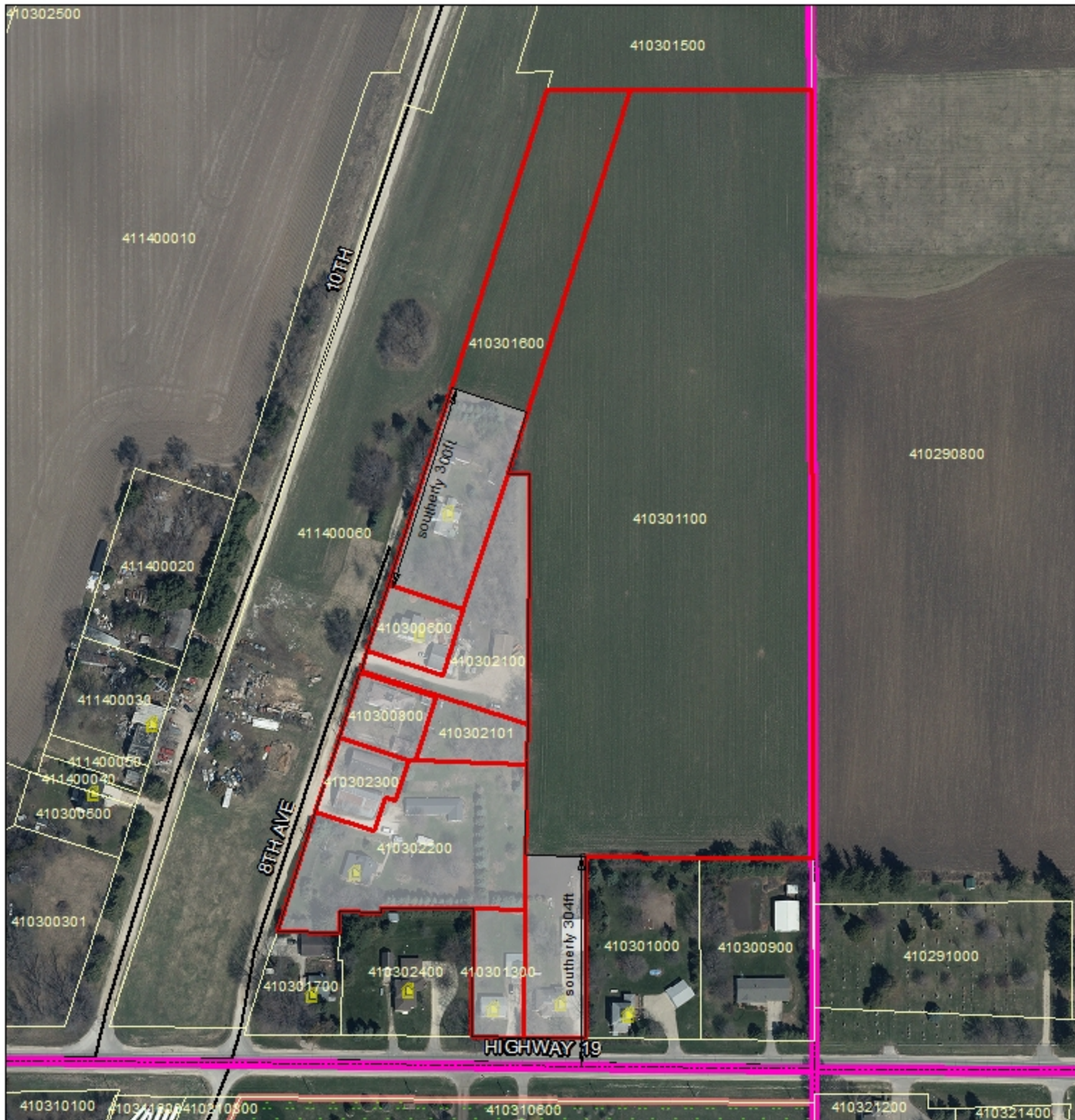
Subd. 11. Additional information as may be requested by the Planning Commission or zoning staff.

STANTON TOWNSHIP

Proposed Map Amendments (Rezones)

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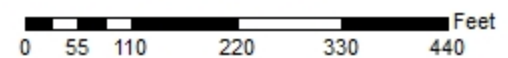
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- 41-030-1600 (southerly 300 feet)
- 41-030-2100
- 41-030-2101
- 41-030-2200
- 41-030-2300



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2016 Aerial Imagery

Map Created May, 2018, Ryan Bechel

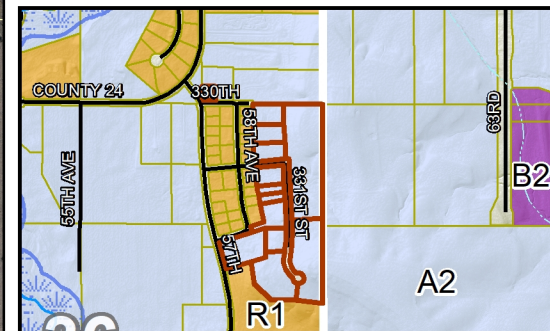


STANTON TOWNSHIP

Proposed Map Amendments (Rezones)

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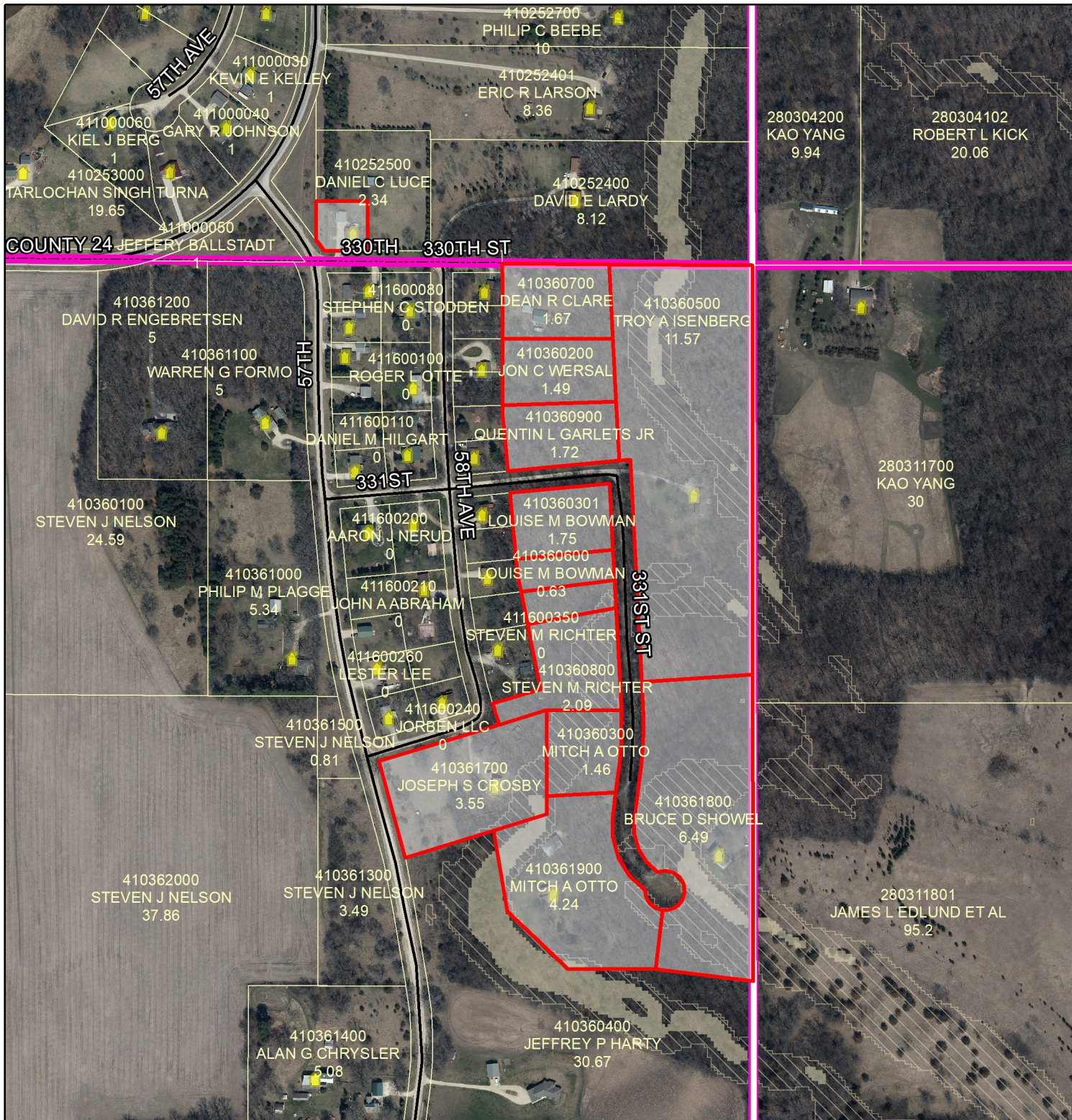
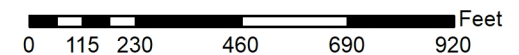
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2016 Aerial Imagery

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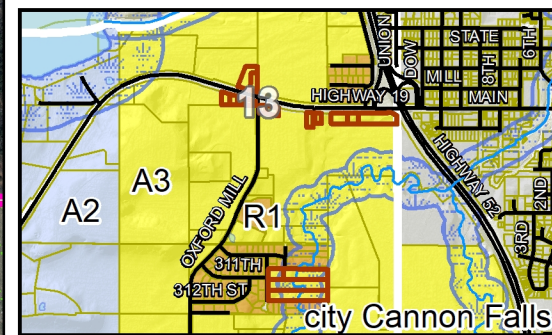


STANTON TOWNSHIP

Proposed Map Amendments (Rezones)

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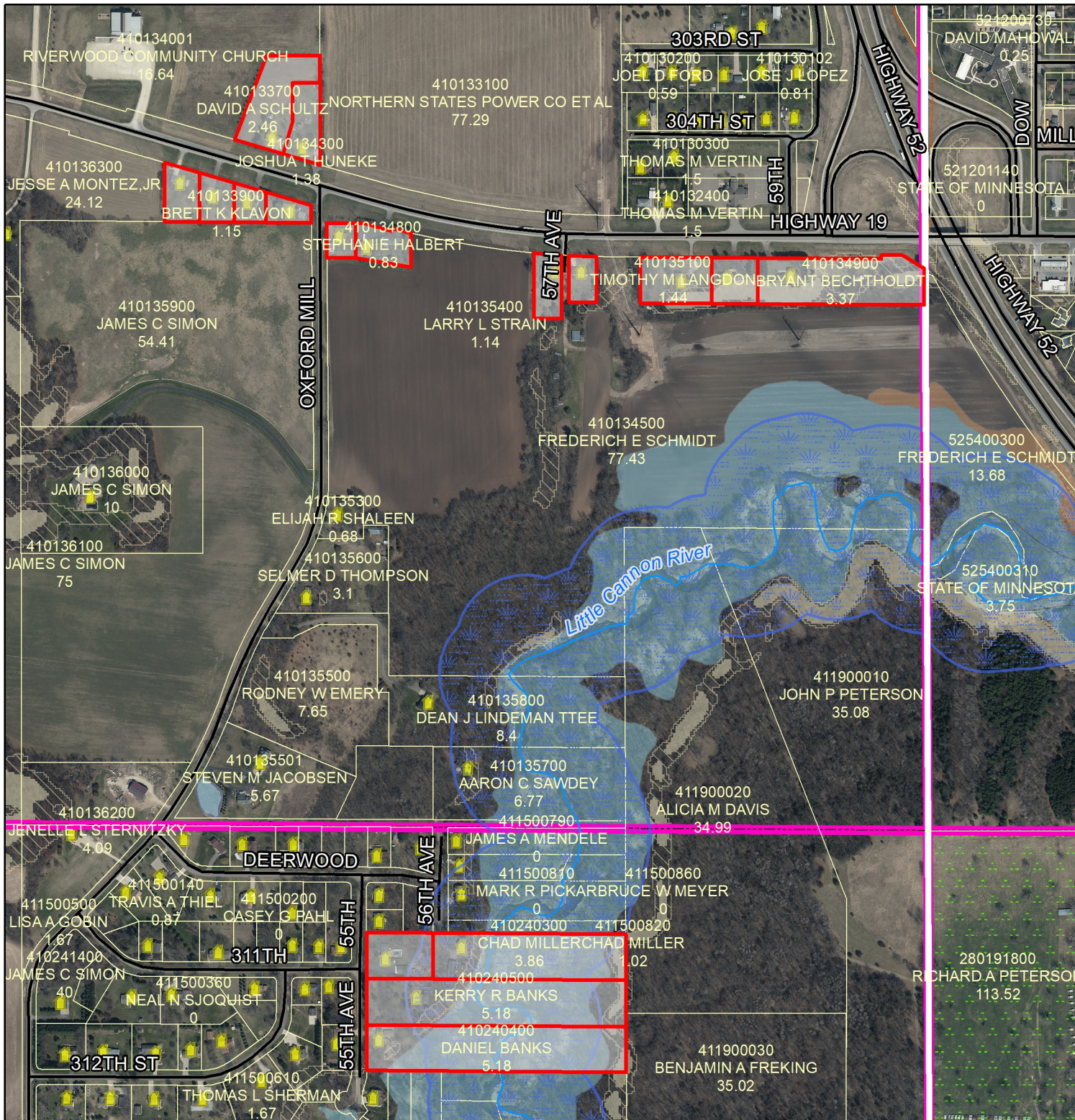
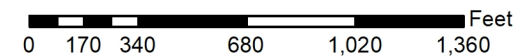
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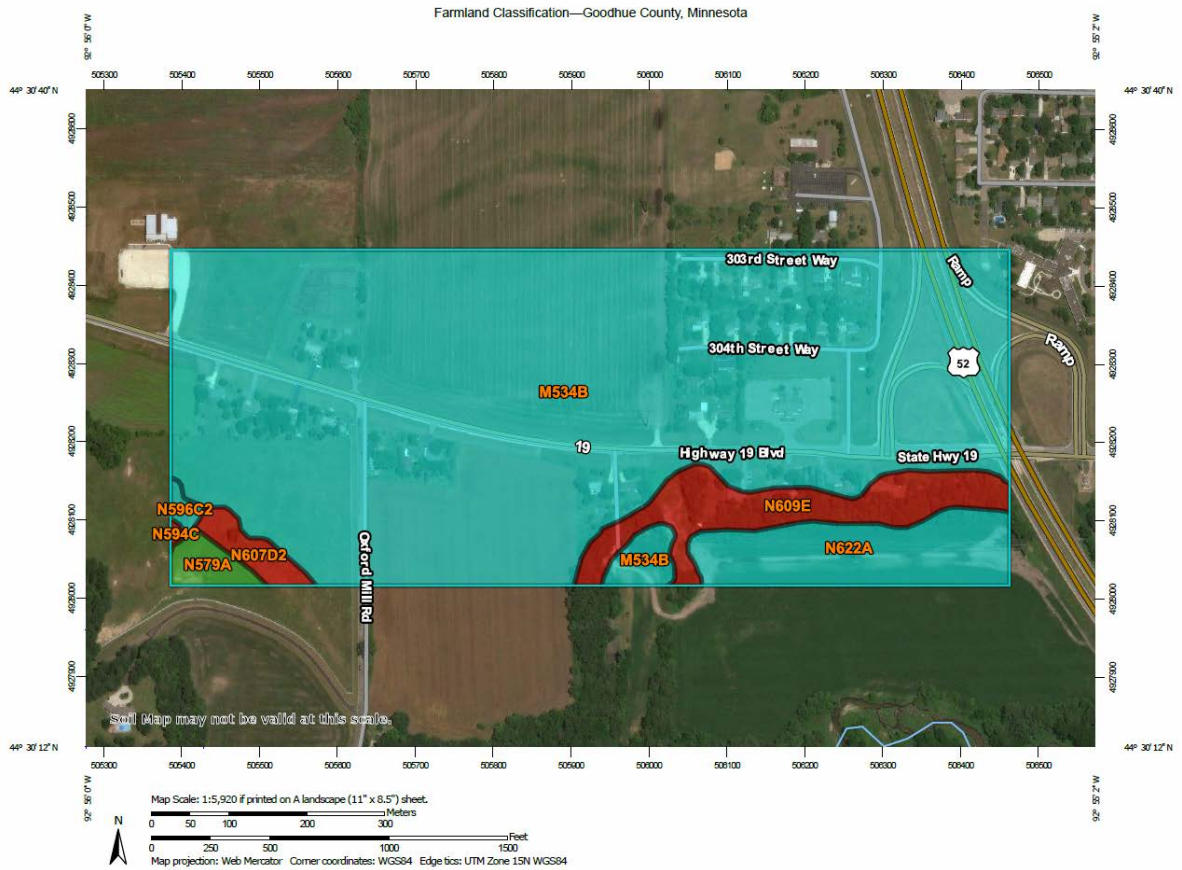


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Map Created April, 2018, Ryan Bechel





USDA Natural Resources Conservation Service

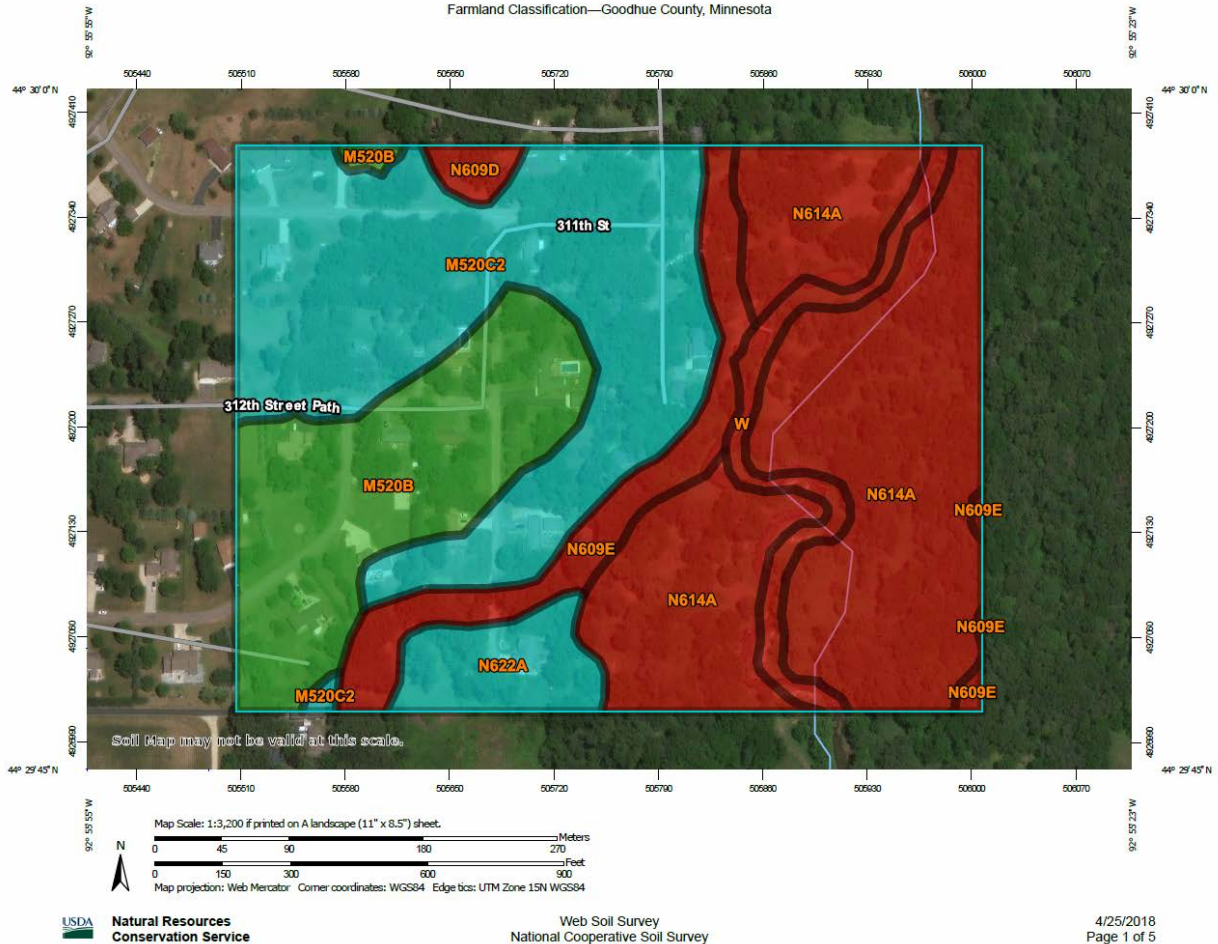
Web Soil Survey National Cooperative Soil Survey

4/25/2018 Page 1 of 5

Farmland Classification

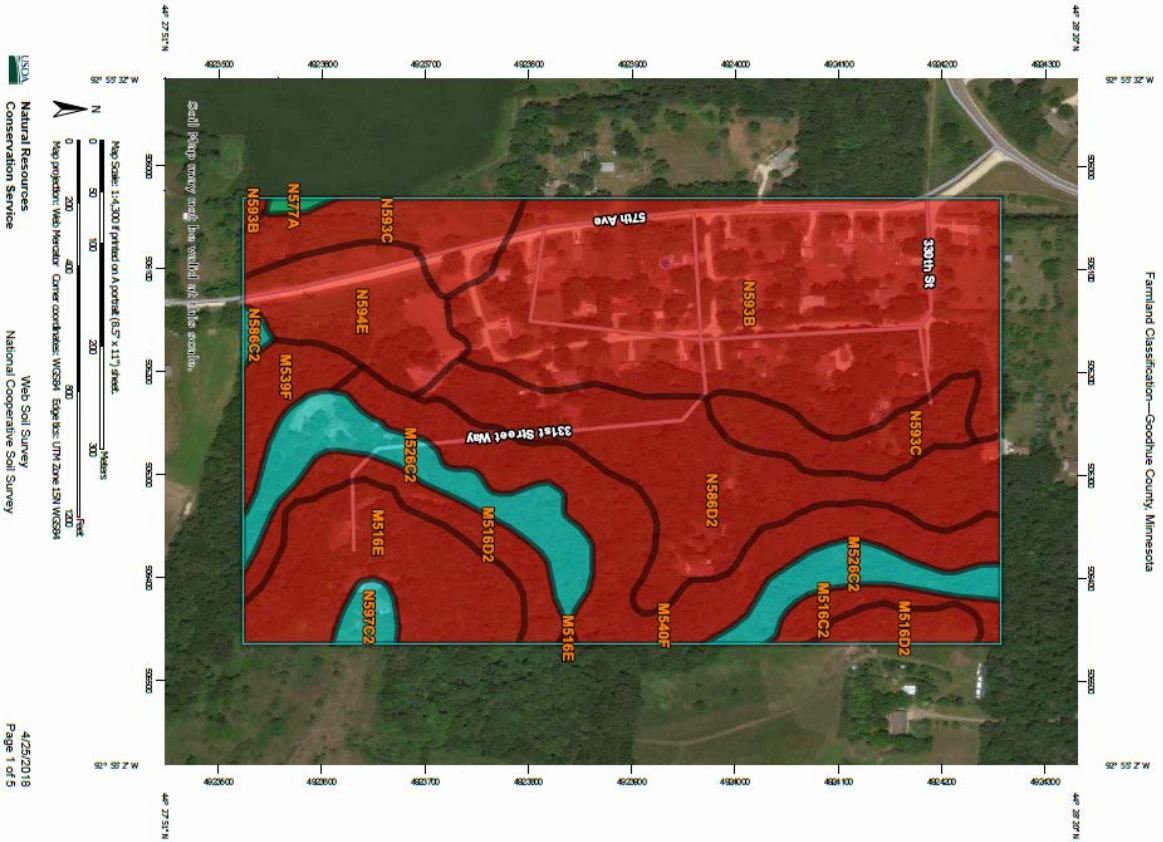
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
M534B	Estherville-Ridgeport complex, 0 to 6 percent slopes	Farmland of statewide importance	95.5	83.3%
N579A	Dakota silt loam, 0 to 3 percent slopes	All areas are prime farmland	1.4	1.2%
N594C	Chelsea loamy sand, 6 to 12 percent slopes	Not prime farmland	0.1	0.1%
N596C2	Eleva sandy loam, 6 to 12 percent slopes, moderately eroded	Farmland of statewide importance	0.4	0.4%
N607D2	Meridian silt loam, 12 to 18 percent slopes, moderately eroded	Not prime farmland	1.5	1.3%
N609E	Hawick sandy loam, 18 to 45 percent slopes	Not prime farmland	7.6	6.6%
N622A	Ankeny-Zumbro complex, 0 to 3 percent slopes, occasionally flooded	Farmland of statewide importance	8.2	7.2%
Totals for Area of Interest			114.7	100.0%

Farmland Classification—Goodhue County, Minnesota



Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
M520B	Rasset sandy loam, 0 to 6 percent slopes	All areas are prime farmland	8.2	17.5%
M520C2	Rasset sandy loam, 6 to 12 percent slopes, moderately eroded	Farmland of statewide importance	14.2	30.3%
N609D	Hawick sandy loam, 12 to 18 percent slopes	Not prime farmland	0.5	1.0%
N609E	Hawick sandy loam, 18 to 45 percent slopes	Not prime farmland	3.5	7.4%
N614A	Kalmarville-Radford complex, 0 to 3 percent slopes, frequently flooded	Not prime farmland	16.5	35.3%
N622A	Ankeny-Zumbro complex, 0 to 3 percent slopes, occasionally flooded	Farmland of statewide importance	2.0	4.3%
W	Water	Not prime farmland	2.0	4.2%
Totals for Area of Interest			46.9	100.0%



Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
M516C2	Wings-Wagen Prairie complex, 6 to 12 percent slopes, moderately eroded	Not prime farmland	1.4	1.8%
M516D2	Wings-Wagen Prairie complex, 12 to 18 percent slopes, moderately eroded	Not prime farmland	4.3	5.5%
M516E	Wings-Wagen Prairie complex, 18 to 35 percent slopes	Not prime farmland	7.0	8.9%
M526C2	Winneshiak silt loam, 6 to 12 percent slopes, moderately eroded	Farmland of statewide importance	6.8	8.8%
M539F	Bellechester loamy sand, 18 to 45 percent slopes	Not prime farmland	1.9	2.4%
M540F	Frontenac-Bellechester complex, 18 to 45 percent slopes	Not prime farmland	0.2	11.6%
M577A	Shandep-Cylinder complex, 0 to 2 percent slopes	Prime farmland if drained	0.2	0.2%
M580C2	Ridgeton, sandy substratum-Eden Prairie complex, 6 to 12 percent slopes, moderately eroded	Farmland of statewide importance	0.3	0.3%
M580D2	Ridgeton, sandy substratum-Eden Prairie complex, 12 to 20 percent slopes, moderately eroded	Not prime farmland	10.5	13.4%
M589B	Sparta loamy sand, 0 to 6 percent slopes	Not prime farmland	24.7	31.4%
M583C	Sparta loamy sand, 6 to 12 percent slopes	Not prime farmland	6.8	8.6%
M594E	Chelsea loamy sand, 12 to 35 percent slopes	Not prime farmland	4.9	6.3%
M597C2	Waucoma-Winneshiak complex, 6 to 12 percent slopes, moderately eroded	Farmland of statewide importance	0.8	1.0%
Totals for Area of Interest			78.8	100.0%



Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
M538A	Waukegan silt loam, 0 to 2 percent slopes	All areas are prime farmland	25.1	100.0%
Totals for Area of Interest			25.1	100.0%

GOODHUE COUNTY ZONING ORDINANCE

Table of Uses

Use	A-1	A-2	A-3	R-1
Residential				
Single-Family Dwelling	P	P	P	P
Two, Three, Or Four Family Dwellings	NP	NP	NP	P
Accessory Dwelling Unit (ADU) (Art. 11 § 31)	P	P	P	P
Residential Accessory Buildings $\geq 7,200\text{ft}^2$ (Art. 11 § 6)	C/I	C/I	C/I	NP
Mobile Home Park (Art. 16)	NP	NP	NP	C/I
Agricultural				
Feedlots (Art.13)				
New Feedlot (Art.13)	P	P	NP	NP
New Feedlot outside of Farmyard (Art.13)	C/I	C/I	NP	NP
Feedlot expansion up to ≤ 100 Animal Units (Art.13)	P	P	P	NP
Feedlot expansion to ≥ 300 Animal Units (Art.13)	P	C/I	NP	NP
Feedlot expansion to ≥ 500 Animal Units (Art.13)	C/I	C/I	NP	NP
Animal waste storage structure $\geq 500,000$ gallons (lagoon system, earthen basin, or associated structure [pit]) (Art.13)	C/I	C/I	C/I	NP
Agricultural Operations (including tree farms) (Art.11 § 24)				
Farm Market/On-farm market/Roadside Stand $< 2400\text{ft}^2$ (Art. 11 § 29)	P	P	P	NP
Farm Market/On-farm market/Roadside Stand $> 2400\text{ft}^2$ (Art. 11 § 29)	C/I	C/I	C/I	NP
Plant Nurseries & Sales	P	P	P	NP
Farm Wineries $< 10,000\text{ft}^2$ (Art. 11 § 27)	P	P	P	NP
Farm Wineries $> 10,000\text{ft}^2$ (Art. 11 § 27)	C/I	C/I	C/I	NP
Temporary/Seasonal Off-Site Roadside Produce Stands	C/I	C/I	NP	NP
Education Farm Retreat (Art. 11 § 14)	C/I	C/I	C/I	NP
Non-Agricultural Uses Associated W/Agritourism (Art. 11 § 30)	C/I	C/I	C/I	NP
3 horses on a minimum 5 acre lot				C/I
Commercial				
Home Businesses - Tier 1 (Art.11 § 12)	P	P	P	P
Home Businesses - Tier 2 (Art.11 § 12)	P	P	P	I
Home Businesses - Tier 3 (Art.11 § 12)	I	I	I	NP
Commercial Kennel/Raising of fur-bearing animals (Art.11 § 26)	C/I	C/I	C/I ^{bc}	NP
Commercial/Industrial Uses primarily intended to serve Ag. Community	C/I	C/I	C/I ^{bc}	NP
Boarding or Rooming Houses as an accessory use	C/I	C/I	C/I ^{bc}	C/I
Bed and Breakfast Inn (Art.11 § 13)	C/I	C/I	C/I ^{bc}	C/I
Contractors Yard (Art.11 § 33)	C/I	C/I	C/I	NP
Veterinary Clinic	C/I	C/I	NP	NP
Industrial				
Mining, Quarrying, Excavating/Filling (Art.14)	P	P	NP	NP
Junk/Salvage Reclamation Yard (Art.11 § 10)	C/I	C/I	NP	NP

a. Accessory buildings $> 500\text{ft}^2$ shall be $\geq 100\text{ft}$ from any lot line and $\geq 200\text{ft}$ from the nearest dwelling (Art.23 § 3 subd. 1)

b. Any mining, excavating, or filling of land for these uses shall be by conditional use (Art.23 § 3 subd. 10)

c. Accessory structures and uses customarily incidental to this use shall be by conditional use (Art.23 § 3 subd. 11)

KEY: P = PERMITTED NP = NOT PERMITTED C = CONDITIONAL USE PERMIT I = INTERIM USE PERMIT

GOODHUE COUNTY ZONING ORDINANCE

Table of Uses

Use	A-1	A-2	A-3	R-1
Recreational				
Public Stable	C/I	C/I	C/I	NP
Park/Recreational Area (operated by a governmental agency)	C/I	C/I	C/I ^{bc}	NP
Park/Recreational Area	NP	NP	NP	C/I
Hunting Club/Shooting Preserve	C/I	C/I	NP	NP
Campground &/or RV Site (Art.16 § 7)	C/I	C/I	C/I	NP
Park Manager's Residence (1 per campground/RV park w/ ≥ 30 campsites)	NP	C/I	C/I	NP
Commercial Outdoor Recreation Facilities (including, but not limited to, Golf Courses/Driving Ranges, Tennis Courts, Skiing, Swimming Pools, Park Facilities)	C/I	C/I	C/I ^{abc}	NP
Commercial Outdoor Recreation Health Facilities	NP	C/I	NP	NP
Commercial Outdoor Recreation Storage Structure (size & location to be approved by the Planning Advisory Commission)	NP	NP	C/I ^{bc}	NP
Retreat Centers (Art.11 § 25)	NP	C/I	C/I	NP
Institutional				
Community Building	C/I	C/I	C/I ^{bc}	C/I
Church	C/I	C/I	C/I ^{bc}	C/I
Cemetery	C/I	C/I	C/I ^{bc}	NP
Memorial Garden	C/I	C/I	NP	NP
Public School	C/I	C/I	C/I ^{bc}	C/I
Private School	C/I	C/I	C/I ^{bc}	NP
Nursery School	C/I	C/I	C/I ^{bc}	NP
Funeral Home	NP	NP	C/I ^{bc}	NP
Hospital, Sanitarium, Philanthropic/Eleemosynary Institutions (except correctional institutions, animal hospitals)	NP	NP	C/I ^{bc}	NP
Miscellaneous				
WECS (Non-Commercial Micro) (Art. 18)	P	P	P	P
WECS (Non-Commercial) (Art. 18)	P	P	C/I	NP
WECS (Commercial) (Art. 18)	C/I	C/I	NP	NP
WECS (Meteorological Tower) (Art. 18)	P	P	C/I	NP
SES (Utility Scale) (Art. 19)	C/I	C/I	C/I	NP
SES (Commercial Scale) (Art. 19)	P	P	P	P
SES (Residential Scale) (Art. 19)	P	P	P	P
Aircraft Landing Fields & Facilities	C/I	C/I	NP	NP
Sanitary Landfills/Sewage Disposal Works	C/I	NP	NP	NP
Non-agricultural Lagoons (In accordance w/ MPCA regulations)	C/I	NP	NP	NP
Migratory Labor Camp	C/I	C/I	NP	NP
Commercial Radio Towers/TV Towers/Transmitters	C/I	C/I	C/I	NP

KEY: P = PERMITTED NP = NOT PERMITTED C = CONDITIONAL USE PERMIT I = INTERIM USE PERMIT

GOODHUE COUNTY ZONING ORDINANCE

General District Regulations

	A-1	A-2	A-3	R-1
Density				
Dwellings	4 per section	12 per section (1- 1/4 1/4)	1 per 35 acres (6000 sq feet if sewered by Muni)	20,000 sq feet* (6000 sq feet if sewerd by Muni)
Yard Setbacks				
Right of Way Line	60 feet	60 feet	60 feet	40 feet
Side and Rear	30 feet	30 feet	30 feet	8 feet
Side and Rear (livestock building)	100 feet	100 feet	100 feet	NA
Bluff Setbacks				
Bluff Impact Zone	30 feet	30 feet	30 feet	30 feet
Height Requirements				
Agricultural Buildings	Exempt	NA	NA	NA
Principal buildings	35 feet	35 feet	35 feet	35 feet
Lot Size				
Dwelling lot size (minimum)	2 acres*	2 acres*	35 acres	20,000 sq feet*

a. Accessory buildings > 500ft² shall be ≥ 100ft from any lot line and ≥ 200ft from the nearest dwelling (A3-Art.23 § 3 subd. 1)

b. Mining activities: 1000 ft (reduced to 300 ft by written consent) (Art.14 § 6 subd. 4)

c. Feedlots: 1000 ft or 94% Odor OFFSET to nearest dwelling(other than operator's dwelling); 1000 ft or 96% Odor OFFSET for new R1 Districts(Art.13 § 7)

*The lot is large enough and so situated to meet the SSTS standards

Goodhue County Land Use Management

Goodhue County Government Center | 509 West Fifth Street | Red Wing, Minnesota 55066

Lisa M. Hanni, L.S. Director

Building | Planning | Zoning
Telephone: 651.385.3104
Fax: 651.385.3106



County Surveyor / Recorder

Environmental Health | Land Surveying | GIS
Telephone: 651.385.3223
Fax: 651.385.3098

To: Planning Commission
From: Land Use Management
Meeting Date: May 14, 2017
Report date: May 7, 2017

PUBLIC HEARING: Non-Metallic Mineral Extraction Facility - Conditional Use Permit (CUP)

Request by Doug Mahoney (applicant/owner) for CUP for a Non-Metallic Mineral Extraction Facility. Proposed mining includes a limestone quarry and sand/gravel pit and associated processing/transport equipment and facilities. The total site area is 61.5 acres. The area to be mined is approximately 13.4 acres. This CUP proposes to reopen an inactive/lapsed non-metallic mining operation located at 32245 296th Street, Red Wing, MN 55066.

Application Information:

Applicant(s): Doug Mahoney
Address of zoning request: 32245 296th Street, Red Wing, MN 55066
PID: 32-009-1201

Short Legal Description: Part of the W 1450.00 feet of the S $\frac{1}{2}$ of the NW $\frac{1}{4}$ and that part of the W 1450.00 feet of the N $\frac{1}{2}$ of the SW $\frac{1}{4}$ of Section 9, Twp 112 N, Range 13 W, Florence Township.

Township Information: The Applicant has informed Florence Township that he has submitted both CUP and Variance requests to the County related to the proposed Mineral Extraction Facility. To date the Applicant has attended two Township Planning Commission Meetings including conducting a site visit for Township Officials. Florence Township will require the Applicant to obtain an Interim Use Permit to operate the proposed mining facility as well as a Variance to allow a portion of the operation within a Bluff Impact Zone.

Attachments:

Application Submittals (Hard Copy to PAC of Existing Conditions, Operations, Reclamations Site Maps, Excerpts from Mining Plan, CUP Application Form)
Complete application submittals are available online
Goodhue County Zoning Ordinance: <http://www.co.goodhue.mn.us/DocumentCenter/View/2428>
Florence Township Questions/Issues

Background:

Doug Mahoney, owner of the subject property has submitted a Conditional Use Permit (CUP) Application proposing to re-open a previously operated mining site to extract non-metallic mineral aggregates. The site is proposed to include 13.4 acres of mining located on a parcel of property of 61.5 acres. The proposed mining operation will include a rock quarry (north pit) and sand and gravel mining area (south pit). The Mahoney CUP Application does not propose to mine within the Jordan Sandstone layer (*frac sand*). The subject property (Parcel #320091201) is located within Section 9, Florence Township, on property located within an A2 (Agriculture) Zone District. Mining that includes extraction of more than 400 cubic yards of non-metallic minerals resources per year is subject to approval of a Conditional Use Permit or an Interim Use Permit by the County

Board. Portions of the proposed mining areas are located within Blufflands (Bluff Impact Zone). Current Bluffland Regulations restrict mining within the Bluff Impact Zone. Mr. Mahoney has also submitted a Variance Applicant for consideration by the Board of Adjustment to allow part of his proposed operations to occur within a Bluff Impact Zone. Mr. Mahoney's Variance request will be considered by the Board of Adjustment at their May 21, 2018, Regular Meeting.

More than ten years ago, Mr. Mahoney allowed the required annual registration for his mine to lapse. He was provided numerous reminders to renew his registration before he was informed that he would no longer be allowed to operate his mining operation (2007). When Mr. Mahoney contacted the Land Use Management Department approximately two years ago to inquire about re-opening mining operations, he was told that he would be subject to obtaining a Conditional Use Permit or Interim Use Permit based on current County Mineral Extraction regulations. In addition, he was told that he would only be able to conduct mining operations within the Bluff Impact Zone if he was able to obtain a Variance to the restriction on mining within Bluff Impact Zone set forth in the County's Bluffland Regulations.

Mr. Mahoney initially approached the County about applying for the CUP and Variance in January 2018. At that time, he had not contacted Florence Township and so he did not make application to the County. Mr. Mahoney proceeded to contact Florence Township to make Township Officials aware of his mining proposal and intent to apply for a CUP and Variance to Goodhue County. He attended a March 7, 2018, Florence Township Planning Commission Meeting and briefed that group regarding his proposal. The Florence Planning Commission informed Mr. Mahoney that his proposed mining operation would be subject to obtaining an Interim Use Permit and Variance (to mine within a Bluff Impact Zone) from the Township. They proceeded to schedule a site visit on April 9, 2018, for Township Officials to visit the proposed mining site with Mr. Mahoney. County Planner and Zoning Administrator, Michael A. Wozniak, AICP, attended both the March 7 and April 9, Florence Township Planning Commission Meetings.

Florence Township has taken no action as of the date of this Staff Report (May 7, 2018) regarding Mr. Mahoney's Mining Proposal. The Township Planning Commission has posed a variety of questions and raised various issues of concern in order to help inform County review of the Mahoney proposal. The Township has requested time be allotted at the Planning Advisory Commission Meeting on May 14, to allow Township Officials to present Florence Township concerns regarding Mr. Mahoney's CUP request. Staff will ask the Township to submit their comments in writing if possible so that they may be shared with the Planning Advisory Commission prior to the May 14, PAC Meeting.

Following his making Florence Township aware of Mining proposal and intent to apply to Goodhue County, Mr. Mahoney submitted on March 21, 2018, a Conditional Use Permit for a Non-Metallic Mineral Extraction Facility and a Variance request to allow a portion of his mining operation to occur within a Bluff Impact Zone. Application materials including numerous site planning, narratives and various supporting data were submitted at that time. Following initial review of his application submittals, the County Planning and Zoning Administrator informed Mr. Mahoney by way of letter dated April 5, 2018, that his applications were not considered complete. The April 5, 2018, letter called out specific application provisions that had not been addressed sufficiently or were in need of further clarifications. Mr. Mahoney and his consultant, Johnson and Scofield Inc, have subsequently provided additional maps and written explanation to supplement the extensive application materials provided on March 21, 2018, to address the items set forth in the April 5, 2018 letter.

A determination was made by Land Use Management Department Staff that Mr. Mahoney had sufficiently met application submittal requirements to place consideration of his Conditional Use

Permit Application on the May 14, 2018, Planning Advisory Commission Meeting and to schedule a public hearing for that date.

Project Summary:

Mr. Mahoney and his consultant, Johnson and Scofield Inc, have devoted a considerable amount of time during the past year to prepare a proposal to conform to County application submittal requirements and pertinent performance standards to operate a Non-Metallic Mineral Extraction Facility at 32245 296th Street, Florence Township (Parcel #320091201). Goodhue County Zoning Ordinance, Article 14 (Mineral Extraction) includes detailed application submittal requirements and performance standards.

Non-Metallic Mineral Extraction Facilities are recognized as a permitted land use within the A2 Zone District, however, extraction of more than 400 cubic yards per year is subject to approval of a CUP or IUP by the County Board.

Portions of the proposed mining operations (see Maps B1 and B2 with Bluff Impact Zone Boundary) lie within a Bluff Impact Zone. The County's Bluffland Regulations (Article 12) include a restriction on Mineral Extraction within the Bluff Impact Zone (Section 4, Subd. 7). The only grading activity that may be permitted is approved erosion and sediment control measures. Mr. Mahoney has applied to the Board of Adjustment for a variance to allow mineral extraction and related activities to occur within those portions of his site that lie within the Bluff Impact Zone.

Land Use Management Department Staff have conducted a thorough review of Mr. Mahoney's CUP Application submittal including supplemental materials requested following initial review of the application. Hard copy of the completed CUP Application Form, key site maps, narrative information describing the project, and relevant comments/questions raised by Florence Township, the Goodhue SWCD (Beau Kennedy) and the Minnesota DNR have been provided in the Planning Advisory Commission Packets. In addition a link has been provided for access to all of Mr. Mahoney's CUP Application Submittal Materials.

The following key issues were a focus of the review of the Mahoney Mining Proposal:

Water Resources:

Potential impacts on surface water and ground water resources must be considered when reviewing the Mahoney Mining Proposal.

The Applicant has stated, "Surface water runoff quality will not be a major issue or concern due to the fact that all surface runoff will be contained within the mining site area (page 8. Non-Metallic Mining Reclamation Plan). Proposed Erosion and Sedimentation Measures have been detailed on Map B1 (Proposed Operations - South Pit) and Map B2 (Proposed Operations – North Pit). In addition the Applicant has provided an illustration of the general pattern of surface drainage on Map A3 (Hydrology).

The applicant has identified "the primary threat to water quality at the mining operation will be leakage or spillage of diesel fuel, hydraulic, motor and other oils, anti-freeze and other equipment operational fluids." Mr. Mahoney's Application further states: "To minimize this type of contamination, the Owner will centralize the servicing and fueling of all mobile equipment in the existing Mahoney pit and all fuel will be brought on-site by mobile transport trucks. For minor fueling needs, there is a 1000-gallon MSHA approved above round Diesel fuel tank that is used on the existing Mahoney pit."

An additional water resources issue stems from the fact that Applicant has proposed the use of a mobile wash plant at the site. The Application states: “All material washing activities will take place at the existing sand pit.” Further noted is that “Raw mined materials is dumped into a feed grizzly and conveyed to the wash plant. Within the wash plant are three vibrating grates causing separation into three size groups after removing most of the 200 (opening/inch) minus fines. Through the use of sieves, jigs and shakers, four products are produced. These products are then used to create the gradation mixes required by the Owner’s customers.”

The Applicant has stated “to facilitate this washing process, wash water historically was collected in a ground water basin in the existing sand pit”. Map B1 (Proposed Operation – South Pit) illustrates and identifies the proposed water extraction site, Mobile Wash Plant, and proposed wastewater sedimentation ponds. Joe Richter, MNDNR Hydrologist who is responsible for reviewing/issuing Water Appropriation Permits if required has indicated that he will need to an estimate of the volume of ground water to be drawn (from the pond extending below the water table) and rate of withdrawal. These factors may affect any concerns regarding area water resources including wetlands and a calcareous fen located approximately 2000 feet from the proposed mining site. Beau Kennedy, Water Planner/Wetland’s Coordinator with the Goodhue SWCD has also expressed the need for information regarding volume and rate of water usage in respect to potential impact on nearby Wetlands. The need for this further clarification regarding water usage has been passed on to the Applicant. It is expected that the Applicant will offer further information regarding water usage at the May 14, Planning Advisory Commission Meeting.

See proposed conditions 5-7 to address the water resources concerns.

Noise, Dust, Vibration:

Impacts from the proposed Mahoney Non-Metallic Mineral Extraction Facility (rock and sand/gravel mining) may include noise, vibration and dust. Noise may be expected by periodic blasting (north pit), crushing (north pit), washing (south pit) and the use of heavy equipment from mining and loading. In addition, noise may be created by mining activity and transport of mining products.

Mr. Mahoney has indicated that explosives will be used in the North Pit for blasting rock. He has stated that no explosives will be stored on site and that the third party will be responsible for all applicable permits, notifications and seismic monitoring. Any approval of the CUP should include a condition that no blasting may occur prior to submittal of a plan from a qualified party regarding the location of blasting, timing, notifications, and seismic analysis.

The Mining Operations would be subject to complying with applicable MPCA Noise Standards. The Applicant has not proposed specific dust control measures, however, some of the features included in the Operations Plan such as creating earthen berm around the perimeter of mining area that would be seeded to establish vegetative cover would help mitigate dust.

Aesthetics:

Aggregate mining is a high impact land use that results in significant long-term alteration to the landscape in addition visual impacts for the duration of the mining activity. These may include seeing open pits, major equipment such as the mobile wash plant, mobile crusher, front-end loaders and gravel hauling trucking.

The North Pit as proposed will be visible only from limited vantage points from the bluff to the east and north, generally it should not be highly visible from nearby dwelling sites. The mobile crushing and screening equipment to be located in the North Pit would generally not be visible from most vantage points.

Vehicles using the site access road to reach the North Pit would be visible from some of the dwelling sites located east of Mahoney Mining Site and from the facilities on Mt. Frontenac (Golf Course and Ski Jump/Recreation Complex (if constructed)).

Activity in the South Pit will be partially visible from Hwy. 61 when traveling southbound and from some of the higher vantage points including Mt. Frontenac. Some of the mining will be occurring below grade and will be partially screened with an Permanent Screening Berm as illustrated on Map B1 (Proposed Operations – South Pit). The proposed mobile wash plant and truck/load weighing scale would be somewhat more visible depending on the vantage point.

Truck traffic proposed at an average of 50 trucks/day would generally be visible on 296th and Hwy 61.

Traffic Safety: Mr. Mahoney has indicated that he expects an average daily estimate of 50 trucks per day. The access to the mining site is 296th Street, a Florence Township road. The driveway access from the Mahoney Property onto 296th is located approximately 1500 feet east of the intersection of 296th and Minnesota Trunk Highway 61. No direct access to Highway 61 is being requested the mining site does not front directly onto Highway 61. Land Use Management Staff have forwarded relevant information regarding the Mahoney Mining Proposal to the MNDOT District 6 Planning Office for comment. Further information will be provided to the Planning Advisory Commission on May 14, at the Meeting.

Setbacks: The Applicant has indicated that mining activity will be setback the required minimum of 50 feet or further from property boundaries based upon proposed Operations Plans and the Surveyed and Legally Described boundaries of proposed mining areas. The proposed South Pit and the Access Road to the North Pit, fall within the 1000-foot setback required for new mineral extraction facilities from existing dwellings. The nearest dwelling sites to the proposed mining site include five dwelling sites that range from approximately 630 to 2000 feet. One dwelling (Parcel 32-009-1204 owned by Bryce Dankers) falls within the required setback of 1000 feet (approximately 630 feet to the closest part of the mining operation) for new mining operations from existing dwellings. New mining operations may be allowed within 300 feet of an existing dwelling if written consent of the property is first secured. Mr. Mahoney has not as of yet indicated that he has secured written consent to conduct mining within closer than 1000 feet to Mr. Dankers dwelling.

Bluff Impact Zone: The Applicant has identified the boundaries of the Bluff Impact Zone (Toe to Top of Bluff) based on Bluff Impact Zone data provided by the Land Use Management Department GIS Staff that was confirmed with field checking with spot elevations to confirm the location of the toe and top of bluff (see Map B1 and B2). Approximately 75% of the proposed mineral extraction facility lies outside of the bluff impact zone with roughly 25% of the 13.4 acres of proposed mining falling within the bluff impact zone. The site access road to reach the North Pit from the base of the property is sited mainly within the bluff impact zone; this improvement is already in place.

Actions for consideration:

Staff recommendation is based on the review of the submission and project area prior to the public hearing. The following staff findings should be amended to reflect any concerns conveyed during the PAC meeting and public hearing:

Draft Findings of Fact:

- The proposed use does not appear to be injurious to the use and enjoyment of other property in the immediate vicinity, nor substantially diminish and impair property values within the immediate vicinity.

Mining is by nature a high impact land use. Operations involve for a quarry and sand/gravel mine involve blasting, crushing, washing including the use of heavy equipment for earth moving and transport of mined/processed materials. The proposed mining operation would involve re-opening a previously mining site of limited size and scope (13.4 acres of mining)

- That the establishment of the CUP/IUP will not impede the orderly development and improvement of surrounding property for uses predominant to the area.

The nearest dwelling sites to the proposed mining site include five dwelling sites that range from approximately 630 to 2000 feet. One dwelling (owned by Bryce Dankers) falls within the required setback of 1000 feet (approximately 630 feet to the closest part of the mining operation) for new mining operations from existing dwellings. New mining operations may be allowed within 300 feet of an existing dwelling if written consent of the property is first secured. Mr. Mahoney has not as of yet indicated that he has secured written consent to conduct mining within closer than 1000 feet to Mr. Dankers dwelling.

- That adequate utilities, access roads, drainage and other necessary facilities have been or are being provided.

The proposed Mahoney Mining Operation will utilize an existing site access road that provides access to 296th Street a Florence Township Road. Mining related truck traffic will access Minnesota Highway 61 at the intersection with 296th Street, approximately 1530 feet from where the Mining site driveway intersects with 296th Street. Information regarding the proposed mining operation has been forwarded to the MNDOT District 6 Planning Office for comment. Any comments received will be provided to the Planning Commission at the May 14, 2018, Meeting.

- That adequate measures have been or will be taken to provide sufficient off-street parking and loading space to serve the proposed use.

Off-street parking and loading areas have been identified on the Operations Site Maps submitted by the Applicant.

- That adequate measures have been or will be taken to prevent or control offensive odor, fumes, dust, noise, and vibration so that none of these will constitute a nuisance, and to control lighted signs and other lights in such a manner that no disturbance to neighboring properties will result.

Impacts from rock and sand/gravel mining may include noise, vibration and dust. Noise may be generated by blasting (north pit), crushing (north pit), washing (south pit) and the use of heavy equipment and trucks. In addition, noise may be created by mining activity and transport of mining products.

Mr. Mahoney has indicated that explosive will be used in the North Pit for blasting rock. He has stated that no explosives will be stored on site and that the third party will be responsible for all applicable permits, notifications and seismic monitoring. Any approval of the CUP should include a condition that no blasting may occur prior to submittal of a plan from a qualified party regarding the location of blasting, timing, notifications, and seismic analysis.

The north pit is relatively isolated limited aesthetics impacts from Hwy 61 or nearby dwelling sites. In addition, the relative isolation and bowl shape of the north pit should help limit the noise, vibration or dust generated by control blasting. Much of the activity in the south pit will occur below grade helping to mitigate dust and noise impacts.

The Mining Operations would be subject to complying with applicable MPCA Noise Standards. The Applicant has not proposed specific dust control measures, however, some

of the features included in the Operations Plan such as creating earthen berm around the perimeter of mining area that would be seeded to establish vegetative cover would help mitigate dust.

Staff Recommendation:

LUM Staff recommends the Planning Commission

- adopt the staff report into the record (dated May 7, 2018);
- adopt the findings of fact;
- accept the application, testimony, exhibits, and other evidence presented into the record; and

Recommend that the County Board of Commissioners **APPROVE** the request of Doug Mahoney for a Conditional Use Permit to operate a Non-Metallic Mineral Extraction Facility. Subject to the following conditions:

1. This CUP replaces and removes any prior authorization conduct mining of Non-Metallic Minerals Resources on the subject property;
2. Activities shall be conducted according to submitted plans, specifications, and narrative included with the Conditional Use Permit application submitted to Goodhue County Land Use Management Office, minor adjustments may be made to approved mining plans with approval from the Zoning Administrator;
3. Hours of Operation shall be limited to 6:00 a.m. to 10:00 p.m., Monday through Saturday. Any exceptions must comply with Article 14, Section 6, Subd. 4.
4. No blasting may occur prior to submittal to the Land Use Management Department of a plan that specifies the location and timing of blasting; measures to be taken to mitigate noise, vibration and dust; method of notifying nearby property owners within ½ mile, Florence Township and the Zoning Administrator.
5. Compliance with all necessary State and Federal registrations, permits, licensing, and regulations. Evidence shall be provided to the County of all required permits, including but limited to MPCA NPDES Permit, and MNDNR Water Appropriate Permit (if required) prior to start of Mining Operations.
6. No Mining Operations shall commence unless the Applicant/Owner has provide evidence that a Water Appropriation Permit has been obtained from the Minnesota Department of Natural Resources, or written confirmation that a Water Appropriation Permit is not required.
7. The Applicant shall obtain a written confirmation from Wetland’s Coordinator, Beau Kennedy, indicating Wetland’s review requirements have been prior to start of Mining Operations.
8. The owners will cooperate with inspections of the facility in coordination with Land Use staff.
9. All final grades and restoration must be consistent with the approved and amended reclamation plans.
10. Within twelve (12) months after completion of mineral extraction or after termination of the permit, all equipment, vehicles, machinery, materials, and debris shall be removed from the subject property.
11. Site reclamation must be completed within twelve (12) months after completion of mineral extraction, after termination of the permit, or according to an approved plan schedule. Failure to annually register the mineral extraction facility will be considered termination of the mineral extraction facility and the twelve (12) month period begins.
12. Security. The applicant/owner (Doug Mahoney) of the property on which the mineral extraction is occurring, shall post a letter of credit, bond, or cash escrow in \$70, 875.00. If the required Security is provided in the form of a “Letter of Credit” or a “Performance Bond”, it shall be subject to review and approval by the County Attorney prior to start of Mining Operations. Goodhue County shall be listed as the

eligible party to access the Security to reimburse the following costs upon failure of the Applicant/Owner to comply with requirements of this Conditional Use Permit:

- A. Costs of bringing the operation into compliance with the mineral extraction permit requirements including site monitoring and enforcement costs.
 - B. Extraordinary costs of repairing roads due to the special burden resulting from the hauling of materials and traffic associated with the operation.
 - C. Site restoration.
 - D. Costs the county may incur in enforcing the terms of the conditional use permit, and land use permit, including attorney's fees.
 - E. A Bond or Letter of Credit shall be valid for a minimum of one (1) year; and shall include a provision for notification to the County at least thirty (30) days prior to cancellation or non-renewal.
13. Mineral Extraction and related activities are limited to Parcel A and Parcel B as legally described on the Certificate of Description for: Doug Mahoney (Drawing Number S-7492, certified by Marcus S. Johnson, Minnesota License NO. 47460, Date: April 26, 2018.

Located at 32245 296th Street, Red Wing, MN 55066, Parcels 320091201, Part of the W 1450.00 feet of the S $\frac{1}{2}$ of the NW $\frac{1}{4}$ and that part of the W 1450.00 feet of the N $\frac{1}{2}$ of the SW $\frac{1}{4}$ of Section 9, Twp 112 N, Range 13 W, Florence Township.

1 **GOODHUE COUNTY CONDITIONAL/INTERIM USE PERMIT APPLICATION**

Parcel # 320091201

Permit

PROPERTY OWNER INFORMATION

Last Name Mahoney		First Doug		Email:	
Street Address 32245 296th Street				Phone 651-380-3071	
City Red Wing		State Mn	Zip 55066	Attach Legal Description as Exhibit "A" <input type="checkbox"/>	
Authorized Agent Steve Voigt		stevev@jlsmail.com		Phone 651-388-1558	
Mailing Address of Landowner: 32245 296th Street Red Wing Mn. 55066					
Mailing Address of Agent: 1203 Main Street Red Wing Mn. 55066					

PROJECT INFORMATION

Site Address (if different than above): _____

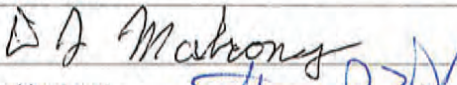
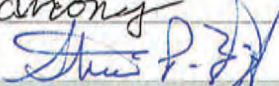
Lot Size 61.5 acres	Structure Dimensions (if applicable) No permanent structures will be built.
----------------------------	--

What is the conditional/interim use permit for? **Non-metallic Mining**

Written justification for request including discussion of how any potential conflicts with existing nearby land uses will be minimized
 The purpose of this C.U.P. is to obtain the necessary permits to reopen an inactive/lapsed nonmetallic mine. The previous mining operation caused no known conflicts with nearby land uses, and non are foreseen with the reopening of the existing mining areas. The use of Best Management Practices will minimize most conflicts that could come about as a result of this permit.

DISCLAIMER AND PROPERTY OWNER SIGNATURE

I hereby swear and affirm that the information supplied to Goodhue County Land Use Management Department is accurate and true. I acknowledge that this application is rendered invalid and void should the County determine that information supplied by me, the applicant in applying for this variance is inaccurate or untrue. I hereby give authorization for the above mentioned agent to represent me and my property in the above mentioned matter.

Signature of Landowner 	Date 1-9-18
Signature of Agent Authorized by Agent 	

TOWNSHIP INFORMATION

Township Zoning Permit Attached? If no please have township complete below:

By signing this form, the Township acknowledges being made aware of the request stated above. In no way does signing this application indicate the Township's official approval or denial of the variance request.

Signature	Title	Date
-----------	-------	------

Comments:

COUNTY SECTION COUNTY FEE \$350 RECEIPT # _____ DATE PAID _____

Applicant requests a variance from Article 12 Section 4 Subdivision 7 of the Goodhue County Zoning Ordinance

What is the formal wording of the request?

Shoreland _____ Lake/Stream Name _____ Zoning District _____
 Date Received _____ Date of Public Hearing _____ DNR Notice _____ City Notice _____

Action Taken: Approve Deny Conditions:

GOODHUE COUNTY CONDITIONAL/INTERIM USE PERMIT APPLICATION

PROJECT SUMMARY

Please provide answers to the following questions in the spaces below. If additional space is needed, you may provide an attached document.

1. Description of purpose and planned scope of operations (including retail/wholesale activities).

This is to be a non-metallic mining operation. Sand and rock will be surfaced mined and then hauled off-site.

2. Planned use of existing buildings and proposed new structures associated with the proposal.

Existing structures are not part of this mining operation. A small parking lot, scale with shack, approved fuel storage, and a portable toilet will be added for the mining process, but removed during reclamation.

3. Proposed number of non-resident employees.

Five employees are proposed at this time, however the demands of the mine may increase this number.

4. Proposed hours of operation (time of day, days of the week, time of year) including special events not within the normal operating schedule.

The hours of operation are estimated to be from 6 a.m. to 10 p.m Monday to Saturday.

5. Planned maximum capacity/occupancy.

N/A. There is no building being erected for this mining operation.

6. Traffic generation and congestion, loading and unloading areas, and site access.

The site has existing haul roads and access to Highway 61 from 296th street. The additional traffic from the mining operation should not cause any additional traffic congestion.

7. Off-street parking provisions (number of spaces, location, and surface materials).

An aggregate parking lot with five spaces will be built. If the number of permanent employees rises the parking lot will be increased to meet the demand of additional employees. Parking shall meet county standards.

8. Proposed solid waste disposal provisions.

A dumpster or other county approved collection method will be used for disposing solid waste.

9. Proposed sanitary sewage disposal systems, potable water systems, and utility services.

Sanitary sewage will be collected and disposed of in portable toilets. No potable water system is planned.

All utilities needed are already installed on the property.



10. Existing and proposed exterior lighting.

There is no proposed exterior lighting planned. In the event mining operations take place during dark hours mobile lighting may be used.

11. Existing and proposed exterior signage.

No exterior signage is proposed at this time. If in the future a sign is proposed all county zoning standards will be followed.

12. Existing and proposed exterior storage.

Stockpiles of aggregates will be kept in the pits and screened from public view by the pits themselves and safety berms around the mining pits.

13. Proposed safety and security measures.

Chainlink fence, and signs shall be installed around the mining areas for safety and security.

14. Adequacy of accessibility for emergency services to the site.

Any emergency services needing access to this site can use Highway 61 and 296th street.

15. Potential for generation of noise, odor, or dust and proposed mitigation measures.

Best Management Practices (BMP) will be used to mitigate any nuisance that results from this mining operation.

16. Anticipated landscaping, grading, excavation, filling, and vegetation removal activities.

The overburden of the site will be stripped, stockpiled, and then respread during the reclamation process.

17. Existing and proposed surface-water drainage provisions.

All surface-water drainage shall be managed per MPCA standards, permits, and BMP's .

18. Description of food and liquor preparation, serving, and handling provisions.

There shall be no food or liquor prepared at this location.

19. Provide any other such information you feel is essential to the review of your proposal.

Please see attached existing conditions, proposed operations, and reclamation plan.



Planning Advisory Commission

Public Hearing
May 14, 2018

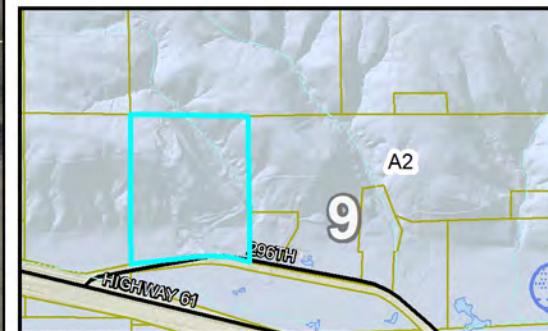
Doug Mahoney
32245 296th Street
Red Wing, MN 55066
A2 Zoned District

Parcel 32.009.1201
S 1/2 NW 1/4, N 1/2 SW 1/4,
Sect 09 Twp 112 Range 13
in Florence Township

Request for CUP for
Non-Metallic Mineral
Extraction Facility

Legend

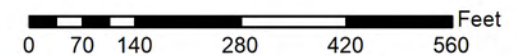
Intermittent Streams	Bluff Impact Zones (% slope) 20
Protected Streams	Bluff Impact Zones (% slope) 30
Lakes & Other Water Bodies	FEMA Flood Zones
Shoreland	2% Annual Chance
Historic Districts	A
Parcels	AE
Registered Feedlots	AO
Dwellings	X
Municipalities	



DATA DISCLAIMER: Goodhue County assumes NO liability for the accuracy or completeness of this map OR responsibility for any associated direct, indirect, or consequential damages that may result from its use or misuse. Goodhue County Copyright 2018.

2016 Aerial Imagery

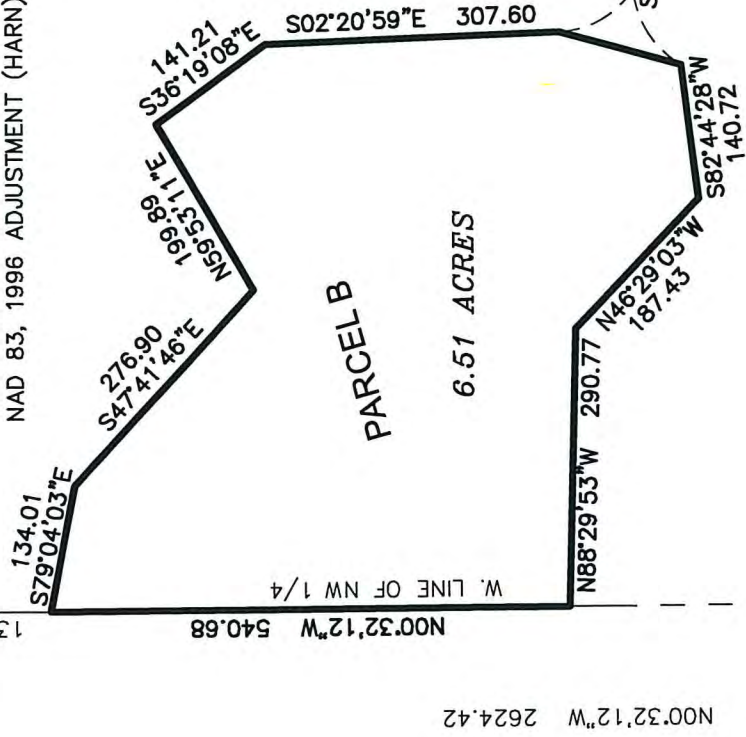
Map Created May, 2018, Ryan Bechel



NW COR. OF SEC. 9,
TWP. 112N, RGE. 13W.

BEARINGS SHOWN HEREON ARE ORIENTED TO
THE GOODHUE COUNTY COORDINATE SYSTEM,
NAD 83, 1996 ADJUSTMENT (HARN)

☉ DENOTES GOODHUE COUNTY SECTION CORNER.

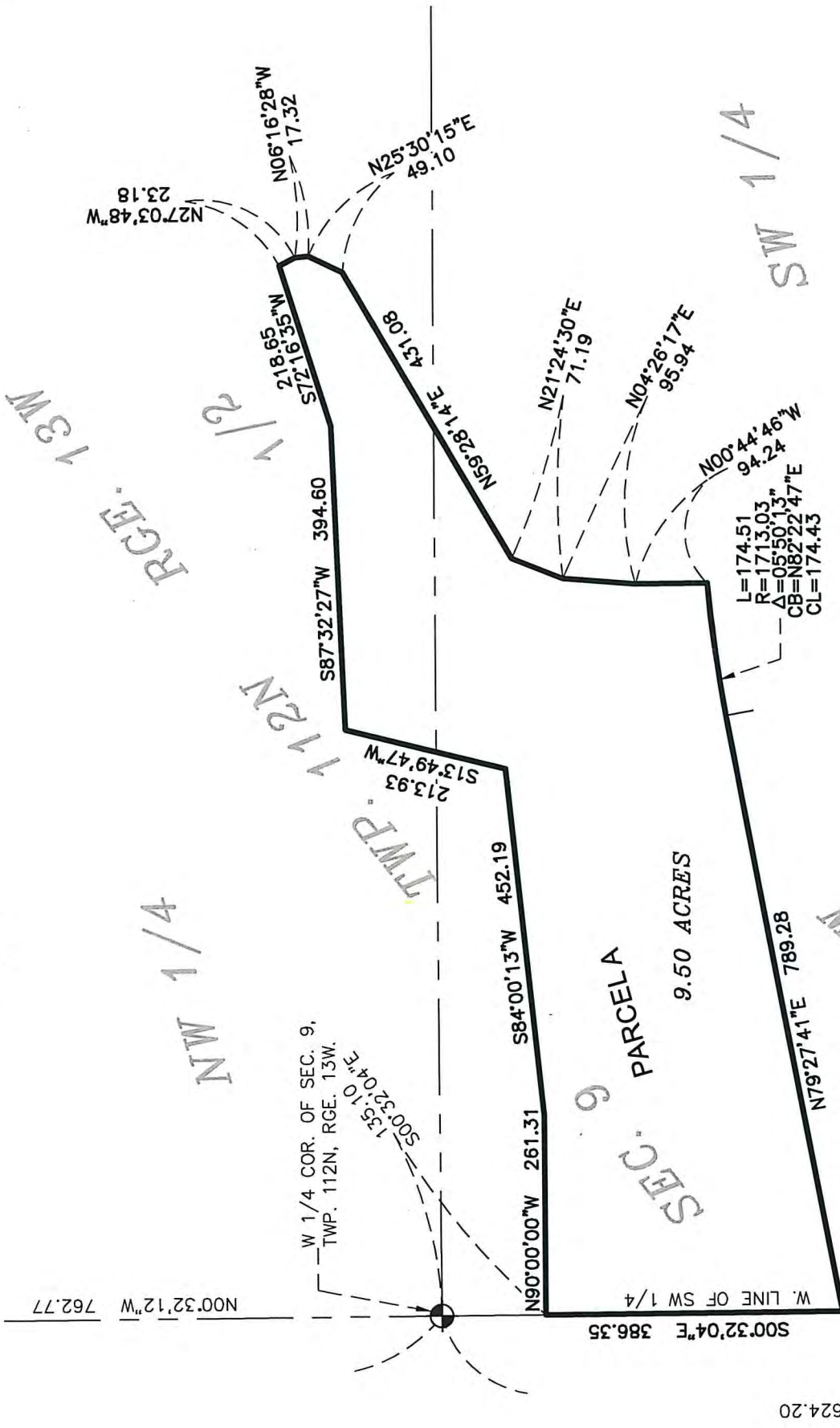


PARCEL B PROPOSED MINING AREA DESCRIPTION

That part of the Northwest Quarter of Section 9, Township 112 North, Range 13 West, Goodhue County, Minnesota, described as follows:

Commencing at the west quarter corner of said Section 9; thence on an assumed bearing of North 00 degrees 32 minutes 12 seconds West, along the west line of said Northwest Quarter, a distance of 762.77 feet to the point of beginning of the mining area to be described; thence continue North 00 degrees 32 minutes 12 seconds West, along said west line, a distance of 540.68 feet; thence South 79 degrees 04 minutes 03 seconds East, a distance of 134.01 feet; thence South 47 degrees 41 minutes 46 seconds East, a distance of 276.90 feet; thence North 59 degrees 53 minutes 11 seconds East, a distance of 199.89 feet; thence South 36 degrees 19 minutes 08 seconds East, a distance of 141.21 feet; thence South 02 degrees 08 seconds East, a distance of 199.89 feet; thence South 36 degrees 15 minutes 08 seconds East, a distance of 141.21 feet; thence South 02 degrees 08 minutes 59 seconds East, a distance of 307.60 feet; thence South 15 degrees 06 minutes 45 seconds West, a distance of 131.49 feet; thence North 46 degrees 29 minutes 03 seconds West, a distance of 187.43 feet; thence North 88 degrees 29 minutes 53 seconds West, a distance of 140.72 feet; thence North 88 degrees 29 minutes 53 seconds West, a distance of 187.43 feet; thence North 88 degrees 29 minutes 53 seconds West, a distance of 290.77 feet to the point of beginning.

Subject to all easements and restrictions of record.



PARCEL A PROPOSED MINING AREA DESCRIPTION

That part of the West Half of Section 9, Township 112 North, Range 13 West, Goodhue County, Minnesota, described as follows:

Commencing at the west quarter corner of said Section 9; thence on an assumed bearing of South 00 degrees 32 minutes 04 seconds East, along the west line of the Southwest Quarter of said Section 9, a distance of 135.10 feet to the point of beginning of the mining area to be described; thence continue South 00 degrees 32 minutes 04 minutes East, along said west line, a distance of 386.35 feet; thence North 79 degrees 41 seconds East, a distance of 789.28 feet; thence northeasterly, a distance of 174.51 feet, being a tangential curve concave to the southeast, having a radius of 1713.03 feet, and a central angle of 05 degrees 50 minutes 13 seconds; thence North 00 degrees 44 minutes 46 seconds West not tangent to the last described curve, a distance of 94.24 feet; thence North 04 degrees 26 minutes 17 seconds East, a distance of 95.94 feet; thence North 21 degrees 24 minutes 30 seconds East, a distance of 71.19 feet; thence North 25 degrees 15 minutes 15 seconds East, a distance of 49.10 feet; thence North 06 degrees 16 minutes 28 seconds West, a distance of 23.18 feet; thence South 72 degrees 13 minutes 49 minutes 48 seconds West, a distance of 394.60 feet; thence South 13 degrees 49 minutes 47 seconds West, a distance of 213.93 feet; thence South 84 degrees 00 minutes 13 seconds West, a distance of 452.19 feet; thence North 90 degrees 00 minutes 00 seconds West, a distance of 261.31 feet to the point of beginning.

Subject to all easements and restrictions of record.

SW COR. OF SEC. 9,
TWP. 112N, RGE. 13W.

S:\Share\STR\CERTS\112-13\9\MAHONEY 2016\MAHONEY PIT DESCRIPTION\112-13\MAHONEY PIT DESCRIPTION.dwg

CERTIFICATE OF DESCRIPTION FOR:

DOUG MAHONEY

**JOHNSON & SCOFIELD INC.
SURVEYING AND ENGINEERING**

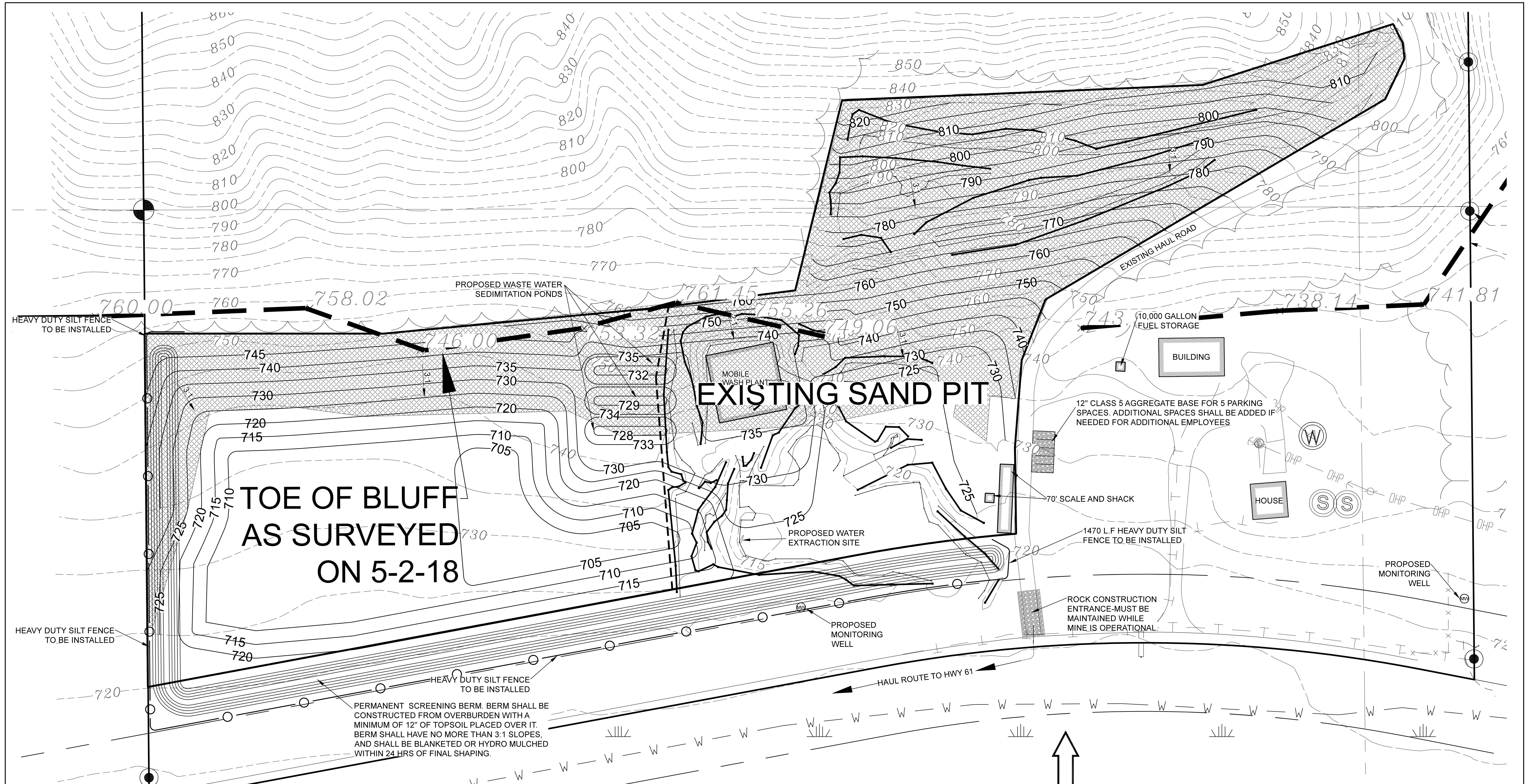
1203 MAIN STREET, RED WING, MN 55066
(651) 388-1558

I hereby certify that this survey, plan or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.

Marcus S. Johnson

Marcus S. Johnson
Minnesota License No. 47460
Date: April 26, 2018

BK. NA PG. NA W.O.# DRAWING NUMBER
SHEET 1 OF 1 SHEETS 18-334 S-7492



**TOE OF BLUFF
AS SURVEYED
ON 5-2-18**

EXISTING SAND PIT

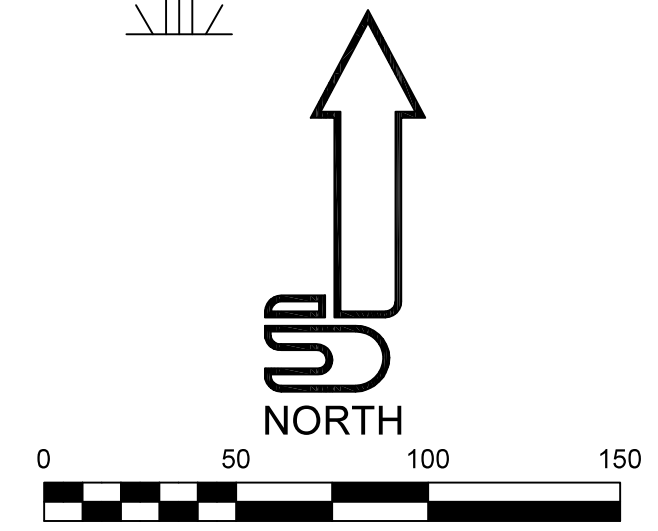
LEGEND

- These standard symbols will be found on this plan sheet.
- DENOTES SECTION LINE
 - DENOTES CENTERLINE OF ROAD
 - DENOTES PROPERTY LINE
 - DENOTES 60° BOUNDARY OFFSET LINE
 - DENOTES EXISTING ROAD RIGHT OF WAY LINE
 - DENOTES EASEMENT
 - DENOTES WETLAND BOUNDARY
 - DENOTES EXISTING TREE LINE
 - DENOTES EDGE OF GRASS AND CROP
 - DENOTES EXISTING PIT BOUNDARY
 - DENOTES EXISTING INDEX CONTOUR AND ELEVATION
 - DENOTES EXISTING OVERHEAD POWER LINE
 - DENOTES EXISTING UNDERGROUND TELEPHONE LINE
 - DENOTES EXISTING FENCE
 - ⊕ DENOTES SECTION CORNER
 - ⊙ DENOTES EXISTING IRON PIPE (BOUNDARY MARKER)
 - ⊙ DENOTES EXISTING ELECTRIC METER
 - ⊙ DENOTES EXISTING POWER POLE WITH GUY WIRE
 - ⊙ DENOTES WELL
 - ⊙ DENOTES SEPTIC SYSTEM
 - ⊙ DENOTES EXISTING WETLAND
 - ⊙ DENOTES PROPOSED INDEX CONTOUR AND ELEVATION LABEL
 - ⊙ DENOTES PROPOSED MONITORING WELL

QUANTITIES

AREA	TOPSOIL	OVERBURDEN	MINERAL EXTRACT
9.95 ACRES	10875	35220	196400

THE EXACT AMOUNT OF TOPSOIL AND OVERBURDEN IN THE EXISTING PIT IS UNKNOWN, AND MAY CAUSE THESE QUANTITIES TO VARY, HOWEVER THE TOTAL CUBIC YARDAGE OF MATERIAL TO BE MOVED SHOULD BE ACCURATE.



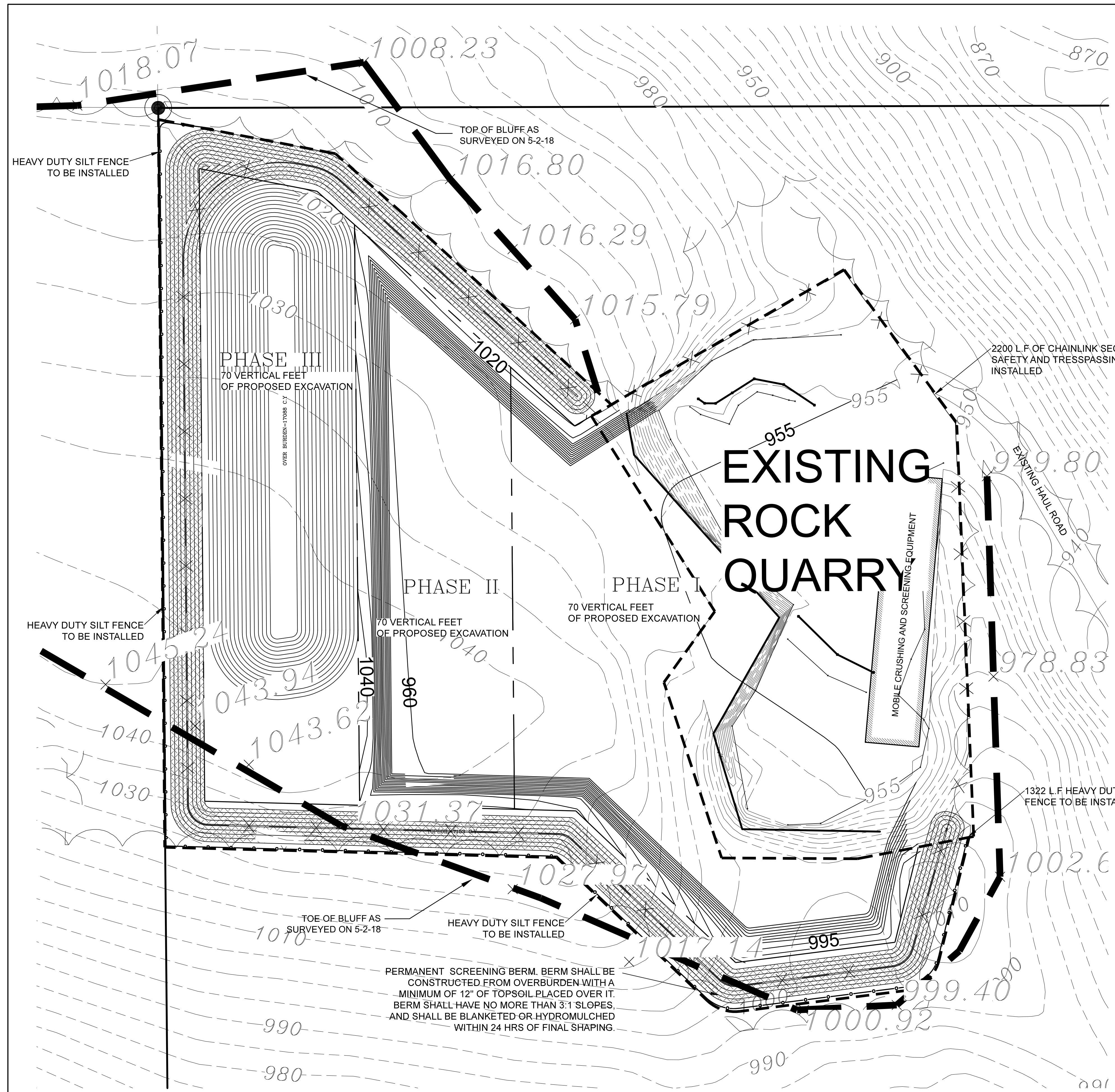
FILE PATH \\S:\Share\STR\CERTS\112-13\9\MAHONEY 2016\CIVIL DESIGN

JOHNSON & SCOFIELD INC.
Surveying & Engineering,
1203 Main Street Red Wing, MN 55066
ph. 651.388.1558 fax 651.388.1559

DESIGNED	BY	DATE	LATEST REVISION:
SPV			Prepared For:
SPD			DOUG MAHONEY
SPV			32245 296TH STREET
			RED WING, MN 55066
			PHONE: 651-380-3071

DOUG MAHONEY
FLORENCE TOWNSHIP, MINNESOTA

**MAP B.1 PROPOSED
OPERATIONS- SOUTH PIT**
SHEET 1 OF 3 SHEETS



LEGEND
These standard symbols will be found on this plan sheet.

- DENOTES SECTION LINE
- DENOTES PROPERTY LINE
- DENOTES EXISTING TREE LINE
- DENOTES EDGE OF GRASS AND CROP
- DENOTES EXISTING PIT BOUNDARY
- DENOTES EXISTING INDEX CONTOUR AND ELEVATION
- DENOTES PROPOSED QUARRY EXPANSION
- DENOTES PROPOSED CHAINLINK SECURITY FENCE
- DENOTES PROPOSED INDEX CONTOUR AND ELEVATION LABEL

QUANTITIES

PHASE	AREA	TOPSOIL CY	OVERBURDEN CY	MINERAL EXTRACT CY
I	1.19 ACRES	2870	9887	121190
II	1.0 ACRES	2428	8365	104963
III	1.21 ACRES	2927	10081	123568
TOTAL	3.40 ACRES	8225	28333	349721

SEDIMENT AND EROSION CONTROL

- CONTRACTOR SHALL INSTALL PERIMETER SILT FENCE BEFORE START OF ANY CONSTRUCTION ACTIVITY. TO PREVENT SEDIMENT RUNOFF FROM REACHING THE CURB OR STREET RIGHT OF WAY, PERIMETER DOWN-SLOPE SILT FENCE SHALL BE INSTALLED ACROSS ALL PRIVATE LOTS. WHILE STILL VULNERABLE DUE TO EXPOSED SOIL, ROCK CHECK DAMS WILL BE PLACED EVERY 25 FEET ALONG THE CENTERLINE OF EACH DRAINAGE SWALE ON GRADES EXCEEDING 4% TO REDUCE FLOW VELOCITIES THAT CAUSE EROSION. SEE DETAIL SHEET.
- TO PREVENT TRACKING OF DIRT ONTO HARD SURFACE STREET RIGHT-OF-WAY, ROCK CONSTRUCTION ENTRANCES SHALL BE INSTALLED AND MAINTAINED UNTIL VEHICLE ENTRANCES ONTO THE SITE ARE NO LONGER REQUIRED AND TOPSOIL IS SCHEDULED TO BE REPLACED. ALL VEHICLE ACCESS TO THIS SITE SHALL USE THE ROCK CONSTRUCTION ENTRANCES. SHOULD THE ROCK CONSTRUCTION ENTRANCES BECOME INEFFECTIVE DUE TO EXCESSIVE SOIL CONTAMINATION, THEY SHALL BE REMOVED AND REPLACED. SEE DETAIL SHEET.
- SUFFICIENT TOPSOIL IS TO BE SALVAGED TO PROVIDE COVER AFTER GRADING OPERATIONS. ALL SOIL STOCKPILES AND FINISHED GRADED AREAS ARE TO BE SEEDED IMMEDIATELY IN ORDER TO ESTABLISH VEGETATION WITH WHEAT OR RYE GRASS @ 100 LB./ACRE.
- DURING CONSTRUCTION INSTALL AND MAINTAIN APPROVED INLET PROTECTION AT ALL ACTIVE STORM SEWER INLETS. SEE DETAILS SHEET. SEDIMENT RUNOFF SHOULD BE MINIMIZED BY RESPONSIBLE SITE EROSION CONTROL. EROSION CONTROL MEASURES MUST BE INSPECTED BY THE CITY BEFORE ANY GRADING ACTIVITY BEGINS. TO PREVENT SILT AND SEDIMENT FROM ENTERING THE STORM SEWER SYSTEM, A FILTER BAG INSERT, SEDIMENT CONTROL INLET HAT, ROCK LOG RING OR OTHER DEVICE APPROVED BY THE CITY, SHALL BE INSTALLED AT THE INLET.
- ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE STABILIZED AS SOON AS POSSIBLE. AREAS THAT HAVE BEEN DISTURBED OR AT FINISH GRADE, BUT HAVE NO ACTIVE WORK, SHALL BE SEEDED AND MULCHED OR SODDED WITHIN 14 DAYS, EXCEPT ON SLOPES STEEPER THAN 4H:1V. STEEPER SLOPES SHALL BE SEEDED AND COVERED WITH AN EROSION CONTROL BLANKET OR SEEDED AND MULCHED WITH A TACKIFYING AGENT OR SODDED. AS SOON AS POSSIBLE AFTER GRADING OPERATIONS HAVE BEEN COMPLETED, TOPSOIL SHALL BE SPREAD AND THE ENTIRE SITE SHALL BE VEGETATED. FINAL SITE STABILIZATION SHALL BE EVIDENT WHEN SEEDED GRASS IS PRESENT ON ALL EXPOSED GRADING AREAS AND HAS GROWN TO A LENGTH OF 8 INCHES AND THERE ARE NO SIGNS OF ONGOING EROSION. IF SOD IS PLACED IN-LIEU OF SEED, IT SHALL BE WATERED AND MAINTAINED AND SHOW NO SIGNS OF STRESS FOR AT LEAST 30 DAYS. THE CITY SHALL APPROVE FINAL SITE STABILIZATION.
- A CONCRETE WASHOUT AREA IS REQUIRED FOR ALL CONCRETE CONSTRUCTION. THE WASHOUT SYSTEM CAN BE A PORTABLE UNIT PROVIDED BY THE CONCRETE SUPPLIER OR AN IN-GROUND SYSTEM CONSTRUCTED BY THE CONTRACTOR. ONE ACCEPTABLE METHOD OF CREATING AN IN-GROUND WASHOUT PIT WOULD BE TO EXCAVATE A 3 FOOT DEEP AREA (MIN. 3' WIDTH X VARIABLE LENGTH AS NEEDED), LINED WITH 10 MIL PLASTIC AND PERIMETER ANCHORED WITH SAND BAGS OR AGGREGATE. IF THE LINING BECOMES DAMAGED (PUNCTURED OR RIPPED), THE WASHOUT SHALL NOT BE USED UNTIL THE LINING IS REPAIRED. CONCRETE POURS SHALL NOT BE CONDUCTED DURING OR BEFORE AN ANTICIPATED STORM EVENT. CONCRETE WASTES SHALL BE ALLOWED TO HARDEN, BROKEN UP, THEN DISPOSED OF ACCORDING TO LOCAL ORDINANCE. THIS WASHOUT PIT SHALL BE LOCATED AWAY FROM ALL STEEP SLOPES AND DRAINAGE INLETS.
- A NPDES STORM WATER PERMIT FOR CONSTRUCTION IS REQUIRED FOR THIS PROJECT. THE PROJECT OWNER AND/OR CONTRACTOR WILL NEED TO APPLY FOR THE PERMIT THROUGH THE MPCA.

PERMANENT SCREENING BERM. BERM SHALL BE CONSTRUCTED FROM OVERBURDEN WITH A MINIMUM OF 12" OF TOPSOIL PLACED OVER IT. BERM SHALL HAVE NO MORE THAN 3:1 SLOPES, AND SHALL BE BLANKETED OR HYDROMULCHED WITHIN 24 HRS OF FINAL SHAPING.

NORTH PIT ENLARGMENT

JOHNSON & SCOFIELD INC.
Surveying & Engineering,
1203 Main Street Red Wing, MN 55066
ph. 651.388.1558 fax 651.388.1559

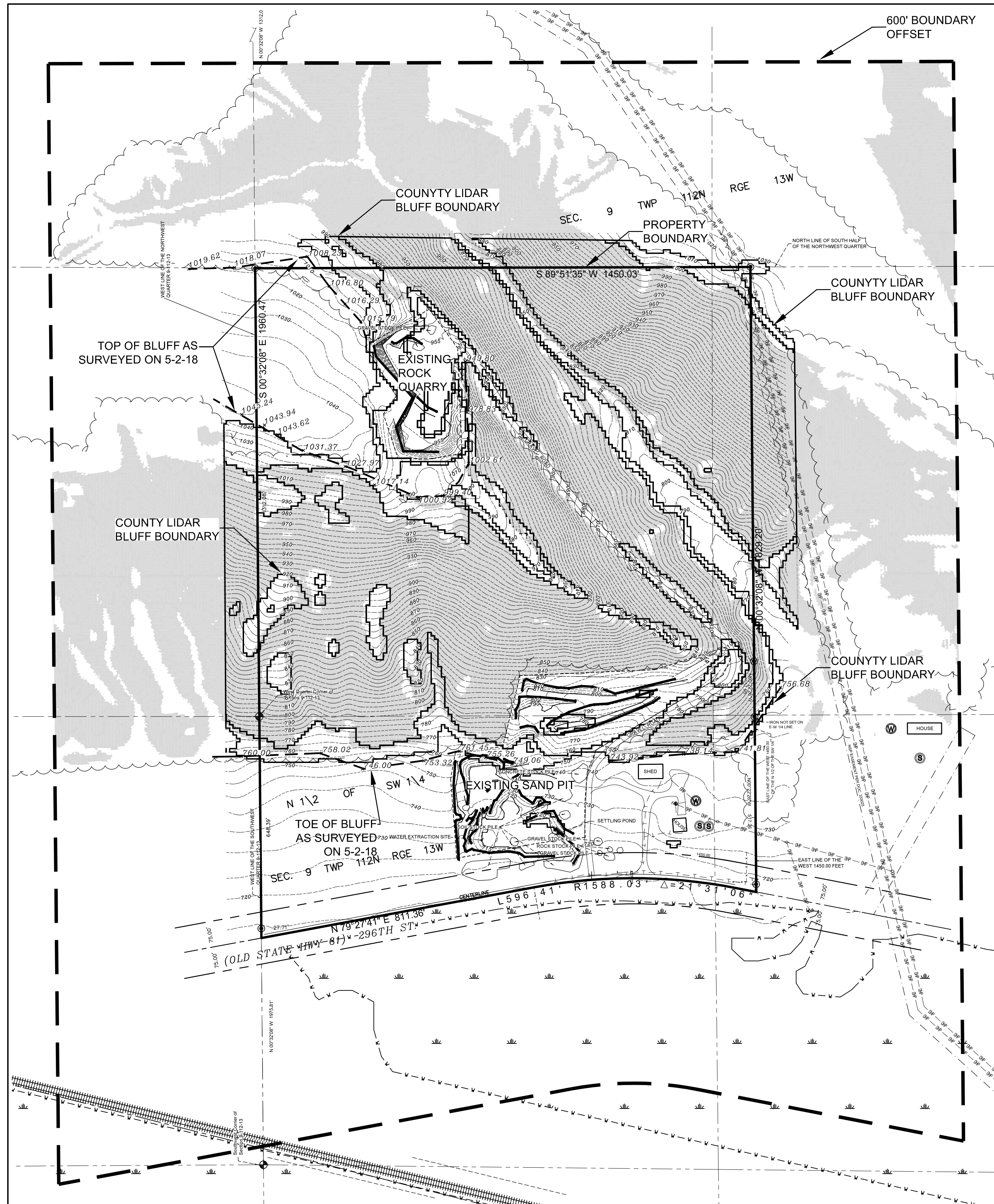
DESIGNED	REVISOR	BY	DATE	LATEST REVISION:
SPV				Prepared For:
SPD				DOUG MAHONEY
SPV				32245 296TH STREET
				RED WING, MN 55066
				PHONE: 651-380-3071

DOUG MAHONEY
FLORENCE TOWNSHIP, MINNESOTA

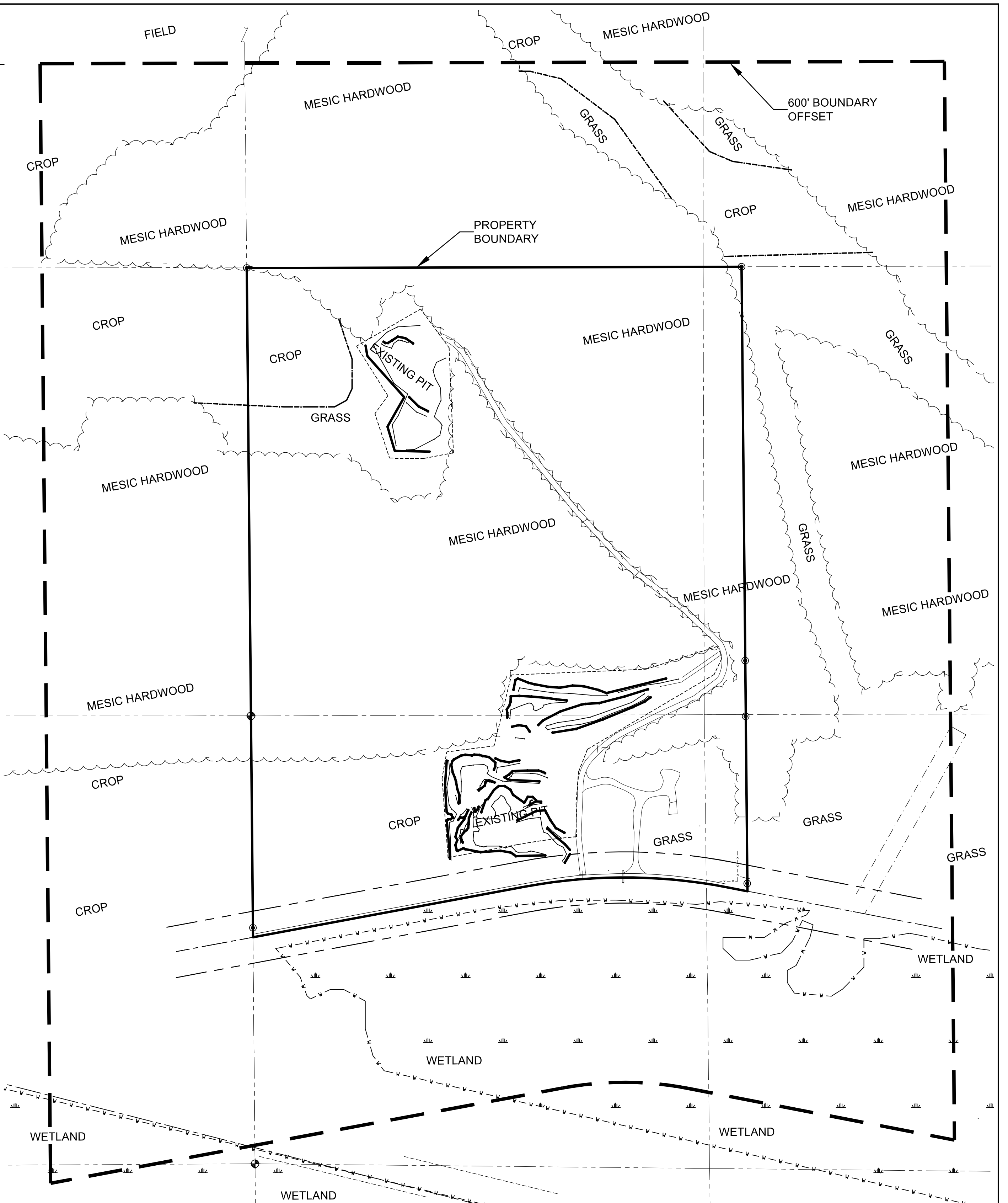
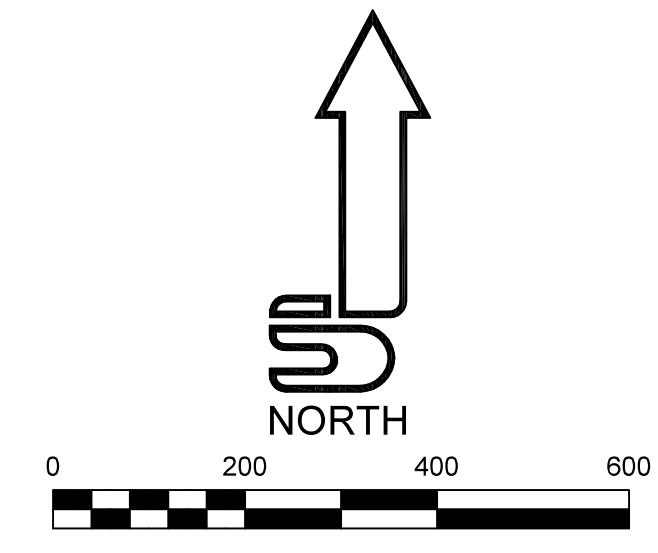
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MAP B.2 PROPOSED OPERATIONS— NORTH PIT

SHEET 2 OF 3 SHEETS



- ### LEGEND
- These standard symbols will be found on this plan sheet.
- DENOTES SECTION LINE
 - DENOTES CENTERLINE OF ROAD
 - DENOTES PROPERTY LINE
 - - - - DENOTES 600' BOUNDARY OFFSET LINE
 - - - - DENOTES EXISTING ROAD RIGHT OF WAY LINE
 - - - - DENOTES EASEMENT
 - - - - DENOTES WETLAND BOUNDARY
 - - - - DENOTES EXISTING TREE LINE
 - - - - DENOTES EDGE OF GRASS AND CROP
 - - - - DENOTES EXISTING PIT BOUNDARY
 - - - - DENOTES EXISTING 2' LIDAR CONTOUR
 - - - - DENOTES EXISTING INDEX CONTOUR AND ELEVATION
 - - - - DENOTES EXISTING 1' CONTOUR
 - - - - DENOTES EXISTING OVERHEAD POWER LINE
 - - - - DENOTES EXISTING UNDERGROUND TELEPHONE LINE
 - - - - DENOTES EXISTING FENCE
 - - - - DENOTES EXISTING RAILROAD TRACKS
 - ⊕ DENOTES SECTION CORNER
 - ⊙ DENOTES EXISTING IRON PIPE (BOUNDARY MARKER)
 - ⊙ DENOTES EXISTING ELECTRIC METER
 - ⊙ DENOTES EXISTING POWER POLE WITH GUY WIRE
 - ⊙ DENOTES WELL
 - ⊙ DENOTES SEPTIC SYSTEM
 - DENOTES HOUSE OR SHED
 - DENOTES EXISTING WETLAND
 - DENOTES BLUFF ZONE
 - - - - DENOTES EDGE OF FIELD SURVEYED BLUFF
 - - - - DENOTES EDGE OF BLUFF FROM COUNTY GIS



LEGAL DESCRIPTION OF RECORD FOR CONTIGUOUS PROPERTY

The Southeast Quarter of the Northeast Quarter of Section 8, Township 112 North, Range 13 West, Goodhue County, Minnesota.

And

The Northeast Quarter of the Southeast Quarter of Section 8, Township 112 North, Range 13 West, Goodhue County, Minnesota.

EXCEPT the right of way of the Chicago, Milwaukee, St. Paul and Pacific Railroad, and also

EXCEPT that part described as follows: Beginning at the intersection of the east line of the Southeast Quarter of Section 8 with the centerline of the concrete paved Township Road (Old State Highway Number 61); thence southwesterly on a straight line along the centerline of said concrete paved Township Road, and its southwesterly extension, a distance of 600.00 feet; thence south, parallel with the east line of said Southeast Quarter of Section 8, a distance of 260 feet, more or less, to the northeasterly right of way line of the Chicago, Milwaukee, St. Paul and Pacific Railroad; thence southeasterly, along said northeasterly railroad right of way line, a distance of 610 feet, more or less, to the east line of said Southeast Quarter of Section 8; thence north along said east line, a distance of 510 feet, more or less, to the point of beginning. All that part of the SE 1/4 of the NW 1/4, the NE 1/4 of the SW 1/4, and the NW 1/4 of the SE 1/4, all in Section 8, Township 112, Range 13, in Goodhue County, Minn., lying N1/2 of U.S. Highway No. 61, excepting therefrom the following tract of land: From the SW corner of the SE 1/4 of the NW 1/4 of Sec. 8, T. 112 N., R. 13 W., go N 126 1/2 feet to the center of U.S. Highway 61, as now located for point of beginning of land herein described; thence N along the VY line of the SE 1/4 of the NW 1/4 of said Sec. 8, a distance of 387 feet to an iron monument; thence Ely parallel with said U.S. Highway 61, a distance of 200 feet to a point distant 16 feet Ely of an iron monument; thence SW to a point in the center of said Highway 61 distant 150 feet Ely of point of beginning; thence Wly along the center line of said U.S. Highway 61, 150 feet to point of beginning.

The north half (N 1/2) of the Northwest Quarter (NW 1/4) of Section 8, the northwest Quarter (NW 1/4) of the northeast quarter (NE 1/4) of Section 8, and the southwest quarter (SW 1/4) of Section 5, all being in Township 112 north, of range 13 west of the 4th principal meridian in the County of Goodhue and State of Minnesota foresaid.

LEGAL DESCRIPTION FOR WHICH THE FACILITY IS LOCATED

The West 1450.00 feet of the South Half of the Northwest Quarter of Section 9, Township 112 North, Range 13 West, Goodhue County, Minnesota.

And

That part of the West 1450.00 feet of the North Half of the Southwest Quarter of Section 9, Township 112 North, Range 13 West, Goodhue County, Minnesota, which lies northerly of the centerline of the concrete paved Township Road (Old State Highway Number 61).

LOT AREA=61.51 ACRES

GENERAL NOTES:

- SEE ATTACHED WELL MAP (SHEET 5) FOR WELL INFORMATION.
- GEOLOGICAL INFORMATION COMES FROM THE USGS AND THE MINNESOTA GEOLOGICAL SURVEY.
- CONTOUR DATA OUT SIDE OF THE PIT BOUNDARIES COMES FROM THE GOODHUE COUNTY OFFICE OF GIS.
- WETLAND DATA COMES FROM THE NWI AND THE USGS
- HYDROLOGICAL INFORMATION COMES FROM THE USGS, MN DNR, AND THE MINNESOTA GEOLOGICAL SURVEY.

THREATENED AND ENDANGERED SPECIES

- SEE APPENDIX "L" FOR THE MN DNR VEGETATION LETTER DATED FEBRUARY 8, 2017.
- NONE OF THE FOUR LISTED THREATENED AND ENDANGERED SPECIES IN GOODHUE COUNTY ARE FOUND ON OR WITHIN ONE QUARTER MILE OF THE SITE. SOURCES: NHIS, MNDNR/USFWS

HISTORICAL, CULTURAL, AND ARCHAEOLOGICAL FEATURES

- THERE ARE NO REGISTERED HISTORICAL, CULTURAL, OR ARCHAEOLOGICAL FEATURES FOUND AT THIS SITE. SOURCES: MN STATE HISTORIC PRESERVATION OFFICE (MN NRHP).
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JOHNSON & SCOFIELD INC.
 Surveying & Engineering,

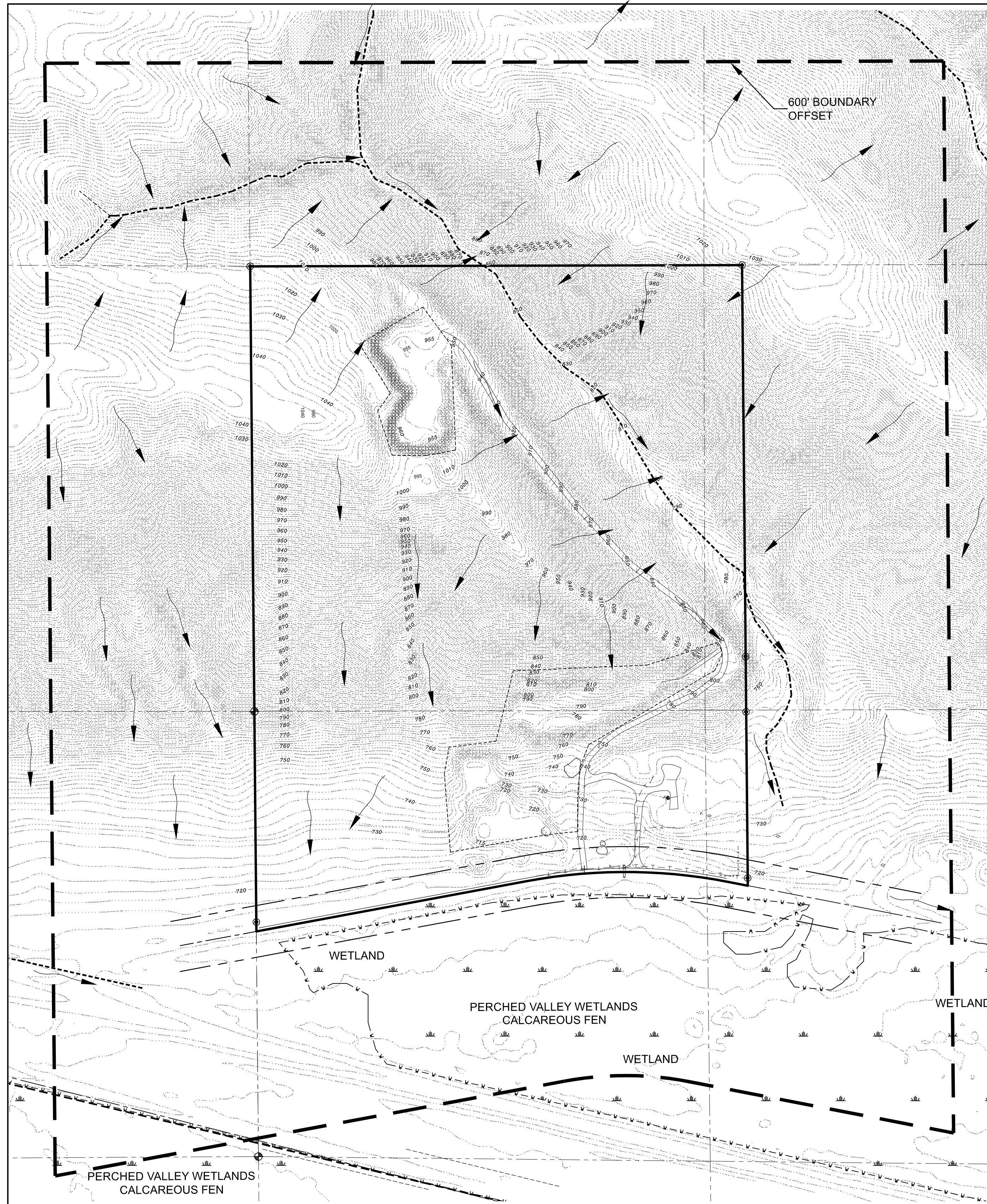
1203 Main Street Red Wing, MN 55066
 ph. 651.388.1558 fax 651.388.1559

	REVISED	BY	DATE	LATEST REVISION:
DESIGNED	SPV			Prepared For:
DRAWN	SPD			DOUG MAHONEY
CHECKED	SPV			32245 296TH STREET
				RED WING, MN 55066
				PHONE: 651-380-3071

DOUG MAHONEY
 FLORENCE TOWNSHIP, MINNESOTA

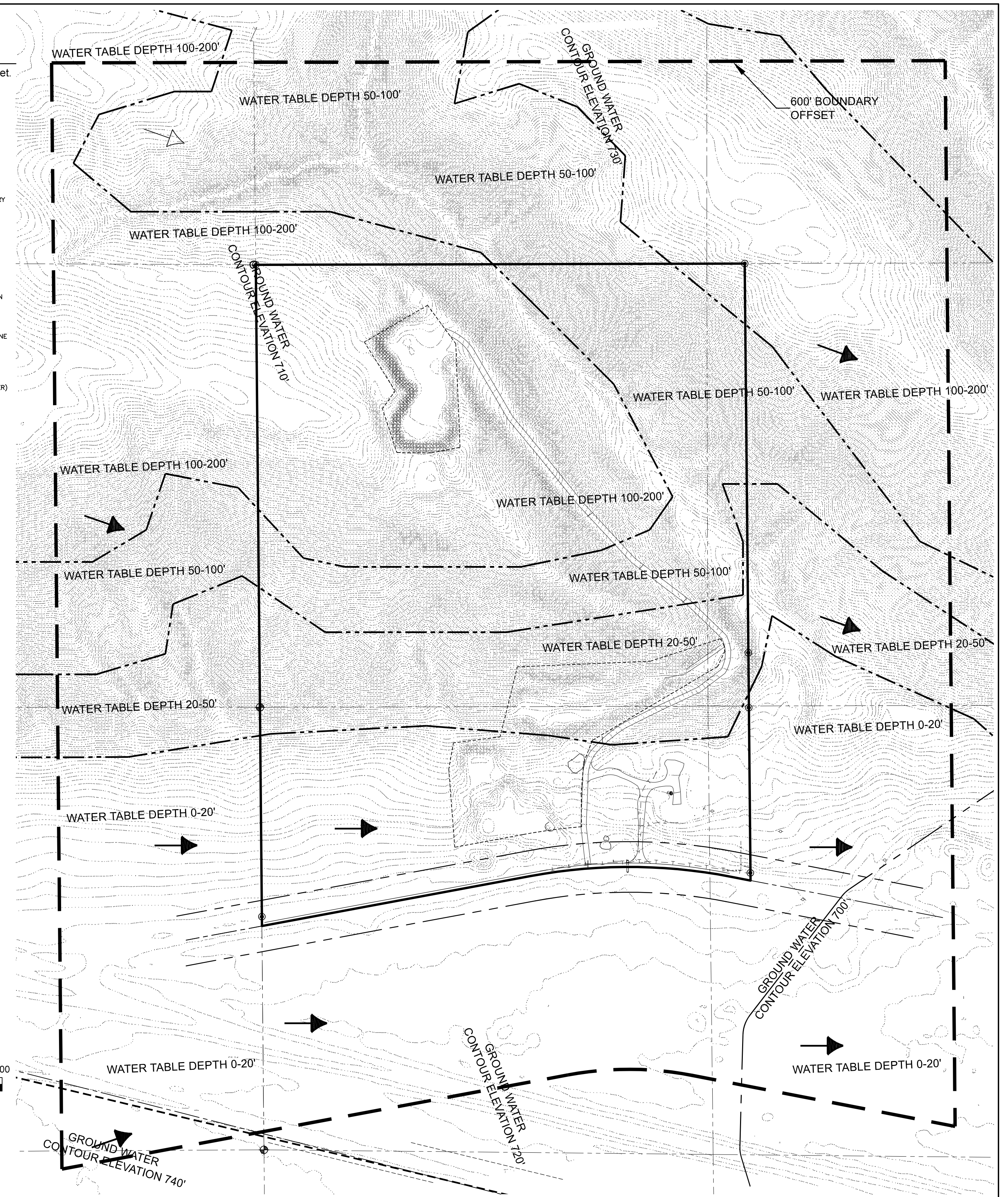
MAP A.1
EXISTING SITE CONDITIONS

SHEET 1 OF 4 SHEETS

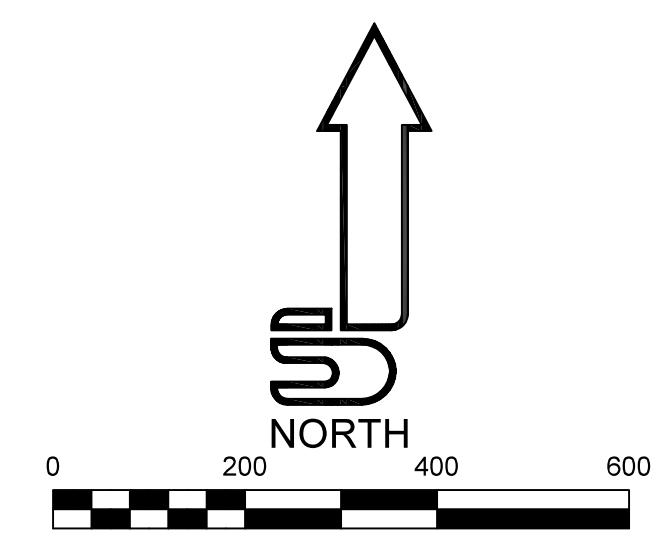


SURFACE HYDROLOGY

- LEGEND**
 These standard symbols will be found on this plan sheet.
- DENOTES SECTION LINE
 - DENOTES CENTERLINE OF ROAD
 - DENOTES PROPERTY LINE
 - DENOTES 600' BOUNDARY OFFSET LINE
 - DENOTES EXISTING ROAD RIGHT OF WAY LINE
 - DENOTES EASEMENT
 - DENOTES WETLAND BOUNDARY
 - DENOTES EXISTING PIT BOUNDARY
 - DENOTES BEDROCK UNIT BOUNDARY
 - DENOTES QUATERNARY SEDIMENT UNIT BOUNDARY
 - DENOTES SOIL UNIT BOUNDARY
 - DENOTES WATER TABLE CONTOUR
 - DENOTES GROUND WATER DEPTH BOUNDARY
 - DENOTES SURFACE FLOW DIRECTION
 - DENOTES EXISTING SURFACE FLOW PATH
 - DENOTES AQUIFER FLOW DIRECTION
 - 925 DENOTES EXISTING GEX CONTOUR AND ELEVATION
 - DENOTES EXISTING 1' CONTOUR
 - DENOTES EXISTING OVERHEAD POWER LINE
 - DENOTES EXISTING UNDERGROUND TELEPHONE LINE
 - DENOTES EXISTING FENCE
 - DENOTES EXISTING RAILROAD TRACKS
 - ⊕ DENOTES SECTION CORNER
 - ⊙ DENOTES EXISTING IRON PIPE (BOUNDARY MARKER)
 - ⊙ DENOTES EXISTING ELECTRIC METER
 - ⊙ DENOTES EXISTING POWER POLE WITH GUY WIRE
 - ⊙ DENOTES WELL
 - ⊙ DENOTES SEPTIC SYSTEM
 - DENOTES HOUSE OR SHED
 - DENOTES EXISTING WETLAND



GROUND WATER



GENERAL NOTES:

- SEE ATTACHED WELL MAP (SHEET 5) FOR WELL INFORMATION.
- GEOLOGICAL INFORMATION COMES FROM THE USGS AND THE MINNESOTA GEOLOGICAL SURVEY.
- CONTOUR DATA OUT SIDE OF THE PIT BOUNDARIES COMES FROM THE GOODHUE COUNTY OFFICE OF GIS.
- WETLAND DATA COMES FROM THE NWI AND THE USGS
- HYDROLOGICAL INFORMATION COMES FROM THE USGS, MN DNR, AND THE MINNESOTA GEOLOGICAL SURVEY.

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JOHNSON & SCOFIELD INC.
 Surveying & Engineering,

1203 Main Street Red Wing, MN 55066
 ph. 651.388.1558 fax 651.388.1559

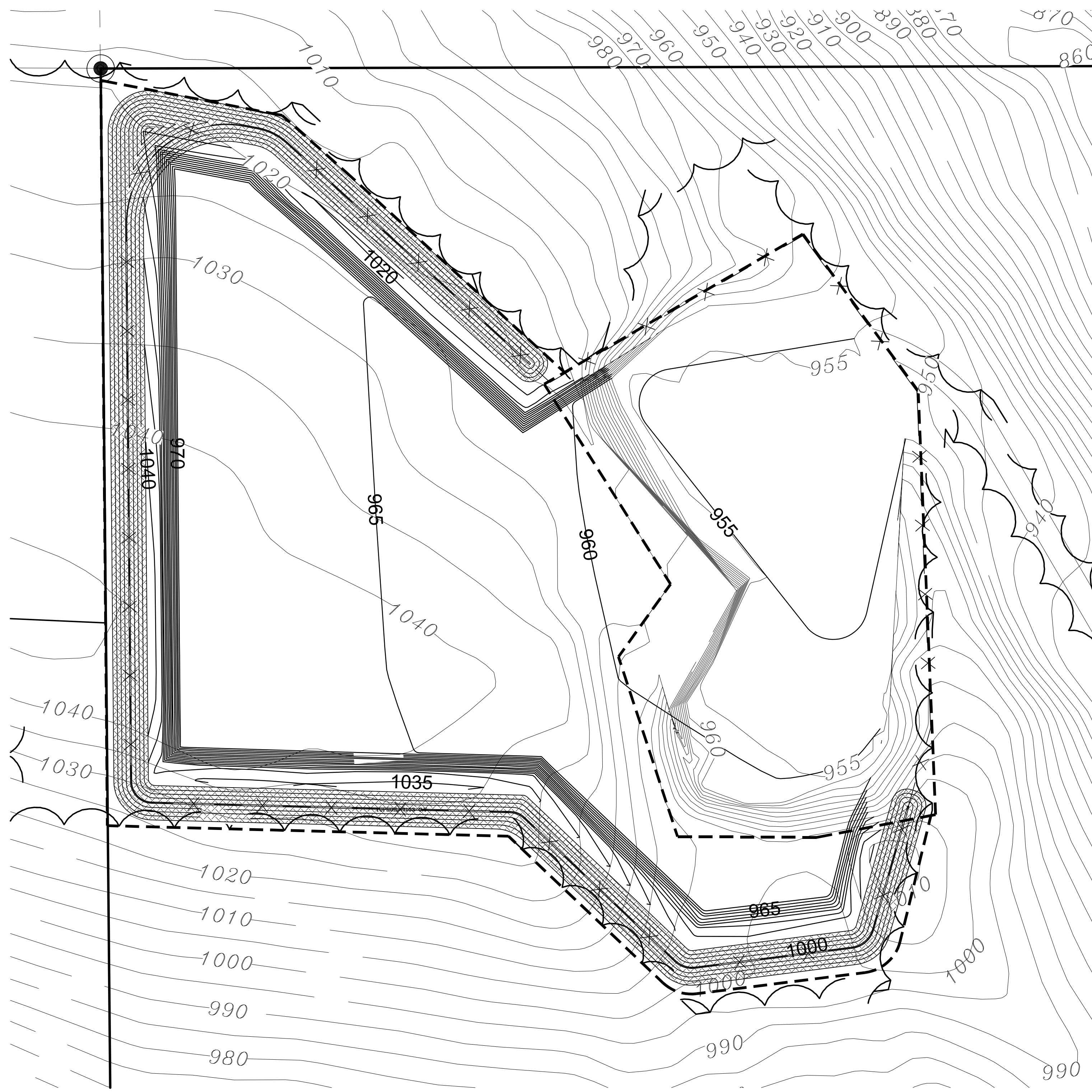
DESIGNED SPV
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 CHECKED SPV

REVISED	BY	DATE	LATEST REVISION:
ADD SHEET 11 SIGN DETAIL	SPD	4/26/18	Prepared For:
			DOUG MAHONEY
			32245 296TH STREET
			RED WING, MN 55066
			PHONE: 651-380-3071

DOUG MAHONEY
 FLORENCE TOWNSHIP, MINNESOTA

MAP A.3
HYDROLOGY

SHEET 3 OF 4 SHEETS



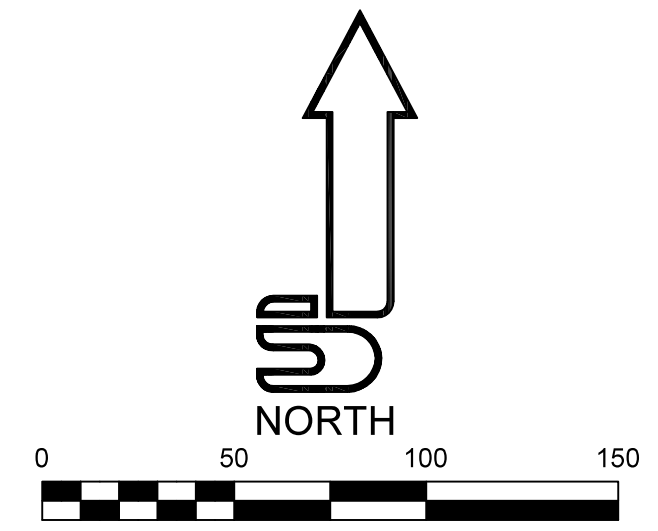
- SEDIMENT AND EROSION CONTROL**
- CONTRACTOR SHALL INSTALL PERIMETER SILT FENCE BEFORE START OF ANY CONSTRUCTION ACTIVITY. TO PREVENT SEDIMENT RUNOFF FROM REACHING THE CURB OR STREET RIGHT OF WAY, PERIMETER DIVERSION SILT FENCE SHALL BE INSTALLED ACROSS ALL PRIVATE LOTS. WHILE STILL VULNERABLE DUE TO EXPOSED SOIL, ROCK CHECK DAMS WILL BE PLACED EVERY 25 FEET ALONG THE CENTERLINE OF EACH DRAINAGE SWALE ON GRADES EXCEEDING 4% TO REDUCE FLOW VELOCITIES THAT CAUSE EROSION. SEE DETAIL SHEET.
 - TO PREVENT TRACKING OF DIRT ONTO HARD SURFACE STREET RIGHT OF WAY, ROCK CONSTRUCTION ENTRANCES SHALL BE INSTALLED AND MAINTAINED UNTIL VEHICLE ENTRANCES ONTO THE SITE ARE NO LONGER REQUIRED AND TOPSOIL IS SCHEDULED TO BE REPLACED. ALL VEHICLE ACCESS TO THE SITE SHALL USE THE ROCK CONSTRUCTION ENTRANCES. SHOULD THE ROCK CONSTRUCTION ENTRANCES BECOME INEFFECTIVE DUE TO EXCESSIVE SOIL CONTAMINATION, THEY SHALL BE REMOVED AND REPLACED. SEE DETAIL SHEET.
 - SUFFICIENT TOPSOIL IS TO BE SALVAGED TO PROVIDE COVER AFTER GRADING OPERATIONS. ALL SOIL STOCKPILES AND FINISHED GRADED AREAS ARE TO BE SEEDS IMMEDIATELY IN ORDER TO ESTABLISH VEGETATION WITH WHEAT OR RYE GRASS @ 100 LB/ACRE.
 - DURING CONSTRUCTION INSTALL AND MAINTAIN APPROVED INLET PROTECTION AT ALL ACTIVE STORM SEWER INLETS. SEE DETAILS SHEET. SEDIMENT RUNOFF SHOULD BE MINIMIZED BY RESPONSIBLE SITE EROSION CONTROL. EROSION CONTROL MEASURES MUST BE INSPECTED BY THE CITY BEFORE ANY GRADING ACTIVITY BEGINS TO PREVENT SILT AND SEDIMENT FROM ENTERING THE STORM SEWER SYSTEM. A FILTER BAG INSERT, SEDIMENT CONTROL INLET HAT, ROCK LOG RING OR OTHER DEVICE APPROVED BY THE CITY, SHALL BE INSTALLED AT THE INLET.
 - ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE STABILIZED AS SOON AS POSSIBLE. AREAS THAT HAVE BEEN DISTURBED OR AT FINISH GRADE, BUT HAVE NO ACTIVE WORK, SHALL BE SEEDS AND MULCHED OR SOOED WITHIN 14 DAYS EXCEPT ON SLOPES STEEPER THAN 4H:1V. STEEPER SLOPES SHALL BE SEEDS AND COVERED WITH AN EROSION CONTROL BLANKET OR SEEDS AND MULCHED WITHIN 14 DAYS EXCEPT ON SLOPES STEEPER THAN 4H:1V. THE ENTIRE SITE SHALL BE VEGETATED. FINAL SITE STABILIZATION SHALL BE EVIDENT WHEN SEEDS OR SOO IS PLACED IN ALL EXPOSED OR ASHED AREAS AND HAS GROWN TO A LENGTH OF 6 INCHES AND THERE ARE NO SIGNS OF DRAINAGE EROSION. IF SOO IS PLACED IN ALL EXPOSED AREAS, IT SHALL BE WATERED AND MAINTAINED AND SHOW NO SIGNS OF STRESS FOR AT LEAST 30 DAYS. THE CITY SHALL APPROVE FINAL SITE STABILIZATION.
 - A CONCRETE WASHOUT AREA IS REQUIRED FOR ALL CONCRETE CONSTRUCTION. THE WASHOUT SYSTEM CAN BE A PORTABLE UNIT PROVIDED BY THE CONCRETE SUPPLIER OR AN IN-GROUND SYSTEM CONSTRUCTED BY THE CONTRACTOR. ONE ACCEPTABLE METHOD OF CREATING AN IN-GROUND WASHOUT PIT WOULD BE TO EXCAVATE A 3 FOOT DEEP AREA (MIN. 7' WITH A VARIABLE LENGTH) NEEDED, LINED WITH 15 MIL PLASTIC AND PERIMETER ANCHORED WITH SAND BAGS OR CAGGREGATE. IF THE LINER BECOMES DAMAGED (PUNCTURED OR PERFORATED), THE WASHOUT SHALL NOT BE USED UNTIL THE LINER IS REPAIRED. CONCRETE POURS SHALL NOT BE CONDUCTED DURING OR BEFORE AN ANTICIPATED STORM EVENT. CONCRETE SWATES SHALL BE ALLOWED TO HARDEN, BROKE UP, THEN DISPOSED OF ACCORDING TO LOCAL ORDINANCE. THIS WASHOUT PIT SHALL BE LOCATED AWAY FROM ALL STEEP SLOPES AND DRAINAGE INLETS.
 - A NPDES STORM WATER PERMIT FOR CONSTRUCTION IS REQUIRED FOR THIS PROJECT. THE PROJECT OWNER AND/OR CONTRACTOR WILL NEED TO APPLY FOR THE PERMIT THROUGH THE MPCA.

LEGEND

These standard symbols will be found on this plan sheet.

	DENOTES SECTION LINE
	DENOTES PROPERTY LINE
	DENOTES EXISTING TREE LINE
	DENOTES EDGE OF GRASS AND CROP
	DENOTES EXISTING PIT BOUNDARY
	DENOTES EXISTING INDEX CONTOUR AND ELEVATION
	DENOTES PROPOSED QUARRY EXPANSION
	DENOTES PROPOSED CHAINLINK SECURITY FENCE
	DENOTES PROPOSED INDEX CONTOUR AND ELEVATION LABEL
	DENOTES PROPOSED CATEGORY 3 EROSION CONTROL BLANKET

ALL DISTURBED AREAS SHALL BE SEEDS AND MULCHED. FOR SEED SPECIFICATIONS REFER TO DOUG MAHONEY MINING RECLAMATION PLAN SHEET 20 APPENDIX "J" TEMPORARY AND PERMANENT SEED MIXTURES.



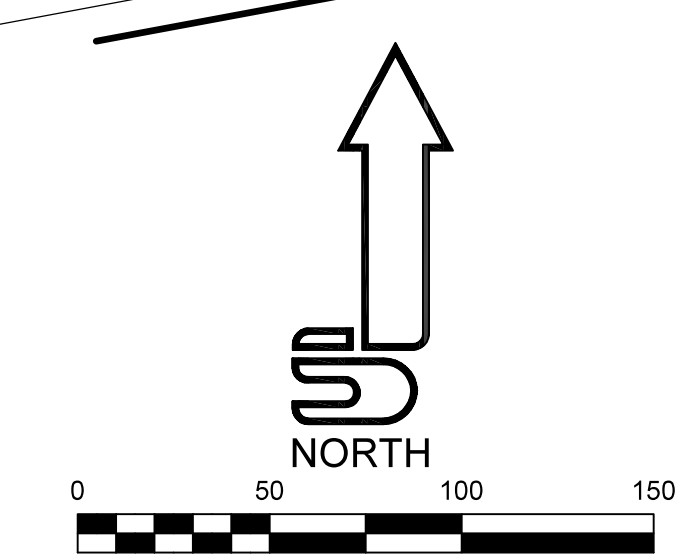
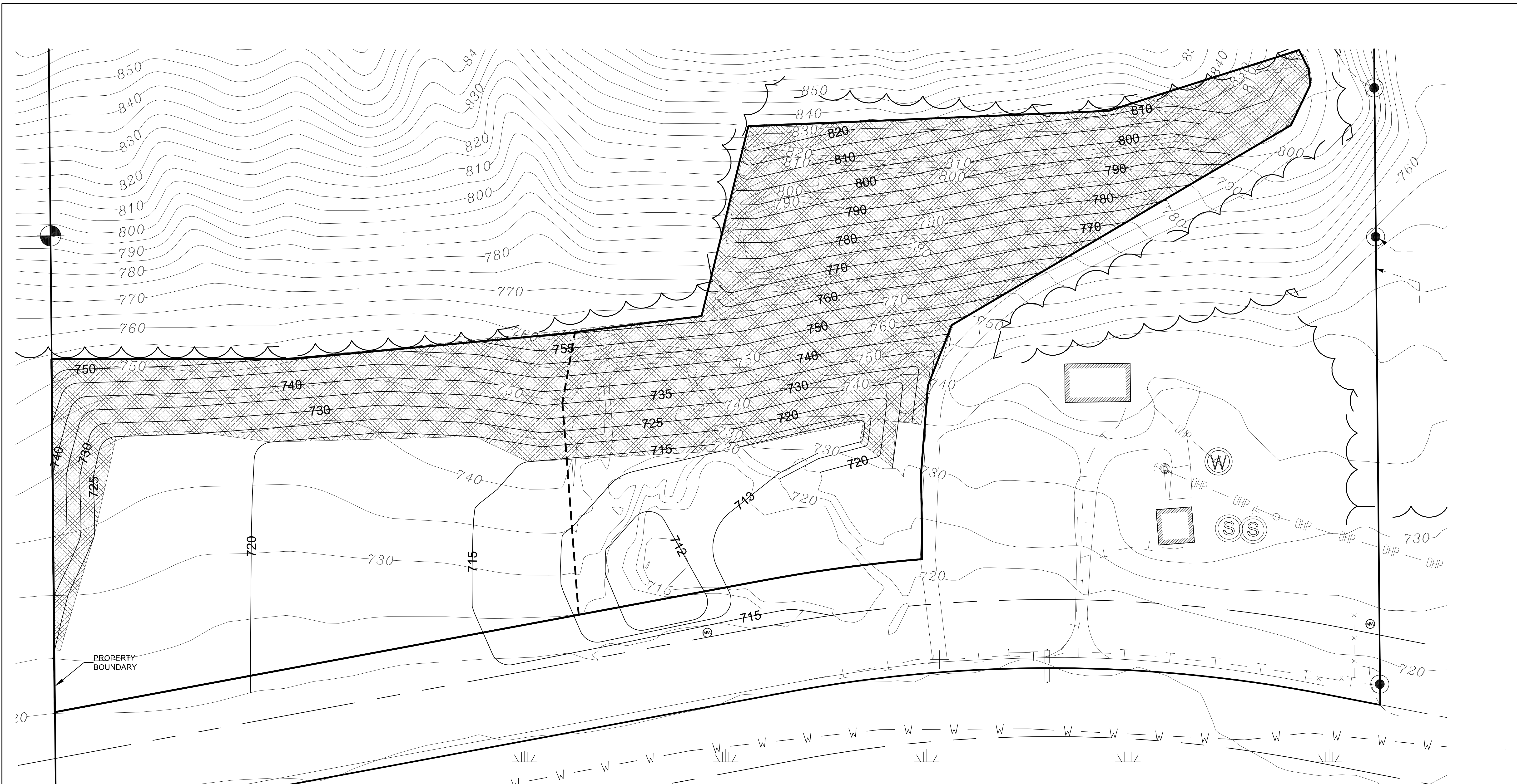
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JOHNSON & SCOFIELD INC.
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 1203 Main Street Red Wing, MN 55066
 ph. 651.388.1558 fax 651.388.1559

DESIGNED	REVISD	BY	DATE	LATEST REVISION:
SPV				Prepared For:
SPD				DOUG MAHONEY
SPV				32245 296TH STREET
				RED WING, MN 55066
				PHONE: 651-380-3071

DOUG MAHONEY
 FLORENCE TOWNSHIP, MINNESOTA

MAP C.2
NORTH PIT RECLAMATION
 SHEET 2 OF 2 SHEETS



ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED. FOR SEED SPECIFICATIONS REFER TO DOUG MAHONEY MINING RECLAMATION PLAN SHEET 20 APPENDIX "J" TEMPORARY AND PERMANENT SEED MIXTURES.

LEGEND
These standard symbols will be found on this plan sheet.

--- DENOTES SECTION LINE	--- DENOTES EXISTING UNDERGROUND TELEPHONE LINE
--- DENOTES CENTERLINE OF ROAD	--- DENOTES EXISTING FENCE
--- DENOTES PROPERTY LINE	--- DENOTES SECTION CORNER
--- DENOTES 600' BOUNDARY OFFSET LINE	--- DENOTES EXISTING IRON PIPE (BOUNDARY MARKER)
--- DENOTES EXISTING ROAD RIGHT OF WAY LINE	--- DENOTES EXISTING ELECTRIC METER
--- DENOTES EASEMENT	--- DENOTES EXISTING POWER POLE WITH GUY WIRE
--- DENOTES WETLAND BOUNDARY	--- DENOTES WELL
--- DENOTES EXISTING TREE LINE	--- DENOTES SEPTIC SYSTEM
--- DENOTES EDGE OF GRASS AND CROP	--- DENOTES EXISTING WETLAND
--- DENOTES EXISTING PIT BOUNDARY	--- DENOTES EXISTING WETLAND
--- DENOTES EXISTING INDEX CONTOUR AND ELEVATION	--- DENOTES PROPOSED INDEX CONTOUR AND ELEVATION LABEL
--- DENOTES EXISTING OVERHEAD POWER LINE	--- DENOTES PROPOSED MONITORING WELL
	--- DENOTES PROPOSED CATEGORY 3 EROSION CONTROL BLANKET

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				PHONE: 651-380-3071

DOUG MAHONEY
FLORENCE TOWNSHIP, MINNESOTA

MAP C.1
SOUTH PIT RECLAMATION
SHEET 1 OF 2 SHEETS

Wozniak, Michael

From: Kristen Eide-Tollefson <healingsystems69@gmail.com>
Sent: Saturday, April 28, 2018 4:46 PM
To: Wozniak, Michael
Cc: Jody McIlrath; Beth Knudsen; Jan Bruce
Subject: Some agency recommendations re: Reclamation

Mike:

There are several pieces of information I got from Heather Arends at DNR, who was the staff person in charge of reclamation for the EQB Silica Sand Technical committee. She's a mining coordinator at DNR now. There is more, but these are the main points I thought would interest you.

1. Estimates are low that assume the current operator will do the reclamation. This is often not the case. It is necessary to do an estimate assuming third party implementation of the reclamation plan.
2. High slopes are bigger issue on that area. The high wall, you ultimately want it benched and sloped back if it works within the viewscape, or you can leave it as a highwall depending on the safety risk, depending on local ordinances. What you don't want is a recreational trail (official or unofficial) with people being able to fall off the high wall. Should be gated and fenced to prevent public access/dumping
3. TOPSOIL should be stored separately. If it gets mixed in it won't do much good.
4. The access road up the bluff. Need to require a bermed road, to halfway up the rim of the truck wheel. See MSHA guidelines Mining Safety Health Ssociety that have to be followed, regulating safety of mine workers. Proper slope and berming information should be available at the Duluth office. Call them
5. For annual check ins: What did you do this year, did you do any reclamation, what are you planning for next year. Have them calculate the reclamation costs for 2 years. That gives you time for yearly check in, dialogue and baseline. Redo calculations as you go, from what you learn. Have financial assurance instrument that covers the expansion on an annual basis. Don't do the 20.00 an acre average. That doesn't work. Can ask them to break it down by 5 year blocks. Sketch out costs
6. For financial assurance make sure piles are taken away, not included in the estimate. They might say we'll have these piles (of material) and that will help cover the cost of reclamation. Don't go there. You need to have cash. You don't want to have to sell anything.
7. You want to ensure enough funding to cover cost for third party, for a third party to do the reclamation. Projections have to include third party performance
8. What does it take to slope to move material, to seed it, to take out any roads that are not going to be permanent, to put it all back into a natural stable state. So what are the reclamation objectives for vegetation. At what point is it safe, non polluting, sedimenting. What is the coverage you need? What to do with ruts, what are intermediate reclamation and stabilization goals. Should also ask about invasive species management, removing invasive species.
9. Standard is 3 to 1 slope but you might want a steeper slope to blend in with the landscape. So it looks natural. Sometimes if you overdo it it might not look natural.
10. As far as the sand pit goes, if there is an open water feature, it is important to make sure the slopes surrounding are easy to exit if something or someone falls in; all around or at designated spots where you can get out. In terms of reclamation you want a water body feature that mimics natural slope and habitat with vegetation, add some contour.

Hope these notes are helpful! Any questions, contact Heather Arends, DNR heather.arends@state.mn.us

Kristen

03/12/18

Review of Doug Mahoney Mining Permit Request and Information

Jody McIlrath

1. On the CUP application form to Goodhue County it says 61.5 acres are in the project. (Florence Township only allows 40 acres for open mining at one time).
2. Hours of operation are listed as 6 am to 10 pm. F.T. ordinance allows for 7 am to 7 pm.
3. The permit application makes no mention of blasting, hours of blasting, or who will be conducting it. Doug had mentioned there will be blasting and that an outside company will be doing it. This needs to be in the application. No pre-blasting survey mentioned.
4. There is no mitigation plan- dealing with problems, complaints neighbor notification.
5. Letter from Johnson and Scofield says that the Reclamation Plan is for "Mahoney's Industrial zoned" mining project. The proposed sites are in an A2 zone, as Florence has no Industrial zones but is stated later in the documentation.
6. The project is for 61.5 acre area, but the documentation states only 13.4 acres is to be mined over 20 years? Clarification is needed on this.
7. In the same letter, again the hours of operation are not allowed according to F.T. ordinance.
8. Regarding the water basin, what is the potential impact to the wetland area if unseasonable rainfall occurs and floods the holding ponds?
9. Regarding the variance, how far into the prohibited 300 feet from the toe of the bluff is being requested to be mined? As a layman, it's hard to interpret the maps.
10. A reclamation bond of \$46,000, to \$50,000 should be on file with the Township and would not be released until final inspection of the reclamation is deemed complete.
11. All of the maps should include road names.
12. What amount of acreage comprises the North and South existing pits?
13. There is a lot of well information in the documentation, but I have no expertise in determining if there is any impact to any neighboring wells.
14. On page 35, the map of the surveys of soil in the two pit areas and the accompanying chart, area 1010 is 1.9 acres, and 586D2 is 9.6 acres which totals 11. 5 acres. Where are the other 1.9 acres?
15. Page 65- The DNR mentions concerns regarding the calcareous fen and its proximity to the mine. What preventions will be taken to avoid impacts to the fen?
16. Page 91- the maps indicates high to moderate contamination sensitivity.
17. Page 119- the photos of fractures are of what relevance to this project and where were the photos taken?
18. Page 122- SHPO and OSA File search indicated a 35 acre project with a 1 mile radius of study. The application indicates a 61.5 acre project. Its findings indicate the existence of burial mounds

Questions from the Florence Township Planning Commission for Mike Wozniak regarding Doug Mahoney's mine proposal:

Are there application deadlines that would force us to act on this proposal within a certain amount of time? (per Mike: 60 days to take action from when permit application is received)

Is the proposal in compliance with the county bluff land ordinances?

Where does the county stand on this issue? Is it an approvable activity under the conditional use permit process?

Does this proposal need a variance? Which ones?

Where is the top and the toe of the bluff?

Concerns about affecting water table.

Who performs inspections while the mine is in operation and who approves the final reclamation?

Does the county require a reclamation bond?

Does the county have a copy of the proposal?

Can Mike Wozniak attend the next planning commission meeting on March 12?(per Mike: yes)

April 9 6:00 Mahoney - Township
Site Visit

Nonmetallic Mining Reclamation Plan

Location: Part of the NW ¼ & SW ¼ Sec
9, T112N, R13W, Florence Township
Goodhue County, Minnesota

Owner & Proposer: **Doug Mahoney**



Prepared by:
Johnson & Scofield, Inc.
1203 Main Street
Red Wing, MN 55066

 **JOHNSON & SCOFIELD INC.**
Surveying & Engineering



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Steven P. Voigt
Minnesota Licensed
Professional Engineer

Tony A. Blumentritt
Minnesota and Minnesota
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May 22, 2017

Mr. Doug Mahoney
32245 296th Street
Red Wing, Mn 55066

Re: Reclamation Plan
Goodhue County
Parcel 320091201
Near Frontenac Minnesota

Dear Mr. Mahoney:

As one of the requirements of a Conditional Use permit you received for an expansion of your existing mining operation, we are please to present this Reclamation Plan for your industrial zoned mining operation near Frontenac, Mn. This plan contains the plan narrative and maps of existing and proposed future topography for your entire mining site.

It has been our pleasure to assist you in preparing this plan and we thank you for choosing Johnson & Scofield, Inc. to be your consultant for this service. If you have questions about this plan, or if there are additional services we can provide in support of this plan or other work you propose to do, please call our office (651) 388-1558 and talk with either Steve Voigt (Ext.103) or Marcus Johnson (Ext.107).

Sincerely,

JOHNSON & SCOFIELD INCORPORATED

Steven P. Voigt
Senior Engineer

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SITE INFORMATION

Description of Operation

Responsible Person: The Owner is the responsible person with legal and operational responsibility for this proposed mining pit and its' operation and long term maintenance.

Owner contact information is:

Mr. Doug Mahoney
32245 296th Street
Red Wing, Mn 55066
Phone (651) 380-3071

Location: The Owner proposes to reopen an existing mining area to extract nonmetallic mineral aggregates. The proposed pit location is in the West 1450.00 feet of the South Half of the Northwest Quarter and That part of the West 1450.00 feet of the North Half of the Southwest Quarter of Section 9, Township 112 North, Range 13 West, Goodhue County, Minnesota, which lies northerly of the centerline of the concrete paved Township Road (Old State Highway Number 61). in the Florence Township, Goodhue County, Minnesota. Specifically, the area is in Goodhue County Parcel #'s 320091201. This parcel and other contiguous parcels are currently zoned "A2-AGRICULTURAL". (See attached Appendix "O"). The total site area is 61.5 acres. The area to be mined is approximately 13.4 acres (See attached Appendix "A" for legal description and boundary survey of subject parcel).

Estimated Time of Operation: This Mining operation could last as long as 20 years. The general hours of operation is estimated to be from 6 a.m. to 10 p.m., and will be opened from Monday to Saturday.

List of Equipment: This Mining operation will use traditional equipment for the excavation, transport and processing of nonmetallic mineral aggregate. See Appendix "B" for the list of planned operation equipment.

Explosives: This Mining operation will use explosives in the North Pit for blasting rock. This will be handled by a third party. No explosives will be stored on site. The third party will be responsible for all applicable permits, notifications, and seismic monitoring.

List of Chemicals: There are no plans to use any chemicals for dust suppression or mining purposes on this site.

Traffic and Weight Enforcement: There will be a scale onsite to weigh vehicles before they leave the mining site. The site will have access to U.S. Highway 61 from 296th street. 296th street is a concrete paved road, and Hwy 61 has no spring weight restrictions (See attached Appendix "N"). Mr. Mahoney owns the land between the entrance on 296th and Hwy 61, therefore the houses to the east of the subject property should not be affected by the additional traffic load created for hauling the mineral products.



Source and Disposition of Water: Water use is planned at this site. All material washing activities will take place at the existing sand pit. A brief description of the washing process here follows. Raw mined material is dumped into a feed grisly and conveyed to the wash plant. Within the wash plant are three vibrating grates causing separation into three size groups after removing most of the 200 (opening/inch) minus fines. Through the use of sieves, jigs and shakers, four products are produced. These products are then used to create the gradation mixes required by the Owners customers.

To facilitate this washing process, wash water historically was collected in a ground water basin in the existing sand pit.

Topographic Map: Maps showing the existing site conditions and the projected conditions after reclamation activities are complete can be found in Appendix "F", "G", & "H" of this plan identified as Existing Conditions, Proposed Operations, and Reclamation Topographic maps.

Depth of Excavations:

Existing – Excavations in the existing sand pit are on average 20-30 feet in depth. Excavations in the existing rock quarry are on average 70-80 feet in depth. Previous mining activity has occurred on this property from which topsoil was removed to create required berms along 296th street. These berms are permanent and will remain throughout the life of this mining project and beyond.

Proposed – The Owner proposes to open and operate, over a period of several years (perhaps 20 years or longer), approximately 16.0 acres of this property. This will be accomplished in phases. Each phase will consist of strips of land running north and south (roughly parallel with the west property lines of the parcel). The topsoil will be stripped at the commencement of each phase and added to existing and proposed topsoil stockpiles currently located around the existing pits.

In the sand pit mineral aggregates will be removed from this pit commencing at a point not closer than 50 feet from the property line to a depth of approximately 30 feet or a maximum of 8 feet below the ground water table elevation. The ground water level is well known due to the previous mining activities in the pit. When most of the existing mineral deposit located above the water table is removed, backhoe excavation will continue below the water table in the center of the pit or dredging equipment will be brought into the site to remove additional mineral material depending on slope stability and mineral availability. Contemporaneous reclamation will be done on this site due to the need to store topsoil and overburden.

In the rock quarry, mineral aggregates will be removed from this pit commencing at a point not closer than 30 feet from the property line to a depth of approximately 75 feet. The ground water level is well below (100-200 feet) the intended excavation depths.

Topsoil Removal and Storage: A significant amount of the available topsoil has and will be removed from existing mining areas and placed into stockpiles and berms. These berms will be constructed in a 30 foot corridor area lying between the pit sites and the property lines along the highway. No grading will take place during this topsoil removal that would create slopes that could contribute to erosion and sediment runoff to surrounding surface waters.

As explained above, the majority of topsoil will be removed in stages as access to mineral deposits is needed. The remaining topsoil will be added to existing, and proposed topsoil stockpiles. As mining operations progress and as room becomes available in this new pit, topsoil may be stockpiled in areas of this pit where mining operations will have been completed and no additional mining is anticipated.

All of the topsoil in the Rock Quarry areas on this site is classified as silt loam. The topsoil in the Sand Pit is approximately 80% silt loam with the remaining 20% being sandy loam located along the northern pit boundary. See Appendix "D" for a detailed soils report of this site.

The Owner gives assurance that 12 to 18 inches of topsoil will be salvaged and/or substituted and stored for final site reclamation. The Post-mining land use will continue to be A2-agricultural and it is assumed that related man-made structures will be added to this site at some future time. If a pond is made and is of sufficient size and depth, it may support fish habitat and provide that additional recreational use.

Biological Resources, Plants and Wildlife: The present use of this site is agricultural and forest/wooded land. This site contains no protected or special plant communities or wildlife species. This statement is made from the Owners personal knowledge of the site and from an Endangered Resources Review Request reports for both the existing Mahoney pit and this new proposed pit area. These reports were made in response to Endangered Resources Review Requests submitted to the Minnesota DNR (See Appendix "E"). There are no other known biological resources present on this site. There is no plan to eliminate some of the forested areas. Any future plans to eliminate forested areas should be minimal and will have a minimal impact on wildlife habitat. This reclamation plan does not propose to restore forest area to the pre-reclamation condition.

Man-made Features: This site is surrounded by man-made features. Along the South property line parallel with 296th street, is the highway and utilities within the right-of-way.

Near the east property line is an existing home site with buildings, fences, wooded area, a driveway and a well.

Across the North property line is an existing wooded area with no man made features.

Along the west property line is an agricultural field, and wooded area.



Historical and Archeological Sites : There are no known Historical, Cultural, and Archeological features within one mile of the proposed mining facility. The closest known historical features would be the Old Frontenac Historic District.

Monitoring of the Mine: The Owner will be responsible for the over-all operation and management of the mine. This includes minimization of mining waste and management of mining waste disposal (primarily stripping waste material that will be used for final slope construction).

It also includes disposal of wastes that are not mining wastes (temporary structures, equipment refuse, miscellaneous and temporary debris storage, etc.). Any non-mining waste will not be allowed to accumulate in significant quantities within the mine. These will be disposed of in accordance with local, state and federal laws through proper use of demolition landfills and recycling facilities. Equipment or materials that are unrelated to the mining operation (ie: junk-yard collection) will not be allowed to be stored on this mining site.

Any waste materials stored on the mining site will be Non-Toxic. Safety of these areas will be addressed primarily by creating stable 3:1 or flatter slopes when the storage areas are made. All entrances to the mine will be posted to warn of "NO TRESPASSING" by non-employees to discourage any public access. Since the owner of this mine lives on site someone will usually be present to help enforce the restricted access and other mining safety rules.

Groundwater quality is always a concern. The primary threat to water quality at this mining operation will be leakage or spillage of diesel fuel, hydraulic, motor and other oils, anti-freeze and other equipment operational fluids. To minimize this type of contamination, the Owner will centralize the servicing and fueling of all mobile equipment in the existing Mahoney pit and all fuel will be brought on-site by mobile transport trucks. For minor fueling needs, there is a 1000-gallon MSHA approved above ground Diesel fuel tank that is used on the existing Mahoney pit.

Surface water runoff quality will not be a major issue or concern due to the fact that all surface runoff will be contained within the mining site area. Any erosion that occurs will be negated by the continuing mining operation. Any siltation or runoff deposition will be captured through the mining and material sorting process. Any erosion or sedimentation that does occur will take place below the existing ground surface elevation and will therefore have no possible way to flow into and contaminate existing surface waters in the surrounding area.

POST- MINING LAND USE

The existing zoning for this site is Agricultural and the post-mining land use will continue to be Agricultural unless the property is re-zoned at some future time. As stated above, it is assumed that future Agricultural development will occur on this property. This will likely result in the creation of man-made structures such as buildings, fences and

associated infrastructure. Examples of future potential uses such as tree farming, plant nurseries and sales, or agricultural operations, are just a few possibilities.

RECLAMATION MEASURES

The sand pit site will be excavated to a depth approximately 30 feet below the existing ground level. This excavation will be a continuation of and westerly progression of the current excavation. A possible exception to this would be deeper excavation near the center of this site which would probably become a permanent pond. All slopes around the boundary of this site will be constructed to 3:1 (3-feet Horizontal to 1-foot Vertical). If a pond is constructed, a 4:1 slope will be constructed from the final ground surface to a point where it intersects the water table. From this point, a 10:1 bench will be constructed below the water surface for a minimum of 10 feet horizontal distance followed by a 3:1 or steeper final slope to the pond bottom. This final slope is not deemed to be potentially hazardous as depth of the pond is not likely to be very great for economic reasons and because this slope would be submerged at all times.

3:1 final slopes will be constructed along the entire proposed pit perimeters. Exposed areas of the mine will be covered with approximately 18 inches of salvaged or substitute topsoil to support re-vegetation, over a minimum of 2 feet of overburden material . A temporary cover crop of oats or rye will be planted to produce quick germination and site stabilization until the permanent seed mixture begins to grow. (See Appendix "K").

PROJECTED COST OF RECLAMATION

The costs for reclamation will consist of final site grading to produce 3:1 and other proposed slopes as shown on the Post-Reclamation Topographic map, the retrieval and spreading of overburden and topsoil on all exposed areas, and the planting of the nurse crop and required seed mixture as specified by Florence Township or Goodhue County. Costs will also include maintenance until site stabilization. With lengthy 3:1 slopes prevalent at this site, washouts will likely occur from significant rain events necessitating some minor re-spreading and or replacement of topsoil followed by re-planting. To hasten site stabilization, erosion control blankets may be installed in some of the more challenging areas of the site. The Owner will strive to find a balance between using this more expensive remedy and performing repeated repairs in the more problematic areas of the pit.

Estimate of Reclamation Costs (In 2017 dollars):

• Dozer and grading operations:	40 Hours @ \$150/hr	\$6,000
• Topsoil Placement:	40 Hours @ \$500/hr	\$20,000
• Category 3 Erosion Control Blanket	Lump Sum @	\$15,000
• Seed	Lump Sum @	\$2,500
• Mulch	Lump Sum @	\$3,200
• Repairs and Maintenance	Lump Sum @	\$10,000
	TOTAL ESTIMATED RECLAMATION COST	\$56,700



CRITERIA OF RECLAMATION PLAN

The criteria for assessing when reclamation is complete and, therefore, when the financial assurance can be released shall be based upon the following quantifiable criteria:

- 1.) No slopes shall remain on the reclamation site (except for rock quarry walls) that are greater than 3:1 which is equivalent to a slope angle of approximately 18.5 degrees. This can be easily field verified by use of transits or clinometers or by use of a fabricated template with a level attached to the horizontal arm.
- 2.) Re-vegetation and stabilization success shall be identified by comparison to control plots established either earlier in the same year or in previous years on areas that are relatively flat (less than 2% slope) and have standing vegetation of at least 6 inches in height. Re-vegetation shall be considered successful when vegetative cover density on the entire site is approximately 85% of the control plot density.
- 3.) Successful establishment of tree growth shall be recognized when, after 6 months from planting, 95% of planted trees are still in good health, showing no signs of distress (such as wilting or discolorization), and are properly supported.

CERTIFICATION OF RECLAMATION PLAN

Certification of this Reclamation Plan shall be accomplished in accordance with Goodhue County article 14 Mineral Extraction.

The Owner (or his designee) shall submit to Goodhue County a request for inspection when reclamation work has been completed.

Nonmetallic Mining Reclamation Plan

Location: Part of the NW ¼ & SW ¼ Sec
9, T112N, R13W, Florence Township
Goodhue County, Minnesota

Owner & Proposer: **Doug Mahoney**



Prepared by:
Johnson & Scofield, Inc.
1203 Main Street
Red Wing, MN 55066

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May 22, 2017

Mr. Doug Mahoney
32245 296th Street
Red Wing, Mn 55066

Re: Reclamation Plan
Goodhue County
Parcel 320091201
Near Frontenac Minnesota

Dear Mr. Mahoney:

As one of the requirements of a Conditional Use permit you received for an expansion of your existing mining operation, we are please to present this Reclamation Plan for your industrial zoned mining operation near Frontenac, Mn. This plan contains the plan narrative and maps of existing and proposed future topography for your entire mining site.

It has been our pleasure to assist you in preparing this plan and we thank you for choosing Johnson & Scofield, Inc. to be your consultant for this service. If you have questions about this plan, or if there are additional services we can provide in support of this plan or other work you propose to do, please call our office (651) 388-1558 and talk with either Steve Voigt (Ext.103) or Marcus Johnson (Ext.107).

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JOHNSON & SCOFIELD INCORPORATED

Steven P. Voigt
Senior Engineer

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SITE INFORMATION

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Responsible Person: The Owner is the responsible person with legal and operational responsibility for this proposed mining pit and its' operation and long term maintenance.

Owner contact information is:

Mr. Doug Mahoney
32245 296th Street
Red Wing, Mn 55066
Phone (651) 380-3071

Location: The Owner proposes to reopen an existing mining area to extract nonmetallic mineral aggregates. The proposed pit location is in the West 1450.00 feet of the South Half of the Northwest Quarter and That part of the West 1450.00 feet of the North Half of the Southwest Quarter of Section 9, Township 112 North, Range 13 West, Goodhue County, Minnesota, which lies northerly of the centerline of the concrete paved Township Road (Old State Highway Number 61). in the Florence Township, Goodhue County, Minnesota. Specifically, the area is in Goodhue County Parcel #'s 320091201. This parcel and other contiguous parcels are currently zoned "A2-AGRICULTURAL". (See attached Appendix "O"). The total site area is 61.5 acres. The area to be mined is approximately 13.4 acres (See attached Appendix "A" for legal description and boundary survey of subject parcel).

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Source and Disposition of Water: Water use is planned at this site. All material washing activities will take place at the existing sand pit. A brief description of the washing process here follows. Raw mined material is dumped into a feed grisly and conveyed to the wash plant. Within the wash plant are three vibrating grates causing separation into three size groups after removing most of the 200 (opening/inch) minus fines. Through the use of sieves, jigs and shakers, four products are produced. These products are then used to create the gradation mixes required by the Owners customers.

To facilitate this washing process, wash water historically was collected in a ground water basin in the existing sand pit.

Topographic Map: Maps showing the existing site conditions and the projected conditions after reclamation activities are complete can be found in Appendix "F", "G", & "H" of this plan identified as Existing Conditions, Proposed Operations, and Reclamation Topographic maps.

Depth of Excavations:

Existing – Excavations in the existing sand pit are on average 20-30 feet in depth. Excavations in the existing rock quarry are on average 70-80 feet in depth. Previous mining activity has occurred on this property from which topsoil was removed to create required berms along 296th street. These berms are permanent and will remain throughout the life of this mining project and beyond.

Proposed – The Owner proposes to open and operate, over a period of several years (perhaps 20 years or longer), approximately 16.0 acres of this property. This will be accomplished in phases. Each phase will consist of strips of land running north and south (roughly parallel with the west property lines of the parcel). The topsoil will be stripped at the commencement of each phase and added to existing and proposed topsoil stockpiles currently located around the existing pits.

In the sand pit mineral aggregates will be removed from this pit commencing at a point not closer than 50 feet from the property line to a depth of approximately 30 feet or a maximum of 8 feet below the ground water table elevation. The ground water level is well known due to the previous mining activities in the pit. When most of the existing mineral deposit located above the water table is removed, backhoe excavation will continue below the water table in the center of the pit or dredging equipment will be brought into the site to remove additional mineral material depending on slope stability and mineral availability. Contemporaneous reclamation will be done on this site due to the need to store topsoil and overburden.

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All of the topsoil in the Rock Quarry areas on this site is classified as silt loam. The topsoil in the Sand Pit is approximately 80% silt loam with the remaining 20% being sandy loam located along the northern pit boundary. See Appendix "D" for a detailed soils report of this site.

The Owner gives assurance that 12 to 18 inches of topsoil will be salvaged and/or substituted and stored for final site reclamation. The Post-mining land use will continue to be A2-agricultural and it is assumed that related man-made structures will be added to this site at some future time. If a pond is made and is of sufficient size and depth, it may support fish habitat and provide that additional recreational use.

Biological Resources, Plants and Wildlife: The present use of this site is agricultural and forest/wooded land. This site contains no protected or special plant communities or wildlife species. This statement is made from the Owners personal knowledge of the site and from an Endangered Resources Review Request reports for both the existing Mahoney pit and this new proposed pit area. These reports were made in response to Endangered Resources Review Requests submitted to the Minnesota DNR (See Appendix "E"). There are no other known biological resources present on this site. There is no plan to eliminate some of the forested areas. Any future plans to eliminate forested areas should be minimal and will have a minimal impact on wildlife habitat. This reclamation plan does not propose to restore forest area to the pre-reclamation condition.

Man-made Features: This site is surrounded by man-made features. Along the South property line parallel with 296th street, is the highway and utilities within the right-of-way.

Near the east property line is an existing home site with buildings, fences, wooded area, a driveway and a well.

Across the North property line is an existing wooded area with no man made features.

Along the west property line is an agricultural field, and wooded area.



Historical and Archeological Sites : There are no known Historical, Cultural, and Archeological features within one mile of the proposed mining facility. The closest known historical features would be the Old Frontenac Historic District.

Monitoring of the Mine: The Owner will be responsible for the over-all operation and management of the mine. This includes minimization of mining waste and management of mining waste disposal (primarily stripping waste material that will be used for final slope construction).

It also includes disposal of wastes that are not mining wastes (temporary structures, equipment refuse, miscellaneous and temporary debris storage, etc.). Any non-mining waste will not be allowed to accumulate in significant quantities within the mine. These will be disposed of in accordance with local, state and federal laws through proper use of demolition landfills and recycling facilities. Equipment or materials that are unrelated to the mining operation (ie: junk-yard collection) will not be allowed to be stored on this mining site.

Any waste materials stored on the mining site will be Non-Toxic. Safety of these areas will be addressed primarily by creating stable 3:1 or flatter slopes when the storage areas are made. All entrances to the mine will be posted to warn of "NO TRESPASSING" by non-employees to discourage any public access. Since the owner of this mine lives on site someone will usually be present to help enforce the restricted access and other mining safety rules.

Groundwater quality is always a concern. The primary threat to water quality at this mining operation will be leakage or spillage of diesel fuel, hydraulic, motor and other oils, anti-freeze and other equipment operational fluids. To minimize this type of contamination, the Owner will centralize the servicing and fueling of all mobile equipment in the existing Mahoney pit and all fuel will be brought on-site by mobile transport trucks. For minor fueling needs, there is a 1000-gallon MSHA approved above ground Diesel fuel tank that is used on the existing Mahoney pit.

Surface water runoff quality will not be a major issue or concern due to the fact that all surface runoff will be contained within the mining site area. Any erosion that occurs will be negated by the continuing mining operation. Any siltation or runoff deposition will be captured through the mining and material sorting process. Any erosion or sedimentation that does occur will take place below the existing ground surface elevation and will therefore have no possible way to flow into and contaminate existing surface waters in the surrounding area.

POST- MINING LAND USE

The existing zoning for this site is Agricultural and the post-mining land use will continue to be Agricultural unless the property is re-zoned at some future time. As stated above, it is assumed that future Agricultural development will occur on this property. This will likely result in the creation of man-made structures such as buildings, fences and

associated infrastructure. Examples of future potential uses such as tree farming, plant nurseries and sales, or agricultural operations, are just a few possibilities.

RECLAMATION MEASURES

The sand pit site will be excavated to a depth approximately 30 feet below the existing ground level. This excavation will be a continuation of and westerly progression of the current excavation. A possible exception to this would be deeper excavation near the center of this site which would probably become a permanent pond. All slopes around the boundary of this site will be constructed to 3:1 (3-feet Horizontal to 1-foot Vertical). If a pond is constructed, a 4:1 slope will be constructed from the final ground surface to a point where it intersects the water table. From this point, a 10:1 bench will be constructed below the water surface for a minimum of 10 feet horizontal distance followed by a 3:1 or steeper final slope to the pond bottom. This final slope is not deemed to be potentially hazardous as depth of the pond is not likely to be very great for economic reasons and because this slope would be submerged at all times.

3:1 final slopes will be constructed along the entire proposed pit perimeters. Exposed areas of the mine will be covered with approximately 18 inches of salvaged or substitute topsoil to support re-vegetation, over a minimum of 2 feet of overburden material . A temporary cover crop of oats or rye will be planted to produce quick germination and site stabilization until the permanent seed mixture begins to grow. (See Appendix "K").

PROJECTED COST OF RECLAMATION

The costs for reclamation will consist of final site grading to produce 3:1 and other proposed slopes as shown on the Post-Reclamation Topographic map, the retrieval and spreading of overburden and topsoil on all exposed areas, and the planting of the nurse crop and required seed mixture as specified by Florence Township or Goodhue County. Costs will also include maintenance until site stabilization. With lengthy 3:1 slopes prevalent at this site, washouts will likely occur from significant rain events necessitating some minor re-spreading and or replacement of topsoil followed by re-planting. To hasten site stabilization, erosion control blankets may be installed in some of the more challenging areas of the site. The Owner will strive to find a balance between using this more expensive remedy and performing repeated repairs in the more problematic areas of the pit.

Estimate of Reclamation Costs (In 2017 dollars):

• Dozer and grading operations:	40 Hours @ \$150/hr	\$6,000
• Topsoil Placement:	40 Hours @ \$500/hr	\$20,000
• Category 3 Erosion Control Blanket	Lump Sum @	\$15,000
• Seed	Lump Sum @	\$2,500
• Mulch	Lump Sum @	\$3,200
• Repairs and Maintenance	Lump Sum @	\$10,000
	TOTAL ESTIMATED RECLAMATION COST	\$56,700



CRITERIA OF RECLAMATION PLAN

The criteria for assessing when reclamation is complete and, therefore, when the financial assurance can be released shall be based upon the following quantifiable criteria:

- 1.) No slopes shall remain on the reclamation site (except for rock quarry walls) that are greater than 3:1 which is equivalent to a slope angle of approximately 18.5 degrees. This can be easily field verified by use of transits or clinometers or by use of a fabricated template with a level attached to the horizontal arm.
- 2.) Re-vegetation and stabilization success shall be identified by comparison to control plots established either earlier in the same year or in previous years on areas that are relatively flat (less than 2% slope) and have standing vegetation of at least 6 inches in height. Re-vegetation shall be considered successful when vegetative cover density on the entire site is approximately 85% of the control plot density.
- 3.) Successful establishment of tree growth shall be recognized when, after 6 months from planting, 95% of planted trees are still in good health, showing no signs of distress (such as wilting or discolorization), and are properly supported.

CERTIFICATION OF RECLAMATION PLAN

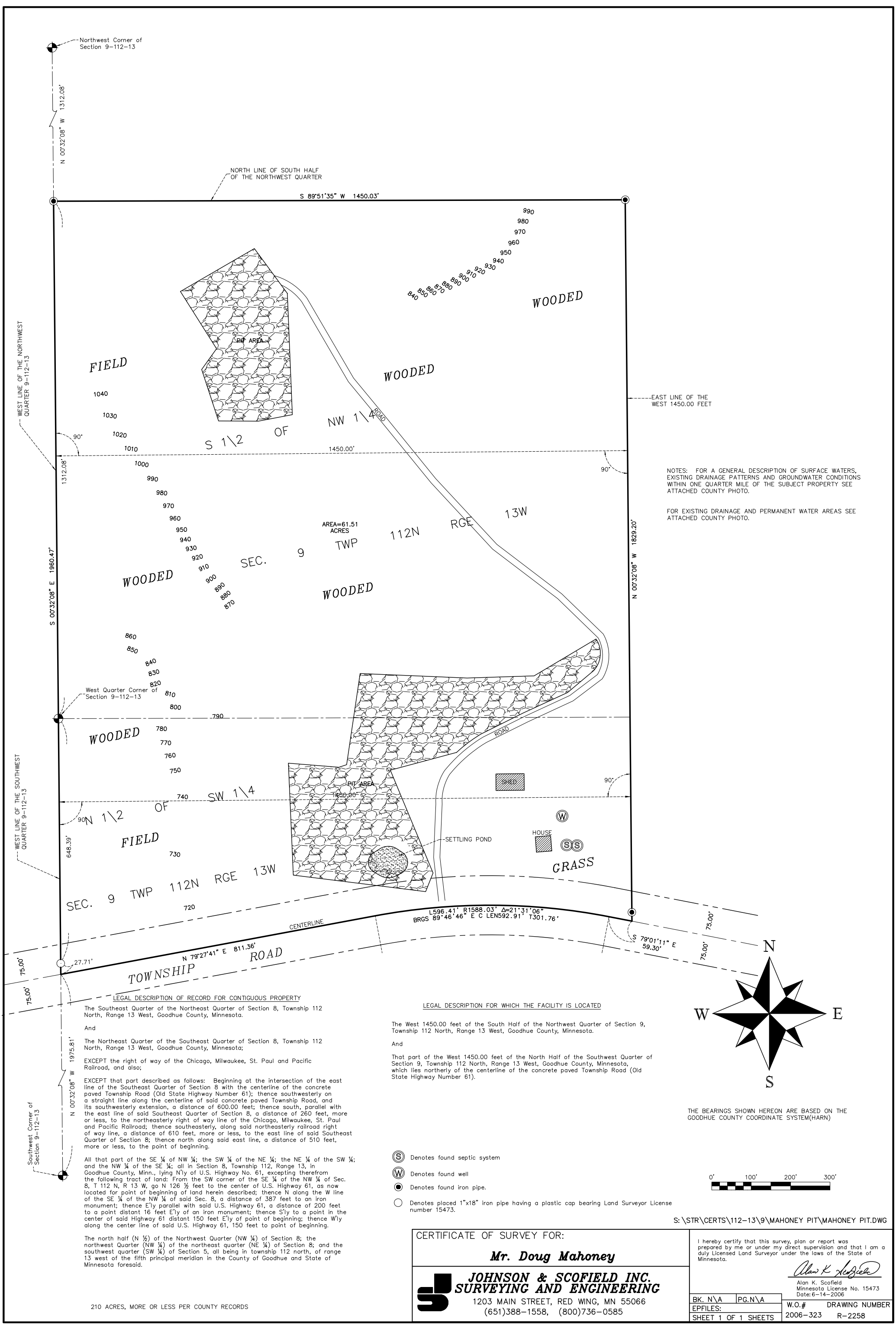
Certification of this Reclamation Plan shall be accomplished in accordance with Goodhue County article 14 Mineral Extraction.

The Owner (or his designee) shall submit to Goodhue County a request for inspection when reclamation work has been completed.



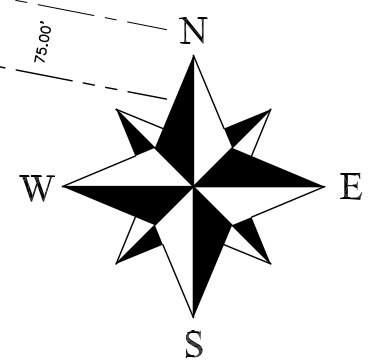
Appendix A

Certified Boundary Survey with Legal Description

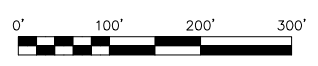


NOTES: FOR A GENERAL DESCRIPTION OF SURFACE WATERS, EXISTING DRAINAGE PATTERNS AND GROUNDWATER CONDITIONS WITHIN ONE QUARTER MILE OF THE SUBJECT PROPERTY SEE ATTACHED COUNTY PHOTO.

FOR EXISTING DRAINAGE AND PERMANENT WATER AREAS SEE ATTACHED COUNTY PHOTO.



THE BEARINGS SHOWN HEREON ARE BASED ON THE GOODHUE COUNTY COORDINATE SYSTEM(HARN)



LEGAL DESCRIPTION OF RECORD FOR CONTIGUOUS PROPERTY

The Southeast Quarter of the Northeast Quarter of Section 8, Township 112 North, Range 13 West, Goodhue County, Minnesota.

And

The Northeast Quarter of the Southeast Quarter of Section 8, Township 112 North, Range 13 West, Goodhue County, Minnesota;

EXCEPT the right of way of the Chicago, Milwaukee, St. Paul and Pacific Railroad, and also;

EXCEPT that part described as follows: Beginning at the intersection of the east line of the Southeast Quarter of Section 8 with the centerline of the concrete paved Township Road (Old State Highway Number 61); thence southwesterly on a straight line along the centerline of said concrete paved Township Road, and its southwesterly extension, a distance of 600.00 feet; thence south, parallel with the east line of said Southeast Quarter of Section 8, a distance of 260 feet, more or less, to the northeasterly right of way line of the Chicago, Milwaukee, St. Paul and Pacific Railroad; thence southeasterly, along said northeasterly railroad right of way line, a distance of 610 feet, more or less, to the east line of said Southeast Quarter of Section 8; thence north along said east line, a distance of 510 feet, more or less, to the point of beginning.

All that part of the SE 1/4 of the NW 1/4; the SW 1/4 of the NE 1/4; the NE 1/4 of the SW 1/4; and the NW 1/4 of the SE 1/4; all in Section 8, Township 112, Range 13, in Goodhue County, Minn., lying N'y of U.S. Highway No. 61, excepting therefrom the following tract of land: From the SW corner of the SE 1/4 of the NW 1/4 of Sec. 8, T 112 N, R 13 W, go N 126 1/2 feet to the center of U.S. Highway 61, as now located for point of beginning of land herein described; thence N along the W line of the SE 1/4 of the NW 1/4 of said Sec. 8, a distance of 387 feet to an iron monument; thence E'y parallel with said U.S. Highway 61, a distance of 200 feet to a point distant 16 feet E'y of an iron monument; thence S'y to a point in the center of said Highway 61 distant 150 feet E'y of point of beginning; thence W'y along the center line of said U.S. Highway 61, 150 feet to point of beginning.

The north half (N 1/2) of the Northwest Quarter (NW 1/4) of Section 8; the northwest Quarter (NW 1/4) of the northeast quarter (NE 1/4) of Section 8; and the southwest quarter (SW 1/4) of Section 5, all being in township 112 north, of range 13 west of the fifth principal meridian in the County of Goodhue and State of Minnesota foresaid.

LEGAL DESCRIPTION FOR WHICH THE FACILITY IS LOCATED


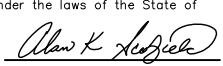
The West 1450.00 feet of the South Half of the Northwest Quarter of Section 9, Township 112 North, Range 13 West, Goodhue County, Minnesota.

And

That part of the West 1450.00 feet of the North Half of the Southwest Quarter of Section 9, Township 112 North, Range 13 West, Goodhue County, Minnesota, which lies northerly of the centerline of the concrete paved Township Road (Old State Highway Number 61).

- ⊙ Denotes found septic system
- ⊕ Denotes found well
- Denotes found iron pipe.
- Denotes placed 1"x18" iron pipe having a plastic cap bearing Land Surveyor License number 15473.

210 ACRES, MORE OR LESS PER COUNTY RECORDS

CERTIFICATE OF SURVEY FOR: Mr. Doug Mahoney		I hereby certify that this survey, plan or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.	
 JOHNSON & SCOFIELD INC. SURVEYING AND ENGINEERING 1203 MAIN STREET, RED WING, MN 55066 (651)388-1558, (800)736-0585		 Alan K. Scofield Minnesota License No. 15473 Date: 6-14-2006	
BK. N\A	PG. N\A	W.O.#	DRAWING NUMBER
EFILES:		2006-323	R-2258
SHEET 1 OF 1 SHEETS			

S:\STR\CERTS\112-13\9\MAHONEY PIT\MAHONEY PIT.DWG



Appendix B

Planned Mining Operation Equipment List

Planned Mining Operation Equipment List

1. **1-Power Crusher / Screener**
2. **1-Wash Plant**
3. **4-Loader**
4. **2-Excavators**
5. **1-Skidsteer loader**
6. **1-Pit Truck with welder and torch**
7. **80' x 10' Cardinal Scale & Scale Shack**



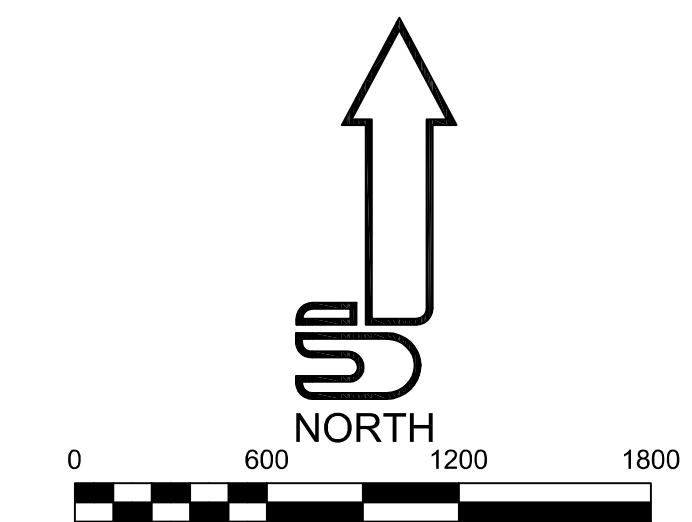
Appendix C

Site Specific Well Log Report Certificates



WELL LIST

WELL #	PIN	DEPTH	STATIC WATER LEVEL	DATE CONSTRUCTED	CONSTRUCTION
725085	320050202	480'	340'	10/28/05	ROTARY DRILLED, WELDED STEEL CASE, GROUTED
451571	320040400	420'	230'	06/1/88	ROTARY DRILLED, WELDED STEEL CASE, GROUTED
475898	320050201	473'	340'	7/26/91	ROTARY DRILLED, WELDED STEEL CASE, GROUTED
697762	320091204	180'	51'	5/7/04	WELDED STEEL CASE, GROUTED
495150	320091200	200'	72'	3/3/02	STEEL CASE, GROUTED
142597	320091203	110'	50'	6/18/78	ROTARY DRILLED, WELDED STEEL CASE, GROUTED
676131	320091206	180'	30'	10/7/02	ROTARY DRILLED, WELDED STEEL CASE, GROUTED
738011	320090800	140'	42'	7/31/06	ROTARY DRILLED, WELDED STEEL CASE, GROUTED
460172	320090900	495'	380'	7/31/90	CASED AND GROUTED
795451	320160100	150'	45'	6/20/13	ROTARY DRILLED, WELDED STEEL CASE, GROUTED



JOHNSON & SCOFIELD INC.
Surveying & Engineering,

1203 Main Street Red Wing, MN 55066
ph. 651.388.1558 fax 651.388.1559

DESIGNED	REVISD	BY	DATE	LATEST REVISION:
SPV				Prepared For:
SPD				DOUG MAHONEY
SPV				32245 296TH STREET
				RED WING, MN 55066
				PHONE: 651-380-3071

DOUG MAHONEY
FLORENCE TOWNSHIP, MINNESOTA

FILE PATH \\S:\Share\STR\CERTS\112-13\9\MAHONEY 2016\CIVIL DESIGN

WELL MAP

SHEET 1 OF 1 SHEETS

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
 Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO.

676131

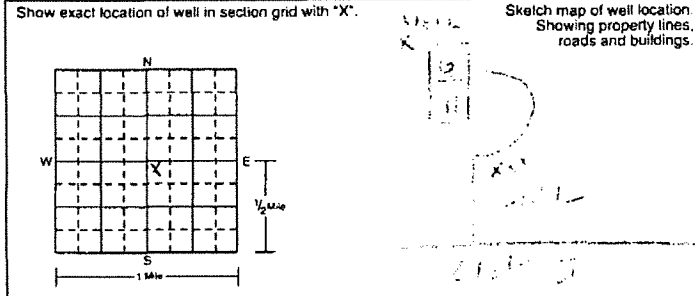
WELL LOCATION
 County Name
Goodhue #02-048C

Township Name **Florence** Township No. **112N** Range No. **13W** Section No. **9** Fraction **NW, NW, SE**

WELL DEPTH (completed) **180** ft. Date Work Completed **10/7/02**

House Number, Street Name, City, and Zip Code of Well Location
32665 296th St., Red Wing, MN

DRILLING METHOD
 Cable Tool Driven Dug
 Auger Rotary Jetted



DRILLING FLUID **Foam** WELL HYDROFRACTURED? YES NO
 FROM _____ ft. to _____ ft.

USE
 Domestic Monitoring Heating/Cooling
 Irrigation Community PWS Industry/Commercial
 Environ. Bore Hole Noncommunity PWS Remedial
 Dewatering

CASING Drive Shoe? Yes No
 Steel Threaded Welded
 Plastic

CASING DIAMETER WEIGHT
8 in. to **20** ft. **Removed** lbs./ft. **12** in. to **20** ft.
4 in. to **145** ft. **10.79** lbs./ft. **8** in. to **145** ft.
 _____ in. to _____ ft. _____ lbs./ft. _____ in. to _____ ft.

PROPERTY OWNER'S NAME
Jason Dankers

SCREEN **N/A** OPEN HOLE
 Make _____ from **145** ft. to **180** ft.
 Type _____ Diam. _____
 Slot/Gauze _____ Length _____
 Set between _____ ft. and _____ ft. FITTINGS: _____

Property owner's mailing address if different than well location address indicated above.
**32665 296th St.
 Red Wing, MN 55066**

STATIC WATER LEVEL
30 ft. below above land surface Date measured **8/14/02**

WELL OWNER'S NAME
Same

PUMPING LEVEL (below land surface)
 _____ ft. after _____ hrs. pumping _____ g.p.m.

Well owner's mailing address if different than property owner's address indicated above.

WELL HEAD COMPLETION **Whitewater** Model **S04**
 Pitless adapter manufacturer Casing Protection 12 in. above grade
 At-grade (Environmental Wells and Borings ONLY)

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Clay	Brown	Soft	0	20
Sandstone	Green	Soft	20	150
Sandstone	Brown	Soft	150	180

GROUTING INFORMATION
 Well grouted? Yes No
 Grout Material Neat cement Bentonite Concrete High Solids Bentonite
 from **0** to **145** ft. **3** yds. bags
 from _____ to _____ ft. _____ yds. bags
 from _____ to _____ ft. _____ yds. bags

NEAREST KNOWN SOURCE OF CONTAMINATION
60 feet **SE** direction **Sewer Pipe** type _____
 Well disinfected upon completion? Yes No

PUMP
 Not installed Date installed **9/9/02**
 Manufacturer's name **Jacuzzi**
 Model number **7S410-11** HP **3/4** Volts **230**
 Length of drop pipe **105** ft. Capacity _____ g.p.m.
 Type: Submersible L.S. Turbine Reciprocating Jet

ABANDONED WELLS
 Does property have any not in use and not sealed well(s)? Yes No

VARIANCE
 Was a variance granted from the MDH for this well? Yes No TN# _____

WELL CONTRACTOR CERTIFICATION
 This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

REMARKS, ELEVATION, SOURCE OF DATA, etc.
Parcel 32.009.1206 **OCT 1 0 2002**

Carlson Well Drilling, Inc. 19649
 Licensee Business Name Lic. or Reg. No. **10/7/02**
 Authorized Representative Signature Date
Paul Carlson/Mike State 8/14/02
 Name of Driller Date

LOCAL COPY **676131**

WATER WELL RECORD

MINNESOTA UNIQUE WELL NO.
for Water Sample

475898

1. LOCATION OF WELL

County Name: **Goodhue # 450**

Township Name: **Florence** Township Number: **112** Range Number: **13** Section No.: **5** Fraction: **SE 1/4 NE 1/4 SE 1/4**

Numerical Street Address and City of Well Location or Distance from Road Intersection:
Route 1, Box 188A, Red Wing, MN 55065

Show exact location of well in section grid with "X". Sketch map of well location.

Addition Name: _____
Block Number: _____
Lot Number: _____

2. PROPERTY OWNER'S NAME: **Jason Peterson**

Mailing Address if different than property address indicated above: _____

3. FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Silt & Clay	Brown	Soft	0	20
Limestone	Brown	Hard	20	150
Sandstone	Yellow	Soft	150	280
Sandstone	Grey	Med	280	325
Sandstone	Green	Soft	325	440
Sandstone	Grey	Soft	440	465
Sandstone	Green	Soft	465	473

17. REMARKS, ELEVATION, SOURCE OF DATA, etc.

320050201

4. WELL DEPTH (completed) **473** ft. Date of Completion **7-26-91**

5. DRILLING METHOD

Cable Tool Reverse Driven Dug

Hollow Rod Air Bored _____

Rotary Jetted Power Auger

6. DRILLING FLUID: **Foam**

7. USE

Domestic Monitoring Heat Pump

Irrigation Public Industry

Test Well Municipal Commercial

Air Conditioning _____

8. CASING

Black Threaded Galv. Welded Plastic

HEIGHT (Above/Below Surface) **1.5** ft. Drive Shoe? Yes No _____

8 in. to **20** ft. Weight **25** lbs./ft. **12** in. to **20** ft.

4 in. to **378** ft. Weight **10.79** lbs./ft. **8** in. to **378** ft.

_____ in. to _____ ft. Weight _____ lbs./ft. **4** in. to **473** ft.

9. SCREEN

Or open hole from **378** ft. to **473** ft.

Make _____ Type _____ Diam. _____

Slot/Gauze _____ Length _____ FITTINGS: _____

Set between _____ ft. and _____ ft.

10. STATIC WATER LEVEL **340** ft. below/above land surface Date Measured **6-26-91**

11. PUMPING LEVEL (below land surface)

_____ ft. after _____ hrs. pumping _____ g.p.m.

_____ ft. after _____ hrs. pumping _____ g.p.m.

12. HEAD WELL COMPLETION

Pileless adapter manufacturer **Whitewater** Model **48-T**

Basement, offset At least 12" above ground

Plastic casing protection.

13. WELL GROUTED? Yes No

Neat Cement Bentonite _____

Grout material: **Neat Cement** from **0** to **378** ft. cu. yds. **5**

14. NEAREST SOURCES OF POSSIBLE CONTAMINATION

75 feet **E** direction **Septic** type

Well disinfected upon completion? Yes No

15. PUMP

Date installed **6-26-91** Not installed

Manufacturer's name **Sears Roebuck**

Model number _____ HP **1 1/2** Volts **230**

Length of drop pipe **369** ft. Capacity **10** g.p.m.

Material of drop pipe **1" galvanized**

Type: Submersible L.S. Turbine Reciprocating

Jet Centrifugal _____

16. ABANDONED WELLS

Unused well on property? Yes No

Sealed Permanent Temporary Not sealed

18. WATER WELL CONTRACTOR CERTIFICATION

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

Carlson Well Drilling, Inc. 19302
Licensee Business Name License No. _____

Address: **17530 Red Wing Blvd. Hastings**

Signed **Terry Maher** Date **8-2-91**
Authorized Representative **Paul Carlson**

Name of Driller Date **6-7-91**

LOCAL COPY

475898

WELL LOCATION
County Name
Goodhue County

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL NO.

725085

Township Name: **Florence** Township No.: **112** Range No.: **13** Section No.: **5** Fraction: **NE NE SE**

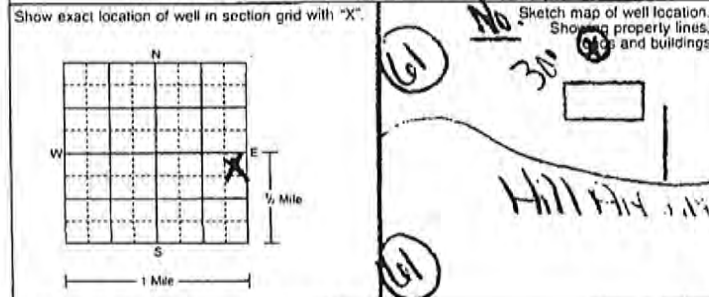
WELL DEPTH (completed) **480ft.** Date Work Completed **10/29/05**

GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds _____
Longitude _____ degrees _____ minutes _____ seconds _____

DRILLING METHOD
 Cable Tool Driven Dug
 Auger Rotary Jetted

House Number, Street Name, City, and Zip Code of Well Location
Hill Avenue Red Wing, MN.

DRILLING FLUID **Foam** WELL HYDROFRACTURED? Yes No
FROM _____ ft. TO _____ ft.



USE
 Domestic Monitoring Heating/Cooling
 Noncommunity PWS Environ. Bore Hole Industry/Commercial
 Community PWS Irrigation Remedial
 Dewatering

CASING Drive Shoe? Yes No
 Steel Threaded Welded
 Plastic

CASING DIAMETER WEIGHT HOLE DIAM.
8 in. to 30 ft. 28.55 lbs./ft. 12 in. to 30 ft.
4 in. to 400 ft. 10.79 lbs./ft. 8 in. to 400 ft.
4 in. to 480 ft.

PROPERTY OWNER'S NAME/COMPANY NAME
Paul Blim

SCREEN OPEN HOLE
Make _____ FROM **400** ft. TO **480** ft.
Type _____ Diam. _____
Slot/Gauze _____ Length _____
Set between _____ ft. and _____ ft. FITTINGS _____

Property owner's mailing address if different than well location address indicated above.
**1527 Featherstone Rd.
Red Wing, Minnesota 55066**
PIP# 32.005.0202

STATIC WATER LEVEL
340 ft. below above land surface Date measured **10/17/05**

WELL OWNER'S NAME/COMPANY NAME
Paul Blim

PUMPING LEVEL (below land surface)
360 ft. after **2** hrs. pumping **20** g.p.m.

Well owner's mailing address if different than property owners address indicated above.
**1527 Featherstone Road
Red Wing, Minnesota 55066**

WELL HEAD COMPLETION
 Well adapter manufacturer **Whitewater** Model **SU4x5 1/2**
 Casing Protection 12 in. above grade
 At-grade (Environmental Wells and Boring ONLY)

GROUTING INFORMATION
Well grouted Yes No
Grout material Neat cement Bentonite Concrete High Solids Bentonite
from **0** to **400** ft. **6** yds. bags
from _____ to _____ ft. _____ yds. _____ bags
from _____ to _____ ft. _____ yds. _____ bags

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Clay	Yellow	Med.	0	30
Lime	Yellow	Hard	30	148
Sandrock	Brown	Soft	148	272
Shale	Blue	Hard	272	315
Sandrock	Green	Med.	315	480

NEAREST KNOWN SOURCE OF CONTAMINATION
55ft. feet **SW** direction **Septic** type
Well disinfected upon completion Yes No

PUMP
 Not installed Date installed **10/29/05**
Manufacturer's name **Aermotor**
Model number **A-12-200** HP **2** Volts **230**
Length of drop pipe **378** ft. Capacity **15** g.p.m.
Type: Submersible L.S. Turbine Reciprocating Jet

ABANDONED WELLS
Does property have any not in use and not sealed well(s) Yes No

VARIANCE
Was a variance granted from the MDH for this well? Yes No TN# _____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

REMARKS, ELEVATION, SOURCE OF DATA, etc.
320050202
JAN 18 2006

Kimmes-Bauer Well Drilling, Inc. #19738
Licensee Business Name Lic. or Reg. No.
10/29/05
Authorized Representative Signature Date

Mike Miller **October 17th, 2005**
Name of Driller

LOCAL COPY **725085**

HE-01205-08 (Rev. 5/02)

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes, Chapter 103J

795451

WELL OR BORING LOCATION
County Name
Goodhue

Township Name Florence Township No. 112 Range No. 13 Section No. 16 Fraction NE 1/4 NE 1/4

WELL/BORING DEPTH (completed) 150 ft. DATE WORK COMPLETED 6/20/13

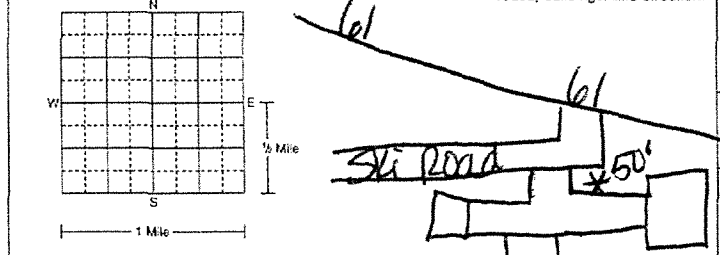
GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds _____
Longitude _____ degrees _____ minutes _____ seconds _____

DRILLING METHOD
 Cable Tool
 Auger
 Other
 Driven
 Rotary

House Number, Street Name, City, and ZIP Code of Well Location
33010 Ski Road Red Wing MN 55068

DRILLING FLUID Bentonite WELL HYDROFRACTURED? Yes No
From _____ ft. To _____ ft.

Show exact location of well/boring in section grid with "X." Sketch map of well/boring location. Showing property lines, roads, buildings, and direction.



USE
 Domestic
 Noncommunity FWS
 Community FWS
 Elevator
 Monitoring
 Environ. Bore Hole
 Irrigation
 Dewatering
 Heating/Cooling
 Industry/Commercial
 Remedial

CASING MATERIAL
 Steel
 Plastic
Drive Shoe? Yes No
 Threaded Welded
HOLE DIAM.
8 in. To 120
4 in. To 150

PROPERTY OWNER'S NAME/COMPANY NAME
Steve Wolf

SCREEN
Make _____ Type _____ Slot/Gauze _____ Set between _____ ft. and _____ ft. FITTINGS _____
OPEN HOLE
From 120 ft. To 150 ft.
Diam. _____ Length _____

Property owner's mailing address if different than well location address indicated above.
5456 Sanibel Drive
Minnetonka, MN 55343

STATIC WATER LEVEL
45 ft. Below Above land surface Measured from _____ Date measured _____

WELL OWNER'S NAME/COMPANY NAME
Steve Wolf

PUMPING LEVEL (below land surface)
100 ft. after 2 hrs. pumping 20 g.p.m.

Well/boring owner's mailing address if different than property owner's address indicated above.

WELLHEAD COMPLETION
 Pitless/adaptor manufacturer _____ Model _____
 Casing protection _____ 12 in. above grade
 At-grade Well House Hand Pump

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Sand/gravel	Brown	soft	0	45
Clay	Blue	med	45	85
Sandrock	Brown	soft	85	115
Sandrock	Brown	med	115	150

GROUTING INFORMATION (specify bentonite, cement-sand, neat-cement, concrete, cuttings, or other)
Material Neat cement From 0 To 120 ft. 24 Yds. Bags

Material _____ From _____ To _____ ft. _____ Yds. Bags
Driven casing seal From _____ To _____ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION
60 feet South direction Septic type

Well disinfected upon completion? Yes No

PUMP
 Not installed Date installed 6/20/13
Manufacturer's name Plintz Waling
Model Number 4F07S HP 3/4 Volts 230
Length of drop pipe 105 ft. Capacity 12 g.p.m.
Type: Submersible L.S. Turbine Reciprocating Jet

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? Yes No

VARIANCE
Was a variance granted from the MDH for this well? Yes No TN# _____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

REMARKS, ELEVATION, SOURCE OF DATA, etc.
COPY
RECEIVED JUL - 8 2013

Kimmes-Bauer Well Drilling, Inc
Licensee Business Name Lic. or Reg. No. 1940
Robert Fitz & Gary Twin
Certified Representative Signature Certified Rep. No. 3888 Date 5/17/13

MINN. DEPT. OF HEALTH COPY 795451

Name of Driller
Robert Fitz & Gary Twin

WELL OR BORING LOCATION
 County Name
Goodhue

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
 Minnesota Statutes, Chapter 1031

Minnesota Well and Boring
 Sealing No.
 Minnesota Unique Well No.
 or W-series No.
 (See back if not known)

H 267195

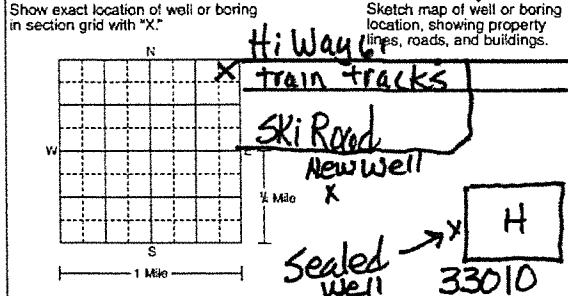
Township Name **Florence** Township No. **110N** Range No. **13W** Section No. **16** Fraction (sm. - 1/4) **NE 1/4** Date Sealed **Oct 3-2013** Date Well or Boring Constructed **1950's**

GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds
 Longitude _____ degrees _____ minutes _____ seconds

Depth Before Sealing **38** ft. Original Depth **38** ft.

Numerical Street Address or Fire Number and City of Well or Boring Location
33010 Ski Road Frontenac, MN

AQUIFER(S)
 Single Aquifer Multi-aquifer
 WELL BORING
 Water-Supply Well Monit. Well
 Env. Bore Hole Other _____
 STATIC WATER LEVEL
 Measured Estimated Date Measured **June 20, 2005**
25 ft. below above land surface



CASING TYPE(S)
 Steel Plastic Tile Other _____

WELLHEAD COMPLETION
 Outside: Well House At Grade Pitless Adapter/Unit Well Pit Other _____
 Inside: Basement Offset Buried Other _____

PROPERTY OWNER'S NAME/COMPANY NAME
Steve Wolf

CASING(S)
 Diameter **4** in. from **6** to **34** ft. Set in oversize hole? Yes No Annular space initially grouted? Yes No Unknown
 _____ in. from _____ to _____ ft. Yes No Yes No Unknown
 _____ in. from _____ to _____ ft. Yes No Yes No Unknown

Property owner's mailing address if different than well location address indicated above
**5456 Sanibel Drive
 Minnetonka, MN 55343**

WELL OWNER'S NAME/COMPANY NAME
SAME

SCREEN/OPEN HOLE
 Screen from **38** to **34** ft. Open Hole from _____ to _____ ft.

Well owner's mailing address if different than property owner's address indicated above

OBSTRUCTIONS
 Rods/Drop Pipe Check Valve(s) Debris Fill No Obstruction
 Type of Obstructions (Describe): **Submersible pump 1" plastic drop pipe**
 Obstructions removed? Yes No Describe: **Pump stuck in 4" casing**

GEOLOGICAL MATERIAL COLOR HARDNESS OR FORMATION FROM TO

PUMP
 Type **3 wire submersible pump**
 Removed Not Present Other **stuck in 4" casing**

If not known, indicate estimated formation log from nearby well or boring.
Sand-Gravel Brown Soft 0 38

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
 No Annular Space Exists Annular Space Grouted with Tremie Pipe Casing Perforation/Removal
 _____ in. from _____ to _____ ft. Perforated Removed
 _____ in. from _____ to _____ ft. Perforated Removed
 Type of Perforator _____
 Other _____

We tried to remove pump. Removed plastic pipe and wire

Goodhue City Public Health O.K.ed Sealing this well.

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
 Grouting Material **Neat Cement** from **32** to **0** ft. _____ yards **4** bags
 _____ from _____ to _____ ft. _____ yards _____ bags
 _____ from _____ to _____ ft. _____ yards _____ bags

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

OTHER WELLS AND BORINGS
 Other unsealed and unused well or boring on property? Yes No How many? _____

Plat/Parcel #
32-016-0100
4" pump stuck inside of 4" casing. Tried to remove by jarring pump. Plastic pipe and wire all removed. Pump at 32 ft

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
 This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Johnson Pump Service Inc License or Registration No. **1353**
Steve Johnson Certified Representative Signature **269** Certified Rep. No. **Oct 3-2013** Date
Steve Mark Johns Name of Person Sealing Well or Boring

MINN. DEPT. OF HEALTH COPY H 267195

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
 Minnesota Statutes, Chapter 103I

738011

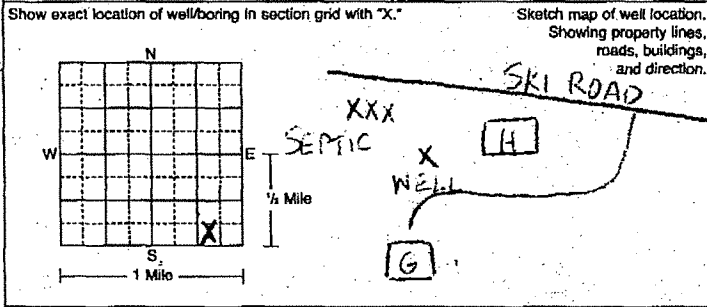
WELL/BORING LOCATION
 County Name
Goodhue #06-022C

Township Name **Florance** Township No. **112N** Range No. **13W** Section No. **9** Fraction **SW 1/4 SE 1/4 SE 1/4**

WELL/BORING DEPTH (completed) **140** ft. DATE WORK COMPLETED **7/31/06**

GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds _____
 Longitude _____ degrees _____ minutes _____ seconds _____
 House Number, Street Name, City, and Zip Code of Well Location
32812 Ski Road, Red Wing or Fire Number _____

DRILLING METHOD
 Cable Tool Driven Dug
 Auger Rotary Jetted



DRILLING FLUID **Bentonite** WELL HYDROFRACTURED? Yes No

USE Domestic Monitoring Heating/Cooling
 Noncommunity PWS Environ. Bore Hole Industry/Commercial
 Community PWS Irrigation Remedial
 Elevator Dewatering

CASING MATERIAL Drive Shoe? Yes No
 Steel Threaded Welded
 Plastic

CASING Diameter **4** in. to **80** ft. Weight **10.79** lbs./ft. Specifications **A53GrB**
 HOLE DIAM. **8** in. to **80** ft.
4 in. to **140** ft.

PROPERTY OWNER'S NAME/COMPANY NAME
BS Development

SCREEN **None** OPEN HOLE From **80** ft. To **140** ft.

Property owner's mailing address if different than well location address indicated above.
P.O. Box 5
Kasson, MN 55944
 P/P# **32.009.0800**

Type _____ Diam. _____
 Slot/Gauze _____ Length _____
 Set between _____ ft. and _____ ft. FITTINGS _____

STATIC WATER LEVEL **42** ft. Below Above land surface Date measured **7/10/06**

WELL/BORING OWNER'S NAME/COMPANY NAME
Same

PUMPING LEVEL (below land surface) _____ ft. after _____ hrs. pumping _____ g.p.m.

Well/boring owner's mailing address if different than property owner's address indicated above.

WELL HEAD COMPLETION **Whitewater** Model **SU4**
 Pitless Adapter Manufacturer Casing Protection 12 in. above grade
 At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION
 Well grouted? Yes No
 Grout materials Neat cement Bentonite Concrete Other
High Solids Neat Cement From **0** To **30** ft. Yds. Bags
 From **30** To **80** ft. Yds. Bags
 From _____ To _____ ft. Yds. Bags

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
Soil	Black	Soft	0	1
Fine Gravel	Brown	Soft	1	15
Gravel & Clay	Brown	Soft	15	39
Sandstone	Green	Soft	39	90
Sandstone	Brown	Soft	90	140

NEAREST KNOWN SOURCE OF CONTAMINATION **75** feet **W** direction **Sewer Pipe** type

Well disinfected upon completion? Yes No

PUMP Date Installed **7/11/06**
 Not installed
 Manufacturer's name **Jacuzzi**
 Model Number **5S410-8** HP **1/2** Volts **115**
 Length of drop pipe **63** ft. Capacity **10** g.p.m.

Type: Submersible L.S. Turbine Reciprocating Jet

ABANDONED WELLS
 Does property have any not in use and not sealed well(s)? Yes No

VARIANCE
 Was a variance granted from the MDH for this well? Yes No TN# _____

WELL CONTRACTOR CERTIFICATION
 This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

REMARKS, ELEVATION, SOURCE OF DATA, etc.
 Prop ID **32.009.0800**
42' 6" well sealed on property MN Unique No. H225497, Goodhue No. 06-025A.

Carlson Well Drilling, Inc. 1461
 Licensee Business Name Lic. or Reg. No.
Paul Carlson No. **81** 7/31/06
 Authorized Representative Signature Date
Paul Carlson/Tom Williams 7/10/06

LOCAL COPY **738011**

Name of Driller
Paul Carlson/Tom Williams
 HE-01205-09 (Rev. 9/05)

AUG 22 2006

WELL OR BORING LOCATION
County Name
Goodhue #06-025A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No.
Minnesota Unique Well No. or W-series No.
(Leave blank if not known)

H 225497

Township Name **Florence** Township No. **112N** Range No. **13W** Section No. **9** Fraction (sm → lg) **SW SE SE** Date Sealed **7/14/06** Date Well or Boring Constructed **1940**

GPS LOCATION: Latitude _____ degrees _____ minutes _____ seconds
Longitude _____ degrees _____ minutes _____ seconds

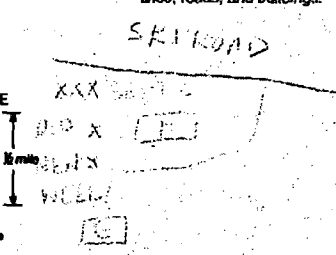
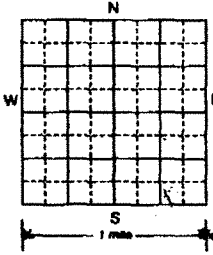
Depth Before Sealing **42** ft. Original Depth **42** ft.

Numerical Street Address or Fire Number and City of Well or Boring Location
32812 Ski Road, Red Wing

AQUIFER(S)
 Single Aquifer Multiaquifer
WELL/BORING
 Water Supply Well Monit. Well
 Env. Bore Hole Other _____
STATIC WATER LEVEL
 Measured Estimated
37 ft. below above land surface

Show exact location of well or boring in section grid with "X"

Sketch map of well or boring location, showing property lines, roads, and buildings.



CASING TYPE(S)
 Steel Plastic Tile Other _____

WELLHEAD COMPLETION
Outside: Well House Pitless Adapter/Unit Well Pit Buried
Inside: Basement Offset Buried

PROPERTY OWNER'S NAME/COMPANY NAME
ES Development

CASING(S)
Diameter _____ Depth _____ Set in oversize hole? Yes No Annular space initially grouted? Yes No Unknown
6 in. from **7** to **38** ft. Yes No Yes No Unknown
_____ in. from _____ to _____ ft. Yes No Yes No Unknown
_____ in. from _____ to _____ ft. Yes No Yes No Unknown

Property owner's mailing address if different than well location address indicated above
**P.O. Box 5
Kasson, MN 55944
PIP# 32.009.0800**

WELL OWNER'S NAME/COMPANY NAME
Same

SCREEN/OPEN HOLE
Screen from _____ to _____ ft. Open Hole from **38** to **42** ft.

Well owner's mailing address if different than property owner's address indicated above

OBSTRUCTIONS
 Rods/Drop Pipe Check Valve(s) Debris Fill No Obstruction
Type of Obstructions (Describe) _____
Obstructions removed? Yes No Describe _____

GEOLOGICAL MATERIAL COLOR HARDNESS OR FORMATION FROM TO

PUMP
Type **Double Jet**
 Removed Not Present Other _____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
Fine Gravel	Brown	Soft	7	15
Gravel/Clay	Brown	Soft	15	38
Sandstone	Green	Soft	38	42

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
 No Annular Space Exists Annular space grouted with tremie pipe Casing Perforation/Removal
_____ in. from _____ to _____ ft. Perforated Removed
_____ in. from _____ to _____ ft. Perforated Removed
Type of perforator _____
 Other _____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
Grouting Material **Neat Cement** from **7** to **42** ft. _____ yards **15** bags
_____ from _____ to _____ ft. _____ yards _____ bags
_____ from _____ to _____ ft. _____ yards _____ bags

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING
**Prop ID 32.009.0800
Geology from new well drilled on property MN Unique No. 738011, Goodhue No. 06-022C
AUG 22 2006**

OTHER WELLS AND BORINGS
Other unsealed and unused well or boring on property? Yes No How many? _____

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Carlson Well Drilling, Inc. 1461
Contractor Business Name License of Registration No.
Paul Carlson No. **81** 7/31/06
Authorized Representative Signature Date
Paul Carlson/Mark Thornton 7/14/06

LOCAL COPY **H 225497**

Name of Person Sealing Well or Boring



Appendix D

Site Detailed Soils Report



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Goodhue County, Minnesota**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

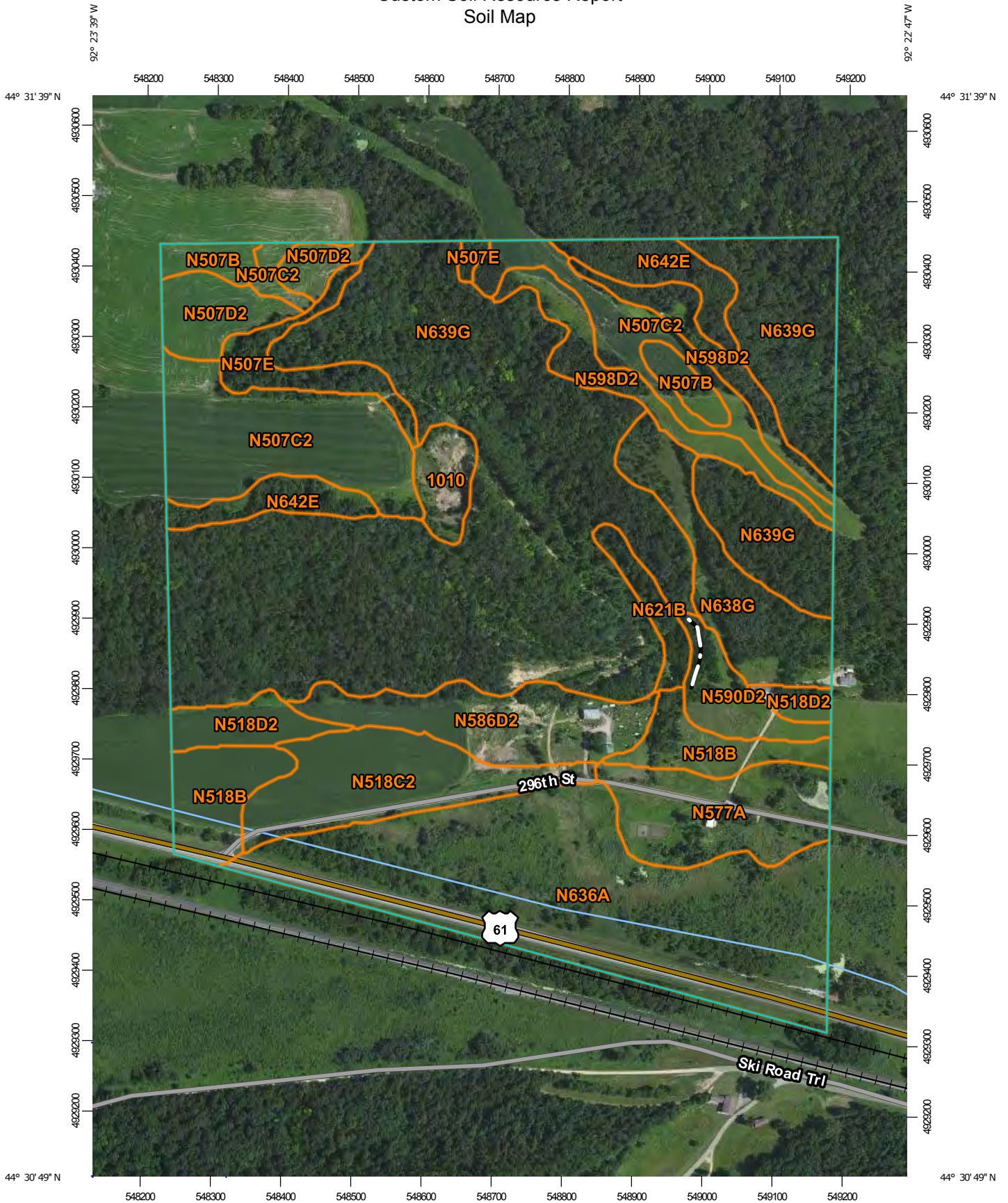
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

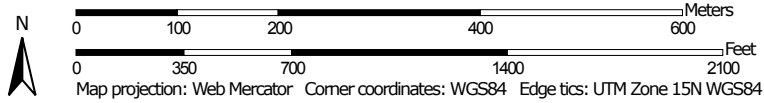
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map




Map Scale: 1:7,480 if printed on A portrait (8.5" x 11") sheet.




MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Goodhue County, Minnesota
 Survey Area Data: Version 12, Sep 19, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 6, 2011—Jul 20, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Goodhue County, Minnesota (MN049)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1010	Pits, quarry	2.9	1.2%
N507B	Timula-Mt. Carroll complex, 2 to 6 percent slopes	3.2	1.4%
N507C2	Timula-Mt. Carroll complex, 6 to 12 percent slopes, moderately eroded	21.1	9.0%
N507D2	Timula-Mt. Carroll complex, 12 to 18 percent slopes, moderately eroded	5.5	2.4%
N507E	Timula-Mt. Carroll complex, 18 to 25 percent slopes	4.5	1.9%
N518B	Lindstrom silt loam, 2 to 6 percent slopes	8.9	3.8%
N518C2	Lindstrom silt loam, 6 to 12 percent slopes, moderately eroded	10.7	4.6%
N518D2	Lindstrom silt loam, 12 to 18 percent slopes, moderately eroded	4.3	1.8%
N577A	Shandep-Cylinder complex, 0 to 2 percent slopes	9.8	4.2%
N586D2	Ridgeton, sandy substratum-Eden Prairie complex, 12 to 20 percent slopes, moderately eroded	9.6	4.1%
N590D2	Tama silt loam, valleys, driftless, 12 to 18 percent slopes, moderately eroded	3.9	1.7%
N598D2	Winneshiek-Waucoma complex, 12 to 18 percent slopes, moderately eroded	8.9	3.8%
N621B	Udifulvents, loamy, 2 to 12 percent slopes, frequently flooded	2.2	1.0%
N636A	Houghton muck, ponded, 0 to 1 percent slopes	36.9	15.7%
N638G	Brodale, flaggy-Bellechester complex, 30 to 70 percent slopes	9.2	3.9%
N639G	Frontenac-Lacrescent complex, 30 to 70 percent slopes	86.0	36.7%
N642E	Frankville-Nasset complex, Oneota formation, 18 to 35 percent slopes	6.9	2.9%
Totals for Area of Interest		234.6	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas

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shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Goodhue County, Minnesota

1010—Pits, quarry

Map Unit Setting

National map unit symbol: 1vg33
Elevation: 980 to 1,310 feet
Mean annual precipitation: 28 to 33 inches
Mean annual air temperature: 43 to 48 degrees F
Frost-free period: 140 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, quarry: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Quarry

Setting

Landform: Valley sides, hills

N507B—Timula-Mt. Carroll complex, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vg2j
Elevation: 590 to 1,310 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 140 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Timula and similar soils: 60 percent
Mt. carroll and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timula

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 15 inches: silt loam
Bw - 15 to 28 inches: silt loam
C - 28 to 80 inches: silt loam

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Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Sloping Upland, Neutral (G105XS002MN)
Hydric soil rating: No

Description of Mt. Carroll

Setting

Landform: Loess hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 24 inches: silt loam
Bw - 24 to 46 inches: silt loam
BC - 46 to 60 inches: silt loam
C - 60 to 80 inches: silt loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: Very high (about 12.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Sloping Upland, Neutral (G105XS002MN)
Hydric soil rating: No

N507C2—Timula-Mt. Carroll complex, 6 to 12 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 1vg2k

Elevation: 590 to 1,310 feet

Mean annual precipitation: 30 to 35 inches

Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 140 to 160 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Timula, moderately eroded, and similar soils: 65 percent

Mt. carroll, moderately eroded, and similar soils: 30 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timula, Moderately Eroded

Setting

Landform: Loess hills

Landform position (two-dimensional): Summit, shoulder

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam

Bt - 6 to 15 inches: silt loam

Bw - 15 to 28 inches: silt loam

C - 28 to 80 inches: silt loam

Properties and qualities

Slope: 6 to 12 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 35 percent

Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Other vegetative classification: Sloping Upland, Neutral (G105XS002MN)

Hydric soil rating: No

Description of Mt. Carroll, Moderately Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 24 inches: silt loam
Bw - 24 to 46 inches: silt loam
BC - 46 to 60 inches: silt loam
C - 60 to 80 inches: silt loam

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 35 percent
Available water storage in profile: Very high (about 12.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Sloping Upland, Neutral (G105XS002MN)
Hydric soil rating: No

N507D2—Timula-Mt. Carroll complex, 12 to 18 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 1vg2l
Elevation: 590 to 1,310 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 140 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Timula, moderately eroded, and similar soils: 70 percent
Mt. carroll, moderately eroded, and similar soils: 20 percent

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Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timula, Moderately Eroded

Setting

Landform: Loess hills

Landform position (two-dimensional): Shoulder, summit

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam

Bt - 6 to 15 inches: silt loam

Bw - 15 to 28 inches: silt loam

C - 28 to 80 inches: silt loam

Properties and qualities

Slope: 12 to 18 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 35 percent

Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Other vegetative classification: Sloping; Fine Texture (G105XS023MN)

Hydric soil rating: No

Description of Mt. Carroll, Moderately Eroded

Setting

Landform: Loess hills

Landform position (two-dimensional): Backslope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam

Bt - 8 to 24 inches: silt loam

Bw - 24 to 46 inches: silt loam

BC - 46 to 60 inches: silt loam

C - 60 to 80 inches: silt loam

Properties and qualities

Slope: 12 to 18 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 35 percent

Available water storage in profile: Very high (about 12.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Other vegetative classification: Sloping; Fine Texture (G105XS023MN)

Hydric soil rating: No

N507E—Timula-Mt. Carroll complex, 18 to 25 percent slopes

Map Unit Setting

National map unit symbol: 1vg2m

Elevation: 590 to 1,310 feet

Mean annual precipitation: 30 to 35 inches

Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 140 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Timula and similar soils: 65 percent

Mt. carroll and similar soils: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timula

Setting

Landform: Loess hills

Landform position (two-dimensional): Shoulder, summit

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loess

Typical profile

A - 0 to 6 inches: silt loam

Bt - 6 to 15 inches: silt loam

Bw - 15 to 28 inches: silt loam

C - 28 to 80 inches: silt loam

Properties and qualities

Slope: 18 to 25 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: High

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 35 percent

Available water storage in profile: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: B

Other vegetative classification: Steep; Fine Texture (G105XS017MN)

Hydric soil rating: No

Description of Mt. Carroll

Setting

Landform: Loess hills

Landform position (two-dimensional): Backslope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loess

Typical profile

A - 0 to 8 inches: silt loam

Bt - 8 to 24 inches: silt loam

Bw - 24 to 46 inches: silt loam

BC - 46 to 60 inches: silt loam

C - 60 to 80 inches: silt loam

Properties and qualities

Slope: 18 to 25 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 35 percent

Available water storage in profile: Very high (about 12.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: B

Other vegetative classification: Steep; Fine Texture (G105XS017MN)

Hydric soil rating: No

N518B—Lindstrom silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1vg2t
Elevation: 590 to 1,310 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 140 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Lindstrom and similar soils: 75 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lindstrom

Setting

Landform: Valley sides
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty alluvium over colluvium

Typical profile

Ap,A - 0 to 29 inches: silt loam
Bw - 29 to 60 inches: silt loam
C - 60 to 80 inches: loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 13.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Sloping Upland, Neutral (G105XS002MN)
Hydric soil rating: No

N518C2—Lindstrom silt loam, 6 to 12 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 1vg2v

Elevation: 590 to 1,310 feet

Mean annual precipitation: 30 to 35 inches

Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 140 to 160 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Lindstrom, moderately eroded, and similar soils: 75 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lindstrom, Moderately Eroded

Setting

Landform: Valley sides

Landform position (two-dimensional): Footslope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Silty alluvium over colluvium

Typical profile

Ap,A - 0 to 29 inches: silt loam

Bw - 29 to 60 inches: silt loam

C - 60 to 80 inches: loam

Properties and qualities

Slope: 6 to 12 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very high (about 13.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Other vegetative classification: Sloping Upland, Neutral (G105XS002MN)

Hydric soil rating: No

N518D2—Lindstrom silt loam, 12 to 18 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 1vg2x
Elevation: 590 to 1,310 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 140 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Lindstrom, moderately eroded, and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lindstrom, Moderately Eroded

Setting

Landform: Valley sides
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty alluvium over colluvium

Typical profile

Ap,A - 0 to 29 inches: silt loam
Bw - 29 to 60 inches: silt loam
C - 60 to 80 inches: loam

Properties and qualities

Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 13.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Sloping; Fine Texture (G105XS023MN)
Hydric soil rating: No

N577A—Shandep-Cylinder complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1n8jh
Elevation: 590 to 1,310 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Shandep and similar soils: 50 percent
Cylinder and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shandep

Setting

Landform: Swales on outwash plains, swales on stream terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy sediments over sandy and gravelly outwash

Typical profile

Ap - 0 to 5 inches: loam
A - 5 to 29 inches: clay loam
Bg1 - 29 to 37 inches: clay loam
Bg2 - 37 to 45 inches: loam
2Cg - 45 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Other vegetative classification: Level Swale, Neutral (G105XS001MN)
Hydric soil rating: Yes

Description of Cylinder

Setting

Landform: Flats on outwash plains, flats on stream terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy sediments over sandy and gravelly outwash

Typical profile

Ap,A1 - 0 to 14 inches: loam
A2 - 14 to 18 inches: loam
Bg1 - 18 to 24 inches: clay loam
Bg2 - 24 to 28 inches: loam
2BC,2C - 28 to 80 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Other vegetative classification: Level Swale, Neutral (G105XS001MN)
Hydric soil rating: No

N586D2—Ridgeton, sandy substratum-Eden Prairie complex, 12 to 20 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 1qfjn
Elevation: 590 to 1,310 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 140 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgeton, sandy substratum, moderately eroded, and similar soils: 65 percent
Eden prairie, moderately eroded, and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgeton, Sandy Substratum, Moderately Eroded

Setting

Landform: Valley sides
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy colluvium over eolian sands or sandy outwash

Typical profile

Ap,A - 0 to 34 inches: loam
Bt - 34 to 62 inches: loam
2BC - 62 to 68 inches: loamy sand
2C - 68 to 80 inches: sand

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Sloping; Fine Texture (G105XS023MN)
Hydric soil rating: No

Description of Eden Prairie, Moderately Eroded

Setting

Landform: Terraces
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy sediments over sandy outwash

Typical profile

Ap - 0 to 10 inches: sandy loam
Bt - 10 to 16 inches: sandy loam
2Bt - 16 to 26 inches: loamy sand
2C1 - 26 to 50 inches: sand
2C2 - 50 to 80 inches: sand

Properties and qualities

Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Low

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Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 5 percent

Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A

Other vegetative classification: Unnamed (G105XS022MN)

Hydric soil rating: No

N590D2—Tama silt loam, valleys, driftless, 12 to 18 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2tc5v

Elevation: 560 to 1,740 feet

Mean annual precipitation: 31 to 39 inches

Mean annual air temperature: 41 to 50 degrees F

Frost-free period: 120 to 190 days

Farmland classification: Not prime farmland

Map Unit Composition

Tama, valleys, moderately eroded, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tama, Valleys, Moderately Eroded

Setting

Landform: Valley sides

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam

BA - 6 to 9 inches: silty clay loam

Bt - 9 to 35 inches: silty clay loam

BC, C - 35 to 79 inches: silt loam

Properties and qualities

Slope: 12 to 18 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Custom Soil Resource Report

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: High (about 11.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Other vegetative classification: Sloping; Fine Texture (G105XS023MN)

Hydric soil rating: No

Minor Components

Timula

Percent of map unit: 5 percent

Landform: Valley sides

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Linear

Other vegetative classification: Sloping; Fine Texture (G105XS023MN)

Hydric soil rating: No

Lindstrom

Percent of map unit: 5 percent

Landform: Valley sides

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Linear

Other vegetative classification: Sloping Upland, Neutral (G105XS002MN)

Hydric soil rating: No

Nasset

Percent of map unit: 5 percent

Landform: Valley sides

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Linear

Other vegetative classification: Sloping; Fine Texture (G105XS023MN)

Hydric soil rating: No

**N598D2—Winneshiek-Waucoma complex, 12 to 18 percent slopes,
moderately eroded**

Map Unit Setting

National map unit symbol: 1t20s
Elevation: 590 to 1,310 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 140 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Winneshiek, moderately eroded, and similar soils: 45 percent
Waucoma, moderately eroded, and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Winneshiek, Moderately Eroded

Setting

Landform: Valley sides
Landform position (two-dimensional): Shoulder, backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy sediments over residuum over limestone bedrock

Typical profile

Ap - 0 to 7 inches: loam
E, BE - 7 to 16 inches: loam
Bt - 16 to 21 inches: clay loam
2Bt - 21 to 24 inches: clay
3R - 24 to 60 inches: weathered bedrock

Properties and qualities

Slope: 12 to 18 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Other vegetative classification: Sandy (G104XS022MN)
Hydric soil rating: No

Description of Waucoma, Moderately Eroded

Setting

Landform: Valley sides
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy sediments over residuum over limestone bedrock

Typical profile

Ap - 0 to 6 inches: loam
E, BE - 6 to 17 inches: loam
Bt - 17 to 45 inches: loam
2Bt - 45 to 55 inches: clay
3R - 55 to 60 inches: weathered bedrock

Properties and qualities

Slope: 12 to 18 percent
Depth to restrictive feature: 40 to 80 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Sloping; Fine Texture (G104XS023MN)
Hydric soil rating: No

N621B—Udifluents, loamy, 2 to 12 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 20j5h
Elevation: 590 to 1,310 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 140 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Udifluents, loamy, frequently flooded, and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udifluvents, Loamy, Frequently Flooded

Setting

Landform: Drainageways
Landform position (two-dimensional): Toeslope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy alluvium

Typical profile

A - 0 to 9 inches: silt loam
C - 9 to 26 inches: stratified silt loam
Ab - 26 to 39 inches: silt loam
Bw - 39 to 52 inches: silt loam
2C - 52 to 60 inches: very gravelly loam

Properties and qualities

Slope: 2 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B
Other vegetative classification: Wet Frequently Flooded (G105XS015MN)
Hydric soil rating: No

N636A—Houghton muck, ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1vg45
Elevation: 590 to 1,310 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Houghton, ponded, and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Houghton, Ponded

Setting

Landform: Depressions on stream terraces
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material

Typical profile

Oa - 0 to 80 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Other vegetative classification: Not Suited (G105XS024MN)
Hydric soil rating: Yes

N638G—Brodale, flaggy-Bellechester complex, 30 to 70 percent slopes

Map Unit Setting

National map unit symbol: 1vhlx
Elevation: 590 to 1,310 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 140 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Brodale, flaggy, and similar soils: 45 percent
Bellechester and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brodale, Flaggy

Setting

Landform: Valley sides
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex

Custom Soil Resource Report

Parent material: Loamy colluvium

Typical profile

A - 0 to 12 inches: channery loam

C - 12 to 60 inches: very flaggy loam

Properties and qualities

Slope: 30 to 70 percent

Percent of area covered with surface fragments: 15.0 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 60 percent

Available water storage in profile: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Ecological site: Dolomite Colluvium Bluff Prairie (R105XY001WI)

Other vegetative classification: Not Suited (G105XS024MN)

Hydric soil rating: No

Description of Bellechester

Setting

Landform: Valley sides

Landform position (two-dimensional): Backslope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy colluvium and/or residuum

Typical profile

A - 0 to 16 inches: loamy sand

Bw,BC - 16 to 42 inches: sand

Cr - 42 to 60 inches: weathered bedrock

Properties and qualities

Slope: 30 to 70 percent

Depth to restrictive feature: 40 to 60 inches to paralithic bedrock

Natural drainage class: Excessively drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 5 percent

Available water storage in profile: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Custom Soil Resource Report

Hydrologic Soil Group: A

Ecological site: Sandstone Colluvium Bluff Prairie (R105XY002WI)

Other vegetative classification: Not Suited (G105XS024MN)

Hydric soil rating: No

N639G—Frontenac-Lacrescent complex, 30 to 70 percent slopes

Map Unit Setting

National map unit symbol: 1vhlw

Elevation: 590 to 1,310 feet

Mean annual precipitation: 30 to 35 inches

Mean annual air temperature: 45 to 50 degrees F

Frost-free period: 140 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Frontenac and similar soils: 55 percent

Lacrescent and similar soils: 30 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frontenac

Setting

Landform: Valley sides

Landform position (two-dimensional): Backslope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loamy sediments over loamy-skeletal colluvium

Typical profile

A,AB - 0 to 12 inches: silt loam

Bw - 12 to 30 inches: silt loam

2C - 30 to 80 inches: very channery loam

Properties and qualities

Slope: 30 to 70 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 10 percent

Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Custom Soil Resource Report

Other vegetative classification: Not Suited (G105XS024MN)
Hydric soil rating: No

Description of Lacrescent

Setting

Landform: Valley sides
Landform position (two-dimensional): Shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Silty and loamy sediments over loamy-skeletal colluvium

Typical profile

A - 0 to 10 inches: silt loam
AB - 10 to 17 inches: channery silt loam
2Bw - 17 to 28 inches: very channery silt loam
2C - 28 to 60 inches: very channery silt loam

Properties and qualities

Slope: 30 to 70 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Other vegetative classification: Not Suited (G105XS024MN)
Hydric soil rating: No

N642E—Frankville-Nasset complex, Oneota formation, 18 to 35 percent slopes

Map Unit Setting

National map unit symbol: 1vhlg
Elevation: 590 to 1,310 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 140 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Frankville, oneota formation, and similar soils: 40 percent

Nasset, oneota formation, and similar soils: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frankville, Oneota Formation

Setting

Landform: Valley sides

Landform position (two-dimensional): Backslope, shoulder

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loess over clayey residuum over limestone bedrock

Typical profile

A - 0 to 6 inches: silt loam

BE - 6 to 14 inches: silt loam

Bt - 14 to 23 inches: silt loam

2Bt - 23 to 28 inches: clay

3R - 28 to 80 inches: weathered bedrock

Properties and qualities

Slope: 18 to 35 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Other vegetative classification: Not Suited (G105XS024MN)

Hydric soil rating: No

Description of Nasset, Oneota Formation

Setting

Landform: Valley sides

Landform position (two-dimensional): Backslope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loess over clayey residuum over limestone bedrock

Typical profile

A - 0 to 6 inches: silt loam

BE - 6 to 12 inches: silt loam

Bt - 12 to 37 inches: silt loam

2Bt - 37 to 44 inches: clay

3R - 44 to 60 inches: weathered bedrock

Custom Soil Resource Report

Properties and qualities

Slope: 18 to 35 percent

Depth to restrictive feature: 40 to 60 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Other vegetative classification: Steep; Fine Texture (G105XS017MN)

Hydric soil rating: No

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Custom Soil Resource Report

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Appendix E

Minnesota Endangered Resource Review Request #ERDB 20170411



Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

May 9, 2017

Correspondence # ERDB 20170411

Mr. Sean Duff
Johnson and Scofield, Inc.
1203 Main Street
Red Wing, Minnesota 55066

RE: Natural Heritage Review of the proposed Mahoney Gravel Pit, T112N R13W Section 9; Goodhue County

Dear Mr. Duff,

As requested, the Minnesota Natural Heritage Information System has been queried to determine if any rare species or other significant natural features are known to occur within an approximate one-mile radius of the proposed project. Based on this query, rare features have been documented within the search area (for details, please visit the Rare Species Guide at <http://www.dnr.state.mn.us/rsg/index.html> for more information on the biology, habitat use, and conservation measures of these rare species). Please note that the following rare features may be adversely affected by the proposed project:

A calcareous fen was documented in the vicinity of the proposed project. A calcareous fen is a rare and distinctive peat-accumulating wetland (please see the attached fact sheet) that is legally protected in Minnesota. The Wetlands Conservation Act, authorized by *Minnesota Statutes*, section 103G.223, states that calcareous fens may not be filled, drained, or otherwise degraded, wholly or partially, by any activity, except as provided for in a management plan approved by the commissioner of the Department of Natural Resources. Many of the unique characteristics of calcareous fens result from the upwelling of groundwater through calcareous substrates. Because of this dependence on groundwater hydrology, calcareous fens can be affected by nearby activities or even those several miles away.

The DNR would have concerns regarding any activities that might affect groundwater flows, including groundwater pumping or discharge. As the proposed project may increase groundwater recharge and may need a DNR water appropriations permit depending on the amount of dewatering proposed, the EAW should adequately address potential effects to this fen. If you have any questions regarding calcareous fen regulations, please contact Doug Norris, Wetlands Program Coordinator, at 651-259-5125 or Doug.Norris@state.mn.us.

The proposed project is partially within two areas identified by the Minnesota Biological Survey (MBS) as Sites of High and Moderate Biodiversity Significance (see enclosed map and Site descriptions). Sites of Biodiversity Significance have varying levels of native biodiversity and are ranked based on the relative significance of this biodiversity at a statewide level. Sites ranked as *High* contain very good quality occurrences of the rarest species, high quality examples of the rare native plant communities, and/or important functional landscapes. Sites ranked as *Moderate* contain occurrences of rare species and/or moderately disturbed native plant

Please include a copy of this letter in any state or local license or permit application. Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.

The Minnesota Natural Heritage Information System has been queried to determine if any rare species or other significant natural features are known to occur within an approximate one-mile radius of the proposed project. For the results of this query, please refer to the enclosed database reports (please visit the Rare Species Guide at <http://www.dnr.state.mn.us/rsg/index.html> for more information on the biology, habitat use, and conservation measures of these rare species). I am providing the database reports only and have not evaluated the potential for the proposed project to adversely affect these rare features.

The enclosed results include an Index Report of records in the Rare Features Database, the main database of the NHIS. To control the release of specific location data, the report is copyrighted and only provides rare features locations to the nearest section. The Index Report may be reprinted, unaltered, in any environmental review document (e.g., EAW or EIS), municipal natural resource plan, or report compiled by your company for the project listed above. If you wish to reproduce the Index Report for any other purpose, please contact me to request written permission.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location (noted above) and the project description provided on the NHIS Data Request Form. Please contact me if project details change or for an updated review if construction has not occurred within one year.

The Natural Heritage Review does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. If you have not done so already, please contact your DNR Regional Environmental Assessment Ecologist to determine whether there are other natural resource concerns associated with the proposed project (contact information available at http://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html). Please be aware that additional site assessments or review may be required.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. An invoice will be mailed to you under separate cover.

Sincerely,



Melissa Doperalski
Natural Heritage Review Specialist
Melissa.Doperalski@state.mn.us

Enc. Rare Features Database: Index Report
Rare Features Database Reports: An Explanation of Fields
Map
Wildlife-Friendly Erosion Control Mesh Fact Sheet

Rare Features Database:

Element Name and Occurrence Number

Vertebrate Animal

Crotalus horridus (Timber Rattlesnake) #7
T113N R14W S36, T112N R13W S10, T111N R12W S6, T111N R13W S15, T [..]; Goodhue, Wabasha County
Pituophis catenifer (Gophersnake) #40
T112N R13W S7, T112N R13W S8, T112N R13W S5, T112N R13W S6; Goodhue County

Vascular Plant

Besseyia bullii (Kitten-tails) #56
T112N R13W S17; Goodhue County
Carex sterilis (Sterile Sedge) #42
T112N R13W S8; Goodhue County
Hieracium longipilum (Long-bearded Hawkweed) #11
T112N R14W S13, T112N R15W S13, T112N R13W S27, T112N R14W S26, T [..]; Goodhue, Wabasha County
Quercus bicolor (Swamp White Oak) #10
T113N R13W S29, T113N R13W S31, T113N R13W S30, T112N R13W S5, T [..]; Goodhue County
Rhynchospora capillacea (Hair-like Beak Rush) #101
T112N R13W S8; Goodhue County
Valeriana edulis var. ciliata (Edible Valerian) #37
T112N R13W S8; Goodhue County

Native Plant Community (This may not represent a complete list. Also see MCBS Native Plant Communities at <http://deli.dnr.state.mn.us>)

<u>Calcareous Fen</u> (Southeastern) Type #1 T112N R13W S8; Goodhue County	(NPC Code: OPp93c)	N/A				S1	GNR	1994-06-07	13101
<u>Dry Bedrock Bluff Prairie</u> (Southern) Type #97 T112N R13W S8, T112N R13W S5; Goodhue County	(NPC Code: UPs13e)	N/A				S3	GNR	1990-10-19	11766
<u>Mesic Sandstone Cliff</u> (Southern) Type #499 T112N R13W S17, T112N R13W S8; Goodhue County	(NPC Code: CTs33a)	N/A				S2	GNR	1990-10-17	13100

Printed May 2017
Data valid for one year

Minnesota Natural Heritage Information System
Index Report of records within 1 mile radius of:
Proposed Mahoney Gravel Pit

SGCN Status: SGCN = The species is a Species in Greatest Conservation Need as identified in Minnesota's State Wildlife Action Plan (<http://www.dnr.state.mn.us/cwcs/index.html>). This designation applies to animals only.

State Rank: Rank that best characterizes the relative rarity or endangerment of the taxon or plant community in Minnesota. The ranks do not represent a legal status. They are used by the Minnesota Department of Natural Resources to set priorities for research, inventory and conservation planning. The state ranks are updated as inventory information becomes available. S1 = Critically imperiled in Minnesota because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. S2 = Imperiled in Minnesota because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. S3 = Vulnerable in Minnesota either because rare or uncommon, or found in a restricted range, or because of other factors making it vulnerable to extirpation. S4 = Apparently secure in Minnesota, usually widespread. S5 = Demonstrably secure in Minnesota, essentially ineradicable under present conditions. SH = Of historical occurrence in the state, perhaps having not been verified in the past 20 years, but suspected to be still extant. An element would become SH without the 20-year delay if the only known occurrences in the state were destroyed or if it had been extensively and unsuccessfully looked for. SNR = Rank not yet assessed. SU = Unable to rank. SX = Presumed extinct in Minnesota. SNA = Rank not applicable. S#S# = Range Rank: a numeric range rank (e.g., S2S3) is used to indicate the range of uncertainty about the exact status of the element. S#B, S#N = Used only for migratory animals, whereby B refers to the breeding population of the element in Minnesota and N refers to the non-breeding population of the element in Minnesota.

Global Rank: The global (i.e., range-wide) assessment of the relative rarity or imperilment of the species or community. Ranges from G1 (critically imperiled due to extreme rarity on a world-wide basis) to G5 (demonstrably secure, though perhaps rare in parts of its range). Global ranks are determined by NatureServe, an international network of natural heritage programs and conservation data centers.

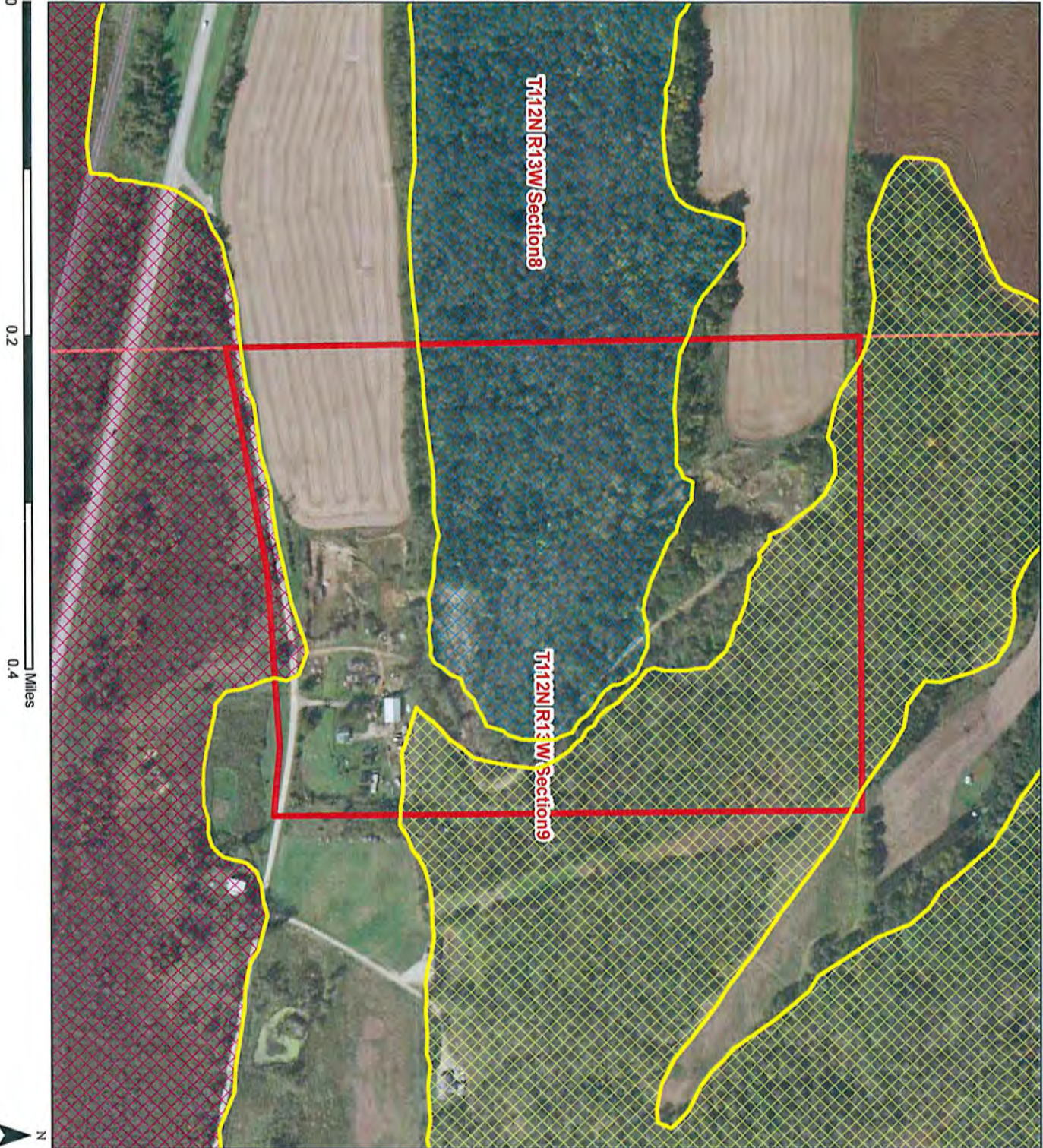
Last Observed Date: Date that the Element Occurrence was last observed to be extant at the site in format YYYY-MM-DD.

EO ID #: Unique identifier for each Element Occurrence record.

Element Occurrence: An area of land and/or water in which an Element (i.e., a rare species or community) is, or was, present, and which has practical conservation value for the Element as evidenced by potential continued (or historical) presence and/or regular recurrence at a given location. Specifications for each species determine whether multiple observations should be considered 1 Element Occurrence or 2, based on minimum separation distance and barriers to movement.

ERDB# 201704011 - Mahoney Gravel Pit
T112N R13W Section 9
Goodhue County

GIS shapefiles of MBS Sites of Biodiversity Significance & DNR Native Plant Communities can be downloaded from the MN Geospatial Commons at <https://gisdata.mn.gov/>



- Legend**
- Mahoney Gravel Pit Project Boundary
 - MBS Sites of Biodiversity Significance
 - Outstanding
 - High
 - Moderate
 - Below
 - PLS Section

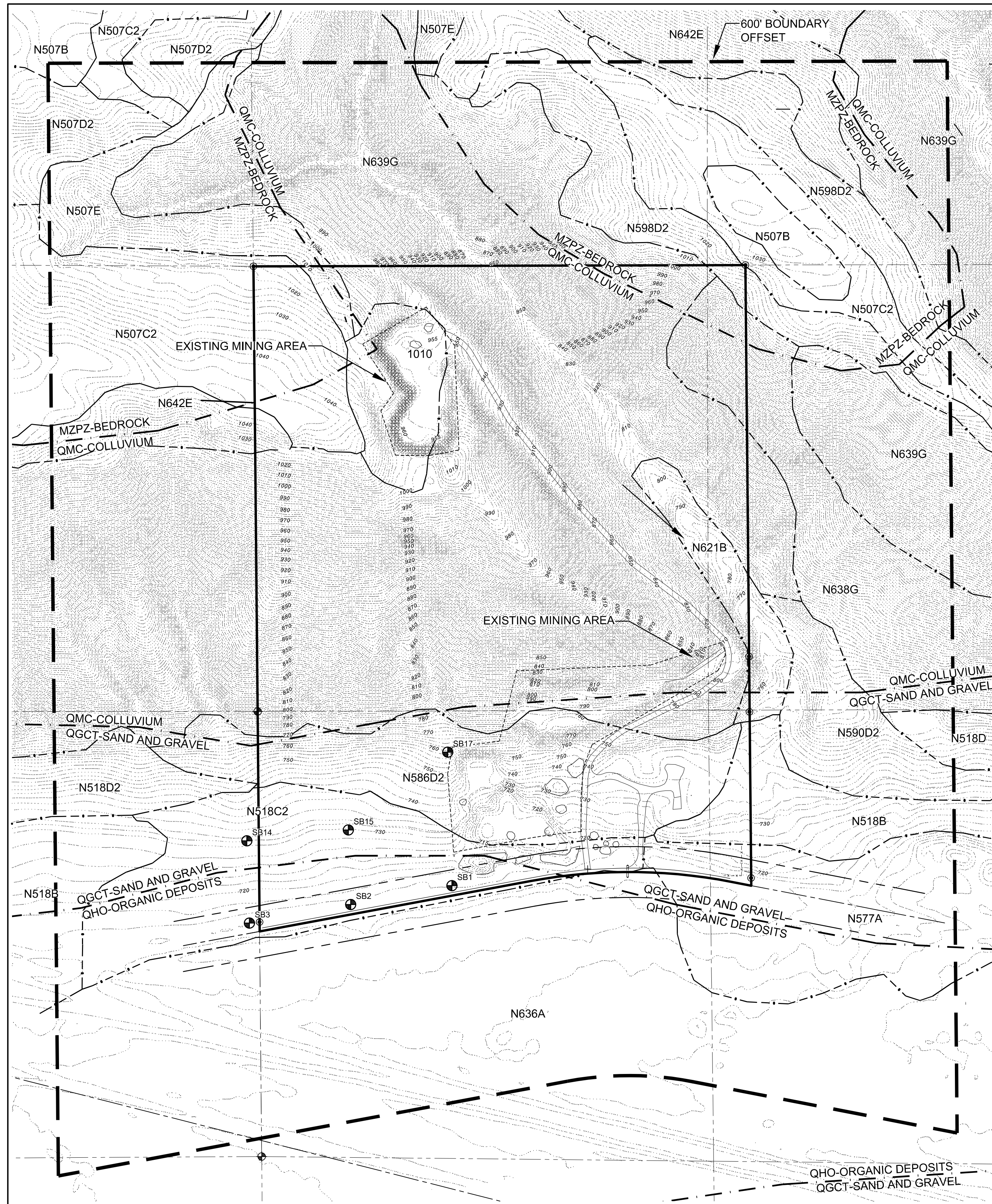


Copyright 2017, State of Minnesota, Department of Natural Resources (DNR). Data was provided by the Division of Ecological and Water Resources, Minnesota DNR. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present.

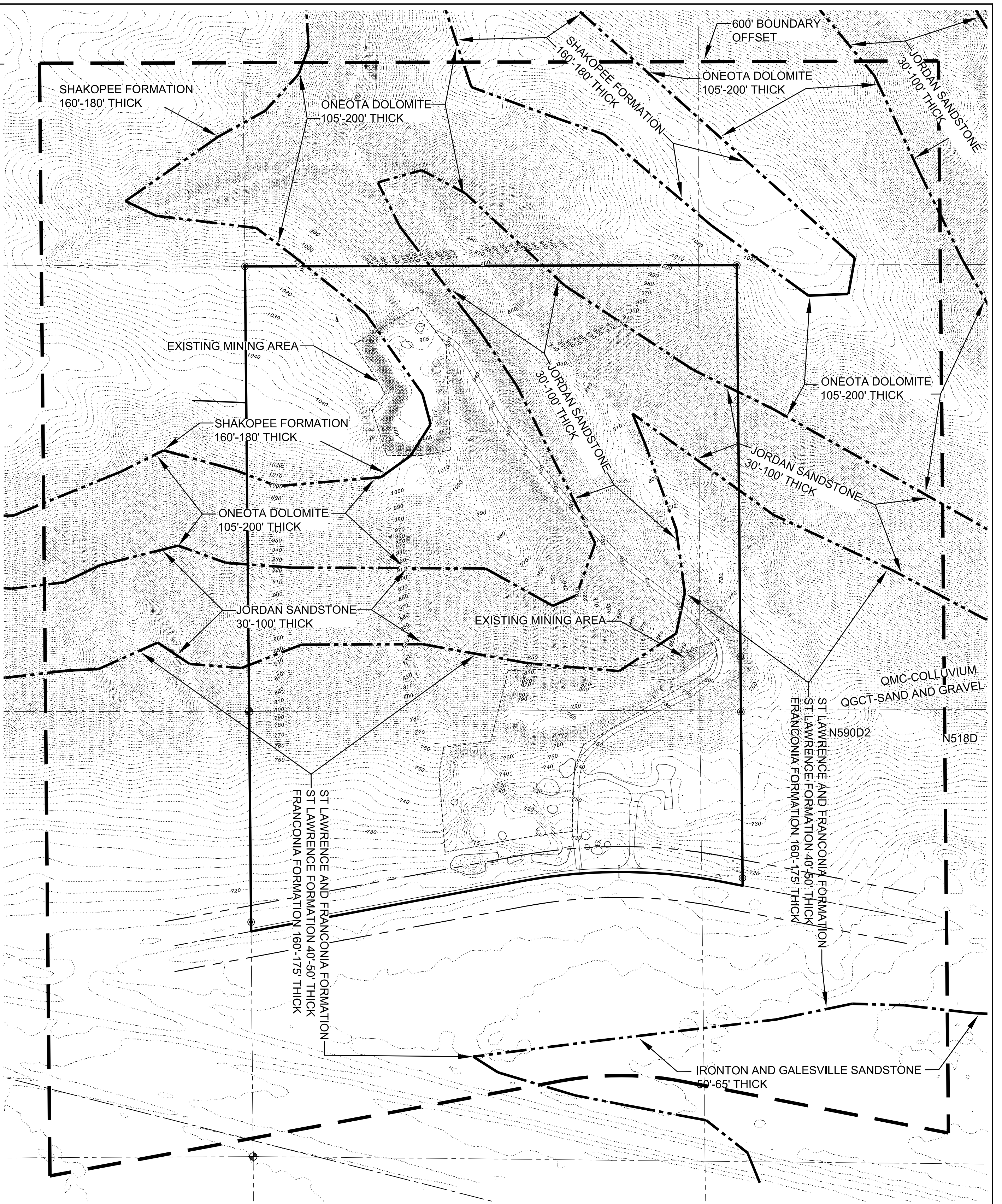


Appendix F

MAP A (Existing Conditions)



- ### LEGEND
- These standard symbols will be found on this plan sheet.
- DENOTES SECTION LINE
 - DENOTES CENTERLINE OF ROAD
 - DENOTES PROPERTY LINE
 - DENOTES 600' BOUNDARY OFFSET LINE
 - DENOTES EXISTING ROAD RIGHT OF WAY LINE
 - DENOTES EASEMENT
 - DENOTES WETLAND BOUNDARY
 - DENOTES EXISTING PIT BOUNDARY
 - DENOTES BEDROCK UNIT BOUNDARY
 - DENOTES QUATERNARY SEDIMENT UNIT BOUNDARY
 - DENOTES SOIL UNIT BOUNDARY
 - DENOTES WATER TABLE CONTOUR
 - DENOTES GROUND WATER DEPTH BOUNDARY
 - DENOTES EXISTING SURFACE FLOW PATH
 - DENOTES AQUIFER FLOW DIRECTION
 - DENOTES EXISTING INDEX CONTOUR AND ELEVATION
 - DENOTES EXISTING 1' CONTOUR
 - DENOTES EXISTING OVERHEAD POWER LINE
 - DENOTES EXISTING UNDERGROUND TELEPHONE LINE
 - DENOTES EXISTING FENCE
 - DENOTES EXISTING RAILROAD TRACKS
 - DENOTES SECTION CORNER
 - DENOTES EXISTING IRON PIPE (BOUNDARY MARKER)
 - DENOTES EXISTING ELECTRIC METER
 - DENOTES EXISTING POWER POLE WITH GUY WIRE
 - DENOTES WELL
 - DENOTES SEPTIC SYSTEM
 - DENOTES HOUSE OR SHED
 - DENOTES EXISTING WETLAND
 - DENOTES QHO-ORGANIC DEPOSITS
 - DENOTES QGCT-SAND AND GRAVEL
 - DENOTES QMC-COLLUVIUM
 - DENOTES MZPZ-BEDROCK
 - DENOTES SOIL UNIT
 - DENOTES SOIL BORE



SOIL BORINGS

SEE APPENDIX "P" FOR SOIL BORE RECORDS

SOIL UNITS AND DEPTH TO BEDROCK

SOIL UNIT	DEPTH TO BEDROCK	SOIL UNIT	DEPTH TO BEDROCK
N1010	N/A	N507B	MORE THAN 80"
N507C2	MORE THAN 80"	N507D2	MORE THAN 80"
N507E	MORE THAN 80"	N518B	MORE THAN 80"
N518C2	MORE THAN 80"	N518D2	MORE THAN 80"
N577A	MORE THAN 80"	N590D2	MORE THAN 80"
N590D2	MORE THAN 80"	N598D2	20'-40"
N621B	MORE THAN 80"	N636A	MORE THAN 80"
N639G	MORE THAN 80"	N639G	MORE THAN 80"
N642E	20'-40"		

NOTE: SOIL UNITS, AND DEPTH TO BEDROCK COME FROM USDA NRCS WEB SOIL SURVEY

QUATERNARY SEDIMENTS:

QHO-ORGANIC DEPOSITS (HOLOCENE) PEAT AND ORGANIC-RICH SILT AND CLAY DEPOSITED IN POORLY DRAINED DEPRESSIONS.

QGCT-SAND AND GRAVEL OF GREY CLOUD TERRACE (HOLOCENE AND PLEISTOCENE) DEPOSITS OF RIVER WARREN. COARSE, CLEAN SAND AND GRAVEL DERIVED FROM THE MISSISSIPPI VALLEY TRAIN AND REWORKED BY THE SWIFT WATER OF RIVER WARREN. DEPTH OF REWORKING UNCERTAIN. UNIT CONSISTS OF MORE THAN ONE LEVEL, SEPARATED BY SCARPIS. NORMAL TERRACE ELEVATIONS IN THE COUNTY, 680-720 FEET.

QMC-COLLUVIUM (PLEISTOCENE)-HILLSLOPE DEPOSITS DERIVED FROM BEDROCK AND FROM LOESS UPSLOPE. TYPICALLY CONSISTS OF TWO SUBUNITS: (1) A ROCKY LOWER UNIT OF ANGULAR CARBONATE CLASTS IN A SILTY TO SANDY MATRIX, WHICH IS OVERLAIN BY (2) A UNIT, PRIMARILY COMPOSED OF SILT, THAT CONTAINS A FEW CARBONATE CLASTS. THE COMPOSITION OF THE LOWER UNIT REFLECTS THE BEDROCK UPSLOPE. THE UPPER UNIT IS LARGELY REWORKED LOESS. BOTH STRATA ARE THIN (LESS THAN 5' ON THE UPPER PARTS OF THE SLOPE; THEY THICKEN DOWNSLOPE TO MAXIMUM OF ABOUT 30'. EXPOSURE OF BEDROCK IS COMMON, ESPECIALLY ON THE UPPER PARTS OF SLOPES.

MZPZ-BEDROCK UNDIVIDED (CRETACEOUS, ORDOVICIAN, CAMBRIAN) - BEDROCK OUTCROPS AND BEDROCK THAT IS GENERALLY WITHIN 5' OF THE SURFACE, EXCLUSIVE OF LOESS, INCLUDES SCANTY AND WIDELY SCATTERED DEPOSITS AND WEATHERING RESIDUUM OF CRETACEOUS AGE. AS WELL AS MORE RECENTLY WEATHERED BEDROCK. SOLID BEDROCK, THEREFORE, IS DEEPER THAN 5' IN MANY PARTS OF THIS UNIT.

FRACTURE PATTERNS

SEE APPENDIX "Q" FOR FRACTURE PATTERNS

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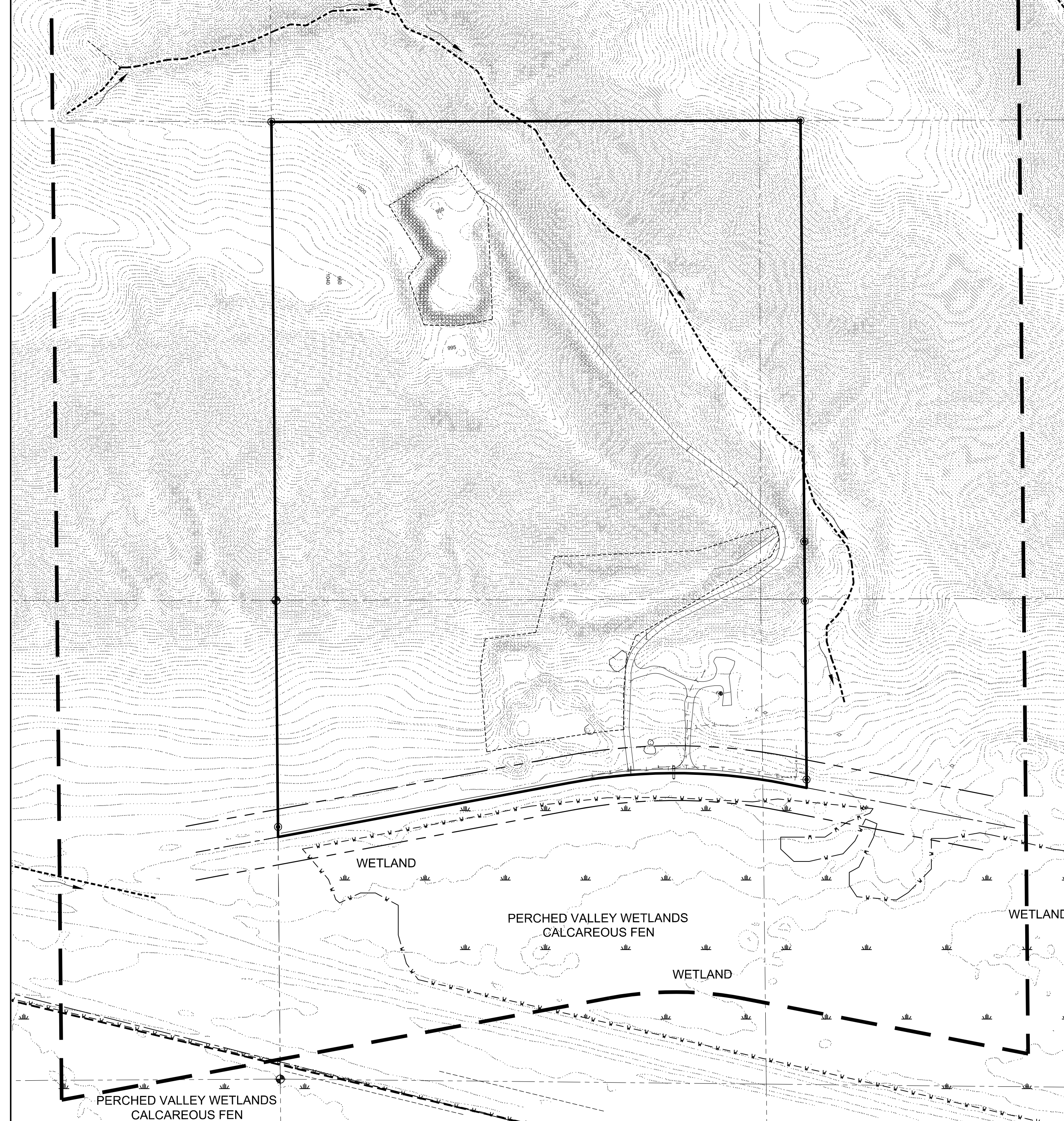
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DOUG MAHONEY
 FLORENCE TOWNSHIP, MINNESOTA

MAP A.2
GEOLOGY
 SHEET 2 OF 4 SHEETS

016\CIVIL

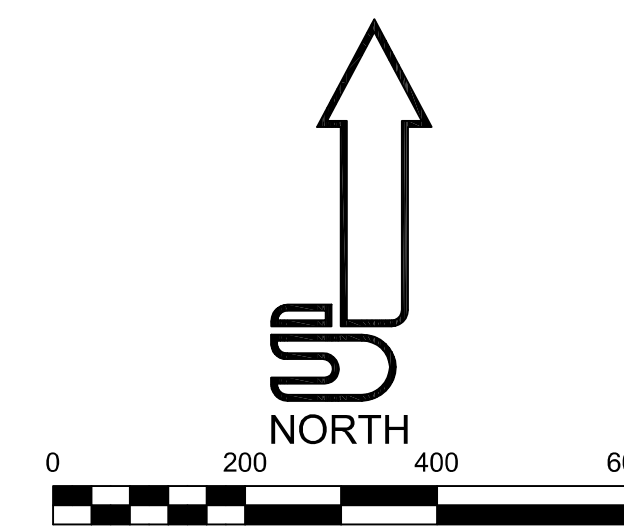


SURFACE HYDROLOGY

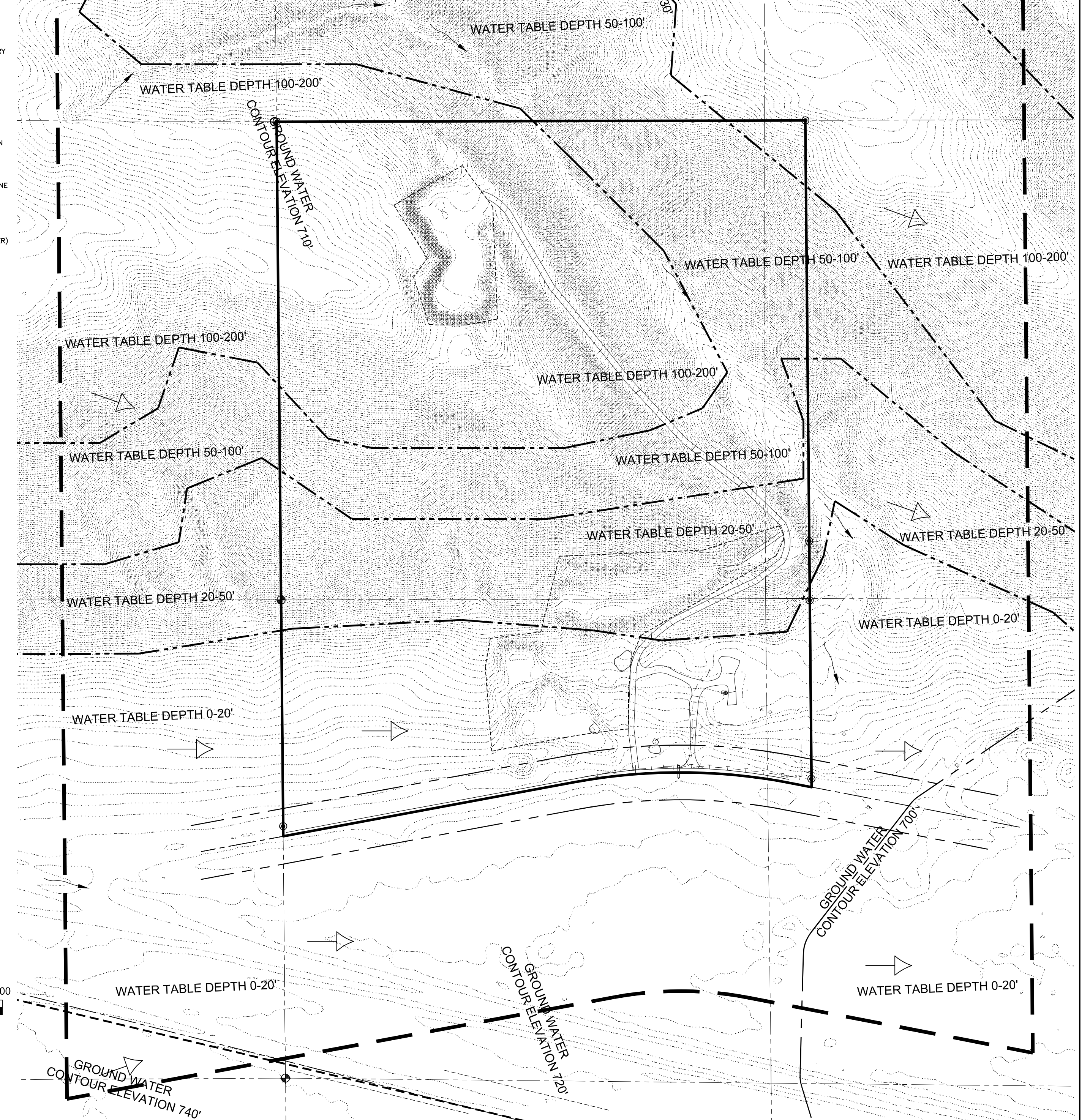
LEGEND

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- DENOTES CENTERLINE OF ROAD
- DENOTES PROPERTY LINE
- DENOTES 600' BOUNDARY OFFSET LINE
- DENOTES EXISTING ROAD RIGHT OF WAY LINE
- DENOTES EASEMENT
- DENOTES WETLAND BOUNDARY
- DENOTES EXISTING PIT BOUNDARY
- DENOTES BEDROCK UNIT BOUNDARY
- DENOTES QUATERNARY SEDIMENT UNIT BOUNDARY
- DENOTES SOIL UNIT BOUNDARY
- DENOTES WATER TABLE CONTOUR
- DENOTES GROUND WATER DEPTH BOUNDARY
- DENOTES EXISTING SURFACE FLOW PATH
- DENOTES AQUIFER FLOW DIRECTION
- 925 --- DENOTES EXISTING IDEK CONTOUR AND ELEVATION
- DENOTES EXISTING 1' CONTOUR
- DENOTES EXISTING OVERHEAD POWER LINE
- DENOTES EXISTING UNDERGROUND TELEPHONE LINE
- DENOTES EXISTING FENCE
- DENOTES EXISTING RAILROAD TRACKS
- DENOTES SECTION CORNER
- DENOTES EXISTING IRON PIPE (BOUNDARY MARKER)
- DENOTES EXISTING ELECTRIC METER
- DENOTES EXISTING POWER POLE WITH GUY WIRE
- DENOTES WELL
- DENOTES SEPTIC SYSTEM
- DENOTES HOUSE OR SHED
- DENOTES EXISTING WETLAND
- DENOTES QHO--ORGANIC DEPOSITS
- DENOTES QGCT--SAND AND GRAVEL
- DENOTES QMC--COLLUVIUM
- DENOTES MZPZ--BEDROCK



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GROUND WATER

GENERAL NOTES:

- SEE ATTACHED WELL MAP (SHEET 5) FOR WELL INFORMATION.
- GEOLOGICAL INFORMATION COMES FROM THE USGS AND THE MINNESOTA GEOLOGICAL SURVEY.
- CONTOUR DATA OUT SIDE OF THE PIT BOUNDARIES COMES FROM THE GOODHUE COUNTY OFFICE OF GIS.
- WETLAND DATA COMES FROM THE NWI AND THE USGS
- HYDROLOGICAL INFORMATION COMES FROM THE USGS, MN DNR, AND THE MINNESOTA GEOLOGICAL SURVEY.

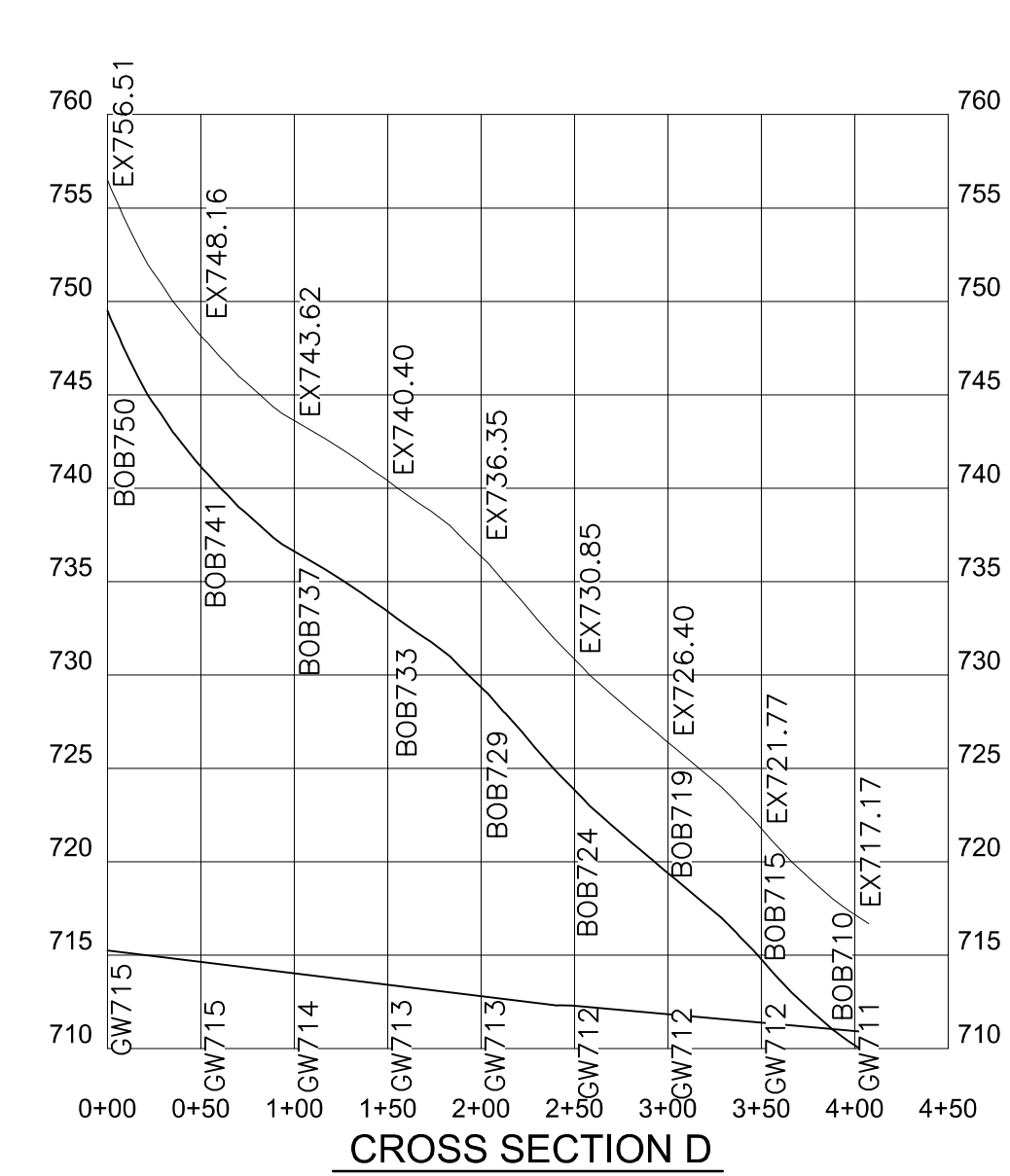
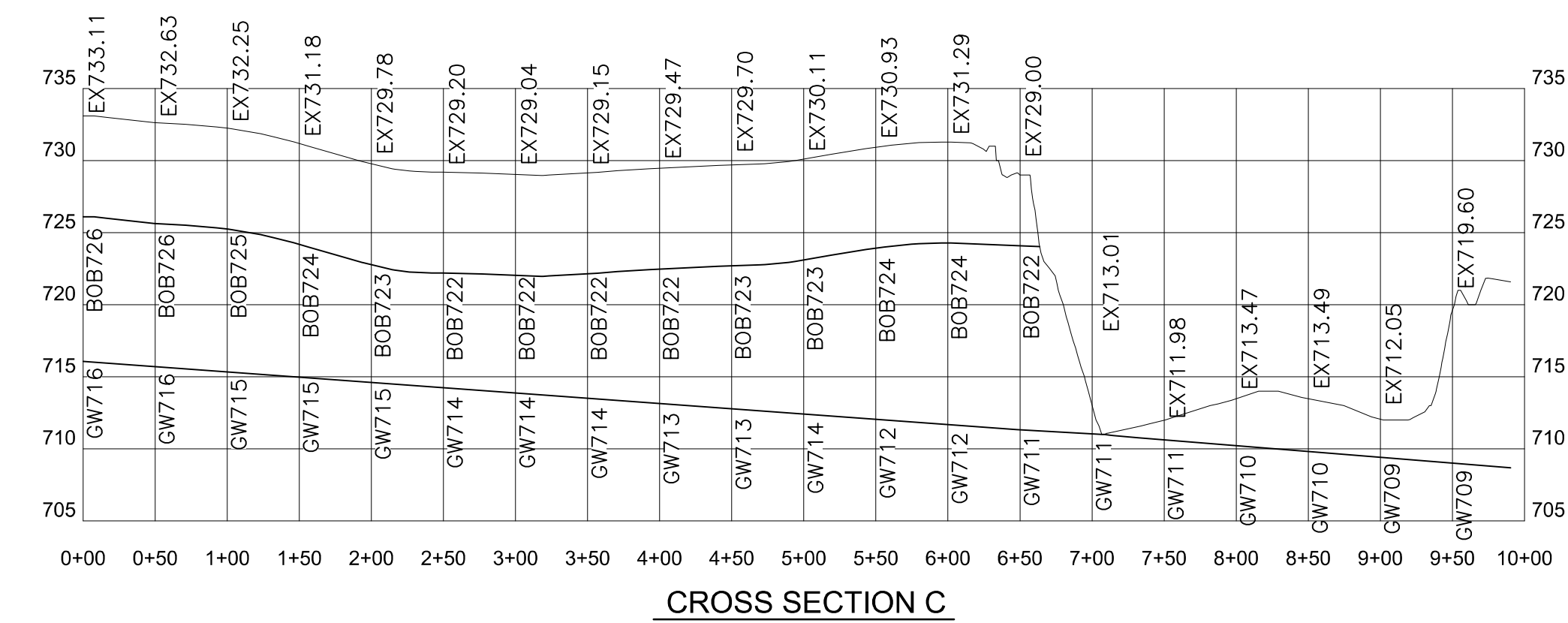
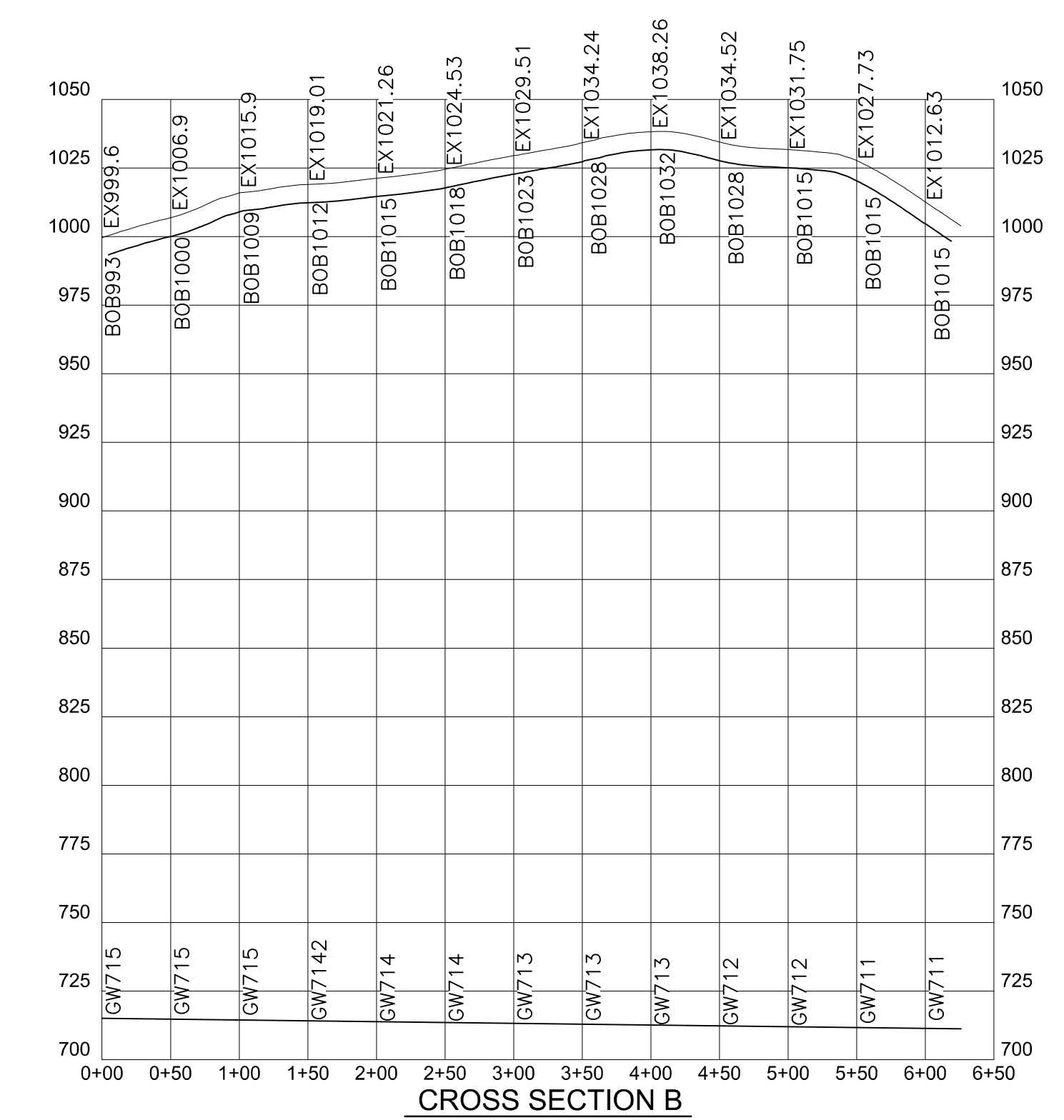
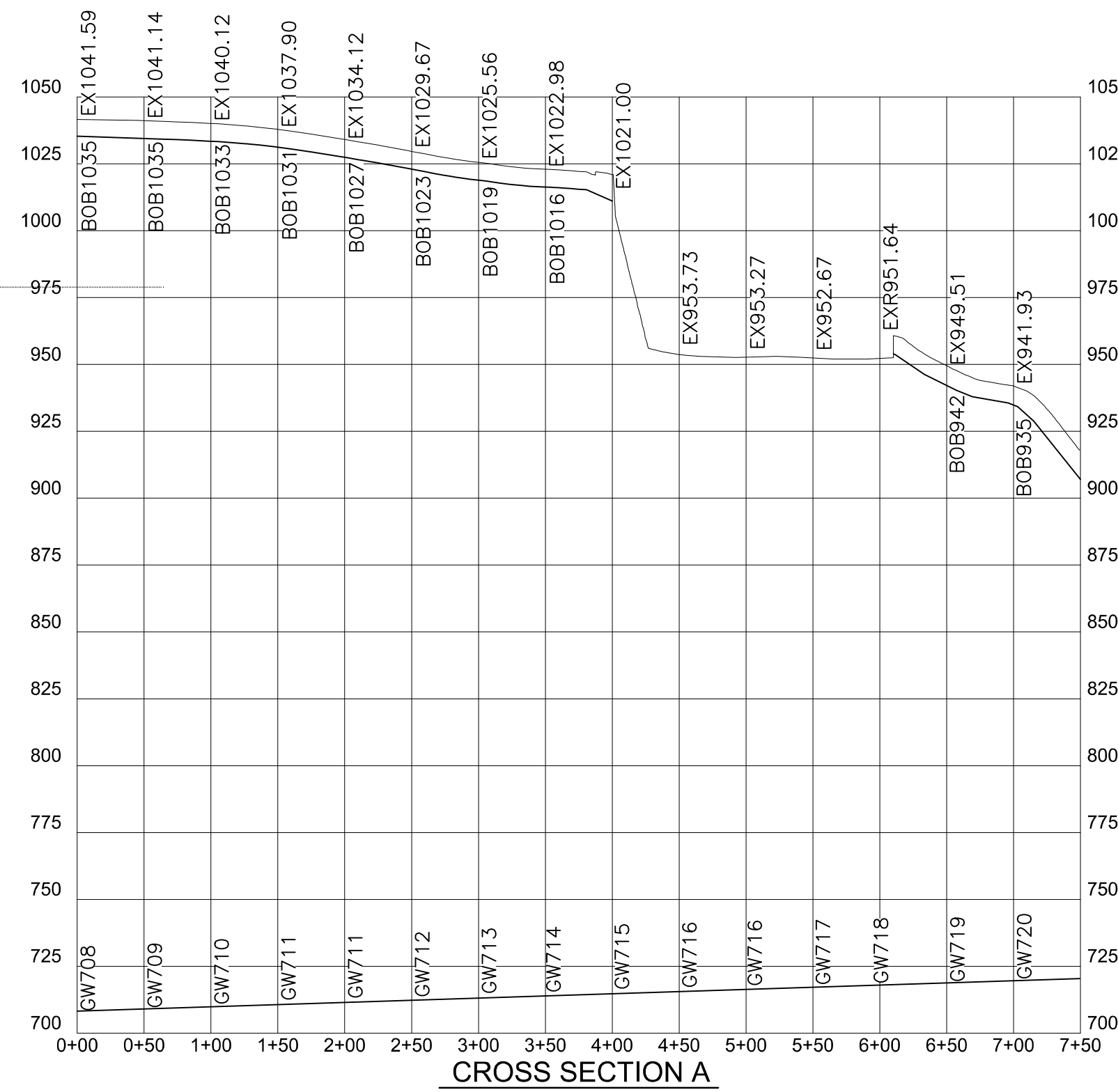
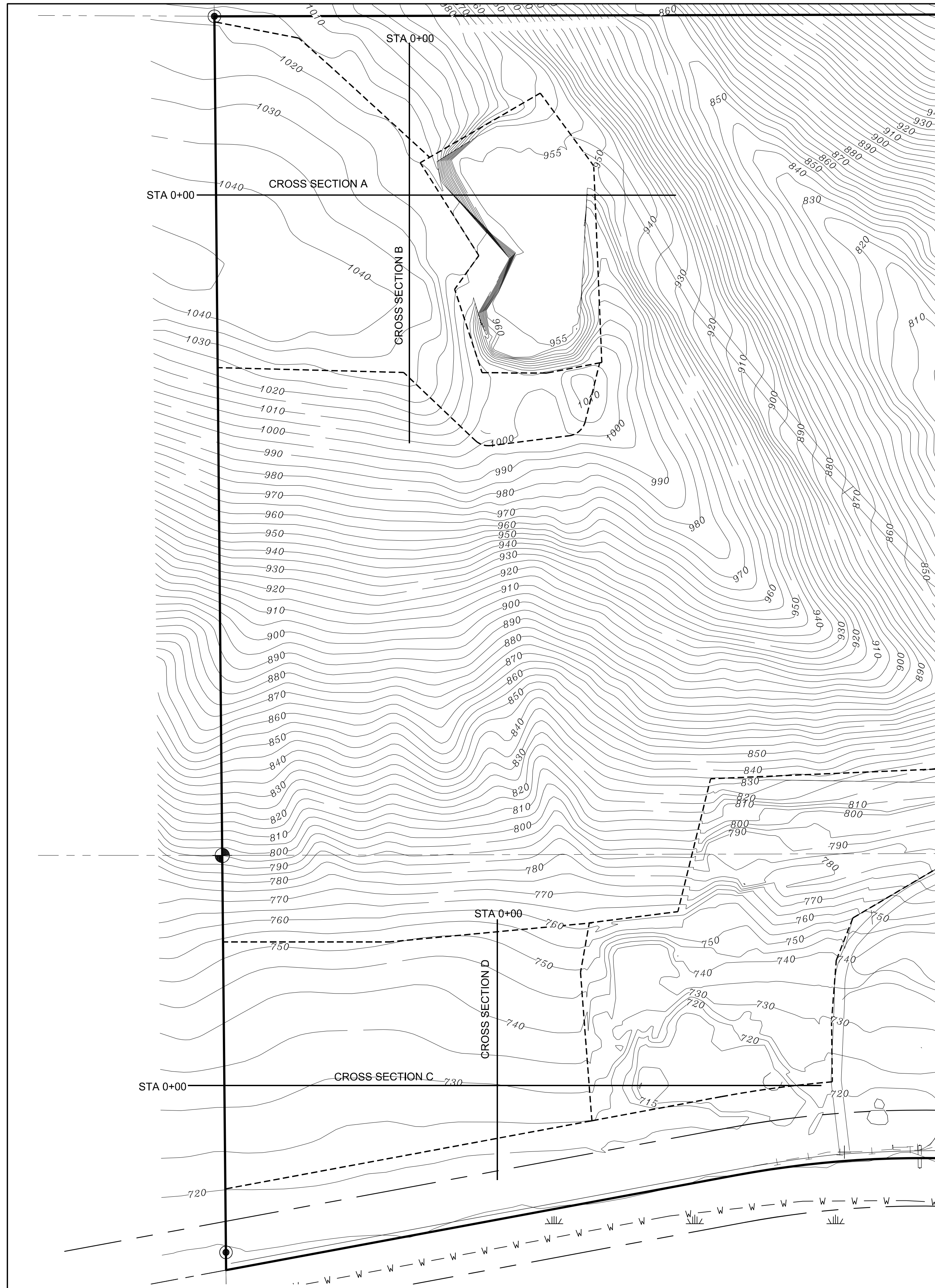
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SPV				32245 296TH STREET
				RED WING, MN 55066
				PHONE: 651-380-3071

DOUG MAHONEY
 FLORENCE TOWNSHIP, MINNESOTA

MAP A.3
HYDROLOGY
 SHEET 3 OF 4 SHEETS



- LEGEND**
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 - DENOTES CENTERLINE OF ROAD
 - DENOTES PROPERTY LINE
 - DENOTES 60' BOUNDARY OFFSET LINE
 - DENOTES EXISTING ROAD RIGHT OF WAY LINE
 - DENOTES EASEMENT
 - DENOTES WETLAND BOUNDARY
 - DENOTES EXISTING PIT BOUNDARY
 - DENOTES PROPOSED PIT BOUNDARY
 - 925 DENOTES EXISTING INDEX CONTOUR AND ELEVATION
 - EX713.01 DENOTES EXISTING GROUND ELEVATION
 - BOB722 DENOTES EXISTING BOTTOM OF OVERBURDEN ELEVATION
 - GW711 DENOTES EXISTING GROUNDWATER ELEVATION

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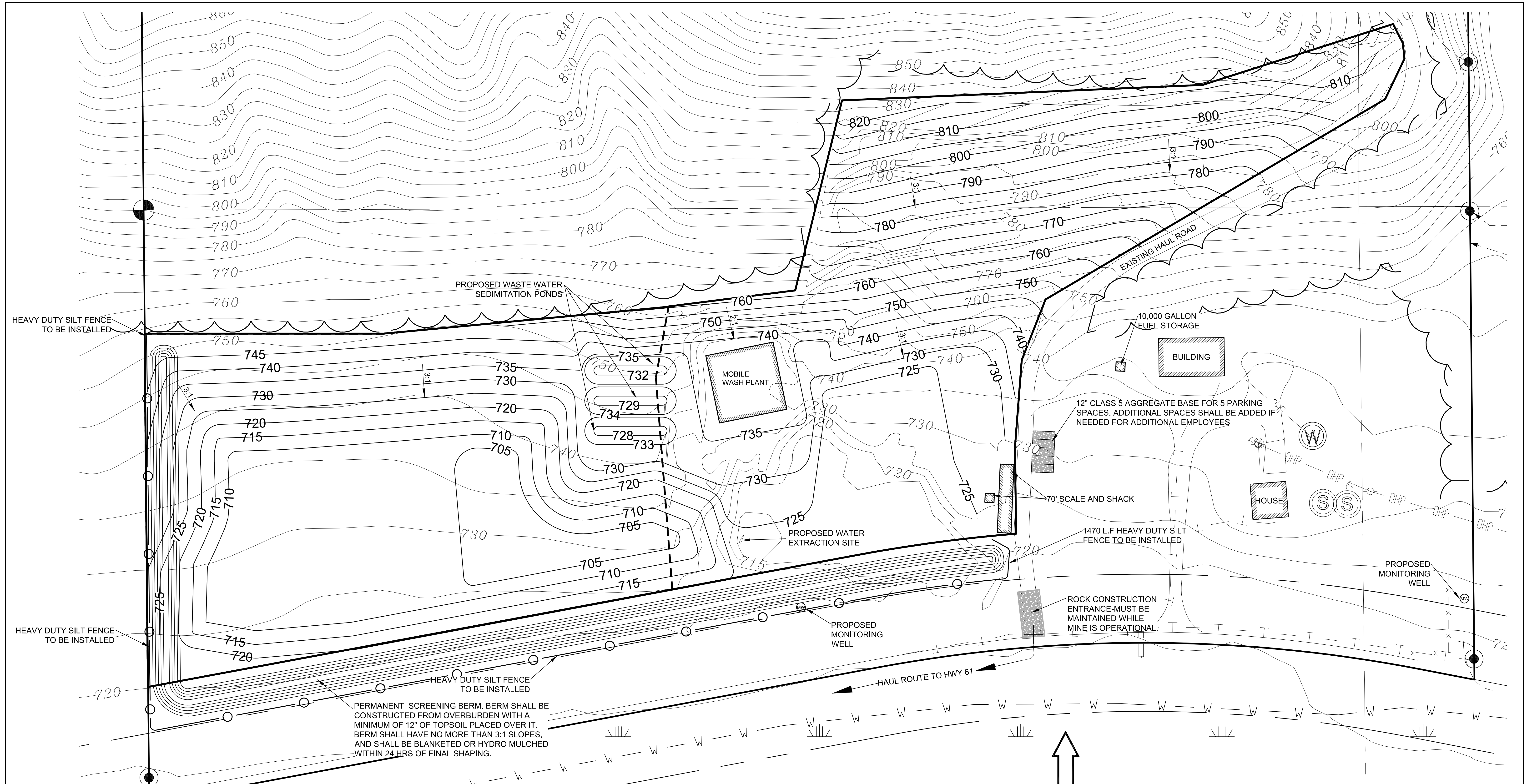
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 FLORENCE TOWNSHIP, MINNESOTA



Appendix G

Map B (Proposed Operations)



LEGEND

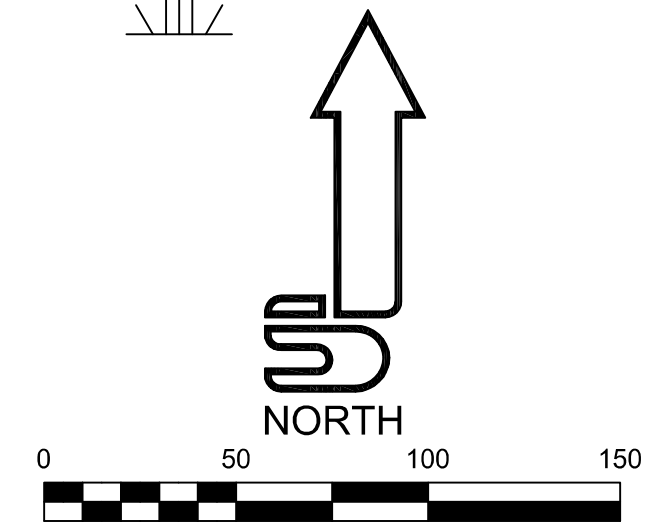
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- DENOTES 60° BOUNDARY OFFSET LINE
- DENOTES EXISTING ROAD RIGHT OF WAY LINE
- DENOTES EASEMENT
- DENOTES WETLAND BOUNDARY
- DENOTES EXISTING TREE LINE
- DENOTES EDGE OF GRASS AND CROP
- DENOTES EXISTING PIT BOUNDARY
- DENOTES EXISTING INDEX CONTOUR AND ELEVATION
- DENOTES EXISTING OVERHEAD POWER LINE
- DENOTES EXISTING UNDERGROUND TELEPHONE LINE
- DENOTES EXISTING FENCE
- ⊕ DENOTES SECTION CORNER
- ⊙ DENOTES EXISTING IRON PIPE (BOUNDARY MARKER)
- ⊙ DENOTES EXISTING ELECTRIC METER
- ⊙ DENOTES EXISTING POWER POLE WITH GUY WIRE
- ⊙ DENOTES WELL
- ⊙ DENOTES SEPTIC SYSTEM
- ⊙ DENOTES EXISTING WETLAND
- ⊙ DENOTES PROPOSED INDEX CONTOUR AND ELEVATION LABEL
- ⊙ DENOTES PROPOSED MONITORING WELL

QUANTITIES

AREA	TOPSOIL	OVERBURDEN	MINERAL EXTRACT
9.95 ACRES	10875	35220	196400

THE EXACT AMOUNT OF TOPSOIL AND OVERBURDEN IN THE EXISTING PIT IS UNKNOWN, AND MAY CAUSE THESE QUANTITIES TO VARY, HOWEVER THE TOTAL CUBIC YARDAGE OF MATERIAL TO BE MOVED SHOULD BE ACCURATE.



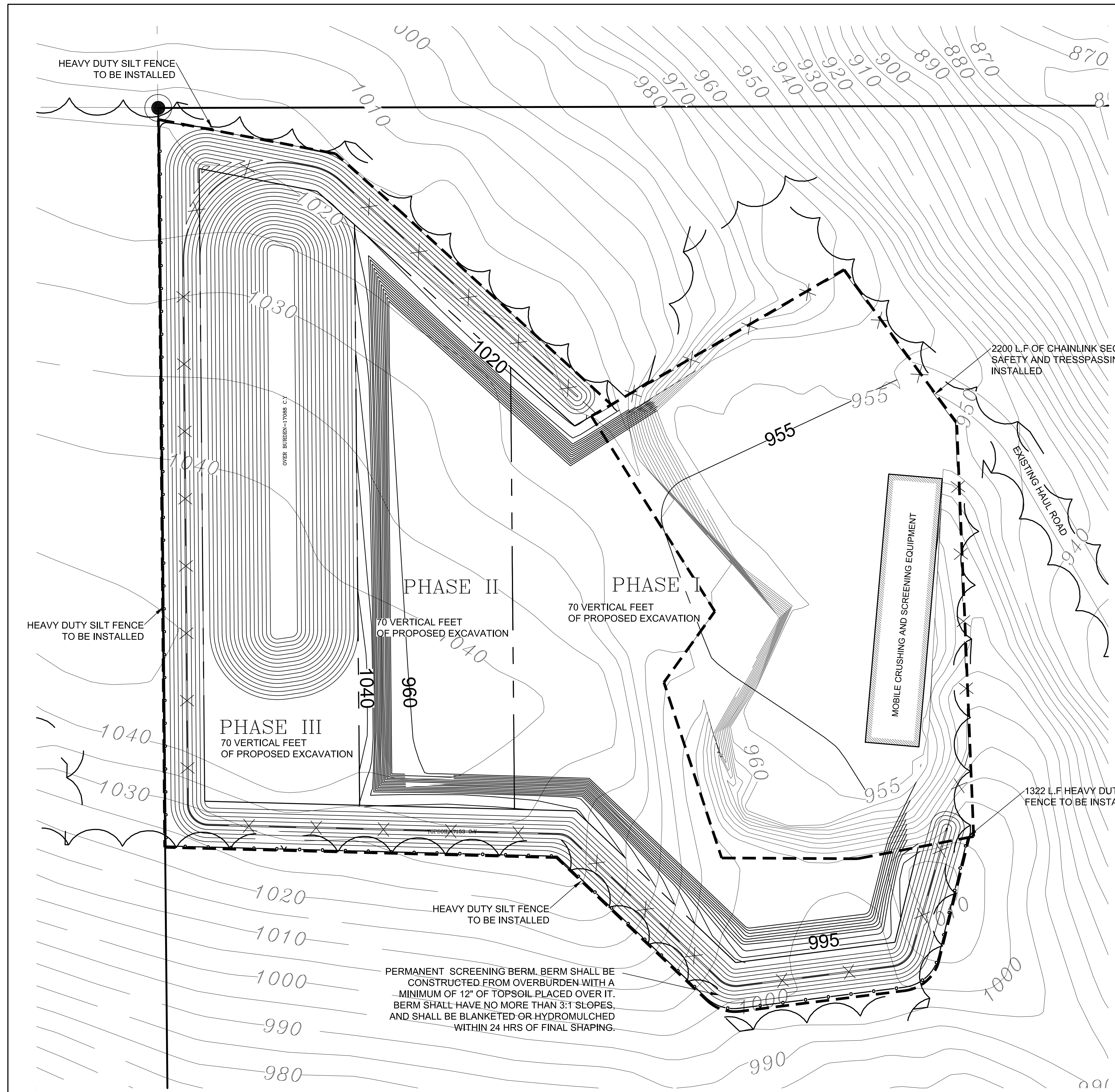
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MAP B.1 PROPOSED OPERATIONS- SOUTH PIT
 SHEET 1 OF 3 SHEETS



LEGEND
These standard symbols will be found on this plan sheet.

- DENOTES SECTION LINE
- DENOTES PROPERTY LINE
- DENOTES EXISTING TREE LINE
- DENOTES EDGE OF GRASS AND CROP
- DENOTES EXISTING PIT BOUNDARY
- DENOTES EXISTING INDEX CONTOUR AND ELEVATION
- DENOTES PROPOSED QUARRY EXPANSION
- DENOTES PROPOSED CHAINLINK SECURITY FENCE
- DENOTES PROPOSED INDEX CONTOUR AND ELEVATION LABEL

QUANTITIES

PHASE	AREA	TOPSOIL CY	OVERBURDEN CY	MINERAL EXTRACT CY
I	1.15 ACRES	2870	9887	121190
II	1.0 ACRES	2428	8365	104963
III	1.21 ACRES	2927	10081	123568
TOTAL	3.40 ACRES	8225	28333	349721

SEDIMENT AND EROSION CONTROL

- CONTRACTOR SHALL INSTALL PERIMETER SILT FENCE BEFORE START OF ANY CONSTRUCTION ACTIVITY. TO PREVENT SEDIMENT RUNOFF FROM REACHING THE CURB OR STREET RIGHT OF WAY, PERIMETER DOWN-SLOPE SILT FENCE SHALL BE INSTALLED ACROSS ALL PRIVATE LOTS. WHILE STILL VULNERABLE DUE TO EXPOSED SOIL, ROCK CHECK DAMS WILL BE PLACED EVERY 25 FEET ALONG THE CENTERLINE OF EACH DRAINAGE SWALE ON GRADES EXCEEDING 4% TO REDUCE FLOW VELOCITIES THAT CAUSE EROSION. SEE DETAIL SHEET.
- TO PREVENT TRACKING OF DIRT ONTO HARD SURFACE STREET RIGHT-OF-WAY, ROCK CONSTRUCTION ENTRANCES SHALL BE INSTALLED AND MAINTAINED UNTIL VEHICLE ENTRANCES ONTO THE SITE ARE NO LONGER REQUIRED AND TOPSOIL IS SCHEDULED TO BE REPLACED. ALL VEHICLE ACCESS TO THIS SITE SHALL USE THE ROCK CONSTRUCTION ENTRANCES. SHOULD THE ROCK CONSTRUCTION ENTRANCES BECOME INEFFECTIVE DUE TO EXCESSIVE SOIL CONTAMINATION, THEY SHALL BE REMOVED AND REPLACED. SEE DETAIL SHEET.
- SUFFICIENT TOPSOIL IS TO BE SALVAGED TO PROVIDE COVER AFTER GRADING OPERATIONS. ALL SOIL STOCKPILES AND FINISHED GRADED AREAS ARE TO BE SEEDED IMMEDIATELY IN ORDER TO ESTABLISH VEGETATION WITH WHEAT OR RYE GRASS @ 100 LB./ACRE.
- DURING CONSTRUCTION INSTALL AND MAINTAIN APPROVED INLET PROTECTION AT ALL ACTIVE STORM SEWER INLETS. SEE DETAILS SHEET. SEDIMENT RUNOFF SHOULD BE MINIMIZED BY RESPONSIBLE SITE EROSION CONTROL. EROSION CONTROL MEASURES MUST BE INSPECTED BY THE CITY BEFORE ANY GRADING ACTIVITY BEGINS. TO PREVENT SILT AND SEDIMENT FROM ENTERING THE STORM SEWER SYSTEM, A FILTER BAG INSERT, SEDIMENT CONTROL INLET HAT, ROCK LOG RING OR OTHER DEVICE APPROVED BY THE CITY, SHALL BE INSTALLED AT THE INLET.
- ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE STABILIZED AS SOON AS POSSIBLE. AREAS THAT HAVE BEEN DISTURBED OR AT FINISH GRADE, BUT HAVE NO ACTIVE WORK, SHALL BE SEEDED AND MULCHED OR SODDED WITHIN 14 DAYS, EXCEPT ON SLOPES STEEPER THAN 4H:1V. STEEPER SLOPES SHALL BE SEEDED AND COVERED WITH AN EROSION CONTROL BLANKET OR SEEDED AND MULCHED WITH A TACKIFYING AGENT OR SODDED. AS SOON AS POSSIBLE AFTER GRADING OPERATIONS HAVE BEEN COMPLETED, TOPSOIL SHALL BE SPREAD AND THE ENTIRE SITE SHALL BE VEGETATED. FINAL SITE STABILIZATION SHALL BE EVIDENT WHEN SEEDED GRASS IS PRESENT ON ALL EXPOSED GRADING AREAS AND HAS GROWN TO A LENGTH OF 6 INCHES AND THERE ARE NO SIGNS OF ONGOING EROSION. IF SOD IS PLACED IN LIEU OF SEED, IT SHALL BE WATERED AND MAINTAINED AND SHOW NO SIGNS OF STRESS FOR AT LEAST 30 DAYS. THE CITY SHALL APPROVE FINAL SITE STABILIZATION.
- A CONCRETE WASHOUT AREA IS REQUIRED FOR ALL CONCRETE CONSTRUCTION. THE WASHOUT SYSTEM CAN BE A PORTABLE UNIT PROVIDED BY THE CONCRETE SUPPLIER OR AN IN-GROUND SYSTEM CONSTRUCTED BY THE CONTRACTOR. ONE ACCEPTABLE METHOD OF CREATING AN IN-GROUND WASHOUT PIT WOULD BE TO EXCAVATE A 3 FOOT DEEP AREA (MIN. 3' WIDTH X VARIABLE LENGTH AS NEEDED), LINED WITH 10 MIL. PLASTIC AND PERIMETER ANCHORED WITH SAND BAGS OR AGGREGATE. IF THE LINING BECOMES DAMAGED (PUNCTURED OR RIPPED), THE WASHOUT SHALL NOT BE USED UNTIL THE LINING IS REPAIRED. CONCRETE POURS SHALL NOT BE CONDUCTED DURING OR BEFORE AN ANTICIPATED STORM EVENT. CONCRETE WASTES SHALL BE ALLOWED TO HARDEN, BROKEN UP, THEN DISPOSED OF ACCORDING TO LOCAL ORDINANCE. THIS WASHOUT PIT SHALL BE LOCATED AWAY FROM ALL STEEP SLOPES AND DRAINAGE INLETS.
- A NPDES STORM WATER PERMIT FOR CONSTRUCTION IS REQUIRED FOR THIS PROJECT. THE PROJECT OWNER AND/OR CONTRACTOR WILL NEED TO APPLY FOR THE PERMIT THROUGH THE MPCA.

PERMANENT SCREENING BERM. BERM SHALL BE CONSTRUCTED FROM OVERBURDEN WITH A MINIMUM OF 12" OF TOPSOIL PLACED OVER IT. BERM SHALL HAVE NO MORE THAN 3:1 SLOPES, AND SHALL BE BLANKETED OR HYDROMULCHED WITHIN 24 HRS OF FINAL SHAPING.

NORTH PIT ENLARGMENT

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ph. 651.388.1558 fax 651.388.1559

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SPV				Prepared For:
SPD				DOUG MAHONEY
SPV				32245 296TH STREET
				RED WING, MN 55066
				PHONE: 651-380-3071

DOUG MAHONEY
FLORENCE TOWNSHIP, MINNESOTA

MAP B.2 PROPOSED OPERATIONS- NORTH PIT
SHEET 2 OF 3 SHEETS

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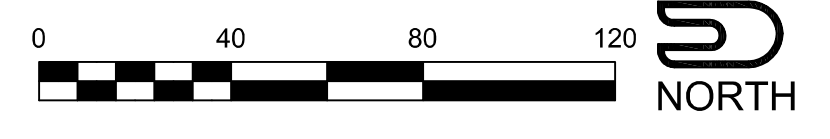
- LEGEND**
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- DENOTES SECTION LINE
 - DENOTES PROPERTY LINE
 - DENOTES EXISTING TREE LINE
 - DENOTES EDGE OF GRASS AND CROP
 - DENOTES EXISTING PIT BOUNDARY
 - DENOTES EXISTING INDEX CONTOUR AND ELEVATION
 - DENOTES PROPOSED QUARRY EXPANSION
 - x - x - x - x - x - x - DENOTES PROPOSED CHAINLINK SECURITY FENCE
 - DENOTES PROPOSED INDEX CONTOUR AND ELEVATION LABEL

HEIGHTS OF MINERAL STOCK PILES WILL VARY BETWEEN 15'-30'. STOCK PILE LOCATIONS WILL VARY DEPENDING UPON AREA BEING MINED AND TRAFFIC FLOW THRU PIT.

CRUSHING AND SCREENING EQUIPMENT

EXISTING TRAIL ROAD

NORTH PIT ENLARGMENT



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MAP B.3 PROPOSED OPERATIONS- NORTH PIT
 SHEET 3 OF 3 SHEETS



Appendix H

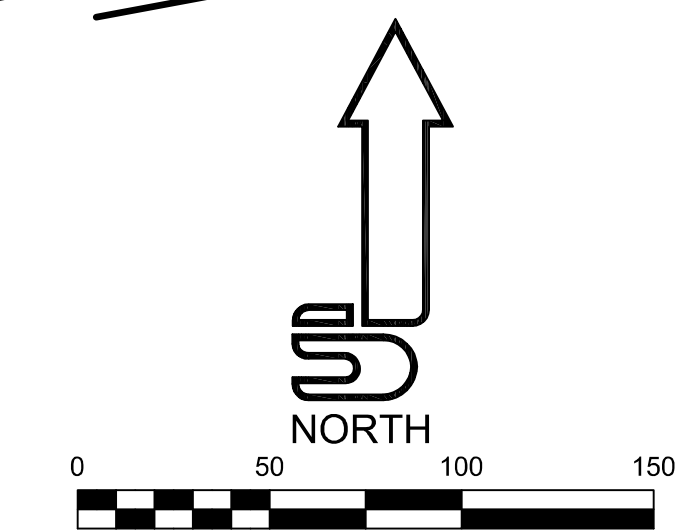
Map C (Reclamation Plan)



LEGEND

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- DENOTES CENTERLINE OF ROAD
- DENOTES PROPERTY LINE
- DENOTES 600' BOUNDARY OFFSET LINE
- DENOTES EXISTING ROAD RIGHT OF WAY LINE
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- DENOTES WETLAND BOUNDARY
- DENOTES EXISTING TREE LINE
- DENOTES EDGE OF GRASS AND CROP
- DENOTES EXISTING PIT BOUNDARY
- DENOTES EXISTING INDEX CONTOUR AND ELEVATION
- DENOTES EXISTING OVERHEAD POWER LINE
- DENOTES EXISTING UNDERGROUND TELEPHONE LINE
- DENOTES EXISTING FENCE
- ⊕ DENOTES SECTION CORNER
- ⊙ DENOTES EXISTING IRON PIPE (BOUNDARY MARKER)
- ⊙ DENOTES EXISTING ELECTRIC METER
- ⊙ DENOTES EXISTING POWER POLE WITH GUY WIRE
- ⊙ DENOTES WELL
- ⊙ DENOTES SEPTIC SYSTEM
- ⊙ DENOTES EXISTING WETLAND
- ⊙ DENOTES PROPOSED INDEX CONTOUR AND ELEVATION LABEL
- ⊙ DENOTES PROPOSED MONITORING WELL



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 FLORENCE TOWNSHIP, MINNESOTA

MAP C.1
SOUTH PIT RECLAMATION
 SHEET 1 OF 2 SHEETS

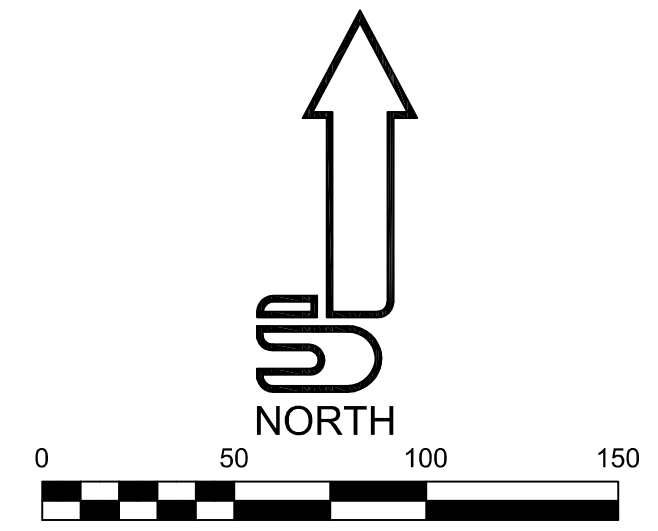


- SEDIMENT AND EROSION CONTROL**
- CONTRACTOR SHALL INSTALL PERMETER SILT FENCE BEFORE START OF ANY CONSTRUCTION ACTIVITY. TO PREVENT SEDIMENT RUNOFF FROM BRACING THE CURB OR STREET RIGHT OF WAY, PERMETER DRAINAGE SILT FENCE SHALL BE INSTALLED ACROSS ALL PRIVATE LOTS WHILE STILL VULNERABLE DUE TO EXPOSED SOIL. ROCK CHECK DAMS WILL BE PLACED EVERY 25 FEET ALONG THE CENTERLINE OF EACH DRAINAGE SWALE ON GRADES EXCEEDING 4% TO REDUCE FLOW VELOCITIES THAT CAUSE EROSION. SEE DETAIL SHEET.
 - TO PREVENT TRACKING OF DIRT ONTO HARD SURFACE STREET RIGHT-OF-WAY, ROCK CONSTRUCTION ENTRANCES SHALL BE INSTALLED AND MAINTAINED UNTIL VEHICLE ENTRANCES ONTO THE SITE ARE NO LONGER REQUIRED AND TOPSOIL IS SCHEDULED TO BE REPLACED. ALL VEHICLE ACCESS TO THIS SITE SHALL USE THE ROCK CONSTRUCTION ENTRANCES. SHOULD THE ROCK CONSTRUCTION ENTRANCES BECOME INEFFECTIVE DUE TO EXCESSIVE SOIL CONTAMINATION, THEY SHALL BE REMOVED AND REPLACED. SEE DETAIL SHEET.
 - SUFFICIENT TOPSOIL IS TO BE SALVAGED TO PROVIDE COVER AFTER GRADING OPERATIONS. ALL SOIL STOCKPILES AND FINISHED GRADED AREAS ARE TO BE SEED IMMEDIATELY IN ORDER TO ESTABLISH VEGETATION WITHIN ONE YEAR OF SITE GRADING @ 100 LBS/ACRE.
 - DURING CONSTRUCTION INSTALL AND MAINTAIN APPROVED SILT PROTECTION AT ALL ACTIVE STORM SEWER INLETS. SEE DETAIL SHEET. SEDIMENT RUNOFF SHOULD BE IMPAIRED BY RESPONSIBLE SITE EROSION CONTROL. EROSION CONTROL MEASURES MUST BE INSPECTED BY THE CITY BEFORE ANY GRADING ACTIVITY BEGINS TO PREVENT SILT AND SEDIMENT FROM ENTERING THE STORM SEWER SYSTEM. A FILTER BAG INSET, SEDIMENT CONTROL INLET MAT, ROCK LOG RING OR OTHER DEVICE APPROVED BY THE CITY, SHALL BE INSTALLED AT THE INLET.
 - ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE STABILIZED AS SOON AS POSSIBLE. AREAS THAT HAVE BEEN DISTURBED OR AT FRESH GRADE, BUT HAVE NO ACTIVE WORK, SHALL BE SEED AND MULCHED OR SOILED WITHIN 14 DAYS EXCEPT ON SLOPES STEEPER THAN 4:1. STEEPER SLOPES SHALL BE SEED AND COVERED WITH AN EROSION CONTROL BLANKET OR SEED AND MULCHED WITH A TACKLING AGENT OR SOILED AS SOON AS POSSIBLE AFTER GRADING OPERATIONS HAVE BEEN COMPLETED. TOPSOIL SHALL BE SPREAD AND THE ENTIRE SITE SHALL BE VEGETATED. FINAL SITE STABILIZATION SHALL BE EVIDENT WHEN SEEDS OR GRASS IS PRESENT ON ALL EXPOSED GRADE AREAS AND HAS GROWN TO A LENGTH OF 8 INCHES AND THERE ARE NO SIGNS OF OVERFLOW. IF SOIL IS PLACED RAISED OR SEED IT SHALL BE WATERED AND MAINTAINED AND SHOW NO SIGNS OF STRESS FOR AT LEAST 30 DAYS. THE CITY SHALL APPROVE FINAL SITE STABILIZATION.
 - A CONCRETE WASHOUT AREA IS REQUIRED FOR ALL CONCRETE CONSTRUCTION. THE WASHOUT SYSTEM CAN BE A PORTABLE UNIT PROVIDED BY THE CONCRETE SUPPLIER OR AN IN-GROUND SYSTEM CONSTRUCTED BY THE CONTRACTOR. ONE ACCEPTABLE METHOD OF CREATING AN IN-GROUND WASHOUT PIT WOULD BE TO EXCAVATE A 3 FOOT DEEP AREA MIN. 7' WIDTH X VARIABLE LENGTH AS NEEDED, LINED WITH 15 MIL. PLASTIC AND PERIMETER ANCHORED WITH SAND BAGS OR AGGREGATE. IF THE LINING BECOMES DAMAGED, PUNCTURED OR RIPPED, THE WASHOUT SHALL NOT BE USED UNTIL THE LINING IS REPAIRED. CONCRETE POLISH SHALL NOT BE CONDUCTED DURING OR BEFORE AN ANTICIPATED STORM EVENT. CONCRETE WASTES SHALL BE ALLOWED TO HARDEN, BROKEN UP, THEN DISPOSED OF ACCORDING TO LOCAL ORDINANCE. THIS WASHOUT PIT SHALL BE LOCATED AWAY FROM ALL STEEP SLOPES AND DRAINAGE INLETS.
 - A NPDES STORM WATER PERMIT FOR CONSTRUCTION IS REQUIRED FOR THIS PROJECT. THE PROJECT OWNER AND/OR CONTRACTOR WILL NEED TO APPLY FOR THE PERMIT THROUGH THE NPDES.

LEGEND

These standard symbols will be found on this plan sheet.

	DENOTES SECTION LINE
	DENOTES PROPERTY LINE
	DENOTES EXISTING TREE LINE
	DENOTES EDGE OF GRASS AND CROP
	DENOTES EXISTING PIT BOUNDARY
	DENOTES EXISTING INDEX CONTOUR AND ELEVATION
	DENOTES PROPOSED QUARRY EXPANSION
	DENOTES PROPOSED CHANNEL SECURITY FENCE
	DENOTES PROPOSED INDEX CONTOUR AND ELEVATION LABEL



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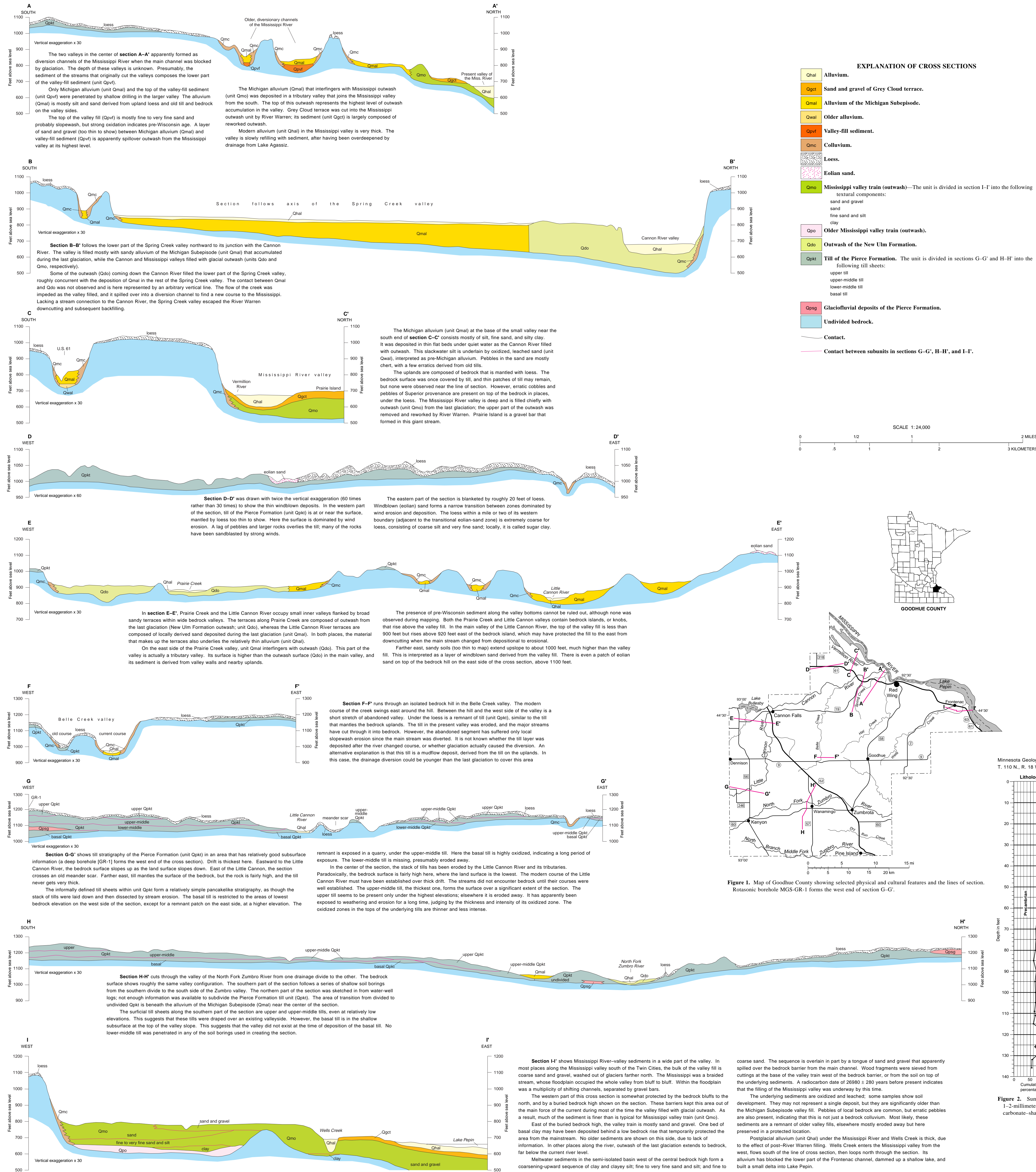
DOUG MAHONEY
 FLORENCE TOWNSHIP, MINNESOTA

MAP C.2
NORTH PIT RECLAMATION
 SHEET 2 OF 2 SHEETS



Appendix I

**Bed Rock Geological & Karst Information
Geologic Atlas of Goodhue County
Mn Geological Survey**



QUATERNARY STRATIGRAPHY

By
Howard C. Hobbs

1998

INTRODUCTION

This plate is a companion to the surficial geologic map (Plate 3) as it shows Quaternary deposits at depth. The units are described and correlated on Plate 3. The cross sections are enlarged about four times the horizontal scale relative to the map, and thirty times the vertical scale (sixty times for D-D') to show details and thin layers. The cross sections should be regarded as diagrams illustrating significant points, rather than precise geometric relationships. The reader should be able to use this information, along with the thickness of Quaternary sediments (also on Plate 3) to predict, at least in a general way, Quaternary stratigraphy in areas where cross sections were not constructed.

Some aspects of the sections are more precise than others. The land surface (upper line) is based on topographic contours (at the 1:24,000-scale) that cross the line of section. It is the most accurate and detailed line on the sections. However, this surface is misleading in places where the line of section crosses a hillslope obliquely. Here the slope looks more gentle than it would be if the line were drawn straight down the slope. However, the great vertical exaggeration makes all of the hillslopes look steeper than they really are.

The accuracy of the bedrock surface (lowest line) is variable. Where surficial cover is thin, the bedrock surface is approximated by the land surface, and is just as accurate. Elsewhere, the elevation of the bedrock surface is extrapolated from widely separated sources of information like water-well logs, many of which are not on the line of section. For such areas, the line of the bedrock surface represents what the geologist thinks it should be, but the potential margin of error is large.

The uppermost sediment at any given place generally corresponds (given the difference in scale) to the surficial mapping unit on Plate 3. The distribution of buried sediment layers are inferred from scattered subsurface data. The lines chosen for cross sections have a greater than average density of subsurface data, but much extrapolation is still required.

THICKNESS OF QUATERNARY SEDIMENTS AND QUATERNARY STRATIGRAPHY

Most of the thickness of drift (or Quaternary sediments) in Goodhue County is till, except in the valley of the Mississippi River and its tributaries. In general, the till is thickest in the western part of the county (Plate 3). Some of the four tills sheets of the Pierce Formation (unit Oqkt) identified in the western part of the county may not have extended farther east; for example, the lower-middle till of the Pierce was not identified near Wauwano (section H-H'). An area of thick drift is present north of Zumbro, in the lee of a major north-south bedrock escarpment. The bedrock surface drops 200 feet from the Galena Group to the Prairie du Chien Group in two to three miles (Plate 2). This area would have been relatively protected from glacial erosion, and may have accumulated thick till, especially in the earlier glaciations.

DISTINGUISHING TILL UNITS

Till of the Pierce Formation (unit Oqkt) has been subdivided into four separate till sheets in parts of the cross sections. Although descriptive logs from water wells and soil borings can be used to classify a material as till, they do not permit the till to be subdivided. Individual tills can be recognized only in areas where good samples were obtained from excavations and soil borings. All tills of the Pierce Formation are of Winnipeg provenance (Plate 3) but can be separated by subtle differences in texture and rock type. Four tills were recognized in Rotasonic boring MGS-GR-1 (Fig. 2); they are here named informally by their position in the sequence.

The basal till contains a high proportion of Paleozoic rock fragments. Roughly half are angular, and appear to be local. This is expected, inasmuch as the bedrock in this region is Paleozoic, and basal tills are typically enriched in the local bedrock. The texture of the basal till is variable. In the Rotasonic boring MGS-GR-1, where it overlies the Decorah Shale, it is rather clayey. In a quarry site at the east end of section G-G', it incorporates an older, oxidized loess at its base and is silty.

The lower-middle till is low in clay. The proportion of Paleozoic carbonate rock is higher than in the upper-middle and upper tills, but less than in the basal till. Red grains of Superior provenance are sparse to very sparse. Cretaceous grains are more common than in the basal or upper tills, but less than in the upper-middle till.

The upper-middle till is fairly clayey; it is the richest of all these tills in Cretaceous grains, especially in calcareous shale. It also appears to contain more clay than the other tills, because it develops wetting and drying cracks on exposed surfaces. It has the lowest number of Superior-provenance grains of all the Pierce Formation till sheets.

The upper till contains the lowest proportion of Paleozoic grains of the four tills, and the highest proportion of Superior-provenance grains.

Gray till of the Illinois Episode has been recognized in a few places in and near Goodhue County, but not along the lines of sections on this plate. Its texture is similar to the older tills of the Pierce Formation. In general, this till is richer in Paleozoic and Cretaceous carbonate grains than most of the older Pierce Formation samples. It is also richer in dark though not red grains.

Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based; however, the Minnesota Geological Survey does not warrant or guarantee that there are no errors. Users may wish to verify critical information; sources include both the references listed here and information on file at the office of the Minnesota Geological Survey in St. Paul. In addition, effort has been made to ensure that the interpretation conforms to sound geologic and cartographic principles. No claim is made that the interpretation shown is rigorously correct, however, and it should not be used to guide engineering-scale decisions without site-specific verification.

Figure 1. Map of Goodhue County showing selected physical and cultural features and the lines of section. Rotasonic borehole MGS-GR-1 forms the west end of section G-G'.

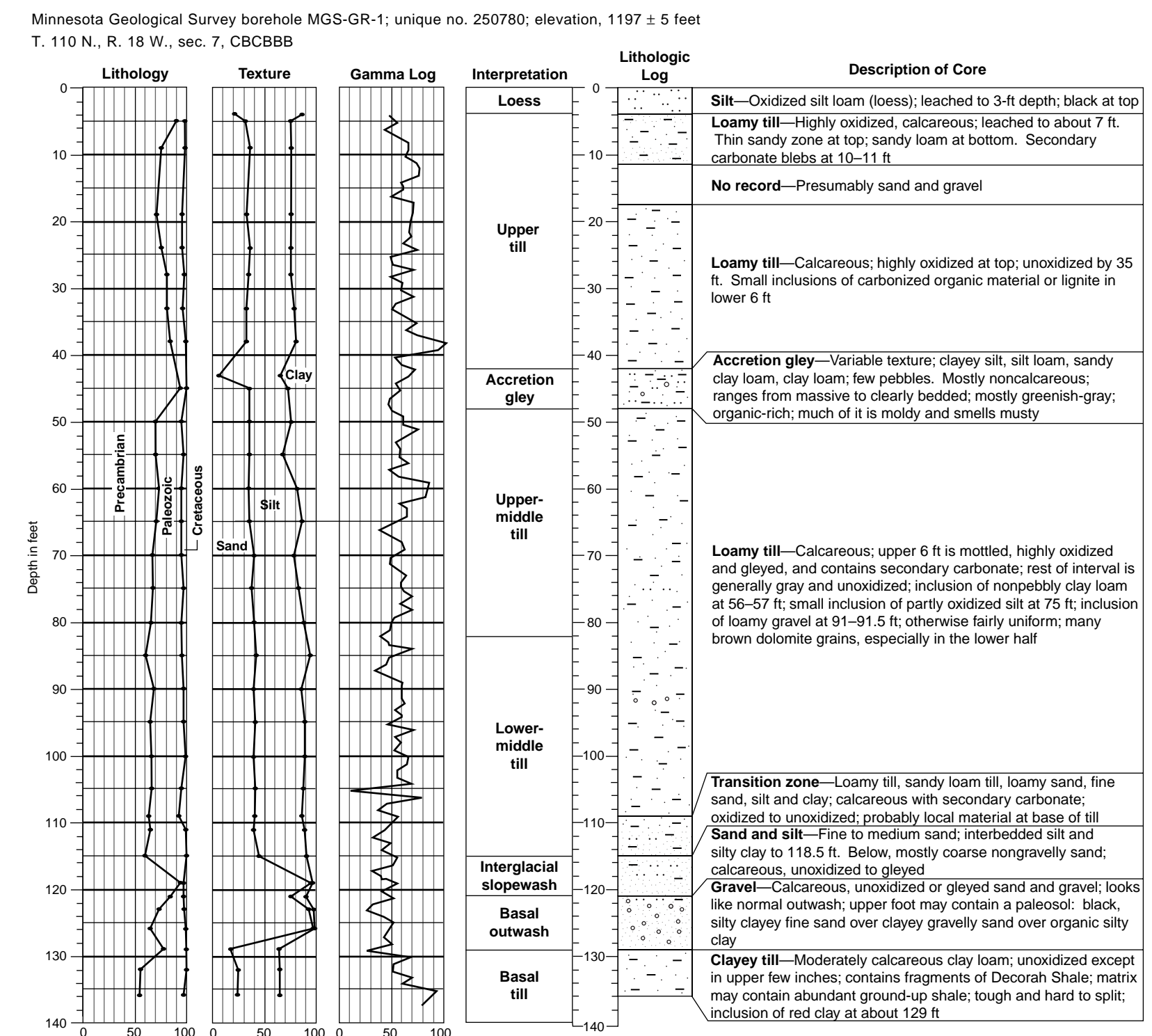


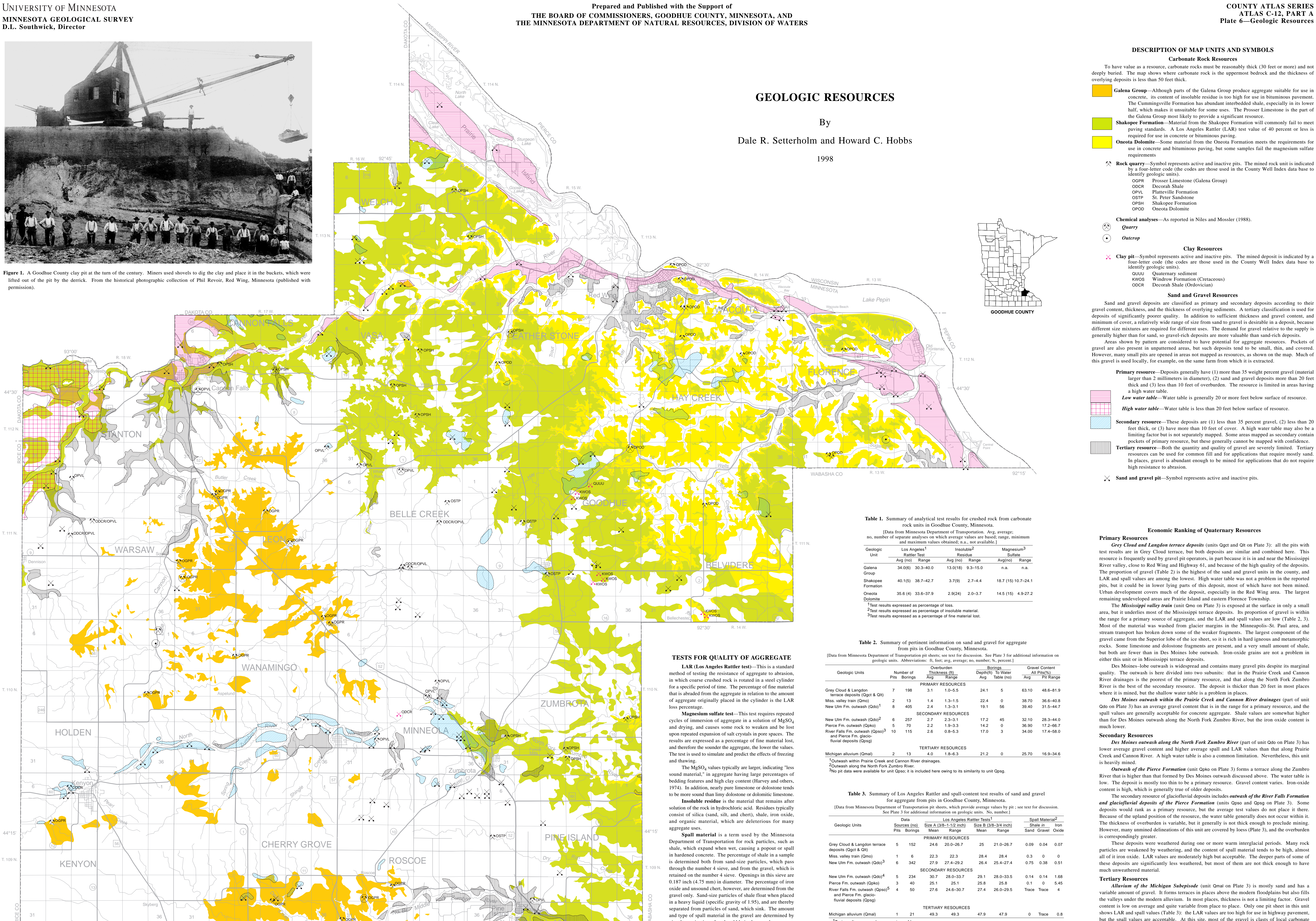
Figure 2. Summary of pertinent information for samples taken from Rotasonic borehole MGS-GR-1. Lithology was determined using the 1–2-millimeter-size fraction of the samples. The three lithologic classes—Precambrian-Paleozoic-Cretaceous—generally correspond to crystalline-carbonate-shale rock types. Texture was determined using the less-than-two-millimeter-size fraction of the samples.



Figure 1. A Goodhue County clay pit at the turn of the century. Miners used shovels to dig the clay and place it in the buckets, which were lifted out of the pit by the derrick. From the historical photographic collection of Phil Revoir, Red Wing, Minnesota (published with permission).

GEOLOGIC RESOURCES

By
Dale R. Setterholm and Howard C. Hobbs
1998



DESCRIPTION OF MAP UNITS AND SYMBOLS

Carbonate Rock Resources

To have value as a resource, carbonate rocks must be reasonably thick (30 feet or more) and not deeply buried. The map shows where carbonate rock is the uppermost bedrock and the thickness of overlying deposits is less than 50 feet thick.

- Galena Group**—Although parts of the Galena Group produce aggregate suitable for use in concrete, its content of insoluble residue is too high for use in bituminous pavement. The Cummingsville Formation has abundant interbedded shale, especially in its lower half, which makes it unsuitable for some uses. The Prosser Limestone is the part of the Galena Group most likely to provide a significant resource.
- Shakopee Formation**—Material from the Shakopee Formation will commonly fail to meet paving standards. A Los Angeles Rattler (LAR) test value of 40 percent or less is required for use in concrete or bituminous paving.
- Onota Dolomite**—Some material from the Onota Formation meets the requirements for use in concrete and bituminous paving, but some samples fail the magnesium sulfate requirements.

Rock quarry—Symbol represents active and inactive pits. The mined rock unit is indicated by a four-letter code (the codes are those used in the County Well Index data base to identify geologic units).

Quarry—Symbol represents active and inactive pits. The mined deposit is indicated by a four-letter code (the codes are those used in the County Well Index data base to identify geologic units).

- Clay Resources**
- Clay pit**—Symbol represents active and inactive pits. The mined deposit is indicated by a four-letter code (the codes are those used in the County Well Index data base to identify geologic units).
- Quaternary sediment**
- KWOS** Windrow Formation (Cretaceous)
- ODCR** Decorah Shale (Ordovician)

Sand and Gravel Resources

Sand and gravel deposits are classified as primary and secondary deposits according to their gravel content, thickness, and the thickness of overlying sediments. A tertiary classification is used for deposits of significantly poorer quality. In addition to sufficient thickness and gravel content, and minimum of cover, a relatively wide range of size from sand to gravel is desirable in a deposit, because different size mixtures are required for different uses. The demand for gravel relative to the supply is generally higher than for sand, so gravel-rich deposits are more valuable than sand-rich deposits.

Areas shown by pattern are considered to have potential for aggregate resources. Pockets of gravel are also present in unpatterned areas, but such deposits tend to be small, thin, and covered. However, many small pits are opened in areas not mapped as resources, as shown on the map. Much of this gravel is used locally, for example, on the same farm from which it is extracted.

Primary resource—Deposits generally have (1) more than 35 weight percent gravel (material larger than 2 millimeters in diameter), (2) sand and gravel deposits more than 20 feet thick and (3) less than 10 feet of overburden. The resource is limited in areas having a high water table.

Low water table—Water table is generally 20 or more feet below surface of resource.

High water table—Water table is less than 20 feet below surface of resource.

Secondary resource—These deposits are (1) less than 35 percent gravel, (2) less than 20 feet thick, or (3) have more than 10 feet of cover. A high water table may also be a limiting factor but is not separately mapped. Some areas mapped as secondary contain pockets of primary resource, but these generally cannot be mapped with confidence.

Tertiary resource—Both the quantity and quality of gravel are severely limited. Tertiary resources can be used for common fill and for applications that require mostly sand. In places, gravel is abundant enough to be mined for applications that do not require high resistance to abrasion.

Sand and gravel pit—Symbol represents active and inactive pits.

Economic Ranking of Quaternary Resources

Primary Resources
Grey Cloud and Langdon terrace deposits (units Qgt and Qlt on Plate 3): all the pits with test results are in Grey Cloud terrace, but both deposits are similar and combined here. This resource is frequently used by gravel pit operators, in part because it is in and near the Mississippi River valley, close to Red Wing and Highway 61, and because of the high quality of the deposits. The proportion of gravel (Table 2) is the highest of the sand and gravel units in the county, and LAR and spall values are among the lowest. High water table was not a problem in the reported pits, but it could be in lower lying parts of this deposit, most of which have not been mined. Urban development covers much of the deposit, especially in the Red Wing area. The largest remaining undeveloped areas are Prairie Island and eastern Florence Township.

The **Mississippi valley train** (unit Qm on Plate 3) is exposed at the surface in only a small area, but it underlies most of the Mississippi terrace deposits. Its proportion of gravel is within the range for a primary source of aggregate, and the LAR and spall values are low (Table 2, 3). Most of the material was washed from glacial margins in the Minneapolis-St. Paul area, and stream transport has broken down some of the weaker fragments. The largest component of the gravel came from the Superior lobe of the ice sheet, so it is rich in hard igneous and metamorphic rocks. Some limestone and dolomite fragments are present, and a very small amount of shale, but both are fewer than in Des Moines lobe outwash. Iron-oxide grains are not a problem in either this unit or in Mississippi terrace deposits.

Des Moines lobe outwash is widespread and contains many gravel pits despite its marginal quality. The outwash is here divided into two subunits: that in the Prairie Creek and Cannon River drainages is the poorest of the primary resource, and that along the North Fork Zumbro River is the best of the secondary resource. The deposit is thicker than 20 feet in most places where it is mined, but the shallow water table is a problem in places.

Des Moines outwash within the Prairie Creek and Cannon River drainages (part of unit Qdo on Plate 3) has an average gravel content that is in the range for a primary resource, and the spall values are generally acceptable for concrete aggregate. Shale values are somewhat higher than for Des Moines outwash along the North Fork Zumbro River, but the iron oxide content is much lower.

Des Moines outwash along the North Fork Zumbro River (part of unit Qdo on Plate 3) has lower average gravel content and higher average spall and LAR values than that along Prairie Creek and Cannon River. A high water table is also a common limitation. Nevertheless, this unit is heavily mined.

Outwash of the Pierce Formation (unit Qps on Plate 3) forms a terrace along the Zumbro River that is higher than that formed by Des Moines outwash dissected above. The water table is low. The deposit is mostly too thin to be a primary resource. Gravel content values, iron-oxide content is high, which is generally true of older deposits.

The secondary resource of glaciofluvial deposits includes **outwash of the River Falls Formation and glaciofluvial deposits of the Pierce Formation** (units Qrs and Qps on Plate 3). Some deposits would rank as a primary resource, but the average test values do not place it there. Because of the upland position of the resource, the water table generally does not occur within it. The thickness of overburden is variable, but it generally is not thick enough to preclude mining. However, many unmined deliberations of this unit are covered by loess (Plate 3), and the overburden is correspondingly greater.

These deposits were weathered during one or more warm interglacial periods. Many rock particles are weakened by weathering, and the content of spall material tends to be high, almost all of it iron oxide. LAR values are moderately high but acceptable. The deeper parts of some of these deposits are significantly less weathered, but most of them are not thick enough to have much unweathered material.

Tertiary Resources
Alluvium of the Michigan Subside (unit Qma on Plate 3) is mostly sand and has a variable amount of gravel. It forms terraces in places above the modern floodplains but also fills the valleys under the modern alluvium. In many places, thickness is not a limiting factor. Gravel content is low on average and quite variable from place to place. Only one pit in this unit shows LAR and spall values (Table 3); the LAR values are too high for use in highway pavement, but the spall values are acceptable. At this site, most of the gravel is clasts of local carbonate rock, weathered from the alluvium. Lower LAR values might be expected from pits in this unit in the Red Wing area, where glacially derived pebbles are more common, but no data are available. The parts of this alluvium overlain by loess were not mapped as a resource, because the additional overburden on an already marginal deposit probably precludes mining.

Modern alluvium (unit Qal on Plate 3) is not mapped as a resource as it contains little or no gravel itself. However, it overlies gravel-rich deposits in places. Some gravel pits could be expanded into areas of alluvium, although a high water table and occasional flooding would be expected. In the upper reaches of many streams, the layer of alluvium is thin enough to be stripped, but in the Mississippi valley, and the lower parts of its tributaries, the alluvium is too thick for this to be feasible.

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TESTS FOR QUALITY OF AGGREGATE

LAR (Los Angeles Rattler test)—This is a standard method of testing the resistance of aggregate to abrasion, in which coarse crushed rock is rotated in a steel cylinder for a specific period of time. The percentage of fine material that is abraded from the aggregate in relation to the amount of aggregate originally placed in the cylinder is the LAR loss percentage.

Magnesium sulfate test—This test requires repeated cycles of immersion of aggregate in a solution of $MgSO_4$ and drying, and causes some rock to weaken and be lost upon repeated expansion of salt crystals in pore spaces. The results are expressed as a percentage of fine material lost, and therefore the sounder the aggregate, the lower the values. The test is used to simulate and predict the effects of freezing and thawing.

The $MgSO_4$ values typically are larger, indicating "less sound material," in aggregate having large percentages of bedding features and high clay content (Harvey and others, 1974). In addition, nearly pure limestone or dolomite tends to be more sound than limy dolomite or dolomitic limestone. Insoluble residue is the material that remains after solution of the rock in hydrochloric acid. Residues typically consist of silica (sand, silt, and chert), shale, iron oxide, and organic material, which are deleterious for many aggregate uses.

Spall material is a term used by the Minnesota Department of Transportation for rock particles, such as shale, which expand when wet, causing a popout or spall in hardened concrete. The percentage of shale in a sample is determined both from sand-size particles, which pass through the number 4 sieve, and from the gravel, which is retained on the number 4 sieve. Openings in this sieve are 0.187 inch (4.75 mm) in diameter. The percentage of iron oxide and unbound chert, however, are determined from the gravel only. Sand-size particles of shale float when placed in a heavy liquid (specific gravity of 1.95), and are thereby separated from particles of sand, which sink. The amount and type of spall material in the gravel are determined by visual examination of each pebble in the sample.

1930s one large sewer-pipe factory closed for this reason. Previously, the clay was mined by men with hand shovels so that this sand layers within the clay could be kept separate from the clay (Johnson, 1986) (Fig. 1). Later, powered equipment was used for excavating because the remaining clay was of insufficient quality for pottery, and clay for sewer pipe did not require hand work. The pottery operation continued for some time by importing clay from Ohio and elsewhere. Sewer pipe was manufactured until 1972.

A previous investigation (Austin, 1963) mapped Cretaceous strata in an area approaching 75 square miles in east-central and northeastern Goodhue County. Since that time, a subsurface data base of well records and downhole geophysical logs has been created as an aid to bedrock mapping. This information shows that the deposits are too discontinuous to be represented as a mappable unit.

The clay pits shown on the resource map all relate to this industry, with the exception of the pit northeast of Wanamingo that mined Decorah Shale. One of the clay pits northeast of Goodhue, known as the Hirsch pit, mined Pleistocene clay.

Lime Before the invention of Portland cement, natural hydraulic cement was produced by burning limestone. A limestone with the proper amounts of calcium carbonate and clay was required, and the bluffs near Red Wing yielded a well-sorted limestone. The lime manufacturing industry flourished in this area from the mid 1800s to about 1908 (Blondell, 1940). Its product was known throughout the northwest until the advent of Portland cement ended demand for it (Blondell, 1940).

QUATERNARY RESOURCES
The major Quaternary resource in Goodhue County is sand and gravel, which is used mostly for road construction and maintenance but also in general construction. Contractors prefer to obtain gravel close to the site of use, because the cost of hauling is a large part of the total cost. Thus, gravel is mined in many parts of the county, rather than in just a few of the very best deposits. Some sand and gravel deposits are limited by high water table. In Goodhue County, probably more gravel exists below the water table than above. Although it is possible to extract gravel below the water table, it requires special equipment, or the deposit must be dewatered.

Historic Resources

Dimension Stone

The bluffs of Red Wing supplied dimension stone blocks for foundations, bridges, and other uses from the middle of the nineteenth century until at least 1916 (Eide, 1941). Most of the quarries were located at Barn Bluff or Sorin Bluff, or at other locations very close to downtown Red Wing. The quarries produced stone from the Shakopee and Onota Formations. Proximity to the river made shipping by barge attractive. Much stone was used locally, but it was also shipped and used in projects like the stone arch bridge at Saint Anthony Falls in Minneapolis (Eide, 1941). Quarry locations in the city eventually worked against the industry when residents became annoyed with the noise and flying debris produced by blasting.

Clay

Possibly the most widely known of Goodhue County's natural resources is the clay that was mined there, due to the reputation of the stoneware, dinnerware, and other pottery manufactured from it. Accounts of the history of the industry from the Goodhue County Historical Society indicate that the clay was used for pottery at least as early as 1862 (Red Wing Collectors Society, 1996). By the late 1800s, the clay was mined in commercial quantities and was later used to manufacture sewer pipe as well as stoneware (Fig. 1).

The clay and associated sediments have been assigned to the Otterbrand Member of the Cretaceous Window Formation (Andrews, 1958). F.W. Anderson (1889) suggested that the clays were an example of glacial transport of large bedrock blocks on mass. This phenomenon has been documented elsewhere in the state since that time (for example, Knabbe, 1996). It is an attractive theory because the clay occurs in "lenses or tabular blocks as much as a few feet thick and several tens of acres in areal extent that are intercalated with ferruginous sands" (Austin, 1963). Only the clay bodies that have been mined have shown to extend over such wide areas.

There is very little left of these deposits today. The industry declined because the known deposits were mined out, and suitable replacements could not be found. By the early

Goodhue County, and the Cummingsville Formation has abundant interbedded shale, especially in its lower half, making it less desirable as a resource. The Prosser Limestone is the only part of the Galena Group likely to provide a significant resource.

Tests of samples from the Shakopee Formation indicate LAR abrasion loss of 38.7-42.7 percent with a mean value of 40.1 percent. A value of 40 percent or less is required for use in concrete or bituminous paving. Magnesium sulfate tests yielded values of 10-24 percent loss and a mean of 18.7 percent. Use in concrete paving requires less than 15 percent loss, and use in bituminous paving requires less than 20 percent loss. All tests for insoluble residue show values well within the requirement of less than 10 percent for bituminous paving. These limited data suggest material from the Shakopee Formation will commonly fail to meet paving standards.

Samples from the Onota Formation indicate some material from the formation meets the requirements for use in concrete and bituminous paving, but some samples fail the magnesium sulfate requirements.

There are no available data on the suitability of the Platville Formation in paving mixtures.

The map shows the location of both active and inactive quarries. Only three counties statewide have more active quarries than Goodhue County, and there are almost 100 inactive quarries (Nelson and others, 1990). Existing quarries are generally located near an eroded edge of a resource because of the advantages associated with mining horizontally into the rock. More site-specific studies within these areas would be required to locate resources more accurately. The limestone of the Platville Formation is not mapped as a resource because it is generally too thin to be quarried economically.

Sandstone Resources
The St. Peter Sandstone is mined for fill. The Jordan Sandstone is also a likely source for this use. There are historic accounts of white sand from the Red Wing area being used for the manufacture of glass (Hancock, 1888).

Digital base modified from 1990 Census TIGER/Line Files of U.S. Bureau of the Census (source scale 1:100,000); county border files modified from Minnesota Department of Transportation files; digital base annotation by Minnesota Geological Survey
Universal Transverse Mercator Projection, grid zone 15
1927 North American Datum

INTRODUCTION

Goodhue County is endowed with geologic resources useful to its residents. The demand for particular resources has changed over time as needs and the technology to satisfy them have changed. Historically, the geologic formations of the county provided stone for building, lime for mortar, and clay for pottery, brick, and tile. Currently, crushed rock, sand, and gravel are extracted, mostly for building roads.

The map shows the location of both inactive and active pits and quarries. It is common for quarries to cease operations, lie dormant for some time, and then go back into operation as demand and prices change.

This map is based solely on geologic criteria. Urban development, land-use restrictions, and economic considerations are also important factors in determining the feasibility of mining natural resources. These factors are subject to abrupt changes and therefore are not considered here. The digital version of this map can be compared with those other themes in a Geographic Information System (GIS).

BACKGROUND RESOURCES

Carbonate bedrock is quarried in the county and crushed for use as aggregate, riprap, and agricultural lime. The Minnesota Department of Transportation has compiled a limited body of data regarding the suitability of these carbonate rocks in concrete and bituminous pavement. The samples that were tested can be related to specific formations, but not always to specific members of a formation. Consequently, the test results can only be used as a general guide, and they may not apply to the entire thickness of a formation, or over its entire outcrop (Table 1).

Limited tests suggest that rock of the Galena Group (or those parts of it that have been tested) produces aggregate suitable for use in concrete, but its insoluble residue content is too high for bituminous pavement. The Stewartville Formation of the Galena is not present in

BEDROCK TOPOGRAPHY

By
Dale R. Setterholm and Bruce A. Bloomgren
1998

INTRODUCTION

The landscape of Goodhue County reflects a long and complex interaction of erosion and deposition under climatic conditions that have varied from subtropical to glacial. The earth materials found at the land surface range in age from bedrock formed more than 500 million years ago to sediments that are accumulating today. In much of the county, the present landscape is strongly influenced by the configuration of the underlying bedrock surface.

One of the most prominent features on the landscape is a network of valleys cut into the bedrock. Most of these valleys are oriented north-south or east-west; the valley floors slope downward to join the valley presently occupied by the Mississippi River. The tributary valleys contain a significant thickness of sediment (Plate 3) and were once deeper than they are now. The sediment in the valley of the Mississippi River is more than 350 feet thick in places.

The topography of the land surface between the valleys is similar to the underlying bedrock surface in many places, particularly where that bedrock is covered by less than 50 feet of glacial sediment, as is generally in the northern half of the county (Fig. 1A; also Plate 3). At least half of the southern part of the county has more than 50 feet of glacial drift overlying bedrock, and in some areas the thickness of these deposits exceeds 250 feet.

MAP PREPARATION METHODS

The bedrock topography was mapped by compiling information on the elevation of the bedrock surface from field mapping of outcrops, soil maps, borings, and records of water-well construction. Where the bedrock surface is near the land surface and information is abundant, the contours that delineate that surface show great detail. In areas where the bedrock is deeply buried, points of known bedrock elevation are more sparsely distributed, and such detail is not possible. The distribution of the data points is shown on the data-base map (Plate 1) and should be considered in assessing the reliability of the map at any particular place.

THE TOPOGRAPHY OF THE BEDROCK SURFACE

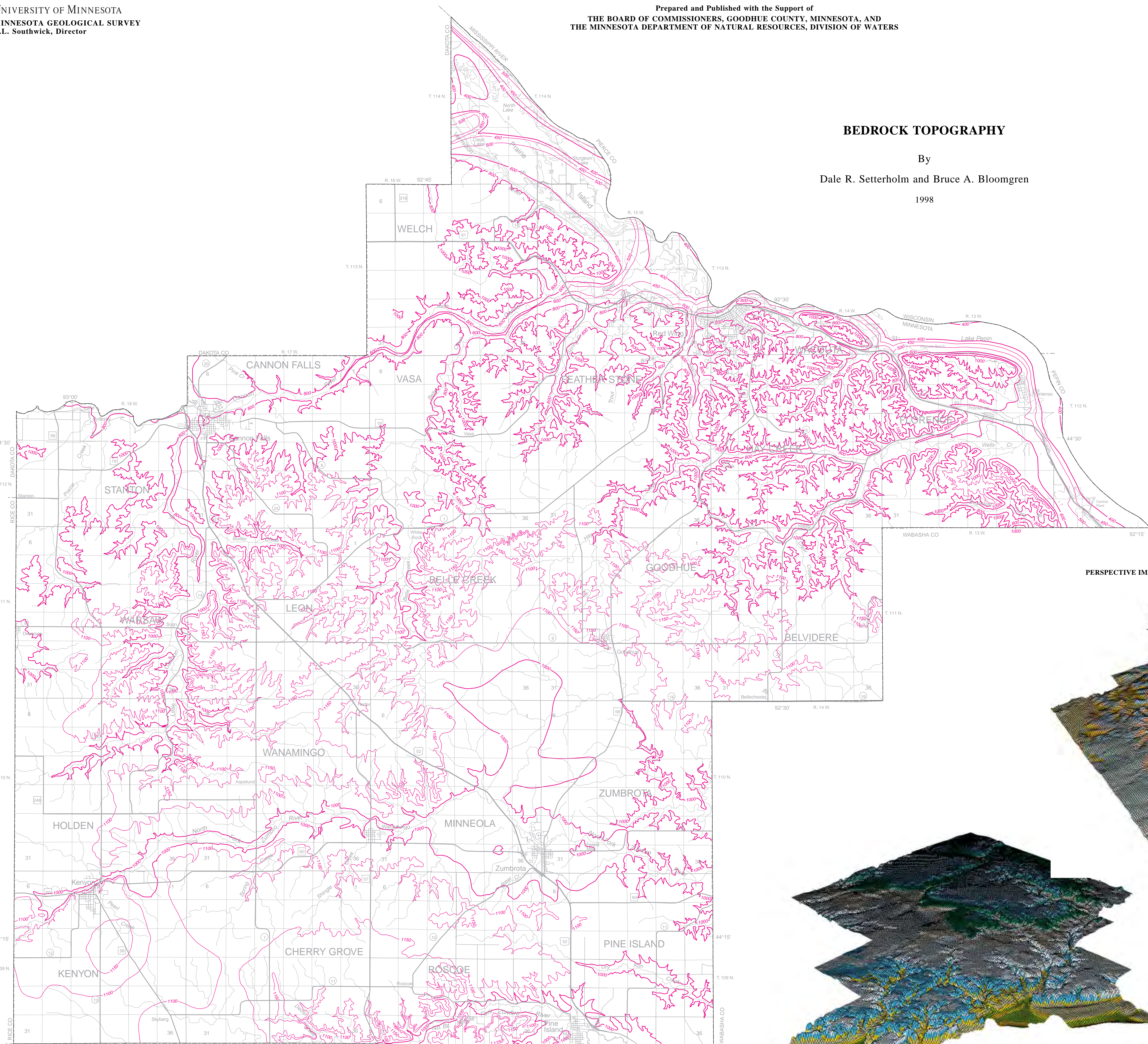
Harder layers of rock are more resistant to weathering and erosion; softer layers are more vulnerable to disintegration. Harder rock types will therefore occupy the greatest area of the bedrock surface, and more erodible rock types will compose the bedrock surface over a much smaller area. Extensive limestone and dolomite formations form the bedrock surface over most of the county. Weaker sandstone and shale units are at the bedrock surface only in and along the edges of valleys cut into the bedrock (Figs. 1B and 1C; also Plate 2).

In most of the western half of the county, resistant limestone of the Galena Group (the Prosser and Cummingsville formations on Plate 2) forms extensive flat areas on the bedrock surface. At the edges of these mesas, the more erodible rocks of the formations underlying the Galena—the Decorah Shale, Platteville Limestone, Glenwood Shale, and St. Peter Sandstone—form the shoulders and walls of valleys cut into the Galena rocks. These same formations form the slope of the escarpment between the Galena Group subcrop and the lower tier of the bedrock surface which is composed of rocks of the Prairie du Chien Group (Shakopee and Onota formations on Plate 2).

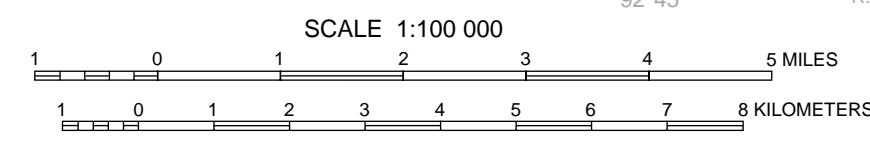
The limestone and dolomite of the Prairie du Chien Group underlie the upland areas of eastern Goodhue County, the northern edge of the western part of the county, and the valley of the Cannon River in that area (Figs. 1B and 1C; also Plate 2). Valleys cut through the Prairie du Chien Group rocks into the Jordan Sandstone, the St. Lawrence Formation, and the Ironton and Galvestine Sandstones. In the broad bedrock valley now occupied by the Mississippi River, the Eau Claire Formation and the Mt. Simon Sandstone compose the uppermost bedrock formations (Plate 2).

Bedrock valleys are more closely spaced in the northeastern part of the county, possibly owing to more extensive fracturing of the Prairie du Chien Group rocks that is related to the faulting in this area. The valleys are oversized for the streams that now occupy them, an indication that earlier in their history stream flow was much higher.

Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based; however, the Minnesota Geological Survey does not warrant or guarantee that there are no errors. Users may wish to verify critical information; sources include both the references listed here and information on file at the offices of the Minnesota Geological Survey in St. Paul. In addition, effort has been made to ensure that the interpretation conforms to sound geologic and cartographic principles. No claim is made that the interpretation shown is rigorously correct, however, and it should not be used to guide engineering-scale decisions without site-specific verification.



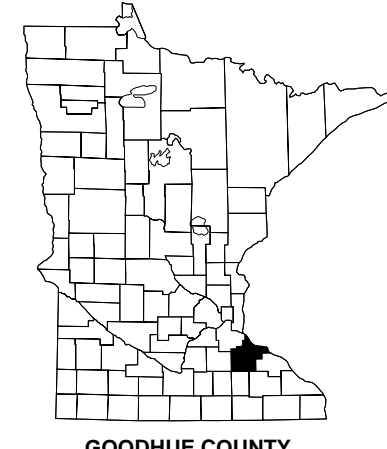
Digital base modified from 1990 Census TIGER/Line Files of U.S. Bureau of the Census (source scale 1:100,000); county border files modified from Minnesota Department of Transportation files; digital base annotation by Minnesota Geological Survey
Universal Transverse Mercator Projection, grid zone 15
1927 North American Datum



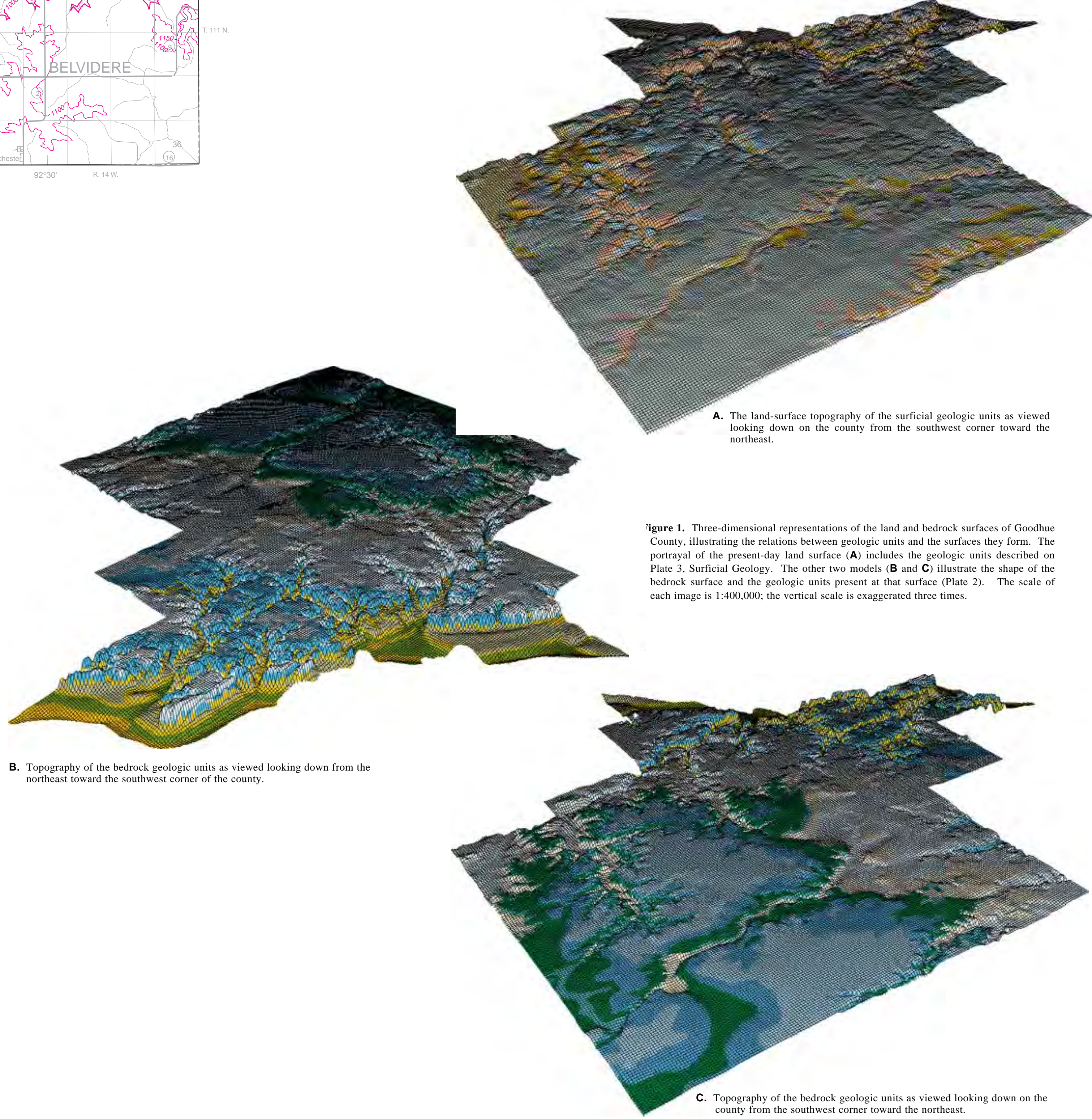
GIS compilation and cartography by
Joyce Meints and Emily Bauer

EXPLANATION

— Line of equal elevation on the bedrock surface—
In feet above mean sea level. Contour interval 200 feet;
supplementary contours at 450, 500, 1100, and 1150 feet.



PERSPECTIVE IMAGES OF GOODHUE COUNTY



A. The land-surface topography of the surficial geologic units as viewed looking down on the county from the southwest corner toward the northeast.

B. Topography of the bedrock geologic units as viewed looking down from the northeast toward the southwest corner of the county.

C. Topography of the bedrock geologic units as viewed looking down on the county from the southwest corner toward the northeast.

Figure 1. Three-dimensional representations of the land and bedrock surfaces of Goodhue County, illustrating the relations between geologic units and the surfaces they form. The portrayal of the present-day land surface (**A**) includes the geologic units described on Plate 3, Surficial Geology. The other two models (**B** and **C**) illustrate the shape of the bedrock surface and the geologic units present at that surface (Plate 2). The scale of each image is 1:400,000; the vertical scale is exaggerated three times.

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BEDROCK GEOLOGY

By
Anthony C. Runkel
1998

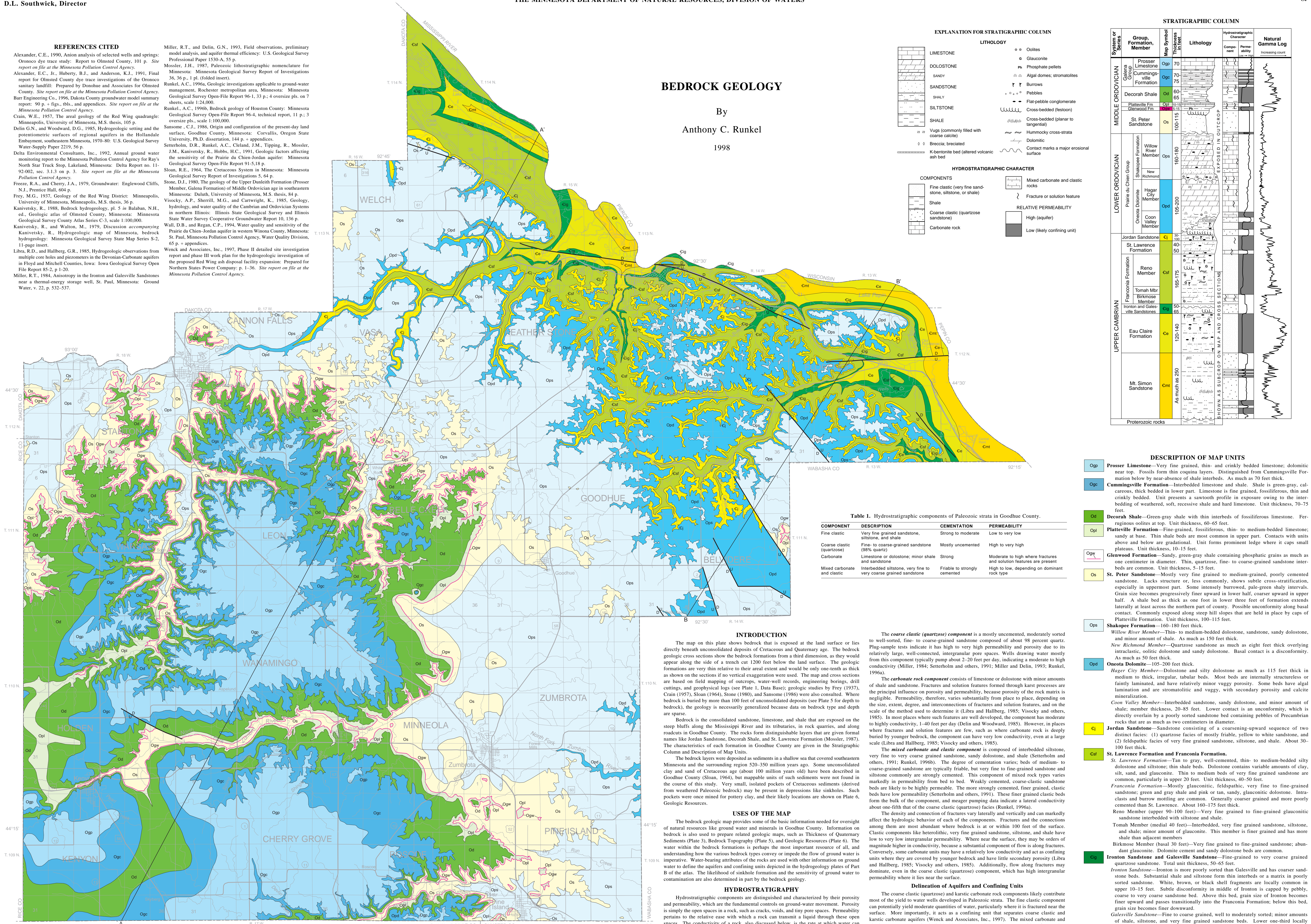


Table 1. Hydrostratigraphic components of Paleozoic strata in Goodhue County.

COMPONENT	DESCRIPTION	CEMENTATION	PERMEABILITY
Fine clastic	Very fine grained sandstone, siltstone, and shale	Strong to moderate	Low to very low
Coarse clastic (quartzose)	Fine- to coarse-grained sandstone (98% quartz)	Mostly uncemented	High to very high
Carbonate	Limestone or dolostone; minor shale and sandstone	Strong	Moderate to high where fractures and solution features are present
Mixed carbonate and clastic	Interbedded siltstone, very fine to very coarse grained sandstone	Friable to strongly cemented	High to low, depending on dominant rock type

INTRODUCTION

The map on this plate shows bedrock that is exposed at the land surface or lies directly beneath unconsolidated deposits of Cretaceous and Quaternary age. The bedrock geologic cross sections show the bedrock formations from a third dimension, as they would appear along the side of a trench cut 1200 feet below the land surface. The geologic formations are very thin relative to their areal extent and would be only one-tenth as thick as shown on the sections if no vertical exaggeration were used. The map and cross sections are based on field mapping of outcrops, water-well records, engineering borings, drill cuttings, and geophysical logs (see Plate 1, Data Base); geologic studies by Frey (1937), Crain (1957), Sloan (1964), Stone (1980), and Sansone (1986) were also consulted. Where bedrock is buried by more than 100 feet of unconsolidated deposits (see Plate 5 for depth to bedrock), the geology is necessarily generalized because data on bedrock type and depth are sparse.

Bedrock is the consolidated sandstone, limestone, and shale that are exposed on the steep bluffs along the Mississippi River and its tributaries, in rock quarries, and along roadcuts in Goodhue County. The rocks from distinguishable layers that are given formal names like Jordan Sandstone, Decora Shale, and St. Lawrence Formation (Mossler, 1987). The characteristics of each formation in Goodhue County are given in the Stratigraphic Column and Description of Map Units.

The bedrock layers were deposited as sediments in a shallow sea that covered southeastern Minnesota and the surrounding region 520-350 million years ago. Some unconsolidated clay and sand of Cretaceous age (about 100 million years old) have been described in Goodhue County (Sloan, 1964), but mappable units of such sediments were not found in the course of this study. Very small, isolated pockets of Cretaceous sediments (derived from weathered Paleozoic bedrock) may be present in depressions like sinkholes. Such rocks were once mined for pottery clay, and their likely locations are shown on Plate 6, Geologic Resources.

USES OF THE MAP

The bedrock geologic map provides some of the basic information needed for oversight of natural resources like ground water and minerals in Goodhue County. Information on bedrock is also used to prepare related geologic maps, such as Thickness of Quaternary Sediments (Plate 3), Bedrock Topography (Plate 5), and Geologic Resources (Plate 6). The water within the bedrock formations is perhaps the most important resource of all, and understanding how the various bedrock types convey or impede the flow of ground water is imperative. Water-bearing attributes of the rocks are used with other information on ground water to define the aquifers and confining units depicted in the hydrogeologic plates of Part B of the atlas. The likelihood of sinkhole formation and the sensitivity of ground water to contamination are also determined in part by the bedrock geology.

HYDROSTRATIGRAPHY

Hydrostratigraphic components are distinguished and characterized by their porosity and permeability, which are the fundamental controls on ground-water movement. Porosity is simply the open spaces in a rock, such as cracks, voids, and tiny pore spaces. Permeability pertains to the relative ease with which a rock can transmit a liquid through these open spaces. The conductivity of a rock, also discussed below, is the rate at which water can move through it.

Hydrostratigraphic Components

The Paleozoic bedrock in Goodhue County consists of four distinct hydrostratigraphic components, which have been defined and characterized in studies elsewhere in southeastern Minnesota (Setterholm and others, 1991; Miller and Delin, 1993; Runkel, 1996b). The components are (1) fine clastic, (2) coarse clastic or quartzose, (3) mixed carbonate and clastic, and (4) carbonate. A clastic rock is a sedimentary rock composed principally of broken fragments derived from pre-existing rocks. The stratigraphic position of these components relative to the formally defined groups, formations, and members of the Paleozoic rocks is shown in the Stratigraphic Column. Porosity and permeability were determined through laboratory tests of plug samples and hydraulic testing of water wells in southeastern Minnesota, including Goodhue County.

The fine clastic component consists of very fine grained sandstone, siltstone, and shale in thin to medium-thick beds that are strongly to moderately cemented. The component has low to very low relative permeability, several orders of magnitude less than that of the coarse grained sandstone of the coarse clastic (quartzose) component. Vertical conductivity is low to very low in the fine clastic component, commonly 0.001-0.00001 (10⁻³-10⁻⁵) feet per day for interbedded, very fine sandstone and shale (Miller and Delin, 1993), and as low as 0.0000001 (10⁻⁷) feet per day for units composed almost entirely of shale (Freese and Cherry, 1979). Horizontal conductivity in interbedded sandstone and shale is typically more than 100 times greater than vertical permeability (Miller, 1984; Setterholm and others, 1991; Miller and Delin, 1993).

The coarse clastic (quartzose) component is a mostly uncemented, moderately sorted to well-sorted, fine- to coarse-grained sandstone composed of about 98 percent quartz. Plug-sample tests indicate it has high to very high permeability and porosity due to its relatively large, well-connected, intergranular pore spaces. Wells drawing water mostly from this component typically pump about 2-20 feet per day, indicating a moderate to high conductivity (Miller, 1984; Setterholm and others, 1991; Miller and Delin, 1993; Runkel, 1996a).

The carbonate rock component consists of limestone or dolostone with minor amounts of shale and sandstone. Fractures and solution features formed through karst processes are the principal influence on porosity and permeability, because porosity of the rock matrix is negligible. Permeability, therefore, varies substantially from place to place, depending on the size, extent, degree, and interconnections of fractures and solution features, and on the scale of the method used to determine it (Libra and Hallberg, 1985; Visocky and others, 1985). In most places where such features are well developed, the component has moderate to highly conductivity, 1-40 feet per day (Delin and Woodward, 1985). However, in places where fractures and solution features are few, such as where carbonate rock is deeply buried by younger bedrock, the component can have low conductivity, even at a large scale (Libra and Hallberg, 1985; Visocky and others, 1985).

The mixed carbonate and clastic component is composed of interbedded siltstone, very fine to very coarse grained sandstone, sandy dolostone, and shale (Setterholm and others, 1991; Runkel, 1996b). The degree of cementation varies; beds of medium- to coarse-grained sandstone are typically friable, but very fine to fine-grained sandstone and siltstone commonly are strongly cemented. This component of mixed rock types varies markedly in permeability from bed to bed. Weakly cemented, coarse-clastic sandstone beds are likely to be highly permeable. The more strongly cemented, fine grained, clastic beds have low permeability (Setterholm and others, 1991). These finer grained clastic beds from the bulk of the component, and meager pumping data indicate a lateral conductivity about one-fifth that of the coarse clastic (quartzose) facies (Runkel, 1996a).

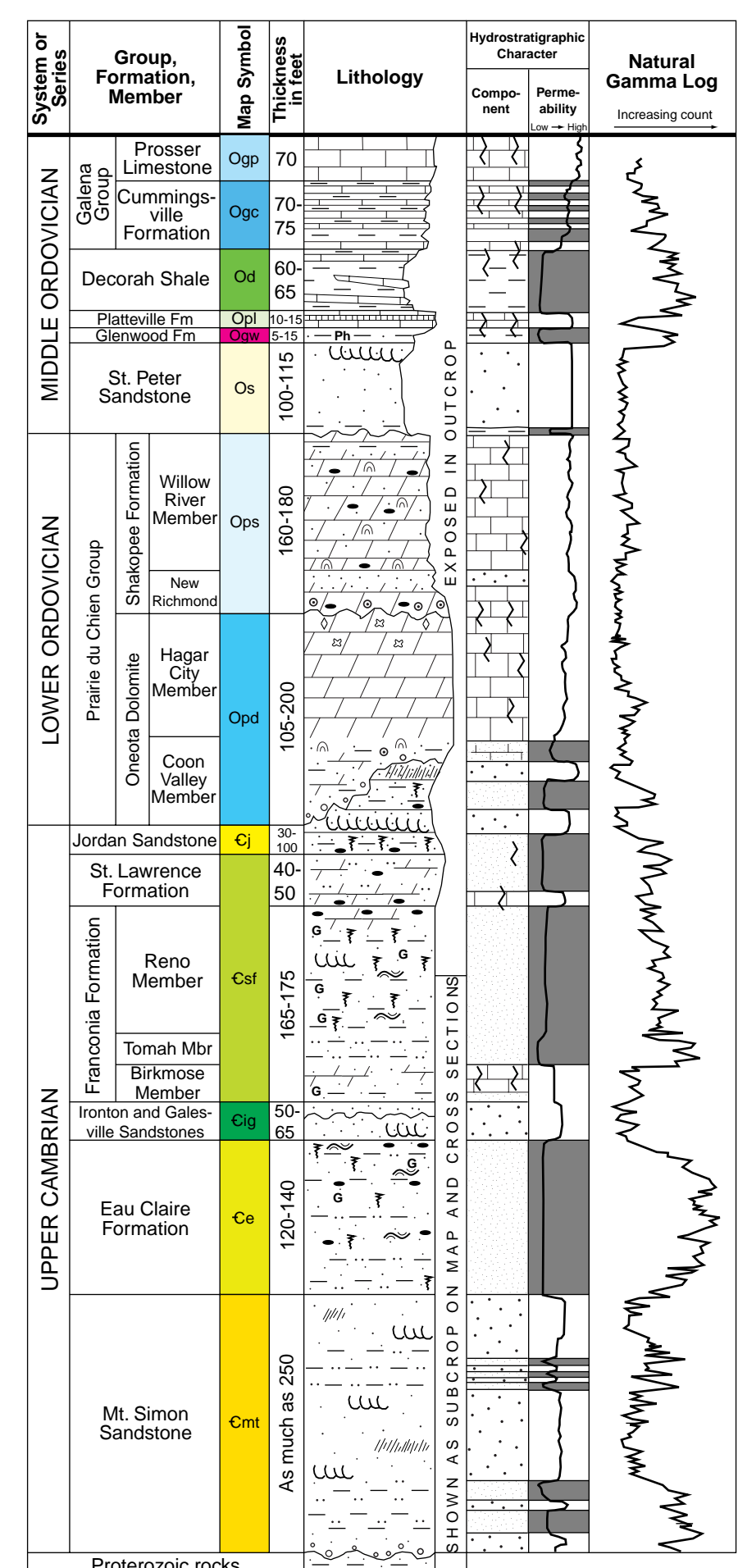
The density and connection of fractures vary laterally and vertically and can markedly affect the hydrologic behavior of each of the components. Fractures and the connections among them are most abundant where bedrock is at or within 100 feet of the surface. Clastic components like heterolithic, very fine grained sandstone, siltstone, and shale have low to very low intergranular permeability. Where near the surface, they may be orders of magnitude higher in conductivity, because a substantial component of flow is along fractures. Conversely, some carbonate units may have a relatively low conductivity and act as confining units where they are covered by younger bedrock and have little secondary porosity (Libra and Hallberg, 1985; Visocky and others, 1985). Additionally, flow along fractures may dominate, even in the coarse clastic (quartzose) component, which has high intergranular permeability where it lies near the surface.

Delineation of Aquifers and Confining Units

The coarse clastic (quartzose) and karstic carbonate rock components likely contribute most of the yield to water wells developed in Paleozoic strata. The fine clastic component can potentially yield moderate quantities of water, particularly where it is fractured near the surface. More importantly, it acts as a confining unit that separates coarse clastic and karstic carbonate aquifers (Wenck and Associates, Inc., 1997). The mixed carbonate and clastic component contains individual beds that can yield moderate quantities of water, but where greater than 10 feet thick, it apparently also acts as a confining unit (Setterholm and others, 1991). Unfractured carbonate rock can also serve as a confining unit (Visocky and others, 1985; Alexander and others, 1991; Barr Engineering, 1996).

Two of the most widely used aquifers in Goodhue County, the Franconia-Ironton-Galeville and the Prairie du Chien-Jordan and are not single, hydraulically connected aquifer systems as previously believed (Kaniavsky and Walton, 1979). Pumping tests (Miller, 1984; Delta Environmental Consultants, Inc., 1992; Miller and Delin, 1993) and carefully collected measurements of local static water levels (Delta Environmental Consultants, Inc., 1992; Wenck and Associates, Inc., 1997) clearly indicate that water in the upper part of the Franconia is hydraulically separated from water in the lowermost Franconia, Ironton, and Galeville formations. Some fractured, carbonate-cemented rock in the lower part of the Franconia where it is at or near the surface is a source of many springs in the county and is perhaps the only highly permeable conduit for ground water within the Franconia. The Prairie du Chien-Jordan aquifer is also two distinct aquifers, an upper carbonate aquifer and a lower quartzose aquifer, which are separated by an intervening confining unit composed of the mixed clastic and carbonate component. Hydraulic separation of the carbonate and quartzose aquifers is indicated by several lines of hydrologic evidence gathered in Goodhue and adjacent counties, including potentiometric data (Kaniavsky, 1988; Alexander and others, 1991), pumping tests (Barr Engineering, 1996), and ground-water chemistry (Alexander, 1990; Setterholm and others, 1991; Wall and Regan, 1994).

STRATIGRAPHIC COLUMN



DESCRIPTION OF MAP UNITS

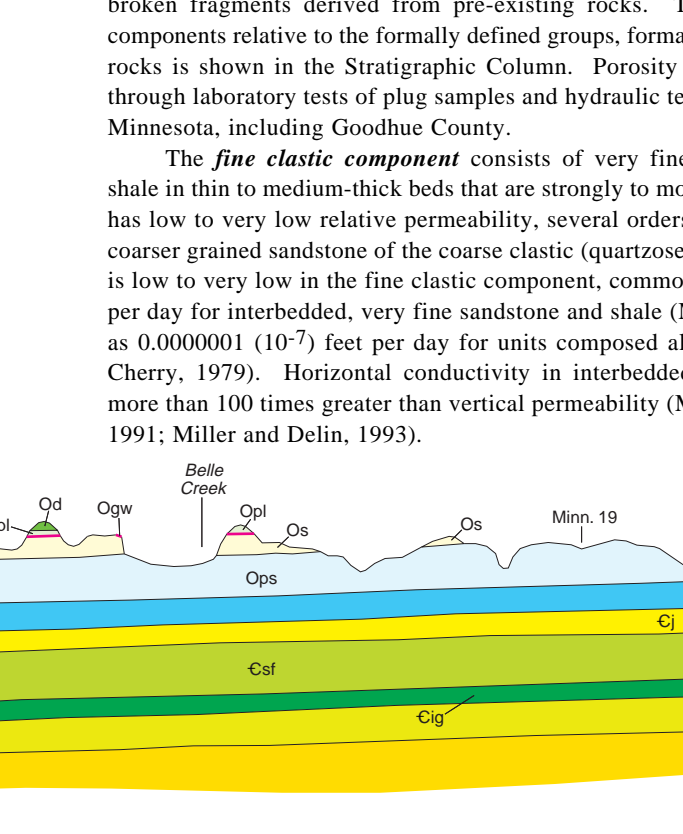
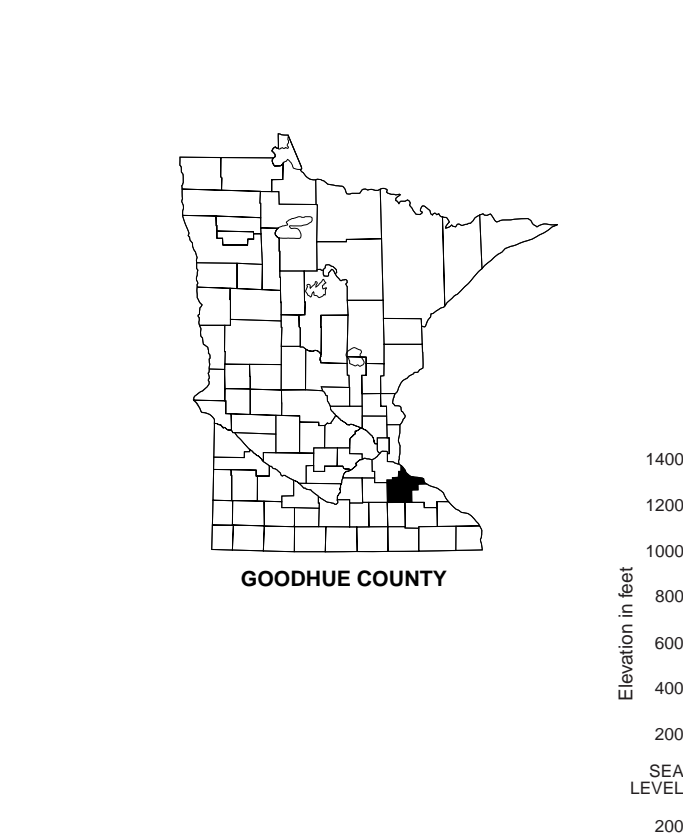
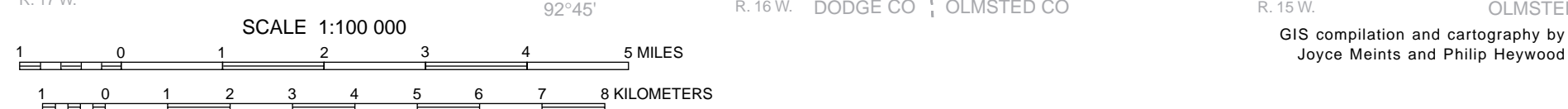
- Osp** Prosser Limestone—Very fine grained, thin- and crinkly bedded limestone; dolomitic near top. Fossils from thin coquina layers. Distinguished from Cummingsville Formation below by near-absence of shale interbeds. As much as 70 feet thick.
- Ocp** Cummingsville Formation—Interbedded limestone and shale. Shale is green-gray, calcareous, thick bedded in lower part. Limestone is fine grained, fossiliferous, thin and crinkly bedded. Unit presents a sawtooth profile in exposure owing to the interbedding of weathered, soft, recessive shale and hard limestone. Unit thickness, 70-75 feet.
- Ods** Decora Shale—Green-gray shale with thin interbeds of fossiliferous limestone. Ferruginous shales at top. Unit thicknesses, 60-65 feet.
- Opl** Plattville Formation—Fine-grained, fossiliferous, thin- to medium-bedded limestone; sandy at base. Thin shale beds are most common in upper part. Contacts with units above and below are gradational. Unit forms prominent ledge where it caps small plateaus. Unit thicknesses, 10-15 feet.
- Ogw** Glenwood Formation—Sandy, green-gray shale containing phosphatic grains as much as one centimeter in diameter. Thin, quartzose, fine- to coarse-grained sandstone interbeds are common. Unit thicknesses, 5-15 feet.
- Ost** St. Peter Sandstone—Mostly very fine grained to medium-grained, poorly cemented sandstone. Lacks structure or, less commonly, shows subtle cross-stratification, especially in uppermost part. Some intensely burrowed, pale-green silt intervals. Grain size becomes progressively finer upward in lower half, coarser upward in upper half. A shale bed as thick as one foot in lower three feet of formation extends laterally at least across the northern part of county. Possible unconformity along basal contact. Commonly exposed along steep hill slopes that are held in place by caps of Plattville Formation. Unit thickness, 100-115 feet.
- Osh** Shakopee Formation—160-180 feet thick.
- Osw** Willow River Member—Thin to medium-bedded dolostone, sandstone, sandy dolostone, and minor amount of shale. As much as 150 feet thick.
- Or** New Richmond Member—Quartzose sandstone as much as eight feet thick overlying intraclastic, oolitic dolostone and sandy dolostone. Basal contact is a disconformity. As much as 50 feet thick.
- Ond** Onondaga Dolomite—105-200 feet thick.
- Ocm** Hager City Member—Dolostone and silty dolostone with as much as 115 feet thick in middle part, irregular, tabular beds. Most beds are internally structureless or faintly laminated, and have relatively minor vuggy porosity. Some beds have algal laminations and are stromatolitic and vuggy, with secondary porosity and calcite mineralization.
- Ocn** Coon Valley Member—Interbedded sandstone, sandy dolostone, and minor amount of shale; member thickness, 20-85 feet. Lower contact is an unconformity, which is directly overburied by a poorly sorted sandstone bed containing pebbles of Precambrian rocks that are as much as two centimeters in diameter.
- Ocj** Jordan Sandstone—Sandstone consisting of a coarsening-upward sequence of two distinct facies: (1) quartzose facies of mostly friable, yellow to white sandstone, and (2) felspathic facies of very fine grained sandstone, siltstone, and shale. About 30-100 feet thick.
- Ocl** St. Lawrence Formation and Franconia Formation.
- Sl** St. Lawrence Formation—Tan to gray, well-cemented, thin- to medium-bedded siltstone and sandstone; this shale beds. Dolostone contains variable amounts of clay, silt, sand, and glauconitic. This to medium beds of very fine grained sandstone are common, particularly in upper 20 feet. Unit thickness, 40-50 feet.
- F** Franconia Formation—Mostly glauconitic, felspathic, very fine to fine-grained sandstone; green and gray shale and pink or tan, sandy, glauconitic dolostone. Intracasts and burrow mottling are common. Generally coarser grained and more strongly cemented than St. Lawrence. About 160-175 feet thick.
- R** Reno Member (upper 90-100 feet)—Very fine grained to fine-grained glauconitic sandstone interbedded with siltstone and shale.
- T** Tomah Member (medial 40 feet)—Interbedded, very fine grained sandstone, siltstone, and shale; minor amount of glauconitic. This member is finer grained and has more shale than adjacent members.
- B** Birkmore Member (basal 30 feet)—Very fine grained to fine-grained sandstone; abundant dolomite cement and sandy dolostone beds are common.
- I** Ironton Sandstone and Galeville Sandstone—Fine-grained to very coarse grained sandstone. Totals unit thicknesses, 50-65 feet.
- I** Ironton Sandstone—Ironton is more poorly sorted than Galeville and has coarser sandstone beds. Substantial shale and siltstone form thin interbeds or a matrix in poorly sorted sandstone. White, brown, or black shell fragments are locally common in upper 10-15 feet. Subtle disconformity in middle of Ironton is capped by poorly sorted, very coarse sandstone bed. Above this bed, grain size of Ironton becomes finer upward and passes transitionally into the Franconia Formation; below this bed, grain size becomes finer downward.
- G** Galeville Sandstone—Fine to coarse grained, well to moderately sorted; minor amounts of shale, siltstone, and very fine grained sandstone beds. Lower one-third locally intertongues with felspathic, very fine grained sandstone of underlying Eau Claire Formation.
- E** Eau Claire Formation—Commonly interbedded sandstone, siltstone, shale; thin to medium-thick beds. The sandstone is very fine grained to fine grained, tan, variably glauconitic, laterally stratified, hummocky stratified or bioturbated. Siltstone is tan to gray, laterally stratified or bioturbated. Shale is gray to greenish-gray. Gray to black shell fragments are common. Unit coarsens upward, with shale and siltstone replaced in abundance by sandstone. Uppermost 10-20 feet is mostly very fine grained sandstone and siltstone. About 120-140 feet thick.
- M** Mt. Simon Sandstone—Mostly yellow to yellow, fine- to coarse-grained, friable, quartzose sandstone. Scant subsurface data indicate that the Mt. Simon is as much as 250 feet thick. The top of the Mt. Simon is marked locally by a thin "rusty" sandstone that contains iron-coated, fine to coarse sand grains and abundant black shell fragments. Beds of variegated shale, siltstone, and felspathic, very fine grained sandstone are common, particularly in the upper two-thirds of the formation. Pebble conglomerate or pebbly sandstone is common in the lowermost 100 feet of the formation.
- P** Proterozoic rocks, undifferentiated—Samples from a few deep water wells that penetrated the entire Mt. Simon beneath the city of Red Wing indicate that the rocks beneath the Mt. Simon include buff to tan quartz arenite of the Hinckley Sandstone and arkosic red sandstone, shale, and siltstone of the Fond du Lac Formation.

DESCRIPTION OF MAP SYMBOLS

- G** Geologic contact—Approximately located; generally concealed.
- U** Fault—Approximately located; generally concealed. U, upthrown side; D, downthrown side.
- A-A'** Line of section.

Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based. However, the Minnesota Geological Survey does not warrant or guarantee that there are no errors. Users may wish to verify critical information sources include both the references listed here and information on file at the offices of the Minnesota Geological Survey in St. Paul. In addition, effort has been made to ensure that the interpretation conforms to standard geologic and cartographic principles. No claim is made that the interpretation shown is rigorously correct, however, and it should not be used to guide engineering scale design without site-specific verification.

Digital base modified from 1990 Census TIGER/Line Files of U.S. Bureau of the Census (source scale 1:100,000); county border files modified from Minnesota Department of Transportation files; digital base annotation by Minnesota Geological Survey.
Universal Transverse Mercator Projection, grid zone 15
1927 North American Datum



Appendix J

**Groundwater Hydrology
Geologic Atlas of Goodhue County
Mn DNR Division of Waters**



FIGURE 1. Sinkhole MN25-D0363. A typical Galena sinkhole in the woodlands of the western half of Leon Township, D363 consists of an old, bowl-shaped sinkhole about 30 feet in diameter and 3 feet deep. In the center is a currently active, funnel-shaped collapse measuring 10 feet in diameter by 3 feet deep.



FIGURE 2. Spring MN25-A0007, Edstrom Spring, A7 is a headwater spring of a branch of Spring Creek in Featherstone Township. The green plant growing in the spring is watercress (*Nasturtium officinale*), which is endemic to springs. The constant 45°F temperature of the spring water enables Spring Creek to support a trout fishery.

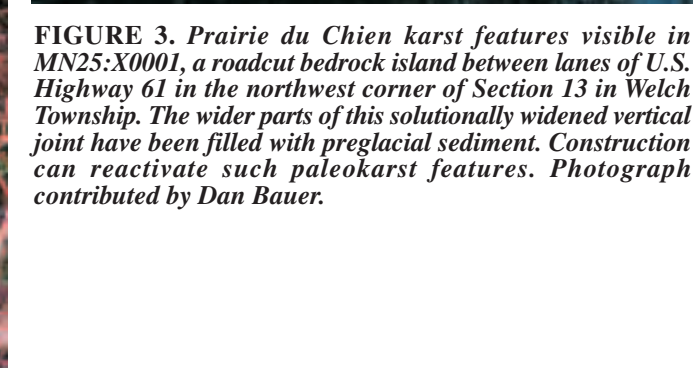


FIGURE 3. Prairie du Chien karst features visible in MN25-X0001, a roadcut bedrock island between lanes of U.S. Highway 61 in the northwest corner of Section 13 in Welch Township. The wider parts of this solutionally widened vertical joint have been filled with preglacial sediment. Construction can reactivate such paleokarst features. Photograph contributed by Dan Bauer.

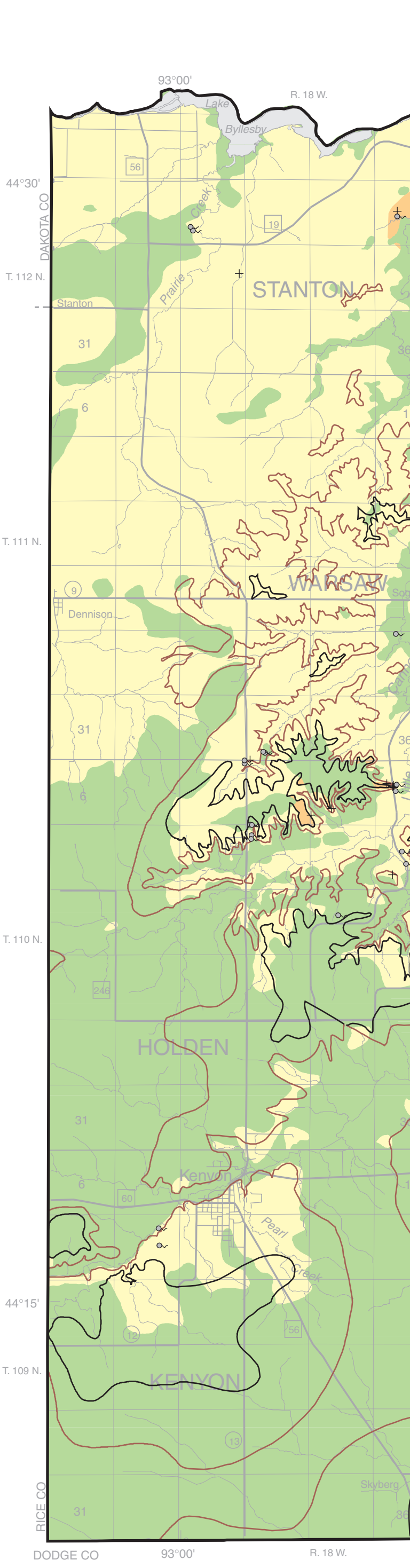
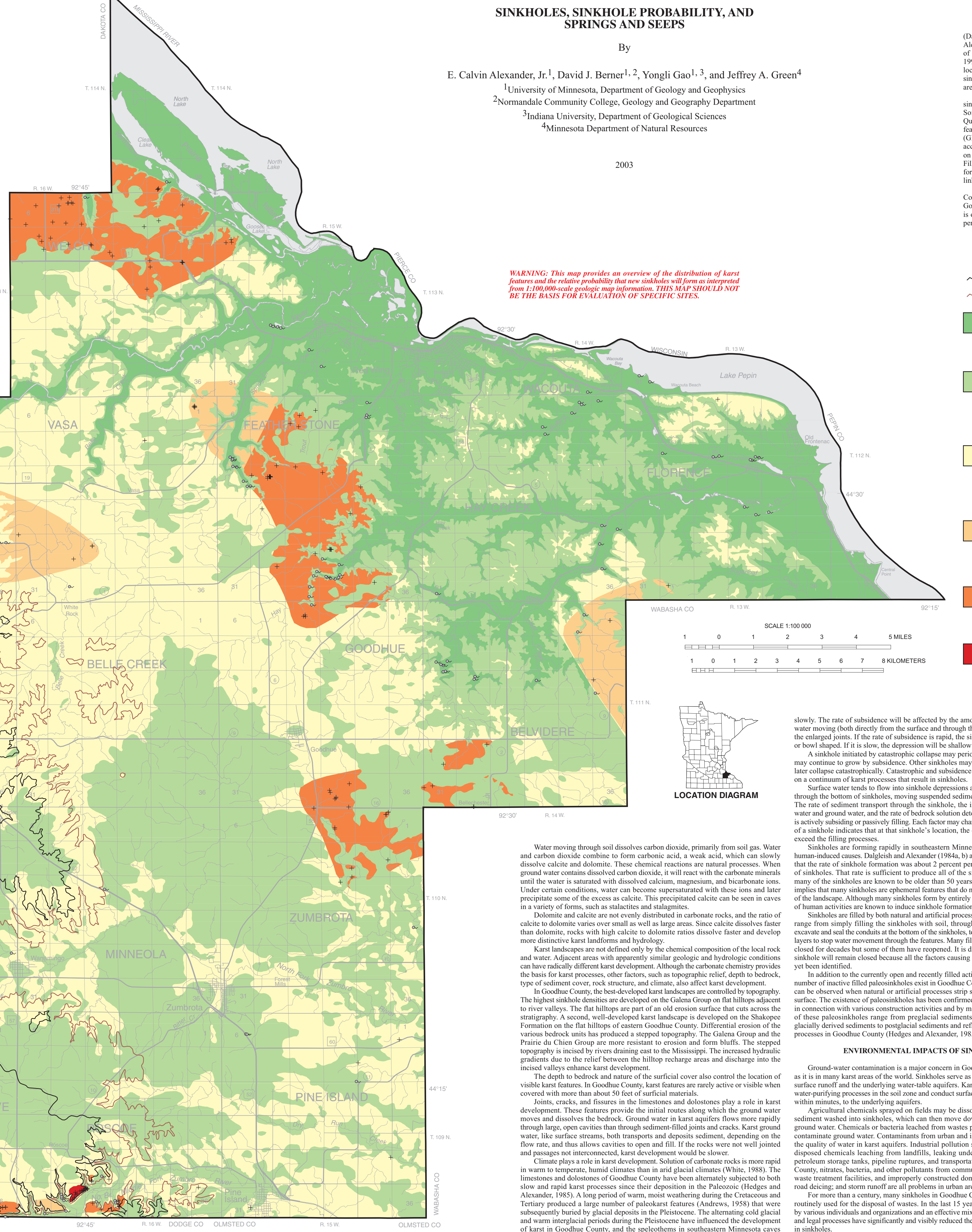


FIGURE 4. Sinkhole MN25-D0291, D291 was a 6-foot-diameter by 5-foot-deep vertical-sided collapse that formed after harvest in October 1996 in Welch Township. Field cultivation filled D291 in spring 1997 and 1998. It redeveloped each following autumn. Photograph contributed by Dan Bauer.



WARNING: This map provides an overview of the distribution of karst features and the relative probability that new sinkholes will form as interpreted from 1:100,000-scale geologic map information. THIS MAP SHOULD NOT BE THE BASIS FOR EVALUATION OF SPECIFIC SITES.

MAP EXPLANATION

The construction of this sinkhole probability map was guided by and builds on earlier efforts in Winona County (Dalglish and Alexander, 1984a, b), Olmsted County (Alexander and Maki, 1988), and Fillmore County (Wittuhn and Alexander, 1995). The relative probability of future sinkhole development is estimated primarily from the observed density of sinkholes. New sinkholes are most likely to form in areas where sinkholes are concentrated (Kemmerly, 1982; Beck, 1991). In places where fewer sinkholes occur, a chance still exists that new sinkholes will open in apparently random locations. Depth to bedrock, bedrock geology, and position on the landscape provide secondary factors to estimate future sinkhole development. The division of the county into areas of varying sinkhole probability is approximate and boundaries are not sharply defined.

The karst features Data Base contains information on 271 sinkholes, nine springs, and 160 springs in Goodhue County. The karst features Data Base contains information on 271 sinkholes, nine springs, and 160 springs in Goodhue County. About two-thirds of the active sinkholes and maybe one-quarter of the larger springs were visited and mapped in Goodhue County. The Karst Features Data Base will be updated as additional information is received. That information is one starting point for any site investigation, but each site will need a careful karst inventory conducted by qualified personnel trained in karst hydrogeology.

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No Probability—The only places in Goodhue County where karst sinkholes cannot form are areas in which the first bedrock is the Jordan Sandstone or a stratigraphically lower unit. Such areas occur in the northeastern part of the county where the Mississippi and Cannon rivers and Spring, Hay, Wells, Bullard, and Sugar Loaf creeks have eroded valleys through the Prairie du Chien Group into the underlying Jordan Sandstone and deeper formations. All other parts of the county have some potential for sinkhole development.

Low Probability—Areas underlain by carbonate bedrock, but in which very few sinkholes are found, are shown as Low Probability for sinkhole development. In Goodhue County, few sinkholes have developed where more than 50 feet of surficial sediments cover the bedrock or where the Onota Dolomite is the first bedrock. The Onota Dolomite is first bedrock along the sides of the Mississippi River valley in the northeastern part of the county. The Onota cliffs contain evidence of karst activity such as enlarged joints and small caves but few sinkholes are found on the steep slopes. Extensive areas with more than 50 feet of sediments over bedrock occur throughout Goodhue County.

Low to Moderate Probability—Large parts of Goodhue County contain areas where only widely scattered individual sinkholes or isolated clusters of two or three sinkholes occur. The average sinkhole density in Low to Moderate Probability areas is less than one sinkhole per square mile. These areas are underlain by carbonate rock covered with less than 50 feet of surficial material. The expected future sinkhole density is generally low in these areas, but is moderate where small sinkhole clusters have developed. Despite the low density of sinkholes, karst aquifers occur; they are rapidly recharged by infiltration through the relatively thin surficial materials.

Moderate to High Probability—In these parts of Goodhue County, sinkholes are common landscape features. They occur as diffuse clusters of three or more sinkholes, with an average sinkhole density of about one per square mile. These Moderate to High Probability areas are particularly challenging to resource managers since sinkholes in these areas are sufficiently far apart that a sinkhole may not be visible from a specific location. This lack of visible sinkholes may encourage development that ignores the land-use constraints imposed by karst.

High Probability—Sinkholes are a prominent part of the landscape when their densities reach 5 to 20 per square mile. In these areas, new sinkholes routinely appear. Clusters of sinkholes may develop in response to local water table changes, either natural or human-induced. Natural changes include droughts and unusually wet periods. Human-induced changes include fluctuations of the water table due to the construction of a building or water-retention facility, or by diverting natural drainage into sinkholes.

Sinkhole Plain—Sinkholes are the dominant landform when their densities exceed about 20 per square mile. In Goodhue County, areas with sinkhole densities from about 20 up to several hundred per square mile are mapped as Sinkhole Plains. New sinkholes often appear in these areas. Sinkholes are major agricultural problems preventing the cultivation of significant fractions of many fields. Sinkhole collapse is a major, ongoing concern for roads and structures. Sheet and gully erosion into the sinkholes is a significant problem. All the precipitation that is not lost to evapotranspiration either infiltrates through the soil or drains into a sinkhole.

slowly. The rate of subsidence will be affected by the amount of sediment carried by water moving (both directly from the surface and through the unsaturated zone) toward the enlarged joints. If the rate of subsidence is rapid, the sinkhole will be cone shaped or bowl shaped. If it is slow, the depression will be shallow for a longer period of time.

A sinkhole initiated by catastrophic collapse may periodically collapse again, or it may continue to grow by subsidence. Other sinkholes may begin with subsidence and later collapse catastrophically. Catastrophic and subsidence sinkholes are end members on a continuum of karst processes that result in sinkholes.

Surface water tends to flow into sinkhole depressions and then into the subsurface through the bottom of sinkholes, moving suspended sediment deeper into the bedrock. The rate of sediment transport through the sinkhole, the interaction between surface water and ground water, and the rate of bedrock solution determine whether the sinkhole is actively subsiding or passively filling. Each factor may change with time. The existence of a sinkhole indicates that at that sinkhole's location, the erosion processes currently exceed the filling processes.

Sinkholes are forming rapidly in southeastern Minnesota that do not become a permanent part of the landscape. Although many sinkholes form by entirely natural processes, a number of human activities are known to induce sinkhole formation (Aley and others, 1973). Sinkholes are filled by both natural and artificial processes. The artificial techniques range from simply filling the sinkholes with soil, through sophisticated attempts to excavate and seal the conduits at the bottom of the sinkholes, to installation of impermeable layers to stop water movement through the features. Many filled sinkholes have remained closed for decades but some of them have reopened. It is difficult to predict whether a sinkhole will remain closed because all the factors causing sinkhole collapses have not yet been identified.

In addition to the currently open and recently filled active sinkholes, a much larger number of inactive filled paleosinkholes exist in Goodhue County. These paleosinkholes can be observed when natural or artificial processes strip sediments from the bedrock surface. The existence of paleosinkholes has been confirmed by dense arrays of borings in various areas of Goodhue County. These borings indicate that infiltration into the karst aquifers through relatively thin soils is a major source of ground-water recharge.

Other environmental problems created by sinkholes are physical. Soil loss can be a significant problem if sheet and gully erosion are allowed to develop around the sinkholes. Potentially hazardous incidents have occurred when new sinkholes open catastrophically under farm equipment being driven over fields.

Any facility may be structurally damaged if a sinkhole opens under or adjacent to it. Homeowners have experienced economic losses from sinkholes collapsing near or under house foundations, roads, or sewer lines. Water retention structures, such as lagoons and ponds, are highly susceptible to sinkhole collapse (Aley and others, 1972). Numerous ponds in Goodhue County have failed because of sinkhole formation. Animal-waste storage facilities in Goodhue County and municipal waste treatment facilities elsewhere in southeastern Minnesota (Alexander and others, 1993) have been damaged when sinkholes developed catastrophically. Highways can be affected by sinkholes.

ENVIRONMENTAL IMPACTS OF SINKHOLES

Ground-water contamination is a major concern in Goodhue County's karst areas, as it is in many karst areas of the world. Sinkholes serve as direct connections between surface runoff and the underlying water-table aquifers. Karst systems bypass potential water-purifying processes in the soil zone and conduct surface water directly, sometimes within minutes, to the underlying aquifers.

Agricultural chemicals sprayed on fields may be dissolved in water or carried on sediment washed into sinkholes, which can then move downward through joints into ground water. Chemicals or bacteria leached from wastes placed in sinkholes can also contaminate ground water. Contaminants from urban and industrial sources can affect the quality of water in karst aquifers. Industrial pollution sources include improperly disposed chemicals leaching from landfills, leaking underground and aboveground petroleum storage tanks, pipeline ruptures, and transportation accidents. In Goodhue County, nitrates, bacteria, and other pollutants from community drainfields, municipal waste treatment facilities, and improperly constructed domestic drainfields; salt from road deicing; and storm runoff are all problems in urban areas.

For more than a century, many sinkholes in Goodhue County were improperly but routinely used for the disposal of wastes. In the last 15 years, public education efforts by various individuals and organizations and an effective mix of community involvement and legal processes have significantly and visibly reduced the incidence of waste disposal in sinkholes.

The ground-water contamination problems associated with karst extend into regions without sinkholes and can influence water quality in springs and wells in nonkarstic aquifers. Hallberg and others (1983) and Libra and others (1984) concluded that most of the ground-water contaminants in the karst region of northeastern Iowa enter the aquifers through soil infiltration and not through direct runoff into sinkholes. The lack of surface streams in many parts of Goodhue County indicates that infiltration into the karst aquifers through relatively thin soils is a major source of ground-water recharge.

Other environmental problems created by sinkholes are physical. Soil loss can be a significant problem if sheet and gully erosion are allowed to develop around the sinkholes. Potentially hazardous incidents have occurred when new sinkholes open catastrophically under farm equipment being driven over fields.

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SPRINGS AND SEEPS

Springs and seeps are places where ground water returns to the surface. They occur where the ground-water table intersects the land surface. Springs and seeps come in a wide, overlapping range of sizes. The water flows range from tens to hundreds of gallons per minute to zero. Many of the important springs and seeps are ephemeral and only flow after large ground-water recharge events. Springs are generally taken to be point sources. The water at springs emerges as a distinct flow from a single point or a small area or pool. Seeps generally describe places where water oozes out of the ground over a broad area. Springs and seeps often, but not always, support distinctive plant and animal communities. Springs and seeps form the headwaters of many perennial streams of Goodhue County and support the coldwater trout fisheries. Springs and seeps often emerge from the bottom sides of stream rivers.

The location of springs in Goodhue County is strongly influenced by the interrelationships between aquifer stratigraphy and topography in the landscape. In southwestern Goodhue County, scattered springs and seeps flow from glacial sediments

on top of the Galena Formation. Much of this landscape has been extensively tiled and it can be difficult to tell a buried tile outlet from a natural spring. Both typically drain to the lowest part of the local landscape. Many springs and seeps occur where the Decorah Shale, Plattville Limestone, and Glenwood Shale intersect the land surface (roughly following the brown contoured line on the map). The headwaters of the Little Cannon River, Belle Creek, and the North and Middle Forks of the Zumbro River flow from Decorah edge and stratigraphically higher springs and seeps in the western and southwestern half of Goodhue County. The third major group of springs rises from the bottom of the Onota Dolomite and the top of the Jordan Sandstone in eastern and northeastern Goodhue County. Such springs and seeps form the headwaters of Spring, Hay, and Wells creeks. A final group of springs emerges near and in the Mississippi River valley forming the northeastern edge of Goodhue County. The Mississippi River is the ultimate base level for the hydrogeology of Goodhue County. Some of the springs flow from glacial terraces and some flow from the St. Lawrence and deeper formations. Springs are the natural outlets of the ground-water flow systems. They form ideal places to sample and monitor the overall water quality in the aquifers. Most springs drain the near-surface aquifers and, like wells in the near-surface aquifers, can be affected by human activities on the surface. Spring water should be assumed to be unpotable until proven otherwise.

SUMMARY

Bedrock composition, topographic position in the landscape, and depth of surficial cover are the main controls on sinkhole formation in Goodhue County. The highest sinkhole densities occur where the Prosser Limestone forms uplands adjacent to entrenched stream valleys. Other combinations of first bedrock and topographic position result in locally greater sinkhole densities. Sinkholes rarely form where there is more than 50 feet of surficial cover over the carbonate bedrock. The pre-Pleistocene paleokarst may also be influencing sinkhole formation. Many existing sinkholes represent reactivation of paleokarst sinkholes.

Sinkholes can form anywhere in Goodhue County except in the stream valleys that have eroded down below the Onota Dolomite. Nearby sinkholes remain the single best predictor of new sinkhole development. However, many sinkholes are not shown on existing maps or may have been filled.

Springs and seeps form the headwaters of most of the flowing surface creeks, streams, and rivers in Goodhue County. Most of them emerge where specific parts of the bedrock stratigraphy intersect the surface topography. The three major concentrations of springs are along the Decorah edge in western and southwestern Goodhue County along the outcrop of the Onota-Jordan contact and along the Mississippi River.

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Digital base compositor:
Roads and county boundaries - Minnesota Department of Transportation GIS Statewide Base Map (source scale 1:24,000)
Hydrologic features - U.S. Geological Survey Digital Line Graphs (source scale 1:100,000)
Digital base annotation - Minnesota Geological Survey
Project data compiled from 1998 to 2001 at the scale of 1:100,000. Universal Transverse Mercator projection, grid zone 15, 1983 North American datum. Vertical datum is mean sea level.
GIS and cartography by Mike Tromrud and Yongli Gao. Edited by Nick Koska.

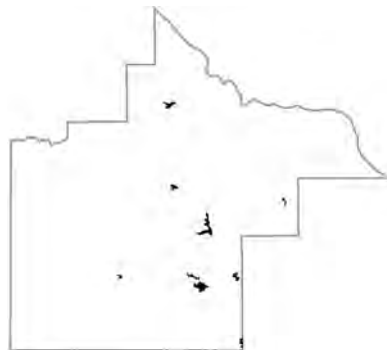
Minnesota Department of Natural Resources
Goodhue County Geologic Atlas, Part B
Plate 9: Sensitivity to Pollution of the Uppermost Bedrock Aquifers
2003

ERRATA

Following printing, several inconsistencies were noticed between the printed map and the geographic information systems (GIS) files (shapefiles) for Plate 9. The GIS files contained the correct information, but the information was shown incorrectly on the printed map. Those inconsistencies include the notable changes listed in the table below. The map shows the area affected by the changes is very limited.

Change Sensitivity Overlay on Map		Map Location		
From	To	Township	Range	Section
Low sensitivity (light green)	Moderate sensitivity (yellow)	T111N	R16W	SW 1/4 of Section 1, SE 1/4 of 2, and N 1/2 of the NE 1/4 of the NE 1/4 of Section 11
		T110N	R17W	NW 1/4 of 25
Moderate sensitivity in thin till area (yellow with circle pattern)	High sensitivity (orange with circled pattern)	T111N	R14W	Contiguous area centered in 14
		T111N	R15W	Contiguous area in 21, 28, 32, 33
		T110N	R15W	Contiguous area in N 1/2 of 30 and portions into 19 and 29
		T110N	R15W	Contiguous area centered in 32 with portions in 29 and 33, not including the W 1/2 of the NW 1/4 of 32
		T110N	R15W	Contiguous area centered in 25 with a portion in 24
T109N	R15W	SE 1/4 of the SE 1/4 of 25, and the NE 1/4 of the NE 1/4 of 36, and the NE 1/4 of the SE 1/4 of 36		
Very high sensitivity in thin till area (red with circle pattern)	High sensitivity in thin till (orange with circled pattern)	T113N	R16W	26

Map showing changed areas listed above.



Corrected files may be downloaded from the following sites:

Map: http://files.dnr.state.mn.us/waters/groundwater_section/mapping/cga/c12_goodhue/pdf_files/plate09.pdf.

GIS: http://www.dnr.state.mn.us/waters/programs/gw_section/mapping/meta/cga/c12_good/c12b_met.html

SENSITIVITY TO POLLUTION OF THE UPPERMOST BEDROCK AQUIFERS

By
James A. Berg
2003

MAP EXPLANATION

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Minnesota Toll Free: 1-888-646-6367
Telecommunication Device for the Hearing Impaired (TDD): (651) 296-5484
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DNR Web Site: <http://www.dnr.state.mn.us>

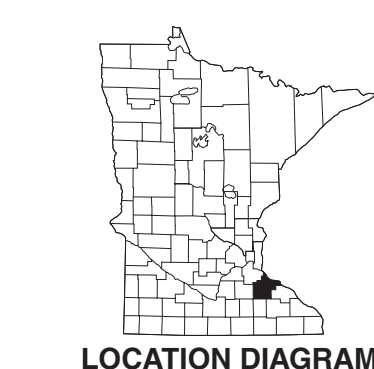
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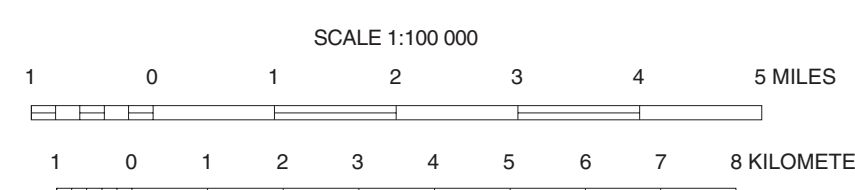
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This map was compiled and generated using geographic information systems (GIS) technology. Digital data products are available from DNR Waters. This map was prepared from publicly available information only. Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based. However, the Department of Natural Resources does not warrant the accuracy, completeness, or any implied uses of these data. Users may wish to verify critical information sources include both the references here and information on file in the office of the Minnesota Geological Survey and the Minnesota Department of Natural Resources. Every effort has been made to ensure the interpretation shown conforms to sound geologic and cartographic principles. This map should not be used to establish legal title, boundaries, or locations of improvements.

Digital base composite: Roads and county boundaries: Minnesota Department of Transportation GIS Statewide Base Map (source scale 1:24,000) Hydrologic features: U.S. Geological Survey Digital Line Graphs (source scale 1:100,000) Digital base annotation: Minnesota Geological Survey Project data compiled from 1986 to 2001 at a scale of 1:100,000, Universal Transverse Mercator projection, grid zone 15, 1983 North American datum, Vertical datum is mean sea level. GIS and cartography by Mike Tronrud and Jim Berg. Edited by Nick Koska.



Caution: The information on this map is a generalized interpretation of the sensitivity of ground water to contamination. The map is intended to be used for resource protection planning and to help focus the gathering of information for site-specific investigations.



- Well Symbols**
- Shape indicates aquifer
 - Galena
 - St. Peter
 - Prairie du Chien
 - Jordan
 - Franconia
 - Ironton-Galesville
 - Mt. Simon
 - Color indicates tritium age
 - Recent—Waters with tritium concentrations of 10 tritium units (TU) or more entered the ground water since 1953.
 - Mixed—Waters with 0.8 to 10 TU are a mixture of recent and vintage.
 - Vintage—Waters with less than 0.8 TU entered the ground water before 1953.
 - Well not tested for tritium.
- Sensitivity Ratings**
- VH** Very High—Hours to months
 - H** High—Weeks to years
 - M** Moderate—Years to decades
 - L** Low—Decades to a century
 - VL** Very Low—A century or more
- Overlying Sediments**
- Outwash or colluvium
 - Alluvium
 - Thin till (5 feet to 50 feet thick)
- Well Labels**
- 1.5 If shown, nitrate concentration equals or exceeds 1 part per million
 - 24.2 If shown, chloride concentration equals or exceeds 12 parts per million
 - 40,000 If shown, ground-water age in years, estimated by carbon-14
- Map Symbols**
- + Sinkhole
 - Estimated area of fully saturated Galena aquifer

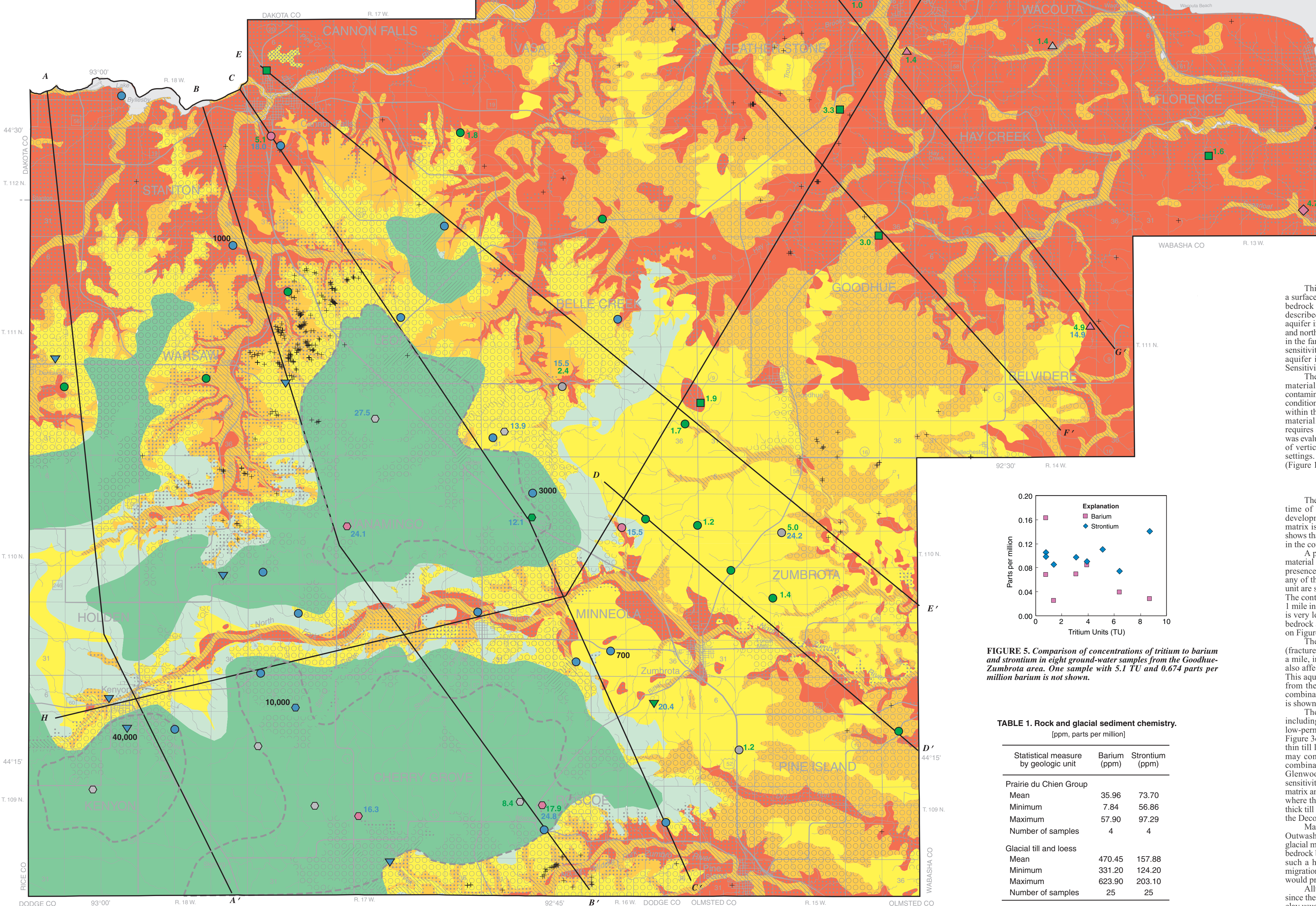


FIGURE 4. Comparison of tritium concentrations to chloride concentrations from well water samples. Chloride concentrations above approximately 12 parts per million appear to be partly attributable to human activities from sources other than halite.

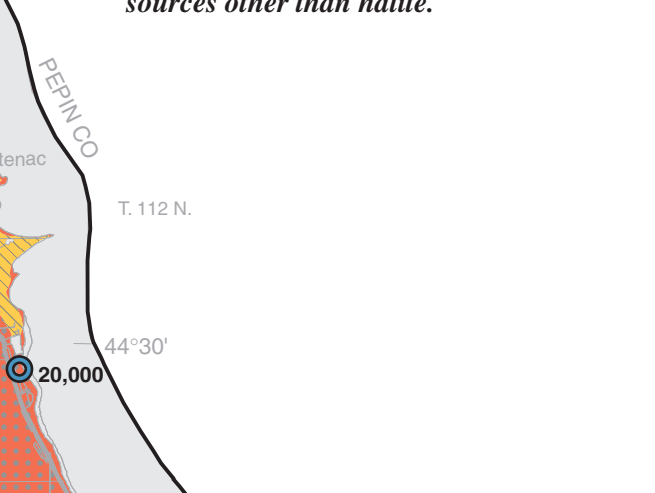


FIGURE 1. Geologic sensitivity rating as defined by vertical travel time (Geologic Sensitivity Workgroup, 1991). Ratings are based on the time range required for water at or near the surface to travel vertically into the uppermost bedrock aquifers (sensitivity target). Tritium and carbon-14 studies indicate the relative ages of ground water.

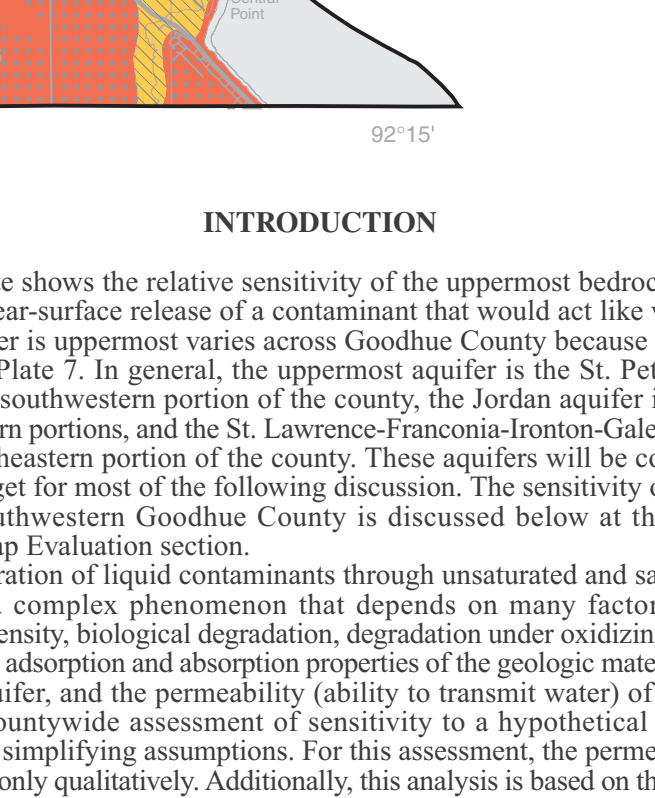


FIGURE 5. Comparison of concentrations of tritium to barium and strontium in eight ground-water samples from the Goodhue-Zumbrota area. One sample with 5.1 TU and 0.674 parts per million barium is not shown.

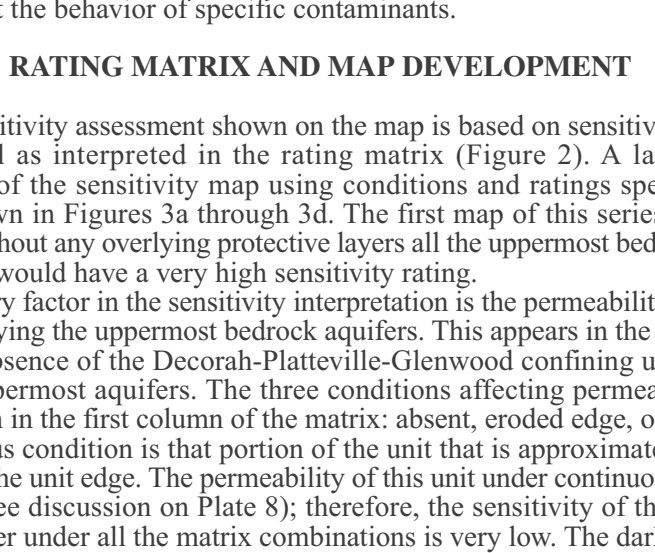


TABLE 1. Rock and glacial sediment chemistry. [ppm, parts per million]

Statistical measure by geologic unit	Barium (ppm)	Strontium (ppm)
Prairie du Chien Group		
Mean	35.96	73.70
Minimum	7.84	56.86
Maximum	57.90	97.29
Number of samples	4	4
Glacial till and loess		
Mean	470.45	157.88
Minimum	331.20	124.20
Maximum	623.90	203.10
Number of samples	25	25

FIGURE 3. Components of the Sensitivity Map. This series of maps show how the various protective geologic layers affect the sensitivity of the uppermost bedrock aquifers (excluding the Galena aquifer).

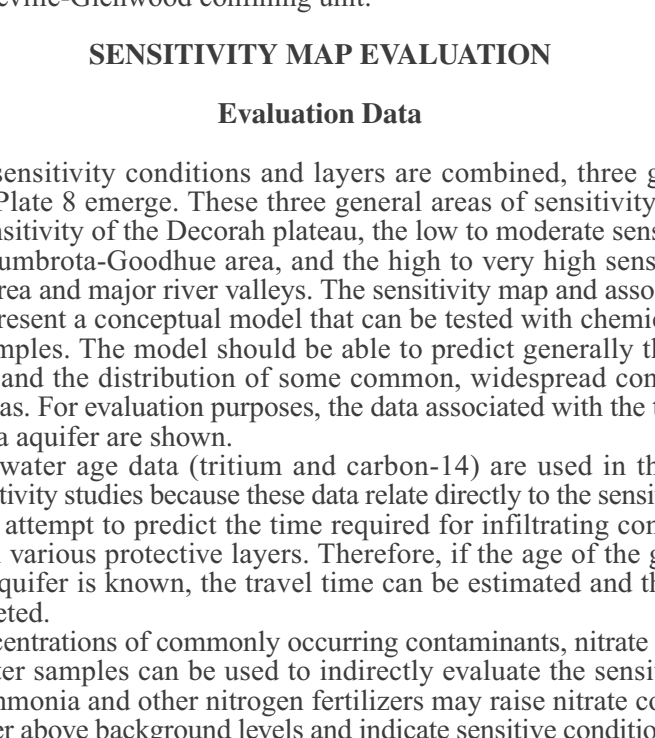


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d. The presence of a thicker till cover (greater than 50 feet) should result in a moderate (yellow) aquifer sensitivity rating where the Decorah-Platteville-Glenwood confining unit is absent.

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HYDROGEOLOGIC CROSS SECTIONS

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Minnesota Toll Free: 1-888-646-6367
Telecommunication Device for the
Hearing Impaired (TDD): (651) 296-5484
TDD Minnesota Toll Free: 1-800-657-3929
DNR Web Site: <http://www.dnr.state.mn.us>

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This map was prepared from publicly available information only. Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based. However, the Department of Natural Resources does not warrant the accuracy, completeness, or any implied uses of these data. Users may wish to verify critical information; sources include both the references here and information on file in the offices of the Minnesota Geological Survey and the Minnesota Department of Natural Resources. Every effort has been made to ensure the interpretation shown conforms to sound geologic and cartographic principles. This map should not be used to establish legal title, boundaries, or locations of improvements.

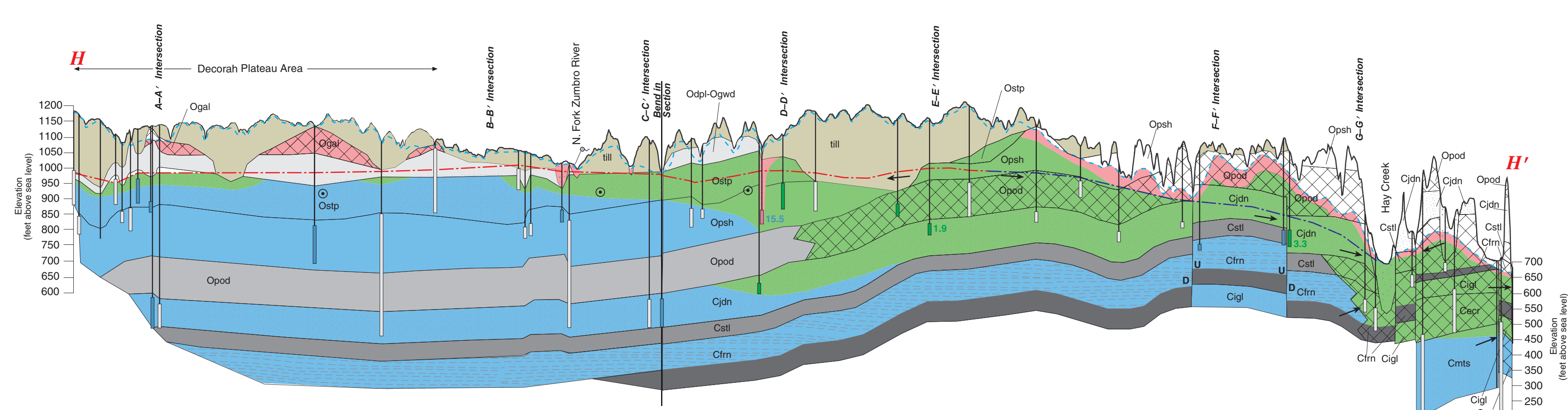
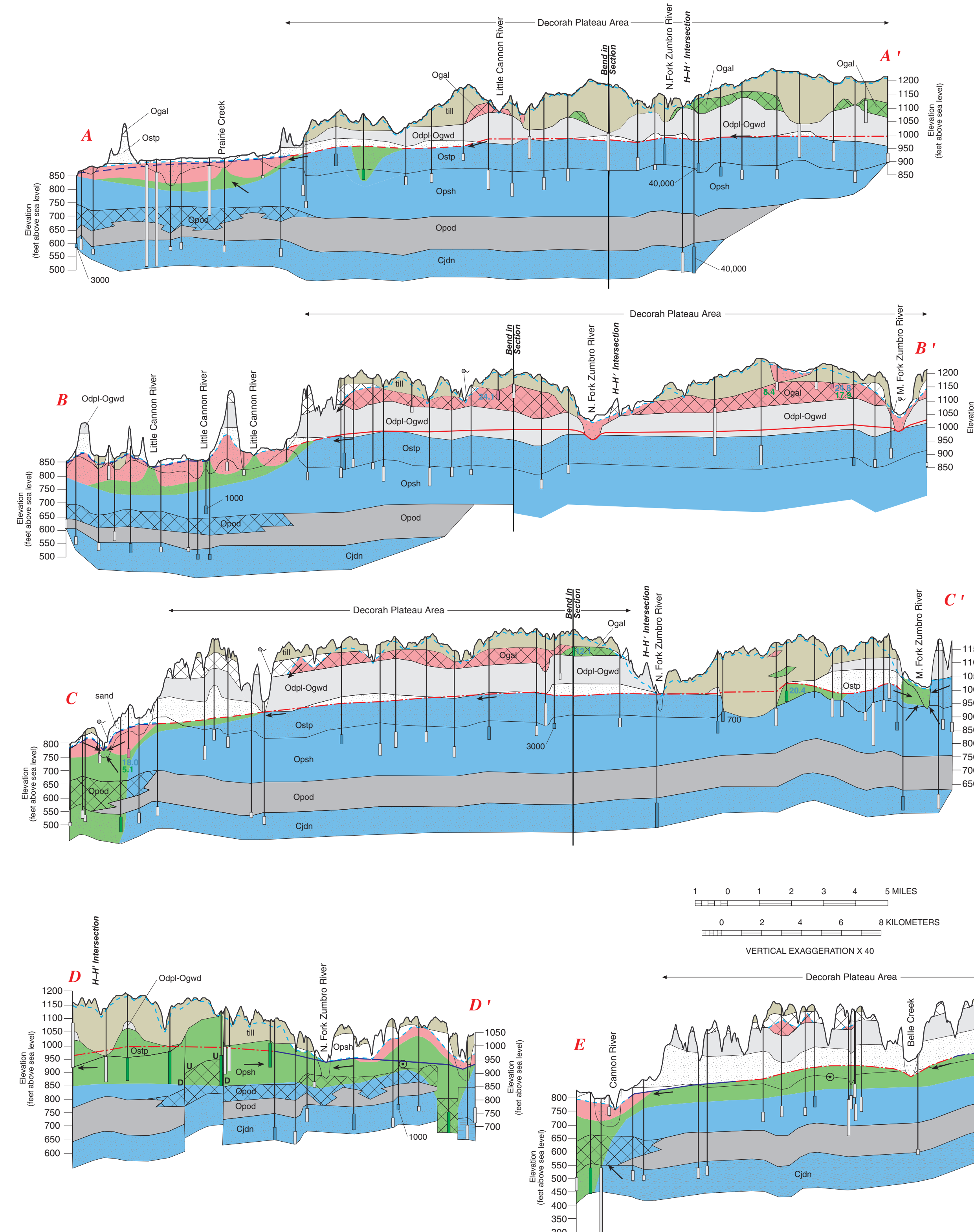
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GIS and cartography by Mike Tronnard and Jim Berg. Edited by Nick Krokka.

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By
James A. Berg

2003



EXPLANATION

Tritium Age—Tritium age not shown for till or bedrock confining units. Uncolored means unsaturated. Vertical rectangle indicates well screen or open hole.

- Recent—Water entered the ground since 1953 (10 or more tritium units).
- Mixed—Water is a mixture of recent and vintage waters (0.8 to less than 10 tritium units).
- Vintage—Water entered the ground before 1953 (less than 0.8 tritium units).
- Well not sampled for tritium.

Potentiometric Surface

- Upper water table

Color indicates aquifer

- St. Peter-Prairie du Chien
- Jordan
- St. Lawrence-Franconia-Ironton-Galesville*

Line type indicates aquifer condition

- Unconfined
- Variable confined and unconfined, or uncertain
- Confined

*Ironton-Galesville may be a separate aquifer, but data are combined here because few wells completed in the Ironton-Galesville aquifer are present in the county.

Aquifer Characteristics of Lithologic Units

Moderate to high conductivity under shallow and deep conditions.

- Sand and gravel deposits
- St. Peter Sandstone (Ostp)
- Shakopee Formation (Opsh)
- Jordan Sandstone (Cjdn)
- Mt. Simon Sandstone (Cmts)

Moderate to high conductivity under shallow conditions. Low conductivity or confining (Oneta Dolomite and St. Lawrence Formation) under deep conditions. Crosshatch pattern indicates fractured, karst, or both conditions indicating enhanced hydraulic conductivity.

- Galena Group (Ogal)
- Oneta Dolomite (Opod)
- St. Lawrence Formation (Cstl)
- Franconia Formation (Cfrn)
- Ironton-Galesville Sandstone (Cigl)
- Eau Claire Formation (Cecr)

Confining Units

- Glacial till
- Decorah-Platteville-Glenwood formations (OdpI-Ogwd)*
- Franconia Formation - lower (Cfrn) (shown only on cross section)

*The Decorah Shale and Glenwood Formation both act as confining units, but the intervening Platteville Formation is a thin aquifer. Combined, these units are treated as a confining unit.

LOCATION DIAGRAM

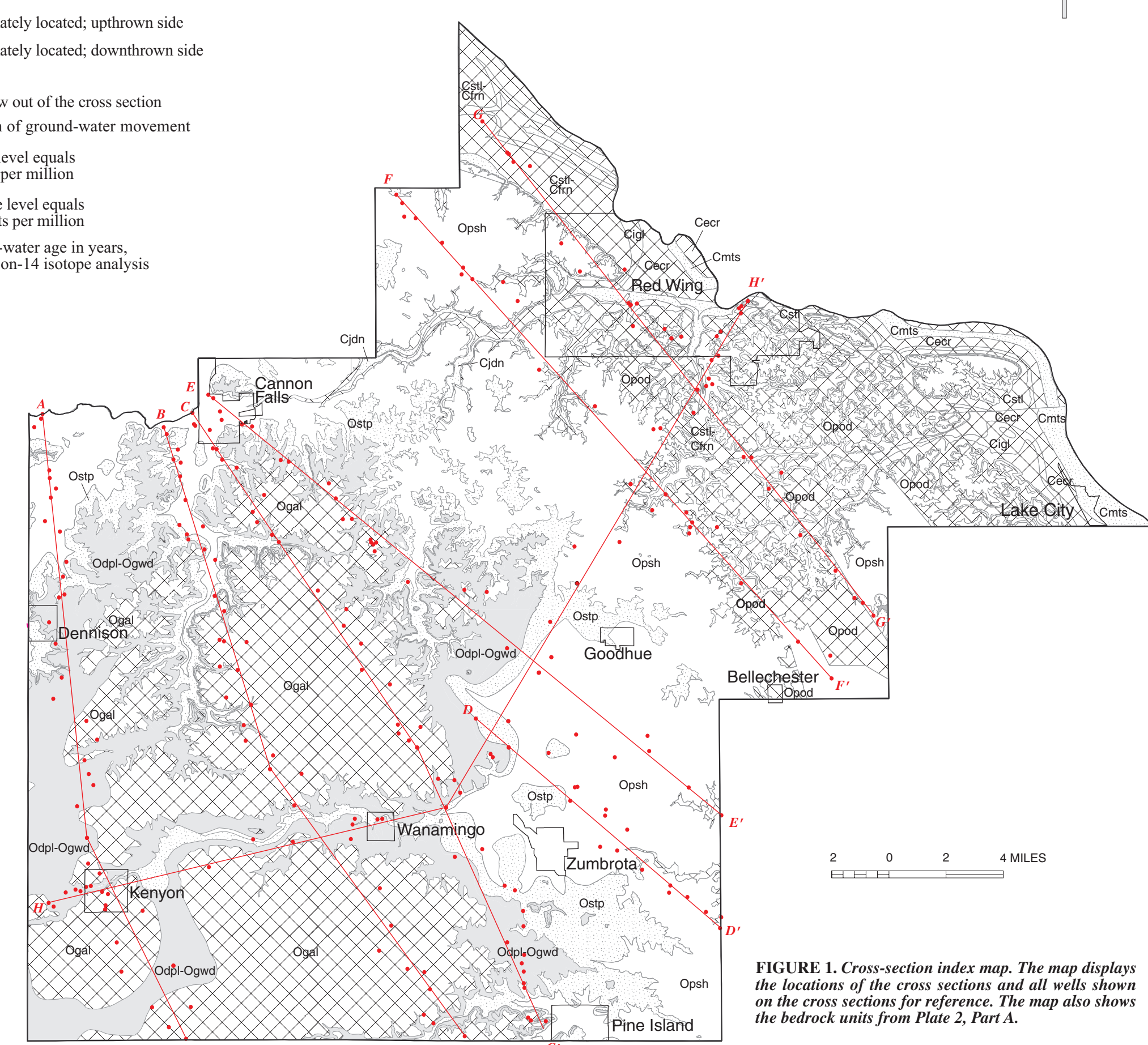


FIGURE 1. Cross-section index map. The map displays the locations of the cross sections and all wells shown on the cross sections for reference. The map also shows the bedrock units from Plate 2, Part A.

INTRODUCTION

The eight hydrogeologic cross sections shown on this plate illustrate the horizontal and vertical extent of hydrogeologic units (aquifers and confining units), ground-water residence time, and water-table and potentiometric surface profiles. The cross sections were located within the county to show as much tritium data as possible. The cross sections were constructed using a combination of well data from the County Well Index (CWI) and information from Bedrock Geology (Plate 2) and Surficial Geology (Plate 3) in Part A. The locations of the wells and cross sections are shown in Figure 1. Some of the faults shown on the cross sections are not indicated in Part A but are suggested by abrupt elevation changes in bedrock contacts noted in CWI logs. The well information for each cross section was projected onto the trace of the cross-section line from distances no greater than a mile.

RELATIVE HYDRAULIC CONDUCTIVITY

The various hydrogeologic units shown on the cross sections are classified according to the regional average of hydraulic conductivity (Runkel and others, 2003). Hydraulic conductivity, or the water-transmitting capacity of the hydrogeologic unit, is controlled by the porosity (open spaces within the unit) and permeability (a measure of how connected the open spaces are) within the unit. These factors mostly depend on the rock type (lithology) and the depth of the hydrogeologic unit beneath the top of the bedrock. A comparison of rock types influencing hydraulic conductivity would be a shale layer versus a sandstone layer. The shale, which is a very fine-grained rock, will usually have a much lower permeability and hydraulic conductivity than the sandstone, which is a much coarser grained rock. Examples of the shallow versus deep influence of hydraulic conductivity are shown on Figure 2. On this figure are several examples of fine-grained layers, containing shale, siltstone, or fine grained sandstone, which typically have no fractures, solution-enhanced fractures, or other karst features. These units are expected to have low hydraulic conductivity and are confining units. These same layers traced to a location closer to the top of the bedrock contain fractures and solution-enhanced fractures that can totally change the hydraulic properties of the layer.

The hydraulic properties of the two types of aquifers shown on this plate are influenced by their depth and lithology. The first type of aquifer exhibits moderate to high (16 feet per day to 67 feet per day) hydraulic conductivity characteristics under shallow and deep conditions (sand and gravel, St. Peter-Shakopee, Jordan, and Mt. Simon aquifers). The second type possesses a moderate to high hydraulic conductivity range only under shallow conditions (Galena, Oneta, St. Lawrence-Franconia-Ironton-Galesville, and Eau Claire aquifers). The confining units include the glacial till, the Decorah-Platteville-Glenwood formations, Oneta Dolomite (under deep conditions), St. Lawrence Formation (under deep conditions), and the lower portion of the Franconia Formation. These units have very low vertical hydraulic conductivities. No measured hydraulic conductivity values are available for the till unit. Furthermore, the drillers' logs in Goodhue County generally do not provide very detailed descriptions of the till. However, the tritium data (discussed below) suggest that the till may be permeable enough to allow surface water infiltration to the underlying bedrock within the last 50 years. Therefore, the till unit is classified in this report as a leaky confining unit. According to Runkel and others (2003), deep occurrences of the St. Lawrence Formation at different locations can have properties of both an aquifer and a confining unit. The lower portion of the Franconia, however, may be an effective confining unit under both shallow and deep conditions.

POTENTIOMETRIC SURFACES

Several different potentiometric surfaces are shown on cross sections A-A' through H-H' (cross-section explanation and Figure 3). The cross sections show two types of unconfined potentiometric surfaces. The line with the short dashes identifies the upper water table that exists mostly above the Decorah-Platteville-Glenwood confining unit and within thick till layers in the southern and middle portions of the county. In northeastern Goodhue County, this line represents the water table that exists deep within the

river bluffs. The upper water-table lines are elevation profiles derived from the water-table DEM, which was used to create the water-table depth model (Plate 7). Near the edges of the Decorah plateau and beneath the Decorah-Platteville-Glenwood confining unit, another unconfined potentiometric surface may exist (buried unconfined). Confined conditions are shown with the solid lines and are colored to match the potentiometric contours of the three main aquifer systems shown on Plate 7. Finally, in some areas, the bedrock potentiometric surface, shown as a dash and dot line, appears to vary between confined and unconfined conditions. This line type was also used where insufficient data exist to establish confining conditions.

GROUND-WATER RESIDENCE TIME

The red, green, and blue areas shown on these cross sections represent the age of the ground water, also known as ground-water residence time. This is the approximate time that has elapsed since the moment the water infiltrated the land surface to the time it was pumped from the aquifer for this investigation. Tritium (³H) is a naturally occurring isotope of hydrogen. Concentrations of this isotope in the atmosphere were greatly increased from 1953 through 1963 by above-ground detonation of hydrogen bombs (Alexander and Alexander, 1989). Since this isotope decays at a known rate (half life of 12.43 years), the proportion of recently (last 50 years) recharged water in an aquifer can be estimated from tritium concentrations. Water samples with concentrations of tritium greater than 10 tritium units (TU) are considered recent water (mostly recharged in the past 50 years, shown in red). Concentrations less than the detection limit (0.8 TU) are considered vintage water (recharged prior to 1953, shown in blue). Concentrations between these two limits are considered a mixture of recent and vintage and are referred to as mixed (shown in green). Ground-water age for the vintage samples can be estimated with the carbon-14 (¹⁴C) isotope. This also is a naturally occurring isotope, which has a much longer half-life than tritium (5,730 years). Carbon-14 is used to estimate ground-water residence within a time span of 100 years to 40,000 years.

DECORAH PLATEAU AREA

The Decorah Plateau consists of remnants of the Galena Group over the Decorah-Platteville-Glenwood confining unit. The Decorah Plateau is resistant to erosion and dominates the topography of southeastern Goodhue County (cross-sections A-A', B-B', C-C', E-E', and H-H'). Water infiltration through the till in this area is rapid enough to create recent and mixed tritium concentrations in ground-water samples from wells completed in the underlying Galena aquifer (shown on Plate 7 and cross-section C-C'). The low permeability of the Decorah-Platteville-Glenwood confining unit produces a shallow water table across most of the plateau, except for the river bluff areas. The water table is probably deep within the bluff areas near the Cannon River, the Little Cannon River, Belle Creek, and the Middle Fork Zumbro River where the till is thin or absent and the Decorah-Platteville-Glenwood confining unit may be fractured and permeable.

A very low rate of surface water infiltration through the Decorah-Platteville-Glenwood confining unit is indicated by the predominance of vintage ground water sampled from the underlying St. Peter-Shakopee aquifer (cross-sections A-A', B-B', C-C', E-E', and H-H'). Two exceptions to this low rate of water infiltration are indicated by mixed concentrations of tritium in ground-water samples from the St. Peter Sandstone (right end of cross-section C-C') and the Shakopee Formation (the left one-third of cross-section A-A'). The mixed conditions occur near the edges of the plateau where the Decorah-Platteville-Glenwood confining unit is thin, locally eroded, or possibly fractured. These conditions allow greater surface water infiltration than areas beneath the central portion of the plateau.

The Jordan aquifer beneath this plateau also characteristically contains vintage water. The aquifer is protected not only by the Decorah-Platteville-Glenwood confining unit but also by the overlying Oneta Dolomite. The Jordan aquifer is thin, locally eroded, or possibly fractured. The St. Peter-Shakopee aquifer shown on cross-section C-C' (3,000 years) is significantly younger than the age date of a water sample (40,000 years, cross-section A-A') from the Jordan aquifer. This difference may be due to the additional protective properties of the Oneta confining unit.

ZUMBROTA-GOODHUE AREA

East of the Decorah-Platteville-Glenwood edge, in an area north of Zumbrota and southwest of Goodhue, surface water infiltration through thick till layers may be responsible for detectable concentrations of tritium in the underlying Shakopee, fractured Oneta, and Jordan aquifers (cross-section D-D', the right end of E-E', and the middle portion of H-H'). Several low to moderate (1 part per million [ppm] to 5 ppm) nitrate concentrations and elevated chloride concentrations (greater than 12 ppm) in water samples from the first bedrock aquifers in this area also suggest that this till layer has limited protective characteristics (see right end of cross-section E-E' and bedrock potentiometric map on Plate 7). An alternative explanation could be that ground water from the Galena aquifer flows east from the plateau area, infiltrates laterally through the glacial till, and recharges the Shakopee and lower aquifers with water containing elevated nitrate and chloride. A combination of vertical and lateral flow is also possible. This part of the county is a topographic and potentiometric high area and is, therefore, an important ground-water recharge area for the underlying bedrock aquifers.

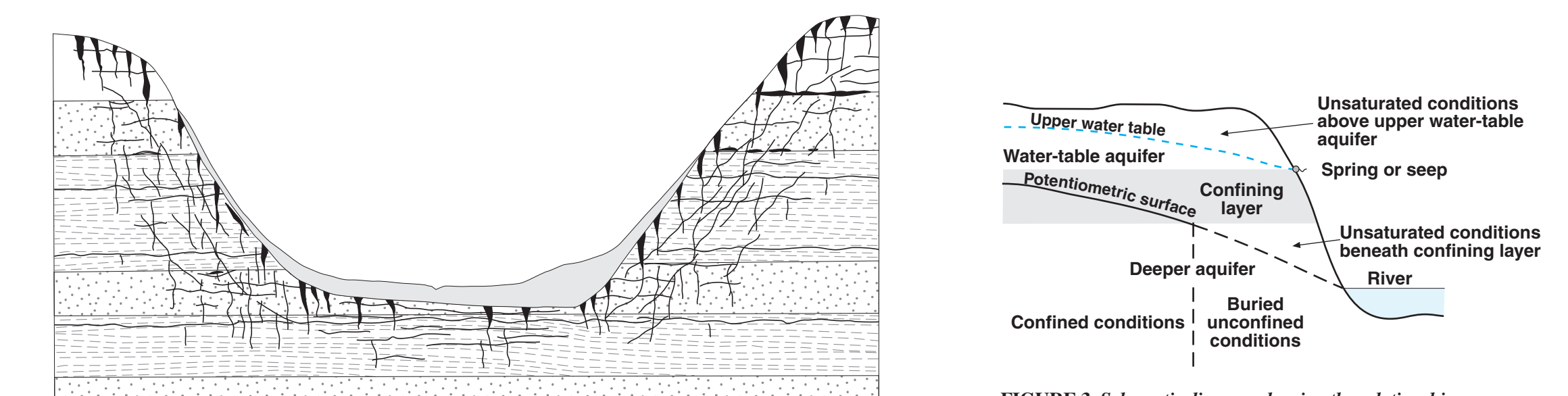
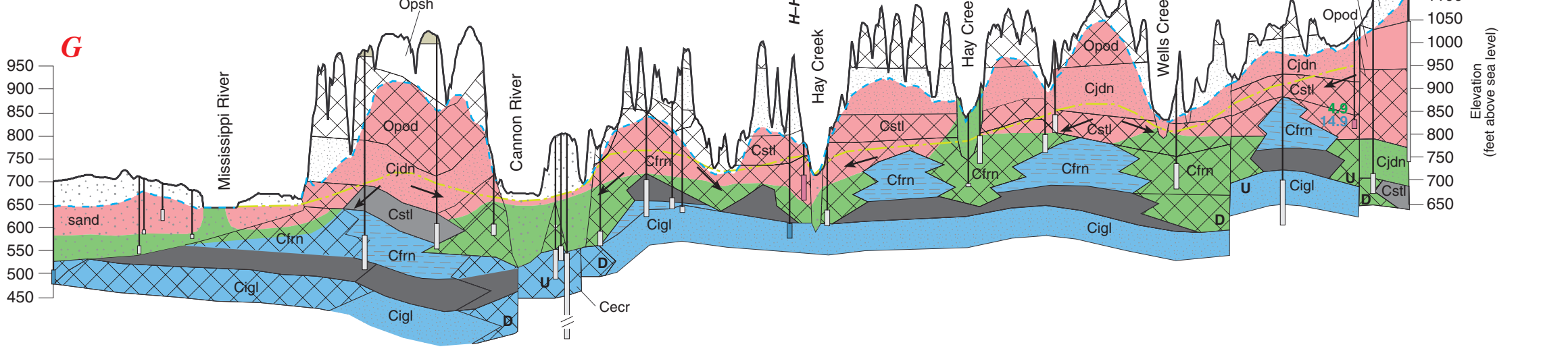
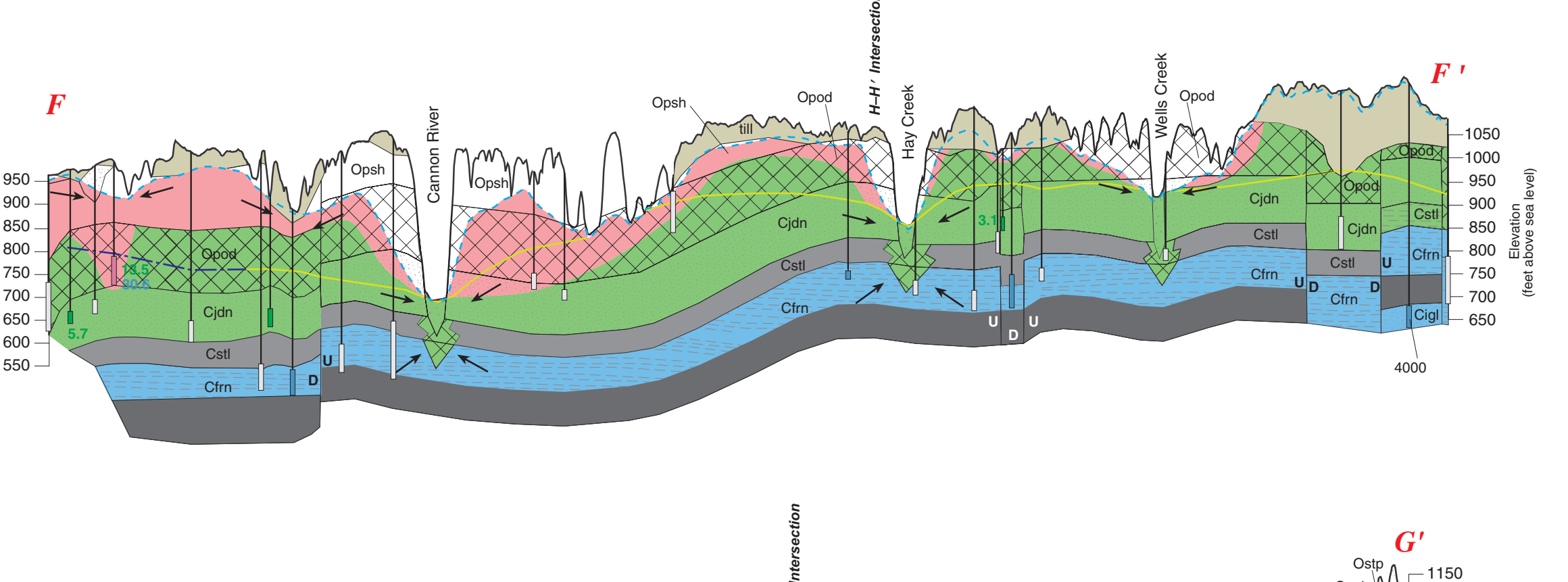
NORTHEASTERN GOODHUE COUNTY AND MAJOR RIVER VALLEYS

In these remaining parts of the county, the Decorah-Platteville-Glenwood confining unit has been eroded and thick till layers only exist in isolated areas. The water table tends to be deeper in these areas with no surficial or near-surface confining layers that limit infiltration elsewhere in the county. The Oneta Dolomite, which is a confining unit beneath the Decorah Plateau, is commonly a shallow aquifer (less than 200 feet below the top of the bedrock) in the northeastern portion of the county (cross-sections F-F' and H-H'). Recent and mixed tritium values that dominate ground-water samples from these areas indicate relatively rapid recharge through the permeable shallow bedrock (see bedrock potentiometric surface map, Plate 7). Recent tritium concentrations were detected in five bedrock water samples in this area from somewhat deep wells (100 feet to 200 feet) suggesting enhanced permeability resulting from extensive fractures or solution features in these areas (left end of cross-section F-F' and right end of cross-section G-G').

There are several notable exceptions from these areas where the deeper aquifers are protected by deep confining units. Vintage tritium concentrations are found in samples from the Jordan aquifer (left ends of cross-sections A-A' and B-B') beneath a deep section of the Oneta Dolomite, which is apparently a confining unit in this area. Similarly, vintage water was extracted from deep wells in the lower formations (St. Lawrence, Franconia, Ironton-Galesville, and Eau Claire) that are protected by the low-permeability characteristics of these formations under deep conditions (cross-section F-F', center of cross-section G-G', and right end of cross-section H-H'). Several vintage water samples were collected from wells in the Cannon, Little Cannon, and Mississippi river valleys, which probably represent old discharging water (left ends of cross-sections B-B' and G-G' and bedrock potentiometric surface map, Plate 7).

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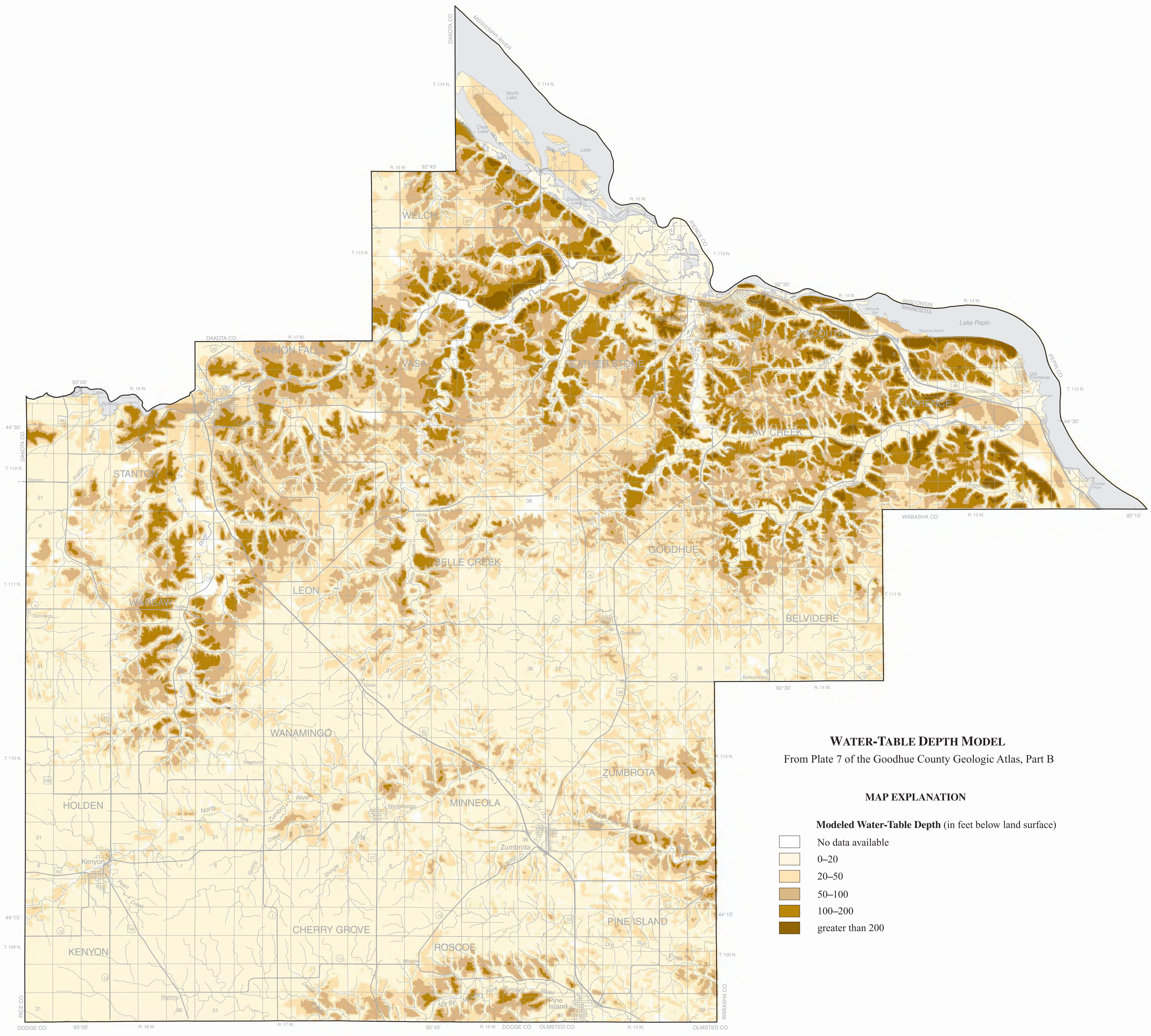


EXPLANATION

- Coarse clastic component
- Carbonate component
- Nonsystematic fractures (some solution enlarged)
- Surficial deposits
- Fine clastic component

FIGURE 2. The distribution of fractures and solution-enhanced fractures in shallow settings (less than 200 feet below the top of bedrock) for the three general rock types in the county. These features are combined and shown as a crosshatch pattern on the cross sections. From Runkel and others (2003).

FIGURE 3. Buried diagram showing the relationship between buried confined and buried unconfined conditions in a deeper aquifer. Modified from Palen (1990).



WATER-TABLE DEPTH MODEL
 From Plate 7 of the Goodhue County Geologic Atlas, Part B

MAP EXPLANATION

- Modeled Water-Table Depth (in feet below land surface)**
- No data available
 - 0–20
 - 20–50
 - 50–100
 - 100–200
 - greater than 200

BEDROCK AND WATER-TABLE HYDROGEOLOGY

By

James A. Berg and Randy Bradt
2003

INTRODUCTION

Ground-water supplies in Goodhue County are pumped from 10 bedrock units and unconsolidated sand and gravel water-table aquifers. The bedrock aquifers consist of thick sandstone and carbonate formations, and 95 percent of ground water used in the county is drawn from bedrock aquifers. Not all of these units are used or can be used as aquifers in all portions of the county (Figures 1 and 2). Aquifers of the Prairie du Chien Group, Jordan Sandstone, and Franconia Formation are the most commonly used; 80 percent of the wells listed for Goodhue County, in the County Well Index data base (Plate 1, Part A), are completed in those three aquifers. The main features on this plate include information on the distribution and characteristics of the uppermost water-supply bedrock aquifers and ground-water flow directions of the bedrock aquifers (see map at upper right). The other map (lower left) presents information on depth to the water table and the Galena aquifer.

The tributary system extending southwest of the Mississippi River, which forms the northeastern boundary of the county, has dramatically eroded the bedrock and glacial sediment. This erosion has created distinctly different hydrogeologic conditions in southwestern and northeastern Goodhue County (Figure 1). In the southwest, these aquifers are separated deep beneath the top of the bedrock (deeper than 200 feet) by low-permeability units such as shale, massive dolomite formations, and fine-grained sandstones. In the northeastern portion of the county and in the major river valleys, where these units are relatively shallow (less than 200 feet below the top of the bedrock), the permeability of these units has increased dramatically through formation of fractures and solution-enlarged (karst) cavities (Runkel and others, 2003). Therefore, geologic formations that are not aquifers in the southwestern portion of the county are used as aquifers in northeastern Goodhue County where these units exist at shallower depths and are more permeable. Furthermore, several formations that exist in the western portion of the county have been eroded in the eastern portion of the county and in the major river valleys. This change in the permeability of bedrock aquifers across the county is shown in cross section G-G' (see Plate 8). Figure 2 on Plate 8 illustrates the shallow and deep bedrock permeability relationships that are essential to understanding bedrock aquifers in the county.

CHARACTERISTICS OF THE MAJOR BEDROCK AQUIFERS

Aquifer yields can be estimated and compared by specific capacity information from high-discharge wells (Table 1). Specific capacity is the well discharge (measured in gallons per minute [gpm]) divided by the water-level drawdown in the pumping well. Based on limited data, water-table sand and gravel aquifers (QWTA), the Prairie du Chien aquifer (Shakopee and Ononota formations), and the Jordan aquifer appear to have the highest capacities; the Franconia aquifer may have the lowest yield of the major aquifers. The following descriptions of lithology and hydraulic conductivity are summarized from Plate 2, Part A, and from Runkel and others (2003).

Galena aquifer. The Galena aquifer comprises the two formations of the Galena Group: the Prosser Limestone and the underlying Cummingsville Formation. Both formations are fine grained and fossiliferous with thin, crinkly bedding. Interbedded green-gray shale layers distinguish the Cummingsville Formation. The Galena aquifer exists only in a shallow setting in western Goodhue County (see map at lower left and Figure 2). The Galena Group and the similar Cedar Valley Group in southeastern Minnesota have an average hydraulic conductivity of 67 feet per day but can have conductivities as high as 170 feet per day. This is a thin bedrock aquifer in the county, usually less than 100 feet thick (see Plate 8, cross-section B-B').

St. Peter-Shakopee aquifer. This aquifer comprises the St. Peter Sandstone and the Shakopee Formation (upper portion of the Prairie du Chien Group). The St. Peter Sandstone is a very fine to medium grained and poorly cemented sandstone that only exists in the western portion of the county. A 1- to 3-foot-thick shale layer exists at the base of the formation in northern Goodhue County. This layer was assumed not to be an effective regional confining unit but may have local confining properties. The Shakopee Formation is a thin-to-medium-bedded dolomite with minor amounts of sandstone and sandy dolomite. The Shakopee is generally not identified as a formation in the interpreted logs of

the County Well Index. (CWI) databases but is combined with the Ononota Formation as part of the Prairie du Chien Group.

The regional average conductivity values under deep conditions are approximately 16 feet per day and 34 feet per day, respectively, for the St. Peter and Shakopee portions of the aquifer. The regional average conductivity values under shallow conditions are 39 feet per day and 61 feet per day, respectively. The composite aquifer thickness is typically 250 feet in western Goodhue County, thins in the north and northeast, and is absent in the extreme northeast. **Jordan aquifer.** This unit comprises very fine-grained feldspathic sandstone, siltstone, and shale coarse upward to quartzose sandstone. This aquifer is used mostly under deep conditions in the county. It has an average regional conductivity, under deep conditions, of approximately 17 feet per day. The aquifer is approximately 100 feet thick across most of the county and is abruptly truncated in the northeastern valleys. Under deep conditions, this aquifer is separated from the overlying St. Peter-Shakopee aquifer by the Ononota confining unit (see Plate 8, cross-sections A-A', B-B', C-C', E-E', and H-H').

Franconia aquifer. The Franconia Formation is mostly a clayey, feldsparic, very fine- to fine-grained sandstone. It also consists of shale and sandy-clayey dolomite. The aquifer is used under deep and shallow conditions in northeastern Goodhue County. The average regional conductivity under shallow conditions is approximately 32 feet per day. The average regional conductivity under deep conditions is approximately 6 feet per day. The formation is approximately 170 feet thick. The upper portion of this formation is used as an aquifer under shallow conditions. Much of the lower portion of the formation has very low hydraulic conductivity even under shallow conditions and is considered a confining unit.

DISTRIBUTION OF AQUIFER USE

The limited extent of some formations and the permeability enhancement of the shallow bedrock in the northeast result in different patterns of aquifer use within Goodhue County (Figure 2). Use of the Galena aquifer is limited to areas in the southwestern portion of the county. The water-table alluvial aquifers are used in the Mississippi River valley and a few of the tributaries (Figure 2a). The St. Peter, Prairie du Chien, and Jordan aquifers have overlapping use areas and are limited to the western two-thirds of the county (Figure 2b). The St. Lawrence, Franconia, Ironton-Galesville, and Eau Claire aquifers also have overlapping use areas and are limited to the northeastern portion of the county (Figure 2c). According to CWI, the use area of the Mt. Simon aquifer is limited to four wells in the Mississippi River valley.

WATER-TABLE DEPTH MODEL

The water-table aquifers are generally not used as a water source except in older wells in the northern and northeastern portions of Goodhue County. The water-table aquifers, however, are often monitored carefully in remedial investigations of ground-water contamination to help prevent contaminants from reaching connected surface water bodies and deeper aquifers. Development of site-specific, remedial investigations often relies on county-scale maps to help design investigation plans.

Since water-level information from wells in the county is very limited and inadequate for creating a county water-table map, other sources of water-table information were combined to produce a water-table digital elevation model (DEM) with ANUDEM software (Hutchinson, 1997). The values of the water-table DEM, which is available as a raster DEM, were subtracted from a land surface elevation DEM to produce the water-table depth model (see map below). The inputs for the water-table DEM included CWI water-level data from Quaternary water-table wells (QWTA); shallow (less than 100 feet deep) bedrock water levels; shallow borehole measurements by the Minnesota Geological Survey; and elevation values of surface-water bodies, wetlands listed in the National Wetland Inventory (NWI), perennial streams, and seeps. In addition, water-table elevations were estimated from soil classifications (Poch, 1976) where redoxomorphic (partially oxidized) soils were observed indicating seasonal high water-table conditions. Intermittent streams in valleys with no shallow water-table indicators (wetlands, high water-table soils, and seeps) were assigned an assumed water-table elevation value of 10 feet below land surface. The ANUDEM algorithm uses a combination of least squares and linear interpolation.

Shallow water-table conditions are characteristic of the southwestern portion of the county where the Decorah-Platteville-Glenwood confining unit and thick, clayey glacial till layers exist. The Decorah-Platteville-Glenwood confining unit appears to be among the least permeable units in southeastern Minnesota (Runkel and others, 2003). It limits surface water from moving downward into the deeper bedrock units (Lindgren, 2001). This exceptionally low permeability creates a large perched water table above the unit and an unsaturated (nonwater-bearing) zone exists beneath the unit within its periphery. Similar relationships have been noted at other locations in southeastern Minnesota (Lindgren, 2001; Campion, 1997; and Palen, 1990). These perched and unsaturated relationships are shown on Plate 8, cross-sections A-A', B-B', C-C', and E-E'. The uncolored portions of these cross sections represent unsaturated rock and sediment.

POTENTIOMETRIC SURFACES OF THE UPPERMOST WATER-SUPPLY BEDROCK AQUIFERS

Potentiometric surface is defined as "a surface that represents the level to which water will rise in a tightly cased well" (Fetter, 1988). The potentiometric surface of a confined aquifer occurs above the top of an aquifer where an overlying confining layer exists. In an unconfined aquifer, also called a water-table aquifer, the water surface is also a potentiometric surface where the pore pressure is equal to the atmospheric pressure. The map on the right shows the combined surfaces of the three primary aquifers or aquifer systems in the county: the St. Peter-Prairie du Chien aquifer system, the Jordan aquifer, and the St. Lawrence-Franconia-Ironton-Galesville aquifer system. Each of these systems exists separated by confining units in the western portion of the county. Each system changes to the north, northeast, and southeast into a water-table system where erosion has removed the overlying layers (Figure 3). Aquifer use and aquifer data from each of the systems are limited, almost exclusively, to concentric zones that wrap around the southwestern corner of the county. Therefore, a comparison of directly adjacent data from each separate system usually was not possible.

Ground water in the uppermost water-supply bedrock aquifer generally flows from the south and central portions of the county to the north, northeast, and southeast toward the drainages of the Cannon, Mississippi, and Zumbro rivers, respectively. The smaller river valleys, including Prairie Creek, Little Cannon River, Spring Creek, Hay Creek, Wells Creek, and North Fork Zumbro River, alter the local ground-water flow directions creating the complicated patterns shown on the map to the right. All of these valleys are ground-water discharge areas. The 1000-foot-contour areas near Goodhue and Zumbro are important recharge areas of the Prairie du Chien and Jordan aquifers.

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This map was compiled and generated using geographic information systems (GIS) technology. Digital data products are available from DNR Waters.

This map was prepared from publicly available information only. Every reasonable effort has been made to ensure the accuracy of the factual data on which this map interpretation is based. However, the Department of Natural Resources does not warrant the accuracy, completeness, or any implied uses of these data. Users may wish to verify critical information; sources include both the references here and information on file in the offices of the Minnesota Geological Survey and the Minnesota Department of Natural Resources. Every effort has been made to ensure the interpretation shown conforms to sound geologic and cartographic principles. This map should not be used to establish legal title, boundaries, or locations of improvements.

POTENTIOMETRIC SURFACES OF THE UPPERMOST WATER-SUPPLY BEDROCK AQUIFERS

Cross sections shown on Plate 8

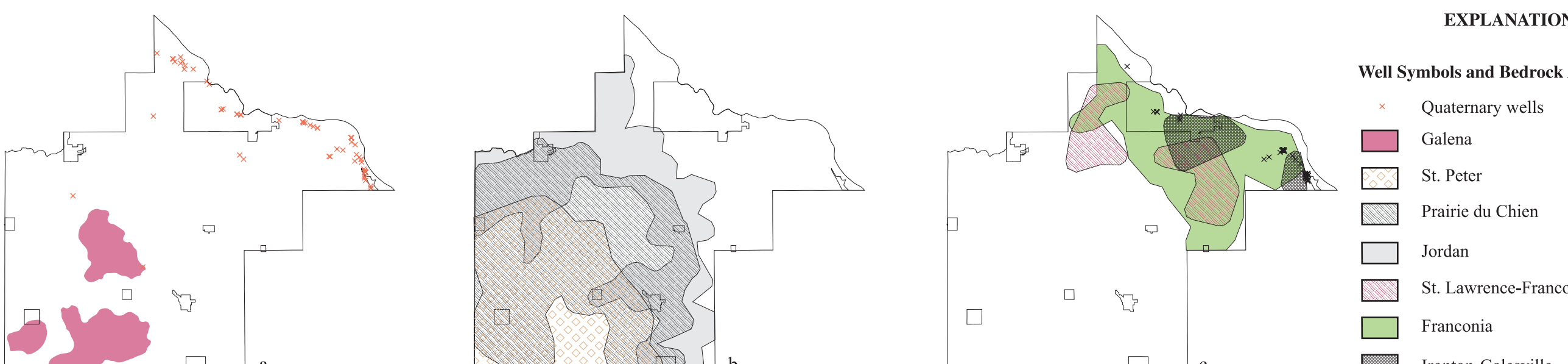
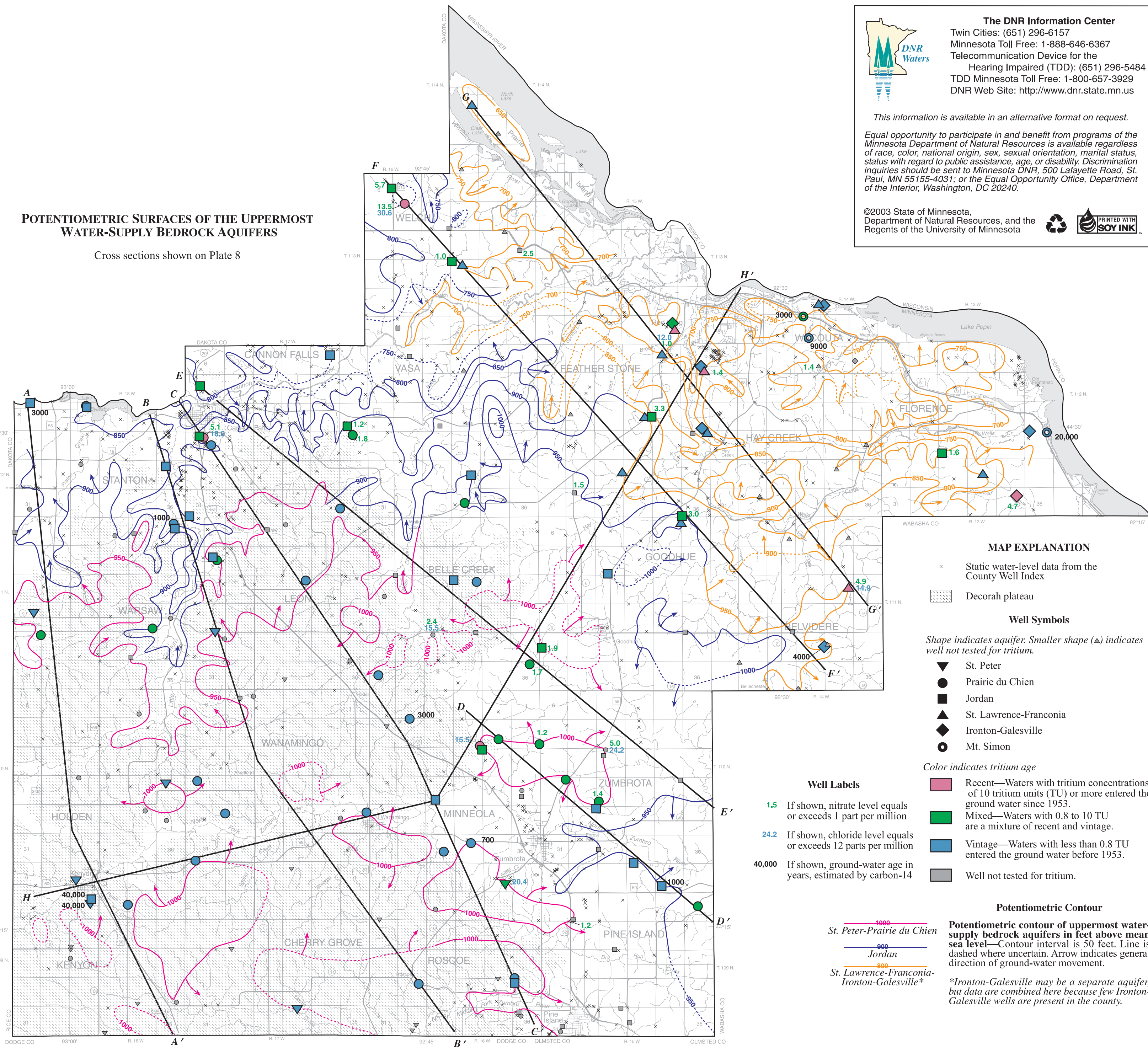


FIGURE 2. Distribution of aquifer use. Certain aquifers and aquifer groups have distinct usage areas in Goodhue County because of lateral changes in aquifer depth and the limited extent of some aquifers. Most domestic wells are typically drilled only to a depth needed to provide adequate water supply and comply with the state well code.

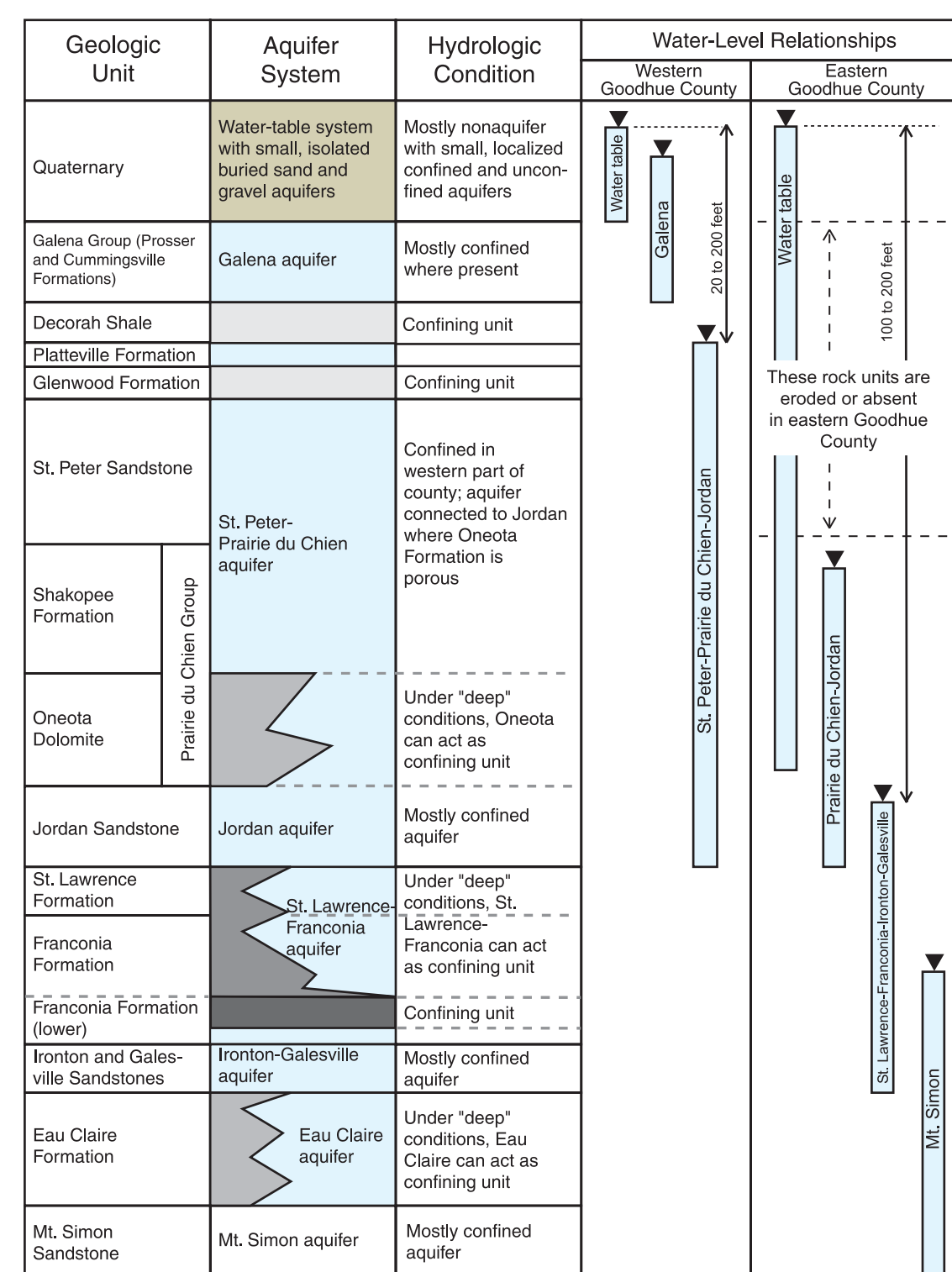


FIGURE 1. Sequence of aquifers, aquifer characteristics, and water-level relationships in Goodhue County. The first three columns show that some rock units are aquifers or confining units wherever they exist in the county. Other rock units, such as the Ononota Dolomite and the St. Lawrence, Franconia, and Eau Claire formations, are only aquifers in the northeast. The Water-Level Relationships column shows the relative depth range of water levels that can be expected from the various aquifers in the western and eastern portions of the county.

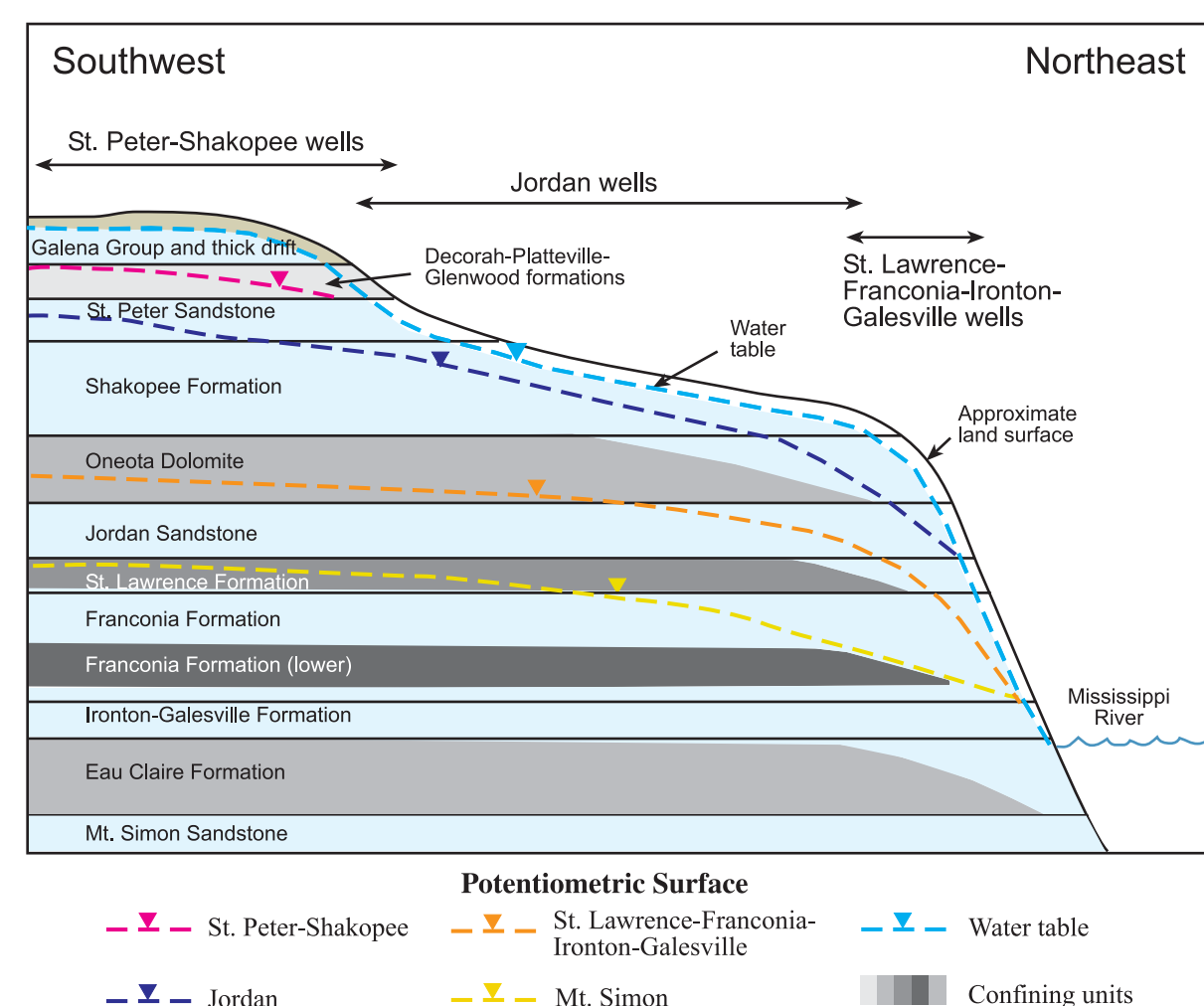


FIGURE 3. Schematic hydrogeologic cross section. The bedrock potentiometric surface (above) is a composite of three aquifer systems that are separate in the southwest and merge in the northeast. The areas of general aquifer use and data availability are shown by the horizontal arrows at the top of this diagram. The light blue areas represent the permeable and saturated portions of the rock units.

TABLE 1. Specific capacity of selected large-capacity wells*. [QWTA, Quaternary water-table aquifer]

Aquifer	Well diameter (inches)	Mean	Minimum	Maximum	Number of tests
QWTA	6 to 12	67	27	107	4
Prairie du Chien	8 to 16	41	2	89	8
Jordan	10 to 24	15	3	35	8
Franconia	4	6	2	13	3

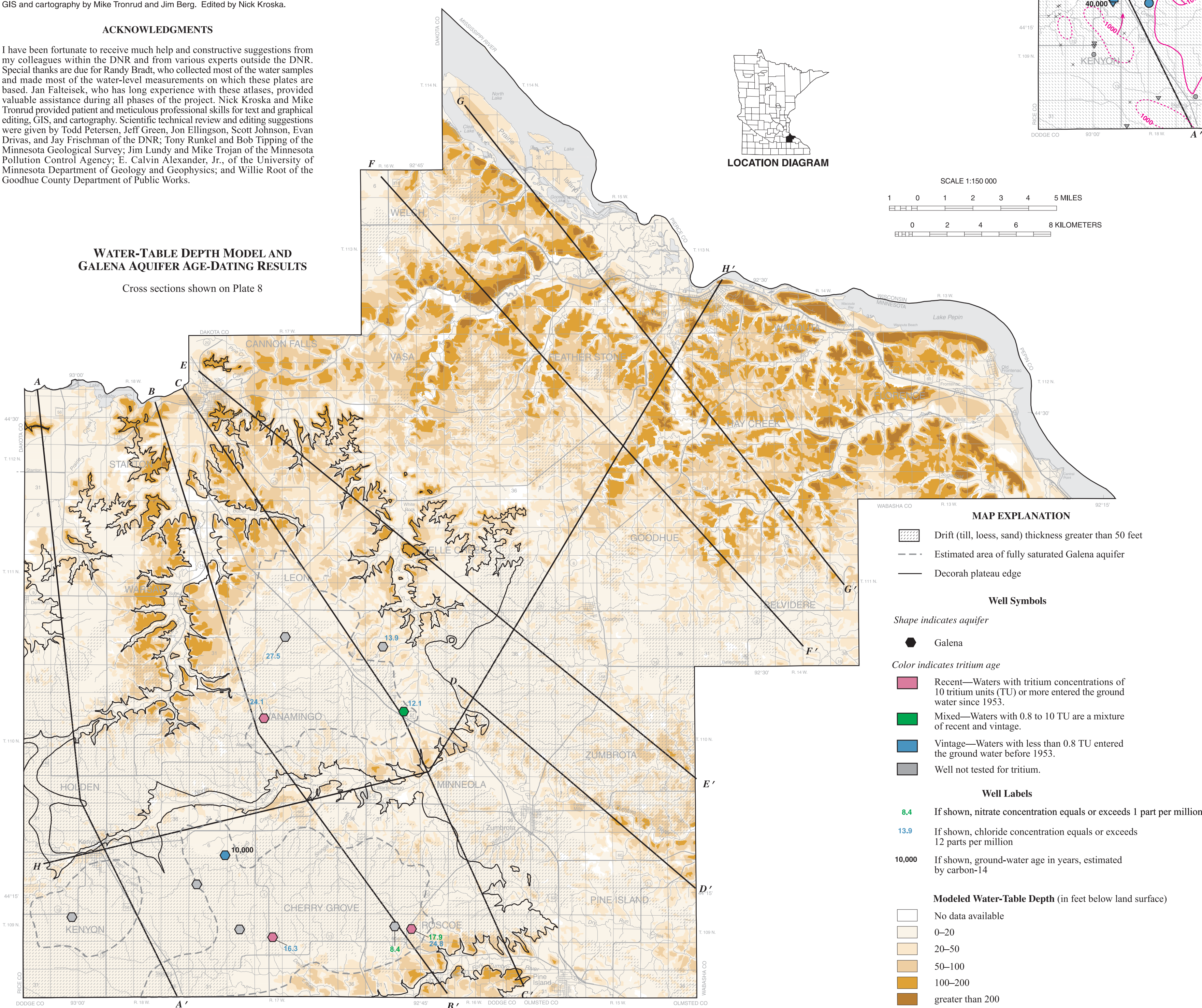
*Specific capacity was measured by well discharge in gallons per minute per foot of water-level drawdown. Tests conducted on wells with large-capacity rates greater than 100 gallons per minute. Data adapted from the County Well Index database.

ACKNOWLEDGMENTS

I have been fortunate to receive much help and constructive suggestions from my colleagues within the DNR and from various experts outside the DNR. Special thanks are due to Randy Bradt, who collected most of the water samples and made most of the water-level measurements on which these plates are based. Jan Falteisek, who has long experience with these atlases, provided valuable assistance during all phases of the project. Nick Kroska and Mike Tromund provided patient and meticulous professional skills for text and graphical editing. GIS and cartography. Scientific technical review and editing suggestions were given by Todd Petersen, Jeff Green, Jon Ellingson, Scott Johnson, Evan Drivas, and Jay Frischman of the DNR; Tony Runkel and Bob Tipping of the Minnesota Geological Survey; Jim Lundy and Mike Trojan of the Minnesota Pollution Control Agency; E. Calvin Alexander, Jr., of the University of Minnesota Department of Geology and Geophysics; and Willie Root of the Goodhue County Department of Public Works.

WATER-TABLE DEPTH MODEL AND GALENA AQUIFER AGE-DATING RESULTS

Cross sections shown on Plate 8





Appendix K

Temporary and Permanent Seed Mixtures



MAHOD1602B
MN CP25 Standard Mix
40.00 Acres

Large Seed: 334.23 Bulk lb
Small Seed: 33.67 Bulk lb

320.00 Total lb
367.91 Bulk lb
320.00 PLS lb

Mix %	PLS lb	Bulk lb	Lot Number	Common Name	Scientific Name	Variety	Origin	Mix Purity	Species Purity	Germ	Hard or Dormant	TZ	Total Viable	PLS
8.75%	28.00	31.24	AGRTRA866A	Slender Wheatgrass	Agropyron trachycaulum	Revenue	Canada	8.18%	96.37%	93.00%	0.00%		93.00%	89.62%
25.00%	80.00	95.25	ANDGER156A	Big Bluestem	Andropogon gerardii	VNS	MN	23.63%	91.29%			92.00%	92.00%	83.99%
18.75%	60.00	68.82	BOUCUR056B	Sideoats Grama	Bouteloua curtipendula	VNS	MN	17.17%	91.77%			95.00%	95.00%	87.18%
1.25%	4.00	4.18	BOUGRA124A	Blue Grama	Bouteloua gracilis	VNS	MN	1.12%	98.65%	88.00%	9.00%		97.00%	95.69%
5.63%	18.00	19.20	ELYCAN015C	Canada Wild Rye	Elymus canadensis	VNS	WI	5.10%	97.66%	68.00%	28.00%		96.00%	93.75%
10.00%	32.00	35.50	ELYVIR056B	Virginia Wild Rye	Elymus virginicus	VNS	MN	8.97%	92.94%	94.00%	3.00%		97.00%	90.15%
1.88%	6.00	6.14	PANVIR056C	Switchgrass	Panicum virgatum	VNS	MN	1.66%	99.67%	57.00%	41.00%		98.00%	97.68%
5.00%	16.00	23.70	SCHSCO056B	Little Bluestem	Schizachyrium scoparium	VNS	MN	4.58%	71.07%	68.00%	27.00%		95.00%	67.52%
11.25%	36.00	38.20	SORNUT375A	Indiangrass	Sorghastrum nutans	VNS	MN	10.09%	97.15%	8.00%	89.00%		97.00%	94.24%
0.47%	1.50	1.88	ACHMIL516A	Western Yarrow	Achillea millefolium	VNS	MN	0.48%	94.11%			85.00%	85.00%	79.99%
4.69%	15.00	17.89	CHAFAS015C	Partridge Pea	Chamaecrista fasciculata	VNS	MN	4.85%	99.83%	20.00%	64.00%		84.00%	83.86%
1.17%	3.75	3.87	DALPUR656B	Purple Prairie Clover	Dalea purpurea	VNS	MN	1.05%	99.92%	26.00%	71.00%		97.00%	96.92%
0.47%	1.50	1.58	HELMAX706A	Maximilian's Sunflower	Helianthus maximiliani	VNS	SD	0.43%	99.93%	40.00%	55.00%		95.00%	94.93%
1.56%	5.00	6.10	HELHEL466A	Ox-eye Sunflower	Heliopsis helianthoides	VNS	IA	1.66%	99.93%	42.00%	40.00%		82.00%	81.94%
0.08%	0.25	0.26	LIAPYC465B	Prairie Blazingstar	Liatis pycnostachya	VNS	IA	0.07%	99.87%			97.00%	97.00%	96.87%
0.94%	3.00	3.28	MONFIS676D	Wild Bergamot	Monarda fistulosa	VNS	IA	0.89%	99.34%			92.00%	92.00%	91.39%
0.94%	3.00	3.20	OENBIE466A	Common Evening Primrose	Oenothera biennis	VNS	IA	0.87%	99.76%			94.00%	94.00%	93.77%
0.08%	0.25	0.27	POTARG026A	Prairie Cinquefoil	Potentilla arguta	VNS	MN	0.07%	94.93%	78.00%	19.00%		97.00%	92.08%
0.78%	2.50	2.94	RATCOL026A	Long-headed Coneflower	Ratibida columnifera	VNS	MN	0.76%	94.36%			90.00%	90.00%	84.92%
0.86%	2.75	2.81	RUDHIR026B	Black-eyed Susan	Rudbeckia hirta	VNS	MN	0.76%	99.75%	96.00%	2.00%		98.00%	97.76%
0.31%	1.00	1.05	VERSTR466A	Hoary Vervain	Verbena stricta	VNS	IA	0.28%	98.78%			96.00%	96.00%	94.83%
0.16%	0.50	0.54	ZIZAU026A	Golden Alexanders	Zizia aurea	VNS	MN	0.14%	98.33%	4.00%	90.00%		94.00%	92.43%

100.00% 320.00 367.91

Purity 92.81%, Inert Matter 7.16%, Other Crop 0.02%, Weed Seed 0.01%

Noxious Weeds/lb: 1 Giant Foxtail

Test Date: 01/2016

AMS 6818

DRY to MESIC		MESIC to WET		WET		DRY to WET				
Butterfly Weed	(Asclepias tuberosa)	0.00	0.00	0.0	OK	0.0	4300	0.10		6
Compass Plant	(Silphium laciniatum)	0.00	0.00	0.0	OK	0.0	660	0.02		7
Heart-leaved Alexander	(Zizia aptera)	0.00	0.00	0.0	OK	0.0	12000	0.28		8
Anise Hyssop	(Agastache Foeniculum)	0.50	1.89	15.7	OK	3.3	165000	3.79		3
Hoary Vervain	(Verbena stricta)	1.00	0.64	5.3	OK	6.7	28000	0.64	1	1
Leadplant	(Amorpha canescens)	0.00	0.00	0.0	OK	0.0	16000	0.37		8
Prairie Smoke	(Geum triflorum)	0.00	0.00	0.0	OK	0.0	27000	0.62		8
Rough Blazingstar	(Liatris aspera)	0.00	0.00	0.0	OK	0.0	16000	0.37		8
Showy Goldenrod	(Solidago speciosa)	0.00	0.00	0.0	OK	0.0	95000	2.18		7
Smooth Aster	(Aster laevis)	0.50	0.63	5.2	OK	3.3	55000	1.26	7	7
Stiff Tickseed	(Coreopsis palmata)	0.00	0.00	0.0	OK	0.0	10000	0.23		7
Canada Milkvetch	(Astragalus canadensis)	2.00	0.78	6.5	OK	13.3	17000	0.39	4	4
Thimbleweed	(Anemone cylindrica)	0.00	0.00	0.0	OK	0.0	26000	0.60		7
MESIC to WET										
Blanketflower	(Gaillardia aristata)	0.00	0.00	0.0	OK	0.0	9813	0.23		2
Canada Tick Trefoil	(Desmodium canadense)	1.00	0.13	1.0	OK	6.7	5500	0.13		6
Common Ox-eye	(Helianthus helianthoides)	2.00	0.29	2.4	OK	13.3	6300	0.14	4	4
Giant Sunflower	(Helianthus giganteus)	0.00	0.00	0.0	OK	0.0	10000	0.23		5
Golden Alexanders	(Zizia aurea)	2.00	0.51	4.2	OK	13.3	11000	0.25	6	6
Ironweed	(Veronia fasticulata)	0.00	0.00	0.0	OK	0.0	24000	0.55		3
Partridge Pea	(Cassia fasticulata)	0.00	0.00	0.0	OK	0.0	2700	0.06		1
Prairie Phlox	(Phlox pilosa)	0.00	0.00	0.0	OK	0.0	19000	0.44		7
Rattlesnake Master	(Eryngium yuccifolium)	0.50	0.09	0.7	OK	3.3	7500	0.17	8	8
Tall Blazingstar	(Liatris pycnostachya)	0.20	0.05	0.4	OK	1.3	11000	0.25	6	6
Wild Bergamot	(Monarda fistulosa)	0.20	0.32	2.7	OK	1.3	70000	1.61	2	2
Yellow Coneflower	(Ratibida pinnata)	1.00	0.69	5.7	OK	6.7	30000	0.69	4	4
WET										
Blue Vervain	(Verbena hastata)	0.00	0.00	0.0	OK	0.0	93000	2.13		3
Boneset	(Eupatorium perfoliatum)	0.00	0.00	0.0	OK	0.0	160000	3.67		6
Cup Plant	(Silphium perfoliatum)	0.00	0.00	0.0	OK	0.0	1400	0.03		1
Joe-pye Weed	(Eupatorium maculatum)	0.00	0.00	0.0	OK	0.0	95000	2.18		5
New England Aster	(Aster novae-angliae)	0.00	0.00	0.0	OK	0.0	66000	1.52		3
Panicled Aster	(Aster simplex)	0.00	0.00	0.0	OK	0.0	156000	3.58		4
Sneezeweed	(Helenium autumnale)	0.00	0.00	0.0	OK	0.0	130000	2.98		4
Swamp Milkweed	(Asclepias incarnata)	0.00	0.00	0.0	OK	0.0	4800	0.11		4
DRY to WET										
Black-eyed Susan	(Rudbeckia hirta)	1.00	2.11	17.5	OK	6.7	92000	2.11	2	2
Illinois Bundleflower	(Desmanthus illinoensis)	0.00	0.00	0.0	OK	0.0	4200	0.10		4
Purple Prairie Clover	(Petalostemum purpurum)	1.00	0.41	3.4	OK	6.7	18000	0.41	8	8
Maximilian Sunflower	(Helianthus maximiliani)	0.00	0.00	0.0	OK	0.0	13000	0.30		4
Stiff Goldenrod	(Solidago rigida)	0.50	0.47	3.9	OK	3.3	41000	0.94	4	4

White Prairie Clover	(Petaloctenium candidum)	1.00	0.44	3.6	OK	6.7	19000	0.44	10	10
Yarrow	(Achillea millefolium)	0.50	2.07	17.2	OK	3.3	180000	4.13	1	1
Min. 16 PLS oz/ac	TOTAL	15.00	12.04	100.0		100.0		AVE COC FORB	5.1	

TOTAL SEEDS/FT 4/ 39.9

PERCENT GRASS 5/ 70%
 PERCENT FLOWER 30%

AVE. COC - MIX 5.0

SPECIES RICHNESS 23

- 3/ Individual species not to exceed 20% by seeds/ft
- 4/ Minimum 35 seeds/square foot
- 5/ Maximum 70% grasses

6/ Assignment of Coefficients

- 0 to 3 : Plants with a high range of ecological tolerances/ found in a variety of plant communities
- 4 to 6 : Plants with an intermediate range of ecological tolerances/ associated with a specific plant community
- 7 to 8 : Plants with a poor range of ecological tolerances/ associated with advanced successional stage
- 9 to 10 : Plants with a high degree of fidelity to a narrow range of pristine habitats

Appendix L

MNDNR Division Of Forestry Site Vegetation Overview



Minnesota Department of Natural Resources
Division of Forestry
Lake City Office
Phone: 651-345-3216

February 8, 2017

Subject: Mahoney property/site vegetation

As per request of Mr. Mahoney, this is an overview of the vegetation near the existing gravel pit location in SWNW sect9-t112n-r13w.

The east, south and west sides of the existing gravel pit are made up of mesic hardwood forest, with predominantly oak present. The south and south west facing slopes are heavier to bur oak, and the east slope red oak. Scattered cottonwood are also present on the south side of the pit. There is a mix of other hardwood tree and shrub species present, including both desired and undesired species. The ecological classification type for the area is MHS37. The area to the north is agricultural field that was recently enrolled in CRP.

Mr. Mahoney has recently carried out a selective and salvage harvest on a good portion of the woods. The intent of that harvest was to utilize and regenerate mature/overmature timber. There are also several pockets of oak wilt present on the property.

Sincerely,

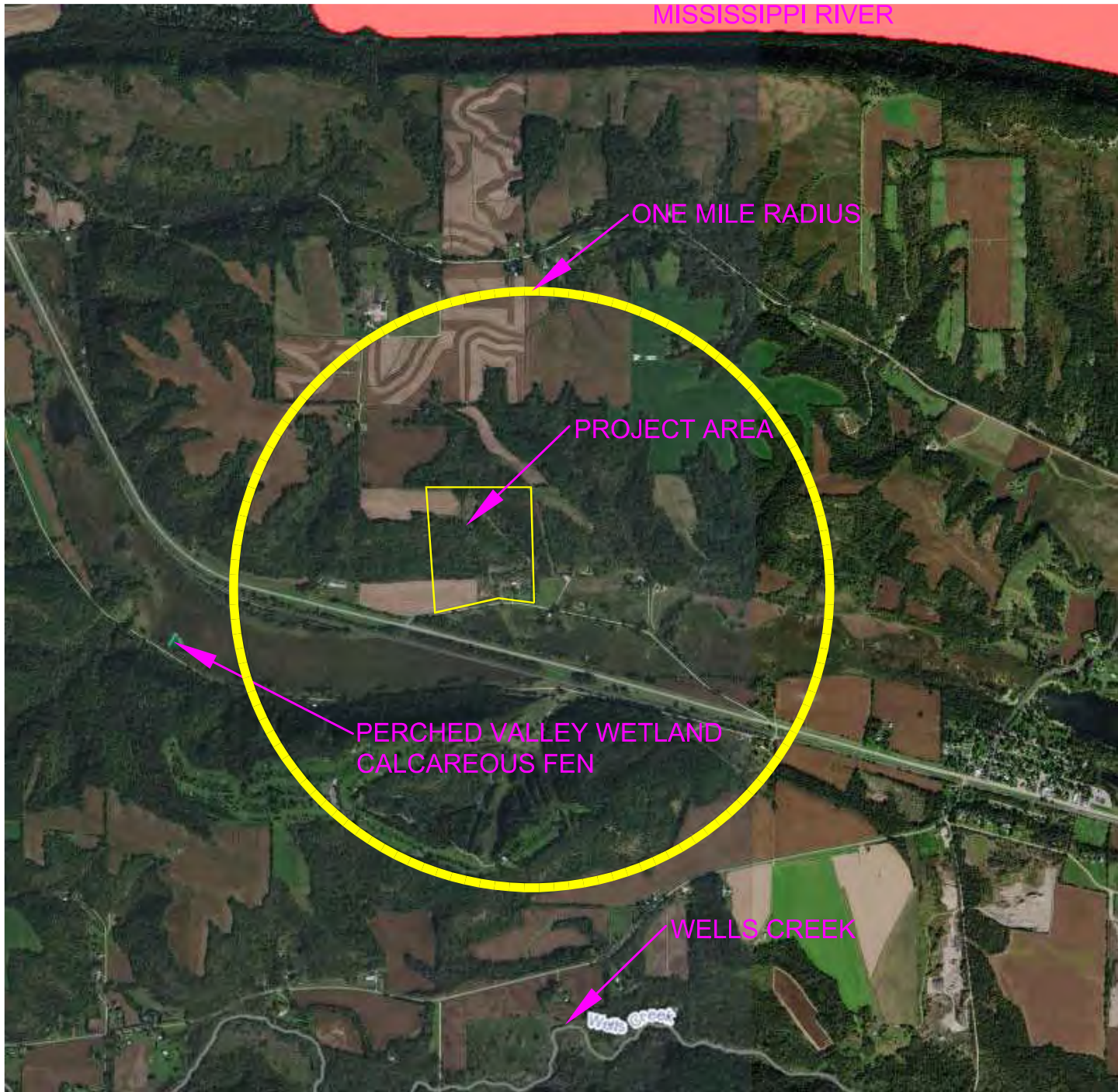
A handwritten signature in black ink that reads "Mike Wachholz". The signature is fluid and cursive, with a long horizontal stroke at the end.

Mike Wachholz - Forester



Appendix M

MPCA Impaired Waters Map



MISSISSIPPI RIVER

ONE MILE RADIUS

PROJECT AREA

PERCHED VALLEY WETLAND
CALCAREOUS FEN

WELLS CREEK

Wells Creek

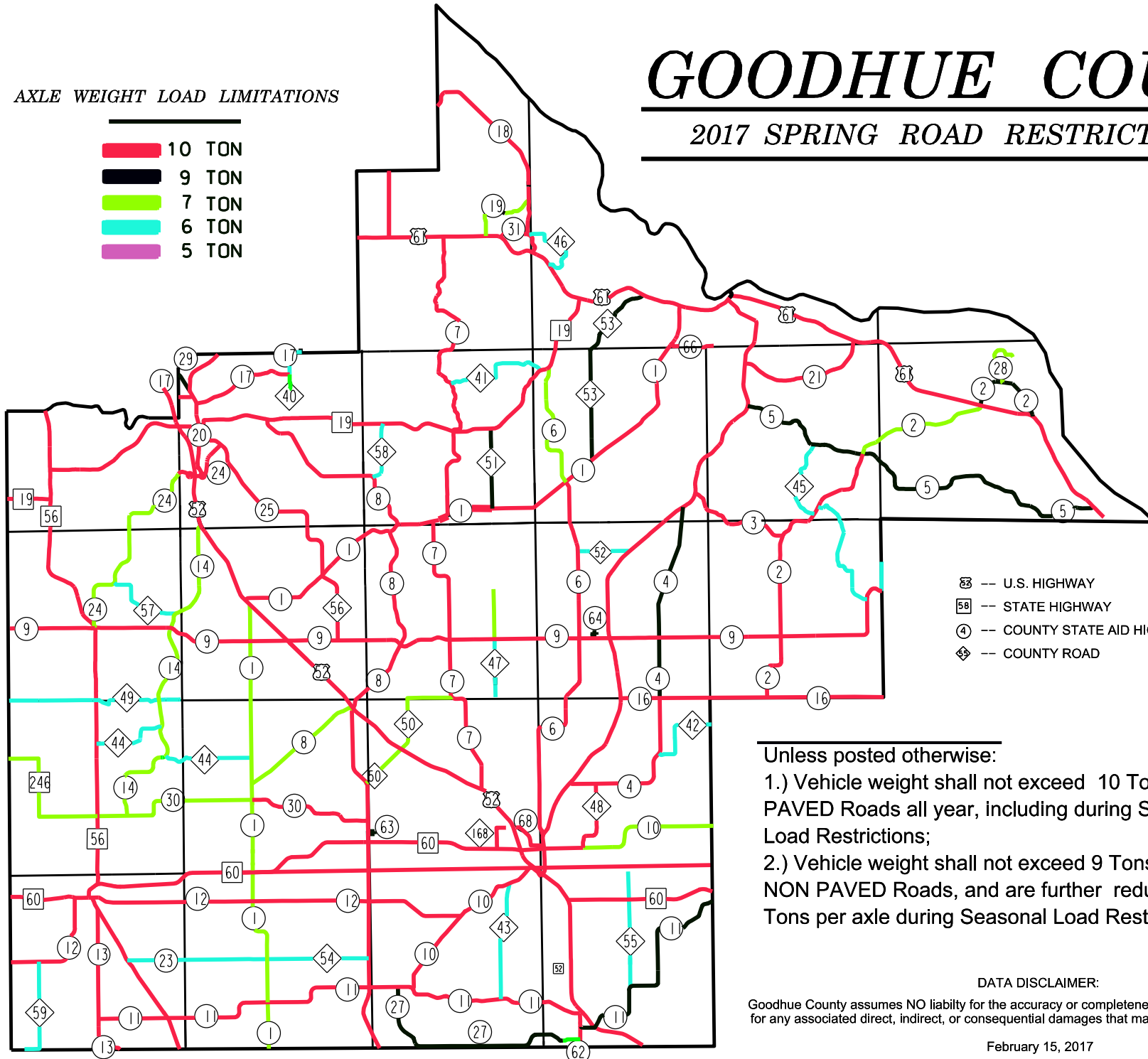
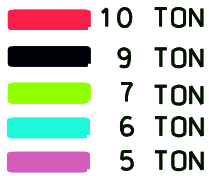
Appendix N

Road Restrictions Map Goodhue County

GOODHUE COUNTY

2017 SPRING ROAD RESTRICTION MAP

AXLE WEIGHT LOAD LIMITATIONS



- 85 -- U.S. HIGHWAY
- 58 -- STATE HIGHWAY
- 4 -- COUNTY STATE AID HIGHWAY
- 46 -- COUNTY ROAD

Unless posted otherwise:

- 1.) Vehicle weight shall not exceed 10 Tons per axle on PAVED Roads all year, including during Seasonal Load Restrictions;
- 2.) Vehicle weight shall not exceed 9 Tons per axle on NON PAVED Roads, and are further reduced to 5 Tons per axle during Seasonal Load Restrictions.

DATA DISCLAIMER:

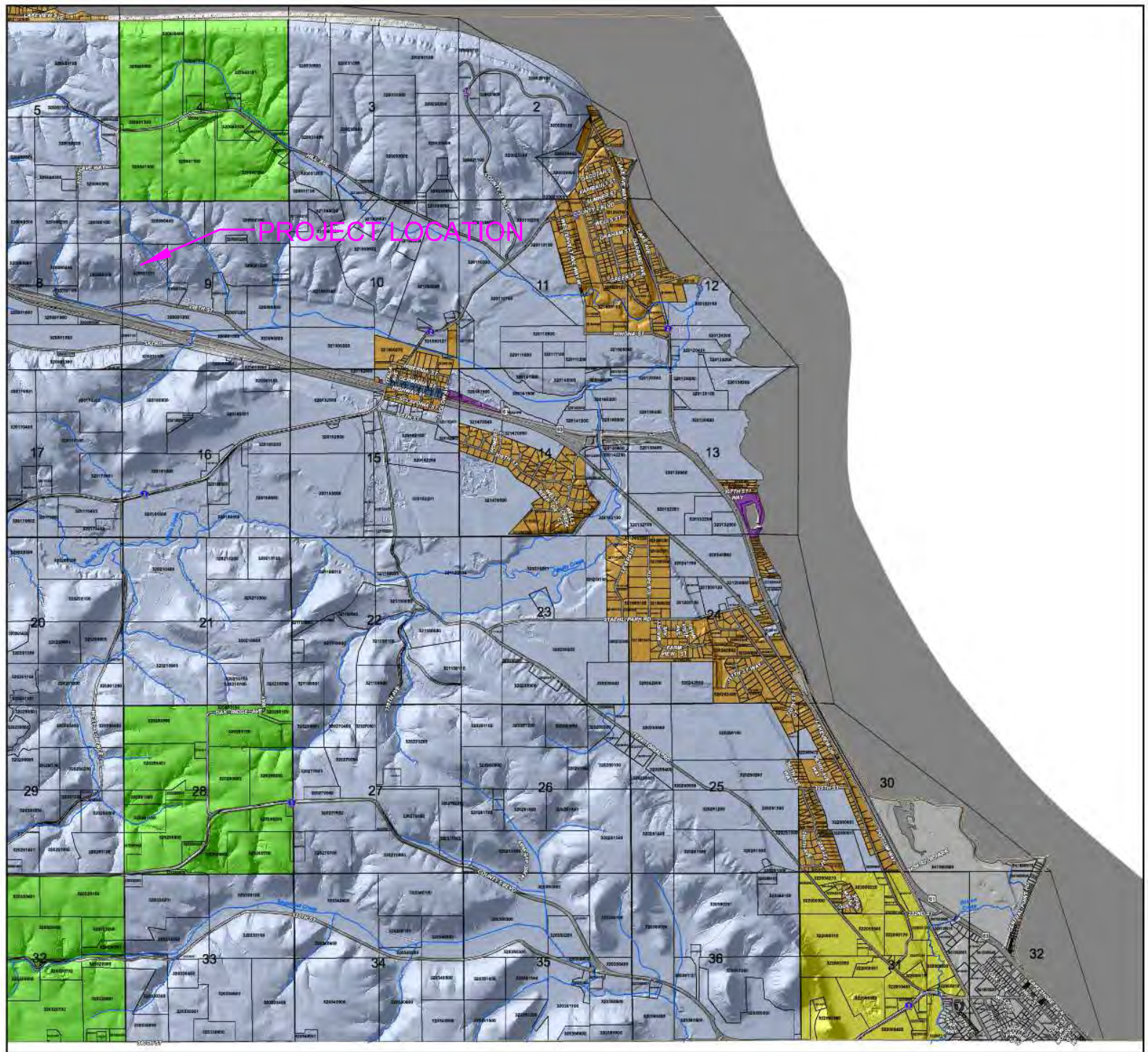
Goodhue County assumes NO liability for the accuracy or completeness of this map OR responsibility for any associated direct, indirect, or consequential damages that may result from its use or misuse.

February 15, 2017



Appendix O

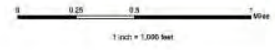
**Zoning Map
Florence Township Goodhue County**



- Legend**
- A1 - Agricultural Protection
 - A2 - Agricultural
 - A3 - Urban Fringe
 - B1 - General Business
 - B2 - Highway Business
 - CN - Commercial Recreation
 - I - Industry
 - MXH - Mixed Use
 - R1 - Suburban Residential
 - R2C - Common River Recreation
 - R2N - Common River Scenic
 - Section
 - Parcel with Identification Number
 - Stream
 - Municipal Boundary
 - Within City Limits or No Data



GOODHUE COUNTY ZONING
Florence Township



DATA DISCLAIMER:
 Goodhue County does not warrant the accuracy or completeness of this map or the responsibility for any associated errors, omissions, or consequential damages that may result from its use or misuse. Goodhue County Copyright 2014

Appendix P

Soil Boring Logs

CLASS OF MATERIAL CL-5 DRILL PIT MANONEY
 LOCATION _____ WEIGHT OF SAMPLE _____ POUNDS

Test Hole # H 1 Stripping _____
 Depth Sample D 110170 N Bottom Condition _____

4-6'

INDIV. WEIGHTS	CUMULATIVE WTS. PASS.	TOTAL PASS	SPECS.
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET <u>1</u> "			
PASS <u>1</u> " SIEVE, RET <u>3/4</u> "			100
PASS <u>3/4</u> " SIEVE, RET <u>3/8</u> "	<u>41.9</u>		90-100
PASS <u>3/8</u> " SIEVE, RET <u>4</u> " 41.9	<u>70.2</u>	<u>383.0</u>	100 50-90
PASS <u>4</u> " SIEVE, RET <u>B</u> "			35-80
CHECK TOTAL			

- (B) DRY ONE SAMPLE AND RECORD WEIGHT
- (C) WASH AND DRY OTHER SAMPLE AND RECORD WEIGHT
- (D) LOSS IN WASHING (B-C) ENTER BELOW

383.9
291.8
92.1

INDIV. WEIGHTS	CUM. WTS. PASSING	CUM % PASSING	% PASSING TOTAL PASS	SPECS.
PASS <u>4</u> " SIEVE, RET <u>8</u> " 70.2 <u>7.7</u>	<u>341.1</u>		<u>89</u>	<u>35-80</u>
PASS <u>8</u> " SIEVE, RET <u>10</u> " 4.2 <u>23.8</u>	<u>270.9</u>			
PASS <u>10</u> " SIEVE, RET <u>20</u> " 23.8 <u>18.3</u>	<u>246.7</u>		<u>70</u>	<u>20-65</u>
PASS <u>20</u> " SIEVE, RET <u>40</u> " 18.3 <u>77.1</u>	<u>242.9</u>			
PASS <u>40</u> " SIEVE, RET <u>80</u> " 77.1 <u>50.1</u>	<u>224.6</u>		<u>59</u>	<u>10-35</u>
PASS <u>80</u> " SIEVE, RET <u>200</u> "	<u>50.1</u>			
PASS #200 SIEVE RET BOTTOM	<u>5.3</u>		<u>25.4</u>	<u>3-10</u>
LOSS BY WASHING	<u>92.1</u>			

CHECK TOTAL

SMALL CHECK (B) WITHIN 2 GRAMS

SAND _____
 SHALE _____
 % SHALE _____

BY VEL

DATE 2-25-03

CLASS OF MATERIAL CL-5 DRILL PIT MAHONEY
 LOCATION _____ WEIGHT OF SAMPLE _____ POUNDS

Test Hole # H 1 Stripping _____
 Depth Sample _____ Bottom Condition _____

6-221

	INDIV. WEIGHTS	CUMULATIVE WTS. PASS.	TOTAL PASS	SPECS.
PASS _____ " SIEVE, RET _____ "				
PASS _____ " SIEVE, RET _____ "				
PASS _____ " SIEVE, RET _____ "				
PASS _____ " SIEVE, RET <u>1</u> "	<u>0.5</u>	<u>18.2</u>	<u>150</u>	
PASS <u>1</u> " SIEVE, RET <u>3/4</u> "	<u>0.3</u>	<u>17.7</u>	<u>97</u>	<u>100</u>
PASS <u>3/4</u> " SIEVE, RET <u>3/8</u> "	<u>1.3</u>	<u>17.4</u>	<u>96</u>	<u>90-100</u>
PASS <u>3/8</u> " SIEVE, RET <u>4</u> "	<u>2.4</u>	<u>16.1</u>	<u>88</u>	<u>50-90</u>
PASS <u>4</u> " SIEVE, RET <u>B</u> "	<u>13.7</u>	<u>13.7</u>	<u>75</u>	<u>35-80</u>
CHECK TOTAL				

(B) DRY ONE SAMPLE AND RECORD WEIGHT 418.0
 (C) WASH AND DRY OTHER SAMPLE AND RECORD WEIGHT 398.0
 (D) LOSS IN WASHING (B-C) ENTER BELOW 20.0

	INDIV. WEIGHTS	CUM. WTS. PASSING	CUM % PASSING	%PASSING TOTAL PASS	SPECS.
PASS <u>4</u> " SIEVE, RET <u>8</u> "	<u>84.6</u>	<u>417.9</u>	<u>100</u>	<u>75</u>	<u>35-80</u>
PASS <u>8</u> " SIEVE, RET <u>10</u> "	<u>19.2</u>	<u>333.3</u>			
PASS <u>10</u> " SIEVE, RET <u>20</u> "	<u>152.7</u>	<u>314.1</u>	<u>75</u>	<u>56</u>	<u>20-65</u>
PASS <u>20</u> " SIEVE, RET <u>40</u> "	<u>95.3</u>	<u>161.4</u>			
PASS <u>40</u> " SIEVE, RET <u>80</u> "	<u>33.8</u>	<u>66.1</u>	<u>16</u>	<u>12</u>	<u>10-35</u>
PASS <u>80</u> " SIEVE, RET <u>200</u> "	<u>10.5</u>	<u>32.3</u>			
PASS #200 SIEVE RET BOTTOM	<u>1.8</u>	<u>21.8</u>	<u>5</u>	<u>39</u>	<u>3-10</u>
LOSS BY WASHING	<u>20.0</u>				

CHECK TOTAL _____ SMALL CHECK (B) WITHIN 2 GRAMS

SAND _____
 SHALE _____
 % SHALE _____

BY DEL
 DATE 2-25-03

CLASS OF MATERIAL CL-5 DRILL PIT MANONEY
 LOCATION _____ WEIGHT OF SAMPLE _____ POUNDS

Test Hole # H #1 Stripping _____
 Depth Sample 22-32' Bottom Condition _____

INDIV. WEIGHTS	CUMULATIVE WTS. PASS.	TOTAL PASS	SPECS.
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET <u>1</u> "			
PASS <u>1</u> " SIEVE, RET <u>3/4</u> "			100
PASS <u>3/4</u> " SIEVE, RET <u>3/8</u> "	0.4	16.3	90-100
PASS <u>3/8</u> " SIEVE, RET <u>4</u> "	1.3	15.9	50-90
PASS <u>4</u> " SIEVE, RET <u>B</u> "	14.6	14.6	35-80
CHECK TOTAL			

(B) DRY ONE SAMPLE AND RECORD WEIGHT 407.4
 (C) WASH AND DRY OTHER SAMPLE AND RECORD WEIGHT 403.7
 (D) LOSS IN WASHING (B-C) ENTER BELOW 3.7

INDIV. WEIGHTS	CUM. WTS. PASSING	CUM % PASSING	%PASSING TOTAL PASS	SPECS.
PASS <u>4</u> " SIEVE, RET <u>8</u> "	78.6	407.4	100	90 35-80
PASS <u>8</u> " SIEVE, RET <u>10</u> "	21.1	328.8		
PASS <u>10</u> " SIEVE, RET <u>20</u> "	186.8	307.7	76	68 20-65
PASS <u>20</u> " SIEVE, RET <u>40</u> "	103.2	120.9		
PASS <u>40</u> " SIEVE, RET <u>80</u> "	11.4	17.7	4	4 10-35
PASS <u>80</u> " SIEVE, RET <u>200</u> "	2.2	6.3		
PASS #200 SIEVE RET BOTTOM	0.4	4.1	1	0.91 3-10
LOSS BY WASHING	<u>3.7</u>			

CHECK TOTAL _____ SMALL CHECK (B) WITHIN 2 GRAMS

SAND _____
 SHALE _____
 % SHALE _____

BY DEL
 DATE 2-25-03

CLASS OF MATERIAL CL-5 DRILL PIT MANONEY
LOCATION _____ WEIGHT OF SAMPLE _____ POUNDS

Test Hole # H 1 Stripping _____

Depth Sample _____ Bottom Condition _____

32-37

INDIV. WEIGHTS	CUMULATIVE WTS. PASS.	TOTAL PASS	SPECS.
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET <u>1</u> "			
PASS <u>1</u> " SIEVE, RET <u>3/4</u> "	—	—	100
PASS <u>3/4</u> " SIEVE, RET <u>3/8</u> "	—		90-100
PASS <u>3/8</u> " SIEVE, RET <u>4</u> "	0.2	3.7	50-90
PASS <u>4</u> " SIEVE, RET <u>B</u> "	3.5	3.5	35-80
CHECK TOTAL			

(B) DRY ONE SAMPLE AND RECORD WEIGHT

(C) WASH AND DRY OTHER SAMPLE AND RECORD WEIGHT

(D) LOSS IN WASHING (B-C) ENTER BELOW

410.6
407.3
3.3

INDIV. WEIGHTS	CUM. WTS. PASSING	CUM % PASSING	%PASSING TOTAL PASS	SPECS.	
PASS <u>4</u> " SIEVE, RET <u>8</u> "	48.3	410.6	100	96	35-80
PASS <u>8</u> " SIEVE, RET <u>10</u> "	16.2	362.3			
PASS <u>10</u> " SIEVE, RET <u>20</u> "	182.6	346.1	84	81	20-65
PASS <u>20</u> " SIEVE, RET <u>40</u> "	144.8	163.5			
PASS <u>40</u> " SIEVE, RET <u>80</u> "	12.8	18.7	5	4	10-35
PASS <u>80</u> " SIEVE, RET <u>200</u> "	2.2	5.9			
PASS #200 SIEVE RET BOTTOM	0.4	2.7	1	0.9	3-10
LOSS BY WASHING	3.3				

CHECK TOTAL

SMALL CHECK (B) WITHIN 2 GRAMS

SAND _____

SHALE _____

% SHALE _____

ROCK _____

BY DEL

DATE 2-25-03

CLASS OF MATERIAL CL-5 DRILL PIT MANONEY
 LOCATION _____ WEIGHT OF SAMPLE _____ POUNDS

Test Hole # X 2 Stripping _____
 Depth Sample _____ Bottom Condition _____
15-221

INDIV. WEIGHTS	CUMULATIVE WTS. PASS.	TOTAL PASS	SPECS.
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET <u>1</u> "			
PASS <u>1</u> " SIEVE, RET <u>3/4</u> "			100
PASS <u>3/4</u> " SIEVE, RET <u>3/8</u> "	0.2	8.9	90-100
PASS <u>3/8</u> " SIEVE, RET <u>4</u> "	1.0	8.6	50-90
PASS <u>4</u> " SIEVE, RET <u>B</u> "	7.6	7.6	35-80
CHECK TOTAL			

(B) DRY ONE SAMPLE AND RECORD WEIGHT 420.4
 (C) WASH AND DRY OTHER SAMPLE AND RECORD WEIGHT 406.3
 (D) LOSS IN WASHING (B-C) ENTER BELOW 14.3

INDIV. WEIGHTS	CUM. WTS. PASSING	CUM % PASSING	%PASSING TOTAL PASS	SPECS.	
PASS <u>4</u> " SIEVE, RET <u>8</u> "	66.9	420.8	100	85	35-80
PASS <u>8</u> " SIEVE, RET <u>10</u> "	16.7	353.9			
PASS <u>10</u> " SIEVE, RET <u>20</u> "	166.6	337.2	80	68	20-65
PASS <u>20</u> " SIEVE, RET <u>40</u> "	123.9	170.6			
PASS <u>40</u> " SIEVE, RET <u>80</u> "	21.7	46.7	11	9	10-35
PASS <u>80</u> " SIEVE, RET <u>200</u> "	8.7	25.0			
PASS #200 SIEVE RET BOTTOM	2.0	16.3	4	3.3	3-10
LOSS BY WASHING	14.3				
CHECK TOTAL					

SMALL CHECK (B) WITH IN 2 GRAMS

SAND _____
 SHALE _____
 % SHALE _____

BY DEL
 DATE 2-25-03

CLASS OF MATERIAL CL-5 DRILL PIT MANONEY
 LOCATION _____ WEIGHT OF SAMPLE _____ POUNDS

Test Hole # H 3A Stripping _____
 Depth Sample 0-5 Strip Bottom Condition _____
5'-16'

INDIV. WEIGHTS	CUMULATIVE WTS. PASS.	TOTAL PASS	SPECS.
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET <u>1</u> "	<u>—</u>		
PASS <u>1</u> " SIEVE, RET <u>3/4</u> "	<u>0.3</u>	<u>23.5</u>	<u>100</u>
PASS <u>3/4</u> " SIEVE, RET <u>3/8</u> "	<u>0.5</u>	<u>23.2</u>	<u>99</u>
PASS <u>3/8</u> " SIEVE, RET <u>4</u> "	<u>1.0</u>	<u>22.7</u>	<u>50-90</u>
PASS <u>4</u> " SIEVE, RET <u>B</u> "	<u>21.7</u>	<u>21.7</u>	<u>35-80</u>
CHECK TOTAL			

(B) DRY ONE SAMPLE AND RECORD WEIGHT 448.7
 (C) WASH AND DRY OTHER SAMPLE AND RECORD WEIGHT 427.8
 (D) LOSS IN WASHING (B-C) ENTER BELOW 20.9

INDIV. WEIGHTS	CUM. WTS. PASSING	CUM % PASSING	%PASSING TOTAL PASS	SPECS.	
PASS <u>4</u> " SIEVE, RET <u>8</u> "	<u>35.0</u>	<u>448.8</u>	<u>100</u>	<u>92</u>	<u>35-80</u>
PASS <u>8</u> " SIEVE, RET <u>10</u> "	<u>8.5</u>	<u>413.8</u>			
PASS <u>10</u> " SIEVE, RET <u>20</u> "	<u>73.8</u>	<u>405.3</u>	<u>90</u>	<u>83</u>	<u>20-65</u>
PASS <u>20</u> " SIEVE, RET <u>40</u> "	<u>90.4</u>	<u>331.5</u>			
PASS <u>40</u> " SIEVE, RET <u>80</u> "	<u>166.0</u>	<u>241.1</u>	<u>54</u>	<u>49</u>	<u>10-35</u>
PASS <u>80</u> " SIEVE, RET <u>200</u> "	<u>48.7</u>	<u>75.1</u>			
PASS #200 SIEVE RET BOTTOM	<u>5.5</u>	<u>26.4</u>	<u>6</u>	<u>5.4</u>	<u>3-10</u>
LOSS BY WASHING	<u>20.9</u>				

CHECK TOTAL _____ SMALL CHECK (B) WITHIN 2 GRAMS

SAND	<u>14</u>	<u>744.7</u>	<u>448.7</u>	<u>4</u>	BY <u>REL</u>
SHALE		<u>2.4</u>	<u>0.1</u>		
% SHALE		<u>0.35</u>	<u>0.02</u>	<u>%</u>	DATE <u>2-25-03</u>
ROCK					

CLASS OF MATERIAL U-5 DRILL PIT MANONEY
 LOCATION _____ WEIGHT OF SAMPLE _____ POUNDS

Test Hole # H 3B Stripping _____
 Depth Sample 16-27' Bottom Condition _____

	INDIV. WEIGHTS	CUMULATIVE WTS. PASS.	TOTAL PASS	SPECS.
PASS _____ " SIEVE, RET _____ "				
PASS _____ " SIEVE, RET _____ "				
PASS _____ " SIEVE, RET _____ "				
PASS _____ " SIEVE, RET <u>1</u> "				
PASS <u>1</u> " SIEVE, RET <u>3/4</u> "	—			100
PASS <u>3/4</u> " SIEVE, RET <u>3/8</u> "	0.2	5.4	100	90-100
PASS <u>3/8</u> " SIEVE, RET <u>4</u> "	0.5	5.2	96	50-90
PASS <u>4</u> " SIEVE, RET <u>B</u> "	4.7	4.7	87	35-80
CHECK TOTAL				

(B) DRY ONE SAMPLE AND RECORD WEIGHT 369.9
 (C) WASH AND DRY OTHER SAMPLE AND RECORD WEIGHT 367.3
 (D) LOSS IN WASHING (B-C) ENTER BELOW 2.6

	INDIV. WEIGHTS	CUM. WTS. PASSING	CUM % PASSING	%PASSING TOTAL PASS	SPECS.
PASS <u>4</u> " SIEVE, RET <u>8</u> "	74.8	369.6	100	87	35-80
PASS <u>8</u> " SIEVE, RET <u>10</u> "	21.0	294.8			
PASS <u>10</u> " SIEVE, RET <u>20</u> "	161.0	273.8	74	64	20-65
PASS <u>20</u> " SIEVE, RET <u>40</u> "	88.9	112.8			
PASS <u>40</u> " SIEVE, RET <u>80</u> "	16.0	23.9	6	6	10-35
PASS <u>80</u> " SIEVE, RET <u>200</u> "	4.6	7.9			
PASS #200 SIEVE RET BOTTOM	0.7	3.3	1	0.8	3-10
LOSS BY WASHING	2.6				

CHECK TOTAL _____ SMALL CHECK (B) WITHIN 2 GRAMS

SAND _____
 SHALE _____
 % SHALE _____

BY DEL
 DATE 2-25-03

CLASS OF MATERIAL CL-5 DRILL PIT MANONEY
 LOCATION _____ WEIGHT OF SAMPLE _____ POUNDS

Test Hole # H 14 Stripping _____
 Depth Sample _____ Bottom Condition _____

7'-22'

INDIV. WEIGHTS	CUMULATIVE WTS. PASS.	TOTAL PASS	SPECS.
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET <u>1</u> "			
PASS <u>1</u> " SIEVE, RET <u>3/4</u> "	<u>0.1</u>	<u>5.9</u>	<u>100</u> <u>100</u>
PASS <u>3/4</u> " SIEVE, RET <u>3/8</u> "	<u>0.5</u>	<u>5.8</u>	<u>98</u> <u>40-100</u>
PASS <u>3/8</u> " SIEVE, RET <u>4</u> "	<u>1.1</u>	<u>5.3</u>	<u>90</u> <u>50-90</u>
PASS <u>4</u> " SIEVE, RET <u>B</u> "	<u>4.2</u>	<u>4.2</u>	<u>71</u> <u>35-80</u>
CHECK TOTAL			

(B) DRY ONE SAMPLE AND RECORD WEIGHT 381.5
 (C) WASH AND DRY OTHER SAMPLE AND RECORD WEIGHT 366.9
 (D) LOSS IN WASHING (B-C) ENTER BELOW 14.6

INDIV. WEIGHTS	CUM. WTS. PASSING	CUM % PASSING	%PASSING TOTAL PASS	SPECS.
PASS <u>4</u> " SIEVE, RET <u>8</u> "	<u>117.2</u>	<u>381.7</u>	<u>100</u>	<u>71</u> <u>35-80</u>
PASS <u>8</u> " SIEVE, RET <u>10</u> "	<u>23.6</u>	<u>264.5</u>		
PASS <u>10</u> " SIEVE, RET <u>20</u> "	<u>110.0</u>	<u>240.9</u>	<u>63</u>	<u>45</u> <u>20-65</u>
PASS <u>20</u> " SIEVE, RET <u>40</u> "	<u>49.8</u>	<u>130.9</u>		
PASS <u>40</u> " SIEVE, RET <u>80</u> "	<u>45.6</u>	<u>81.1</u>	<u>21</u>	<u>15</u> <u>10-35</u>
PASS <u>80</u> " SIEVE, RET <u>200</u> "	<u>17.8</u>	<u>35.5</u>		
PASS #200 SIEVE RET BOTTOM	<u>3.1</u>	<u>17.7</u>	<u>5</u>	<u>3.3</u> <u>3-10</u>
LOSS BY WASHING	<u>14.6</u>			
CHECK TOTAL				

SMALL CHECK (B) WITHIN 2 GRAMS

SAND _____
 SHALE _____
 % SHALE _____

BY DEL
 DATE 2-25-03

CLASS OF MATERIAL CL-5 DRILL PIT MANONEY
LOCATION _____ WEIGHT OF SAMPLE _____ POUNDS

Test Hole # H 15 Stripping _____

Depth Sample _____ Bottom Condition _____

6-37'

	INDIV. WEIGHTS	CUMULATIVE WTS. PASS.	TOTAL PASS	SPECS.
PASS _____ " SIEVE, RET _____ "				
PASS _____ " SIEVE, RET _____ "				
PASS _____ " SIEVE, RET _____ "				
PASS _____ " SIEVE, RET <u>1</u> "				
PASS <u>1</u> " SIEVE, RET <u>3/4</u> "	0.2	5.7	100	100
PASS <u>3/4</u> " SIEVE, RET <u>3/8</u> "	0.3	5.5	96	90-100
PASS <u>3/8</u> " SIEVE, RET <u>4</u> "	0.9	5.2	91	50-90
PASS <u>4</u> " SIEVE, RET <u>B</u> "	4.3	4.3	75	35-80
CHECK TOTAL				

(B) DRY ONE SAMPLE AND RECORD WEIGHT

(C) WASH AND DRY OTHER SAMPLE AND RECORD WEIGHT

(D) LOSS IN WASHING (B-C) ENTER BELOW

442.9
421.4
21.5

	INDIV. WEIGHTS	CUM. WTS. PASSING	CUM % PASSING	%PASSING TOTAL PASS	SPECS.
PASS <u>4</u> " SIEVE, RET <u>8</u> "	107.4	441.9	100	75	35-80
PASS <u>8</u> " SIEVE, RET <u>10</u> "	22.5	334.5			
PASS <u>10</u> " SIEVE, RET <u>20</u> "	104.5	312.0	71	53	20-65
PASS <u>20</u> " SIEVE, RET <u>40</u> "	47.3	207.5			
PASS <u>40</u> " SIEVE, RET <u>80</u> "	97.8	160.2	36	27	10-35
PASS <u>80</u> " SIEVE, RET <u>200</u> "	37.1	62.4			
PASS #200 SIEVE RET BOTTOM	3.8	25.3	6	4.3	3-10
LOSS BY WASHING	<u>21.5</u>				

CHECK TOTAL

SMALL CHECK (B) WITHIN 2 GRAMS

SAND _____

SHALE _____

% SHALE _____

ROCK _____

BY DEL

DATE 2-25-03

CLASS OF MATERIAL CL-5 DRILL PIT MAHONEY
 LOCATION _____ WEIGHT OF SAMPLE _____ POUNDS

Test Hole # X #17 Stripping _____
 Depth Sample _____ Bottom Condition _____

6-12'

INDIV. WEIGHTS	CUMULATIVE WTS. PASS.	TOTAL PASS	SPECS.
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET _____ "			
PASS _____ " SIEVE, RET <u>1</u> "	<u>1.1</u>	<u>100</u>	
PASS <u>1</u> " SIEVE, RET <u>3/4</u> "	<u>0.3</u>	<u>83</u>	<u>100</u>
PASS <u>3/4</u> " SIEVE, RET <u>3/8</u> "	<u>0.6</u>	<u>78</u>	<u>40-100</u>
PASS <u>3/8</u> " SIEVE, RET <u>4</u> "	<u>1.2</u>	<u>69</u>	<u>50-90</u>
PASS <u>4</u> " SIEVE, RET <u>B</u> "	<u>3.3</u>	<u>51</u>	<u>35-80</u>
CHECK TOTAL			

(B) DRY ONE SAMPLE AND RECORD WEIGHT 437.0
 (C) WASH AND DRY OTHER SAMPLE AND RECORD WEIGHT 297.0
 (D) LOSS IN WASHING (B-C) ENTER BELOW: 140.0

INDIV. WEIGHTS	CUM. WTS. PASSING	CUM % PASSING	%PASSING TOTAL PASS	SPECS.
PASS <u>4</u> " SIEVE, RET <u>8</u> "	<u>28.7</u>	<u>100</u>	<u>51</u>	<u>35-80</u>
PASS <u>8</u> " SIEVE, RET <u>10</u> "	<u>5.8</u>	<u>408.3</u>		
PASS <u>10</u> " SIEVE, RET <u>20</u> "	<u>32.1</u>	<u>402.5</u>	<u>92</u>	<u>20-65</u>
PASS <u>20</u> " SIEVE, RET <u>40</u> "	<u>37.0</u>	<u>370.4</u>	<u>0</u>	
PASS <u>40</u> " SIEVE, RET <u>80</u> "	<u>90.5</u>	<u>333.4</u>	<u>76</u>	<u>10-35</u>
PASS <u>80</u> " SIEVE, RET <u>200</u> "	<u>87.9</u>	<u>242.9</u>		
PASS #200 SIEVE RET BOTTOM	<u>15.0</u>	<u>155.0</u>	<u>35</u>	<u>3-10</u>
LOSS BY WASHING	<u>140.0</u>			

CHECK TOTAL _____ SMALL CHECK (B) WITHIN 2 GRAMS
 SAND 14 496.5 | 437.0 - 4 BY VEL
 SHALE 4.8 | 0.1
 % SHALE 0.9620 | 0.02
 DATE 2-25-03

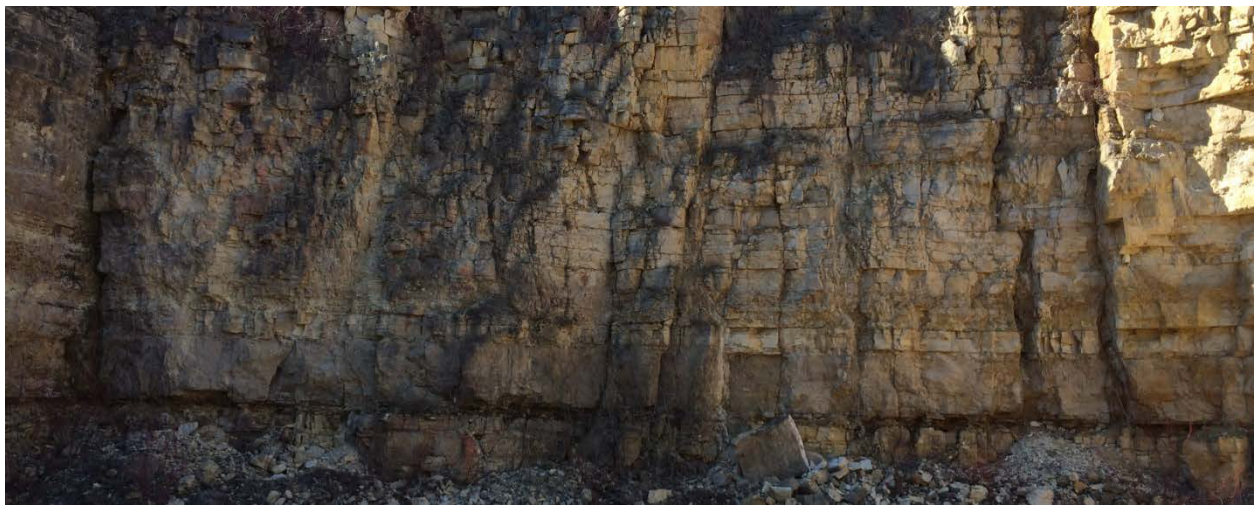


Appendix Q

Fracture Patterns

FRACTURE PATTERNS







Appendix F

71 @H F5 @F9DCFH

SHPO and OSA File Search for the Doug Mahoney Gravel Pit, Goodhue County, Minnesota

by David L. Peterson, Ph.D. (Archaeopaths Consulting, St. Paul, MN)
with contributions by China Beverley

On July 26, 2017, David Peterson conducted a file search at the Minnesota State Historic Preservation Office (SHPO) for cultural properties on and in the vicinity of the Doug Mahoney Gravel Pit in Florence Township, Goodhue County, Minnesota. The search was performed by agreement with the Red Wing office of Scofield & Johnson Land Surveying & Engineering. Peterson also contacted the Minnesota Office of the State Archaeologist (OSA) for information about archaeological sites in the OSA database that may not appear in SHPO records for the area.

Location

The gravel pit (Figure 1) is an approximately 35-acre parcel located on the north side of Highway 63 in Florence Township, approximately 1.5 miles west of Frontenac and 3 miles southeast of Wacouta in northeastern Goodhue County.

Legal: NE $\frac{1}{4}$ and SE $\frac{1}{4}$ of Section 8, and NW $\frac{1}{4}$ and SW $\frac{1}{4}$ of Section 9, T112N, R13W
UTM (WGS84 Zone 15 T): 548775.12 m E, 4929899.84 m N

Environmental and Cultural Setting

The property and the rest of Goodhue County are situated in the western Southeast Riverine archaeological region (Anfinson 1990; Minnesota Department of Transportation 2002). This region is dissected by streams and contains no natural lakes except those like Lake Pepin that occur in valley bottoms. Three major rivers, the Cannon, the Zumbro, and the Root, extend west into the region from the Mississippi. The area is host to extensive rock outcrops and secondary lithic deposits, some with chert nodules of high quality for stone tool manufacture. While largely covered in open prairie, in the Late Holocene the river lowlands were lined by elm, ash, and cottonwood forests, while Big Woods forests occurred in the Mississippi River uplands. Oak groves known as "oak barrens" dotted the prairie interior. Prehistoric game included deer, elk, and bison in the uplands, and mussels, fish, and waterfowl in the bottoms. Among the edible plants were water lilies and the prairie turnip, while oak woods were a rich source of acorns.

Some of the early history of the area is represented in the Trygg Map created by J. W. Trygg (1966). Trygg consulted original land surveys of the Upper Midwest from 1859 to 1894 in assembling his map, which presents traces of early Native American and pioneer sites mapped in the 19th century. The Trygg Map (sheet 7) shows that when the township was surveyed in 1855, the area was covered in prairie and bottomlands and it was crosscut by wagon trails from east to west.

File Search

SHPO site maps of Goodhue County, the SHPO database (Cinadr personal communication), and OSA database (Koenen personal communication) show the presence of a few archaeological and historic sites within a one-mile radius of the property (Figure 1). Of potential archaeological significance is the Murtinger Peat Bog (21-GDd), where deeply buried animal bone was recovered that probably dates to prehistoric times but may be non-cultural. This is .8 miles west of the gravel pit property on the south side of Highway 63. Next is a historic barn (GD-FLC-003) that was standing in 1978 about 1/8 mile from the property on the opposite side of Highway 63. The most notable site is a

group of possible plowed down burial mounds on the south side of Highway 63 about .9 miles east of the property. Although reduced in size by plowing these may still contain human remains. Finally, running east to west to the south of the property are remnants of the Mendota-Wabasha military wagon road build from 1850 to 1861.

There are several more sites beyond the one-mile radius but the most significant is another possible plowed burial mound (21-GD-0125) in the SW 1/4 of the SW 1/4 of Section 16, T112N, R13W. Although beyond the normal scope of a cultural property search such as this, it is notable as further indication of the possibility of Native American burial sites in the area.

Site Number	Location	Description
21-GDd	.8 miles from property in the NE1/4 NW1/4 SW1/4 of Section 8	Murtinger Peat Bog, where deeply buried faunal remains were recovered
GD-FLC-003	About .12 miles from the property in SW1/4 NW1/4 SW1/4 Section 8	Historic barn recorded in 1978, possibly no longer standing
GD-FLC-045	South of the property in the S 1/2 of Sections 8 and 9	Remnants of a Mendota-Wabasha military wagon road built in 1850-1861
21-GD-0123	.9 miles from the property in NW1/4 NW1/4 of Section 15	Possible plowed burial mounds
21-GD-0125	SW 1/4 SW 1/4 of Section 16	Possible plowed burial mound

Concluding Remarks

Activities carried out in the immediate area of the Doug Mahoney Gravel Pit will not impact any known historical or archaeological sites on or within a one-mile radius of the property.

There are no cultural properties recorded to date on the property. There are a few within and beyond a one-mile radius showing the archaeological and historical potential of the area. There are two areas with possible plowed Native American burial mounds. While this does not indicate a presence of burials on the gravel pit property, their proximity does suggest the possibility of burials in the area that would be protected by the Private Cemeteries Act.

If archaeological or historic properties are encountered while any undertaking is conducted, SHPO and/or OSA should be notified. Even when federal funds are not involved in an undertaking, burial sites have special protection under the Private Cemeteries Act and if encountered, the Office of the State Archaeologist (OSA) should be contacted immediately, either directly or through the SHPO.

References

- Anfinson, S. 1990 Archaeological Regions in Minnesota and the Woodland Period. In *The Woodland Tradition in the Western Great Lakes: Papers Presented to Elden Johnson*, edited by G. E. Gibbon, pp. 135-166. University of Minnesota Publications in Anthropology No. 4. Department of Anthropology, University of Minnesota, Minneapolis.
- Cinadr, T. personal communication [07/24/2017]. Email message to China Beverley.
- Koenen, B. personal communication [7/25/2017]. Email message to David Peterson.

Minnesota Department of Transportation 2002. *Mn/Model Final Report Phases 1-3*. Chapter 3: Minnesota Environment and Native American Culture History, by Guy E. Gibbon, Craig M. Johnson, and Elizabeth Hobbs. Last accessed 07/29/2017: <http://www.dot.state.mn.us/mnmodel/P3FinalReport/chapter3.html#ch343>

Trygg, J. W. 1966. *Composite Map of U.S. Land Surveyor's Office Original Plats and Field Notes*. Trygg Land Office, Ely, MN.

Figure 1. Location of the Doug Mahoney Gravel Pit, and archaeological and historical sites in the vicinity as described in the report.

