EXHIBIT A
to
Revised Final Related Actions
Environmental Impact Statement (FEIS)
for
Sand & Gravel Mining and Accessory Uses

Completeness and Preliminary Adequacy Decision

Empire Township, Board of Supervisors
Dakota County, Minnesota

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Instructions

During the review of the Comments received and preparation of the Responses, the Township, as the Responsible Governmental Unit (RGU), determined that:

1. The loss of County Road status for 170th Street in the City of Lakeville and the stated desire by City of Lakeville to apply load limit restrictions on 170th Street in its jurisdiction, created a need to remodel the Traffic Study.

2. The findings of the Groundwater Impact Study were incorporated into the Empire Township Draft EIS (March 2005) and the Final EIS (June 2005). As a result of agency comments made on the FEIS, revisions were seen as necessary to the modeling in the impact study. These revisions have been incorporated in a Revised Groundwater Impact Study.

3. Some comments received directly referenced the Mitigation Plan. In addition, the remodeling of the Transportation Plan and the Groundwater Impact Study necessitated certain changes in the Mitigation Plan.

Included in this Exhibit are:

a. All comments to the FEIS with responses
b. Web link to the revised figures from the Traffic Study
c. Web link to the revised Groundwater Impact Study
d. Web link to the revised Mitigation Plan

- Note: Comments are included as received from commentors. Responses to these comments are inserted as appropriate to address each topic area.
- Note: For reference processing purposes, each paragraph included in the comments received was identified with a number.

DAKOTA COUNTY COMMENTS:

TOPIC AREA 1 - IMPACTS ON WATER RESOURCES

1. *Section 12 – Physical Impacts on Water Resources*

2. Township Response to County Comments 16-28, Items 121-145: Groundwater Impact Study.

3. Summary of County Comments

4. Dakota County staff have reviewed the groundwater modeling effort in detail. On the whole, the effort appears to be very well done, but it also appears to contain fundamental errors that make it unreliable for the required purposes. We believe that it must be revised, for the following reasons:

5. The predicted fates of the Total Dissolved Solids (TDS) and temperature plumes are not correct - especially with respect to the Rosemount well field and in its wellhead protection area - and some of the predictions are probably not "conservative".

6. Butler pond, its surrounding fragile wetlands and other surface water bodies may be heavily impacted. The provided model is not suitable to predict whether wetlands will dry-up or drown, whether Butler pond will shrink or expand, etc.

7. Our review has relied on the DEIS and FEIS documentation, references cited therein, other studies, and original documents. Based on the material available to us, we believe that the model results may be substantially incorrect in estimating groundwater exchanges with surface water, and in computing groundwater transport times and concentrations.

8. Our two overarching concerns with the model are:

9. 1. We believe that the boundary and initial conditions used in the prediction scenarios for flux and transport are incorrect, and

10. 2. We believe that the inverse modeling tool, MODAC, has been used beyond its ability and that the resulting model is incorrect.

Township Response (comment nos. 1-10):

A number of actions have been taken to address these comments. First, the Townships consultants contacted the County to obtain a better understanding of the County's concerns. Based on these discussions between the Township and the County, a number of modifications to the model have been made to alleviate concerns regarding the representativeness and predicative capability of the groundwater model developed for the Groundwater Impact Study. The changes to the model suggested by the County had an effect on all aspects of the model results. Therefore, the original Groundwater Impact Study has been revised to reflect these changes. This new document will be referred to herein as the Revised Groundwater Impact Study.

County comments and specific revisions to the original model are addressed in responses to Comments 2 through 60. To properly address the technical aspects of the County comments, responses provided are also in the same level of technical detail.

Modeling Methodology

11. The specific points are discussed below; by necessity, some of them are quite technical.

12. *Comment 18, Response 125. Modeling Methodology*

13. County (Comment):

14. This modeling effort is built on the use of MODAC as an inverse modeling tool. MODAC is an implementation for MODFLOW of the Hydraulic Gradient Comparison Method, which is published in a peer-reviewed journal (Guo & Zhang, Ground Water 38, no. 6: 815-826, 2000; see References note). MODAC was written by the authors of the article.

15. The concept used by MODAC is to find a hydraulic conductivity field that lets a groundwater model reproduce a target piezometric surface. This is a valid modeling technique, and we do not contest that MODAC is an "industry accepted" tool, as stated in the FEIS. However, like any other scientific modeling tool, it has intrinsic limitations. Most importantly, given an incorrect target piezometric surface, or incorrect model parameters, the model will find an incorrect hydraulic conductivity field. In that case, although the final model may fit the calibration data perfectly, it will contain incorrect parameters and cannot be used for predictions.

16. For this reason, Guo & Zhang state on page 821:

17. "For real world problems, there are always uncertainties associated with data and the hydrogeologic conceptual model. Thus, the results achieved using the proposed method are limited by the quality of the conceptual model on which it is based. A general procedure for applying the proposed method to real-world problems should be followed to ensure the method is not misused." (emphasis ours)

18. "The general procedure of using the hydraulic gradient comparison method on field problems requires rigorous conceptual model development, use of a global calibration target, and an iterative calibration process. The conceptual model development includes interpretation of ground water potentiometric surface, development of zones of hydraulic conductivity constraints, and estimation of sink and source conditions, boundary conditions, and other hydrologic parameters." (emphasis ours)

19. Dakota County staff believe that the groundwater model in the FEIS is based on an incorrect conceptual model, and that inadequate constraints were used on the hydraulic conductivity zones.

20. The authors of MODAC stress that, for the method to work, the target water table contours must be correct. They state in the Groundwater article on page 822, paragraph 2:

21. "For the sites in which measured hydraulic heads are limited, interpretation of the potentiometric surface may be based on measured data and supported by other hydrogeologic information. In these cases, the confidence level of an interpreted potentiometric surface is low. Parameter estimation may be used either to provide a general understanding of the site hydraulic conductivity or as a tool to match the observed hydraulic head at measured points as works in conventional model calibration methods." (emphasis ours)

22. We read this to mean that, under these conditions, it is not advisable to use MODAC to fit a continuous hydraulic conductivity field. The potentiometric surfaces used in this FEIS all have this problem to some extent. The surface used as a fitting target in the Quaternary aquifer has critical local highs that are speculative, rather than measured (FEIS paragraph 129). The surfaces used in the lower aquifer layers are based on data (FEIS Figure 4) that is sparse, relative to the detail of the fitted hydraulic conductivity field (FEIS Figure 7).

23. We believe that, considering the lack of confidence in the target potentiometric surfaces, the variations in hydraulic conductivities reported in figures 6 and 7 occur at local scales that exceed the capabilities of the technique. We point out that local highs and lows tend to occur in specific areas of

interest (such as Butler pond, the Vermillion river and its tributaries). This adds uncertainty precisely at the locations that are the most sensitive. Although some specific values and some average values may be argued as being valid, we contend that the inverse model properly justifies neither their fine variation nor their final values.

24. In addition, FEIS section 2.2.2 (page 2-4) states that the ratio of vertical to horizontal hydraulic conductivity is assumed to be constant over each layer. This is justified based on a small sampling of measurements that appear to show differences in vertical hydraulic conductivity. The result is that the vertical anisotropies vary by the same amount as the horizontal, following figures 6 and 7. This seems to be an inference that is not supported by the available data. In our opinion, it is more reasonable to assume zones of constant vertical hydraulic conductivity, based on the geologic information (such as the presence or absence of clay and basal St. Peter).

Township Response (comment nos. 12-24):

The County raised concerns regarding the applicability of MODAC to calibrate the groundwater model developed for the site. While the concerns and unknowns stated above are acknowledged, we believe the calibration code was utilized sufficiently given the modeling objectives. This was confirmed by one of the primary authors of the code, who is employed by the Township's contractor and provided technical review of the model and supporting document. However, to satisfy the additional concerns of the County, a conventional calibration approach, such as "trial and error calibration", was applied to the revised study.

It was conveyed by the County that it would be more confident in a "parsimonious model that barely meets the criteria for good fit rather than a highly detailed model that meets the criteria excellently". Particularly in the case of Layers 2 and 3 of the model, the use of a uniform value of hydraulic conductivity for each layer was requested. As such, the distribution and variation in hydraulic conductivity in the revised model is simplified, and variations in hydraulic conductivity adhere primarily to the distribution of geologic units.

Major hydraulic conductivity zones in Layer 1 are delineated based on the material present in the Quaternary aquifer (i.e. alluvium, glacial till, etc) and whether the St. Peter Sandstone is present. These areas are delineated as:

- Floodplain alluvium and Des Moines outwash along the river channels
- Superior Outwash and St. Peter Sandstone
- Superior outwash with none or little St. Peter Sandstone present (northeast of proposed mining area)
- Northeast corner of model domain where Mississippi River floodplain alluvium is likely to be prevalent.
- "Old Gray" Till and St. Peter Sandstone

The calibrated values of hydraulic conductivity for these zones are depicted in **Figure 7R** in the Revised Groundwater Impact Study.

The County was concerned that the lower values used in the original model (~ 0.1 ft/day) may not provide a conservative estimate. Therefore, values in the revised model range from 10 ft/day to 110 ft/day in Layer 1, values of 30 ft/day in Layer 2, and values of 40 ft/day in Layer 3. These are comparable to values used in past modeling efforts (e.g. Barr Engineering, 1999) that were accepted by the County, and are in agreement with mean values from aquifer tests conducted in Apple Valley, northwest of the proposed mining area.

The County suggested that a uniform value of vertical hydraulic conductivity should be assigned to the model, as opposed to using a ratio of horizontal and vertical hydraulic conductivity. However, this approach was not taken, as it may present an unrealistic scenario of downward leakage into the lower aquifers. For example, if a uniform value of vertical hydraulic conductivity is assigned, 10 ft/day would yield a ratio of approximately 10:1 if the horizontal conductivity is 94 ft/day (upper end of permeability range for St. Peter Sandstone). However, if the horizontal hydraulic conductivity is assigned to be 1 ft/day (near the lower end of the permeability range for the St. Peter Sandstone), this yields an anisotropy ratio of 1:10, which is extremely unrealistic for this formation and is not consistent with field data (Schoenberg, 1994). Using an assumed ratio, as done in the original model, is consistent with available field data as well as typical ratios observed in scientific literature.

Groundwater Mounds

25. *Comment 20, Response 129. Inferred groundwater mounds.*

26. County (Comment):

27. We questioned the way that local groundwater mounds were inferred from topography and incorporated into the model. We remain concerned about these inferences, because they are based on the very generic statement in Freeze and Cherry (1979) that the water table should reflect the surface topography. We believe that this does not meet the criteria for data reliability that is required for MODAC. They appear to have a large influence on the model results.

Township Response (comment nos. 25-27):

After discussing these comments with representatives of the County, it was generally agreed that while the interpreted groundwater mounds likely exist, they may not be sufficiently connected to the primary groundwater system and may represent "perched" conditions. The County suggested a method of conceptualizing these mounds, and this recommendation was employed in the revised model. An illustration of this conceptualization was added as **Figure 18R** to the Revised Groundwater Impact Study.

The following is a description of the County's modeling recommendation. This was added to **Section 2.1.1** of the Revised Groundwater Impact Study:

> *"The groundwater mounds are interpreted to occur in a fictional model layer 0, which interacts with actual model layer 1 in a manner like rainfall infiltration (see **Figure 18R**). Water from layer 0 might*

cascade down at the edge of the Glenwood Formation, but the correct amount and location of water entering the top of layer 1 can probably be modeled adequately by using typical values of infiltration as if the Platteville-Glenwood is not there. Head values measured in or above the Platteville would not be part of the calibration target. Hydraulic conductivity values in model layer 1 below the Glenwood would reflect the full thickness of the St. Peter, and be on the upper end of reported values, rather than the lower end."

Modeling Details

28. *Comment 21, Response 131. Hydraulic conductivity in model layer 1*.

29. County (Comment):

30. The model predicts a hydraulic conductivity of less than 0.1 foot/day in Layer 1 near the southeast corner of section 8. The Geologic Atlas shows that the full thickness of the St. Peter Sandstone, and some of the Platteville Limestone are present here. The value here should be much closer to a value typical for the St. Peter (up to 94 feet/day). This is a striking difference, and indicates either that grouping the St. Peter with the Quaternary in model layer 1 is inappropriate, or that the target piezometric surface should be measured in the dominant aquifer layer in this area (i.e. in the St. Peter, and not in the surficial clay).

Township Response (comment nos. 28-30):

Hydraulic conductivity values for the area in question have been revised to reflect a value that the County suggested was more representative of the St. Peter Sandstone. A value of 10 ft/day was used for these areas in the revised model. This value is approximately two orders of magnitude greater than the value used in the original model. It is also twice the permeability value (5 ft/day) that was considered acceptable to the County for evaluating impacts to Butler Pond and the surrounding vicinity. While it does represent the lower to mid-range of permeability for the St. Peter Sandstone (values range from 0.3 to 94 ft/day), it is a realistic value as these areas roughly correspond with locations of bedrock highs (Bloomberg et al, 1990) and generally correspond to outcrops of Old Grey Till (Hobbs et al., 1990). These bedrock highs suggest areas that are more resistant to, or have been subjected to less glacial scouring and erosion as other parts of the region (Bloomgren et al., 1990). Therefore, it is reasonable to assume that the competency of these rocks is greater and should exhibit lower permeability compared to other rocks more weathered by the glacial action.

While the response to Comment 27 above indicates that grouping of the Quaternary units and St. Peter Sandstone into the same model layer may be inappropriate, subsequent discussions with the County indicated that they are amenable to that modeling approach. However, the County suggested the permeability of the model layer is best represented as a value more indicative of the St. Peter Sandstone as opposed to the combined effect of the Sandstone and overlying glacial till. Schoenberg (1994) notes that the range of hydraulic conductivity for the St. Peter Sandstone is 0.3 to 94 ft/day, with values primarily between 1 and 20 ft/day. A value

of 35 ft/day was used primarily throughout the revised model domain with the exception of the local topographic highs, which were assigned as 10 ft/day as previously described.

31. *Comment 22, Response 133 - Comment 23, Response 135 - Comment 28, Response 145. Hydraulic conductivity of bedrock units in model layers 2 and 3.*

32. County (Comment):

33. We strongly disagree that fitted values for hydraulic conductivity of less than 0.1 foot/day can be justified in either model layer 2 or 3, corresponding to the Prairie-du-Chien Limestone and the Jordan Sandstone aquifers.

34. The Township's response states that the hydraulic conductivity could be much less developed where the Old Gray Till is present, and where it is located away from the bedrock valleys. The Old Gray Till has probably been present for less than a hundred thousand years, while the Prairie-du-Chien Limestone is hundreds of millions of years old, and has lain exposed for tens of millions of years. Minnesota Geological Survey publication RI-61 (see References note) reports that the minimum value of hydraulic conductivities in the Prairie-du-Chien Aquifer is about 5 feet/day; and that they do not vary much across southeastern Minnesota, under varying covers - except for right along the edges of bedrock valleys. The study area is not adjacent to a buried bedrock valley.

35. Dakota County staff analyzed data taken from drawdowns that were reported in construction records for five irrigation wells completed in the Prairie-du-Chien Aquifer in and near Empire Township. The data show hydraulic conductivities that range from 2.3 to 128 feet/day; with the high variability due primarily to the low quality of the original data.

36. The Township's response states that the hydraulic conductivity measured by the Rosemount well field aquifer test may be biased to the high side because the wells were sited where the yield would be highest. We disagree. Municipal well aquifer tests in the Jordan Sandstone have been performed on the municipal well fields belonging to Empire, in March of 2001, Apple Valley in 2001, and Rosemount. The computed hydraulic conductivities for these tests are 40, 77, and 30.5 feet/day, respectively. The hydraulic conductivity at Rosemount appears biased slightly on the low side, rather than on the high side.

37. We believe it is not appropriate to fit varying hydraulic conductivities in layers 2 and 3 using inverse modeling because of the paucity of calibration data specific to these layers and the high probability that they are relatively uniform. The regional norms or locally measured aquifer test values should be used. The fact that the fitted values in Figure 7 of the DEIS show such a great variation implies that other parts of the model are wrong. The fitted values are up to 2 orders of magnitude lower than regional norms. This raises a concern that the model's fluxes and transport computations may be similarly incorrect, as discussed below in comment 28.

Township Response (comment nos. 31-37):

As indicated in response to Comment 30, the hydraulic conductivity values in the model have been revised. Per the request of the County, uniform values of hydraulic conductivity were used for Layer 2 (Prairie du Chien) and Layer 3 (Jordan). Hydraulic conductivity values of 30 ft/day and 40 ft/day were used for the Prairie du Chien and Jordan aquifers, respectively. These values are comparable to values used in past regional modeling efforts for the area (e.g. Barr Engineering, 1999) and

in the case of the Jordan Sandstone, represent the approximate geometric mean for the hydraulic conductivities calculated from aquifer tests conducted at Apple Valley.

Note that since a uniform value of hydraulic conductivity was utilized for Layers 2 and 3 of the model, no figures were deemed necessary to represent these layers. To maintain continuity in the numbering used in the original Groundwater Impact Study, Figure 8 has been removed with no replacement.

While not addressed specifically in the County's written comment, discussions with the County also resulted in the modification of porosities in Layers 2 and 3 of the model for transport simulations. The original porosity values of 0.2 and 0.3 for the Prairie du Chien (Layer 2) and Jordan (Layer 3) aquifers were changed to 0.09 and 0.21, respectively, for the revised model based on recommendations by the Minnesota Department of Health. Porosity in Layer 1 of the model remained unchanged with a value of 0.3.

38. *Comment 16, Response 121; Comment 19, Response 127. Model calibration*.

39. County Response:

40. We asked for additional information about how well the model fitted the observed data. The information provided in the revised Figure 5 and Figure 5B contains inconsistencies, which indicate that the data is reported incorrectly:

41. a. The number of points in Layer 1 reported in the graph (32) is higher than on the map (28).

42. b. The number of points in the Prairie-du-Chien aquifer that are plotted on the graph is 18; the number reported in the FEIS is 17.

43. c. Several of the reported residuals at the measurement points do not correspond when they are compared to the predicted vs. interpreted heads in Layer 1. For example, the error reported at the DNR well in the Northwest corner of the proposed mining area is inconsistent with the nearby contours of interpreted and calibrated heads: it should be negative.

44. d. Similarly, the magnitude of the error reported at a well in the Southwest section of the proposed mining area (and shown on Figure 5) is inconsistent with the piezometric head contours that were provided. The well is much closer to the 910 foot contours than the 920 foot contours for both the interpreted and simulated heads. Therefore, both of these heads at the well should be within 911 feet and 915 feet, which is a maximum absolute difference of 4 feet. The reported value of -8.91 (almost a 9-foot absolute error) is far out of that range. If this value is correctly reported, then we question whether the interpreted surface actually meets the observed values at these points, as the above mentioned publication requires for MODAC.

45. Perhaps comment 19 was not explicit enough, but we request the missing calibration results for layers 2 and 3, as they were not displayed on Figure 5. We need the error values and the simulated contours in those layers.

46. We are concerned about the spatial distribution of errors. The fact that there appear to be trends in the error is an indication that the model is incorrect.

Township Response (comment nos. 38-46):

As the model was recalibrated, new figures have been generated to represent the new data. Appropriate QA/QC procedures were conducted to prevent any inconsistencies in data reporting.

Simulated head contours for Layers 2 and 3 are presented in the Revised Groundwater Impact Study in **Figure 5R**. This figure also includes the appropriate model residuals for observations (where available *and* reliable) posted at the well locations.

The revised calibrated model does not exhibit an inordinate amount of spatial trends in the model residuals. While some "clustering" of residuals may be evident in this calibrated model, this is likely due to the "parsimonious" model, requested by the County, with a hydraulic conductivity distribution with limited variation (i.e. large K zones). This may be remedied by additional refinement of the hydraulic conductivity distribution, but this was not considered necessary as the model satisfies calibration criteria (RMSE/Head less than 0.1) and further refinement would not significantly impact the predictive model results.

47. *Comment 23, Response 135. Sensitivity analysis.*

48. County Response:

49. The Township's response points out that the model is most sensitive to infiltration rates from rainfall. We suggest that this response should be followed by an explanation of why the model was not calibrated against this most sensitive parameter.

50. Indeed, according to Guo & Zhang (2000), p824, Fig. C-3, model calibration with MODAC is iterative: recharge intensity and distribution are to be calibrated separately from the hydraulic conductivity. In the DEIS, we found no reporting of a calibration against the recharge intensity. This would be acceptable, had the model been insensitive to that parameter. Given the assertion of comment 23, we believe this absence should be either remedied or defended.

Township Response (comment nos. 47-50):

Lack of detailed data in this area limits the ability to calibrate recharge and hydraulic conductivity simultaneously. With lack of sufficient and reliable data, these parameters are subject to "parameter correlation" as outlined by Hill (1998) and Poeter and Hill (1997). Therefore, the upper range of recharge (4.5 in/yr, with 9 in/yr assigned to the floodplains) was assigned to facilitate larger calibrated hydraulic conductivities throughout the model domain, which leads to a more conservative estimate for the contaminant transport simulations.

In the Revised Groundwater Impact Study, the following sentence was added to the end of the 2nd paragraph in Section 2.4, Sensitivity Analysis:

"However, this value was not varied from the assigned value in the model, as the recharge rates assigned in Section 2.1.3 represent the potential maximum amount of

recharge to the groundwater system and add to the conservatism of the model in regards to contaminant transport simulations carried out in Section 4."

Note that subsequent discussions with the County indicated that the recharge values used in the model are reasonable.

51. *Comment 27, Response 143. Boundary conditions on flux and transport modeling.*

52. County Comment:

53. We wanted to know the contaminant flux boundary conditions at the ponds. The Township's response states that those conditions are irrelevant, because the ponds act primarily as sinks. However, the DEIS (Section 4.2, page 4-3) states that ponds 2, 3, 4, 5 and 11 cause a slight rise in the surrounding groundwater levels, which means they recharge the aquifer. We do not understand exactly what the figures and documentation indicate is happening at the ponds, and we request a more complete explanation. The meaning of the illustrations (DEIS Figures 13 and 14) are no longer clear to us. Perhaps each pond could have a summary that describes its boundary conditions for flow, boundary and initial conditions for transport, and predicted and simulated fluxes and concentrations. Some cross sections with fluxes and concentrations illustrated and quantified would help us better understand the information.

54. We are concerned that the General Head Boundary (GHB) condition may have been misapplied on the ponds in the End Use scenario. The Township's response states that the heads in the ponds are given by the mining plan. A pond modeled with the GHB boundary will add or remove water from the model as needed, to meet the boundary condition. The model fitting process must verify that the amount of water added or removed by the pond meets specified expectations for mass balance, such as recharge, evaporation, or discharge to streams. When prediction scenarios are run, the specified head in the GHB ponds must be fitted iteratively until the net flux again meets the given mass balance expectations; heads specified in the mining plans can not be used "as is".

55. The Township's response states that the flux out of Pond 1 is "less than 5 percent of the overall water budget". If that means that 95 percent of the groundwater entering Pond 1 evaporates, then we would like to know if the 5 percent that infiltrates would have a 20-times higher concentration of TDS. We remain uncertain about exactly what is predicted at Pond 1 and the reasons why. Pond 1 is in the Rosemount Wellhead Protection Area, and we want to correctly understand how it will function.

56. The DEIS proposes an analogy between the groundwater ponds and Shanahan Pond, but it seems to actually address the stormwater ponds. It should be clarified, and justified.

Township Response (comment nos. 51-56):

The end-use ponds were modeled as groundwater fed surface water bodies and in turn, act as a source and sink for the groundwater system. Groundwater enters the ponds from the upgradient side of the pond, for the most part from the south-southwest. While in the pond, the water is then affected by meteoric processes such as possible increased TDS concentration due to evaporation and increased overall temperature due to heating by ambient temperatures. This water then re-enters the groundwater system on the downgradient side of the pond, to the north-northeast. The General Head Boundary (GHB) package of MODFLOW facilitates the mathematical representation of this model boundary condition. A TDS concentration

and temperature is assigned to the GHB as a source term. Therefore, all water that is added to the system via the end-use ponds represents affected mine water.

The elevation of water in the ponds should be approximately that of the groundwater elevation prior to excavation of the pond. Expected elevations of the ponds denoted in **Figure 13R** are based on the potentiometric surface map depicted in **Figure 4R**. However, these values represent elevations expected to occur in the field. As expected, simulated heads in the proposed mining area of the calibrated model may differ from actual, in some cases by a few feet. Elevations assigned to the boundary conditions representing the end-use ponds were adjusted to account for the differences in model-simulated and actual heads expected as indicated in **Figure 13R**.

The surface water ponds constructed around the end-use ponds are intended to act as surface water diversion structures and prevent runoff from entering the larger ponds. Thus, the only source of water to the ponds is groundwater discharge and direct precipitation into the pond itself. Precipitation in the metro area ranges from 26 to 32 inches and evapotranspiration is on average 23 inches (Allmendinger and Mitton, 1995). This suggests that during dry years, precipitation and evaporation to the ponds will essentially be balanced (i.e. minimum precipitation and maximum evaporation). But, during wet years, when precipitation is at a maximum and evaporation is at a minimum, this could be an increase of water to the ponds of just less than one foot. To maintain conservatism in the study, two feet were added to the water elevation in the ponds to facilitate increased leakage of “affected” water to the groundwater system. It should be noted, that this may be overly conservative as this is representing “wet” conditions, whereas the simulated flow to surface water features (i.e. rivers, wetlands) in the model are intended to represent dry or low flow conditions. Therefore, evaluation of results should take this into account.

By assigning a head value, the boundary condition will add or remove water as necessary to the model domain to satisfy the imposed constraints. The County suggests iteratively adjusting the head value in the pond until a balance in accord with a water budget for each pond is achieved. Assigning a head value in the ponds above the water table ensures continued leakage of the end-use pond water into the groundwater system. This approach was taken because it will likely add more than actual affected water to the system, adding even more conservatism to the model prediction for hydraulic impacts and contaminant migration.

Note that while the surface water ponds/swales may allow infiltration of moderate amounts of surface water, it is anticipated that this water may not have enough residence time to experience significant increases in temperature or TDS prior to infiltration. Thus, these surface water bodies are modeled solely as a hydraulic source to the groundwater system but with no appreciable amount of temperature or TDS added to the system.

As noted in Comment 55, the County indicated that Pond 1 may not have been adequately represented in previous simulations. The revised model shows significant leakage from this pond to evaluate potential impacts to the groundwater system.

The simulated distribution of temperature and TDS in Layer 1 of the revised model is relatively similar to previous simulations. However, it should be noted that the distribution of the plumes to the northeast of the proposed mining area is less than previously simulated. This is due to the revised hydraulic conductivity distribution, which adheres to the geology more closely. In the northeast, there is likely a permeability decrease in this area of Layer 1 as there is no St. Peter Sandstone present along the northeast boundary of the mining area. A slight reduction in permeability is consistent with previous modeling efforts conducted in the area (see Barr Engineering, 1999; Metro Model). However, it should be noted that revised simulations indicate a larger distribution of higher temperature and higher TDS water within the proposed mining area than originally simulated. The revised model with greater hydraulic conductivity in Layers 2 and 3 of the model indicates downward leakage of mining affected water. The distribution of TDS and elevated temperature in the Jordan Sandstone (Layer 3) is depicted in the newly added **Figure 19R.**

In the Groundwater Impact Study, Shanahan Pond is referred to as a stormwater pond. However, it is not interpreted to function in a similar manner as the stormwater ponds described here. It is interpreted to be fed, at least in part, by groundwater. Thus, Shanahan Pond should prove as an adequate analogue as to how the end-use ponds will react to temperature increases and TDS increases attributed to evapo-concentration. Temperature changes observed at Shanahan Pond appear to represent that of local surface waters such as the Vermillion River. However, average TDS based on specific conductance data indicates that the average TDS of Shanahan Pond is 80 mg/L. This is more than five times lower than average TDS in groundwater and local surface water. Thus, the pond is likely being recycled with fresh stormwater and has limited time to be affected by evapo-concentration effects. To maintain conservatism in this analysis, a TDS concentration of 1,000 mg/L was assigned to represent pond water heavily impacted by evapo-concentration. Note that the TDS concentration of the ponds (~1,000 mg/L) is more than ten times the summer TDS of the analogue pond (80 mg/L) and twice the ambient groundwater TDS (~500 mg/L).

A new table summarizing the parameters of the ponds was not added to the Revised Groundwater Impact Study, as this information is already presented in **Figure 13R** and described in Section 4.2. However, additional text has been added to the Revised Groundwater Impact Study to help alleviate any confusion regarding the conceptual representation of the end-use ponds.

57. *Comment 28, Response 145. Infiltration and flux underestimated*.

58. County Comment:

59. We expressed concern that the entire flow system is simulated as slower than actual, because the model fitted parameters of hydraulic conductivity and infiltration are both low compared to typical values. We understand the concerns raised in the response: that knowledge of the correct infiltration rate is lacking, and the prior existing models differ considerably. We also understand that for some of the predictive purposes, an underestimate may be “conservative”.

60. We remain concerned however, because an underestimate may not be conservative for other predictive purposes, such as transport; and especially for wellhead protection. Based on the considerable effort that was expended in the DEIS to justify very low hydraulic conductivity rates, it appears that the possibility of higher infiltration rates was not sufficiently tested in the model fitting process. The actual infiltration rates that were used should be illustrated on a map, so that they can be known; descriptions limited to 'average' rates are not sufficient.

Township Response (comment nos. 57-60):

As indicated in response to Comment 30, the flow model was revised with hydraulic conductivity values suggested by the County. However, recharge/infiltration rates in the original model, in addition to the newly revised model, are not "low" as claimed in the above comment. Recharge/infiltration rates were assigned as 4 in/yr in the majority of the model domain with rates of 9 in/yr in the floodplain and represent the upper limit of recharge rates reported in previous studies (see **Section 3.3.1** of the Impact Study). Note that recharge values used in past models (e.g. Barr Engineering, 1999) are as high as 27 in/yr in our study area. This is unrealistic, as they represent a value that is 85 to 100 percent the average precipitation rate

Discussions with the County have deemed the range of recharge/infiltration utilized in the model is adequate to assess impacts to the groundwater system.

A new figure (**Figure 17R**) illustrating the recharge distribution to the model has been added for clarification.

Revisions to the original model, as suggested by the County, are summarized in the following table.

The revised model, as a whole, reaches relatively similar conclusions to the original model in regard to hydraulic impacts on the surface water features (i.e. rivers and wetlands). This is primarily because the hydraulic conductivity beneath these features in both the previous model and the revised model are relatively similar. The areas in question denoted by the County have been revised, but show little change to the predicted hydraulic impacts. However, the revisions to Layers 2 and 3 of the model show an increase in downward migration in the affected groundwater (see also Response to Comment 129).

Revisions to the Original Water Model

Model Layer	Values in Original Model	Observed Values (Schoenberg, 1994)	Values Suggested by the County	Values Utilized in Revised Model	Comment
Layer 1: Glacial Till/ Alluvium and St. Peter Sandstone	0.1 to 123 ft/day	Glacial Till: $4x10^{-5}$ to 26 Alluvium: 8 to 61 St. Peter: 0.3 to 94 ft/day	5 to 100 ft/day	10 to 110 ft/day	The St. Peter Sandstone is relatively discontinuous and is not present everywhere within the Study Area. Where present, Model Layer 1 represents the combined effects of both the glacial till/alluvium and the St. Peter Sandstone. Where it is absent,

					Layer 1 represents the glacial till/alluvium only.
Layer 2: Prairie du Chien	0.1 to 15 ft/day	50	No absolute value suggested; however values were inferred by referencing aquifer test results yielding 30 to 77 ft/day	30 ft/day	Note: the observed value is one isolated value. Values are likely representative of a range of values relatively similar to the Jordan Sandstone. However, this range of values is not representative of areas of relict bedrock highs near rivers (e.g. Vermillion) that may be closer to 5 ft/day. Revised model value is consistent with past modeling efforts (Barr Engineering, 1999) approved by the County.
Layer 3: Jordan Sandstone	0.1 to 15 ft/day	19 to 107	As above for Layer 2	40 ft/day	Revised model value is consistent with past modeling efforts (Barr Engineering, 1999) approved by the County.

References:

"Hydraulic Gradient Comparison Method to Estimate Aquifer Hydraulic Parameters Under Steady State Conditions." X. Guo, C.-M. Zhang, Groundwater Vol. 38 No.6. Nov-Dec 2000. pp 815-826.

"Minnesota Geologic Survey publication RI-61. Hydrogeology of the Paleozoic bedrock in Southeastern Minnesota." A.C. Runkel, R.G. Tipping, E.C. Alexander, Jr., J.A. Green, J.H. Mossler, and S.C. Alexander. 2003.

TOPIC AREA 2 – TRAFFIC

[SIC – Adjustment made in comment numbering]

64. Section 21 -- Traffic

65. *Township Response – Comment 33: Traffic Mitigation/Improvement Plan*

66.

67. "The Township acknowledges Dakota County's concerns regarding roadway improvements needed to accommodate the planned developments that are not programmed or funded. …This traffic study modeled the combined traffic impacts of the planned developments with the road network proposed in the Dakota County Transportation Plan. This effort modeled the reasonableness of the planned road improvements. Dakota County should take measures to incorporate roadway improvements into their Capital Improvement Program, and take measures to promote roadway improvements and funding sources needed to accommodate regional growth. This traffic study identified impacts that could be caused by this mining effort and mitigation solutions to those impacts." (emphasis added)

68. County *Response:*

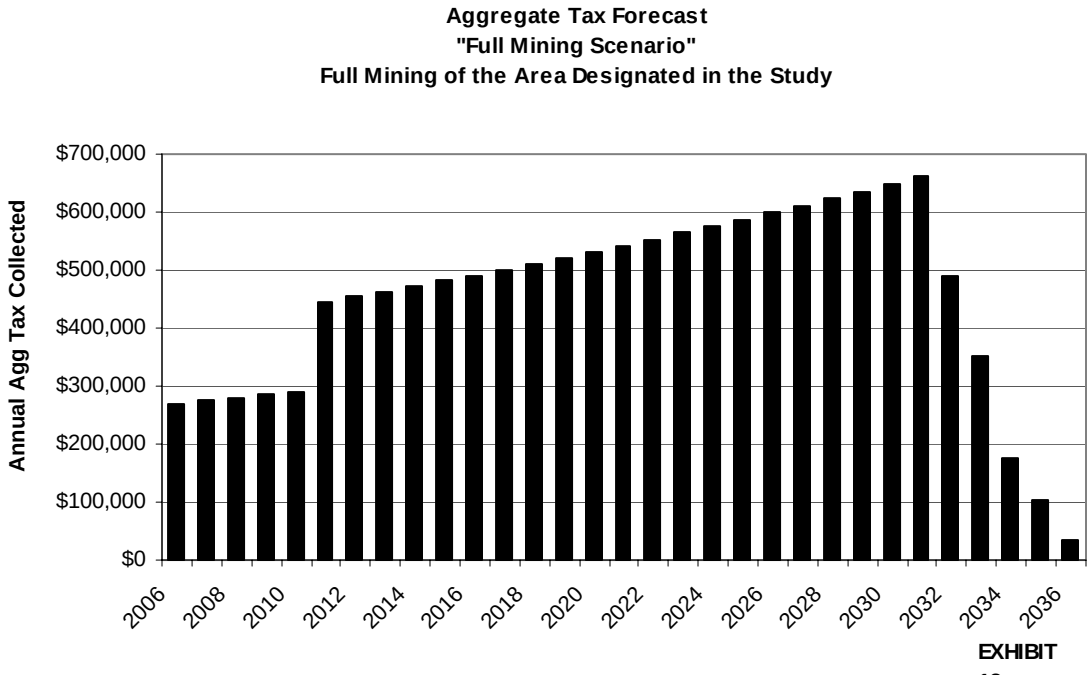
69. The Dakota County 2025 Transportation Plan shows the County's highway system needs. The Plan also identifies a $400 million shortfall, or $20 million per year, to meet expansion needs - such as

expansion of CSAH 31 and CSAH 46 to six-lane facilities. Based on assumed revenues, these expansions are not envisioned in the 20-year plan period. The County does not have the resources to meet the demand associated with anticipated growth. Without additional highway revenues available to the County, the additional traffic and concentrated truck traffic from the proposed development will further degrade mobility on the County highway system.

Township Response (comment nos. 64-69):

The Township understands that roadway improvements and funding are far behind roadway improvement needs and traffic demands. This deficit is a regional issue, and the Township welcomes the opportunity to work with the cities of Apple Valley, Rosemount, Lakeville and Farmington, along with Empire Township, Mn/DOT and the County to address this issue.

It is estimated that the gravel tax generated from mining within Empire over the anticipated period will net at least $14,000,000 in today's dollars. It is hoped that all of this tax revenue will be used to mitigate transportation improvements required in part by ongoing mining traffic. The following projection illustrates the potential receipts.



70. Please refer also to our response to Comment #180, regarding Roadway Improvement Needs.

71. Township Response -- Comment #180: *2025 Dakota County Transportation Plan* and

72. "Development Driven Investments".

73. "The comment regarding roadway structure to support trucks is well taken. It is noted, however, that the significant roadway deficiencies are due to accommodated regional growth and are capacity related. The contribution portion of the demand associated with the proposed mining activity is

small. While it is recognized that the mining activity will add truck trips to the regional roadway system, these roadways are designed to accommodate legal loads.

74. The larger issue of transportation costs and revenues seems beyond this EIS and related activity.

Township Response (comment nos. 70-74):

Comment noted.

75. Dakota County currently collects gravel tax for this material transported on the roadway system that is in addition to normal road-user revenues. Therefore, mine operators are or will be paying /mitigating for the additional wear on road surfaces that may be caused by a legal truckload.

Township Response (comment nos. 75

The mine operators are currently paying fees for road wear/maintenance and these fees may increase as a result of the future mining plan.

76. It is noted that mining activity currently exists and operates on many of the roadways included in this study. This project is a continuation and replacement of existing truck activity in Apple Valley, Lakeville, and northern Empire Township. Truck activity that already exists on the roadway system. Additionally, recent classification studies on several road locations indicated that these roadways are already carrying higher than average truck percentages, compared with typical roads in Minnesota."

77. County *Response* - Truck Traffic.

78. Dakota County currently invests over $3 million per year in pavement preservation. Gravel tax revenues account for about $200,000 of this investment. A single semi-trailer-type truck creates the structural impact of over 1,600 vehicles.

Township Response (comment nos. 76-78):

The long term contribution to the deterioration of pavements by heavy trucks and the failure of the gravel tax mechanism to adequately fund the necessary pavement preservation programs is acknowledged. However, these issues appear beyond the scope of this EIS and Mitigation Plan.

The Township does and will support the County in efforts to define a more equitable and appropriate approach to funding the needed maintenance whether it is at the county, regional or state level.

79. The concentration of trucks associated with existing traffic and this development will diminish pavement structural capacity at a much faster rate than limited county transportation revenues (including current gravel taxes). Without additional sources of revenue, the County may need to rely on posting load limits to extend the structural integrity of the road to a reasonable service life.

Township Response (comment no. 79)

The Township recognizes the County's need to protect its infrastructure. If a load limit posting is imposed, the Township would work with the County to consider alternative access opportunities, or cooperation to determine alternative means to fund roadway improvements to maintain reasonable access.

Roadway Improvement Needs

80. County *Response* - Roadway Improvement Needs.

81. County staff continue to be concerned about the fact that development-driven roadway improvement needs in this area of the County exceed the needs identified in the County's current five-year Capital Improvement Plan (CIP). This is an unresolved issue that County staff suggest should be acknowledged by the Township and in the FEIS.

Township Response (comment nos. 80-81):

The Township understands that development driven roadway improvements in this area of the county exceed the planned improvements. It will be incumbent on the cities of Apple Valley, Rosemount, Lakeville and Farmington, along with Empire Township, Mn/DOT and the County to address this important issue on a regional basis.

82. County staff also recommend that the proposed mining activity and corresponding need for roadway system improvements should be addressed through a collaborative effort between Empire Township, the neighboring cities, Dakota County and the Minnesota Department of Transportation (MnDOT). The proposals and assumptions in the FEIS for system improvement needs in that part of Dakota County will not happen unless all the agencies come together to discuss the idea of a major change in needs and highway function for that part of Dakota County. The issue of regional need versus development-driven plans will be key to the discussion.

Township Response (comment no. 82)

The Township agrees. See response to Comment 81.

83. Following are some relevant points from the County's 2020 Transportation Plan:

84. • Dakota County will consider lane additions or highway corridor expansions based on anticipated levels of service of "D" or worse.

85. • The anticipated traffic volume to highway capacity ratio is based on the County Travel Demand Model that determines traffic volume resulting from anticipated land use development.

86. • The need for expansion improvements will be evaluated as a highway approaches 75 percent of its capacity in traffic volume. Expansion needs cannot be addressed directly to site-specific development in place of the overall transportation system needs.

87. • The County will not participate in expansion of highway segments that are not identified as having capacity deficiencies by 2025, but may permit local funding for these improvements if expansion needs are anticipated beyond 2025.

88. • Policy F.11, Cost Participation for Expansion. Participation in expansion projects during the plan period is limited to those segments that are identified as having capacity deficiencies by year 2025. Those projects driven by preservation or replacement projects will use 20-year forecast to determine appropriate design standards.

89. Dakota County staff are willing to work with Empire Township and other interested parties to discuss how we might address the roadway system issues noted above.

Township Response (comment nos. 83-89):

Comments noted.

90. County Comment - *TH 3 Corridor.*

91. TH 3 is classified by Mn/DOT as a "Preservation" highway, which means the existing two-lane roadway will be maintained as needed, but there are no plans or funding to add lane capacity.

Comment noted.

92. The County's 2025 Transportation Plan calls for:

93. • a north-south principal arterial study in the TH 3 corridor area extending north-south from I-494 to CSAH 42 and east-west between CSAH 31/33 and CSAH 73; and

94. • collaborating with Mn/DOT to study the needs of the TH 3 corridor between the cities of Inver Grove Heights and Farmington.

Township Response (comment nos. 90-94:

Comments noted.

95. County *Comment* - TH 3/CSAH 42 Intersection.

96. County staff concur with the Township that the need for roadway improvements at this intersection is not a direct result of the mining development traffic alone. However, the Traffic Improvement Study (TIS) identified this intersection as "through/right for south-bound traffic". The County's comment was aimed at the through/right geometrics shown in the study and emphasizes the fact that, if the improvement is not done prior to the mining, the impact would be greater – as a result of the mining truck traffic. County staff suggest that the FEIS list this intersection as a "right turn lane need".

Township Response (comment nos. 95-96):

The results of the analysis did not show a level of service failure for this movement. The right turn lane is recognized as a desired roadway feature for all intersections along CSAH 42, and it is recognized that any traffic added to the right turn will increase the intersection difficulty.

97. Section 25 – Nearby Resources: Designated Parks, Recreation Areas or Trails

98. County Comment - *Township Comments and EIS Revisions*.

99. Thank you for adding text and figures in the FEIS that acknowledge the proposed new regional park, the need to maintain water quantity and quality in Butler Pond, potential trail corridors, and the proposed Wildlife Management Area. County staff also note and appreciate the willingness of Empire Township and the Mining Consortium to coordinate with the County and the Minnesota Department of Natural Resources on these efforts.

Township Response (comment nos. 97-99):

Comment noted.

DNR COMMENTS:

100. Section I, Water Quality, Surface Water Runoff (Item No. 17)

101. This section of the Final EIS addresses water quality and surface water runoff. Although the Final EIS indicates Empire Township will require that the requirements of the Vermillion River Watershed Joint Powers Organization (JPO) be met, the DNR recommends that the Final EIS also indicate that Empire Township will require that the Vermillion River Joint Powers Organization's Watershed Management Plan be followed and that standards and rules adopted and/or approved by the Vermillion River JPO also be followed.

Township Response (comment nos. 100-101)

Each mine operator will be required to obtain review and approval from the Vermillion River Watershed JPO for their grading plans and best management practices (BMP) for erosion control and water quality protection prior to obtaining a mining permit from Empire Township. The Township cannot require the miners follow another agencies plan per se, but can require that they obtain another agencies approval before the Township takes action on a permit request. Pages 3-11 of Section 3 of the FEIS (Mitigation Plan) outlines the BMP that will be used, which should be consistent with the JPO plan.

102. Section II, Comments and Responses on the Draft Environmental Impact Statement

103. The DNR submitted comments on the Draft EIS regarding the issue of stormwater management and discharge. Part of the DNR's concern about stormwater management and discharge is in the thermal impact to the Vermillion River from the proposed project. The discussion of thermal impacts in the Draft EIS did not appear to be complete.

104. Empire Township's response to the DNR comments stated that "[i]ncreased stormwater flow times on the order of hours are not anticipated to have significant thermal impacts on the Vermillion River." (Final EIS, Comment #211.) The Vermillion River is a designated trout stream at the point of discharge from this sub-watershed. Rules of the Minnesota Pollution Control Agency regarding trout streams are that trout streams are classified as 2A waters and our understanding is the temperature standard for Class 2A waters needs to be met for designated trout streams (Minn. Rules, part 7050.0222, subpart 2). The temperature standard for Class 2A waters is "no material increase". Class 2A waters shall be such to "permit the propagation and maintenance of a healthy community of cold water sport or commercial fish and associated aquatic life, and their habitats; ... be suitable for aquatic recreation of all kinds, including bathing; and … also protected as a source of drinking water." The EIS should not be based on whether it is anticipated that there will be significant thermal impacts, but rather clearly identify if there will or will not be thermal increases to the Vermillion River as a result of the project (i.e., will the temperature standard of no material increase be met). The DNR's experience is that the Vermillion River temperatures are in the range of as warm as it can be before the trout may begin to feel stressed. (The requirements for Class 2A waters which we have described in these comments did not appear to be included in the Final EIS.)

Township Response (comment nos. 102-104)

MPCA proposed rule amendment to MN Rules Ch. 7050 says " 'Altered materially' 'material increase' 'material manner' 'seriously impaired' and 'significant increase' as used in subps. 2,5, and 6 mean that pollution of the waters of the state has resulted in degradation of the physical, chemical or biological qualities of the water body to the extent that attainable or previously existing beneficial uses are actually or potentially lost."

The phrase "no material increase" as it relates to water temperature and trout has been interpreted to mean that the change in temperature does not preclude trout from inhabiting a stream. It is not believed that the intent of the phase was no increase or it would have said, "No increase." Based on the analysis of the original groundwater impact study and the revised groundwater impact study, the potential increase in temperature to the Butler Pond wetland was small (0.03 to 1.03 original and 0.07 to 1.13 revised) and within the range of error of the model. The Butler Pond impoundment is more than 2,000 feet from the confluence with the Vermillion River. Therefore, it was concluded that the potential for the temperature increase to impact trout habitat in the Vermillion River would not be measurable, and thus not material. Additionally, there are no records of trout using this tributary between Butler Pond and the Vermillion River, indicating that there may already be limiting factors for trout use within this tributary.

105. In the comments the DNR submitted on the Draft EIS, the DNR stated that the analysis does not take into consideration the cumulative impacts that are occurring as a result of development in the remainder of the watershed, and minimized the importance of small changes. Comments submitted by Dakota County on the Draft EIS specifically requested that the EIS include impacts on the designated trout steam area. Empire Township, in response to these comments (Final EIS, Comment #111) stated the "cumulative effect of the increased stormwater runoff volume and decreased flow is not anticipated to be noticeable in the water levels of the downstream wetlands nor is it expected to affect the character of the wetland, its functions and values." The Final EIS does not completely address the effects on the designated trout stream. Increased stormwater runoff volume and runoff durations will have impacts on the stability of the stream channel and thereby the potential to negatively effect the trout stream habitat as the stream erodes and adjusts its banks and channel morphology to accommodate the increased volume.

Township Response (comment no. 105)

This would be true if the mining area runoff was not controlled through diversion channels, wetlands and Butler Pond. However, the rate of runoff will be controlled through the stormwater channels identified within the mining plan, on-site ponds, the large wetland area above Butler Pond and by the outlet structure at Butler Pond. Within the sub-watershed that will experience the greatest increase in runoff volume (P8) is ultimately controlled by the existing structure/dam at the outlet from Butler Pond. The channel downstream from this structure would not be substantially affected by the increased stormwater runoff volume upstream.

106. Also in this response to Dakota County, Empire Township states that there is expected to be an increase in water flowing to Butler Pond of "less than 1.3 degrees Celsius". This was apparently not in the Draft EIS. This increase in temperature flowing into the pond does have the potential to be a significant effect on the pond. The increase in stormwater volume and the increase in temperature has the potential to further warm as it moves through the downstream wetlands and also has the potential to cause negative thermal effects on the Vermillion River.

Township Response (comment no. 106)

Both the Groundwater Impact Study (page 4-7) and the Surface Water Impact Study (Page 42) identified the estimated water temperature increase as a result of mining. The DEIS provided summaries for both studies as well as direct links to both documents.

See also responses to Comments 101, 104, 105 and 109.

107. Section III, Mitigation Plan

108. This section of the Final EIS contains the Mitigation Plan and according to the Final EIS is "to provide reviewers, regulators, and prospective users of the site with an understanding of the actions necessary to protect the environment and limit impacts by the proposed project."

109. Goal 5 of the Mitigation Plan is to preserve and protect the quality, quantity and rate of stormwater reaching downstream water bodies including wetlands, the Vermillion River, Butler Pond, and North Creek. The DNR is more concerned about thermal impacts to the Vermillion River than to Butler Wetland. The actions for Goal 5 identified in the Final EIS relate only to wetlands. No information is provided about how the quality, quantity, and rate of stormwater will be preserved and protected before reaching Butler Pond, North Creek, the unnamed tributary, and the Vermillion River. The Final EIS suggests that using swales and speeding up the rate of flow to the wetland will reduce thermal impacts. This would likely be the case if the water is simply stored in a pond for a longer period of time, and then sent to the Butler Wetland via surface flows. However, a better way to mitigate temperature impacts would be to keep the water on-site to be infiltrated. The best way to reduce thermal loading to the Vermillion River is to limit discharge, because the travel time between the Gravel Extraction area and the trout stream will negate any thermal mitigation prior to discharge to Butler Wetland. A more effective thermal mitigation measure, therefore, would be to infiltrate all stormwater in excess of pre-development volumes. This would provide the Butler Wetland with the necessary discharge while minimizing thermal loading to the designated trout stream.

Township Response (comment nos. 107-109)

The DEIS attempted to balance the concerns of decreasing flow to the Vermillion River and Butler Pond as well as concerns for increasing water temperatures downstream from the mining area. If the majority of the groundwater flow were toward the wetland and Vermillion River, the suggestion made by the DNR would have been the preferred method of handling the stormwater. However, the majority of the groundwater flow appears to be to the northeast toward the Mississippi River. Therefore if all, or the majority of, the surface runoff were directed to infiltration areas, the flow volume to the wetland and Vermillion River would be significantly less than today. It was the Townships interpretation that the flow reduction would

have a greater potential impact on the surface waters than would the projected increase in water temperature if the surface water was directed to Butler Pond wetland.

With regard to the DEIS discussing temperature increases to Butler Pond, the water must go through Butler Pond before continuing downstream to the Vermillion River. Butler Pond currently acts as a location for potential surface water warming prior to reaching the River. The small upstream impacts to temperature would be tempered by this existing ponding area as upstream water mixes with the ponded water.

To address the concerns of the DNR regarding water temperature increases; the Township proposes that Township and DNR develop an agreement on how the surface water will be addressed so as to balance the water flow with potential water temperature increases. To further address this issue, Goal 5 (see response to comment 110) has been modified in the mitigation plan to emphasize the importance of controlling water temperature increases to downstream waters.

Downstream waters are not in the ownership of the Township or the mining consortium. Therefore the Township looks to the DNR, Dakota SWCD, and the JPO to determine appropriate locations for monitoring current and future flow and temperature conditions. The Township will cooperate with these agencies to develop a reasonable monitoring plan. Also see the response to Comment 129.

110. Goal 6 of the Mitigation Plan is to provide mitigation for indirect wetland and watercourse impacts. The Mitigation Plan in the Final EIS does not clearly address how specifically monitoring will be conducted to determine if increased flows are having negative effects on the wetlands, Butler pond, and the tributaries to and the main stem of the Vermillion River. The Final EIS indicates that there will be warming of waters leaving the mine site. With the increase in water temperature and increase in volume there is the potential for thermal effects to the Vermillion River and its cold-water fishery. Base line data of water temperatures should be collected before mining begins and monitoring should continue throughout the project to detect thermal impacts to the designated trout stream (a Class 2A water) reaches of the Vermillion River. The DNR's understanding of the rules of the Minnesota Pollution Control Agency, is that the temperature standard for Class 2A waters is no thermal increase to the Class 2A waters (Minn. Rules, part 7050.0222, subpart 2). If a rise in water temperature is detected, the Mitigation Plan should identify the mitigation measures that will be used to eliminate the impact, as well as the monitoring that will occur to determine if stream channel degradation occurs, and is causing sedimentation to impact the trout habitat. In addition, the Mitigation Plan should include mitigation measures that will be used to protect the stream channel and habitat or restore it if the increased flows start to degrade the tributaries or main stem.

Township Response (comment no. 110)

See response to Comments 101 through 109 above.

The following has been added to Goal 5 of the Mitigation Plan:

The Groundwater Impact Study in section 4.3.2 revealed potential temperature increases ranging between 0.07 and 1.13 ºC to the local surface water and wetland features. Although this is well below the range of seasonal fluctuations and within

the range of variability related to sampling error and the report concludes, “impacts related to temperature and TDS to these surface water features are deemed to be negligible”, the sensitivity of the Vermillion River as a designated trout stream requires that the Mitigation Plan include:

- Monitoring of groundwater and surface water temperatures
- Monitor the stream channel in close proximity to the mining area for degradation from sedimentation that might impact the trout habitat.
- Annually, hold a meeting of all mine operators to review their mining plan for the next 12 months and adjust potential mitigation measures that will be used to eliminate impacts, if detected.
- Mitigation measures that will be used to protect the stream channel and habitat, or restore it if degradation occurs.

An area wide monitoring plan will prescribe the specifics of this monitoring. The Township’s consultant will recommend any mitigation that may be necessary.

CITY OF LAKEVILLE COMMENTS:

111. The City of Lakeville received a copy of the Final EIS (FEIS) for the Empire Township Sand and Gravel Mining and Accessory Uses Project (June 2005) on July 16, 2005. As part of the Mining Project's preliminary environmental review process, the City of Lakeville commented on the Scoping Document. The comments provided in a letter to Bolton & Menk dated December 23, 2003 raised concerns with regard to transportation (CR 58 -170th Street), ground water and project phasing. The City did not respond to the Draft EIS (DEIS), dated March 2005 since we had previously stated our concerns. However, we did not receive any response to our comments and they were not addressed in the FEIS and thus we reiterate the following issues.

Township Response (comment no. 111)

The comments from the City of Lakeville during the scoping process did include reference to the potential turnback status of 170th Street in the City, however without some time qualification as to when this could occur, it was difficult to include in the Traffic Study. Now that the turnback is inplace, a revision to the Traffic Study has been made to address the issues of potential limitations on truck traffic.

112. Transportation:

113. County Road 58 / 170th Street from the Lakeville City border to Pilot Knob Road was turn-backed to the City by Dakota County effective August 1, 2005. This change in status poses a significant issue for Lakeville, given the volume and type of traffic that is expected to be generated by the Mining Project.

Township Response (comment nos. 112-113)

The Township was not made aware of this change prior to publication of the FEIS. To respond to the City's concern, the Township met with the City to discuss options and a revised analysis was conducted to address potential future truck restrictions on the segment of 170th Street between Diamond Path and Pilot Knob Road. The Township also met with Dakota County to ensure that the analysis of rerouted trucks would not pose new issues for the County.

The results of the revised analysis is summarized in the December 1, 2005 Traffic Impact Study Amendment Memo (http://www.empiretownship.govoffice.com/). The impact of rerouting trucks up Diamond Path Road (to be constructed by others prior to 2015 for adjacent development) to 160th was found to be minor, requiring no additional mitigation. The previous suggested westbound right turn arrow at the intersection of 170th Street / Pilot Knob Road is not needed under the truck restriction scenario.

114. The City's 1999 Comprehensive Transportation Plan projected the traffic volumes on 170th Street between the City's east border and Pilot Knob to be 3500 ADT in the year 2020. The FEIS now anticipates that traffic volumes will be 6000 ADT by the year 2015. Moreover, approximately one-third of the traffic projected on 170th Street by the FEIS will be Mining Project related, and we

assume this to be primarily truck type usage. Heavy commercial wheel loadings traffic determines pavement design, and this amount of heavy traffic is of great concern.

115. The volume of traffic on 170th Street has been identified by the FEIS as requiring turn lane improvements at the intersection of Pilot Knob and 170th. The FEIS fails, however, to identify how these improvements will be funded. While the County's Mining Tax is cited as a possible source, this fund falls short of being able to address all areas of needed improvements. The City portion of the gravel tax is only $29,000 per year, an insignificant amount to finance any roadway improvements. A means of assigning the proportionate share of the intersection improvement cost to the Mining Project is seen as essential if there is to be an adequate and timely response to the needs that will be generated.

Township Response (comment nos. 114-115)

The results of the analysis did not show a level of service failure for this movement. The right turn lane is recognized as a desired roadway feature for all intersections along CSAH 46, (what does 42 have to do with this?)and it is recognized that any traffic added to the right turn will increase the intersection difficulty.

The study indicated that this right turn lane will be necessary to manage background traffic caused by the other developments in the area

116. With the turn-back of CR 58 from the County to the City, Lakeville has assumed the responsibility for maintenance and repair of 170th Street. In this regard, the type of traffic and the volume of heavy trucks becomes a highly significant issue to the City. Dakota County noted in its DEIS comments that "one legal weight truck is comparable to 9600 cars with regard to impact on roadway structure." (FEIS page 38, item 172) The 2015 projected increase of 2000 ADT due to mining activities which is assumed to be comprised primarily of heavy trucks will generate significant maintenance costs for which the City of Lakeville has no direct source of funding. The City of Lakeville has the authority to post a 7-ton limit on the Street, thereby prohibiting the heavy truck usage. The City will also be evaluating the reconstruction and realignment of 170th Street to lessen or eliminate its potential for truck traffic. The impact of these actions should be evaluated by the FEIS. Lacking such analysis the transportation portion of the FEIS could possibly be invalidated.

Township Response (comment no. 116)

See response to Comment 113.

Traffic Impact Study Amendment Memo - http://www.empiretownship.govoffice.com/

117. Mine Phasing:

118. The FEIS contains a five year mine phasing graphic. The Brandtjen property which borders Lakeville and which is part of the Empire Project is shown as being completed by 2010. This coincides with Lakeville Brandtjen PUD project mining in the City of Lakeville. Additionally, at present, gravel from the Brandtjen Empire Project is conveyed to the Lakeville Nordic Square site. As part of this coordinated operation, it is understood that screening and noise mitigation measures are required to minimize impact on the proposed residential development in Lakeville.

Township Response (comment nos. 117-118)

That is a correct. All mitigation measures will apply to all neighboring properties, including Lakeville.

119. SUMMARY:

120. The City of Lakeville will be pursuing the necessary actions to restrict truck traffic on 170th Street. Given these circumstances related to 170th Street, the FEIS is viewed as inadequately addressing transportation infrastructure needs. The elimination of 170th Street for truck traffic needs to be thoroughly considered. Moreover, the implementation of roadway improvements is critical to the proper operation of the Mining Project. Lacking the funding sources to accomplish these improvements will negate the acceptable operation of the Mining Project.

Township Response (comment nos. 119-120)

See response to Comments 111 through 118 above.

METROPOLITAN COUNCIL COMMENTS:

121. Metropolitan Council staff has completed the review of the Final Environmental Impact Statement (FEIS) for Empire Township Sand & Gravel Mining and Accessory Uses to determine its adequacy and accuracy in addressing regional concerns and the proposed project's potential for significant environmental impact. The FEIS concerns the sand and gravel mining-accessory uses proposed for northwestern Empire Township. The proposal calls for opening new mines and expanding existing aggregate mining areas totaling approximately 3,600 acres. A mining consortium would remove and process approximately 200 million tons of sand and gravel within the review site over the next 30 to 40 years. Council staff previously reviewed the Draft EIS on April 19, 2005 and the Scoping Environmental Assessment Worksheet (EAW) for this site on December 23, 2003. Staff review finds that the document is complete and accurate in regards to regional concerns but the following comments have been offered for your consideration:

122. Environment (Jim Larsen, 651-602-1159)

123. The phasing and staging plan (Figure 1D) for site mining activities indicates that most of the mining in the southeast corner of the gravel mining area, immediately upstream of Butler Pond and the Vermillion River Wetland complex, is not planned to take place for 20 to 30 years. The Council would prefer that the Sections 8, 9, 10, and 16 areas within the southeast portion of the Mining Area containing the unnamed tributary to the Vermillion River and the higher quality woodland, wetland, and prairie habitat on the site be maintained intact. The adjacent Butler Pond-Vermillion River Wetland complex to the southeast of the mining area is under consideration for purchase and designation as a Regional Park. Mining activities on this adjacent site could result in impacts to this adjacent site, planned for preservation as a park. The Council requests to be notified by the Township in advance of any consideration of changes to the mining timing/ phasing plan in this particular area. The Council also requests to be added to the Goal 7 Responsible Parties list so that the Council will have an opportunity to participate in the discussion and review of the Mitigation Plan monitoring program for the area.

Township Response (comment nos. 121-123)

It is understood that the Met Council desires that higher quality woodlands, wetlands and prairie be preserved to the maximum extent possible. This desire is noted by the Township and the Mining Consortium.

The Met Council will be added to Goal 7 as a Responsible Party. It is the Township's intention to coordinate with the DNR, Dakota SWCD, and the JPO to develop and implement a reasonable monitoring plan.

124. This completes the Council's review of the FEIS. The Council will take no formal action. If you have any questions or need further information, please contact Chris Moates, principal reviewer, at 651-602-1750 or at chris.moates@metc.state.mn.us.

Township Response (comment no. 124)

Comment noted.

DAKOTA COUNTY SWCD COMMENTS

125. Overall our concern with a proposed mining operation of 3,600 acres within any watershed is the amount and length of time groundwater is removed to facilitate this size of facility. We understand that sand and gravel is both in demand and in abundance within this portion of Empire Township. However, we discourage any dewatering activities east of Biscayne Avenue.

126. Changes to water resources may be slow and seem trivial, but the cumulative change over decades of dewatering can be significant. Under the current proposal, there is greater potential to impair more regionally significant water resources if dewatering occurs east of Biscayne Avenue.

Township Response (comment nos. 125-126)

The following has been added to Strategy 3.2.5 in the Mitigation Plan:

As stated in the EAW, "*by practice, the Township has not permitted de-watering during the mining process but it has permitted the extraction of material below the water table with draglines and backhoes. … . The potential impacts of excavation below the water table will be investigated in the EIS."*

Section 4.4 of the Groundwater Impact Study explained that, "*dewatering could be allowed in the northern portion of the Mining Area with minimal impacts on surface water features*." Dewatering in areas other than the northern portion of the Mining Area will only be permitted after further study and monitoring to ensure minimal impacts. This concern was particularly directed at both the southeast (east of Biscayne) and the southwest (near North Creek) portions of the Mining Area.

127. Since the "absolute specifics of plant operations, locations, and mine schedules, etc. are not known at this time" (as stated in the response to comment # 85), and modeling can offer only a prediction of what will happen in the future, it is difficult to provide quality comments based on the generic concepts. Interim use permits with quantifiable conditions and consistent monitoring is the best way to make sure that impacts to natural resources are controlled from dewatering that occurs over decades.

Township Response (comment no. 127)

The mitigation plan found in Section 3 of the FEIS is intended to set the baseline conditions that each mine operator must follow and include in their individual mining permit applications. In addition, Empire Township, in cooperation with the Dakota SWCD and JPO intends to ensure that natural resources impacts are minimized.

128. Ongoing and future water monitoring plans are not detailed in the FEIS and the framework for monitoring or the responsible parties is not well documented. It is understood from the FEIS that detailed monitoring plans will be developed outside of the FEIS. However, the FEIS should more clearly define some parameters. For example:

129. Goal 6 includes in its "Actions Required" to "Monitor the surface water systems for change." However, the three points under this action do not describe any kind of monitoring plan. This is the

same for second required action to "Monitor the groundwater system for changes." The third required action does address the "Environmental monitoring and contingency plan" but states that the monitoring plan will be developed "as necessary." We believe a monitoring plan is absolutely necessary and should be developed with technical state and local agencies including the Vermillion River Watershed Joint Powers Organization (JPO) and the DNR before the first mine is developed.

Township Response (comment nos. 128-129)

Since some mines within the Mining Area are already permitted and in operation, the development of the plan will occur concurrently with new mining operations.

The Township will work with the Dakota SWCD and JPO to develop an overall comprehensive mine monitoring plan that will be implemented by the Township (miners) as part of the permit conditions.

130. Goal 7, in Section 7.1.4 mentions that surface waters will be monitored but only lists waterbodies such as stormwater ponds, wash ponds, and make-up water sumps. It is hoped that surface water monitoring will also include the Vermillion River, tributaries to the River, Butler Pond, and significant wetlands. Chemical parameters such as total and dissolved solids, turbidity, conductivity, and nutrients should be analyzed on a regular basis. Physical parameters including flow and temperature should be monitored continuously. And, biological and habitat indices should be monitored regularly in all waterbodies.

Township Response (comment no. 130)

Goal 7 in the Mitigation Plan includes specific references to monitoring North Creek and the Butler Pond areas. A revision to Goal 7, Section 7.1.4 includes the following clarification:

7.1.4 Environmental Monitoring and Contingency Plan

The Township will work with the Dakota SWCD and JPO to develop an overall comprehensive mine monitoring plan that will be implemented by the Township (miners) as part of the permit conditions. The plan must address the actual mining schedule from each mine operator. At a minimum it is anticipated that the monitoring plan shall include the monitoring of all surface water bodies including stormwater retention ponds, wash ponds and make-up water sumps. At a minimum, the plan shall include the installation and monitoring of both up-gradient and down-gradient monitoring wells capable of evaluating changes in groundwater elevation, temperature and dissolved solids. The operating plan shall be approvable by all local government authorities including Empire Township, the Rosemount Wellhead and Source Water Protection Plan Administrator, Dakota County Environmental Management and the Vermillion River Watershed Joint Powers Organization (JPO). The plan shall list contingencies that the mine operator will implement based on observed groundwater impacts.

The mine operators shall also fund a separate long-term monitoring program that includes long-term monitoring and reporting of:

- The existing Empire groundwater monitoring wells
- Butler Pond
- The North Creek tributary to the Vermillion River
- Adjacent wetlands.

The information shall be used by the operators to validate the numerical model simulations and ensure that unanticipated changes in site conditions are promptly addressed. The Environmental Monitoring and Contingency Plan is intended to address the inherent uncertainties associated with trying to simulate future conditions using a numerical groundwater model.

131. There is uncertainty who will receive the monitoring data and who will provide oversight. The Vermillion River Watershed JPO and DNR should be included. All monitoring plans should include mitigation measures and corrective actions if monitoring data indicate that adverse impacts have or can be reasonably anticipated. We would encourage the Township to consider conditions under a Interim Use Permit that provide a mechanism to routinely monitor water quality issues and allow appropriate action steps, including closure of mining activity, if conditions are not being met.

Township Response (comment no. 131)

See response to Comment 130.

132. Again, we understand that sand and gravel is a needed commodity in the Twin Cities area. The Empire sand and gravel operation as proposed would be 3,600 acres in size and will last several decades. We encourage the Mining Consortium to be proactive in pursuing technological advances that occur over time to address unforeseen adverse impacts on local natural resources.

Township Response (comment no. 132)

Comment noted. The Township will encourage the mining operators to be proactive.

133. The SWCD is committed to assisting landowners and industry in evaluating new approaches to address water protection efforts. We look forward to working with all involved.

Township Response (comment no. 133)

The Township looks forward to working with the SWCD throughout the mining process.