

REVIEW OF MINING CONDITIONAL USE PERMIT APPLICATION

Four Corners Sand Mine Cemex Construction Material LLC Project #2012100004, AR #2183 Lake County, Florida

Performed by

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For

Lake County
Division of Planning & Community Design
Department of Growth Management
Lake County Board of County Commissioners

EXECUTIVE SUMMARY

The Department of Growth Management of the Division of Planning & Community Design of Lake County, Florida, contracted with Andreyev Engineering, Inc. (AEI) to review documents provided in support and objection to the MCUP application for the Four Corners Sand Mine, Cemex, Project #2012100004, AR #2183. The review of the application is to verify if the application meets the county's conditions for issuance with regard to the hydrogeologic aspects of the mine site, to assess the objections to the project, and to verify that the site is suitable for future development, after reclamation.

The Colinas Group hydrogeological report documents submitted in support of the application were reviewed along with a Devo Engineering, Inc. objection report. Also reviewed were Environmental Resource Permit Reclamation documents, water quality lab reports, Devo Engineering, Inc. Karlton DRI report, Ardaman & Associates, Inc. Expert Opinion, Suitability for Future Development, Four Corners Sand Mine, the Consumptive Use Permit Application for the mine, and the Lake County Mining Ordinance 2013-16.

The application documents were reviewed to assess whether or not the proposed mining meets the requirements for the conditions of issuance of the MCUP, as it relates to the hydrogeological aspects of the conditions for issuance. The Lake County Mining Ordinance 2013-6 was also reviewed for the requirements of obtaining an MCUP. Based on our review of all of the data provided by the county and identified herein, it is our professional opinion that the Colinas Group hydrogeological report provides reasonable assurances that the conditions for issuance related to the hydrogeologic aspects of the MCUP are met. These findings are described in detail in this review report.

The objection document from Devo Engineering was reviewed and it is AEI's professional opinion that the objections are not warranted. A detailed discussion of the objections and our findings is included in this review report.

The documents were reviewed to assess whether or not the site can be developed in accordance with the County Comprehensive Plan after reclamation of the sand mine areas. The Ardaman & Associates Inc. document was reviewed, the Colinas Group document was reviewed, and the Devo Engineering, Inc. objection document was considered, to make this assessment. Based upon those documents and the hydrogeological information available, it is the expert opinion of AEI that the site reclamation will allow for development after reclamation of the sand mine. This will be discussed in more detail in this review report.

PURPOSE OF REVIEW

The Department of Growth Management of the Division of Planning & Community Design of Lake County, Florida, contracted with AEI to review documents provided in support and objection to the MCUP application for the Four Corners Sand Mine, Cemex, Project #2012100004, AR #2183. The review of the application, and other supporting documentation, is to verify if the application meets the county's conditions for issuance with regard to the hydrogeologic aspects of the site, to assess the objections put forth by Devo Engineering, Inc., and to verify that the site can be developed in accordance with the Lake County Comprehensive Plan after reclamation.

The following documents were reviewed for this purpose:

Colinas Group, *Hydrogeologic Report, Mining Site Plan Application, Four Corners Sand Mine*, Cemex Construction Material Florida, LLC

Colinas Group, Environmental Resource Permit (ERP) documents

Devo Engineering, Inc., *Preliminary Review Comments, Hydrogeologic Considerations, Mining Conditional Use Permit – Four Corners Sand Mine*

Ardaman & Associates, Inc., *Expert Opinion, Suitability for Future Development, Proposed Four Corners Sand Mine, Lake County, Florida*

Lake County Mining Ordinance 2013 -16

Each aspect of the AEI review is discussed below with regard to the purpose of the review requested by the county. A synopsis of the conclusions is provided at the end of this review report.

MCUP REVIEW – HYDROGEOLOGIC CONDITIONS FOR ISSUANCE

The Colinas Group document was reviewed to assess whether or not the proposed Four Corners Sand Mine project meets the conditions for issuance of the MCUP as it relates to the hydrogeological aspects of the conditions for issuance. The report addresses the water table elevation, confining unit elevation, upper Floridan aquifer elevation, depth of mining, horizontal and vertical water flow changes, and water quality at the site. It is understood that the phases of mining are being negotiated between the county and the mining company and their consultants at this time, and therefore, the phases of mining will not be addressed in this report.

Water Table and Aquifer Elevations

The Colinas Group report verified reasonable water table elevations for the site and verified well documented elevations of the Hawthorn confining unit and the upper Floridan aquifer. The water table elevation, aquifer elevations, and potentiometric surface elevation at the site were determined by the Colinas Group from onsite borings and piezometers and from well documented research by the USGS and others. According to the field verification and the research, the water table at the site was determined to fluctuate between 85 feet NGVD to 105 feet NGVD. The report verifies that the depth of mining will not extend into the existing confining unit of the Hawthorn Group between the surficial sands and the upper Floridan aquifer. The report verifies that the mine will be mostly dry mining with the exception of a few areas where the mining will extend 15 feet below the water table.

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| Water Table Elevation at the site: | 85 feet NGVD to 105 feet NGVD |
| Ground Elevation of the site: | 100 feet NGVD to 180 feet NGVD |
| Maximum Excavation depth: | 70 feet NGVD to 85 feet NGVD |
| Elevation of the Confining Unit: | 20 feet NGVD to 70 feet NGVD |
| Elevation of the upper Floridan aquifer: | -35 feet NGVD to -90 feet NGVD |
| Potentiometric Surface of the Floridan aquifer: | 90 feet NGVD to 110 feet NGVD |

Flow of Water during Mining and After Reclamation

Due to the dry mining and no dewatering during wet mining, there will be no discharges of water from the excavation areas. The water for washing the product will be from a lower Floridan aquifer well and that water will be discharged into low areas or inactive excavation areas for percolation into the surficial aquifer and eventually into the Floridan aquifer systems. Therefore, there is no proposed runoff from the site to impact nearby properties, lakes, and/or streams. Due to the fact that the mining will not penetrate the confining unit or the Floridan aquifer verifies that the horizontal flow in the upper Floridan aquifer will not be significantly changed.

The excavation area is a sand deposit with various sizes of sand and intermittent clays. The consistency of the deposit is approximately 97% sand and 3% clays. The materials that will be completely extracted are the medium and coarse size sands, which represent 55% of the deposit. The remaining medium to fine sands and intermittent clay will be used with the overburden sands as reclamation materials in the excavated areas after mining is completed. The reclamation materials will not significantly alter the vertical conductance of water. Since the confining unit will not be breached or excavated the recharge to the Floridan aquifer will not be significantly changed.

The majority of water supplies in the area are from upper Floridan aquifer withdrawals. The withdrawals of water for this project are proposed to be from the lower Floridan aquifer and are 450,000 gallons per day (gpd) for processing of the sands. The St. Johns River Water Management District (SJRWMD) Eastern Central Florida (ECF) regional model was used to predict the potential for impacts from withdrawal of the proposed process water from the lower Floridan aquifer. According to the results of the ground-water flow impact model the drawdown in the lower Floridan aquifer is less than 0.5 feet, which is not expected to create a measureable impact in the lower Floridan aquifer system or impact other lower Floridan aquifer withdrawals in the area. Also according to the results of the impact model, there will be no measureable drawdown in the upper Floridan and surficial aquifer systems. Therefore, it is anticipated that there will be no significant impacts to the water supplies of the areas surrounding this mine.

Water Quality Review

The Colinas Group collected water quality samples from three 57 foot to 72 foot monitor wells. The water quality meets the Florida Department of Environmental Protection (FDEP) Standards and does not contain detectable concentrations of major contaminants such as EDB, DBCP, pesticides, and herbicides that would be related to the previous land uses at the site or in the area. Metals and other constituents do not exceed the FDEP standards. Therefore, AEI agrees with the Colinas Group that the mining is not predicted to impact surficial and Floridan aquifer water quality in the area.

REVIEW OF THE OBJECTIONS FROM DEVO ENGINEERING, INC.

The Devo Engineering, Inc., report referenced above was reviewed and their objections to the project noted. The following is a synopsis of their objections and the AEI findings from review of all of the other documents also referenced above. General descriptions of the objections from the Devo Engineering, Inc. report are shown below with our findings indicated beneath each objection statement.

- 1. It is Devo Engineering's contention that the reclamation materials have a low permeability and that flooding may occur, due to the "slurried" nature of the reclamation materials.**

The Colinas Group indicates that the reclamation sands are more than 55% of the excavated deposit sands with intermittent clay. The reclamation materials were also very well described in the Ardaman report to be medium to fine sands with some intermittent clays. The remaining fine sands with intermittent clays and the overburden fine sands will be used as the reclamation materials. The groundwater seepage rate through the existing sands prior to excavation and the seepage rate through the reclamation sands are not predicted to be significantly altered, as described in the Colinas Group and Ardaman reports. Therefore, it is AEI's professional opinion

that the water will continue to effectively percolate down through the reclamation sands without flooding. It is also our finding that the water table will experience some mounding in the areas of designated discharge (shallow aquifer recharge). However, the data suggest that the overall water table across the project will have minimal mounding effect and would not measurably impact off-site areas. The deeper Hawthorn clays, serving as a semi-confining unit, will be unchanged and not mined, which will prevent potential impacts to the underlying Floridan aquifer. Therefore, it is our professional opinion that the vertical conductance through the semi-confining unit will be unchanged and the potentiometric surface of the upper Floridan aquifer will not experience a measurable impact and would remain at about the same elevations.

2. Devo Engineering is stating that the Colinas Group water table measurements differ considerably from Devo Engineering water table measurements and therefore are not representative of the area.

Devo Engineering was comparing measurements made at the county border to the Colinas Group measurements at mine site which is over one mile west of the border. The O'Reilly 1998 hydrogeologic cross section shows not only a significant difference in the topography from the border to mine site, but also shows a difference in the water table of 60 feet from the border area to the mine site, and hence Devo Engineering's stated difference of 60 feet. It is the finding of AEI that the site water table elevations represented by the Colinas Group are reasonable according to the field measurements made at the mine and the regional expert documentation.

3. Devo Engineering is stating that Lake Needham will be an outfall for the mine area after the mining is concluded and that the base of the mine should be 10 feet higher than the Lake Needham flood elevation of 100 feet NGVD.

Devo Engineering is not taking into account that the land surface between mine site and Lake Needham is 150 feet NGVD or 50 feet higher than the mine or Lake Needham. Therefore, Lake Needham will not be an outfall for the site. According the regional topography and water table elevations in the area, the outfall of water would be to the west of the mine project area. However, all of the water used during mining will be retained onsite and there is no proposed discharge of water. Therefore, it is AEI's finding that the base of mining should not be a factor in the potential impacts of Lake Needham and the mining project will not cause significant water table impacts in the off-site areas surrounding the mine site.

4. Devo Engineering is stating that the wet mining is impractical.

AEI personnel have over 20 years of experience reviewing Cemex mining company projects. It is our professional opinion that Cemex Construction Material Florida, LLC knows what equipment is practical for all types of mining their company does, and if they are proposing to wet mine some of the site, they know what equipment is practical and they have the equipment to do it properly.

5. Devo Engineering expressed concerns with a high level of EDB in the Upper Floridan aquifer in the area.

As indicated before, Devo Engineering has extended the borders of the mine too far east. The area of EDB concerns, designated by Devo Engineering in their report, is located east of the mining area. The water quality sampling and laboratory results verify that there will be no water quality problems during mining or after reclamation. It is AEI's professional opinion that water quality problems are not a concern at this site.

POTENTIAL LAND USE AFTER RECLAMATION

AEI reviewed the Colinas Group reports, the Ardaman & Associates, Inc. report, and the Consumptive Use Permit application documents in order to assess whether or not the site can be utilized for development of industrial, urban mixed uses, and multi-story projects once the site is reclaimed. The reclamation materials are medium to fine sand with intermittent clays. AEI agrees with the Ardaman and Associates, Inc. report and their findings that the project site can be developed after reclamation. The material can be compacted to allow for any type of buildings or land use. The fact that the confining unit and the upper Floridan aquifer will not be affected at all by mining verifies that the base of the units below the reclamation materials will be left intact and is an excellent base for the development of the property.

The primary concerns for future development of the reclaimed areas will be the method of reclamation. Based on our review of the proposed reclamation plan, it is our professional opinion that the reclaimed soils will be replaced properly to create the necessary foundation support conditions for future development of the site. It would be prudent for the county to require that the placement of the reclamation soils and the compaction of the same be fully documented by Cemex and submitted to the county for verification.

It is our professional opinion that the aquifer system of the area will not be significantly affected either laterally or vertically, except for potential shallow aquifer mounding that is expected to occur at the on-site locations of the designated discharge of process water. The withdrawals made from the lower Floridan aquifer, for processing of the mined materials, are not expected to create short term or long term impacts to the water resources in the area.

CONCLUSIONS

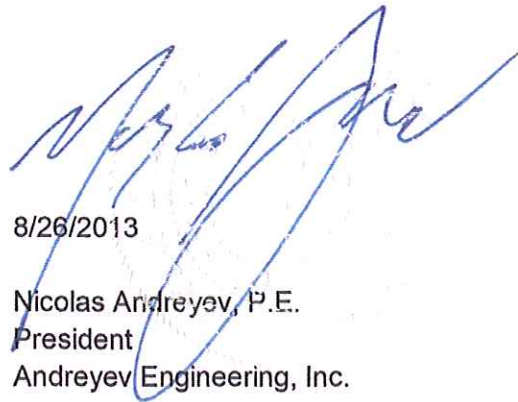
AEI has reviewed all documents presented to them for this review and have found that the project meets the conditions for issuance with regard to the hydrogeologic aspects of the county requirement for an MCUP. AEI did not find any of the objections put forth by Devo Engineering, Inc., to have substantive validity and their concerns are not warranted. AEI agrees with Ardaman & Associates, Inc., in that the site will be reclaimed in a manner that will allow for future development of the site for industrial, urban mixed use, and multi-story projects after reclamation is completed.

PROFESSIONAL CERTIFICATIONS



8/26/2013

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