

MEMORANDUM

To: Mr. Filiberto Flutsch
Project Engineer
District 11 Design

Date: September 21, 1999

File: 11-IMP-98
KP 55.8/61.2
PM 34.9/38.3
11-060700

From: **DEPARTMENT OF TRANSPORTATION**
Division of Materials and Foundations
Roadway Geotechnical Engineering - South

Subject: Geologic Hazard Review

Pursuant to your request received on September 14, 1999, Caltrans RGS has conducted a geologic hazard review for the proposed passing lanes on State Route 98 east of Calexico. The review included site reconnaissance, study of the proposed project, and examination of archived reports related to the project area. Following are the findings of our review.

Seismic Related Hazards

The Imperial Valley is the most seismically active area in the contiguous United States. The central portion of the Imperial Valley is the spreading center along the major San Andreas Rift. Active fault traces pass very near the project area with damaging earthquakes along these faults occurring frequently. The potential effects of a major earthquake on a fault near the project area include ground rupture, ground shaking, liquefaction, and seismically induced settlement.

As detailed in previous geotechnical reports concerning nearby projects, it is considered significantly more economical to rebuild damaged roadway segments following a major seismic event than it is to attempt to mitigate for potential damage during the initial road construction. Therefore, no mitigation for seismic related hazards is recommended for this project.

Groundwater

Due to the irrigation characteristics of the adjacent agricultural land, perched groundwater is likely present within three meters of the roadway surface. Agricultural drains within the adjacent properties and the elevated position of the roadway assure that the roadway structural section remains free of groundwater. No excavations or underground facilities are planned for this project. The project will not be adversely affected by groundwater.

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Shrink and Swell Potential of Native Soils

It is likely that portions of the roadway are underlain by expansive soil. The existing roadway is in excellent condition, showing no indication of shrink or swell of the embankment soil. The consistent irrigation and drainage regime of the adjacent agricultural terrain has resulted in near constant moisture content of the embankment soil. Shrink and swell cycles have been effectively minimized. Expansive soil should not affect the proposed project.

Consolidation and Settlement

The loose, poorly consolidated lakebed deposits underlying the project area have a tendency to settle under large overburden loads. However, the designed project will add little additional embankment loads. Consolidation and settlement will not be a factor on the project.

The geologic hazards discussed in this report are those with a high potential to impact projects in the general area. Geologic hazards not discussed in this report, such as slope stability or soil erosion, have relatively little potential to significantly impact this project as designed. RGENS staff will be available for further assistance. Should you have any questions, please contact me at (619) 467-3290 or CALNET 734-3290.

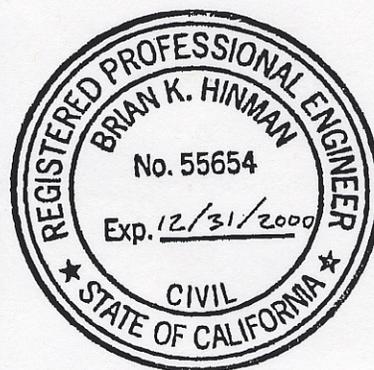
Brian Hinman

Brian Hinman
Associate Materials and Research Engineer

Attachments

BH:

cc: K. Jackura (RGENS-South)
J. Egan
RGENS.02
Project File



State of California

Business, Transportation and Housing Agency

M E M O R A N D U M

To: Johnny Mallouh
Assistant Project Engineer
(M.S. D2)

Date: July 30, 1997

File: 11-IMP-98
PM 0.00/56.88
11-06070K

From: DEPARTMENT OF TRANSPORTATION
Engineering Service Center-Office of Structural Foundations
Roadway Geotechnical (South)

Subject: Geology/Geotechnical Hazards Review

Per your memorandum request dated July 15, 1997, a review of the requested sites has been completed for geological and geotechnical concerns associated with existing roadway widening to provide passing lanes. Where paved shoulders do not exist in the opposite direction of the proposed passing lane, they are also to be added.

PM 21.3-21.8 WESTBOUND (WB)

Widening will occur in an area of blow sand. A vacant bare sand field exists on the right(south) side of road. A sand dune exists between PM2 1.6 & 21.8 on the left (north) side. Widening will require a cut into the sand dune. The cut ratio should be no steeper than 1:2.5, (V:H) the natural slope of the windward side of the dune, adjacent to the roadway.

The roadway is nearly flat lying and at the approximate natural ground profile in the area of proposed widening.

A paved shoulder will need to be added to the eastbound side.

Surface water will need to be removed by drainage ditches on either side of the widening. Existing ditches will require re-construction to current design standards.

PM 22.3-22.8 EASTBOUND (EB)

Farm land is adjacent to the road from this site eastward to the end of the proposed intermittent widening locations to PM 37.5. This area is composed of lake bed deposits of silt and sand that are farmed on both sides of the road. The existing roadbed is elevated approximately 0.5 m above the terrain, with side slopes at a ratio of approximately 1:4 sloping to a ditch flowline 0.75m to 1m below the roadway crown.

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Reproduce what the existing configuration is between PM 22.3 & 22.55, i.e. side slope ratio and roadway drainage.

Between PM 23.55 & 23.8, a farm field drain exists on the right, that has a flowline approximately 2m below the road profile grade. On the left side a canal exists that is elevated approximately 0.5m above the roadway profile.

Shoulder widening adjacent to the canal should include paving the earthen canal slope adjacent to the roadway as it will be cut into for widening.

Widening on the right side will bring traffic close to the farm field drain, a guard rail may be needed adjacent to the drain.

Roadway surface drainage will need to be provided for by replacing the existing drainage.

PM 27.5 - 28.0 (EB)

The terrain consists of sandy silt lake bed deposits. The roadway is elevated 0.3m above the surrounding terrain. The south side of the road slopes on a 1:5 ratio to a ditch flowline that is about 0.5m below the roadway profile elevation.

The north side has a raised berm 0.8m high, 1:2 slope ratio that starts approximately 5m from the ETW. A canal siphon crosses the roadway at PM 27.75.

No special concerns are present at this location. Roadway surface drainage will need to be provided for.

PM 28.1 - 28.6 (WB)

The terrain consists of sandy silt lake bed deposits. Widening on the north side will impinge on the toe of a canal bank that is 1m high. The canal bank should be paved and roadway surface drainage on the north side may have to be conducted away by a culvert beneath the shoulder.

Shoulder widening on the south side presents no special concerns other than maintaining roadway drainage.

PM 35.5 - 36.0 (EB)

The terrain consists of sandy silt lake bed deposits. Widening on the south side of the existing road will need to maintain a roadway drainage ditch. The

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existing ditch is about 1m below the roadway profile, with an approximate 1:5 slope ratio to the ditch flowline from the edge of shoulder.

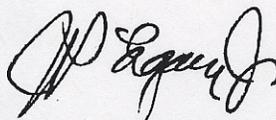
A paved 2.5m wide shoulder exists on the north side of the roadway.

PM 37.0 - 37.5 (WB)

The terrain consists of sandy silt lake bed deposits. Widening on the north side of the roadway will need to maintain a roadway drainage ditch. The existing ditch is about 0.5m to 0.75m below the roadway profile, with an approximate 1:5 slope ratio to the ditch flowline from the edge of shoulder.

A paved 2.5m wide shoulder exists on the south side of the roadway.

For additional information or questions, please call me at 467-4051.



Joseph P. Egan, Jr.
Senior Engineering Geologist

JPE:es

cc: K. Jackura (RGES-South)
Project File (06070k.wid)