Condition 27	Geotechnical-Expansive Soils

Prior to completion of improvement and building plans for the proposed project, a design-level geotechnical report shall be prepared that addresses and reduces potential expansive soil impacts to less than significant. The expansive soil data shall be used with the requirements of the California Building Code (2007), as adopted by the County of San Luis Obispo. These recommendations shall be incorporated into the design of all proposed facilities that are part of the collection system and at the treatment plant site.

Evidence of compliance:

The presence of expansive soils at the project site was evaluated by Fugro West, Inc., and their findings and recommendations for design of the wastewater system are contained in the project Geotechnical Report dated March 9, 2004 and Addendum and Update to the Geotechnical Report dated October 24, 2011. A summary of the findings and recommendations contained in said reports is as follows:

Section 5.5 of Geotechnical Report (Expansive Soil Finding):
"Expansive soil generally consists of fine-grained soil of high plasticity (clay) that can damage near-surface improvements in response to swelling associated with increased moisture content. The near surface soil conditions encountered at the site predominantly consist of granular materials. It is our opinion that these soils have a low to very low potential for expansion (Expansion Index less than 20) on the basis of classification provided in the Uniform Building Code."

Section 6.2.2 of Geotechnical Report (Suggested Material Specs):
*"**Imported Fill Material** brought to the site shall be free of organics, oversize rock (that is over 3 inches in diameter), trash, debris, corrosive, and other deleterious material. Imported materials shall comply with all specified material requirements for the area where the material is being placed. Imported materials used in building areas shall have an Expansive of less than 20. Imported soil to be used as bedding, pipe zone, or trench backfill material shall comply with applicable recommendations of this report. Imported material to be placed within 3 feet of finished grade in pavement areas shall have an R-value of at least 40 as determined by California Test 301. Imported fill should be reviewed by the geotechnical engineer prior to being brought to the site; however, imported fill materials shall comply with all specifications for that material as placed at the site.*

***Pipe zone material** shall consist of onsite or imported soil having a sand equivalent (SE per ASTM 2419) of at least 30 and conforming to Section 19-3.025B, Sand Bedding, of the Caltrans Standard Specifications.*

***Pipe zone bedding** material shall consist of compacted in situ sand or imported material having a sand equivalent of at least 30, and conforming to Section 19-3.025B, Sand Bedding, of the Caltrans Standard Specifications.*

Pipe zone bedding material – gravel *for trench bottom stabilization shall consist of material conforming to either 1) Caltrans Section 26-1.02A, Class 2 aggregate base, ¾ inch or 1-1/2 inch gradation, R-value requirements are waived, 2) Caltrans Section 90-3.02, Coarse Aggregate; or 3) ASTM C-33 No. 8 Coarse Aggregate.*

Trench backfill *shall consist of imported or onsite material that is free of organics, debris, oversized material greater than 3 inches, and other deleterious materials. Trench backfill material shall have at least 85% of the material passing the U.S. Standard No. 4 sieve, and/or comply with the applicable requirements for the area where the trench backfill is being placed (such as the pavement structural section).*

Section 6.2.3 of Geotechnical Report (Clearing and Grubbing):
Prior to commencing grading operations in building or roadway areas that will receive compacted fill or structures, soil containing debris, organics, pavement, uncompacted fill, or other unsuitable materials, should be removed. Demolition areas should be cleared of old foundations, slabs, abandoned utilities, and soils disturbed during the demolition process. Depressions or disturbed areas left from the removal of such material should be replaced with compacted fill."

Section 6.2.4 of Geotechnical Report (Fill Placement):
"The fill should be placed and compacted to at least the minimum relative compaction recommended in this report. The moisture content of the fill should be between 2 percent below to 2 percent above the optimum. Each layer should be spread evenly and should be thoroughly blade mixed during the spreading to provide relative uniformity of material within each layer. Soft or yielding materials should be removed and be replaced with properly compacted fill material, prior to placing the next layer. We recommend that fill materials placed in building or pavement areas be mechanically compacted. Ponding or jetting should only be permitted for the pipeline construction when approved by the Engineer, and should not be used as method of fill placement or compaction in building areas.

Rock, gravel and other oversized material, greater than 4 inches in diameter, should be removed from the fill material being placed. Rocks should not be nested and voids should be filled with compacted material.

When the moisture content of the fill material is below that sufficient to achieve the recommended compaction, water should be added to the fill. While water is being added, the soil should be bladed and mixed to provide relatively uniform moisture content throughout the material. When the moisture content of the fill material is excessive, the fill material should be aerated by blading or other methods. Fill should be spread in lifts no thicker than approximately 8" prior to being compacted. Fill and backfill materials may need to be placed in thinner lifts to achieve the recommended compaction with the equipment being used.

We recommend that prior to placing fill materials, that the existing soils be removed to a depth of at least 2 feet below the existing ground surface. Where fill materials are to be placed on slopes steeper thatn 4:1, the fill should be keyed and benched into the slope. The base key should be excavated at least 2 feet below the existing ground surface, or to relatively firm material. The width of the base key should be at least 10 feet, and extend at least 5 feet beyond the toe of the slope. Subsequent benches should extend into at least firm to hard soil and remove the upper 2 feet of the existing soils. The base key and subsequent benches should be sloped at 2 percent into the hillside."

Section 3.2 of the Addendum has a detailed description of the existing subsurface conditions and does not identify the presence of expansive soils. Section 4.2 of the Addendum indicates that *".... Material recommendations for bedding and trench backfill materials are presented in the Geotechnical Report."*

The recommendations contained within the reports referenced above are intended to offset significant impacts of any expansive soils present at the project site, if they exist at all.

Please note that the expansive soil index classification per UBC noted in Section 5.5 of the Geotechnical Report shall be used with the requirements of the 2010 California Building Code. The 2010 California Building Code was adopted after the Coastal Permit for the project was approved. Therefore, the 2007 California Building Code, which is referenced in Condition 27 of the Coastal Permit is superseded by the 2010 California Building Code.

Condition Satisfied–Collection System

Jason H. Giffen

Director, SLO County Planning

2-7-2012

Date

Condition Satisfied–Treatment Facility

Jason H. Giffen

Director, SLO County Planning

2-7-2012

Date