BROWN & MILLS, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS — CONSTRUCTION MATERIALS TESTING

March 10, 2009
BMI Project No. 09S-030

SWI-
2009-03-10

Mr. David Alameda
T-Mobile
1855 Gateway Boulevard, 9Th Floor
Concord, California 94520

Subject: Geotechnical Investigation
Proposed Telecommunications Facility
Hank's Towing, Site No. BA02074
16081 Mateo Street
San Leandro, California

Dear Mr. Alameda:

Brown & Mills is pleased to present the attached geotechnical investigation report for a proposed telecommunications facility to be located at 16081 Mateo Street in San Leandro, California. Results of our study indicated the site is not within a current Earthquake Fault Hazard Zone or other area known to possess a significant geologic risk to site development. Further, we anticipate conventional grading practices may be used for most site earthwork activities (if any) and that a drilled, cast-in-place concrete pier may be used for support of the proposed steel monopole tower; foundation support for the planned equipment cabinets (or cabinet) may be provided using shallow spread footings and/or a mat foundation.

Though we anticipate the site may be developed generally using conventional grading and foundation construction techniques, it should be noted conditions were identified by our field exploration program that may require special design and/or construction provisions for some project components. A brief summary of these conditions as well as possible design and/or construction provisions to address these potential concerns are outlined below.

- Potentially expansive, near-surface clay soils were encountered during our field exploration program. Based on the scope of the currently proposed project, the presence of potentially expansive clay soils should not have a significant adverse effect on project features. However, if the nature of the proposed construction changes (i.e., buildings, pavements, or other improvements sensitive to ground movement are to be constructed at the site), special design and construction provisions may be required. Such provisions could include removal of on-site, potentially expansive fill soils and replacement with nonexpansive engineered fill, deepening some foundations, and/or reinforcing or otherwise strengthening foundations,

3050 Fite Circle, Suite 101-E, Sacramento, California 95827 Phone (916)362-5541 FAX (916)362-3454
Email Address: bmi.sac@sbcglobal.net

FIELD INVESTIGATION

Subsurface conditions at the site were explored on March 4, 2009, by drilling one boring to a depth of about 30 feet below existing site grade. The boring was advanced using a Mobile B-24, truck-mounted drill rig equipped with a 4-inch, solid-stem flight auger. The approximate location of the boring performed for this investigation is shown on Plate 2.

Our technician maintained a log of the boring, visually classified the soils encountered according to the Unified Soil Classification System (see Plate 3), and obtained representative samples of the subsurface materials. Soil samples were obtained from the boring with a Standard Penetration Sampler driven 18 inches (unless otherwise noted) into undisturbed material using a 140-pound hammer falling 30 inches. After the boring was completed, it was backfilled with the drill cuttings. A log of the exploratory boring performed for this investigation is presented on Plate 4.

SITE CONDITIONS

GEOLOGY AND SEISMICITY

Geologic Setting

The project site is located within the Coast Range geologic province. The geologic structure of this province is complex, having been molded by numerous mountain building events characterized by extensive folding, faulting, and fracturing of variable intensity. Regionally, these folds and faults trend northwesterly and are responsible for the development of a pronounced northwest trending ridge-valley system.

Based on our review of the California Division of Mines and Geology map titled: "Geologic Map of the San Francisco-San Jose Quadrangle, California," compiled by D.L. Wagner, E.J. Bortugno, and R.D. McJunkin (published 1991), the project site lies within an area of Quaternary-age alluvium.

Faulting and Seismicity

The project site is located within a region of California characterized by active faulting. The closest, active[2] fault mapped by the California Division of Mines and Geology is the Hayward Fault, located approximately 1/2 mile to the northeast of the site.

[2] Within this report, a fault is considered active if there is evidence of Holocene (i.e., within the past 10,000 to 12,000 years) surface displacement along one or more of its segments or branches.

SURFACE

The project site consists of a rectangularly-shaped area located at 16081 Mateo Street in San Leandro, California. The site is bounded to the north by an asphalt-concrete-paved vehicular storage area (with an existing telecommunications facility beyond and to the northwest), and to the east, south and west by an asphalt-concrete-paved vehicular storage area. At the time of our field investigation, the site area was surfaced with asphalt concrete and appeared to be used for vehicular storage. Existing topography within the immediate site area was relatively level.

SUBSURFACE

Near-surface earth materials encountered in the boring performed for this investigation (and beneath on-site pavements) consisted predominantly of stiff sandy clay to a depth of about 3 feet below existing site grade. Below these near-surface soils, loose clayey sand, loose silty sand and very stiff silty clay were encountered to the maximum depth explored (approximately 30 feet below existing site grade).

Free groundwater was encountered during our field investigation at a depth of about 7 feet below existing site grade. However, groundwater conditions can vary depending on the season, precipitation, runoff conditions, irrigation and/or groundwater pumping practices (both on and off site), the level of nearby bodies of water, and possibly other factors. Therefore, groundwater conditions presented in this report may not be representative of those which may be encountered during or subsequent to construction.

A more detailed description of the subsurface conditions encountered during our field investigation is provided on the attached log.

Therefore, relatively low geotechnical parameters have been provided for the design of the proposed pier and flexible connections have been recommended for use between the planned tower and equipment cabinet (or cabinets) to allow for possible differential vertical movements.

Specific comments regarding the conditions outlined above, as well as recommendations regarding the geotechnical aspects of project design and construction, are presented in the following sections of this report.

GEOLOGIC HAZARDS

Ground Rupture

No active faults are known to cross the site area, nor is the site within a current Earthquake Fault Hazard Zone (formerly known as an Alquist Priolo Special Studies Zone). Therefore, it is our professional opinion that the potential for ground rupture (or other similar effect) at the site in the event of a seismic event is highly unlikely.

CBC Seismic Design Parameters

In the event the California Building Code (CBC, 2007 edition) is used for seismic design, it is our opinion encountered subsurface conditions (and those suspected below the maximum depth explored) would warrant a type D (i.e., stiff soil) Site Classification. Further, using software provided by the United States Geological Survey (i.e. Java Ground Motion Parameter Calculator - Version 5.0.9), site-specific spectral response acceleration parameters were obtained for the maximum considered earthquake and are summarized in the table below.

Spectral Response Acceleration Parameters		Value
Mapped spectral acceleration for short periods	S_S	1.974g
Mapped spectral acceleration at 1-second period	S_1	0.766g
Site coefficient for short periods	Fa	1.000
Site coefficient at 1-second period	Fv	1.500
Adjusted earthquake spectral response acceleration for short periods	S_{MS}	1.974g
Adjusted earthquake spectral response acceleration at 1-second period	S_{M1}	1.149g
Design earthquake spectral response acceleration for short periods	S_{DS}	1.316g
Design earthquake spectral response acceleration at 1-second period	S_{D1}	0.766g

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

Results of our study indicated the site is not within a current Earthquake Fault Hazard Zone or other area known to possess a significant geologic risk to site development. Further, we anticipate conventional grading practices may be used for most site earthwork activities (if any) and that a drilled, cast-in-place concrete pier may be used for support of the proposed steel monopole tower; foundation support for the planned equipment cabinets (or cabinet) may be provided using shallow spread footings and/or a mat foundation.

Though we anticipate the site may be developed generally using conventional grading and foundation construction techniques, it should be noted conditions were identified by our field exploration program that may require special design and/or construction provisions for some project components. A brief summary of these conditions as well as possible design and/or construction provisions to address these potential concerns are outlined below.

- Potentially expansive, near-surface clay soils were encountered during our field exploration program. Based on the scope of the currently proposed project, the presence of potentially expansive clay soils should not have a significant adverse effect on project features. However, if the nature of the proposed construction changes (i.e., buildings, pavements, or other improvements sensitive to ground movement are to be constructed at the site), special design and construction provisions may be required. Such provisions could include removal of on-site, potentially expansive fill soils and replacement with nonexpansive engineered fill, deepening some foundations, and/or reinforcing or otherwise strengthening foundations, slabs, pavements, and/or other similar improvements to resist earth pressures associated with expansive fill soils.

- Groundwater was initially encountered during our field exploration program at a depth of approximately 7 feet below existing site grade. In our opinion the presence of groundwater may hinder drilling operations for the proposed tower foundation pier, possibly requiring casing, drilling fluids, and/or other methods to advance the excavation and maintain hole stability.

- In addition to hindering drilled excavations for the proposed tower foundation pier, the presence of shallow groundwater may also require temporary dewatering to advance trench and/or other earthwork excavations.

- Cohesionless sandy soils encountered during our field investigation about 5 to 12 feet below existing site grade could be susceptible to liquefaction in the event of a strong, nearby earthquake. In our opinion, the effects of such an event would most likely be limited to minor ground subsidence and some loss of support for the proposed tower foundation pier.

seismic ground motions. In the event of a large, nearby earthquake, we estimate seismically-induced ground subsidence could approach a few inches.

In our opinion (and assuming the planned steel monopole telecommunications tower will be supported using a drilled, cast-in-place concrete pier - see section above titled "Liquefaction"), the most significant adverse effect that seismically-induced ground subsidence may have on the proposed project would involve settlement of planned equipment cabinet (or cabinets) supported on shallow foundations. Based on our understanding of the project, we would not anticipate such settlement to have a significant adverse effect on planned equipment cabinet (or cabinets). However, such settlement may adversely affect utility connections between the planned steel monopole telecommunications tower and planned equipment cabinet (or cabinets). Therefore, we recommend all connections between the planned steel monopole telecommunications tower and planned equipment cabinet (or cabinets) be designed to resist (or accept) a 2-inch vertical, downward movement (of the planned equipment cabinet (or cabinets) with respect to the planned steel monopole telecommunications tower).

Landslides

The site of the proposed telecommunications facility is in an area of relatively level topography. Since little-to-no earthwork grading is anticipated for the project, it is our professional opinion that landsliding is unlikely at the site and that earthwork grading (if any) should not result in a potential for slope instability within or in the immediate vicinity of the site.

EXPANSIVE SOIL

Based on the results of our field exploration program, near-surface clay soils located at the site appear to be expansive. Expansive soils are characterized by their ability to undergo significant volume change (shrink or swell) due to variations in moisture content. Changes in soil moisture content can result from rainfall, landscape irrigation, utility leakage, roof drainage, drought, or other factors, and may cause unacceptable settlement or heave of structures, concrete slabs supported-on-grade, or pavements supported over these materials.

In our opinion (and based on the scope of the currently proposed project), the presence of potentially expansive surficial clay soils should not have a significant adverse effect on currently-planned project features. However, if the nature of the proposed construction changes (i.e., buildings, pavements, or other improvements sensitive to ground movement are to be constructed at the site), special design and construction provisions may be required. Such provisions could include moisture conditioning slab and pavement subgrade soils and strengthening foundations and slabs. In the event the nature of the proposed construction changes, we should be notified immediately in order to review and, if deemed necessary, conduct additional studies and/or provide supplemental recommendations.

Liquefaction

Liquefaction is a phenomenon whereby loose, saturated, granular soil deposits lose a significant portion of their shear strength due to excess pore water pressure buildup resulting from cyclic loading, such as that caused by an earthquake. Among other effects, liquefaction can result in densification of such deposits after an earthquake as excess pore pressures are dissipated (and hence settlements of overlying deposits). The primary factors deciding liquefaction potential of a soil deposit are: (1) the level and duration of seismic ground motions; (2) the type and consistency of the soils; and (3) the depth to groundwater.

Subsurface earth materials encountered during our field investigation generally consisted of stiff sandy clay underlain by loose clayey sand, loose silty sand, and very stiff silty clay. Free groundwater was encountered during our field investigation at a depth of about 7 feet below existing site grade.

Based on empirical procedures[3], it appears loose, cohesionless soils encountered during our field investigation about 5 to 12 feet below existing site grade may be susceptible to liquefaction during or subsequent to a nearby seismic event. In our opinion, possible effects of liquefaction on the project would primarily involve settlement of the ground surface (see section below entitled "Ground Subsidence") as well as possible, partial loss of foundation support of a drilled, cast-in-place concrete pier proposed for support of the planned steel monopole tower.

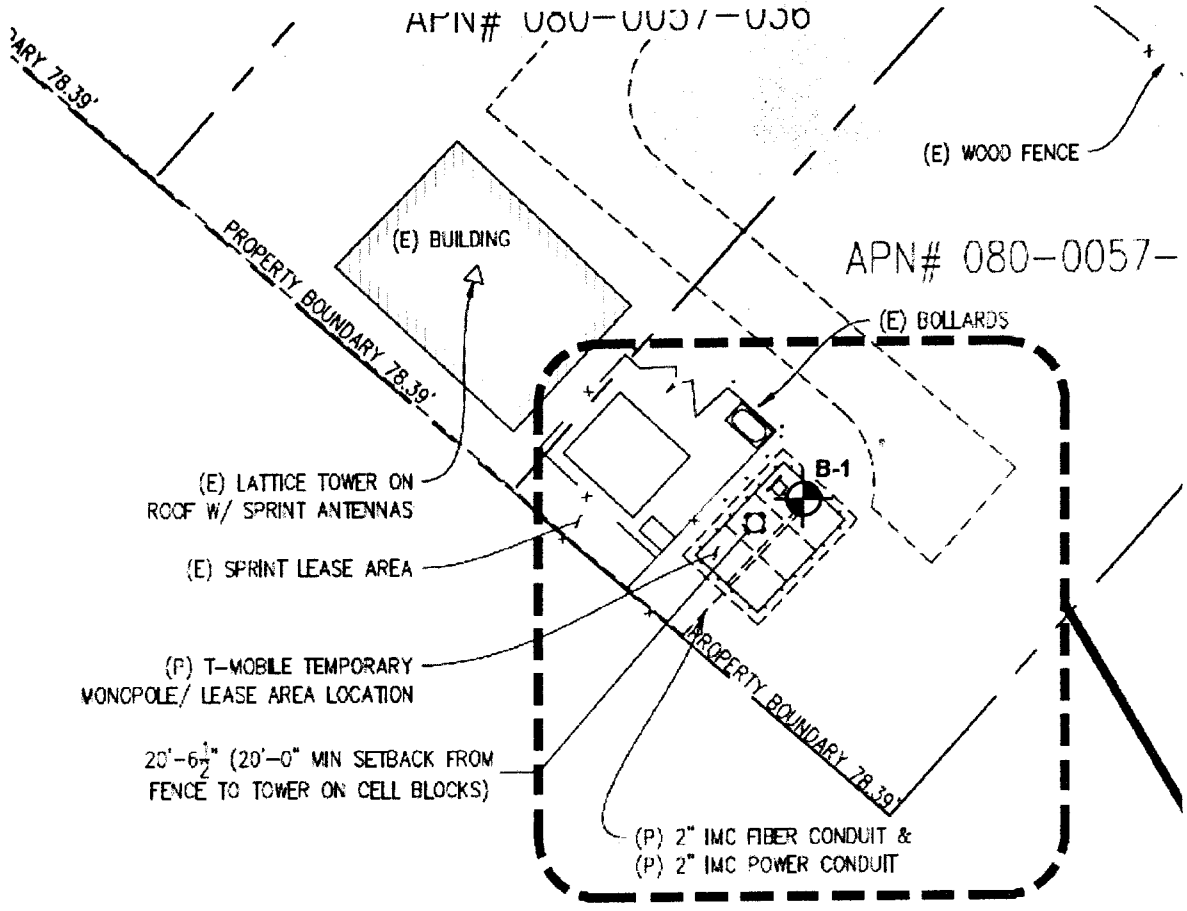
In our opinion, it would not be feasible to eliminate the possibility of liquefaction at the site or completely mitigate possible adverse effects on planned project features. However, it is our opinion that partial loss of foundation support of a drilled, cast-in-place concrete pier (proposed for the planned tower) could be addressed by deepening the proposed pier through the zone of potentially liquefiable soils and by using relatively low geotechnical parameters in the design of the proposed tower foundation (see section below entitled "TOWER FOUNDATION - DRILLED PIER").

Ground Subsidence

Ground subsidence within the site area would typically be due to densification of subsurface soils during or subsequent to a seismic event. Generally, loose, granular soils would be most susceptible to densification, resulting in ground subsidence.

Based on the subsurface conditions encountered during our field investigation, loose, cohesionless soils located at depths about 5 to 12 feet below existing site grade may be susceptible to liquefaction during or subsequent to a nearby seismic event, possibly resulting ground subsidence. The magnitude of possible ground subsidence at the site would be highly dependent on the level and duration of

[3] Reference: "Proceeding of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils," Technical Report NCEER-97-0022, December 31, 1997.



NORTH

NO SCALE

LEGEND

BORING LOCATION AND DESIGNATION

NOTE: The boring was located in the field by visual methods. Therefore, the location of the boring shown on this plan should be considered highly approximate.

REFERENCE: Plan prepared by Streamline Engineering titled "SITE PLAN," Sheet A-1, dated February 3, 2009 (latest revision).

BMI PROJECT NO. ▶ 09S-030

SITE PLAN
PROPOSED TELECOMMUNICATIONS FACILITY
HANK'S TOWING, SITE NO. BA02074
SAN LEANDRO, CALIFORNIA

PLATE
2

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			SYM.	DESCRIPTION
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS GREATER THAN NO. 200 SIEVE	GRAVELS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS (LITTLE OR NO FINES)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		GRAVELS (APPRECIABLE FINES)	GM	Silty gravels, poorly-graded gravel-sand-silt mixtures
			GC	Clayey gravels, poorly-graded gravel-sand-clay mixtures
	SANDS MORE THAN 50% OF COARSE FRACTION PASSES NO. 4 SIEVE	SANDS (LITTLE OR NO FINES)	SW	Well-graded sands, gravelly sands, little or no fines
			SP	Poorly-graded sand, gravelly sands, little or no fines
		SANDS (APPRECIABLE FINES)	SM	Silty sands, poorly-graded sand-gravel-silt mixtures
			SC	Clayey sands, poorly-graded sand-gravel-clay mixtures
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO.200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	Inorganic silts and very fine sands, silty or clayey fine sands, clayey silts with slight plasticity
			CL	Inorganic clays of low-to-medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and clays of low plasticity
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic silts and clays of high plasticity
HIGHLY ORGANIC SOILS			PT	Peat, humus, swamp soils with high organic content

FIELD		LABORATORY	
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2-INCH OUTSIDE DIAMETER)	-4	% PASSING NO.4 SIEVE (ASTM TEST METHOD C 136)
	CALIFORNIA SAMPLER (3-INCH OUTSIDE DIAMETER)	-200	% PASSING NO. 200 SIEVE (ASTM TEST METHOD C 117)
	MODIFIED CALIFORNIA SAMPLER (2.5-INCH OUTSIDE DIAMETER)	LL	LIQUID LIMIT (ASTM TEST METHOD D 4318)
	BAG/BULK	PI	PLASTICITY INDEX (ASTM TEST METHOD D 4318)
	THIN-WALLED SHELBY TUBE (3-INCH OUTSIDE DIAMETER)	R-VAL	RESISTANCE VALUE (CALTRANS TEST 301)
	WATER LEVEL (LEVEL ESTABLISHED AS NOTED ON LOGS)	EI	EXPANSION INDEX (UBC STANDARD 29-2)
	WATER OR SEEPAGE ENCOUNTERED (LEVEL NOT ESTABLISHED)	COL	COLLAPSE POTENTIAL (ASTM TEST METHOD D 5333)
		SP	SWELL POTENTIAL (under a specified load) (ASTM TEST METHOD D 4546)
		SL	SWELL PRESSURE (no consolidation) (ASTM TEST METHOD D 4546)

GENERAL NOTES:

- Lines separating soil or rock strata on logs are approximate boundaries only. Actual transitions may be gradual and, in the case of selectively sampled boring, may vary by as much as the sample interval.
- In general, Unified Soil Classification designations shown on the logs were evaluated using visual methods only. Actual designations (based on laboratory tests) may vary.
- Logs represent general soil conditions on the date and at the location indicated. No warranty is provided as to the continuity of soil conditions between individual sample locations.
- Unconfined comprehensive strengths reported on the logs (if any) were obtained using a pocket penetrometer.

BMI PROJECT NO. ▶ 09S-030

LOG LEGEND
PROPOSED TELECOMMUNICATIONS FACILITY
HANK'S TOWING, SITE NO. BA02074
SAN LEANDRO, CALIFORNIA

EXPLORATION DATE	LOGGED BY	TOTAL DEPTH	BORING NO
March 4, 2009	Peter Schurman	30 feet	**B-1**
EXPLORATION EQUIPMENT		**BACKFILL MATERIAL**	
Mobile B-24 equipped with a 4-inch-diameter, solid-stem auger		Drill cuttings	

FIELD						DESCRIPTION	LABORATORY			
DEPTH (IN FEET)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT	UNCONFINED COMP. STRENGTH (TSF)	USCS LETTER SYMBOL	SURFACE CONDITIONS: Asphalt concrete pavement (about 2 inches of asphalt concrete underlain by about 10 inches of aggregate base) GROUNDWATER CONDITIONS: Free groundwater encountered at a depth of approximately 7 feet below existing site grade. APPROX. GROUND SURFACE ELEVATION (IN FEET) ▶ N/A	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	OTHER LAB TESTS SEE LOG LEGEND FOR ABBREVIATION DEFINITIONS
						ASPHALT CONCRETE PAVEMENT			
		1	9	1.5	CL	***Sandy CLAY:*** Dark olive-gray, moist, stiff, fine grained, with some silt			
5		2	6		SC	***Clayey SAND:*** Dark olive-gray, moist, loose, fine grained, with some silt ▽			
10		3	6		SM	***Silty SAND:*** Olive-brown, moist, loose, fine-to-medium grained, with some clay			
15		4	10	2.25	CL	***Silty CLAY:*** Dark gray-brown, moist, very stiff, with some fine sand			
20		5	9	2.5					
25		6	11	2.5					
30		7	13						

BMI PROJECT NO. ▶ 09S-030

LOG OF EXPLORATORY BORING
PROPOSED TELECOMMUNICATIONS FACILITY
HANK'S TOWING, SITE NO. BA02074
SAN LEANDRO, CALIFORNIA

PLATE **4**