Centennial Geotechnical Engineers Ltd.
Suite 106, 2780 E. Broadway, Vancouver, B.C. V5M 1Y8
Email: centennial@ibm.net
Phone: (604) 255-0828 Fax: (604) 255-0817

FINAL GEOTECHNICAL REPORT
PROPOSED SECONDARY SCHOOL, and
SPORT FACILITIES
835 - 8TH STREET, NEW WESTMINISTER, BC

Prepared for:

New Westminister School District #40
821 - 8th Street
New Westminister, BC.
V3M 3S9

Our File: V04 - 121
October 2004

Centennial Geotechnical Engineers Ltd.

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Suite 106, 2780 E. Broadway, Vancouver, B.C. V5M 1Y8
Email: centennial@ibm.net
Phone: (604) 255-0828 Fax: (604) 255-0817

October 10, 2004

File: V04-121

Director of Operations
New Westminister School District #40
821 - 8th Street
New Westminister, BC. V3W 3S9

Attention: Mr. Larry Bryce

Dear Mr. Larry Bryce,

RE: FINAL GEOTECHNICAL REPORT
PROPOSED SECONDARY SCHOOL and
SPORT FACILITIES
835 - 8TH STREET, NEW WESTMINSTER, BC

1.0 INTRODUCTION

In accordance with the authorization of the Director of Operations for the New Westminister School Board, Mr. Larry Bryce, Centennial Geotechnical Engineers Ltd. (CGE) completed a geotechnical investigation for a proposed secondary school and sport facilities located at the subject property in New Westminister, as shown in Figure 1.

A two-phase geotechnical investigation program was completed in general accordance with the scope of work outlined in our proposals dated May 10 and August 26, 2004.

The purpose of the geotechnical investigation was to identify soil and groundwater conditions beneath the proposed secondary school and sport facilities' sites. Based on the results of the phased geotechnical investigation program, CGE develops recommendations for the geotechnical aspects including site preparation, earthwork, foundation design, lateral earth pressures, drainage control and pavement structure design for roadworks.

This final soils report presents the results of the two-phase subsurface investigation program and provides our recommendations for the geotechnical aspects of the project.

At the time of preparing the final soils report, structural loading conditions for the proposed secondary building are not available.

2.0 PROPOSED SECONDARY SCHOOL and SPORT FACILITIES

As indicated in the preliminary architectural drawings, dated September 29, 2004 prepared by Grant + Sinclair Architects Ltd., CGE understands that the proposed development will include construction of a new secondary school and sport facilities in the following areas:

- The proposed secondary school will be located near the east end of the subject property. The new building is L-shaped, with maximum plan dimensions of about 550 feet by 800 feet (165m by 250m). It will be three stories high and include a 1-level underground parking structure (P1) over the footprint of the entire new building. The final floor grade for the P1 underground parking structure will be established at Elev. 88.88m (geodetic datum).

  At the north end of the building, a second level underground parking structure (P2) with a below grade auto shop will be constructed. The second level underground parking structure is about 120 feet by 250 feet (36m by 75m) in plan dimensions with the final floor grade at Elev. 86m. The auto shop, about 55 feet by 90 feet (17m by 28m) with the final floor slab at Elev. 87m, is located at the northeast corner of the P2 level.

- The proposed sport facilities including two soccer fields and two basketball courts will be constructed on the west side of the new secondary school. The sport facilities would encompass an area of about 400 feet by 600 feet (120m by 180m) in plan dimensions.

The general layout and approximate locations of the proposed secondary school and sport facilities are shown in Figure 2.

3.0 SITE DESCRIPTIONS

General

The parcel of land to be used for construction of the new secondary school is partly owned by the School Board of New Westminster and City of New Westminster. This block of land is bounded on the west by Tenth Avenue, on the north by 6th Street, on the east by Eighth Avenue and on the south by 8th Street.

The parcel of land owned by the New Westminster School Board occupies the south half of the site. There are three major blocks of buildings including the east wing with the Massey Theatre, the west wing with the Adult Academy Learning Centre, and a detached building between the two wings. In addition, there are several asphalt-paved parking lots, a basketball court and a

main driveway along the north end of the site extending between Tenth Avenue on the west and Eight Avenue on the east.

The parcel of land owned by City of New Westminster occupies the northwest quarter of the site. This site is currently occupied by an oval track and field stadium, two grass surface soccer fields, a baseball field, a skateboard rink, and a park.

The northeast quarter of the block of land is occupied by the Royal City Christian Centre and the Moody Park Arena which is operated by City of New Westminister.

The locations of the existing buildings, main driveway, parking lots, park and sport facilities are shown in Figure 3.

3.1 Proposed Secondary School

The proposed secondary school site located on the east side of the subject property is currently occupied by the park, the skateboard rink, a soccer field, the baseball field, a small portion of the east wing Classroom Block, the detached building, the main driveway and at least three parking lots.

The general site grade of the existing school site is relatively level, and slopes gently down from south to north towards the park. There is a slight difference in grade ranging from about 12 inches to 4 feet (0.3 to 1.2m) between the soccer fields and the main driveway. The site grades of the soccer fields and the baseball field are relatively level. In addition, there is a difference in grade of about 3 feet (1m) between the soccer fields and the park at the north.

According to the City of New Westminister Park's manager, the site grade of the park was raised during the last renovation work that was performed several years ago. The area currently occupied by the park was once a local depression, and was subsequently filled with random fill ranging from about 6 to 10 feet (1.8 to 3m) thick obtained from regrading the oval track and field stadium and the soccer fields. Beneath the soccer fields, the area is underlain by about 12 inches (300mm) of river sand fill, a sprinkler system and a network of stormwater drain pipes.

The skateboard rink mainly consists of a concrete lined depression with a concrete apron around the perimeter.

According to the Director of Operations of the School Board of New Westminister, Mr. Larry Bryce, numerous sanitary and storm drain pipes, an underground electrical cable, a steam tunnel, water, telephone and gas lines are located beneath the developed areas of the existing school site. The service gas line to the school property is located near the main entrance to the existing

secondary school, off 8th Street. However, there are no accurate records pertaining to the locations of all the existing underground utilities.

3.2 Proposed Sport Facilities

The locations of the two new soccer fields are currently occupied by the grass playing fields, the basketball court, two parking lots, the west end of the main driveway, and a portion of the west wing of the Classroom Block.

The general site grade of the existing soccer fields is relatively level. However, there is a slight difference in grade of about 12 inches to 4 feet (0.3 to 1.2m) between the soccer fields and the main driveway at the west and east ends, respectively.

4.3 GEOLOGY

In accordance with a surficial geology map M1464A, 1976 by Geological Survey of Canada, the surficial geology at the general area of the site comprises of Vashon Drift and Capilano sediments.

Vashon glacial drift including lodgment and minor flow till, lenses and interbeds of substratified glaciofluvial sand to gravel, and lenses and interbeds of glaciolacustrine laminated stony silt; up to 80 feet (24m) thick but in most places less than 25 feet (7.6m) thick; overlain by glaciomarine and marine deposits similar to Capilano deposits normally less than 10 feet (3m) but in places up to 30 feet (9m) thick.

The Capilano deposits are marine and glaciomarine stony to stoneless silt loam and clay loam with minor sand and silt normally less than 10 feet (3m) thick but up to 100 feet (30m) thick, containing marine shells.

5.0 SUBSURFACE CONDITIONS

5.1 Soils Investigation

The two-phase soils investigation program was conducted using a track-mounted auger drill rig provided by Downrite Drilling on June 3, 2004, and a truck-mounted auger drill rig by Dynamic Drilling on September 3, 2004. The field work was performed under the supervision of our field engineer.

The soil investigation program included advancement of a total of 27 test boreholes and 12 dynamic cone penetration tests (DCPT) at the proposed building and sport facilities' sites. The terminated depths of the test boreholes ranged from about 8.5 to 25 feet (2.6 to 7.6m) below existing ground surfaces. The approximate locations of the boreholes are shown in Figure 3.

Adjacent to these test boreholes, A1, A2, A3, A9, A13, A16, B4, B5, B6, B7, B8, and B9, DCPTs were performed to determine the relative density/consistency of the soils. The DCPTs were completed by advancing a 2-1/4 inch (57mm) dia. cone attached to a string of 1-inch (25mm) dia. drill rods, using a 140-pound (63.6kg) hammer falling 30 inches (760mm). The DCPTs were terminated in a very dense stratum where the total number of blows per foot exceeds at least 60.

The stratigraphy in each test borehole was logged, and representative soil samples were obtained from the auger flights by the field engineer. The recovered soil samples were returned to our laboratory for further visual examination, moisture content tests and unconfined compressive strength measurements using a pocket penetrometer.

The logs of the test boreholes, the results of the dynamic cone penetration tests, moisture content tests and unconfined compressive strength values are presented in Figures A1 to A27, in Appendix A of this report.

5.1.1 Soil Conditions

Subsurface conditions encountered in the test boreholes are presented in the Logs of Test Boreholes in Appendix A of this report.

Four soil profiles, A to D, were interpolated from the soil conditions encountered in the test boreholes advanced beneath the proposed secondary school site. The soil profiles are presented in Figures 4 to 7.

The following sections provide a summary description of generalized soil's profile encountered in the test boreholes beneath the proposed secondary school and the sport facilities. However, soil conditions vary in aerial extent as well as in depths between the test boreholes and across the sites.

Soil Unit 1 A layer of loose, random fill consisting of a mixture of silty sand and gravel with some organic matter was encountered below the existing ground surfaces in the existing park area (A2, A3, B7, B8), the soccer fields (A4, A5, A6, B6, B9), and the west wing of the Classroom Block (A7, A17, B1, B2).

The thickness of the random fill is not uniform, ranging from about 6.5 to 8 feet (2 to 2.4m) in the park, 4 to 8 feet (1.2 to 2.4m) in the soccer fields, and about 4.5 to 5.5 feet (1.4 to 1.6m) at the west wing of the Classroom Block.

Soil Unit 2 Below the topsoil or the random fill, a layer of silty fine-grained sand stratum was encountered extending to the depths of about 4 to10 feet (1.2 to 3m) below ground surfaces. The upper 2 to 3 feet (0.6 to 0.9m) of the sand generally has a rusty brown colour, but grades to tannish brown thereafter.

The silty sand stratum was encountered in many test boreholes including test boreholes A1, A5, A6, A8, A7, A9, B3, B4, B5, B6, B9, and B10. However, the thickness of the sand stratum is not uniform.

The relative density of the silty sand is generally loose with blow counts ranging from about 5 to10 per foot.

Soil Unit 3 Beneath the sand stratum, a layer of tannish grey mottled clayey fine-grained sand with a trace of small pebbles and1-inch gravel was encountered in test boreholes A1, A3, A5, A6, A8, B1, B4, B5, B6, B7 and B10. At test borehole A6, small seashells were found in this stratum. The thickness of the clayey sand is not uniform, ranging from about 3 to 4 feet (0.9 to 1.2m).

The relative density of the clayey sand is compact with blow counts ranging from about 10 to 20 per foot.

Soil Unit 4 Beneath either Soil Unit 2 or 3 is a stratum of grey brown mottled medium plasticity, clayey silt with a trace of small pebbles, about 4 to 8 feet (1.2 to 2.4m) thick. This stratum was encountered in several test boreholes including A1, A2, A4, A9, B2, B5, B6, B7, and B9.

The consistency of the stony, clayey silt varies from firm to stiff. The unconfined compressive strength measurements ranged from about 1.5 to 2 tons per square foot (tsf) on disturbed soils samples.

Soil Unit 5 The stony clayey till-like soils (Soil Unit 4) generally grade without the small pebbles and fine gravel with depths. The stoneless clayey silt stratum is generally 2 to 4 feet (0.6 to 1.2m) thick. However, it is slightly thicker at B3, about 6.5 feet (2m). In addition, the depths to the stoneless clayey silt vary from about zero to15 feet (5m) below existing ground surfaces.

The stoneless clayey silt stratum was encountered in many test boreholes including A1, A3, A5, A6, A7, A9, A10, A17, B3, B4, B5, B7, B8, and B10.

The consistency of the stoneless clayey silt is very stiff with unconfined compressive strength measurements in the order of 4 tsf (380kPa) on disturbed soils samples.

Soil Unit 6 A layer of grey, silty fine-grained sand with small pebbles till-like soils was encountered at the termination of all the test boreholes. The depths to the very dense sandy till soils vary from about 5 to 22 feet (1.4 to 7m) below existing ground surfaces.

The relative density of the sandy till soils is generally very dense with blow counts exceeding 100 per foot.

A Becker Density Test (BDT) was performed at MW6 using a Becker Hammer drill rig. The test involved driving a 6-5/8inch (170mm) dia. close-ended casing using the diesel hammer, and recording the number of blows (N) per foot of advancement of the casing. The N value per foot provides an indication of the relative density of the soils. The BDT test results indicated that the relative density of the sandy till increases with depths, ranging from about 100 to 180 between the depths of 15 and 18 feet (4.6 to 5.5m). Between the depths of 18 and 19 feet (5.5 and 5.8m), the N value was about 500 per foot, reaching refusal of the hammer.

5.2 Groundwater Investigation

The following sections provide a brief description of the groundwater investigation program, the aquifer, the groundwater levels and the perched water table.

5.2.1 Field Investigation

The groundwater investigation was conducted using the 'Becker Hammer' drill rig provided by Dynamic Drilling on July 5 and September 1, 2004 under the supervision of the CGE field engineer.

The groundwater investigation program included drilling of six boreholes and installation of a monitoring well (MW1 to MW6) in each borehole, at the approximate locations as shown in Figure 3.

The boreholes were terminated at the depths of about 47 to 82 feet (14.3 to 25m) below existing ground surfaces where groundwater was encountered. The logs of the boreholes are presented in Appendix A, Figures A28 to 33 of this report.

5.2.2 Monitoring Wells

A total of six monitoring wells were installed in the boreholes advanced by the Becker Hammer drill rig.

The monitoring wells consist of either a 2-inch (50mm) or a 1.5-inch (38mm) diameter PVC pipe, ranging from the depths of about 47 to 82 feet (14.3 to 25m) below existing ground surfaces.

The monitoring well includes a 10 to 15-foot (3 to 4.6m) long screen at the bottom and a blank section above. The well was backfilled with either clean sand or pea gravel to at least 5 feet (1.5m) above the screen. Above the granular backfill, a 2-foot (600mm) thick bentonite seal was installed. The annular space was then backfilled with cuttings to a depth of about 3 feet (1.5m) below ground surfaces. The remaining section of the well was backfilled with bentonite chips. A metal well cover was installed at each monitoring well for protection.

Details of the screen, the sand/gravel packing and bentonite sealing plug are presented in the logs of monitoring well, Figures A28 and A33 in Appendix A of this report.

5.2.3 Aquifer

According to the six boreholes advanced using the Becker Hammer drill rig, the sandy till soils (Soil unit 6) generally extend to the depths of about 36 to 50 feet (11 to 15m) below existing ground surfaces. Below the sandy till soils, an aquifer consisting of silty sand and fine gravel about 10 to 18 feet (3 to 5.5m) thick was encountered in the boreholes. Underlying the aquifer is a stratum of low permeable, silty till soils where all the boreholes terminated.

Two soil profiles, E and F, were interpolated from the soil conditions encountered in the six boreholes. The soil profiles are presented in Figures 8 and 9.

Based on the groundwater level measurements (Table in Section 5.2.4) and the position of the aquifer, the aquifer is under confined flow. The artesian pressures of the confined aquifer range from about 1,100 to1,700 pounds per square foot (psf) at MW3 and MW5, respectively in a south to north direction of the new building site. In a west to east direction, the artesian pressures beneath the new building site range from about 1,100 psf (52.7kPa) to1,950 psf (93.3kPa) at MW3 to MW4, respectively.

5.2.4 Groundwater Level

The monitoring wells were developed by removing at least 3 times the volume of water of the well using a bailer. The groundwater levels in the monitoring wells were measured using a Water Level Metre, model 3001 manufactured by RST Instruments of Coquitlam on September 16, 2004.

The groundwater elevations presented in the summary table are referenced to Universal Traverse Mercator (UTM) monuments 89H5543 (El. 94.201m), 89H5542 (El. 86.311m), 89H6031 (El. 98.778m), 89H6032 (El. 98.134m), and 89H5541 (91.438m). All measurements are reported in metres.

A summary of the groundwater level elevations measured at each monitoring well is presented in the following table.

Monitoring Wells (MW)	Ground Surface Elevation, m	Top of MW Elevation, m	Depth of Groundwater Level, m	Elevation of Groundwater Level, m
MW1	92.22	92.15	1.83	91.03*
MW2	94.94	94.72	8.45	86.49
MW3	94.06	94.02	9.09	84.97
MW4	92.20	92.12	10.58	81.60
MW5	90.67	90.63	5.82	84.85
MW6	90.71	90.69	5.85	84.86

- The measured groundwater level is probably incorrect due to infiltration of perched water.

As shown in the above table, the global direction of groundwater flow at this site is generally down gradient from west (MW2) to east (MW4), with a difference in gravity head of about 16 feet (4.89m). However, a very slight downward gradient of about 6 inches (150mm) was observed in the south to north direction between MW3 and MW5.

5.2.5 Perched Water Level

A perched water table was encountered in the tan fine-grained sand stratum (Soil Unit 2) at the depths of about 5 to 8 feet (1.5 to 2.4m) below existing ground surfaces at the time of the soils investigation in June 2004.

Where the tan sand stratum is presence, CGE anticipates that a perched water table would normally be encountered on the surface of the clayey sand (Soil Unit 3) at the depths of about 4 to 5 feet (1.2 to 1.5m) below existing ground surfaces.

The perch groundwater level will fluctuate with seasonal precipitation. In addition, concentrated groundwater flow/seepage could occur in pockets of sandy granular soil, typically encountered in till-like soils.

6.0 SEISMIC DESIGN CRITERIA AND LIQUEFACTION EVALUATION

6.1 Seismic Design Criteria

The subject property is located within Seismic Zone 4, as defined in the maps contained in the Supplement to the current 1995 edition of the 'Commentary to the National Building Code'.

The earthquake-resistant objectives of the code require that structures, including foundations, be designed in such a manner to remain functional if subject to moderate earthquakes (usually 1 in a 100-year return period), and not collapse to endanger the occupants when subject to the major design earthquake. However, in the process the building may be extensively damaged and may not be useful following the earthquake. A major earthquake is generally taken as that having a 10% probability of exceedance in 50 years (Richter Magnitude 7, 1 in a 475-year return period).

In the absence of a site specific seismic hazard calculation, the 1995 NBCC recommends a design peak firm ground horizontal acceleration of 0.21g for the Greater Vancouver area for the major earthquake with a probability of exceedence of 10% in 50 years (1 in 475-year recurrence interval).

6.2 Liquefaction Assessment

Based on the soil conditions encountered in the test boreholes and at this level of shaking, CGE completed a liquefaction assessment using the methodology proposed by NCEER1996.

The results of the analysis indicated that the unsaturated random fill/topsoil materials, and the native soils (Soil Units 2 to 6) are not susceptible to liquefaction under the current design criteria.

6.3 Foundation Factor

In accordance with the 1998 edition of the British Columbia Building Code, where the subgrade consists of 'rock, dense and very dense coarse-grained soils, very stiff and hard fine-grained soils; compact coarse-grained and firm and stiff fine-grained soils from 0 to 15m deep', the code recommends a foundation factor "F" of 1.0 (Table 4.1.9.C and Clause 4.1.9.1(11)).

7.0 DISCUSSIONS AND RECOMMENDATIONS

7.1 General

As shown in Figures 4 to 7, bulk excavation in the order of 6.5 to 18 feet (2 to 5.5m) and 15 to 20 feet (4.5 to 6m) deep will be required for construction of the 1-level and the 2-level underground parking structure, respectively. Shoring will be required for supporting the vertical cut slopes of the bulk excavation where there is insufficient space for stable slope cuts. In addition, underpinning will be required to support the west perimeter wall of the Massey Theater.

Foundation design for the proposed secondary school will most likely include spread and strip footings to support columns and load-bearing walls, respectively. The floor slab of the proposed building will likely be a slab-on-grade construction.

The following sections provide our recommendations for site preparation, earthwork, drainage control, foundation design, foundation subgrade and slab-on-grade preparation, lateral earth pressures, and pavement structure design.

7.2 Site Preparation

Initial site preparation will include demolition of the pavement structure of the existing parking lots and driveways, stripping of random fill, vegetation and topsoil, and relocation of any existing underground utilities encountered within the footprint of the proposed school and sport facilities' sites. The excavated soils should be disposed in approved landfill facilities.

Stripping should extend at least 5 feet (1.5m) beyond the footprint of the proposed secondary school, sport facilities, fire access/service roads and parking lots. Additional stripping would be required where subgrade soil is damaged or softened due to surface ponding or precipitation, or

where unsuitable soils are encountered. The exposed subgrade surface should be either sloped or crowned to allow draining of infiltrated ground water and to prevent softening of subgrade.

The fine-grained soils such as the native silty sand, clayey sand, stony/stoneless clayey silt and sandy till soils (Soil Units 2 to 6) are sensitive to disturbance by construction traffic when saturated and in wet weather condition. The subgrade surface must be dry, free of ponding water, snow, ice and frozen soils, prior to placement of any fill materials. CGE recommends that a layer of 3/4" (19mm) clear crushed gravel, minimum 6 inches (150mm) thick be placed on the final subgrade surface for protection against disturbance or softening.

Site and subgrade preparation for the proposed sport facilities including the soccer fields, basketball courts, etc. shall follow the recommendations of the landscaped architect.

The south half of the proposed sport facilities is currently occupied by the west wing of the Classroom Block, the basketball court and two parking lots. The current site grades of this area are higher than the level of the existing soccer fields by about 3 to 6 feet (1 to 2m). Assuming the final grades of the new sport facilities are established at the same level as the existing soccer fields, excavation will be required for the southern half of the site to achieve the design grades of the proposed sport facilities.

Underground utilities will be encountered at the proposed construction sites. Where encountered, these utilities should be removed and relocated as per the 'Project' requirements. All utility backfill materials and sludge should be stripped to the subgrade approved by the Geotechnical Engineer. The voids should be backfilled with structural fill as per our recommendations in Section 7.3.3.

Prior to any fill placement, the final subgrade surface should be proof-rolled using a heavy compactor. Where soft/disturbed soils are encountered, these soft materials should be overexcavated, and backfilled with structural fills compacted to at least 95% modified Proctor maximum dry density (MPMDD), ASTM D1557 as per our recommendations discussed in Section 7.3.3 of this report.

The subgrade surface should be examined and approved by the Geotechnical Engineer, prior to any fill placement activities, and/or pouring of footings and floor slabs.

7.3 Earthwork

7.3.1 Excavation

It is a good practice to conduct a pre-construction condition survey of all the existing buildings located adjacent to the proposed development, prior to excavation.

Any excavation greater than 4 feet (1.2m) in depth must be carried out in accordance with the Industrial Health and Safety Regulations prepared by the Workers Compensation Board. In addition, as a safety measure, hoardings should be installed around the perimeter of the bulk excavation.

Construction for the 1-level underground parking structure (a final floor grade at Elev. 88.88m) of the proposed building is expected to extend about 6.5 to18 feet (2 to 5.5m), averaging about 13 feet (4m) below existing site grades. For the 2-level underground parking structure and the auto shop (final floor grades at Elev. 86 to 87m), the depths of excavation would be in the order of 15 to 20 feet (4.5 to 6m), averaging about 16.5 feet (5m) below existing ground surfaces.

For temporary slopes of bulk excavation completed above the groundwater table and away from any adjoining buildings in compact random fills, topsoil and granular soils, the slopes should not be steeper than 1H:1V (horizontal : vertical). For excavation in dense till-like soils (eg. Soil Units 5 and 6), temporary slopes of excavation should not exceed 1H:2V. The above recommended slope configurations should be flattened where seepage is encountered or under wet weather condition. The excavated slopes should be protected by plastic sheets to minimize erosion due to surface runoff and precipitation.

Based on the results of the subsurface investigation, excavation would be carried out through the random fill, silty sand, clayey sand, stony/stoneless clayey silt, and sandy till soils. It is anticipated that it will be possible to excavate these soils using conventional methods such as ripping and excavating with a large excavator. However, large boulders are known to be presence in the till soils, and may require drilling/splitting.

The stability of the slopes should be examined and approved by the Geotechnical Engineer, prior to any workers entering the site.

7.3.2 Shoring System

Where the recommended cut slope configurations discussed in Section 7.3.1 - Excavation cannot be achieved due to lack of space, the excavation will be completed vertically and supported using a shoring system.

A conventional shotcrete and soil anchors shoring system can be considered for support of vertical cut slopes where encroachment of soil anchors is permitted by the adjacent private and public properties' owners. If encroachment permission is not granted by these properties' owners, an internal shoring system using steel soldier piles, with either timber or shotcrete laggings and steel rakers will be required. However, the soldier pile/lagging system will require additional space of about 18 to 24 inches (450 to 600mm).

For excavation in close vicinity of any existing buildings, extreme care must be exercised to prevent undermining the foundation of the structures. Figure 10 shows the general guidelines for excavation adjacent to existing structures. According to the guideline, the perimeter footing of the west exterior wall of the Massey Theater is located within the excavated zone, and will require underpinning.

Regardless of what type of shoring system is used for support of excavation, minor ground movements/settlements in areas adjacent to the excavation will likely occur due to stress release from excavation. The ground adjacent to the excavation should be monitored on a regular basis for potential movements.

CGE will prepare excavation and shoring drawings for tendering and construction of the 1 and 2-level underground parking structure in a later day.

7.3.3 Structural Fills

Structural fills will be required for backfilling areas of overexcavation beneath the footprint of the proposed building, fire access/service roads, parking lots and the sport facilities.

The fill materials should consist of free-draining, 3-inch (75mm) minus sand or gravel, containing less than 5% passing the No.200 sieve. The fill materials may be placed to within 12 inches (300mm) of the underside of floor slabs, the underside of the pavement structure, and bedding of the sport facilities.

The fill materials should be placed in horizontal lifts not exceeding 12 inches (300mm) in loose thickness. Each lift should be compacted to at least 95% MPMDD.

The on-site random fills, topsoil, and imported recycled asphalt and concrete are not suitable as structural fill, nor as backfill for the basements walls. Clean, native granular soils may be reused as general site grading fill in the sport facilities, provided the materials contain less than 5% fines content, and can be compacted to achieve at least 95% MPMDD. The earthwork should be performed during dry summer months.

7.3.4 Backfill behind Basement Walls

Backfill behind the basement walls of the underground parking structure should consist of clean, free-draining sand and gravel with less than 5% fines passing No.200 sieve size. The fill materials should be placed in maximum 12 inches lift with each lift compacted to a minimum of 95% MPMDD.

If there is not sufficient room to operate a small plate tamper behind the basement walls, the backfill should consist of clean 'pea' gravel. The gravel should be placed in 2-foot (600mm) lift, and compacted using a concrete 'pen' vibrator.

7.4 Drainage Control

7.4.1 Construction Dewatering

As discussed in Section 5.2 - Groundwater Investigation, the aquifer encountered beneath the sandy till stratum (Soil Unit 6) is under confined flow, with artesian pressures ranging from about 1,100 to 1,900 psf (52.7 to 93.9kPa.).

In general, construction for the 1-level underground parking structure (a final floor grade at Elev.88.88m) effectively removes an average of about 13 feet (4m) of soils, equivalent to unloading of an overburden pressure of about 1,800 psf (86.2kPa). The net effective overburden pressure between the bottom of the bulk excavation and the top of the confined aquifer would range from about 1,800 to7,200 psf (86.2 to 344.7kPa), which generally exceeds the artesian pressures of the confined aquifer.

At the north end of the building, construction for the two-level underground parking structure and the auto shop (final floor grades at Elev. 86 and 87m) would remove an average of about 16.5 feet (5m) of soils, equivalent to unloading of an overburden pressure of about 2,200 psf (106.6kPa). The net effective overburden pressure between the bottom of the bulk excavation and the top of the confined aquifer would be about 4,300 psf (205.6kPa), which generally exceeds the artesian pressures of the confined aquifer.

The factor of safety for basal heave of the bulk excavation is defined as a ratio between the net effective overburden pressure acting downward on the bottom of the excavation against the uplift hydrostatic/artesian pressure at the base of the excavation.

For the 1-level underground parking structure, the safety factor against basal heave was calculated to be 1.6. For the 2-level underground parking structure, the safety factor against basal heave was about 2.4.

As indicated by the result of the analysis, the risk of potential basal heave during excavation for the one and the two-level underground parking structure is not significant. It is our opinion that there is no requirement for 'depressurization' of the confined aquifer.

Temporary dewatering will be required during excavation and construction of the proposed building due to the presence of the perched water table, as well as localized pockets/seams of granular soils within the till soils. Based on our experience in the general area, automatic sump pumps should be installed to control ground seepage and precipitation during construction.

For construction of the two-level underground parking structure, monitoring well MW5 located at the north end of the building site could produce groundwater flow, due to the depth of excavation and the artesian groundwater level. CGE recommends that MW5, and the other monitoring wells be either sealed or connected to the permanent onsite storm drainage system.

7.4.2 Permanent Drainage System

For the proposed secondary school, the foundation and the floor slab of the underground parking structure will be below the perched groundwater table. CGE recommends that a permanent drainage system consisting of perimeter drain pipes and an underslab drainage network with a pumping facility be installed to prevent groundwater seepage into the underground parking structure. In addition, damp-proofing shall be applied to the subgrade structure to prevent groundwater penetration.

7.4.2.1 Underslab Drainage System

An underslab drainage system consisting of a granular drainage layer, minimum 12 inches thick (300mm) and a series of underslab drain pipes should be installed beneath the floor slab of the underground parking structure.

The underslab drain pipes should be installed at a maximum horizontal spacing of 30 feet (10m) beneath the basement floor to remove water that could otherwise pond under the slab. The drains should consist of a minimum 4-inch (100mm) dia. perforated rigid PVC pipes bedded in a minimum of 12 inches (300mm) surround of 3/4-inch (19mm) clear crushed gravel. Clean-outs should be provided to allow for periodic flushing of the underslab drains.

The pipes should be installed such that their top is located within the gravel drainage blanket. The drain pipes should discharge into a sump, which should be designed so as to prevent the possibility of water backing into these drains. Permission from City of New Westminister for discharge of storm water to the storm sewer is required.

7.4.2.2 Perimeter Drainage System

Perimeter drains should consist of 6-inch (150mm) dia. perforated rigid PVC pipes placed at or below the footing level around either the inside or outside perimeter of the basement structure. The drain pipes should be placed in a minimum 12-inch (300mm) surround of 3/4-inch (19mm) drain rocks. The drain pipes should be connected to a sump with permission from City of New Westminister for discharge to the storm sewer.

Through-wall drain holes, 4-inch (100mm) dia. should be used to connect the exterior backfill with the interior perimeter drains, if an internal drainage system is chosen. The drain rocks should be placed to at least 12 inches (300mm) above the weep holes. Approved filter cloth should be placed at each 'through wall' drain hole to prevent loss of soils. The drain holes should be located at a maximum horizontal spacing of 4 feet (1.2m).

In areas where vertical excavation is carried out it may be necessary to cast subgrade walls using the shotcrete face as a permanent shutter. Hydrostatic pressure should be included in the design of such walls. Otherwise, a geocomposite drainage blanket should be placed against the shotcrete face, extending from the final ground surface to the footing level. This drainage material would provide a path by which groundwater seeping from the soil behind the shotcrete face can flow vertically downward to be collected for discharge. The synthetic drainage blanket should have a minimum overlap of at least 6 inches (150mm).

Around the base of the elevator pits, a perforated drain pipe should be installed to prevent ingress of groundwater into the pits if they are not designed to be waterproof. Where pits are designed to be waterproof, a drain pipe should be placed around the perimeter of the pit immediately below the slab-on-grade to prevent upward migration of water seepage to the basement.

7.5 Foundation Design

The proposed secondary school may be supported by conventional shallow foundation including spread and strip footings at columns and load-bearing walls, respectively. CGE recommends that the footings for the proposed building be located in the undisturbed, very dense sandy till-like soils (Soil Unit 6).

CGE recommends that all the perimeter footings be placed below a depth of 18 inches (450mm) for protection against frost penetration.

For footings placed directly in the undisturbed very dense sandy till-like soils (Soil Unit 6), CGE recommends that a maximum allowable soil bearing pressure of 6,000 psf (290 kPa) be used for

foundation design. The recommended maximum allowable soil bearing pressure can be increased by one-third to account for temporary transient loads due to wind and seismic.

Where footings are founded in the very dense, sandy till stratum (Soil Unit 6), and designed for the above recommended maximum allowable soil bearing pressure, CGE estimates that total settlements would be about 1 inch (25mm). Differential settlements are normally taken as between one-half and three-quarter the total settlements, about ½ to 3/4 inches (1.3 to 2mm).

Adjacent footings should be located far enough to prevent stress influence. Figure 11 shows the general guidelines to prevent stress interference between adjacent footings.

Construction joint between the slab, basement walls and strip footings should be provided with water-stops to prevent groundwater seep into the underground parking structure, if these structural components are poured separately.

7.6 Foundation Subgrade Preparation

Foundation subgrade preparation will include excavation of the existing random fills, topsoil, the stratum of loose native silty sand, the compact clayey sand stratum, the stony and the stoneless clayey silt strata (Soil Units 1 to 5, inclusive) where encountered. In addition, frozen soils (in sub-zero temperature), ice, snow and disturbed soils should be stripped from the foundation subgrade soils, prior to pouring concrete.

As shown in soil profiles A to D (Figures 4 to 7), the depths to the very dense sandy till (Soil Unit 6) are not uniform. In order to reach Soil Unit 6 at the footings for columns and load-bearing walls, overexcavation will be required. The depths of overexcavation would depend on the relative elevation between the design grades of the footings and Soil Unit 6. Prefabricated metal shoring cages approve by WCB shall be used for supporting the cut slopes during excavation and construction of the footings.

Where overexcavation is required to reach the very dense sandy till soils (Soil Unit 6), the edges of the excavation should extend at least the same distance as the depth of excavation beyond the footprint of the footings. The excavation shall be backfilled to the underside of the footings with mass concrete having a minimum 28-day compressive strength of 25 Mpa.

The native sandy till-like soils (Soil Unit 6) are susceptible to softening if exposed to rainfall and construction activities. To prevent the softening of the footing subgrade and to provide stable working surfaces, CGE recommends that a skim coat of lean concrete be applied at the footings' locations, upon the approval of the Geotechnical Engineer.

If the subgrade native soils are allowed to soften prior to placement of the protective cover, the softened materials should be removed and the areas of overexcavation backfilled with lean concrete.

7.7 Slab-on-grade Preparation

Soil Units 4, 5 and 6 are suitable for supporting the slab-on-grade of the 1 and 2-level underground parking structure.

For the slab-on-grade preparation, the final stripped surface should be proof-rolled to determine presence or absence of loose soils. Where soft/loose soils are encountered, the soils should be overexcavated to expose any one of the three soil units (4, 5 and 6). The areas of overexcavation should be backfilled with structural fill materials, as specified in Section 7.3.3 of this report.

For protecting the final subgrade surface of the floor slab, CGE recommends that at least 6 inches (150mm) of 3/4" (19mm) clear crushed gravel be placed immediately.

CGE recommends that the final 12 inches (300 mm) of the structural fill beneath the floor slab of the 1 and 2-level underground parking structure be consisted of 3/4-inch (19mm) clear crushed gravel. The fill materials should be compacted to at least 6 passes using a 1000-pound (450 kg) heavy plate tamper.

A vapour barrier consisting of a 6-mil plastic sheet should be placed on the gravel drainage blanket to prevent upward migration of moisture to the floor. The concrete floor should be cast on the plastic sheeting overlying the gravel drainage blanket.

7.8 Lateral Earth Pressures

The subgrade walls for the 1 and 2-level underground parking structure of the proposed secondary school building should be designed to withstand lateral earth pressures due to static, seismic and surcharge conditions.

7.8.1 Static Condition

For rigid (non-yielding) basement walls, where practically no wall movement is possible, the static earth pressure (triangular distribution) should be computed using an 'at-rest' pressure coefficient, K_o value of 0.47 corresponding to a friction angle of 32 degrees. We recommend that an average total unit weight (γ_T) of 120 pcf (1920 kg/m3) be assumed for the native soils.

7.8.2 Seismic Condition

Based on Wood (1973) and the Mononobe-Okabe methods of analysis, for rigid non-yielding basement walls, the dynamic (seismic) lateral pressure per unit width of wall equals to$2\gamma_T HA_h$, where γ_T is the average total unit weight of native soils (120 pcf), H is the wall height, and A_h is the peak horizontal ground acceleration, 0.21g. The corresponding dynamic thrust equals to $\gamma_T H^2 A_h$ acts at a height of 0.6H above the base of the wall.

7.8.3 Surcharge Loads

Compaction of backfill adjacent to the subgrade walls will induce a transient load to the walls. Light compactors should be used for compaction of fill adjacent to subgrade walls.

If a 250-pound (120 kg) compactor is operating at a distance of 2 feet (600mm) from the subgrade walls, an additional uniform lateral pressure of 50psf (2.5kPa) extending to a depth of 5 feet (1.5m) would be induced to the adjacent walls.

7.9 Fire Access/Services Roads and Parking Lots

7.9.1 Subgrade Preparation

CGE understands that the final grades for the proposed fire truck access/service roads/parking lots will be established close to the existing site grades.

Subgrade preparation for the fire access/services roads and parking lots will include removal of the existing pavement structure, random fills and topsoil to expose the stratum of loose native silty sand (soil unit 2), or the other strata including soil units 3, 4, 5 and 6. The limit of subgrade preparation should extend at least 5 feet (1.5m) beyond the edges of the proposed fire access/service roads and parking lots. For subgrade preparation, refers to the recommendations discussed in Sections 7.2 and 7.3 of this report.

Underground utilities would most likely be encountered during construction of the new school facilities. Where encountered, these utilities should be removed and relocated as per the 'Project' requirements. All utility backfill materials and sludge should be stripped to the subgrade approved by the Geotechnical Engineer. The voids should be backfilled with structural fill as per the recommendations discussed in Section 7.3.3 of this report.

7.9.2 Drainage

The long term performance of the pavement structure is highly dependent on the subgrade support conditions. The need for adequate drainage cannot be over emphasized. The finished pavement surface and the underlying subgrade must be free of depressions and sloped (minimum slope of 2.0%) or crowned to provide effective surface drainage.

Surface water should not be allowed to pond adjacent to the outside edges of the pavement areas. If groundwater is encountered at the subgrade, a subdrain pipe should be installed at least 12 inches (300mm) below the subbase course. The subdrain pipe should be discharged to the on-site storm water system.

7.9.3 Pavement Structure Design

Following subgrade preparation, the pavement structure for the fire truck access road and service roads should consist of the following courses:

- a minimum of 3 inches (75mm) of asphalt concrete,
- a minimum of 8 inches (200mm) of 3/4-inch (19mm) dia. crushed sand and gravel (road mulch) base course, and
- a minimum of 12 inches (300mm) of 3-inch (75mm) minus pit-run sand and gravel subbase course.

For general parking areas, the pavement structure should consist of the following courses:

- a minimum of 3 inches (75mm) of asphalt concrete,
- a minimum of 6 inches (150mm) of 3/4-inch (19mm) dia. crushed sand and gravel (road mulch) base course, and
- a minimum of 8 inches (200mm) of 3-inch (75mm) minus pit-run sand and gravel subbase course.

The base, subbase and site grading fill materials are to be compacted to at least 95% MPMDD.

Recycled asphalt blends and concrete blends are not recommended as site grading fill nor for construction of the pavement structure of the fire access/service roads and parking lots.

8.0 'FIELD REVIEW' INSPECTIONS

CGE shall be notified to provide 'field review' inspections during construction in order to confirm that soil condition encountered are consistent with our design assumptions and that the intent of our design recommendations is being complied.

The 'field review' inspections outlined below will fulfil the obligations specified in the provincial Letters of Assurance - Schedule B1 & B2 for the 'Geotechnical Aspects'.

1. CGE will examine stability of the temporary excavation and the shoring system during construction.

2. CGE will provide inspection for foundation subgrade preparation of footings, subgrade preparation for slab-on-grade, the sport facilities, fire lane, access roads and parking lots.

3. CGE will coordinate a material testing company to perform field and laboratory density tests to determine compaction effort of structural fills beneath the slab-on-grade, the sport facilities, backfill behind the subgrade walls and the pavement structure of the fire lane, access roads and parking lots.

9.0 CLOSURE

This soils report was prepared for the exclusive use of New Westminster School Board, the Architect and Engineers involved in the design of the proposed secondary school in New Westminister. It should be made available to prospective contractors and/or the Contractor for information on factual data only and not as a warranty of subsurface conditions, such as those interpreted from the test borehole logs and discussions of subsurface conditions included in this report.

Any use which a third party makes of this soils report, or any reliance on or decisions to be made based on this report, are the responsibilities of such third parties. CGE accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The analyses, conclusions and recommendations presented in this soils report are based on the site conditions as they presently exist and assume that the explorations are representative of the subsurface conditions throughout the site; ie., the subsurface conditions everywhere are not significantly differed from those enclosed by the explorations. If, during construction,

subsurface conditions different from those encountered in the explorations are observed or appear to be present, CGE should be advised at once so that we can review these conditions and reconsider our recommendations where necessary.

When final structural loading conditions for the new secondary school are available, CGE shall review our geotechnical recommendations, and provide revisions, if necessary.

If there is a substantial lapse of time between the submission of this report and the start of construction, or if conditions have changed due to construction operations at or near the site, it is recommended that this report be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

Prior to the start of construction, CGE should complete a general review of those portions of the plans and specifications which pertain to foundation, earthwork and drainage to determine that they are consistent with our recommendations.

Unanticipated conditions are commonly encountered and cannot be fully determined by merely taking soil samples or making explorations. During construction, CGE should have the opportunity to provide necessary inspection services to confirm that soil conditions encountered conform with our interpretation of the test borehole results. The recommendations provided in this report depend on the inspection services.

The scope of our services does not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, subsurface water, groundwater, on or below this site.

We trust that this soils report meets your current requirements. If there are any questions regarding this soils report, please do not hesitate to contact our office.

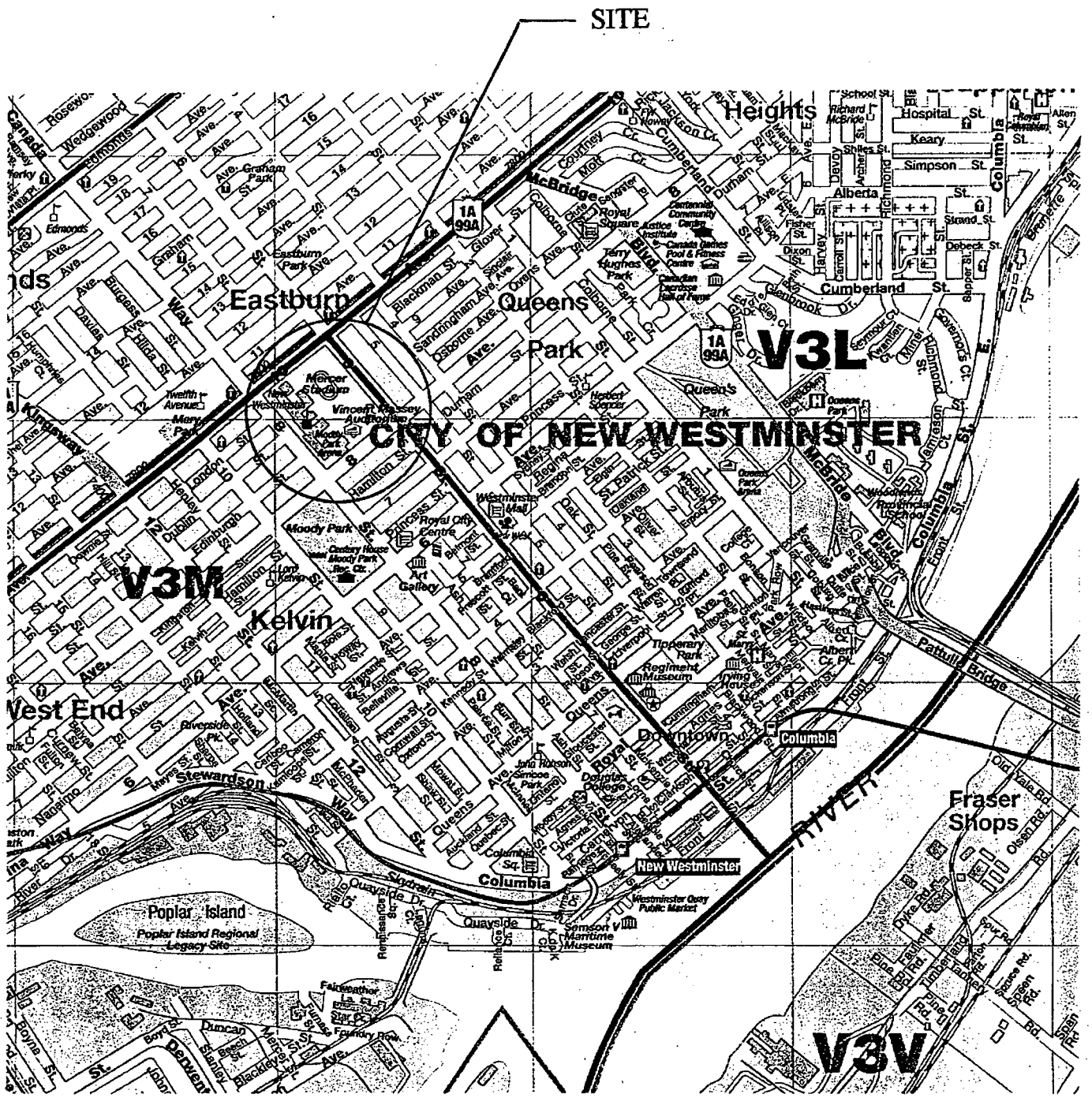
Yours very truly,

CENTENNIAL GEOTECHNICAL ENGINEERS LTD.

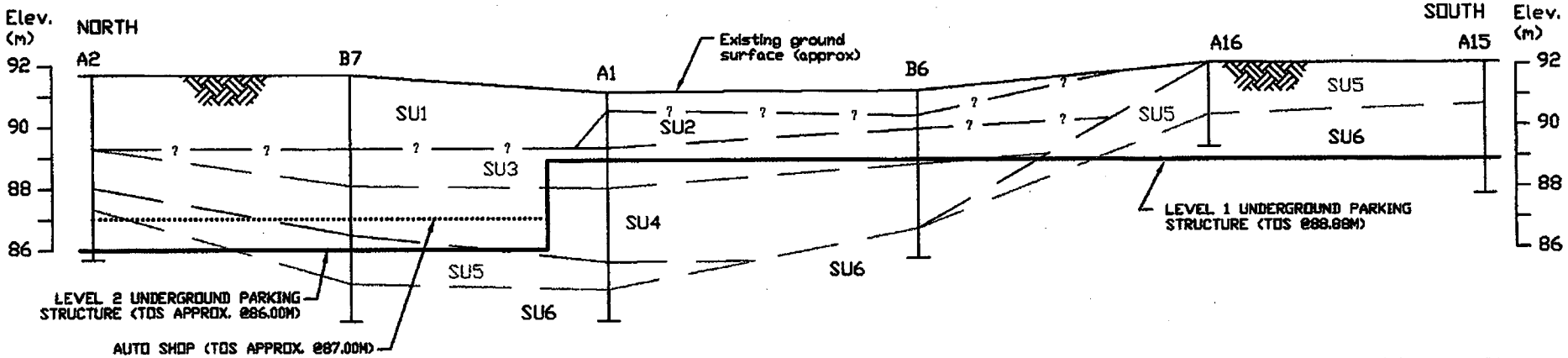
per:

Louis W. H. Lui, P. Eng.
Principal

02.12.04



PROJECT No:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS	
PROJECT:	PROPOSED SECONDARY SCHOOL		
LOCATION:	821 8th STREET NEW WESTMINISTER, BC.	VICINITY MAP	
		DATE: July 15, 2004	DRAWN BY:
			FIGURE: 1



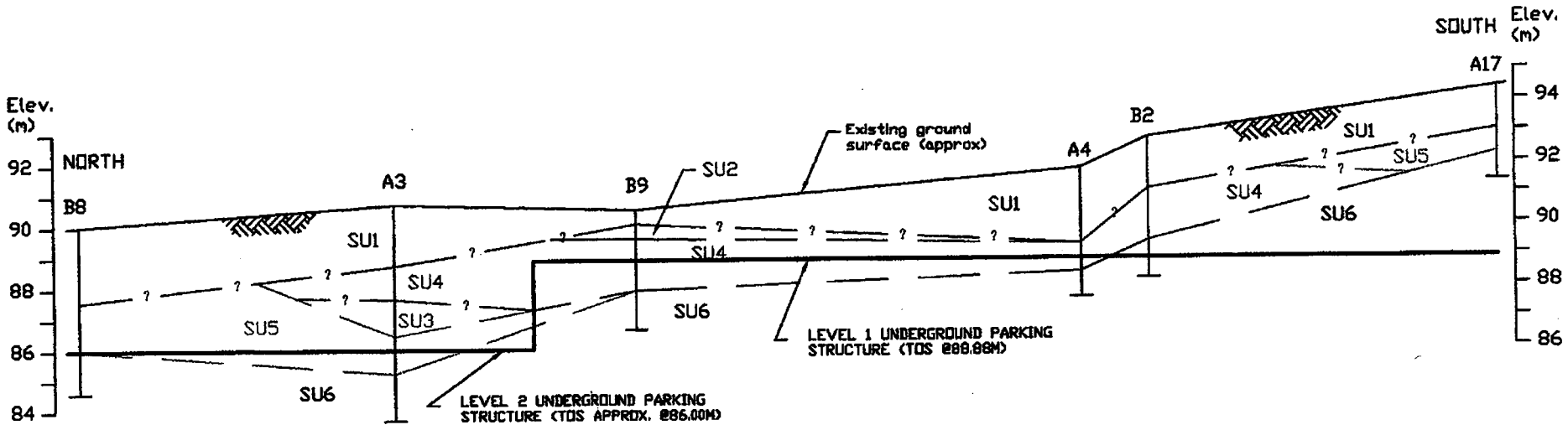
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:200

DESCRIPTION OF SOIL UNITS:

SOIL UNIT 1: Randon fill (loose)
SOIL UNIT 2: Tannish brown, silty fine-grained sand (loose)
SOIL UNIT 3: Tannish grey clayey fine-grained sand, trace of small pebbles, till-like (compact)
SOIL UNIT 4: Grey clayey silt, trace of small pebbles (firm to stiff)
SOIL UNIT 5: Grey clayey silt (very stiff)
SOIL UNIT 6: Grey sandy till (very dense)

Note: The subsurface soil profiles are extrapolated from the logs of test boreholes. The soil conditions vary in thickness as well as aerial extent between test boreholes and across the site.

PROJECT No.:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS LTD.					
PROJECT:	PROPOSED SECONDARY SCHOOL	SOIL PROFILE, A-A (north to south, east end), Secondary School					
LOCATION:	835-8TH STREET, NEW WESTMINISTER, BC.	DATE: Sept 22, 2004	DRAWN BY: AL	SCALE: AS SHOWN	FIGURE: 4		



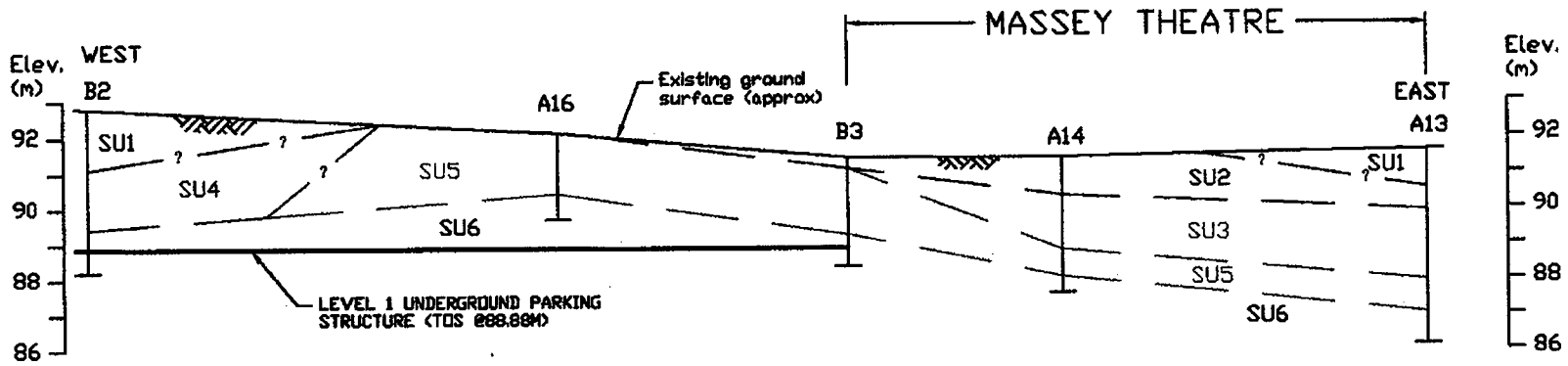
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:200

DESCRIPTION OF SOIL UNITS:

SOIL UNIT 1: Randon fill (loose)
SOIL UNIT 2: Tannish brown, silty fine-grained sand (loose)
SOIL UNIT 3: Tannish grey clayey fine-grained sand, trace of small pebbles, till-like (compact)
SOIL UNIT 4: Grey clayey silt, trace of small pebbles (firm to stiff)
SOIL UNIT 5: Grey clayey silt (very stiff)
SOIL UNIT 6: Grey sandy till (very dense)

Note: The subsurface soil profiles are extrapolated from the logs of test boreholes. The soil conditions vary in thickness as well as aerial extent between test boreholes and across the site.

PROJECT No.:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS LTD.					
PROJECT:	PROPOSED SECONDARY SCHOOL	SOIL PROFILE, B-B (north to south, west end), Secondary School					
LOCATION:	835-8TH STREET, NEW WESTMINISTER, BC.	DATE: Sept 22, 2004	DRAWN BY: AL	SCALE: AS SHOWN	FIGURE: 5		



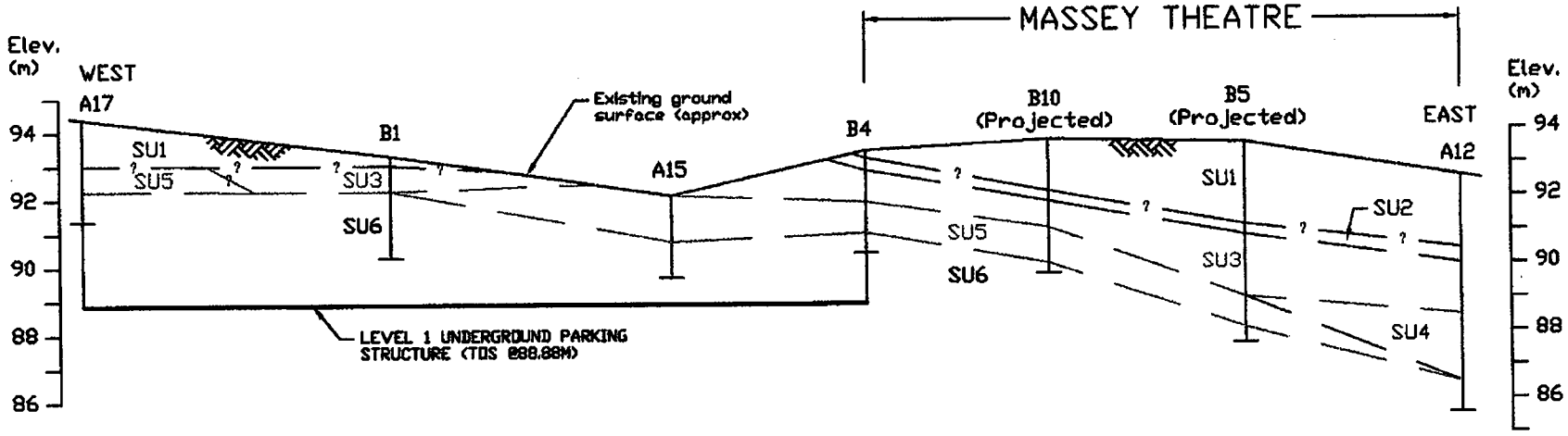
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:200

DESCRIPTION OF SOIL UNITS:

SOIL UNIT 1: Randon fill (loose)
SOIL UNIT 2: Tannish brown, silty fine-grained sand (loose)
SOIL UNIT 3: Tannish grey clayey fine-grained sand, trace of small pebbles, till-like (compact)
SOIL UNIT 4: Grey clayey silt, trace of small pebbles (firm to stiff)
SOIL UNIT 5: Grey clayey silt (very stiff)
SOIL UNIT 6: Grey sandy till (very dense)

Note: The subsurface soil profiles are extrapolated from the logs of test boreholes. The soil conditions vary in thickness as well as aerial extent between test boreholes and across the site.

PROJECT No.:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS LTD.					
PROJECT:	PROPOSED SECONDARY SCHOOL	SOIL PROFILE C-C					
LOCATION:	835-8TH STREET, NEW WESTMINISTER, BC.	DATE: Sept 22, 2004	DRAWN BY: AL	SCALE: AS SHOWN	FIGURE: 6		



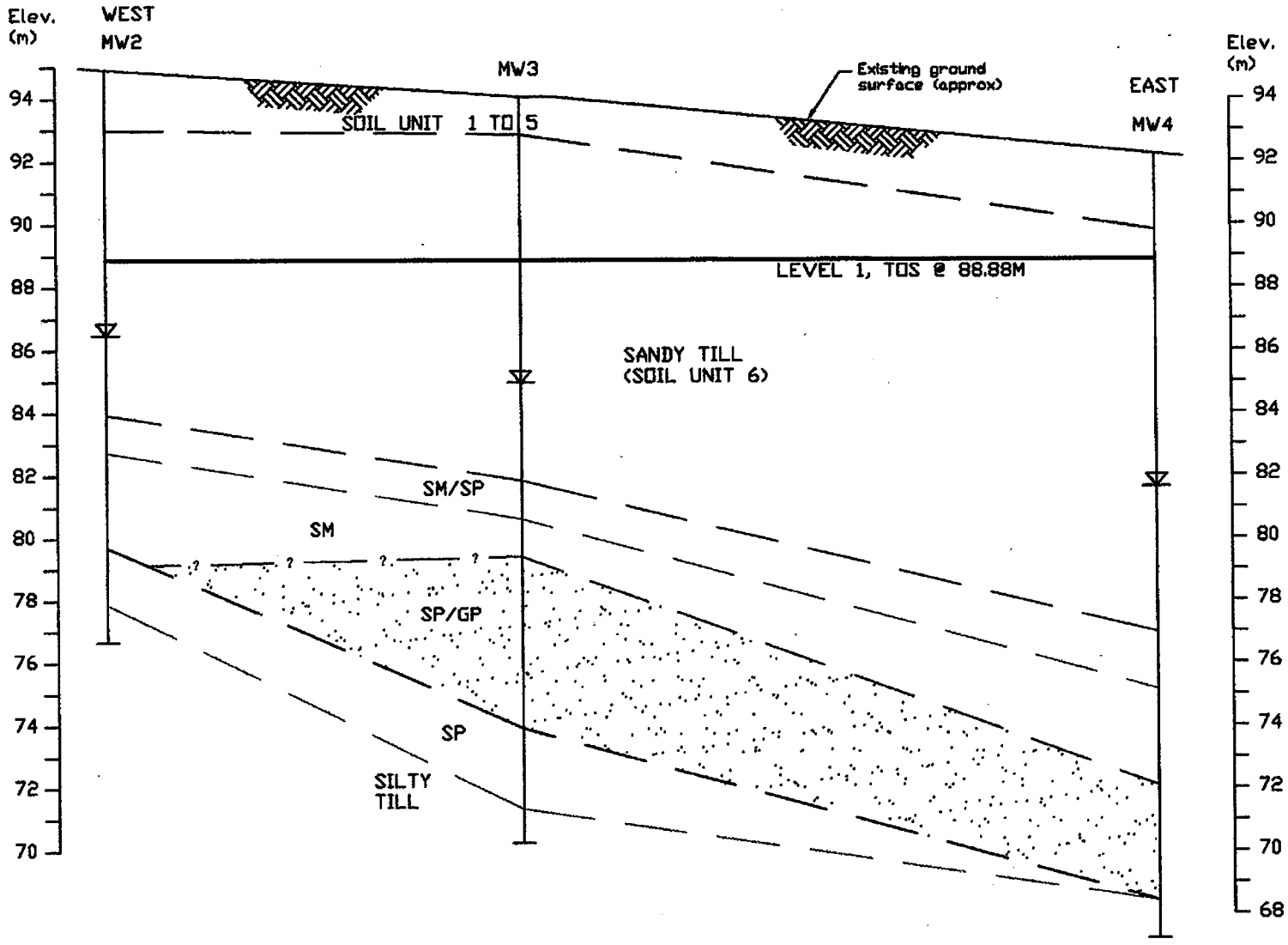
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:200

DESCRIPTION OF SOIL UNITS:

SOIL UNIT 1: Randon fill (loose)
SOIL UNIT 2: Tannish brown, silty fine-grained sand (loose)
SOIL UNIT 3: Tannish grey clayey fine-grained sand, trace of small pebbles, till-like (compact)
SOIL UNIT 4: Grey clayey silt, trace of small pebbles (firm to stiff)
SOIL UNIT 5: Grey clayey silt (very stiff)
SOIL UNIT 6: Grey sandy till (very dense)

Note: The subsurface soil profiles are extrapolated from the logs of test boreholes. The soil conditions vary in thickness as well as aerial extent between test boreholes and across the site.

PROJECT No.:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS LTD.					
PROJECT:	PROPOSED SECONDARY SCHOOL	SOIL PROFILE D-D					
LOCATION:	835-8TH STREET, NEW WESTMINISTER, BC.	DATE: Sept 22, 2004	DRAWN BY: AL	SCALE: AS SHOWN	FIGURE: 7		



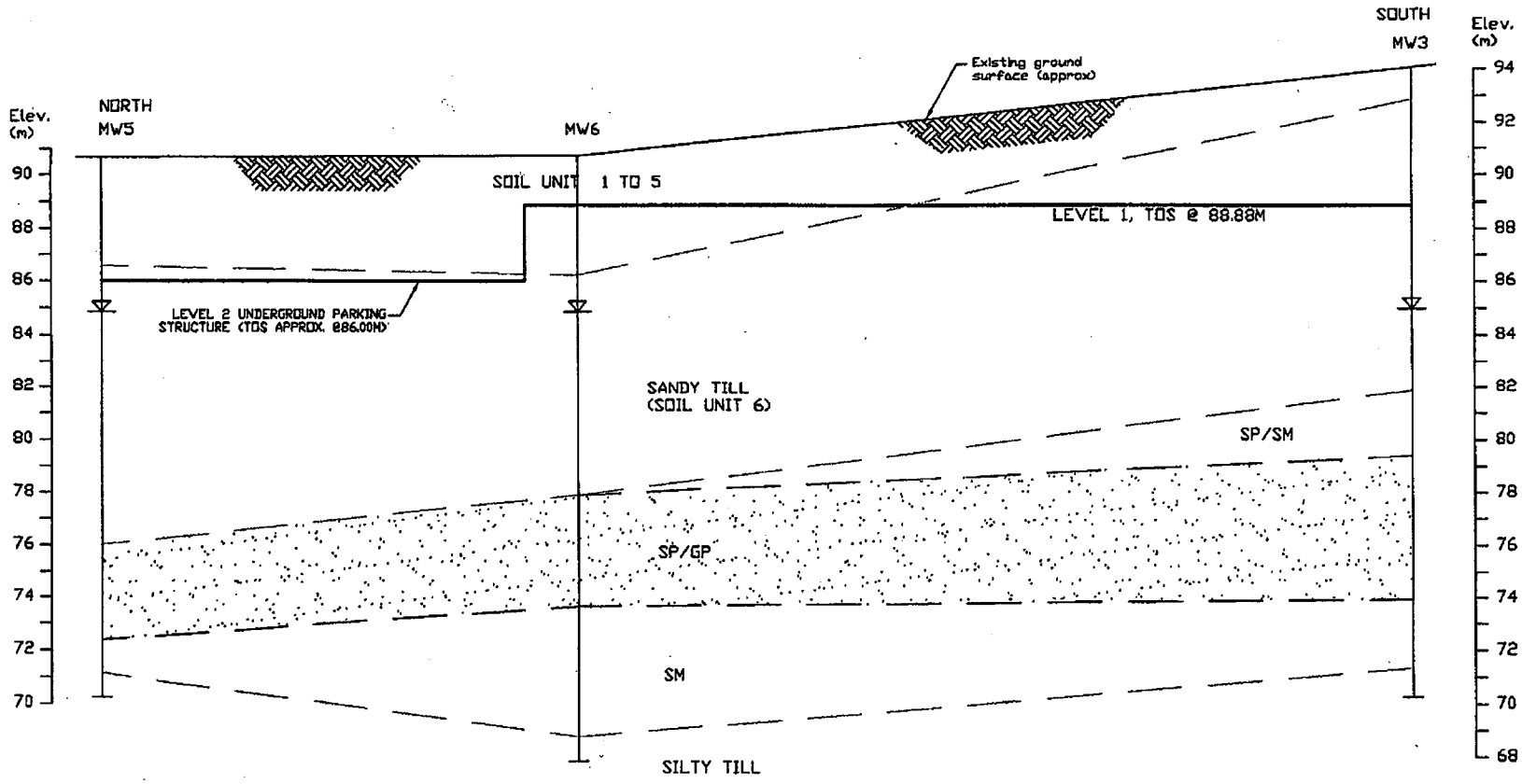
Note: 1. The subsurface soil profiles are extrapolated from the logs of test boreholes. The soil conditions vary in thickness as well as aerial extent between test boreholes and across the site.

2. Refer to FIGURE 4 for soil unit description.

▽ Groundwater level measured on September 16, 2004.

HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:200

PROJECT No.:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS LTD.					
PROJECT:	PROPOSED SECONDARY SCHOOL	SOIL PROFILE E-E					
LOCATION:	835-8TH STREET, NEW WESTMINISTER, BC.	DATE: Sept 22, 2004	DRAWN BY: AL	SCALE: AS SHOWN	FIGURE: 8		



Note: 1. The subsurface soil profiles are extrapolated from the logs of test boreholes. The soil conditions vary in thickness as well as aerial extent between test boreholes and across the site.

2. Refer to FIGURE 4 for soil unit description.

▽ Groundwater level measured on September 16, 2004.

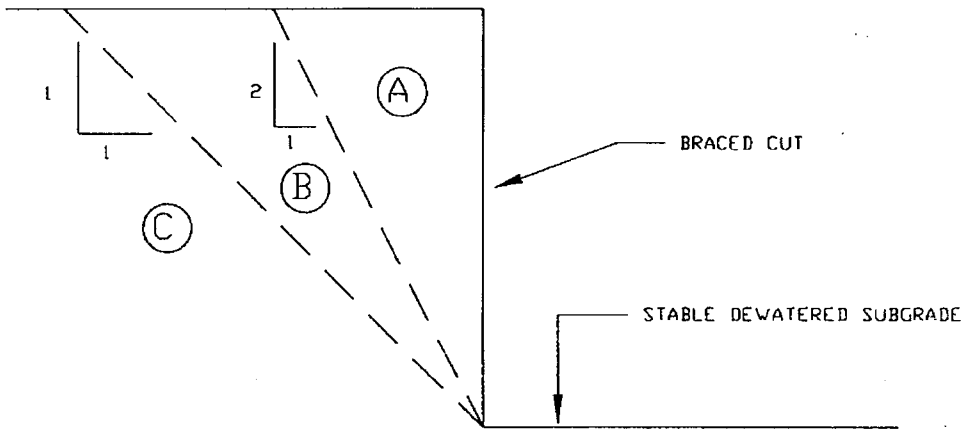
HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:200

PROJECT No.:	V04-121
PROJECT:	PROPOSED SECONDARY SCHOOL
LOCATION:	835-8TH STREET, NEW WESTMINISTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS LTD.

SOIL PROFILE F-F

DATE:	DRAWN BY:	SCALE:	FIGURE:
Sept 22, 2004	AL	AS SHOWN	9

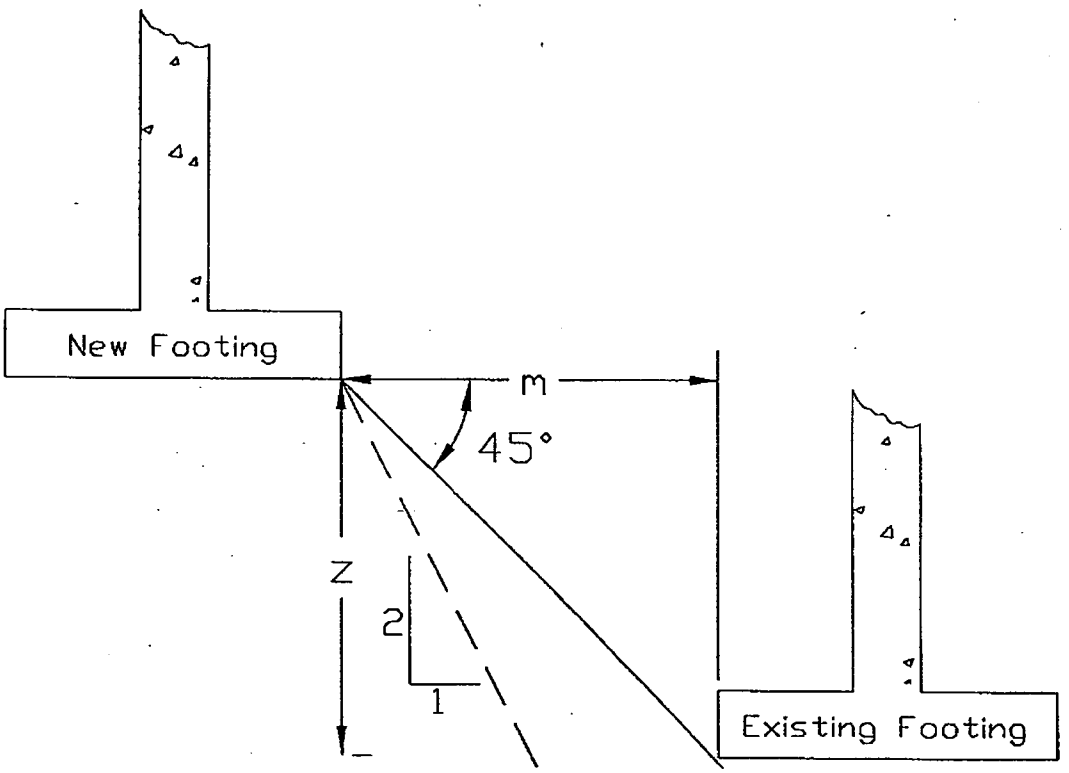


(A) FOUNDATIONS OF IMPORTANT STRUCTURES IN THIS ZONE GENERALLY MUST BE UNDERPINNED.

(B) FOUNDATIONS IN THIS ZONE GENERALLY NOT TO BE UNDERPINNED EXCEPT WHERE UNDERLAIN BY WEAKER CLAYS, OR STRUCTURE IS ESPECIALLY SENSITIVE.

(C) UNDERPINNING ELEMENTS TO RECEIVE THEIR SUPPORT IN THIS ZONE OR BELOW SUBGRADE LEVEL.

PROJECT No:	V04-121	**CENTENNIAL GEOTECHNICAL ENGINEERS**		
PROJECT:	PROPOSED SECONDARY SCHOOL			
LOCATION:	835 - 8TH STREET, NEW WESTMINISTER, BC	GENERAL GUIDLEINES FOR UNDERPINNING		
		DATE: Oct. 6. 2004	DRAWN BY: AL	FIGURE: 10



m > z

SPACE REQUIREMENT TO AVOID INTERFERENCE BETWEEN OLD AND NEW FOOTINGS

NOT TO SCALE

PROJECT No:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS		
PROJECT:	PROPOSED SECONDARY SCHOOL			
LOCATION:	835 - 8TH STREET, NEW WESTMINISTER, BC	GENERAL GUIDLEINES TO AVOID STRESS INFLUENCE		
		DATE: Oct. 6, 2004	DRAWN BY: AL	FIGURE: 11

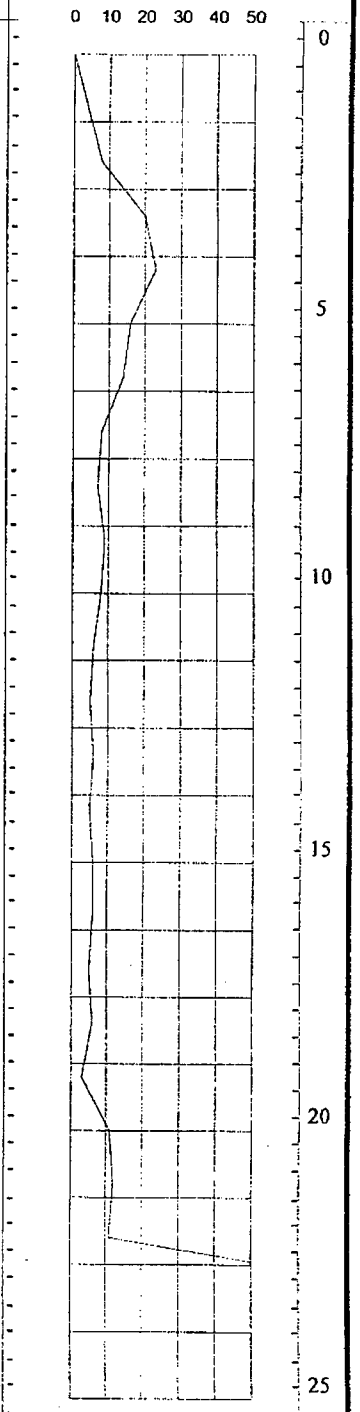
APPENDIX A

Logs of Test Boreholes
and
Monitoring Wells

DATE DRILLED: June 3, 2004	INSPECTOR: LL	AUGER HOLE A1
DRILL METHOD: AUGER	SURFACE ELEVATION: 91.1m ±	SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	**TOPSOIL -** Dark brown, silty sand, some organic matters (loose)	SM		
	SAND - Tannish brown, silty, fine-grained (loose)	SM		
2.5			[X]	23.5
	- grades to tan grey mottled ▽		[X]	23.3
5				
7.5	**SAND -** Tan grey mottled, clayey, fine-grained, trace pebbles & 1" gravel med plasticity (compact)	SC	[X]	23.6
10	**SILT -** Grey, clayey, med plasticity, trace small pebbles & 1" gravel (firm)	ML	[X]	32.7
12.5				
15				
17.5				
	SILT - Grey, clayey, medium plasticity (very stiff) unconfined compressible strength pp ~ 4 tsf	ML	[X]	24
20				
	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[X]	10.3
22.5				
	Note: unconfined compressible strength for disturbed sample (PP), tsf			
	TEST BOREHOLE TERMINATED AT REFUSAL, 25 FEET		[X]	10.3
25				

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



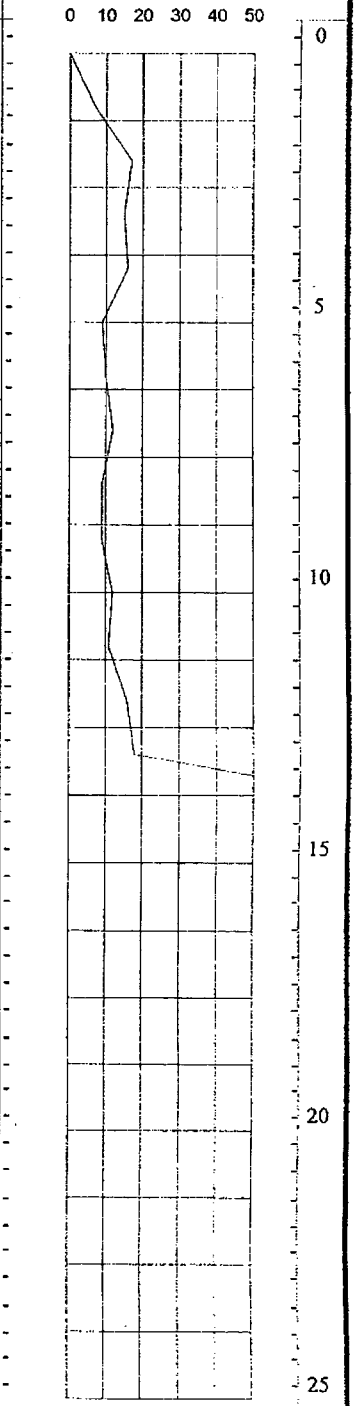
PP, TSF GRAB SAMPLE [X] WATER TABLE ▽

PROJECT No: V04-121	
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS	CENTENNIAL GEOTECHNICAL ENGINEERS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.	BOREHOLE LOG
	DATE: June 17, 2004 / DRAWN BY: CL / FIGURE: A1

DATE DRILLED: June 3, 2004	INSPECTOR: LL	AUGER HOLE A2
DRILL METHOD: AUGER	SURFACE ELEVATION: 91.7m±	SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	**FILL -** Random, brown, silty sand & gravel, some organic matters (loose)	SM		
2.5			[x]	20.3
5				
7.5			[x]	24.8
	SILT - Tan grey mottled, clayey, occ. small pebbles, med plasticity, crumbly, till-like, pp ~ 2tsf (stiff)	ML	[x]	25.6
10				
12.5	**SILT -** Grey, clayey, med plasticity, trace pebbles & 1" gravel, till-like, pp~ 4tsf (very stiff)	ML	[x]	15.9
	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	12.9
15				
17.5			[x]	8.7
	TEST BOREHOLE TERMINATED AT REFUSAL, 18 FEET			
20				
22.5				
	See note on Figure A1			
25				

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



PP, TSF GRAB SAMPLE [x] WATER TABLE

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

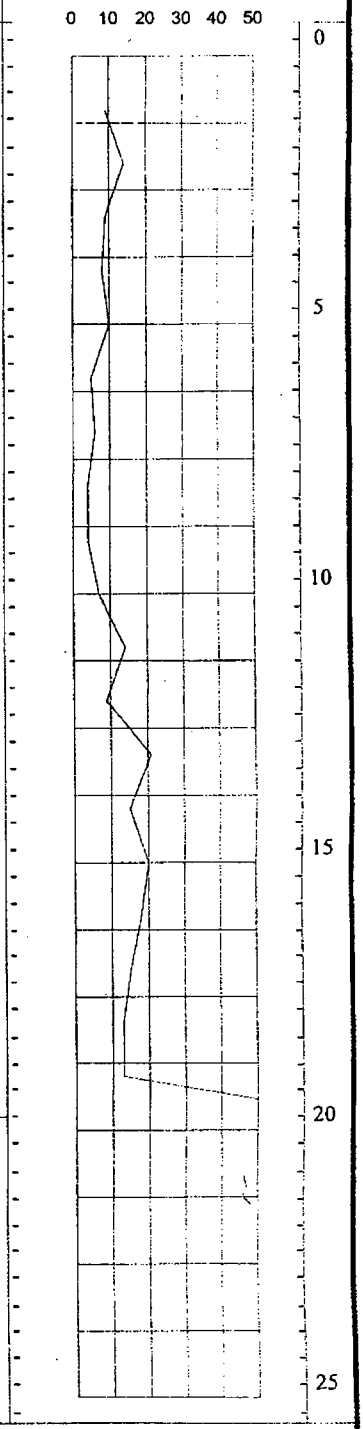
DATE: June 17, 2004 DRAWN BY: CL FIGURE: A2

DATE DRILLED:	June 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	90.7m±

AUGER HOLE A3
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	**FILL -** Random, brown, silty sand & gravel, some organic matters (loose)	SM		
2.5			[x]	23.3
5				
7.5	**SILT -** Tan grey mottled, clayey, occ. small pebbles, med plasticity crumbly, pp 1 - 1.5tsf (firm)	ML	[x]	30.4
10	**SAND -** Grey, clayey, fine-grained, trace pebbles, low to med plasticity, crumbly, pp 2 - 2.5tsf, till-like (compact)	SC	[x]	22.1
12.5				
15	**SILT -** Grey, clayey, med plasticity, pp~ 4 tsf (v. stiff)	ML	[x]	23
17.5				
20	**SAND -** Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	11.3
22.5	TEST BOREHOLE TERMINATED AT REFUSAL, 20 FEET			
25	See note on Figure A1			

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No:	V04-121
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION:	835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

DATE:	DRAWN BY:	FIGURE:
June 17, 2004	CL	A3

DATE DRILLED:	June 3, 2004	INSPECTOR:	LL	AUGER HOLE	A4
DRILL METHOD:	AUGER	SURFACE ELEVATION:	91.8m±	SHEET	1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content	DYNAMIC CONE PENETRATION TEST BLOWS / FOOT
0	**FILL -** Random, brown, silty sand & gravel, some organic matters (loose)	SM			
2.5			[x]	22.9	
5					
7.5	**SILT -** Tan grey mottled, clayey, occ. small pebbles, med plasticity, crumbly, pp 1 - 1.5 tsf (firm)	ML	[x]	27.3	
10	**SAND -** Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	9.3	
12.5	TEST BOREHOLE TERMINATED AT REFUSAL, 13 FEET				
15					
17.5					
20					
22.5					
25	See note on Figure A1				

0 10 20 30 40 50

PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS	
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS		
LOCATION:	835 8th STREET, NEW WESTMINSTER, BC.	BOREHOLE LOG	
		DATE: June 17, 2004	DRAWN BY: CL
			FIGURE: A4

DATE DRILLED: June 3, 2004	INSPECTOR: LL	AUGER HOLE A5
DRILL METHOD: AUGER	SURFACE ELEVATION: 92.1m ±	SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	**FILL -** Random, dark brown, silty sand, some organic matters (loose)	SM		
2.5	6-inch topsoil		[x]	10.3
5	**SAND -** Tannish brown, silty, fine-grained (loose)	SM	[x]	31
7.5	**SAND -** Tan grey mottled, clayey, fine-grained, trace pebbles, crumbly, low to med plasticity, till-like, pp 2 - 2.5 tsf (compact)	SC	[x]	23.1
10	**SILT -** Grey brown mottled, clayey, med plasticity, pp 1.5 - 2 tsf (firm)	ML	[x]	29.8
12.5				
15	**SILT -** Grey, clayey, med plasticity, pp ~ 4 tsf (very stiff)	ML	[x]	22.2
	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	12
17.5	TEST BOREHOLE TERMINATED AT REFUSAL, 16 FEET			
20				
22.5				
25	See note on Figure A1			

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT
0 10 20 30 40 50

PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

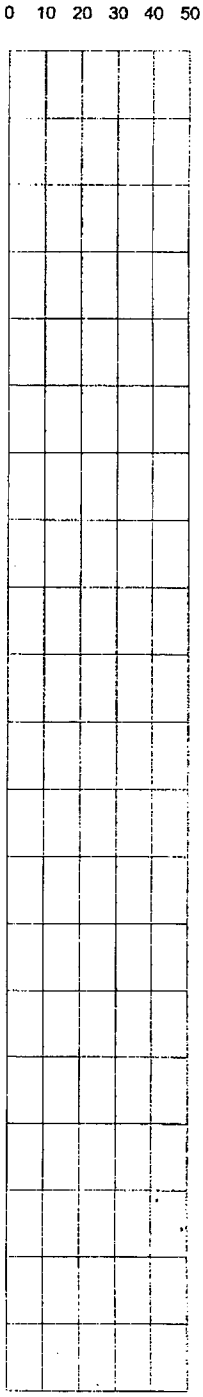
BOREHOLE LOG

DATE:	DRAWN BY:	FIGURE:
June 17, 2004	CL	A5

DATE DRILLED: June 3, 2004	INSPECTOR: LL	AUGER HOLE A6
DRILL METHOD: AUGER	SURFACE ELEVATION: 92.1m +	SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	**FILL -** 12 inches of river sand over Random fill, dark brown silty sand & gravel, some organic (loose)	SM	[x]	30.3
2.5	**SAND -** Rusty brown, silty, fine-grained (loose)	SM	[x]	26.9
5	**SAND -** Tannish grey mottled, silty, fine-grained (loose)	SM	[x]	24.2
7.5				
10	- occ. fine gravel		[x]	20.4
	SAND - Grey, clayey, fine-grained, trace pebbles & seashell, med plasticity, pp - 2 tsf (compact)	SC	[x]	20.7
12.5				
15	**SILT -** Grey, clayey, med plasticity, pp ~ 4 tsf (very stiff)	ML	[x]	22.1
17.5	**SAND -** Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	14
20	TEST BOREHOLE TERMINATED AT REFUSAL, 20 FEET			
22.5				
25	See note on Figure A1			

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

DATE: June 17, 2004 DRAWN BY: CL FIGURE: A6

DATE DRILLED:	June 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	94.2m ±

AUGER HOLE A7
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content	DYNAMIC CONE PENETRATION TEST BLOWS / FOOT
0	**FILL -** Random, dark brown, silty sand, some organic matters (loose)	SM			
2.5	**SAND -** Tannish brown, silty, fine-grained (compact)	SM			
5	**SILT -** Tan grey mottled, clayey, med plasticity, pp ~ 4 tsf (very stiff)	ML	[x]	24.9	
7.5	**SAND -** Grey, clayey/silty, fine-grained, small pebbles & occ. 1.5-2" gravel till-like (very dense)	SM/SC	[x]	13.9	
10	TEST BOREHOLE TERMINATED AT REFUSAL, 8 FEET				
12.5					
15					
17.5					
20					
22.5					
25	See note on Figure A1				

0 10 20 30 40 50

PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

DATE:	DRAWN BY:	FIGURE:
June 17, 2004	CL	A7

DATE DRILLED: June 3, 2004	INSPECTOR: LL	AUGER HOLE A8	
DRILL METHOD: AUGER	SURFACE ELEVATION: 93.1m ±	SHEET 1 OF 1	

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content	DYNAMIC CONE PENETRATION TEST BLOWS / FOOT
0	SAND - Tannish brown, silty, fine-grained (compact)	SM	[x]	15.9	
2.5	SAND - Tan brown mottled, clayey, small pebbles, crumbly low plasticity, till-like, pp 2 - 2.5 tsf (compact)	SC	[x]	19.1	
5					
7.5					
10	SAND - Grey, silty, fine-grained, small pebbles, till-like (v dense)	SM	[x]	8.7	
12.5	TEST BOREHOLE TERMINATED AT REFUSAL, 10 FEET				
15					
17.5					
20					
22.5					
25	See note on Figure A1				

0 10 20 30 40 50

PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121		
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS	CENTENNIAL GEOTECHNICAL ENGINEERS	
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.	BOREHOLE LOG	
	DATE: June 17, 2004	DRAWN BY: CL
		FIGURE: A8

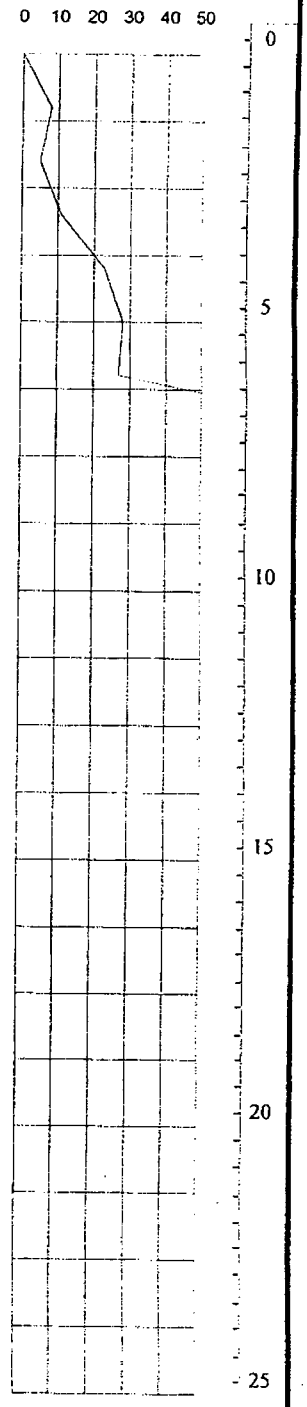
DATE DRILLED: June 3, 2004 | INSPECTOR: LL | AUGER HOLE A9

DRILL METHOD: AUGER | SURFACE ELEVATION: 95.4m ± | SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	SAND - Rusty brown, silty, fine-grained (compact)	SM	[X]	22.6
2.5	SILT - Tan brown mottled; clayey, crumbly, occ. small pebbles, low plasticity, till-like, pp - 2 tsf (stiff)	ML	[X]	30.5
5	- grades to grey, not crumbly, med plasticity, pp ~ 4 tsf, very stiff		[X]	22.6
7.5	SAND - Grey, silty, fine-grained, small pebbles, till-like (v dense)	SM	[X]	9.9
10	TEST BOREHOLE TERMINATED AT REFUSAL, 8 FEET			
12.5				
15				
17.5				
20				
22.5				
25	See note on Figure A1			

DYNAMIC CONE PENETRATION TEST

BLOWS / FOOT



PP, TSF | GRAB SAMPLE [X] | WATER TABLE ▽

PROJECT No: V04-121

PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS

LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

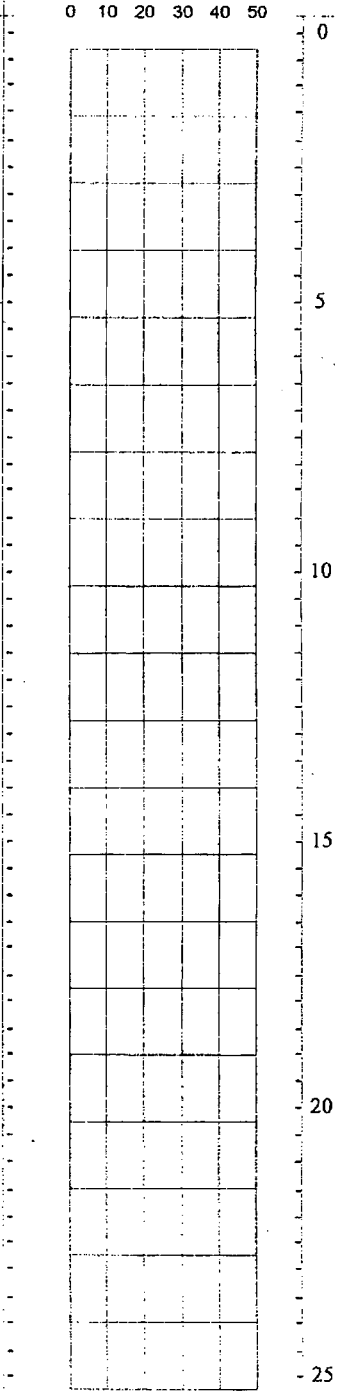
DATE: June 17, 2004 | DRAWN BY: CL | FIGURE: A9

DATE DRILLED:	June 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	95.6m +

AUGER HOLE A10
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	6" topsoil			
	SILT - Tan brown mottled, clayey, till-like, pp~ 4 tsf (very stiff)	ML	[x]	24.9
2.5	SAND - Grey, silty, fine-grained, small pebbles, till-like (v dense)	SM	[x]	10
5	TEST BOREHOLE TERMINATED AT REFUSAL, 5 FEET			
7.5				
10				
12.5				
15				
17.5				
20				
22.5				
25	see note on Figure A1			

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

DATE:	DRAWN BY:	FIGURE:
June 17, 2004	CL	A10

DATE DRILLED:	June 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	95.6m +

AUGER HOLE A11
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	SAMPLE: Soil Class. Symbol	SAMPLE: Sample Type	SAMPLE: Moisture Content
0	6" topsoil			
	SAND - Grey, silty, fine-grained, small pebbles, till-like (v dense)	SM	[x]	8.4
2.5			[x]	7.6
5	TEST BOREHOLE TERMINATED AT REFUSAL, 5 FEET			
7.5				
10				
12.5				
15				
17.5				
20				
22.5				
25				

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT
0 10 20 30 40 50

GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

DATE:	DRAWN BY:	FIGURE:
June 17, 2004	CL	A11

DATE DRILLED:	June 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	92.6m +

AUGER HOLE A12
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content	DYNAMIC CONE PENETRATION TEST BLOWS / FOOT
0	**FILL -** Dark brown, silty sand, some gravel & organic matters (loose)	SM			
2.5			[x]	22.3	
5					
7.5	**SAND -** Tannish brown, silty, fine-grained, saturated (loose)	SM	[x]	25.6	
10	**SAND -** Tan brown mottled, clayey, fine-grained, trace pebbles & 1" gravel crumbly (compact)	SC	[x]	27.2	
12.5					
15	**SILT -** Grey brown mottled, clayey, med plasticity, pp 2 - 2.5 tsf (stiff)	ML	[x]	25.5	
17.5	- grades to grey, very stiff		[x]	24.5	
20	**SAND -** Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	10.9	
22.5					
25	TEST BOREHOLE TERMINATED AT REFUSAL, 23 FEET See note on Figure A1				

0 10 20 30 40 50

PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No:	V04-121
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION:	835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

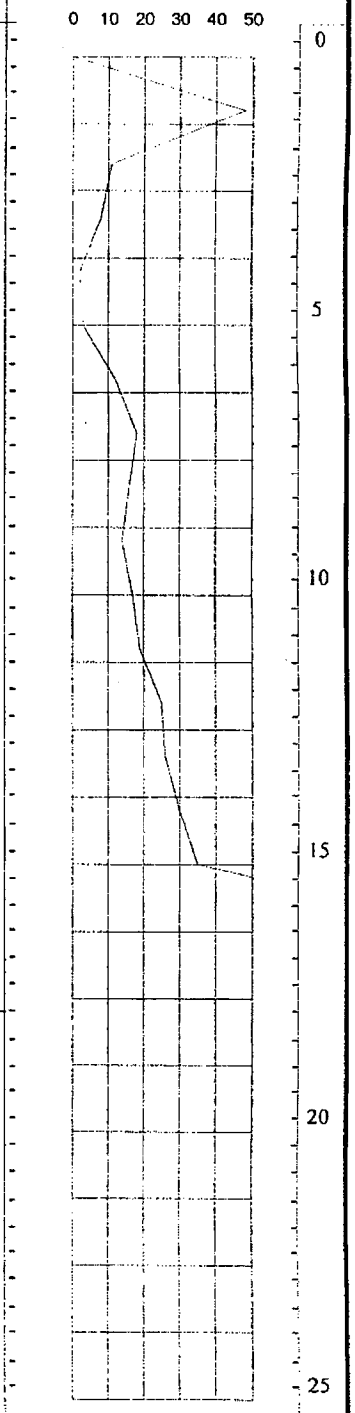
DATE:	DRAWN BY:	FIGURE:
June 17, 2004	CL	A12

DATE DRILLED:	June 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	91.6m ±

AUGER HOLE A13
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	**FILL -** Dark brown, silty sand, some gravel & organic matters (loose)	SM	[X]	79.9
2.5				
	SAND - Tannish brown, silty, fine-grained, saturated (loose)	SM	[X]	29.6
5				
	SAND - Tan brown mottled, clayey, fine-grained, trace pebbles & 1" gravel crumbly, till-like, pp 3 - 3.5 tsf (compact)	SC	[X]	22.4
7.5				
10				
12.5	**SILT -** Grey brown, clayey, med plasticity (very stiff)	ML	[X]	24.6
15				
	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[X]	10.4
17.5				
	TEST BOREHOLE TERMINATED AT REFUSAL, 18 FEET			
20				
22.5				
	See note on Figure A1			
25				

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



PP, TSF GRAB SAMPLE [X] WATER TABLE ▽

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

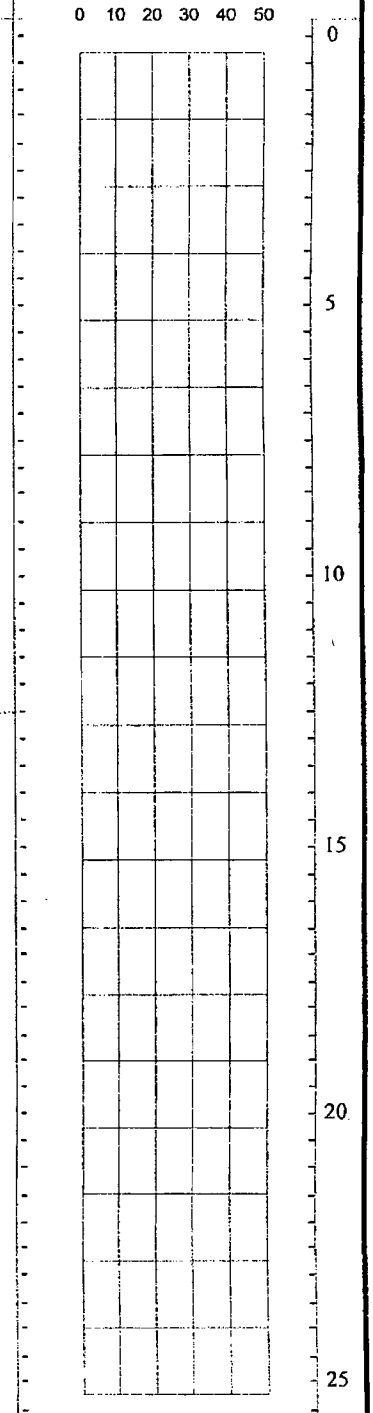
DATE:	DRAWN BY:	FIGURE:
June 17, 2004	CL	A13

DATE DRILLED:	June 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	91.4m ±

AUGER HOLE A14
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	3" asphalt concrete, 2" gravel			
	SAND - Tannish brown, silty, fine-grained (loose)	SM	[x]	20.8
2.5				
	SAND - Tan brown mottled, clayey, fine-grained, trace pebbles, crumbly, pp 3 tsf, till-like (compact)	SC	[x]	22.9
5				
7.5				
	SILT - Grey brown mottled, clayey, med plasticity, pp 3 - 3.5 tsf (very stiff)	ML	[x]	27.7
10				
	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM		
12.5				
	TEST BOREHOLE TERMINATED AT REFUSAL, 12.5 FEET			
15				
17.5				
20				
22.5				
	See note on Figure A1			
25				

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

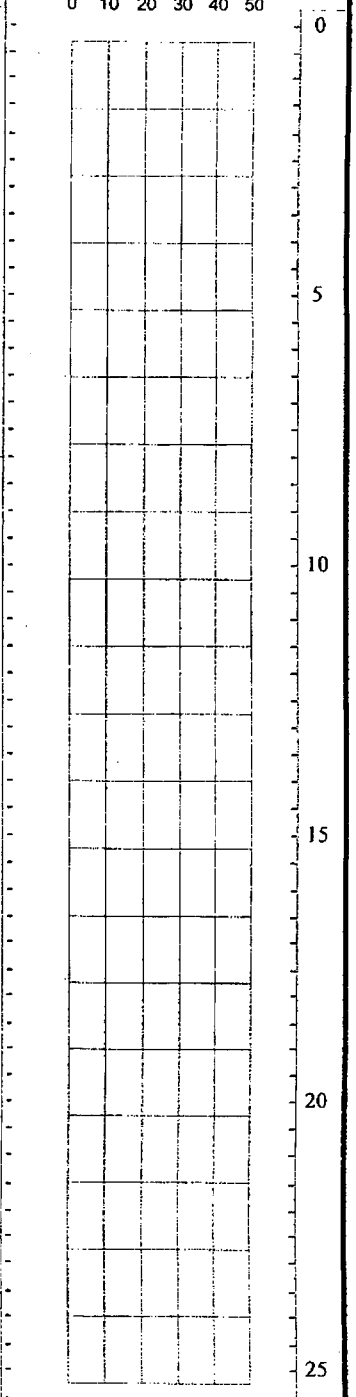
DATE:	DRAWN BY:	FIGURE:
June 17, 2004	CL	A14

DATE DRILLED:	June 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	92.1m ±

AUGER HOLE A15
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	4" asphalt concrete over 4" gravel			
	SILT - Tan brown mottled, clayey, med plasticity, till-like, pp ~ 4 tsf (very stiff)	ML		
2.5			[x]	18.2
5	SAND - Grey, silty, fine-grained, small pebbles, till-like (v dense)	SM	[x]	23.7
7.5				
	TEST BOREHOLE TERMINATED AT REFUSAL, 8 FEET			
10				
12.5				
15				
17.5				
20				
22.5				
	See note on Figure A1			
25				

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

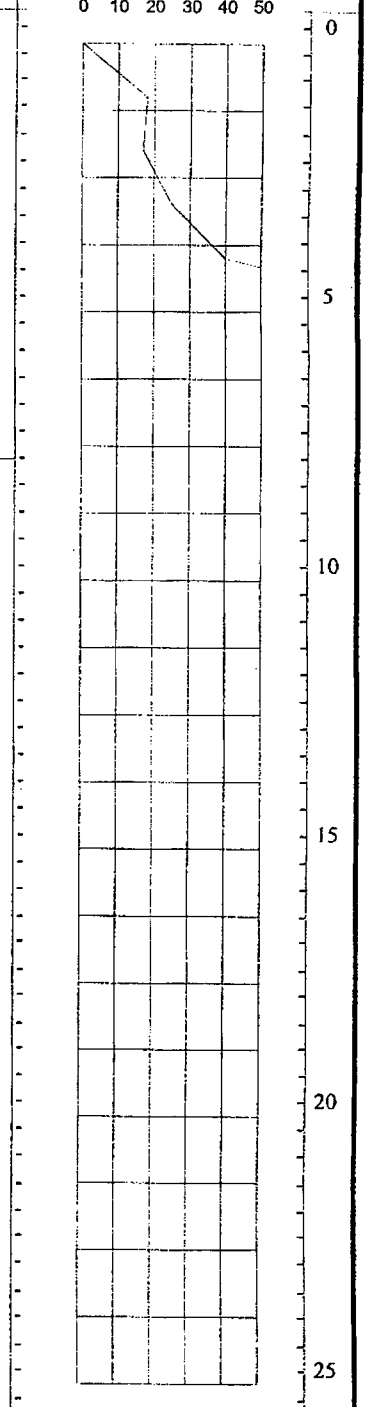
BOREHOLE LOG

DATE:	DRAWN BY:	FIGURE:
June 17, 2004	CL	A15

DATE DRILLED: June 3, 2004	INSPECTOR: LL	AUGER HOLE A16
DRILL METHOD: AUGER	SURFACE ELEVATION: 92.1m ±	SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	3" asphalt concrete over 3" gravel			
	SILT - Tan brown mottled, clayey, med plasticity, till-like, pp ~ 4 tsf (very stiff)	ML		
2.5			[x]	20
5				
	SAND - Grey, silty, fine-grained, small pebbles, till-like (v dense)	SM	[x]	9.1
7.5				
	TEST BOREHOLE TERMINATED AT REFUSAL, 8 FEET			
10				
12.5				
15				
17.5				
20				
22.5				
	See note on Figure A1			
25				

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121		
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS	CENTENNIAL GEOTECHNICAL ENGINEERS	
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.	BOREHOLE LOG	
	DATE: June 17, 2004	DRAWN BY: CL
		FIGURE: A16

DATE DRILLED:	June 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	94.4m±

AUGER HOLE A17
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content	DYNAMIC CONE PENETRATION TEST BLOWS / FOOT
0	**FILL -** Random, brown, silty sand & gravel, some organic matters (loose)	SM	[x]	20	
2.5					
5	**SILT -** Tan grey mottled, clayey, med plasticity (very stiff)	ML			
7.5	**SAND -** Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	7	
10	TEST BOREHOLE TERMINATED AT REFUSAL, 10 FEET				
12.5					
15					
17.5					
20					
22.5					
25					

0 10 20 30 40 50

PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

DATE: June 17, 2004 DRAWN BY: CL FIGURE: A17

DATE DRILLED:	September 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	93.3m ±

AUGER HOLE B1
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	4" asphalt concrete			
	FILL - Random, brown, silty sand & gravel, some organic matters (loose)	SM		
	SAND - Tan brown mottled, clayey, fine-grained, trace pebbles & 1" gravel crumbly, pp ~ 1.5 to 2 tsf (compact)	SC	[X]	22.5
2.5				
	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[X]	7.9
5				
7.5			[X]	7.8
10	TEST BOREHOLE TERMINATED AT REFUSAL, 10 FEET			
12.5				
15				
17.5				
20				
22.5				
	See notes on Figure A1			
25				

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT

0 10 20 30 40 50

PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

DATE: Sept. 12, 2004 DRAWN BY: CL FIGURE: A18

DATE DRILLED: September 3, 2004 | INSPECTOR: LL | AUGER HOLE B2

DRILL METHOD: AUGER | SURFACE ELEVATION: 92.8m + | SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content	DYNAMIC CONE PENETRATION TEST BLOWS / FOOT
0	2.5" asphalt cpncrete				0 10 20 30 40 50
	FILL - Random, brown, silty sand & gravel, some organic matters (loose)	SM			
2.5			[x]	19	
5					
	SILT - Tan grey mottled, clayey, occ. small pebbles, med plasticity, crumbly, pp 3 - 3.5 tsf (stiff)	ML	[x]	23.1	
7.5					
10					
	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	18.5	
12.5					
15					
	TEST BOREHOLE TERMINATED AT REFUSAL, 15 FEET				
17.5					
20					
22.5					
	See note on Figure A1				
25					

PP, TSF | GRAB SAMPLE [x] | WATER TABLE ▽

PROJECT No: V04-121

PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS

LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

DATE: Sept. 12, 2004 | DRAWN BY: CL | FIGURE: A19

DATE DRILLED: Sept. 3, 2004 | INSPECTOR: LL | AUGER HOLE B3

DRILL METHOD: AUGER | SURFACE ELEVATION: 91.4m ± | SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content	DYNAMIC CONE PENETRATION TEST BLOWS / FOOT
0	4" asphalt concrete, 2" gravel				0 10 20 30 40 50
	SAND - Tannish brown, silty, fine-grained, some gravel (loose)	SM	X		
2.5	SILT - Grey brown mottled, clayey, med plasticity, pp 3 - 3.5 tsf (very stiff)	ML	X		
5			X		
7.5	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	X		
10	TEST BOREHOLE TERMINATED AT REFUSAL, 10 FEET				
12.5					
15					
17.5					
20					
22.5					
25	see note on Figure A1				

PP, TSF | GRAB SAMPLE X | WATER TABLE ▽

PROJECT No: V04-121

PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS

LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

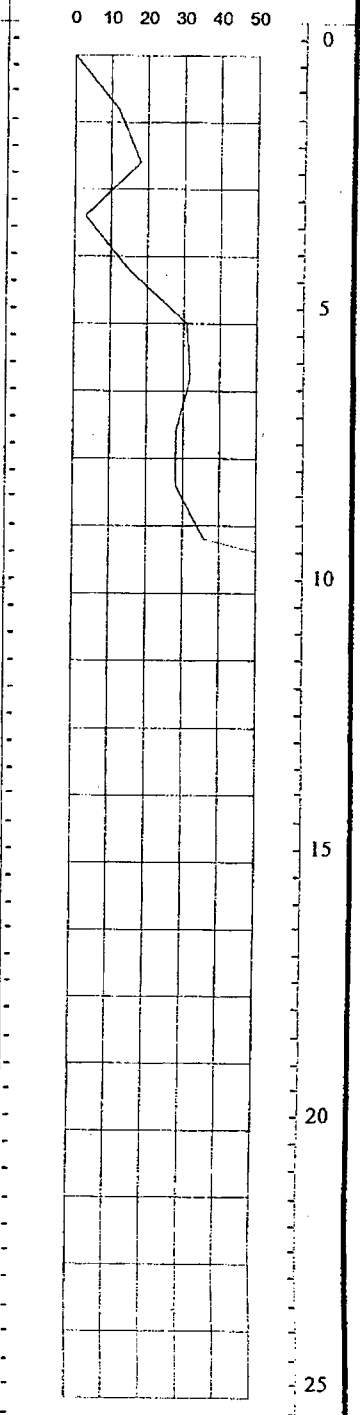
DATE: Sept. 12, 2004 | DRAWN BY: CL | FIGURE: A20

DATE DRILLED:	September 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	91.6m ±

AUGER HOLE B4
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	4.5-inch asphalt concrete			
	FILL - Dark brown, silty sand, some gravel & organic matters (loose)	SM		
	SAND - Tannish brown, silty, fine-grained, saturated (loose)	SM	[X]	79.9
2.5	SAND - Tan brown mottled, clayey, fine-grained, trace pebbles & 1" gravel, crumbly, till-like, pp 2.5 - 3 tsf (compact)	SC	[X]	
			[X]	
5	SILT - Grey brown, clayey, med plasticity (very stiff)	ML	[X]	
7.5				
	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM		
10	TEST BOREHOLE TERMINATED AT REFUSAL, 10 FEET			
12.5				
15			[X]	
17.5				
20				
22.5				
25	see note on Figure A1			

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



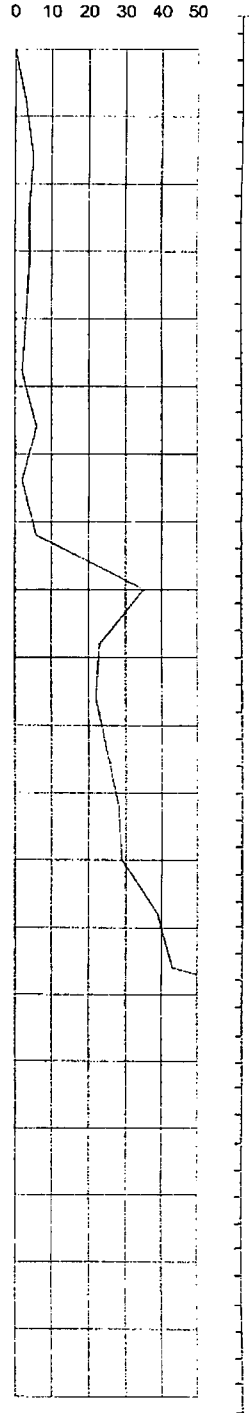
PP, TSF GRAB SAMPLE [X] WATER TABLE

PROJECT No:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS	
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS		
LOCATION:	835 8th STREET, NEW WESTMINSTER, BC.	BOREHOLE LOG	
		DATE: Sept. 12, 2004	DRAWN BY: CL
			FIGURE: A21

DATE DRILLED:	September 3, 2004	INSPECTOR:	LL	AUGER HOLE	B5
DRILL METHOD:	AUGER	SURFACE ELEVATION:	93.6m ±	SHEET	1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	**FILL -** Dark brown, silty sand, some gravel & organic matters (loose)	SM		
2.5			[x]	26
5				
7.5	**SAND -** Rusty brown, silty, fine-grained, saturated (loose)	SM		
10	**SAND -** Grey brown mottled, clayey, fine-grained, trace pebbles & 1" gravel, crumbly, pp ~ 2.5 tsf (compact)	SC	[x]	22.3
12.5			[x]	25.8
15	**SILT -** Grey, clayey, medium plasticity, trace pebbles (very stiff) pp ~ 2.5 tsf	ML	[x]	21.7
17.5	**SAND -** Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	11.7
20	TEST BOREHOLE TERMINATED AT REFUSAL, 19.5 FEET			
22.5				
25	See note on Figure A1			

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

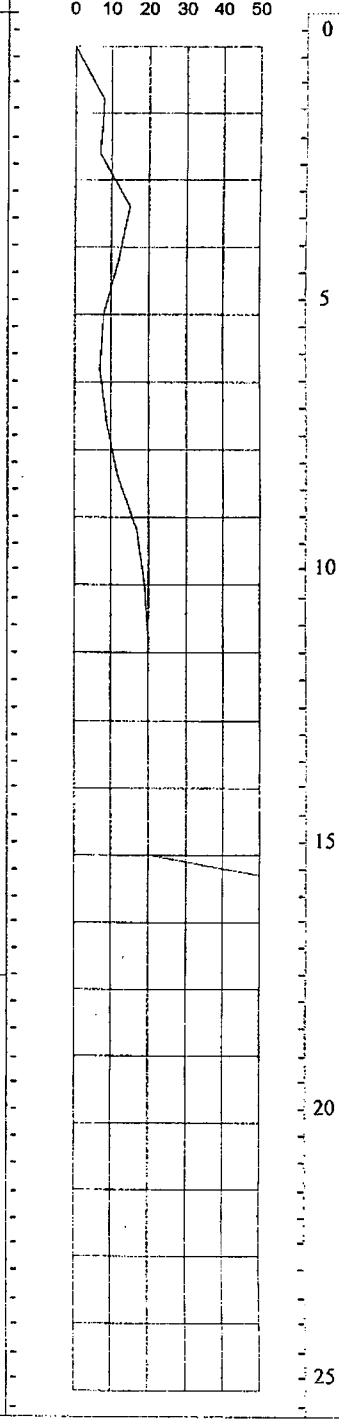
PROJECT No:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS	
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS		
LOCATION:	835 8th STREET, NEW WESTMINSTER, BC.	BOREHOLE LOG	
		DATE: Sept 12, 2004	DRAWN BY: CL
			FIGURE: A22

DATE DRILLED:	September 3, 2004	INSPECTOR:	LL	AUGER HOLE	B6
DRILL METHOD:	AUGER	SURFACE ELEVATION:	91.2m ±	SHEET	1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	FILL - 12-inch river sand, over 12 inches of topsoil (loose)	SM		
2.5	SAND - Tannish brown, silty, fine-grained (loose)	SM	[x]	31.7
5	SAND - Tan grey mottled, clayey, fine-grained, trace pebbles & 1" gravel crumbly, pp ~ 1.5 tsf (compact)	SC	[x]	21.5
7.5	SILT - Grey, clayey, med plasticity, trace small pebbles & 1" gravel (firm) pp ~ 1.5 tsf	ML	[x]	24.9
10	- grades less clayey, very stiff			
12.5			[x]	21.9
15	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	7.9
17.5	TEST BOREHOLE TERMINATED AT REFUSAL, 17.5 FEET			
20				
22.5	See note on Figure A1			
25				

DYNAMIC CONE PENETRATION TEST

BLOWS / FOOT



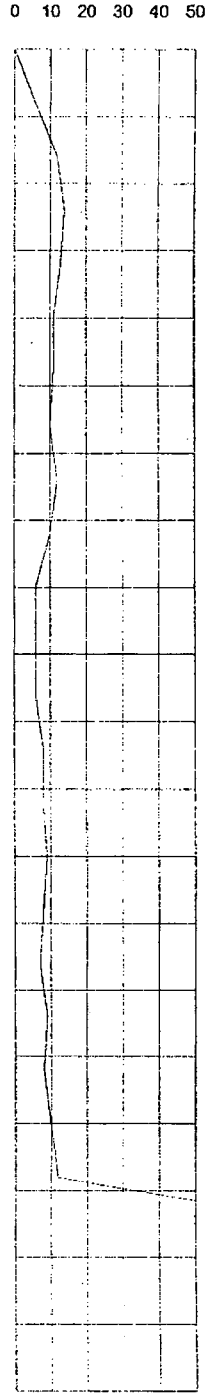
PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS	
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS		
LOCATION:	835 8th STREET, NEW WESTMINSTER, BC.	BOREHOLE LOG	
		DATE: Sept. 12, 2004	DRAWN BY: CL
			FIGURE: A23

DATE DRILLED: Sept. 3, 2004	INSPECTOR: LL	AUGER HOLE B7
DRILL METHOD: AUGER	SURFACE ELEVATION: 91.7m±	SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	**FILL** - Random, brown, silty sand & gravel, some organic matters (loose)	SM		
2.5			[x]	19.6
5				
7.5	**SAND** - Tan grey mottled, clayey, fine-grained, trace pebbles & 1" gravel med plasticity (compact)	SC	[x]	17.7
10				
12.5	**SILT** - Tan grey mottled, clayey, med plasticity, trace small pebbles (firm)	ML	[x]	30.4
15	pebbles grade out		[x]	29.9
17.5	**SILT** - Grey, clayey, med plasticity (stiff)	ML	[x]	26.4
20	- grades to very stiff			
22.5	**SAND** - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	7.5
	See note on Figure A1			
25	**TEST BOREHOLE TERMINATED AT REFUSAL, 25 FEET**			

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No: V04-121
PROJECT: PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION: 835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

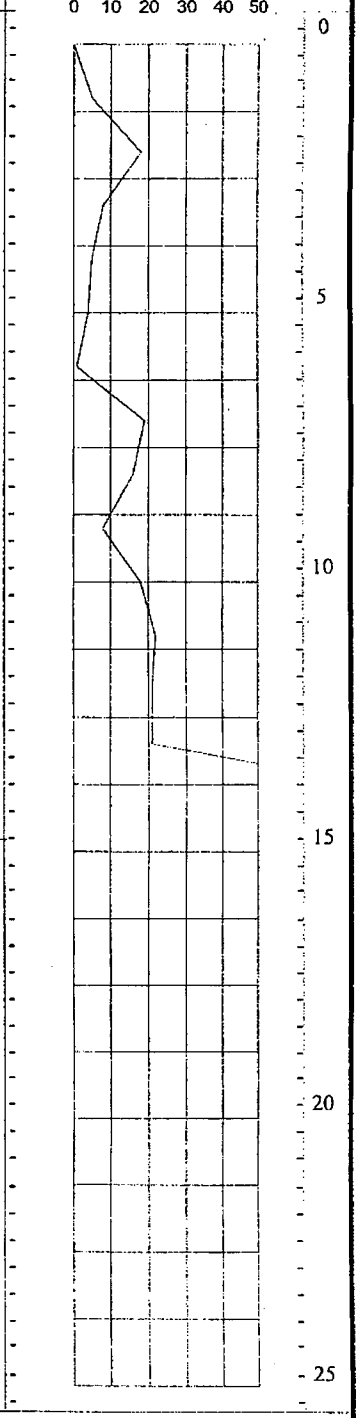
DATE: Sept. 12, 2004 DRAWN BY: CL FIGURE: A24

DATE DRILLED:	September 3, 2004	INSPECTOR:	LL	AUGER HOLE	B8
DRILL METHOD:	AUGER	SURFACE ELEVATION:	90.0m±	SHEET	1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	**FILL -** Random, brown, silty sand & gravel, some organic matters (loose)	SM		
2.5			[x]	15.7
5				
7.5	**SILT -** Grey tan mottled, clayey, med plasticity (very stiff) pp~ 4tsf	ML	[x]	22.4
10				
12.5	- grades with a trace of small pebbles		[x]	26.7
	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	24.7
15				
	TEST BOREHOLE TERMINATED AT REFUSAL, 15 FEET			
17.5				
20				
22.5				
	See note on Figure A1			
25				

DYNAMIC CONE PENETRATION TEST

BLOWS / FOOT



PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

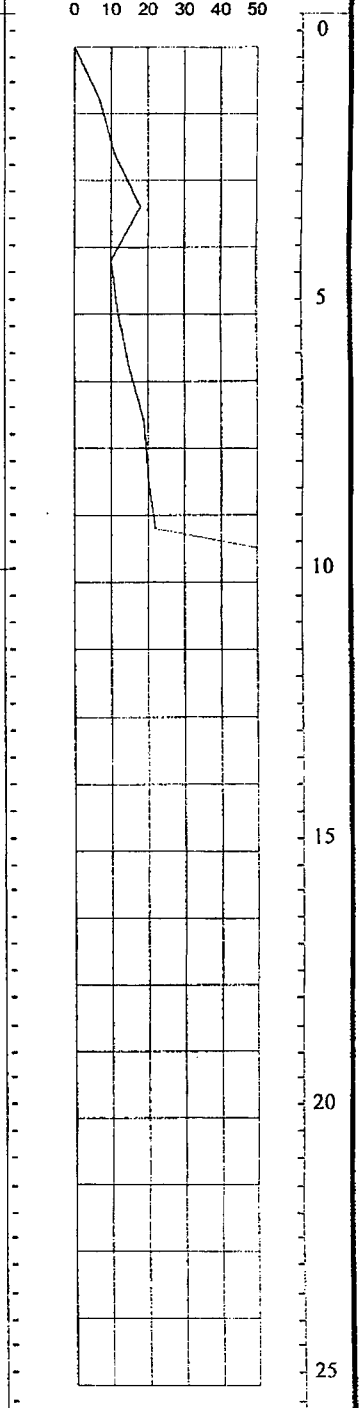
PROJECT No:	V04-121	
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS	CENTENNIAL GEOTECHNICAL ENGINEERS
LOCATION:	835 8th STREET, NEW WESTMINSTER, BC.	BOREHOLE LOG
		DATE: Sept. 12, 2004 / DRAWN BY: CL / FIGURE: A25

DATE DRILLED:	September 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	90.5m+

AUGER HOLE B9
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content
0	**FILL -** brown, silty fine-grained sand, some gravel (loose)	SM		
2.5	**SAND -** Tannish brown, silty, fine-grained (loose)	SM	[x]	19
	SILT - Grey, clayey, med plasticity, trace pebbles & 1" gravel, till-like, pp~ 2 - 2.5 tsf (firm)	ML	[x]	20.5
5				
7.5	- grades to very stiff, pp ~ 3 - 3.5 tsf		[x]	21.2
	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]	16.3
10	**TEST BOREHOLE TERMINATED AT REFUSAL, 10 FEET**			
12.5				
15				
17.5				
20				
22.5				
	See note on Figure A1			
25				

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT



PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No:	V04-121
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION:	835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

DATE:	DRAWN BY:	FIGURE:
Sept 12, 2004	CL	A26

DATE DRILLED:	September 3, 2004	INSPECTOR:	LL
DRILL METHOD:	AUGER	SURFACE ELEVATION:	91.6m ±

AUGER HOLE B10
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	SAMPLE Moisture Content	DYNAMIC CONE PENETRATION TEST BLOWS / FOOT
0	4.-inch asphalt concrete				0 10 20 30 40 50
	FILL - Dark brown, silty sand, some gravel & organic matters (loose)	SM		79.9	
2.5			[x]		
5	SAND - Tannish brown, silty, fine-grained, saturated (loose)	SM	[x]		
	SAND - Tan brown mottled, clayey, fine-grained, trace pebbles & 1" gravel, crumbly, till-like, pp 3 - 3.5 tsf (compact)	SC	[x]		
7.5					
	SILT - Grey brown, clayey, med plasticity (very stiff)	ML	[x]		
10					
	SAND - Grey, silty, fine-grained, small pebbles & occ. 1.5-2" gravel, till-like (very dense)	SM	[x]		
12.5					
	TEST BOREHOLE TERMINATED AT REFUSAL, 13 FEET				
15					
17.5					
20					
22.5					
	see note on Figure A1				
25					

PP, TSF GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No:	V04-121
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION:	835 8th STREET, NEW WESTMINSTER, BC.

CENTENNIAL GEOTECHNICAL ENGINEERS

BOREHOLE LOG

DATE:	DRAWN BY:	FIGURE:
Sept. 12, 2004	CL	A27

DATE DRILLED:	July 5, 2004	INSPECTOR:	R.Y.
DRILL METHOD:	BECKER HAMMER	SURFACE ELEVATION:	92.22m

AUGER HOLE MW 1
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type
0	SAND - Grey, sandy gravel	GM	
	SAND - Grey, silty, fine-grained	SM	
10	SAND - Grey, clayey, some seashells	SC	
	SAND - Grey, silty, fine-grained, some 2 to 3" gravel, till-like - grades to dense at 16 feet	SM/GM	
20			
	- some boulders at 26 feet		
30			
40	SAND - Grey, silty, fine-grained, micaceous, saturated	SM	
	SILT - Grey, clayey, low to medium plasticity	ML	
50	BOTTOM OF MW AT 47 FEET		
60			
70			
80			
90			
	Water level measured at 6 feet below ground surface on Sept. 16, 04		
100			

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT
0 10 20 30 40 50

GRAB SAMPLE x WATER TABLE ▽

PROJECT No:	V04-121
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION:	835 - 8TH STREET NEW WESTMINISTER, BC

CENTENNIAL GEOTECHNICAL ENGINEERS

MONITORING WELL LOG

DATE:	DRAWN BY:	FIGURE:
JULY 12, 2004	CL	A28

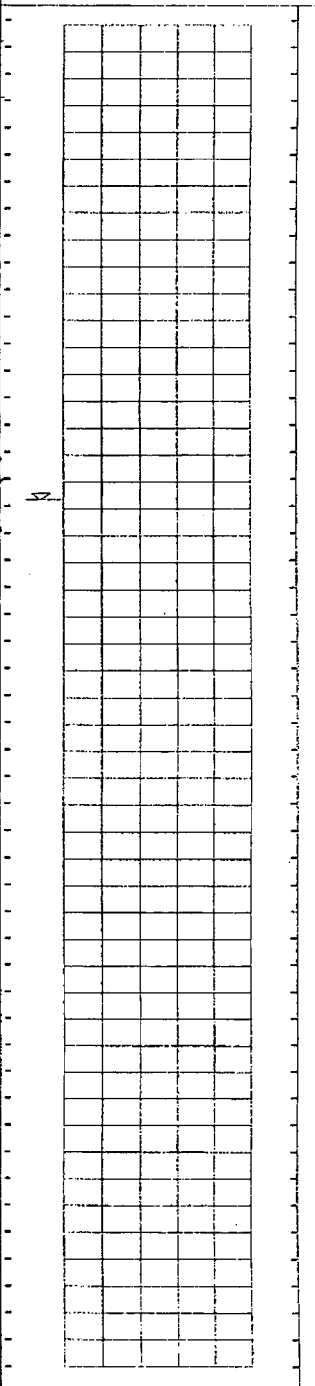
DATE DRILLED:	July 5, 2004	INSPECTOR:	R.Y.	AUGER HOLE	MW 2
DRILL METHOD:	BECKER HAMMER	SURFACE ELEVATION:	94.94m	SHEET	1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type
0	SAND - Grey, sandy gravel	GM	
	SAND - Grey, silty, fine-grained	SM	
10	SAND - Grey, clayey, some sea shells	SC	
	SAND - Grey, silty, fine-grained, some 2 to 3" gravel, till-like - grades to dense at 16 feet	SM/GM	
20			
	- some boulders at 29 feet		
30			
	SAND - Grey, silty, fine-grained, some 1/2" gravel, saturated	SM	
40	SAND - Tannish brown, silty, medium to coarse-grained, 1/2" to 1" gravel	SM	
50	SAND - Tannish brown, silty, fine-grained - abundance of water	SM	
	SILT - Grey brown, clayey, low plasticity, till-like	ML	
60	**BOTTOM OF MW AT 60 FEET**		
70			
80			
90	Water level measured @ 27.7 feet (EL. 86.49m) below ground surface on Sept.16, 04		
100			

DYNAMIC CONE PENETRATION TEST

BLOWS / FOOT

0 10 20 30 40 50



GRAB SAMPLE [x] WATER TABLE ▽

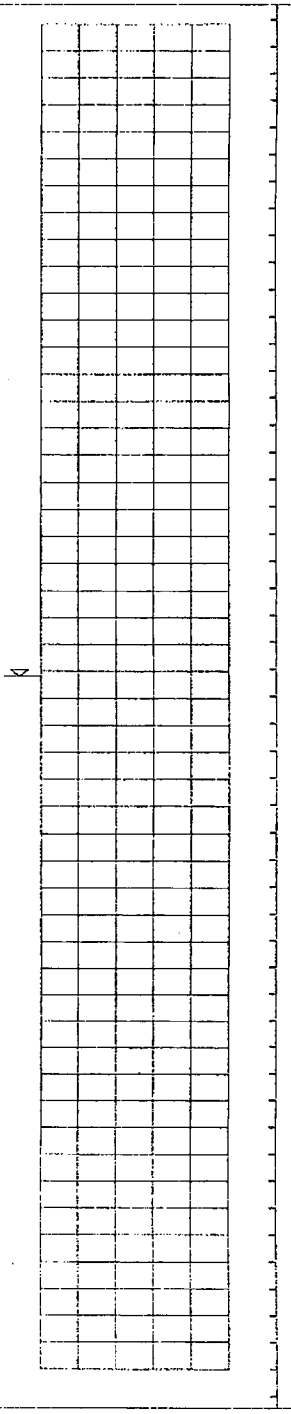
PROJECT No:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS		
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS			
LOCATION:	835 - 8TH STREET NEW WESTMINISTER, BC	MONITORING WELL LOG		
		DATE: JULY 12, 2004	DRAWN BY: CL	FIGURE: A29

DATE DRILLED:	SEPTEMBER 1, 2004	INSPECTOR:	R.Y.
DRILL METHOD:	BECKER HAMMER	SURFACE ELEVATION:	94.06m

AUGER HOLE MW 3
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Moisture Content %
0	SAND - Grey, sandy gravel	GM	
	SAND - Grey, brown, fine-grained, tr gravel, till-like	SM	
10	SAND - Grey, silty, fine-grained, some 2 to 3" gravel, till-like	SM/GM	
20	- some boulders from 20 to 24 feet		
30			
40			34
	SAND - Grey, medium to coarse-grained, some 1" angular gravel	SP	
	- some organic matter at 45 feet		49
	SAND - Grey, silty, fine-grained	SM	24
50	SAND & GRAVEL - Grey, medium to coarse - grained and 1 - 2" subrounded gravel - abundance of water	SP/GP	14
60			
	SAND - Tannish brown, fine to medium-grained, saturated	SP	22
70			
	SILT - Grey brown, clayey, low plasticity, till-like	ML	26
80	BOTTOM OF MW AT 78 FEET		
90			
	Water level measured @ 29.8 feet (EL 84.97m) below ground surface on Sept. 16, 04		
100			

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT
0 10 20 30 40 50



GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No:	V04-121
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION:	835 - 8TH STREET NEW WESTMINISTER, BC

CENTENNIAL GEOTECHNICAL ENGINEERS

MONITORING WELL LOG

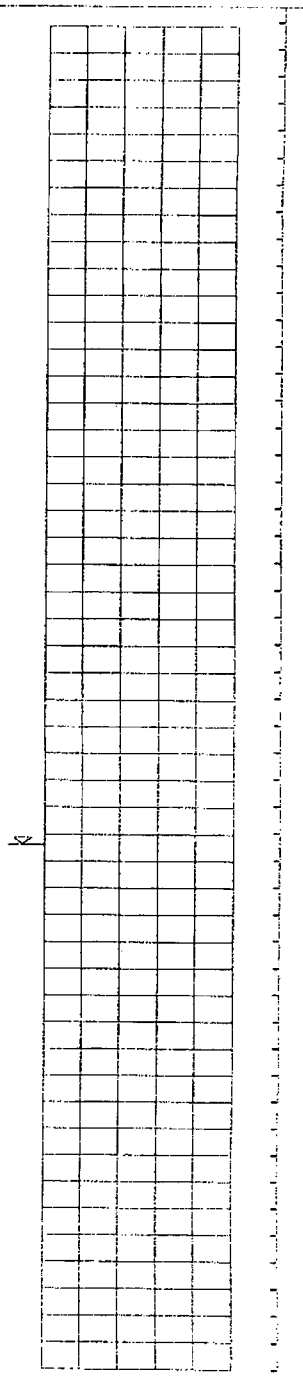
DATE:	DRAWN BY:	FIGURE:
Sept. 12, 2004	CL	A30

DATE DRILLED:	SEPTEMBER 1, 2004	INSPECTOR:	LL
DRILL METHOD:	BECKER HAMMER	SURFACE ELEVATION:	92.2m

AUGER HOLE MW 4
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Moisture Content %
0	SAND - Grey, sandy gravel	GM	
	SAND - Grey, brown, fine-grained, tr gravel, till-like	SM	
10	SAND - Grey, silty, fine-grained, some 2 to 3" gravel, till-like	SM/GM	
20	- some boulders		
30			
40	- some organic matter at 42 to 43 feet		
50	SAND - Grey, medium to coarse- grained, some 1 to 3" subangular gravel - round to subround gravel from 51 to 56 feet	SP	
60	SAND - Grey, silty, fine to medium-grained, some 1 to 3" subangular grave moist, till-like	SM	8
70	SAND & GRAVEL Grey, medium to coarse-grained, and 1 to 3" subround gravel - abundance of water	SP/GP	4.5 5.2
80	SILT - Grey brown, clayey, low plasticity	ML	22
90	BOTTOM OF MW AT 82 FEET		
100	Water level measured @ 34.7 feet (EL. 81.6m) below ground surface on Sept. 16, 2004		

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT
0 10 20 30 40 50



GRAB SAMPLE x WATER TABLE ▽

PROJECT No:	V04-121
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION:	835 - 8TH STREET NEW WESTMINISTER, BC

CENTENNIAL GEOTECHNICAL ENGINEERS

MONITORING WELL LOG

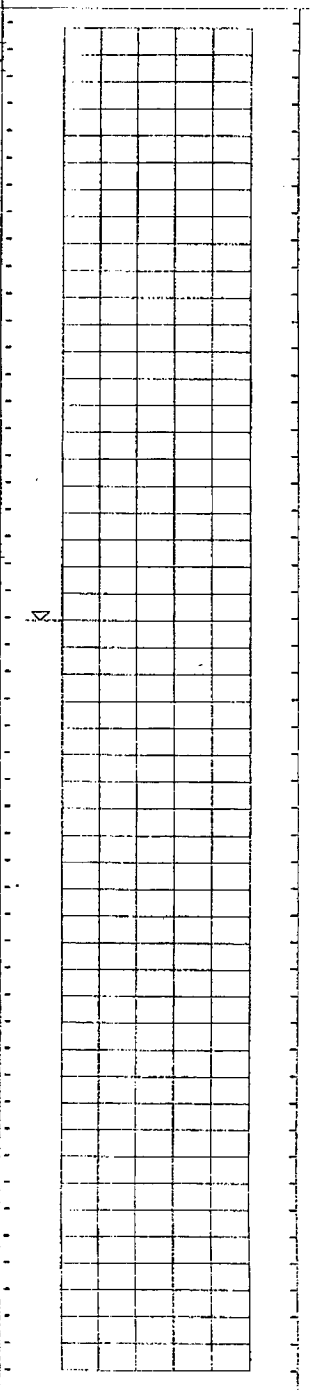
DATE:	DRAWN BY:	FIGURE:
Sept. 12, 2004	CL	A31

DATE DRILLED:	SEPTEMBER 1, 2004	INSPECTOR:	R.Y.
DRILL METHOD:	BECKER HAMMER	SURFACE ELEVATION:	90.67m

AUGER HOLE MW 5
SHEET 1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Moisture Content %
0	SAND - Grey, sandy gravel	GM	
	SAND - Grey brown mottled, clayey, small pebbles, till-like	SC	
10	SILT - Grey brown mottled, clayey, low plasticity	ML	
	SAND - Grey, silty, fine-grained, some 2 to 3" gravel, till-like	SM	
20	- some boulders		
30	- some cobbles from 34 to 37 feet		
40			
	SAND & GRAVEL - Grey, medium to coarse- grained, with 1" subround gravel, saturated	SP/GP	5.6
50			16
			18
60	SAND - Grey, silty, fine-grained, saturated	SM	22
	SAND - Grey, silty, fine-grained, some 2 to 3" gravel, till-like	SM	25
70	**BOTTOM OF MW AT 67 FEET**		
80			
90			
	Water level measured @ 19.1 feet (EL. 84.85m) below ground surface on Sept. 16, 2004		
100			

DYNAMIC CONE PENETRATION TEST
BLOWS / FOOT
0 10 20 30 40 50



GRAB SAMPLE [x] WATER TABLE ▽

PROJECT No:	V04-121
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION:	835 - 8TH STREET NEW WESTMINISTER, BC

CENTENNIAL GEOTECHNICAL ENGINEERS

MONITORING WELL LOG

DATE:	DRAWN BY:	FIGURE:
Sept. 12, 2004	CL	A32

DATE DRILLED:	SEPTEMBER 1, 2004	INSPECTOR:	R.Y.	AUGER HOLE	MW 6
DRILL METHOD:	BECKER HAMMER	SURFACE ELEVATION:	90.71m	SHEET	1 OF 1

DEPTH (ft)	DESCRIPTION OF SOIL AND OBSERVATIONS	Soil Class. Symbol	SAMPLE Sample Type	DYNAMIC CONE PENETRATION TEST BLOWS / FOOT 0 10 20 30 40 50
0	**SAND** - Grey, sandy gravel	GM		
	SAND - Grey, brown, fine-grained, tr gravel, till-like	SM		
10	**SAND** - Grey, silty, fine-grained, some 2 to 3" gravel, till-like	SM/GM		
20	- some boulders			
30	- some organic matter at 35 feet			
40	- grades with 1/2 - 1" subangular gravel			
	SAND & GRAVEL Grey, coarse- grained sand with 1" subround gravel, saturated	SP/GP		
50				
	SAND - Brown, silty, fine-grained, saturated	SM		
60	**SAND** - Grey, fine -grained, micaceous, saturated	SP		
70				
	SILT - Grey brown, clayey, low plasticity	ML		
80	**BOTTOM OF MW AT 75 FEET**			
90				
	Water level measured @ 19.2 feet (EL. 84.86m) below ground surface on Sept. 16, 2004			
100				

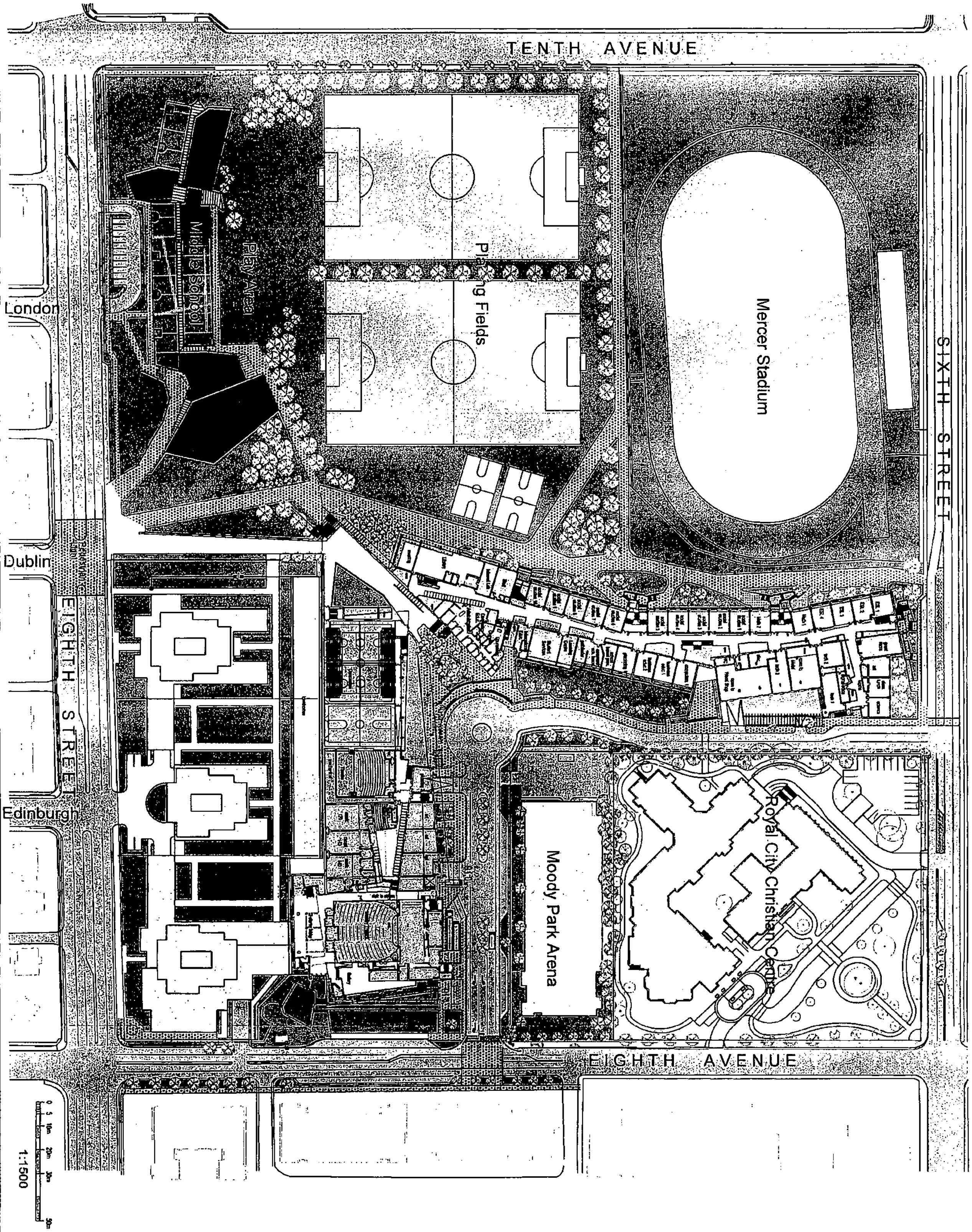
GRAB SAMPLE [X] WATER TABLE ▽

PROJECT No:	V04-121
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS
LOCATION:	835 - 8TH STREET NEW WESTMINISTER, BC

CENTENNIAL GEOTECHNICAL ENGINEERS

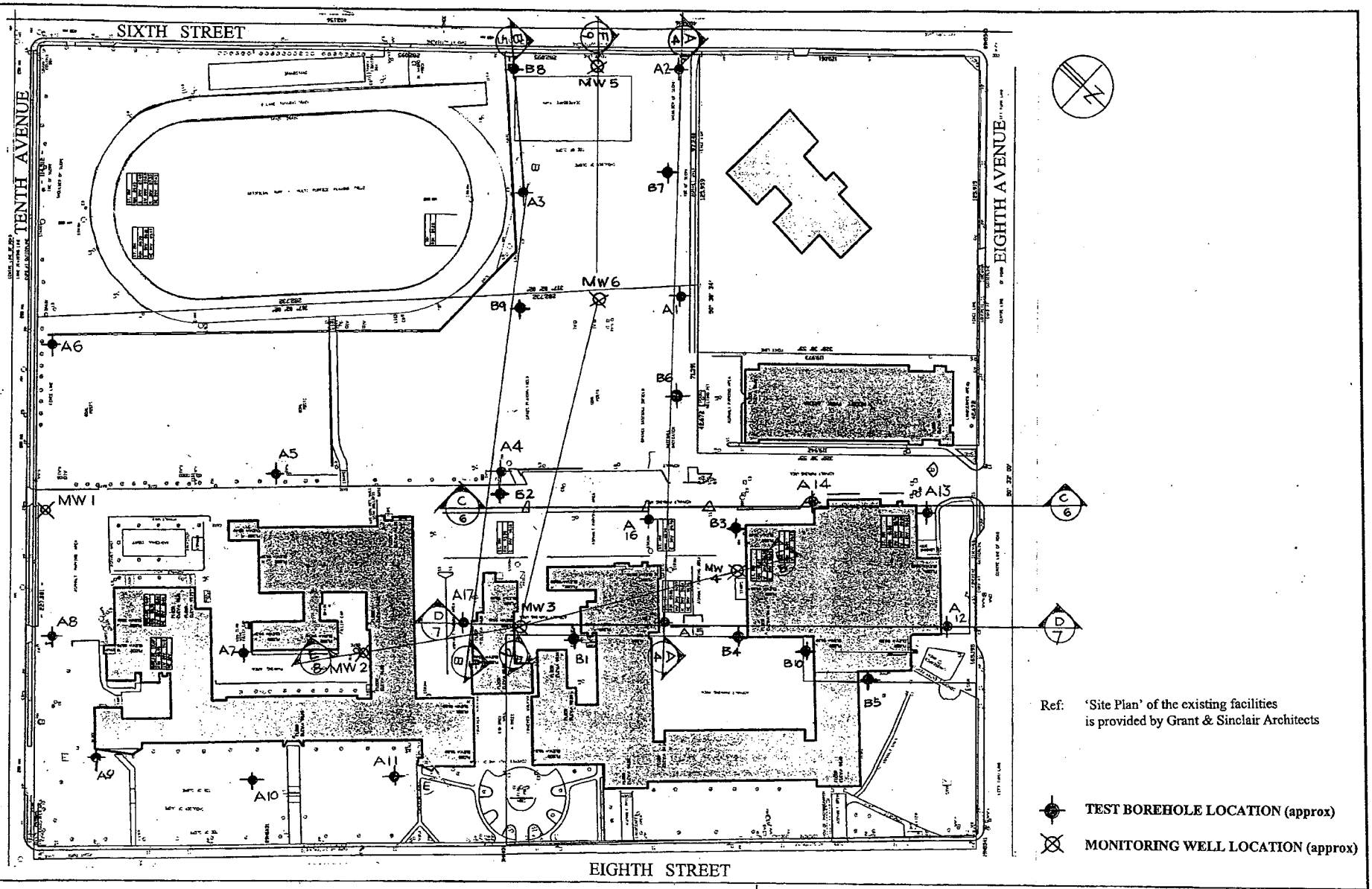
MONITORING WELL LOG

DATE:	DRAWN BY:	FIGURE:
Sept. 12, 2004	CL	A33



New Westminster Secondary School GRANT + SINCLAIR

Level 2 Site



PROJECT No:	V04-121	CENTENNIAL GEOTECHNICAL ENGINEERS			
PROJECT:	PROPOSED SECONDARY & MIDDLE SCHOOLS	SITE PLAN OF THE SCHOOL PROPERTY			
LOCATION:	835 - 8TH STREET, NEW WESTMINISTER, BC.	DATE: July 23, 2004	DRAWN BY:	SCALE: 1:1500	FIGURE: 3