GEOTECHNICAL EVALUATION
RIVERTON COMMERCIAL PROPERTIES
NEAR 3600 WEST AND 13400 SOUTH
RIVERTON, UTAH
JOB NO. 2154JW034

Western Technologies Inc.
The Quality People
Since 1955

SALT LAKE CITY – UTAH
760 South Redwood Road
Salt Lake City, Utah 84104-3619
(801) 972-3650 • fax 972-3653

Prepared for:

CLC ASSOCIATES

April 22, 2004

LICENSED PROFESSIONAL ENGINEER
4/22/04
No. 180305-2202
WARREN D. CLYDE
STATE OF UTAH

Warren D. Clyde, P.E.
Senior Geotechnical Engineer

Robert E. Wenzel, Jr., P.E.
Geotechnical Engineer

Western Technologies Inc.
The Quality People
Since 1955

760 South Redwood Road
Salt Lake City, Utah 84104-3619
(801) 972-3650 • fax 972-3653

April 22, 2004

CLC Associates
350 South 400 East, Suite 304
Salt Lake City, Utah 84111

Attn: Troy Herold, Project Manager

Re: Geotechnical Evaluation
Proposed Commercial Development
Near 3600 West and 13400 South
Riverton, Utah

Job No. 2154JW034

Western Technologies Inc. has completed the geotechnical evaluation for the proposed Commercial Development to be located near 3600 West and 13400 South, Riverton, Utah. This study was performed in general accordance with our proposal number 2154PW062 dated March 3, 2004. The results of our study, including the boring location diagram, laboratory test results, boring logs, and the geotechnical recommendations are attached.

We have appreciated being of service to you in the geotechnical engineering phase of this project and are prepared to assist you during the construction phases as well. If design conditions change, or if you have any questions concerning this report or any of our testing, inspection, design and consulting services, please do not hesitate to contact us. We look forward to working with you on future projects.

Sincerely,
WESTERN TECHNOLOGIES INC.
Geotechnical Engineering Services

Warren D. Clyde, P.E.
Senior Geotechnical Engineer

Copies to: Addressee (5)

TABLE OF CONTENTS

Page No.

1.0 PURPOSE 1

2.0 PROJECT DESCRIPTION 1

3.0 SCOPE OF SERVICES 2
- 3.1 Field Exploration 2
- 3.2 Laboratory Analyses 2
- 3.3 Analyses and Report 3

4.0 SITE CONDITIONS 3
- 4.1 Surface 3
- 4.2 Subsurface 3
  - 4.2.1 Parcel B Main Commercial Building and Theater 3
  - 4.2.2 Parcel B Outlots 16 through 24 4
  - 4.2.3 Parcel B Pavement Areas 4
  - 4.2.4 Parcel A Outlots 12 through 14, Retail Buildings and Pavement Area 4
  - 4.2.5 Parcel A Main Commercial Building 4
  - 4.2.6 Storm Water Detention Basin Area 4
- 4.3 Groundwater 5
- 4.4 Geology 5

5.0 GEOTECHNICAL PROPERTIES AND ANALYSES 5
- 5.1 Laboratory Tests 5
- 5.2 Field Tests 6

6.0 RECOMMENDATIONS 6
- 6.1 General 6
- 6.2 Foundations 6
  - 6.2.1 Main Buildings 6
  - 6.2.2 Outlots/Retail Buildings 6
- 6.3 Lateral Design Criteria 7
- 6.4 Seismic Considerations 9
- 6.5 Slab-on-Grade Support 9
- 6.6 Drainage 9
  - 6.6.1 Subsurface Drainage 10
  - 6.5.2 Percolation Tests 10
- 6.7 Corrosivity 10
- 6.8 Pavements 10

7.0 EARTHWORK 12
- 7.1 General 12
- 7.2 Site Clearing 12
- 7.3 Excavation 12

TABLE OF CONTENTS (Continued)

7.4 Building Pad Preparation 13
7.4.1 Dry Weather Conditions 13
7.4.2 Wet Weather Conditions 13
7.5 Foundation Preparation 13
7.5.1 Parcel B Main Building 13
7.5.2 Parcel A Main Building 14
7.5.3 Outlots/Retail 14
7.6 Interior Slab Preparation 14
7.7 Exterior Slab Preparation 15
7.8 Pavement Preparation 15
7.9 Materials 15
7.10 Placement and Compaction 16
7.11 Compliance 17

8.0 LIMITATIONS 17

9.0 OTHER SERVICES 17

10.0 CLOSURE 17

VICINITY MAP ..... Plate 1

BORING LOCATION DIAGRAM ..... Plate 2

APPENDIX A
Definition of Terminology A-1
Method of Soil Classification A-2
Boring Log Notes A-3
Boring Logs ..... A-4 to A-37

APPENDIX B
Laboratory Tests ..... B-1 to B-5

GEOTECHNICAL EVALUATION
PROJECT NAME
ADDRESS
JOB NO. 2154JT058

1.0 PURPOSE

This report contains the results of our geotechnical evaluation for the proposed commercial development to be located near 3600 West and 13400 South, Riverton Utah. The purpose of these services is to provide information and recommendations regarding:

- Foundation design parameters, including footing types, depths, allowable bearing capacities, and estimated settlements
- Lateral earth pressures
- Seismic considerations
- Earthwork, including site preparation, fill placement, and suitability of existing soils for fill materials
- Drainage
- Pavements
- Corrosivity

Our services included obtaining information on site conditions, performing field and laboratory testing, performing engineering analyses, providing recommendations for use in foundation, floor slab, and on-site pavement design, and presenting earthwork guidelines. Results of the field exploration, field tests, and laboratory testing program are presented in the Appendices.

2.0 PROJECT DESCRIPTION

Project information supplied by Mr. Troy Herold, Project Manager, CLC Associates on March 3, 2004 indicates the proposed development will consist of two main 1 to 2 story, Retail/Commercial Structures and 16 Retail/Outlots located on Both Parcels A and B. In addition a detention basin is proposed on the southeast corner of Parcel A. Construction of the main building will consist of masonry walls with steel framing and slab on grade floors. The ground floor level will be within 3 feet of the existing site grades. Maximum structural loads are estimated as follows:

- Interior Column Loads 85 to 150 kips
- Column Uplift Due to Wind 30 kips
- Exterior Column Loads 50 kips
- Non-load Bearing Concrete Masonry Wall Loads 1.5 to 2.0 kips per lineal foot
- Load Bearing Concrete Masonry Wall Loads 4.0 to 6.0 kips per lineal foot
- Maximum uniform Floor Slab Live Load 125 psf
- Estimated Maximum Floor Slab Concentrated Load 5.0 kips

We understand that parts of the site will be paved with asphalt and/or Portland cement concrete. Structure types and loads for the outlots are unknown at the time of this report but are assumed to be similar to the main building. Final site grading plans were not available prior to preparation of this report. Should any of this information be incorrect, we request that the Client notify WT immediately.

3.0 SCOPE OF SERVICES

3.1 Field Exploration

Seven borings were drilled to depths ranging from 15 to 30 feet below existing site grade in proposed main building areas. In addition 16 borings were drilled to depths of 15 to 20 feet in the proposed outlot areas and 6 borings were drilled to depths of 6.5 feet in proposed paved parking and drive areas. Two additional borings and three percolation test holes were drilled in the proposed storm water detention area. The borings were at the approximate locations shown on the attached Boring Location Diagram, Plate 2. Logs of the Borings are presented in Appendix A. Subsoils encountered during drilling were examined visually and sampled at selected depth intervals.

A field log was prepared for each boring. These logs contain visual classifications of the materials encountered during drilling as well as interpolation of the subsurface conditions between samples. Final logs, included in Appendix A, represent our interpretation of the field logs and include modifications based on laboratory observations and tests of the field samples. The final logs describe the materials encountered, their thicknesses, and the locations where samples were obtained.

The Unified Soil Classification System was used to classify soils. The soil classification symbols appear on the boring logs and are briefly described in Appendix A.

3.2 Laboratory Analyses

Laboratory analyses were performed on representative soil samples to aid in material classification and to estimate pertinent engineering properties of the on-site soils for preparation of this report. Testing was performed in general accordance with applicable ASTM specifications. The following tests were performed and the results are presented in Appendix B.

- Liquid limit & plasticity index
- Field moisture content
- In-situ soil density
- Maximum density-optimum moisture relationship

- Expansion
- Consolidation
- Sieve analysis

3.3 Analyses and Report

This geotechnical evaluation report includes a description of the project, a discussion of the field and laboratory testing programs, a discussion of the subsurface conditions, and design recommendations as required to satisfy the purpose previously described.

The scope of our services did not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, surface water, groundwater or air, on, below or around this site. All conditions noted or observed are strictly for the information of our client. If environmental information is required, we recommend an environmental assessment be conducted which addresses environmental concerns.

4.0 SITE CONDITIONS

4.1 Surface

At the time of our exploration, the site was undeveloped ground currently in use for agricultural purposes. The ground surface was relatively flat and contained a moderate growth of grass and alfalfa on the south half of Parcel A. Parcel B had been plowed in the recent past. Site drainage was to the south and east, although shallow depressions existed. Other site features include the Rose Creek drainage ditch crossing both Parcel A and B.

Surrounding land uses include Bangerter Highway to the west and south, agricultural fields, a large commercial office building and residential housing to the north, and agricultural fields to the east.

4.2 Subsurface

4.2.1 Parcel B Main Commercial Buildings and Theater

As presented on Logs of Borings, B-12 through B-16 the surface soils to depths of ½ to 1 foot were found to be clayey topsoil of soft consistency and moderate plasticity. The materials underlying the surface soils and extending to the full depth explored of 31.5 feet consisted for the most part of stiff to very stiff and medium dense to very dense interbedded layers of clay, silt, and clayey silty sand underlain by silty sandy gravel.

4.2.2 Parcel B Outlots 16 through 24

As presented on Logs of Borings, B-1 thourgh B-11 the surface soils to depths of ½ to 1 foot were found to be clayey topsoil of soft consistency and moderate plasticity. The materials underlying the surface soils and extending to the full depth explored of 21.5 feet consisted for the most part of stiff to very stiff and medium dense to very dense interbedded layers of clay, silt, and clayey silty sand.

4.2.3 Parcel B Pavement Areas

As presented on Logs of Borings, B-26 though B-28 and B-30 through B-32, the surface soils to depths of ½ to 1 foot were found to be clayey topsoil of loose density to soft consistency and moderate plasticity. The materials underlying the surface soils and extending to the full depth explored of 6.5 feet consisted for the most part of stiff to very stiff and medium dense to dense interbedded layers of clay, silt, and clayey silty sand.

4.2.4 Parcel A Outlots 12 through 14, Retail Buildings and Pavement Areas

As presented on Logs of Borings B-17 though B-21 and B-33, the surface soils to depths of 6 inches were found to be clayey topsoil of loose density to soft consistency and moderate plasticity. The materials underlying the surface soils and extending to the full depth explored of 16.5 feet consisted for the most part of stiff to hard and medium dense to very dense clay and clayey sand with pockets of clayey gravel.

4.2.5 Parcel A Main Commercial Building

As presented on Logs of Borings B-22 and B-23, the surface soils to depths of 6 inches were found to be clayey topsoil of loose density to soft consistency and moderate plasticity. The materials underlying the surface soils and extending to the full depth of explored of 21.5 feet consisted for the most part of very stiff to hard clay and silty sand to a depth of 8 feet underlain by very dense sandy gravel on the north end of the building. The south side of the building consisted mainly of very dense silty gravel.

4.2.6 Storm Water Detention Basin Area

As presented on Logs of Borings B-24 and B-25, the surface soils to depths of 6 inches were found to be clayey topsoil of loose density to soft consistency and moderate plasticity. The materials underlying the surface soils and extending to the full depth explored of 21.5 feet consisted for the most part of clay to depths of 4 to 8 feet underlain by sandy gravel.

4.3 Groundwater

Groundwater was not encountered in any test boring at the time of exploration. These observations represent the groundwater conditions at the time of measurements and may not be indicative of other times. Groundwater levels and soil moisture conditions can be expected to fluctuate with varying local and regional seasonal and perennial weather conditions, changes in surface and subsurface drainage patterns, adjacent construction or development, and other factors.

4.4 Geology

The site is located in the Jordan Valley east of the Oquirrh Mountain range in the Wasatch Range section of the Middle Rocky Mountains Province. The Wasatch Range trends north-south and includes broad alluvial valley bottoms and low hills in the north and rugged mountains cut by deep valleys in the south. The Property is in an area bounded by the Great Salt Lake to the north and northeast, the Oquirrh Mountains to the west, and the Wasatch Mountains to the east. Most of the area is a plane gently sloping down to the east. The site is located on Quaternary Provo Formation and Younger Shore Facies, which include chiefly sand and gravel, silts and clays in beach deposits, bars, spits, and deltas and possibly Alluvial Deposits consisting of stream alluvium, alluvial fans, and locally, mudflows (Utah Geological Survey, 1983).

The nearest fault is located approximately 7.5 miles to the east. The maximum credible earthquake that can be generated would have a Richter magnitude of 7. Surface rupture is not expected at this site.

5.0 GEOTECHNICAL PROPERTIES AND ANALYSIS

5.1 Laboratory Tests

Laboratory test results indicate that native clay/silt subsoils near shallow foundation level exhibit slight to moderate compressibility at existing water contents. Slight additional compression occurs when the water content is increased.

The Expansion Index (EI) for the near surface soils was determined to be 42. These soils are considered to have a low expansion potential according ASTM Standard 4829 and the 2000 International Building Code. Swell/ consolidation tests done at loads approximating floor and foundation loads show slight consolidation with the addition of moisture. Therefore these soils typically do not exhibit a significant expansion potential when recompacted and confined by loads approximating floor and pavement loads.

5.2 Field Tests

Native subsoils near shallow foundation level in proposed building area exhibited moderate to high resistance to penetration using the standard penetration test method (ASTM D1586) and test method ASTM D3550. This corresponds to a low to medium bearing capacity for native soils in their present condition. The penetration resistances also exhibited variability between test locations. This represents a potential for differential settlements within structures supported on native soils in their existing condition.

6.0 RECOMMENDATIONS

6.1 General

Recommendations contained in this report are based on our understanding of the project criteria described in Section 2.0, Project Description, and the assumption that the soil and subsurface conditions are those disclosed by the borings. Others may change the plans, final elevations, number and type of structures, foundation loads, and floor levels during design or construction. Substantially different subsurface conditions from those described herein may be encountered or become known. Any changes in the project criteria or subsurface conditions shall be brought to our attention in writing.

6.2 Foundations

6.2.1 Main Buildings

Footings should be underlain by at least two (2) feet of imported granular engineered fill. Exterior footings and footings in unheated spaces should bear at least 2.5 feet below the lowest adjacent final compacted subgrade or top of paving. Footings in interior heated spaces should bear at least 1 foot below the final finish floor elevation. Footings placed on properly compacted fill may be designed to impose a maximum of dead plus live load pressure 2500 pounds per square foot.

6.2.2 Outlots/Retail Buildings

Footings for Outlots and small retail buildings should be underlain by at least two (2) feet of imported granular engineered fill. Exterior footings and footings in unheated spaces should bear at least 2.5 feet below the lowest adjacent final compacted subgrade or top of paving. Footings in interior heated spaces should bear at at least 1 foot below the final finish floor elevation. Footings placed on properly compacted fill may be designed to impose a maximum of dead plus live load pressure of 2500 pounds per square foot.

Outlot recommendations are based on a single test boring per lot. Building types and locations were not available at the time this report was written. When this information becomes available we recommend that additional borings be done for the specific project conditions.

We anticipate that settlement of the proposed structures, supported as recommended, should be less than 1 inch. Differential settlement should be less than one half (1/2) inch.

The design bearing capacities apply to dead loads plus design live load conditions. The design bearing capacity may be increased by one-third when considering total loads that include wind or seismic. Recommended minimum widths of column and wall footings are 30 inches and 24 inches, respectively.

Thickened slab sections can be used to support interior partitions, provided that loads do not exceed 900 pounds per linear foot, thickened sections have a minimum width of 12 inches, and thickness and reinforcement are consistent with structural requirements.

All footings, stem walls, and masonry walls should be reinforced to reduce the potential for distress caused by differential foundation movements. The use of joints at openings or other discontinuities in masonry walls is recommended.

We recommend that the geotechnical engineer or his representative observe the foundation installation before reinforcing steel and concrete are placed. It should be determined whether the soils exposed are similar to those anticipated for support of the footings. Any soft, loose or unacceptable soils should be undercut to suitable materials and backfilled with approved fill materials or lean concrete. Soil backfill should be properly compacted.

6.3 Lateral Design Criteria

For cantilevered walls above any free water surface with level backfill and no surcharge loads, recommended equivalent fluid pressures and coefficients of base friction for unrestrained elements are:

- Active:
  Undisturbed subsoil.....35 psf/ft
  Compacted granular backfill.....30 psf/ft
  Compacted site soils (non-clay) .....35 psf/ft
  Clay site soils .....not recommended for use

- Passive:
  Shallow wall footings.....250 psf/ft
  Shallow column footings .....400 psf/ft

- Coefficient of base friction..... 0.35*

  * The coefficient of base friction should be reduced to 0.30 when used in conjunction with passive pressure.

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- At-rest:
  Undisturbed subsoil.....60 psf/ft
  Compacted granular backfill.....55 psf/ft

These lateral earth pressures are not applicable for submerged soils. We should be consulted for additional recommendations if such conditions are to be included in the design. Any surcharge from adjacent loadings must also be considered. Walls below grade, should be waterproofed or at least damp proofed.

We recommend a free-draining soil layer or manufactured geosynthetic material, be constructed adjacent to the back of the wall. A filter may be required between the soil backfill and drainage layer. This drainage zone should help prevent hydrostatic pressure buildup. This vertical drain should be tied into a gravity drainage system at the base of the wall. It is important that all backfill be properly placed and compacted. Backfill should be mechanically compacted in layers. Flooding or jetting should not be permitted. Care should be taken not to damage the walls when placing the backfill. Backfills should be inspected and tested during placement (See Plates in Appendix D).

Free-draining, granular soils containing less than five percent fines (by weight) passing a No. 200 sieve should be placed adjacent to any below ground walls (i.e.-retaining walls). A drainage system consisting of either weep holes or perforated drain lines (placed near the base of the wall) should be used to intercept and discharge water which would tend to saturate the backfill. Where used, drain lines should be embedded in a uniformly graded filter material and provided with adequate clean-outs for periodic maintenance. An impervious soil should be used in the upper layer of backfill to reduce the potential for water infiltration.

Fill against footings, stem walls, basement walls and retaining walls should be compacted to densities specified in **Earthwork**. Medium to high plasticity clay soils should not be used as backfill against retaining walls. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Overcompaction may cause excessive lateral earth pressures which could result in wall movements.

6.4 Seismic Considerations

For structural designs based upon the International Building Code 2000, the following criteria will apply. The site class is S_D. S_s, the spectral acceleration for short periods, is 1.201. S_1, the spectral acceleration for a 1-second period, is 0.702. F_a and F_v, in accordance with Table 1615.1.2 (1) and 1615.1.2 (2), are 1.02 and 1.54, respectively.

As indicated on the *Selected Critical Facilities and Geologic Hazards, Salt Lake County, Utah* map published by the Utah Geological Survey, the nearest mapped fault is located approximately 7.5 miles to the east. Liquefaction potential at the site is shown as "Very Low". Liquefaction of soils requires three conditions, 1) loose sands, 2) groundwater and 3) a earthquake causing ground movement sufficient to liquefy the soils. Based upon the soils observed at this site, mainly clays and dense sands and gravels and the absence of groundwater to a depth greater than 31.5 feet, this "Very Low" potential is confirmed. Liquefaction of the soils is not anticipated at this site.

6.5 Slab-on-Grade Support

Floor slabs can be supported on undisturbed native soils and or engineered fill. The slab subgrade should be prepared by the procedures outlined in this report. A minimum 6 inch layer of free draining crushed 3/8 to ¾ inch aggregate should be provided beneath all slabs to help prevent capillary rise and a damp slab

All concrete placement and curing operations should follow the American Concrete Institute manual recommendations. Improper curing techniques and/or high slump (water-cement ratio) could cause excessive shrinkage, cracking or curling. The plastic properties of the concrete should be documented at the time of placement and specimens should also be prepared for strength testing to verify compliance with project specifications. Concrete slabs should be allowed to cure adequately before placing vinyl or other moisture sensitive floor covering.

The recommended modulus of subgrade reaction (k) is 250 psi/in for a minimum of 1 foot of the engineered fill material and 150 psi/in for native undisturbed soils.

6.6 Drainage

In areas where sidewalks or paving do not immediately adjoin the structure, protective slopes should be provided with an outfall of about 6 inches for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to minimize the possibility of moisture infiltration.

6.6.1 Subsurface Drainage

Groundwater was not encountered to a depth of 31.5 feet below the existing ground surface, at the time of our exploration. We do not believe that specialized subsurface drain systems will be required.

6.6.2 Percolation Tests

Three percolation tests were conducted in the proposed detention basin locations. They were run at depths between 5 and 10 feet below existing ground level. Location of the Percolation tests are shown on the Boring Location Diagram (Plate 2). The resulting infiltration rates were as follows:

Percolation Test	Infiltration Rate (min/inch)
P-1	1.30
P-2	1.15
P-3	2.80

6.7 Corrosivity

We recommend a Type II portland cement be used for all concrete on and below grade.

6.8 Pavements → OFF SITE ONLY SEE 9/21/06 WTI

The on-site soils are considered "poor" quality materials for support of pavements. Based on the California Bering Ratio (CBR) laboratory test result of 3, a resilient modulus (M_r) of 4500 pounds per square inch was assigned to the on-site soil.

The traffic anticipated at the facility includes passenger vehicles and small to medium-sized trucks. Based upon the minimum design recommendations given, a daily traffic value of 15 Equivalent 18-kip Single Axle Loads (ESAL's) was estimated for “Standard-Duty” pavement areas and a daily traffic value of 46 ESAL's was used for “Heavy-Duty” pavement areas.

The design pavement sections presented below are based on a reliability value of 85 percent, which corresponds to occasional interruption of traffic for pavement repairs, a design life of 20 years and the following design criteria/method:

- a terminal serviceability index of 2.0
- initial serviceability of 4.2
- standard deviation of 0.45 for flexible pavements
- and 0.35 for rigid pavements
- 1993 AASHTO design procedure.

Traffic Area	Asphalt Concrete Pavement (inches)	Base Course (inches)	Subbase Course (inches)	Rigid Pavement (inches)	Base Course (inches)
Standard-Duty Pavement	3	12	0	5	4
Heavy-Duty Pavement	4	12	0	6	4

Pavements must be constructed upon a firm unyielding subgrade. Stabilization of the subgrade may be required if constructed during wet weather conditions or if soft yielding soils are encountered during construction. The stabilization of the subgrade may require overexcavation of the existing soils and placement of granular engineered fill under the pavement section with the use of a geotextile fabric between the native subgrade and the subbase. The depth of overexcavation should be sufficient to provide a firm unyielding subgrade under the pavement section.

All subbase fill material must have a PI of 4 or less with an AASHTO classification of A-4 or A-2-4, and/or better, and an R-value of 35 or better.

The "design life" of a pavement is defined as the expected life at the end of which reconstruction of the pavement will need to occur. Normal maintenance, including crack sealing, slurry sealing, and/or chip sealing, should be performed during the life of the pavement.

Due to the high static and dynamic loads imposed by trucks in dock areas and at dumpster locations, we recommend that a rigid pavement section be used. The rigid pavement section for Heavy-Duty Pavement recommendations should be increased to 7 inches thick with 4 inches of base course in these areas.

Bituminous surfacing should be constructed of dense-graded, central plant-mix, asphalt concrete. Base course, Portland cement, and asphalt concrete should conform with local government specifications.

Material and compaction requirements should conform to recommendations presented under the **Earthwork** section of this report. The gradient of paved surfaces should ensure positive drainage. Water should not pond in areas directly adjoining paved sections. The native

subgrade soils may soften and lose stability if subjected to conditions which result in an increase in water content.

The pavement section designs presented herein are based upon the anticipated traffic loading. Some damage may occur in localized areas during periods of abnormally heavy traffic loads, such as from repeated passage of construction equipment, or of heavily loaded delivery, haul, or concrete trucks during construction. Consideration should be given to a staged construction and maintenance program or to alternate access routes during construction to limit damage to the final pavement section.

7.0 EARTHWORK

7.1 General

The conclusions contained in this report for the proposed construction are contingent upon compliance with recommendations presented in this section. Any excavating, trenching, or disturbance which occurs after completion of the earthwork must be backfilled, compacted and tested in accordance with the recommendations contained herein. It is not reasonable to rely upon our conclusions and recommendations if any future unobserved and untested trenching, grading or backfilling occurs.

7.2 Site Clearing

Strip and remove existing fill, vegetation, organic topsoil, debris, and any other deleterious materials from the building and surrounding pavement areas. All exposed surfaces should be free of mounds and depressions which could prevent uniform compaction

Site clearing during wet weather conditions should be done in a manner to minimize any infiltration of water into the native subgrades.

7.3 Excavation

On-site clay soils will pump or become unworkable at high water contents. Workability may be improved by scarifying and drying. Overexcavation of wet zones and replacement with imported granular materials may be necessary including stabilization of soft subgrades using geotextile fabric and 18 inches of granular fill. The use of lightweight excavation and compaction equipment may be required to minimize subgrade pumping. Subsoils should be protected from excessive heavy equipment traffic.

All excavations should be sloped or shored in the interest of safety following local, and federal regulations, including current OSHA excavation and trench safety standards.

The soils to be penetrated by the proposed excavations may vary significantly across the site. Our soil classifications are based solely on the materials encountered in exploratory test borings. The contractor should verify that similar conditions exist throughout the proposed area of excavation. If different subsurface conditions are found at the time of construction, we should be contacted immediately to evaluate the conditions encountered.

7.4 Building Pad Preparation

We anticipate that the site will be leveled using cut and fill. After fill areas have been cleared, the natural exposed soils should be prepared as discussed below. Clean native soils may be used as structural fill below the minimum granular fill depths for footings, slabs and pavement sections provided they can be moisture conditioned and compacted according to the requirements for structural fill. This includes stability requirements.

7.4.1 Dry Weather Conditions

After site clearing, the natural exposed soils should be scarified to a minimum depth of 8 inches, brought to the proper water content and then compacted to a minimum of 95 percent of the maximum density as defined by ASTM D1557 prior to placement of engineered fill.

7.4.2 Wet Weather Conditions

During wet weather construction the scarification and recompaction may be omitted provided the subgrade is proof rolled and any soft or unstable soils are overexcavated and replaced with suitable granular materials.

The placement of engineered fill or recompaction of native soils should extend a minimum horizontal distance of 10 feet beyond proposed building lines. This work should be performed in accordance with the **Placement and Compaction** section of this report. If soft or unstable soils are encountered, scarifying, drying and/or deeper overexcavation and replacement with suitable granular materials may be required.

7.5 Foundation Preparation

7.5.1 Parcel B Main Building

In footing areas, remove the native soils to a minimum depth of 2 feet below the bottom of the footing. Removal should extend a minimum of 2.5 feet beyond the footing edges. Prior to imported engineered fill placement the bottom of the footing excavation should be scarified a minimum of 8 inches and recompacted to 95 percent of the maximum density as defined by ASTM D1557. Engineered fill should then be placed and compacted according to the **Placement and Compaction** section of this report.

7.5.2 Parcel A Main Building

Footings may be placed either on undisturbed very dense native gravel and/or a minimum of 2 feet of granular engineered fill. In footing areas, remove the native clay/silt soils to a minimum depth of 2 feet below the bottom of the footing. Removal should extend a minimum of 2.5 feet beyond the footing edges. Prior to imported engineered fill placement the bottom of the footing excavation should be scarified a minimum of 8 inches and recompacted to 95 percent of the maximum density as defined by ASTM D1557. Engineered fill should then be placed and compacted according to the **Placement and Compaction** section of this report.

7.5.3 Outlots/Retail

Footings may be placed either on undisturbed very dense native gravel and/or a minimum of 2 feet of granular engineered fill. In footing areas, remove the native clay/silt soils to a minimum depth of 2 feet below the bottom of the footing. Removal should extend a minimum of 2.5 feet beyond the footing edges. Prior to imported engineered fill placement the bottom of the footing excavation should be scarified a minimum of 8 inches and recompacted to 95 percent of the maximum density as defined by ASTM D1557. Engineered fill should then be placed and compacted according to the **Placement and Compaction** section of this report.

7.6 Interior Slab-on-Grade Preparation

If foundation and floor slab preparation is performed together, no further slab-on-grade preparation will be necessary. However, slabs-on-grade should be founded a minimum of 6 inches of clean 3/8 to ¾ inch gravel over undisturbed native and/or imported, engineered fill material. should be placed directly under the slab to prevent damp slab.

Backfill of interior footings, utilities, and any other excavation below the slabs should be done using recompacted native soils and/or imported engineered fill or base materials. All trenches, and foundation backfill should be done according to the **Placement and Compaction** section of this report.

During construction, it is also important that any slab-on-grade subbase soils disturbed due to adverse weather conditions or other factors be properly moisture conditioned and recompacted 95 percent of the maximum density as defined by ASTM D1557 prior to slab-on-grade construction.

7.7 Exterior Slab Preparation

Exterior slabs-on-grade, should be placed on a minimum of 4 inches of base course. Exterior architectural features, and utilities may experience some movement due to the volume change of the underlying soils due to change in moisture and frost. Potential movement could be reduced by:

- minimizing moisture increases in the backfill
- controlling moisture-density during placement of backfill
- using designs which allow vertical movement between the exterior features and adjoining structural elements
- placing effective control joints on relatively close centers

7.8 Pavement Preparation

Prior to placement of fill and/or pavement materials, the exposed subgrade soils should be scarified a minimum of 8 inches and recompacted to 95 percent of the maximum density as defined by ASTM D1557. Any loose, soft, disturbed, or otherwise unsuitable materials should be overexcavated and replaced with engineered fill.

7.9 Materials

a. Clean on-site native soils may be used as fill material for the following:

- pavement areas, below recommended pavement sections
- backfill of exterior foundation walls
- as engineered fill, where granular fill is not required

. On-site soils are not recommended for fill material in the following:

- in the top 1 foot below interior slab areas
- backfill of interior footings and utility trenches

b. Frozen soils should not be used as fill or backfill.

c. Imported soils should conform to the following:

- Gradation (ASTM C136): percent finer by weight

6"	100
4"	70-100
No. 4 Sieve	50-80
No. 200 Sieve	20 (max)

d. Base course should conform to ASTM D 1241 Grade C or D and/or the following:

- Gradation (ASTM C136): percent finer by weight
  - 1" 100
  - 3/8 in Sieve 50-100
  - No. 4 Sieve 35-85
  - No. 10 Sieve 25-70
  - No. 40 Sieve 15-45
  - No. 200 Sieve 5-15

- Plasticity Index ..... 6 (max)
- Liquid Limit ..... 30 (max)

7.10 Placement and Compaction

a. Place and compact fill in horizontal lifts, using equipment and procedures that will produce recommended water contents and densities throughout the lift. Uncompacted fill lifts should not exceed 8 to 10 inches.

c. No fill should be placed over frozen ground.

d. Materials should be compacted to the following:

Material	Minimum Percent Compaction (ASTM D1557)
• On-site soils, reworked and fill:	
Below slabs-on-grade	95
Below pavement	95
• Imported fill:	
Below footings	95
Below slabs-on-grade	95
Below pavement	95
• Aggregate base	95
• Miscellaneous backfill	90

e. On-site and imported soils should be compacted with a moisture content in the range of 3 percent below to 3 percent above optimum.

7.11 Compliance

Recommendations for slabs-on-grade, foundations and pavement elements supported on compacted fills or prepared subgrade depend upon compliance with **Earthwork** recommendations. To assess compliance, observation and testing should be performed under the direction of a geotechnical engineer.

8.0 LIMITATIONS

This report has been prepared based on our understanding of the project criteria as described in Section 2.0. Others may make changes in the project criteria during design or construction, and substantially different subsurface conditions may be encountered or become known. The conclusions and recommendations presented herein shall not continue to be valid unless all variations are brought to our attention in writing, and we have had an opportunity to assess the effect such variations may have on our conclusions and recommendations and respond in writing.

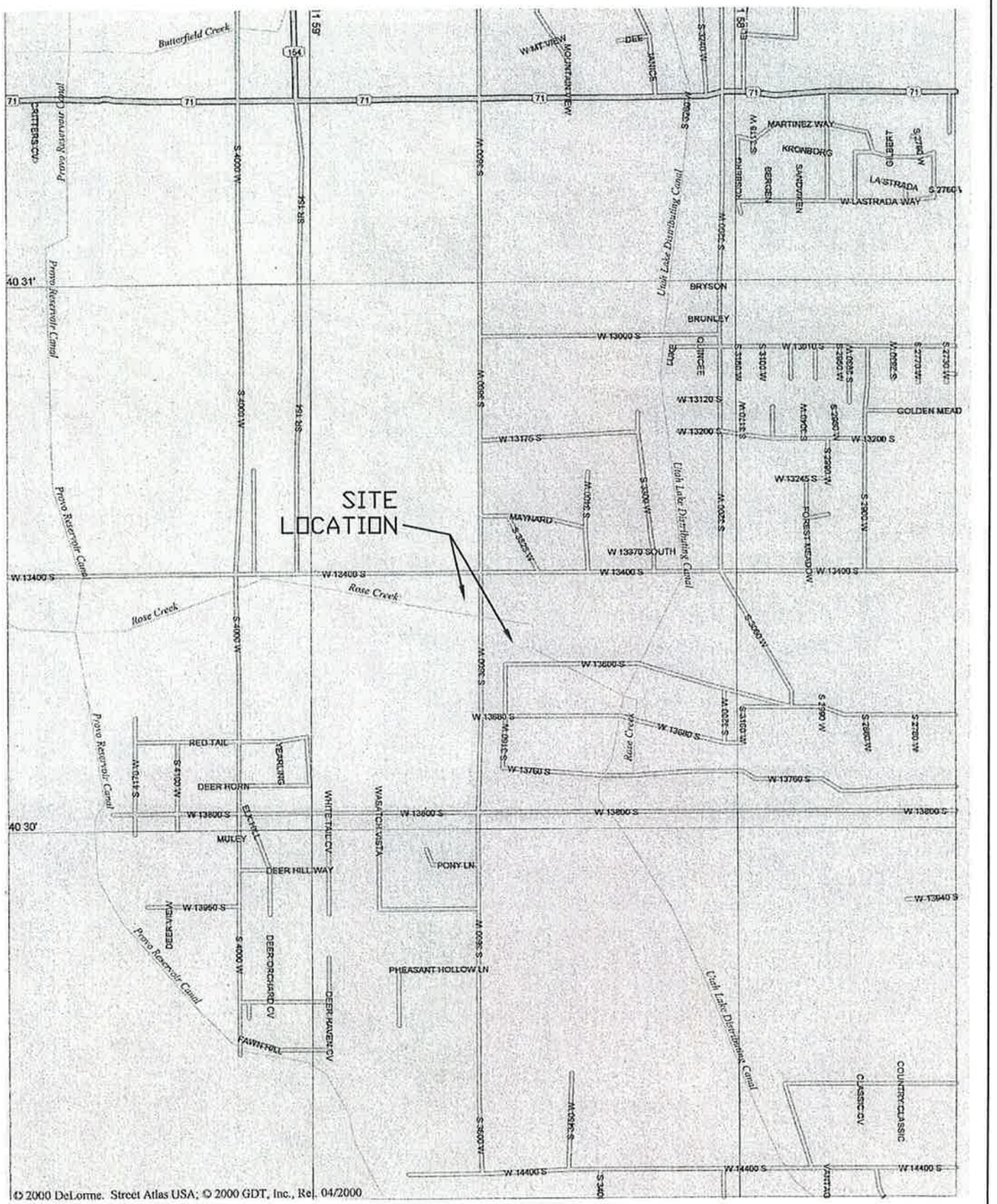
This report does not provide information relative to construction methods or sequences. Any person reviewing this report must draw his own conclusions regarding site conditions as they relate to the employment or development of construction techniques. This report is valid for one year after the date of issuance unless there is a change in circumstances or discovered variations justifying an earlier expiration of validity. After expiration, no person or entity has any right to rely on this report without further review and reporting by WT under a separate contract.

9.0 OTHER SERVICES

The geotechnical engineer should be retained for a general review of final plans and specifications to determine compliance with our recommendations. The geotechnical engineer should also be retained to provide observation and testing services during excavation, earthwork operations, and foundation and construction phases of the project. Observation of footing excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present.

10.0 CLOSURE

We have prepared this report as an aid to the designers of the proposed project. The comments, statements, recommendations, and conclusions set forth in this report reflect the opinions of the authors. These opinions are based upon conditions at the location of specific tests and observations, and on the data developed to satisfy the scope of services defined by the contract documents. Work on your project was performed in accordance with generally accepted industry standards and practices by professionals providing similar services in this locality. No other warranty, express or implied, is made.



N

Not to scale

RIVERTON COMMERCIAL PROPERTY	
Vicinity Map	
Western Technologies, Inc.	
Job No. 2154JT034	Plate: 1

Legend:

Approximate Location of Test Boring

N

Not to scale

RIVERTON COMMERCIAL PROPERTY	
Boring Location Diagram	
Western Technologies, Inc.	
Job No. 2154JT034	Plate: 2

Allowable Soil Bearing Capacity	The recommended maximum contact stress developed at the interface of the foundation element and the supporting material.
Backfill	A specified material placed and compacted in a confined area.
Base Course	A layer of specified material placed on a subgrade or subbase.
Base Course Grade	Top of base course.
Bench	A horizontal surface in a sloped deposit.
Caisson	A concrete foundation element cast in a circular excavation which may have an enlarged base. Sometimes referred to as a cast-in-place pier.
Concrete Slabs-On-Grade	A concrete surface layer cast directly upon a base, subbase or subgrade.
Crushed Rock Base Course	A base course composed of crushed rock of a specified gradation.
Differential Settlement	Unequal settlement between or within foundation elements of a structure.
Engineered Fill	Specified material placed and compacted to specified density and/or moisture conditions under observations of a representative of a soil engineer.
Existing Fill	Materials deposited through the action of man prior to exploration of the site.
Existing Grade	The ground surface at the time of field exploration.
Expansive Potential	The potential of a soil to expand (increase in volume) due to absorption of moisture.
Fill	Materials deposited by the actions of man.
Finished Grade	The final grade created as a part of the project.
Gravel Base Course	A base course composed of naturally occurring gravel with a specified gradation.
Heave	Upward movement
Native Grade	The naturally occurring ground surface.
Native Soil	Naturally occurring on-site soil.
Rock	A natural aggregate of mineral grains connected by strong and permanent cohesive forces. Usually requires drilling, wedging, blasting or other methods of extraordinary force for excavation.
Sand and Gravel Base	A base course of sand and gravel of a specified gradation.
Sand Base Course	A base course composed primarily of sand of a specified gradation.
Scarify	To mechanically loosen soil or break down existing soil structure.
Settlement	Downward movement.
Soil	Any unconsolidated material composed of discrete solid particles, derived from the physical and/or chemical disintegration of vegetable or mineral matter, which can be separated by gentle mechanical means such as agitation in water.
Strip	To remove from present location.
Subbase	A layer of specified material placed to form a layer between the subgrade and base course.
Subbase Grade	Top of subbase.
Subgrade	Prepared native soil surface.

RIVERTON COMMERCIAL PROPERTY	
Definition of Terminology	
Western Technologies Inc.	
Job No.: 2154JT034	Plate: A-1

COARSE-GRAINED SOILS

LESS THAN 50% FINES*

GROUP SYMBOLS	DESCRIPTION	MAJOR DIVISIONS
GW	WELL-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LESS THAN 5% FINES	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE
GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LESS THAN 5% FINES	
GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, MORE THAN 12% FINES	
GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, MORE THAN 12% FINES	
SW	WELL-GRADED SANDS OR GRAVELLY SANDS, LESS THAN 5% FINES	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE
SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, LESS THAN 5% FINES	
SM	SILTY SANDS, SAND-SILT MIXTURES, MORE THAN 12% FINES	
SC	CLAYEY SANDS, SAND-CLAY MIXTURES, MORE THAN 12% FINES	

NOTE: Coarse-grained soils receive dual symbols if they contain 5% to 12% fines (e.g., SW-SM, GP-GC).

FINE-GRAINED SOILS

MORE THAN 50% FINES

GROUP SYMBOLS	DESCRIPTION	MAJOR DIVISIONS
ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
OL	ORGANIC SILTS OR ORGANIC SILT-CLAYS OF LOW PLASTICITY	
MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDS OR SILTS, ELASTIC SILTS	SILTS AND CLAYS LIQUID LIMIT MORE THAN 50
CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY	
PT	PEAT, MUCK AND OTHER HIGHLY ORGANIC SOILS	HIGHLY ORGANIC SOILS

NOTE: Fine-grained soils may receive dual classification based upon plasticity characteristics.

SOIL SIZES

COMPONENT	SIZE RANGE
BOULDERS	Above 12 in.
COBBLES	3 in. – 12 in.
GRAVEL	No. 4 – 3 in.
Coarse	3/4 in. – 3 in.
Fine	No. 4 – 3/4 in.
SAND	No. 200 – No. 4
Coarse	No. 10 – No. 4
Medium	No. 40 – No. 10
Fine	No. 200 – No. 40
*Fines (Silt or Clay)	Below No. 200

NOTE: Only sizes smaller than three inches are used to classify soils

CONSISTENCY

CLAYS & SILTS	BLOWS PER FOOT*
VERY SOFT	0 – 2
SOFT	2 – 4
FIRM	4 – 8
STIFF	8 – 16
VERY STIFF	16 – 32
HARD	Over 32

RELATIVE DENSITY

SANDS & GRAVELS	BLOWS PER FOOT*
VERY LOOSE	0 – 4
LOOSE	4 – 10
MEDIUM DENSE	10 – 30
DENSE	30 – 50
VERY DENSE	Over 50

*Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 inch ID) split spoon (ASTM D1586).

PLASTICITY OF FINE GRAINED SOILS

PLASTICITY INDEX	TERM
0	NON-PLASTIC
1 – 7	LOW
8 – 25	MEDIUM
Over 25	HIGH

DEFINITION OF WATER CONTENT

DRY
SLIGHTLY DAMP
DAMP
MOIST
WET
SATURATED

RIVERTON COMMERCIAL PROPERTY

Method of Classification

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-2

The number shown in "**BORING NO.**" refers to the approximate location of the same number indicated on the "Boring Location Diagram" as positioned in the field by pacing from property lines and/or existing features.

"**TYPE SIZE BORING**" refers to the exploratory equipment used in the boring wherein **HSA = hollow stem auger.**

"**N" in Blows/Foot**" refers to the number of blows of a 140-pound weight, dropped 30 inches, required to advance a two-inch-outside diameter split-barrel sampler a distance of 1 foot. Standard Penetration Test (ASTM D1586). Refusal to penetration is defined as more than 100 blows per foot.

"**R" in Blows/Foot**" refers to the number of blows of a 140-pound weight, dropped 30 inches, required to advance a 2.42-inch-inside-diameter ring sampler a distance of 1 foot. Refusal to penetration is considered more than 50 blows per foot.

"**Sample Type**" refers to the form of sample recovery, in which **N = Split-barrel sample, R = Ring sample, G = Grab Sample.**

"**Dry Density, pcf**" refers to the laboratory-determined dry density in pounds per cubic foot. The symbol "**NR**" indicates that no sample was recovered. The symbol "**DU**" indicates that determination of dry density was not possible.

"**Water Content**, %" refers to the laboratory-determined moisture content in percent (ASTM D2216).

"**Unified Classification**" refers to the soil type as defined by "Method of Soil Classification". The soils were classified visually in the field and, where appropriate, classifications were modified by visual examination of samples in the laboratory and/or by appropriate tests.

These notes and boring logs are intended for use in conjunction with the purposes of our services defined in the text. Boring log data should not be construed as part of the construction plans nor as defining construction conditions.

Boring logs depict our interpretations of subsurface conditions at the locations and on the date(s) noted. Variations in subsurface conditions and soil characteristics may occur between borings. Groundwater levels may fluctuate due to seasonal variations and other factors.

The stratification lines shown on the boring logs represent our interpretation of the approximate boundary between soil types based upon visual field classification. The transition between materials is approximate and may be far more or less gradual than indicated.

RIVERTON COMMERCIAL PROPERTY	
Boring Log Notes	
Western Technologies Inc.	
Job No.: 2154JT034	Plate: A-3

DATE DRILLED: **03-24-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-1

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		13			CL		CLAY; with sand, light brown, stiff to very stiff, dry
17.2		N		24		5			
		N		20		10	SM		SAND; silty, with gravel, light brown, medium dense, dry
		N		26		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-24-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-4

DATE DRILLED: **03-24-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-2

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		16		0	CL		CLAY; silty, sandy, light brown, stiff to very stiff, dry
		N		16		5			
		N		20		10	SM		SAND; silty, with gravel, light brown, medium dense, dry
		N		32		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-24-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-5

DATE DRILLED: **03-24-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-3

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		16		5	CL		CLAY; silty, sandy, light brown, very stiff, moist
		N		18					
		N		24		10	SM		SAND; silty, light brown, medium dense, dry to moist
		N		17		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-24-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-6

DATE DRILLED: **03-23-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-4

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		7			CL		CLAY; silty, sandy, light brown, firm to stiff, dry
		N		7		5			
		N		11		10			
							SM		SAND; silty, with gravel, light brown to gray, medium dense, moist
		N		23		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-23-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-7

DATE DRILLED: **03-23-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-5

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		R	■	25			CL		CLAY; trace sand, light brown, very stiff to hard, moist
19.2		R	■	42		5			
							ML		SILT; sandy, light brown, very stiff, moist
14.0		R	■	21		10			
		R	■	24		15			
		R	■	28		20			
									Terminated At 21.5 Feet
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-23-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-8

DATE DRILLED: **03-23-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-6

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		20			CL		CLAY; silty, sandy, light brown, very stiff, moist
		N		21		5			
							SM		SAND; silty, light brown, medium dense, damp to dry
		N		15		10			
		N		20		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-23-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-9

DATE DRILLED: **03-23-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-7

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		18			CL		CLAY; silty, sandy, light brown, very stiff to hard, dry to moist
		N		34		5			
							SM		SAND; silty, light brown, medium dense, dry
		N		21		10			
		N		19		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-23-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-10

DATE DRILLED: **03-23-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-8

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		8		5	CL		CLAY; silty, sandy, light brown, stiff to very stiff to hard, moist
		N		23					
		N		16		10			
						15	SM		SAND; silty, light brown, medium dense, damp
		N		22					**Terminated At 16.5 Feet**
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-23-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-11

DATE DRILLED: **03-23-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-9

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		19		5	CL		CLAY; silty, sandy, light brown, very stiff to hard, moist to dry
		N		80					
		N		50/0"		10	SM		SAND; silty, gravelly, brown, very dense, dry
		N		50/0"		15	GP		GRAVEL; sandy, brown, very dense, moist
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-23-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-12

DATE DRILLED: **03-23-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-10

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		15			CL		CLAY; silty, sandy, light brown, stiff, moist
		N		14		5	SM		SAND; silty, light brown, medium dense, dry
13.4		N		34		10	CL		CLAY; some sand, light brown, dense, dry
		N		19		15	SM		SAND; silty, light brown, medium dense, dry
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-23-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-13

DATE DRILLED: **03-23-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-11

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		18			CL		CLAY; silty, sandy, light brown, very stiff, moist
		N		9		5	SM		SAND; silty, light brown, loose, dry
		N		13		10	CL		CLAY; silty, sandy, light brown, medium dense, moist
		N		9		15	SM		SAND; silty, light brown, loose, dry
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES: ____ DEPTH: ____ DATE: 03-23-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-14

DATE DRILLED: **03-12-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-12

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; silty, sandy, light brown, very stiff, dry
		R		18					
		R		16		5			
							SM		SAND; silty, gravelly, light brown to gray, very dense, dry
		N		64		10			
							SM		SAND; silty, gravelly, with cobbles, light brown very dense, moist
		N		58/6"		15			
							SM		SAND; silty, gravely light brown, medium dense, moist
		N		29		20			
									Terminated At 21.5 Feet
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES: ____ DEPTH: ____ DATE: 03-12-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-15

DATE DRILLED: **03-12-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-13

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
									* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		29			CL		CLAY; silty, sandy, light brown, very stiff, dry
		R		14		5			
		N		52		10	SM		SAND; silty, gravelly, light brown, very dense, moist
		N		52		15	SC		SAND; clayey, silty, with gravel, light brown, very dense, moist
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-12-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-16

DATE DRILLED: **03-12-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-14

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; silty, sandy, light brown, very stiff, dry
		R		27					
		R		22		5	SM		SAND; silty, light brown, medium, dense, dry
		N		50/0"		10	SM		SAND; silty, gravelly, with cobbles, light brown, very dense, damp
		N		12		15	SC		SAND; clayey, sandy, with gravel, light brown to reddish brown,medium dense to very dense, moist
		N		73		20			
							GP		GRAVEL; sandy, silty, with cobbles, light brown, very dense, moist
		N		50/0"		25			
		N		50/0"		30			
									Terminated At 31.5 Feet
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE:03-12-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-17

DATE DRILLED: **03-12-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-15

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; sandy, light brown, very stiff to hard, damp
		N		41					
14.6	78.4	N		19		5			
							SP		SAND; silty, gravelly, light brown, dense, dry
14.4		N		25		10			
							GM		GRAVEL; sandy, with silt, light brown, dense, damp
6.5		N		45		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE:03-12-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-18

DATE DRILLED: **03-12-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-16

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; silty, sandy, light brown, hard, moist
		N		31					
26.2	70.2	N		29		5	SC		SAND; clayey, gravely, light brown, medium dense, moist
		N		50/6"		10	SM		SAND; silty, with gravel, light brown, very dense, dry
		N		49		15	SC		SAND; clayey, silty, light brown, dense, moist
		N		50/3"		20	GC		GRAVEL; clayey, silty, with cobbles, very dense, very moist
									Terminated At 21.5 Feet
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-12-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-19

DATE DRILLED: **03-11-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-17

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **REW/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; silty, sandy, light brown, firm, moist
		N		7					
						5	SC		SAND; clayey, brown, medium dense, moist
		N		7					
		N		27					
						10			
		N		22					
							GC		GRAVEL; clayey, silty, with cobbles, very dense, moist
		N		50/4"		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-11-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-20

DATE DRILLED: **03-11-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-18

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **REW/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		7			CL		CLAY; , sandy, light brown, stiff to very stiff, moist
		N		20		5			
		N		12		10			
		N		50/6"		15	GM		GRAVEL; silty, with sand, dark brown, very dense, moist
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE:03-11-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-21

DATE DRILLED: **03-11-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-19

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **REW/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
									* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
8.6		N	■	18		5	*CL		CLAY; sandy, light brown to tan, very stiff to hard, dry
		N	■	61					
		N	■	31		10	SM		SAND; silty, some clay, dense, tan to light brown, dry to moist
		N	■	44		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-11-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-22

DATE DRILLED: **03-11-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-20

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; silty, sandy, brown, stiff, moist
		N		10					
						5	SM		SAND; silty, gravelly, brown to gray, medium dense to very dense , dry to moist
		N		36					
		N		29		10			
		N		50/0"		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-11-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-23

DATE DRILLED: **03-11-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-21

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
						0	*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; silty, sandy, light brown, very stiff, dry to moist
		N		28					
		N		25		5			
		N		30		10			
							GM		GRAVEL; sandy, light brown, gray, medium dense, dry
		N		29		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE:03-11-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-24

DATE DRILLED: **03-12-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-22

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; sandy, silty, with gravel, gray to light brown, hard, dry to moist
15.0	108.5	R		62					
						5	SM		SAND; silty, gray to light brown, dense, moist
7.3		R		41					
							GM		GRAVEL; silty, sandy, with cobbles, light brown, very dense, moist
		N		50/0"		10			
						15			
		N		50/6"					
						20			
		N		50/4"					
									Terminated At 21.5 Feet
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-12-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-25

DATE DRILLED: **03-12-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-23

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
									* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		50/6"		5	GM		GRAVEL; sandy, silty, with cobbles, light brown, very dense, moist
		N		50/6"					
		N		50/2"		10			
		N		50/0"		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE:03-12-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-26

DATE DRILLED: **03-11-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-24

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
									* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		15			* CL		CLAY; sandy, silty, light brown, stiff to very stiff, moist
		N		17		5			
		N		81/6"		10	GM		GRAVEL; sandy, with cobbles, gray, very dense, dry
		N		50/0"		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-11-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-27

DATE DRILLED: **03-12-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-25

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; sandy, silty, light brown, stiff, moist
		N		12					
		N		76		5	GM		GRAVEL; silty, sandy, with cobbles, gray, very dense, dry
		N		86		10			
		N		50/6"		15			
									Terminated At 16.5 Feet
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED — NO: X YES: ____ DEPTH: ____ DATE: 03-12-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-28

DATE DRILLED: **03-24-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-26

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
10.2		N		13			CL		CLAY; sandy, light brown, stiff, moist
		N		22		5	SM		SAND; silty, light brown, medium dense, dry
									Terminated At 6.5 Feet
						10			
						15			
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES: ____ DEPTH: ____ DATE: 03-24-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-29

DATE DRILLED: **03-24-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-27

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		12			CL		CLAY; sandy, silty, light brown, stiff, moist
		N		24		5	SM		SAND; silty, with gravel, light brown, medium dense, moist
									Terminated At 6.5 Feet
						10			
						15			
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-24-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-30

DATE DRILLED: **03-24-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-28

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		13			CL		CLAY; sandy, silty, light brown, stiff, moist to damp
		N		12		5			
									Terminated At 6.5 Feet
						10			
						15			
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE:03-24-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-31

DATE DRILLED: **03-24-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-29

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: BORING NUMBER NOT USED

5
10
15
20
25
30
35
40

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE:- -19

NOTES **BORING NUMBER NOT USED**

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-32

DATE DRILLED: **03-24-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-30

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; sandy, silty, light brown, very stiff, moist
		N		28					
						5	SM		SAND; silty, tan to light brown, medium dense, dry
		N		13					
									Terminated At 6.5 Feet
						10			
						15			
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-24-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-33

DATE DRILLED: **03-12-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-31

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
		N		20			CL-ML		SILT-CLAY; with sand, light brown, very stiff, moist
6.2		N		30		5			
									Terminated At 6.5 Feet
						10			
						15			
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES: ____ DEPTH: ____ DATE: 03-12-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-34

DATE DRILLED: **03-24-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-32

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; sandy, silty, light brown, very stiff, moist
		N		18					
		N		29		5	SM		SAND; silty, with gravel, light brown, dense, dry
									Terminated At 6.5 Feet
						10			
						15			
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-24-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-35

DATE DRILLED: **03-12-2004**

DRILL RIG TYPE: **Marl M5T**

BORING TYPE/SIZE: **HSA/ 8 inch**

BORING NO. B-33

LOCATION: **See Boring Location Diagram**

ELEVATION: **Not Determined**

FIELD ENGR: **AP/WT**

WATER CONTENT (%)	DRY DENSITY (LBS/CU.FT)	SAMPLE TYPE	SAMPLE	BLOWS/FT. R or N	BLOWS/FT. C	DEPTH (FT.)	USCS	GRAPHIC	SOIL DESCRIPTION
							*		* TOP OF BORING: TOPSOIL; clay, sandy, organics, dark brown, soft, moist
							CL		CLAY; sandy, silty, light brown, firm, very moist
		N		4					
		N		8		5			
									Terminated At 6.5 Feet
						10			
						15			
						20			
						25			
						30			
						35			
						40			

GROUNDWATER ENCOUNTERED NO: X YES:____ DEPTH:____ DATE: 03-12-2004

NOTES

RIVERTON COMMERCIAL PROPERTY

Boring Log

Western Technologies Inc.

Job No.: 2154JT034 | Plate: A-37

SOIL PROPERTIES

Boring No.	Depth (ft.)	Soil Class.	Initial Dry Density (pcf)	Initial Water Content (%)	Compression Properties			Expansion Properties		Plasticity		Percent Passing #200	Expansion Index	Remarks
					Surcharge (ksf)	Total Compression (%)		Surcharge (ksf)	Expansion (%)	Liquid Limit	Plasticity Index			
						In-Situ	After Saturation							
Composite	1-3	CL	99.0	28.1									42	
B-1	5	CL		17.2						38	19	83.8		
B-5	5	CL		19.2						39	16	94.9		
B-5	10	ML		14.0							NP	87.2		
B-10	5	CL		13.4						40	18	88.1		
B-15	5	CL	78.4	14.6	0.4	-1.45				35	22	64.0		
					0.8	-3.33								
					1.6	-6.80								
					1.6		-6.82							
					3.1		-10.23							
					6.2		-13.3							
					12.5		-17.97							
B-15	10	ML	114.6	14.4						27	NP	70.1		
B-15	15	GM		6.5							NP	11.6		
B-19	2.5	CL		8.6						31	13	69.9		
B-26	2.5	CL		10.2						33	17	60.4		

Note: Initial Dry Density and Initial Water Content are in-situ values unless otherwise noted.
NP = Non-Plastic

Remarks

1. Compacted density (approx. 95% of ASTM D698 max. density at moisture content slightly below optimum.)
2. Submerged to approximate saturation.
3. Slight rebound after saturation.
4. Sample disturbance observed.

RIVERTON COMMERCIAL PROPERTY

Soil Properties

WESTERN TECHNOLOGIES INC.

Job No. 2154JW034 | Plate: B-1

SOIL PROPERTIES

Boring No.	Depth (ft.)	Soil Class.	Initial Dry Density (pcf)	Initial Water Content (%)	Compression Properties			Expansion Properties		Plasticity		Percent Passing #200	Expansion Index	Remarks
					Surcharge (ksf)	Total Compression (%)		Surcharge (ksf)	Expansion (%)	Liquid Limit	Plasticity Index			
						In-Situ	After Saturation							
B-16	5	CL	70.2	26.2	0.4	-1.57								
					0.4		-2.29							2
					0.8		-3.43							
					1.6		-5.24							
					3.2		-7.93							
					6.2		-12.54							
					12.6		-17.44							
B-22	2.5	CL	108.5	15.0	0.4	-0.82				24	7	63.9		
					0.8	-1.68								
					0.8		-2.05							2
					1.6		-2.84							
					3.2		-4.02							
					6.2		-5.51							
					12.6		-7.92							
B-22	5	SM	83.3	7.3							NP	27.8		
B-31	5	CL-ML		6.2						24	7	72.2		

Note: Initial Dry Density and Initial Water Content are in-situ values unless otherwise noted.
NP = Non-Plastic

Remarks

1. Compacted density (approx. 95% of ASTM D698 max. density at moisture content slightly below optimum.)
2. Submerged to approximate saturation.
3. Slight rebound after saturation.
4. Sample disturbance observed.

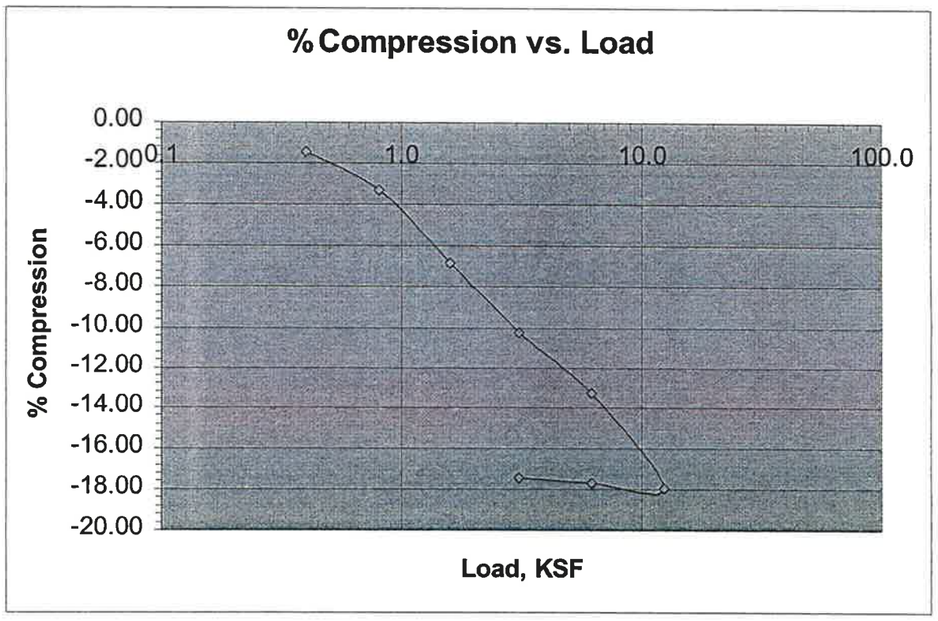
RIVERTON COMMERCIAL PROPERTY

Soil Properties

WESTERN TECHNOLOGIES INC.

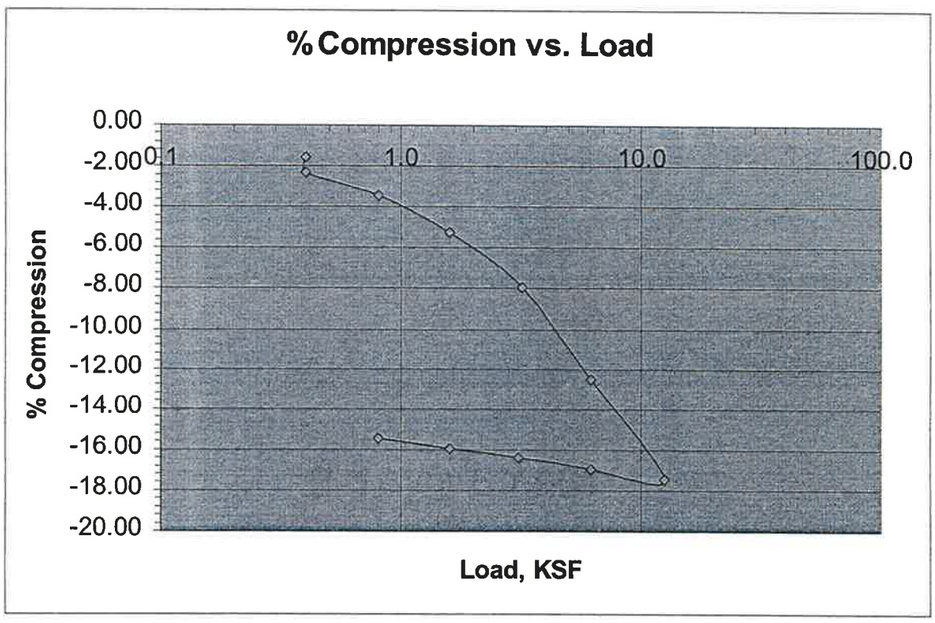
Job No. 2154JW034 | Plate: B-2

B-15 @ 5 FEET



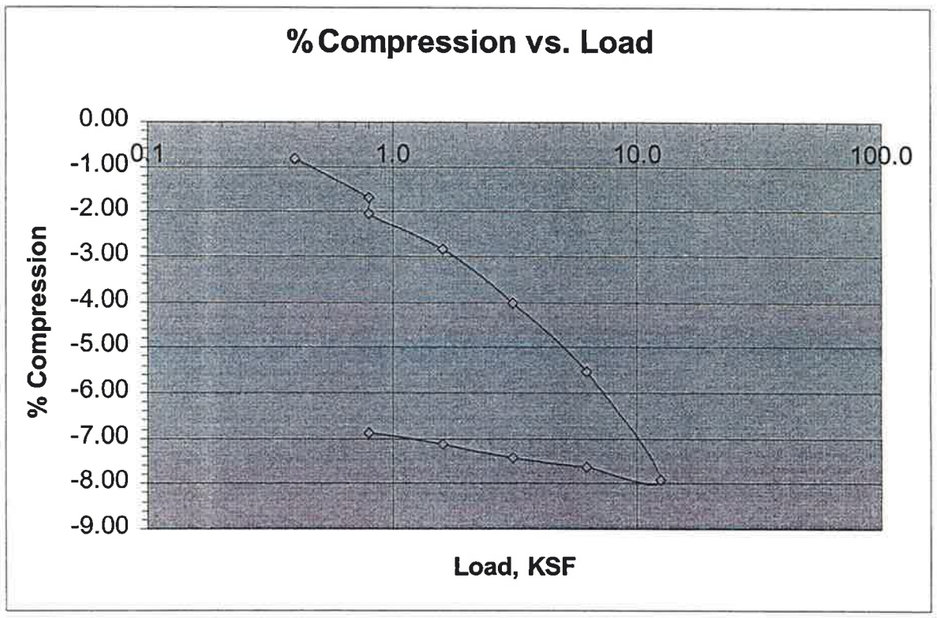
RIVERTON COMMERCIAL PROPERTY	
Consolidation Graph	
WESTERN TECHNOLOGIES INC.	
Job No. 2154JT034	Plate: B-3

B-16 @ 5 FEET



RIVERTON COMMERCIAL PROPERTY
Consolidation Graph
WESTERN TECHNOLOGIES INC.
Job No. 2154JT034 | Plate: B-4

B-22 @ 5 FEET



RIVERTON COMMERCIAL PROPERTY	
Consolidation Graph	
WESTERN TECHNOLOGIES INC.	
Job No. 2154JT034	Plate: B-5