WATSON
ENGINEERING COMPANY, INC.

November 17, 2025

Jerald Hunt
P.O. Box 271
Enterprise, Utah 84725

Subject: Esplin Residence
Parcel #E-1065-0004-0000 Iron County
455 N 1600 West
Newcastle, Utah
Project Number: 25-7983

Dear Jerald,

Watson Engineering Company, Inc. (Watson) has completed the geotechnical investigation for the above referenced project. Enclosed you will find the geotechnical report including the results of our field and laboratory investigation, engineering analysis, and recommendations for this property. The following table presents a summary of our findings.

| Parameter | Result |
|---|---|
| Liquefaction Hazard | None |
| Landslide Hazard | The site is not located in a landslide hazard area |
| Over-excavation Requirement | Over-excavate three feet (3') under foundations, eighteen inches (18") under pavement and exterior flatwork. |
| Expansive Soils | Negligible |
| Soil Salt Solubility | Negligible |
| Concrete Placement | Do not place concrete in freezing weather and blanket all concrete in cold weather |
| Compaction Required | 90% Relative Compaction under foundations; 95% under pavement and concrete flatwork |
| Final Grade Required | 5% (6 inches in 10 feet) |
| Structural Fill | Native Material or Import Material |

As always, if you have any questions or concerns regarding our testing, results, or recommendations please feel free to contact us.

472 N. 2150 W. Suite 7 | Cedar City, Utah 84721
Office: 435.586.3004 Fax: 435.586.7480 Web: www.wecinc.com

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# 1 INTRODUCTION

## 1.1 General Project Information

This report provides our findings as well as our analysis and recommendations with regards to the new residence to be constructed at 455 N 1600 West, Newcastle, Utah on Parcel #E-1065-0004-0000 Iron County, Utah. It is understood that new construction will consist of a single story residential home supported by slab on grade and/or shallow spread footings. A single test pit was excavated to a depth of ten feet (10') in the approximate location where the home will be built. Foundation loads are expected to be light to moderate and no special considerations regarding settlement tolerances are needed. It is understood that the structures will be built according to the 2021 International Residential Code (IRC).

## 1.2 Site Description

The 40-acre parcel is located West of Newcastle, Utah and South of Hwy 56 at 455 N 1600 West. The building site drains to the northwest at about 2% slope and is vegetated with native grass and brush. There is a trailer home at the site and two existing homes on the West side of 1600 West in the vicinity. Other than the trailer home, there was no visual indication of former structures or fill onsite.

## 1.3 Geologic Conditions

From the available maps and USGS interactive GIS database, segments of the Antelope Range Fault system appear to be located within one (1) mile to the West and three (3) miles to the East. Foundations should be designed by a qualified, registered structural engineer using Seismic Site Class "D".

Liquefaction may occur when water-saturated sandy soils are subjected to earthquake ground shaking. When soil liquefies, it loses strength and behaves as a viscous liquid (like quicksand) rather than as a solid. This can cause buildings to sink into the ground or tilt, empty buried tanks to rise to the ground surface, slope failures, nearly level ground to shift laterally tens of feet (lateral spreading), surface subsidence, ground cracking, and sand blows. **This project site does NOT lie in an area susceptible to liquefaction due to groundwater exceeding 50 feet in depth**.

Landslides are common natural hazards in Utah. They often strike without warning and can be destructive and costly. Common types of landslides in Utah are debris flows, slides, and rock falls. Many landslides are associated with rising ground-water levels due to rainfall, snowmelt, and landscape irrigation. Therefore, landslides in Utah typically move during the months of March, April, and May, although debris flows associated with intense thunderstorm rainfall are common in July. **This project site does NOT appear to be located atop an existing Landslide, Debris Flow, or Rockfall hazard.**

## 1.4 Subsoil Conditions

Soil at the site was observed to be sandy with substantial silt and low plastic clay to the termination of the test pit at a depth of ten feet (10′) below the existing grade. A one foot (1′) thick layer of sandy gravel was observed from three feet (3′) to four feet (4′) of depth. The soil was visually classified as 'dry' and no groundwater was observed.

One soil sample was collected, representative of soil from a depth of four feet (4′) to the bottom of the test pit at ten feet (10′). Laboratory test results indicate that the sampled soil classifies as a sandy clay (SC) with a liquid limit of 30% and a plastic index of 16% soil moisture. A modified proctor (ASTM D1557) indicates a maximum dry density of 122.4 pcf to at moisture content of 10.4%. The presence of soluble salt in the soil was found to be negligible.

The liquid limit is the moisture content at which soil begins to flow like a liquid. The plastic limit is the moisture content at which soil can be deformed without crumbling. The plasticity index is the difference between the liquid limit and the plastic limit. It is a measure of how much and what type of clay is in the soil.

# 2 ENGINEERING ANALYSIS AND RECOMMENDATIONS

## 2.1 Analysis

The soil is sufficient to support the anticipated relatively shallow spread footing and slab on grade foundation, subject to remedial earthwork.

It is recommended that foundations bear on structural fill extending at least three feet (3′) below the bottom of footing elevation (both exterior and interior footings), or three feet (3′) below existing grades, whichever is deeper. Structural fill should extend horizontally at least three feet (3′) beyond the edge of the foundation. Structural fill shall consist of native material or import material which has been prepared in accordance with the Fill and Backfill section (2.5) of this report. It is recommended that any slabs-on-grade, basement slabs, and exterior concrete and asphalt flatwork (driveways and sidewalks) be supported on at least eighteen inches (18″) of structural fill.

Based on our limited investigation it appears that excavation operations should be able to proceed with standard equipment. While groundwater was not an issue during our investigation, ingress nuisance moisture may occur during construction depending on the time of year of construction. If there is standing water or it is wet, the subgrade should be allowed to dry out prior to placing footings or flatwork.

## 2.2 Site Preparation

The vegetation should be cleared along with large root systems and debris. If encountered, any loose soil should be removed in its entirety. The foundation subgrade should be over-excavated as necessary.

Precautions should be taken during and after construction to eliminate saturation of foundation soils. All drainage and grading next to the structure foundation shall be constructed in accordance with the requirements of section R401.3 of the International Residential Code (IRC). Over-wetting the soil prior to or during construction may result in softening and pumping causing equipment mobility problems and difficulty in achieving compaction. Saturation of the soil after construction may cause distress to the foundations and flatwork. Positive drainage should be established away from the exterior walls of the structures. Positive grade is defined by having a minimum drainage slope in landscaped areas of six inches (6″) for a minimum distance of ten feet (10′) away from the foundation of the structure (five percent (5%)) and in hard surface pavement areas, two inches (2″) for a minimum distance of eight feet (8′) away from the structure (two percent (2%)). **This positive grade shall be maintained throughout the life of the structure to minimize the amount of moisture infiltrating the soils against the concrete foundation wall, and that a minimum of six inches (6″) of separation from the top of the concrete foundation wall to any landscaping be maintained.** Watering adjacent to the structure should be eliminated and irrigation systems should be properly maintained to prevent over-watering. Roof runoff and other sources of moisture should not be allowed to infiltrate the soils in the vicinity of, or upslope from, the structures. Special care should be taken to properly channel roof runoff and other sources of moisture, this may require other solutions than just site grading.

Prior to placing fills, the bottom of all excavations should be scarified to a depth of eight inches (8″), moisture conditioned to within two percent (2%) of optimum and recompacted to at least 90 percent of the maximum dry density as determined by ASTM D1557 (Modified Proctor). Backfill should be placed as specified in the Fill and Backfill section (2.5) of this report. Once excavation is complete and prior to backfilling it is recommended that a representative of the engineers visit the site and ensure that the subgrade meets the requirements set forth herein.

Pavement areas should be scarified and compacted in a similar manner. Any import fill should comply with the requirements as specified in the Fill and Backfill section (2.5) of this report.

## 2.3 Foundations

It is recommended that foundations bear on structural fill. The foundation should bear at least 10 inches below the bottom of slab, and at least 30 inches below grade for frost protection. If site preparation is carried out as specified herein **an allowable bearing capacity of 1,500 psf** may be used for design.

This bearing capacity is a net pressure and may be increased by 1/3 for wind, seismic, and other transient loads of a short duration. It is recommended that a representative of Watson observe the excavations, once complete to ensure adequate bearing stratum. Recompacted materials should be tested to ensure they meet the requirements herein. Spread footings should be a minimum of 20 inches wide in order to meet Utah state building code. Total settlement is estimated to be on the order of ½ to 1 inch with differential settlement less than half of the total settlement for spread footings.

This bearing capacity relies on the dry strength of the native soil. Increased moisture could cause the foundations to move, it is therefore imperative that proper grades be established and runoff controlled to limit moisture infiltration within five feet (5′) of the structure. Irrigation should be kept at a minimum within five feet (5′) of the structure in order to prevent additional moisture increases to the supporting soils.

## 2.4 Lateral Pressures

The following lateral pressures may be utilized for the proposed construction:

- Active Pressures (Unrestrained walls) 35 psf/ft
- At-Rest Pressures (Restrained walls) 60 psf/ft
- Passive Pressures
  - Continuous Footings 300 psf/ft
  - Spread Footings or Drilled Piers 350 psf/ft
- Coefficient of Friction
  - with passive pressure 0.35
  - without passive pressure 0.45

All backfill must be compacted to at least 90 percent (ASTM D1557) to mobilize these passive pressures at low strain. Expansive soil should not be used as retaining wall or basement wall backfill, except as a surface seal to limit moisture infiltration. The expansive pressures could greatly increase the active pressures.

## 2.5 Fill and Backfill

Native material is suitable for use as general grading and structural fill.

All fill placed for the support of foundations shall be at least three feet (3′) thick and three feet (3′) below existing grade. That placed for slabs-on-grade, exterior concrete flatwork, and driveways shall consist of at least eighteen inches (18″) of structural fill. Structural fill shall consist of approved native or imported low plasticity soils (having a remolded swell potential less than 4% under a 60 psf surcharge). Structural fill should have a solubility of less than 3%, be free of vegetation and debris, and contain no inert materials larger than four inches (4″) in nominal size.

Structural fill should be placed in maximum eight inch (8″) loose lifts and compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer. **Under foundations, structural fill shall be compacted to at least 90 percent of the maximum dry density, in accordance with ASTM D1557. Under floor slabs and pavement areas, structural fill shall be compacted to 95 percent of the maximum dry density.** The moisture content should be within ±2% of optimum for granular soils and at optimum to 2% above optimum for fine grained soils; however, this is only a guide to assist earth work contractors. Any pumping areas of soil shall be excavated and removed from the foundation. Any imported fill materials should be approved prior to importing. Also, prior to placing any fill, the excavation should be observed by the Geotechnical Engineer to observe that unsuitable materials have been removed and that the bottom of the excavation has been compacted to a suitable density.

## 2.6 Slab on Grade

All exterior slabs adjacent to the structure should be tied into the structural foundation with #4 rebar extending from the foundation into the exterior slab at least twelve inches (12″). Stem walls should be tied into interior slabs on grade with #4 rebar placed so that it extends fully into the stem wall and a minimum of approximately 30 bar diameters into the slab. Type 1L concrete should be used for all footings or wherever concrete will come into direct contact with the onsite soils.

Concrete slabs-on-grade and exterior concrete flatwork shall be supported by a four inch (4″) layer of compacted gravel overlying a zone of properly placed and compacted structural fill. The layer of compacted gravel shall consist of Type II Aggregate Base, or Type I pit-run gravel.

All concrete slabs should be designed to minimize cracking as a result of shrinkage. Additionally, all concrete slabs should be reinforced and poured with Type 1L concrete to resist sulfate attack. The steel reinforcement in floor slabs should be doweled into the foundation to aid in resistance of the contraction/expansion potential. We recommend that concrete floor slabs be reinforced as recommended by the Structural Engineer. Reinforcement should be installed at mid-height in the slab unless directed otherwise by the Structural Engineer.

Special precautions must be taken during the placement and curing of all concrete slabs. Excessive slump (greater than 4″) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could lead to excessive shrinkage, cracking or curling in the slabs. We recommend that all concrete placement and curing operations be performed in accordance with the American Concrete Institute (ACI) Manual R318-19. In addition, we recommend concrete placement be in accordance with ACI standard 306.1: Standard Specification for Cold Weather Concreting; ACI standard 306R: Cold Weather Concreting; ACI standard 305.1: Specification for Hot Weather Concreting; and, ACI standard 305R: Hot Weather Concreting.

## 2.7 Radon Gas

Radon is an odorless, tasteless gas created in the ground where uranium and radium exist. The more uranium found beneath the home, the higher the potential for elevated radon levels within a building constructed upon that soil. Radon is classified as a "Group A" carcinogen, defined as a substance known to cause cancer in humans.

According to a map of Utah which shows the incidence and estimated concentration of Radon gas on a county-by-county basis, the average concentration of Radon gas on or beneath this site is estimated to be between 2.0 and 4.0 pCi/L. Therefore, the site is considered to be a moderate risk to occupants; however, all owners are advised to test for Radon gas. **Radon gas is not considered a hazard in a slab on grade home** as the gas will escape into the atmosphere before it enters the home. Should the homeowners be concerned with exposure to radon they may visit www.radon.utah.gov for more information, and to obtain test kits to measure the radon in their home.

# 3 GENERAL DISCUSSION

This report has been prepared for the exclusive use of the addressee and their authorized agents. This report is not intended for use by others and the information contained herein is not applicable to other sites not named herein. This report is valid only until the governing jurisdiction recognizes a new building code. If this occurs prior to construction Watson should be consulted for updated recommendations.

Watson structures our services to meet the specific needs of our clientele; each study and prepared report is unique and prepared solely for the specific client project site(s). No other party may rely on our products or services unless Watson agrees, in writing, to allow such use. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and generally accepted geotechnical practices in the area the work was performed at the time this report was prepared.

**You may NOT rely on this report if such report was:**

- Not prepared for you
- Not prepared for your project
- Not prepared for the specific site explored
- Completed before important project changes were made
- Function of proposed structure has changed
- Evaluation, configuration, location, orientation or weight of the proposed structure has changed
- Composition of the design team has changed
- Project ownership has changed
- Not paid for in full

Our interpretations of subsurface conditions are based on a limited number of field and subsurface observations. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Watson's professional judgment was applied to a limited number of field observations and laboratory analyses. The recommendations put forward in this report result from a very limited number of observations; such limited observations were constrained by budget. Watson's conclusions and interpretations should not be construed as a warranty of the subsurface conditions. A greater degree of accuracy for those observations, interpretations and conclusions offered may be increased by increasing the number of observation points for comparative analysis.

Hazardous materials or environmental contamination discovered at the site during or as a result of field observations or subsurface exploration do not fall within the scope of services for this investigation. Watson cannot and will not be held liable for any such discovery or the spoils left by such discovery. Such hazardous materials are and remain the liability of the property owner.

Do not over-rely on the preliminary construction recommendations included herein; these recommendations are not final as they were formed, as explained above, from a limited number of observation points and a limited number of laboratory tests. Watson's recommendations may only be 'finalized' by our personnel directly observing actual subsurface conditions revealed during construction. Watson cannot and will not assume responsibility or liability for the recommendations contained herein if Watson does not perform construction observation and testing services.

The recommendations contained in this report are based on field explorations, laboratory tests, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from explorations made for this investigation. It is possible that variations in the soil and groundwater conditions exist over the area of the site and between the points explored. The nature and extent of variations may not be evident until construction occurs. If any conditions encountered at this site are different from those described in this report, Watson should be immediately notified so that we may make any necessary revisions to recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, our firm should also be notified.

It is the Client's responsibility to see that all parties to the project, including the Designer, Contractor, Subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

This report is valid for 18 months from the below signed date, or the next code change, whichever comes first. If construction has not commenced prior to expiration of this report, Watson should be contacted to review and provide an update addendum to this report.

## 4 ADDITIONAL SERVICES

The recommendations made in this report are based on the assumption that an adequate program of tests and observations will be made during the construction to verify compliance with these recommendations. These tests and observations should include, but not necessarily be limited to, the following:

- ✓ Observations and testing during site preparation, earthwork and structural fill placement.
- ✓ Observation of footing excavations.
- ✓ Consultation as may be required during construction.

We also recommend that project plans and specifications be reviewed by us to verify compatibility with our conclusions and recommendations. Additional information concerning the scope and cost of these services can be obtained from our office.

Respectfully Submitted,


Blair J. McDonald, P.E.
Geotechnical Engineer


Tim G. Watson, P.E.
President/Principal

# APPENDIX

TEST LOCATION PLAN

TEST PIT LOG

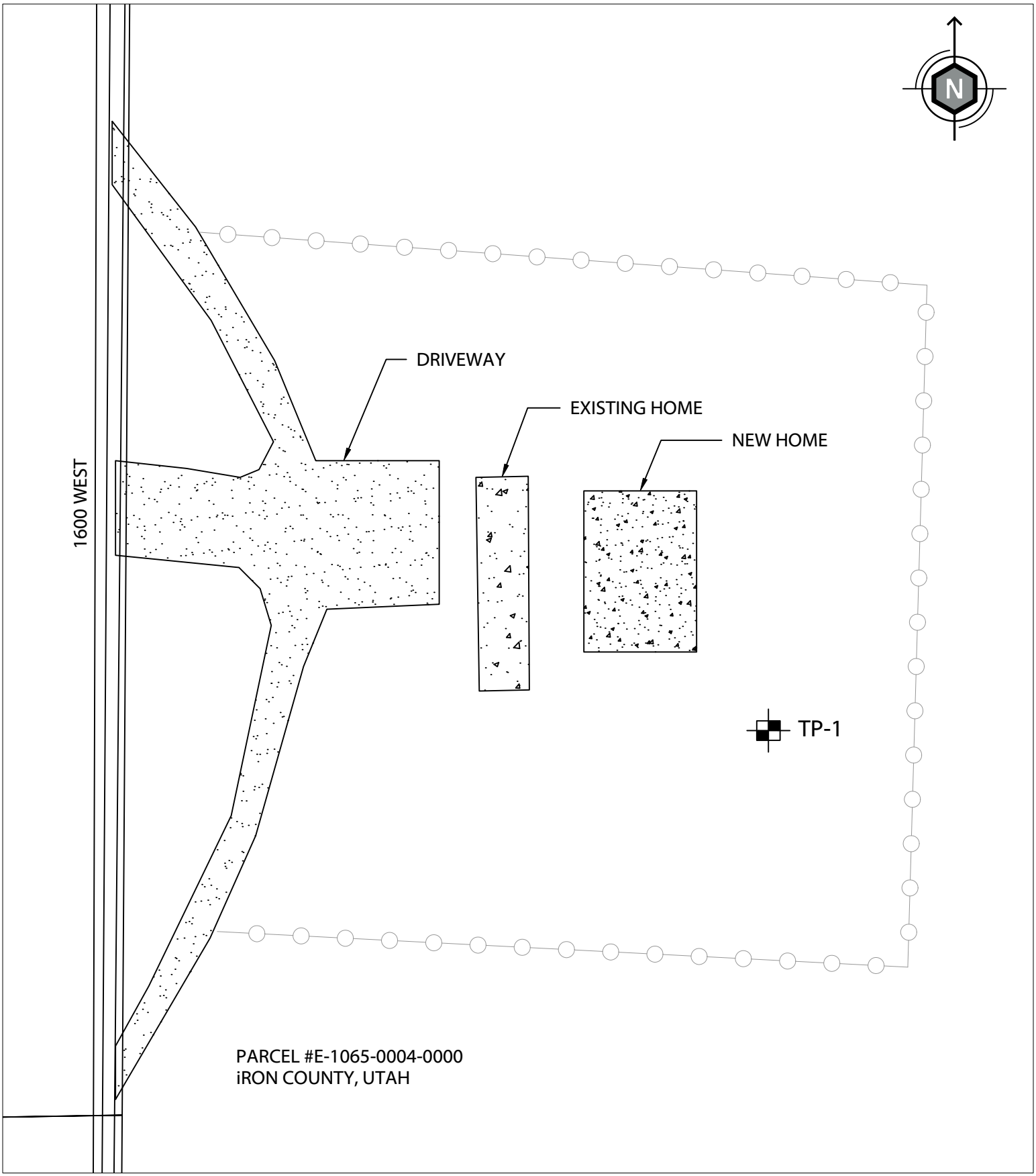
SUMMARY OF LABORATORY RESULTS

MOISTURE-DENSITY RELATIONS

GRAIN SIZE DISTRIBUTION

KEY TO SYMBOLS

SOIL CLASSIFICATION CHART




- APPROXIMATE TEST PIT LOCATION

**WATSON ENGINEERING COMPANY, INC.**
472 N 2150 W, Suite 7
Cedar City, UT 84721
Tel. (435) 586-3004
**www.wecinc.com**



*TEST LOCATION PLAN*

# JERALD HUNT

ESPLIN RESIDENCE
455 N 1600 West
NEWCASTLE, UTAH

DRAWN BY: B. MCDONALD
CHECKED BY: T. WATSON
DATE: 11/17/2025
WATSON PROJECT No.: 25-7983
SCALE: N.T.S.
FILE: TLP (1).DWG
sheet TLP
Sheet 1 of 1

**Watson Engineering Company, Inc.**
**472 N. 2150 W. Ste 7**
**Cedar City, UT 84721**
**435-586-3004**

# TEST PIT LOG: TP1



**CLIENT:** Diamond H Construction
**PROJECT:** Esplin Residence
**PROJECT NUMBER:** 25-7983
**ADDRESS:** 455 N 1600 WEST, New Castle, Utah
**DATE EXCAVATED** 10/20/25 **LOGGED BY** BJM
**EXCAVATION CONTRACTOR** Client
**EXCAVATION METHOD**
**EXCAVATION EQUIPMENT**
**NOTES** No groundwater encountered.

| DEPTH (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | MOISTURE (%) | DRY UNIT WT. (pcf) |
|---|---|---|---|---|---|---|---|
| 0.0 | | Medium Dense Dark Brown TOPSOIL, SILTY W/SAND (SC-Dry) | | | | | |
| | | Medium Dense Brown SILTY SAND (SC-Dry) | | | | | |
| 2.5 | | Medium Dense SANDY GRAVEL (SP-Dry) | | | | | |
| | | Medium Dense Brown SILTY SAND (SC-Dry) Some coarse sand w/gravel; a few 3" cobble | GB BS1 | | | | |
| 5.0 | | | | | | | |
| 7.5 | | | | | | | |
| 10.0 | | | | | | | |

▲SPT N VALUE▲
20 40 60 80
PL MC LL
20 40 60 80
☐FINES CONTENT (%)☐
20 40 60 80

BOTTOM OF TEST PIT AT 10.0 FEET.

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# SUMMARY OF LABORATORY RESULTS



**CLIENT:** Diamond H Construction **PROJECT:** Esplin Residence

**PROJECT NUMBER:** 25-7983 **ADDRESS:** 455 N 1600 WEST, New Castle, Utah

| Borehole | Depth Interval (ft) | Liquid Limit | Plastic Limit | Plasticity Index | Maximum Size (mm) | %<#200 Sieve | Class-ification | Water Content (%) | Dry Density (pcf) | Solubility (%) | Void Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TP1 | 6.0- | 30 | 14 | 16 | 12.5 | 46 | SC | | | < 1 | |

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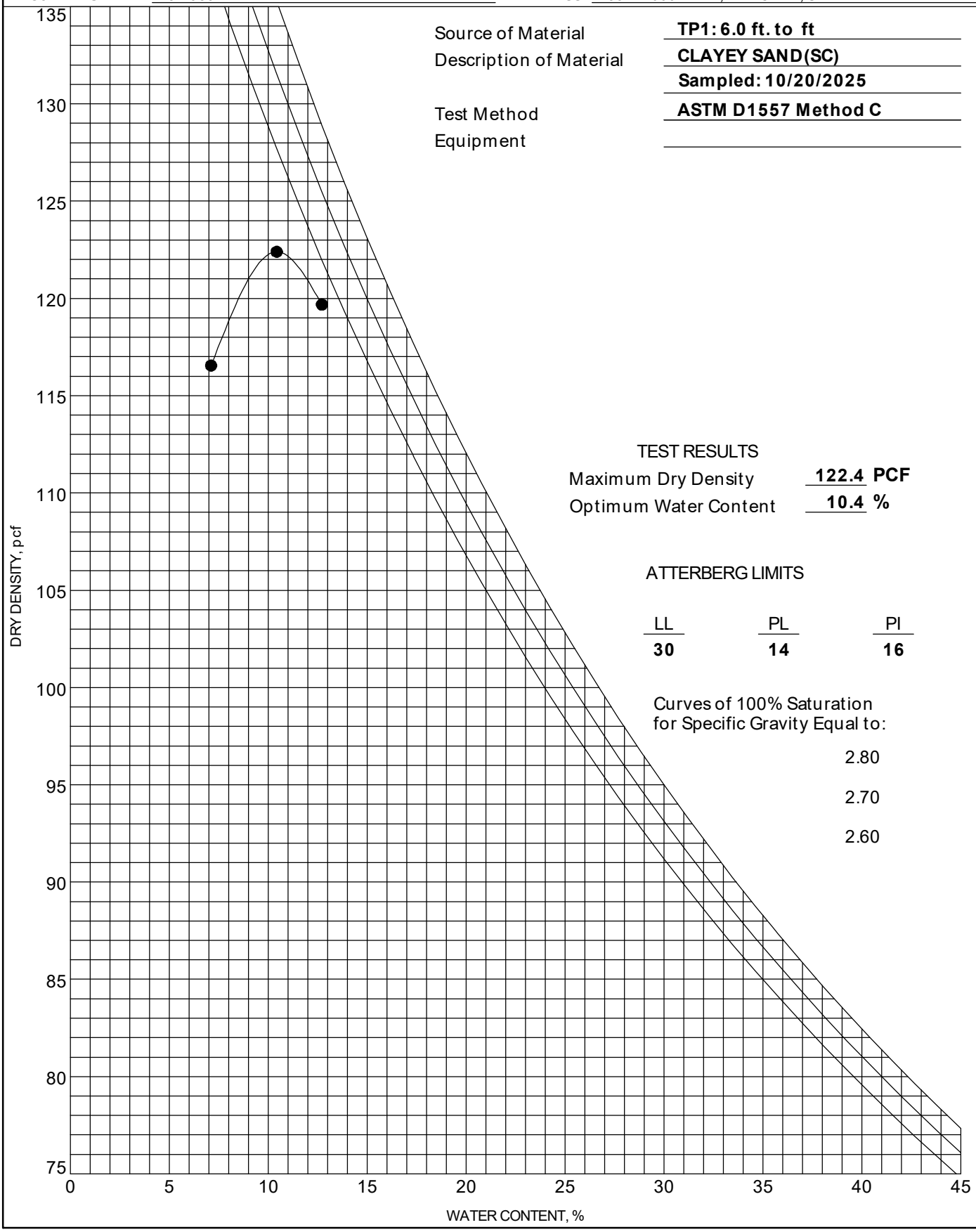
# MOISTURE-DENSITY RELATIONSHIP

**CLIENT:** Diamond H Construction **PROJECT:** Esplin Residence

**PROJECT NUMBER:** 25-7983 **ADDRESS:** 455 N 1600 WEST, New Castle, Utah




Source of Material: **TP1: 6.0 ft. to ft**

Description of Material: **CLAYEY SAND(SC)**

**Sampled: 10/20/2025**

Test Method: **ASTM D1557 Method C**

Equipment:

TEST RESULTS

Maximum Dry Density **122.4 PCF**

Optimum Water Content **10.4 %**

ATTERBERG LIMITS

| LL | PL | PI |
|---|---|---|
| 30 | 14 | 16 |

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

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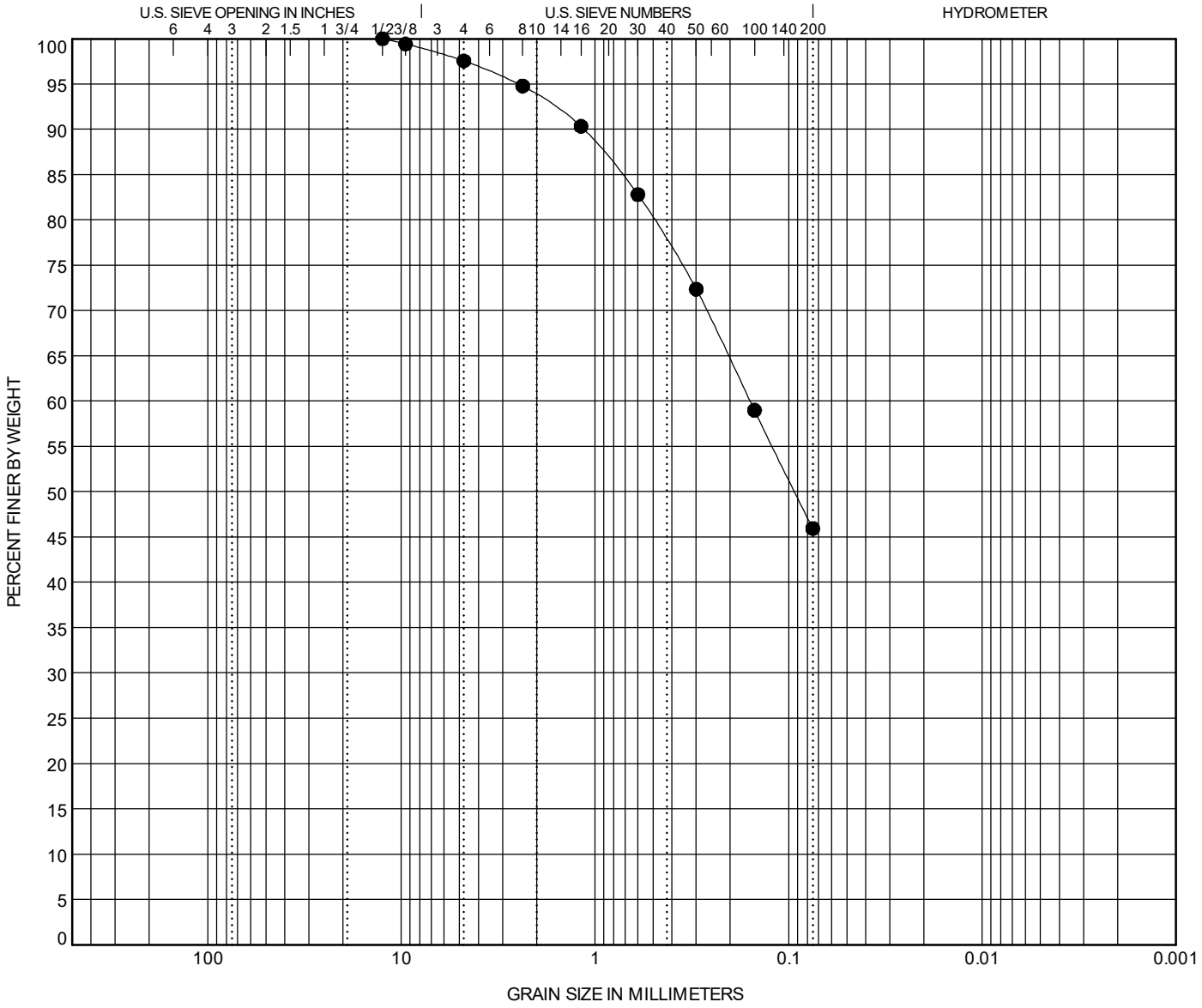
**Cedar City, UT 84721**
**435-586-3004**

# GRAIN SIZE DISTRIBUTION

**CLIENT:** Diamond H Construction **PROJECT:** Esplin Residence

**PROJECT NUMBER:** 25-7983 **ADDRESS:** 455 N 1600 WEST, New Castle, Utah




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| | BOREHOLE | DEPTH | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | **TP1** | **6.0** | **CLAYEY SAND (SC)** | **30** | **14** | **16** | | |

| | BOREHOLE | DEPTH | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | **TP1** | **6.0** | **12.5** | **0.158** | | | **2.5** | **51.6** | **45.9** | |

**Watson Engineering Company, Inc.**
**472 N. 2150 W. Ste 7**
**Cedar City, UT 84721**
**435-586-3004**

# KEY TO SYMBOLS

**CLIENT:** Diamond H Construction **PROJECT:** Esplin Residence

**PROJECT NUMBER:** 25-7983 **ADDRESS:** 455 N 1600 WEST, New Castle, Utah

## *LITHOLOGIC SYMBOLS*
## *(Unified Soil Classification System)*


SC: USCS Clayey Sand


SP: USCS Poorly-graded Sand

## *SAMPLER SYMBOLS*

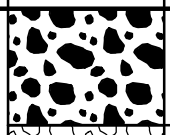
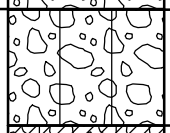
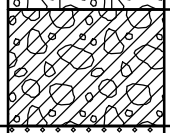
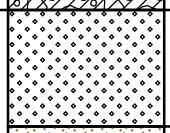
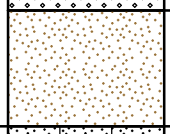
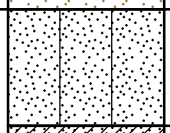
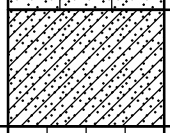
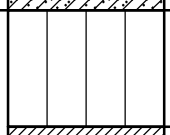
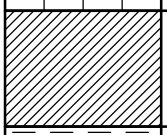
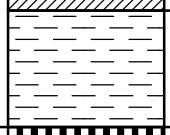
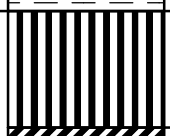
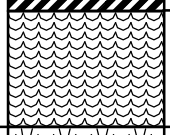
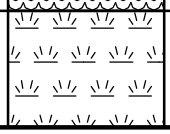

Grab Sample

## *ABBREVIATIONS*

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION
Water Level at Time Drilling, or as Shown
Water Level at End of Drilling, or as Shown
Water Level After 24 Hours, or as Shown

# SOIL CLASSIFICATION CHART

| MAJOR DIVISIONS | | | SYMBOLS | | TYPICAL DESCRIPTIONS |
|---|---|---|---|---|---|
| | | | GRAPH | LETTER | |
| COARSE GRAINED SOILS<br>MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE | GRAVEL AND GRAVELLY SOILS<br>MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE | CLEAN GRAVELS |  | GW | WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | | (LITTLE OR NO FINES) |  | GP | POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | | GRAVELS WITH FINES |  | GM | SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES |
| | | (APPRECIABLE AMOUNT OF FINES) |  | GC | CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES |
| | SAND AND SANDY SOILS<br>MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE | CLEAN SANDS |  | SW | WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES |
| | | (LITTLE OR NO FINES) |  | SP | POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES |
| | | SANDS WITH FINES |  | SM | SILTY SANDS, SAND - SILT MIXTURES |
| | | (APPRECIABLE AMOUNT OF FINES) |  | SC | CLAYEY SANDS, SAND - CLAY MIXTURES |
| FINE GRAINED SOILS<br>MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE | SILTS AND CLAYS | LIQUID LIMIT LESS THAN 50 |  | ML | INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY |
| | | |  | CL | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS |
| | | |  | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| | SILTS AND CLAYS | LIQUID LIMIT GREATER THAN 50 |  | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS |
| | | |  | CH | INORGANIC CLAYS OF HIGH PLASTICITY |
| | | |  | OH | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS |
| HIGHLY ORGANIC SOILS | | |  | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS |

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS