# WOODLAND HILLS PAVEMENT MANAGEMENT PROJECT
# Project ID: CEEn_2018CPST_06

**by**

**Woodland Hills**
**River Sanderson**
**Pablo Galvez**
**Eduardo Rodriguez**
**Nick Linton**

**A Capstone Statement of Work**

**Submitted to**

**Corbett Stephens & Ted Mickelsen**
**Woodland Hills City**

**Department of Civil and Environmental Engineering**
**Brigham Young University**

**October 1, 2018**

# Introduction

**PROJECT TITLE:** WOODLAND HILLS PAVEMENT MANAGEMENT
**PROJECT ID:** CEEn_2018CPST_006
**PROJECT SPONSOR:** Woodland Hills
**TEAM NAME:** Woodland Hills

This project analyzes three damaged streets located in the city of Woodland Hills: West Spring Drive, West Lake View Way and Oak Drive. The purpose of the project is to classify the major streets in Woodland Hills according to functional classification of each street and provide general guidelines on the appropriate treatments to implement when the streets are damaged.

# Proposed Work Plan

The work for the project will be completed in three phases. Phase one will be focused on data collection. Traffic volume, construction drawings, and current street condition data will be gathered and entered into a GIS street map of Woodland Hills. In the second phase, possible road treatments will be evaluated. The final stage will consist of creating a report that gives final recommendations. The final report will include a set of recommended treatments for pot holes, pavement edge sloughing, and cracking, as well as a cost per square yard approximation. The report will also include treatment recommendations for the three streets that will be studied.

# Schedule

Phase 1: Data Collection (Due November 26th, 2018)

During Task 1, the Capstone team will collect traffic data at 5 different locations in Woodland Hills, three located at the recommended sites, provided by the public works director, and two other locations at Woodland Hills Drive and Willow Reed Road. Additionally, the PASER system will be used to evaluate the state of the pavement located along West Spring Drive (0.17 miles), West Lake View Way (0.38 miles), and Oak Drive (1.46 miles). Lastly, the Capstone team will collect any cross-sectional data for the newer roads, or any cross sections available in the city, to understand the current state of the streets to be evaluated.

Phase 2: Data Evaluation (Due February 18th, 2018)

Based on the traffic and movement count data collected, the Capstone team will determine the functional classification of the roads where data were collected. Additionally, the Capstone team will determine potential problems of the pavement at the streets in study using the PASER system, which includes a rating for each street on pavement condition.

Phase 3: Recommendations (Due April 15th, 2018)

The Capstone team will provide recommendations through a Pavement Management Plan, including the approximate time and money needed to fix the roads studied and maintain them in appropriate state for the next twenty years.

# Facilities, Tools, Data and Equipment

Five roads will be studied in total, three of them for pavement analysis and two of them for traffic analysis. The streets are:

1. Oak Drive (pavement analysis)
2. West Lake View Way (pavement analysis)
3. West Spring Drive (pavement analysis)
4. Willow Reed Road (traffic analysis)
5. Woodland Hills Drive (traffic analysis)

To provide the pavement analysis, the PASER manual, a vehicle, cross-sectional drawings, and two volunteers will be needed (50 hours each). To provide the highway functional classification, five cameras, a drill, five poles, a vehicle and two volunteers are needed (35 hours each). Additionally, the collected data will be recorded on ArcGIS by one of the members of the Capstone team (20 hours), a final report (20 hours) with the recommendations, a poster that shows the results of the analysis (15 hours), and a final meeting (combined 12 hours) to present the results, will be performed by the Capstone team. All the tools, equipment and facilities will be provided by BYU, while the preliminary data will be supplied by Woodland Hills.

# Project Budget

Phase 1: Due by November 26th, 2018
- Collect Traffic data - 80 Hours
- Evaluate Pavement - 20 Hours

Phase 2: Due by February 18th, 2018
- Evaluate Collected Traffic Data - 20 Hours
- Evaluate Pavement and Determine Functional Classification - 50 Hours
- Record Data onto GIS - 20 Hours

Phase 3: Due by April 15th, 2018
- Create Final Report - 20 Hours
- Assemble Poster - 15 Hours
- Final Meetings - 12 Hours

Total Time Budget: 227 Hours

Financial Budget:
32 miles (at $0.54 per mile) for each data collection trip and meeting (5 total = $87).
Poster printing $10-$25.
Any additional funds may be used on the development of the final report.
Remaining funds will be distributed among students or returned to the city upon request.

# Deliverables

1. Regular weekly status reports and monthly reports.
2. Final Report with recommendations for pavement improvement with specific recommendations along three streets on Woodland Hills and general guidelines for future pavement issues, including environmental and economical considerations.
3. A poster that reflects a summary of the project and results of the collected and analyzed data.
4. A presentation where the Capstone students present the results from the research.

# Performance Standards

Team will provide work for this Capstone project "as is" using best practices and with best effort. Project results cannot be construed as work performed by licensed professionals and cannot be used as "stamped deliverables" without first being reviewed, approved and stamped by a qualified and relevant license professional engineer.

# Statement of Qualification

W. Spencer Guthrie – Professor

Education:

- Utah State University – BS, Civil and Environmental Engineering, **1998.**
- Texas A&M University – MS, Civil Engineering, **1999**.
- Texas A&M University – PhD, Civil Engineering, **2002.**

Work Experience**:**

- Professor, Civil and Environmental Engineering, BYU, (2014-present)
- Undergraduate Coordinator, Civil and Environmental Engineering, BYU, (2006-present)
- Assistant Professor, Civil and Environmental Engineering, BYU, (2002-2014)
- Graduate Research Assistant, Texas Transportation Institute, (1998-2002)
- Civil Engineering Intern, Hansen and Associates, Inc., (1998)
- Civil Engineering Intern, Smithfield City Corporation, (1996-1998)

Honors and Awards**:**

- Outstanding Faculty Award, Department of Civil and Environmental Engineering, BYU, (2007)
- House of Learning Lectureship, Harold B. Lee Library, BYU, (2007)
- Citizen Service Award, Utah County Sheriff's Office, (2003)
- Fred Burggraf Award, Transportation Research Board, (2002)
- Fellow, Graduate Teaching Academy, Center for Teaching Excellence, Texas A&M University, (2002)
- Best of Session by a Younger Member, Texas Section Fall Meeting, ASCE, (2000)
- Institutional and Professional Service in the Last Five Years
- Session Organizer, Chemical and Mechanical Stabilization of Frost-Susceptible Soils and Aggregates, Transportation Research Board Meeting, Washington, D.C., (2007)
- Member, Committee on Transportation and Infrastructure, Technical Council on Cold Region Engineering, ASCE, (2004-present)
- Session Co-Organizer and Presiding Officer, Materials Characterization, Transportation Research Board Meeting, Washington, D.C., (2004)
- Member, Committee on Frost Action, Transportation Research Board, (2001-present)

Grant G. Schultz – Professor

Education:

- Brigham Young University – BS, Civil Engineering, **1994.**
- Brigham Young University – MS, Civil Engineering, **1995**.
- Texas A&M University – PhD, Civil Engineering, **2003.**

Work Experience**:**

- Professor, Civil & Environmental Engineering, BYU (2015-present)
- Associate Professor, Civil & Environmental Engineering, BYU (2010-2015)
- Assistant Professor, Civil & Environmental Engineering, BYU, (2004-2010)
- Graduate Research Assistant, Texas Transportation Institute, (2001-2003)
- Traffic Engineer/Project Manager, The Sear-Brown Group, (1996-2000)
- Traffic Engineer, Keller Associates, Inc., (1995-1996)

Honors and Awards**:**

- Named Fellow of the Institute of Transportation Engineers, 2010
- Outstanding Transportation Educator Award, Institute of Transportation Engineers Western District, 2008–2009
- Outstanding Faculty Award, Department of Civil and Environmental Engineering, Brigham Young University, 2008
- Best Paper Award, Transportation Research Board, Transportation System Policy, Planning and Process Section (paper topic: Safety Impacts of Access Management Techniques in Utah), 2007
- Outstanding Paper and Presentation Award, Institute of Transportation Engineers Intermountain Section, (paper topic: Advance Warning Signals at Isolated High-Speed Intersections), 2006
- Student of the Year, University Transportation Centers Program, Southwest Region University Transportation Center, Region 6, 2003
- Dr. Robert Herman Award, Southwest Region University Transportation Center, 2003
- Academic Excellence Award, Texas A&M University, 2002–2003
- Jack R. Gilstrap Award, American Public Transportation Foundation, 2001–2003
- Outstanding Doctoral Student, Southwest Region University Transportation Center, 2002
- Ph.D. Student of the Year in Transportation, Texas A&M University, Southwest Region University Transportation Center, 2002
- Outstanding Student, Institute of Transportation Engineers Texas District, 2002
- Eno Fellow, Eno Transportation Foundation Leadership Development Training, 2002

# Appendix A

# Eduardo Rodriguez

♦ (801) 310-4637♦ Provo, UTAH, 84606 ♦
♦ earodriguezmiranda@gmail.com ♦

## Education

**Brigham Young University** **Provo, Utah**
**BS, Civil & Environmental Engineering** **April, 2018**
**American Society of Civil Engineers - Utah Chapter Member**

## Experience

**Utah Department of Transportation (UDOT) – Central Construction Division** **Taylorsville, Utah**
*Intern* **January 2018 - Present**

- ❖ Developing a performance-based traffic control system that uses Bluetooth technology to optimize mobility by maximizing contractor's work windows and minimizing construction impact to public
- ❖ Developing the Concept of Operations for the Demand Driven Mobility Management System D2M2
- ❖ Monitoring , analyzing, and comparing Bluetooth and HERE traffic data and recommending modifications to lane closure schedules
- ❖ Collecting data for the development of a roller mapping and intelligent compaction system

**Brigham Young University, Civil Engineering (Transportation)** **Provo, Utah**
*Undergraduate Research Assistant* **February 2017 - December 2017**

- ❖ Presented quarterly to UDOT board members the research progress. This included data problems, findings, solutions, and future applications
- ❖ Determined the accuracy of previously developed Horizontal Alignment Finder (HAF) Algorithm by using ArcGIS ArcMap, Autocad and Google Earth
- ❖ Improved the accuracy of the HAF algorithm from 85 to 95% by fixing the core code
- ❖ Upgraded the user interface of the algorithm to be more user friendly and compatible with any new data

**BYU Broadcasting** **Provo, Utah**
*Content Translator* **September 2015 – December 2017**

- ❖ Transcribed and translated to Spanish multiple shows and movies to be broadcast in 19 countries in Latin America
- ❖ Improved by 50% the delivery time and the accuracy of the content translated

**Brigham Young University, Civil Engineering (Transportation)** **Provo, Utah**
*Undergraduate Research Assistant* **April 2015 - August 2015**

- ❖ Collected speed and volume data in 14 street intersections using JAMAR counters and LIDAR speed guns
- ❖ Calibrated speed and volume data and determined optimal mounting locations of SmartSensors and virtual sensors
- ❖ Sorted, and selected data to be presented to UDOT board, WAVETRONIX and on the Annual UDOT Conference

## Award

**Rocky Mountain Conference, Steel Bridge Competition** **Provo - Utah**

v. Winner of the 2017 ASCE Steel Bridge Competition at the Rocky Mountain Conference in Salt Lake City.

## Skills

i. Autocad, Revit, Civil 3D, GIS ArcMap
ii. Basic Rstudio,
iii. Microsoft Office Suite

# River Sanderson

602 E 600 N 84606 • E-mail: riversanderson23@gmail.com • (435) 494-7285

## Objective

To provide quality work as an intern that yields valuable hands-on experience and furthers my understanding of a career in engineering

## Education

Bachelor of Civil Engineering – *Brigham Young University, Provo UT*

- Major: Civil Engineering
- Current Standing: Junior
- Graduation: April 2019

## Work Experience

**Building Inspector** – *Complete Property Repair* July 2017 - Present

- Wrote multiple inspection reports a day on repairs needed for building exteriors
- Collaborated with construction managers to help improve construction quality for EDGE homes
- Instructed Edge constructions managers on how to avoid code violations

**Engineering Tech** - *Solcius* January 2017 - June 2017

- Assisted Professional Engineer by compiling solar calculations and specifications for stamping
- Calculated building durability and strength to carry solar panel systems on several structures per day
- Designed 2D plans of solar panels on property and home
- Created an automated calculation spreadsheet using the programming language VBA primer

**Construction Laborer and Manager –** *Ram Builders Inc.* July 2014 - January 2017

- Assisted and worked with construction sales by examining work to be repaired and writing estimates
- Remolded decking systems as a carpenter's assistant
- Labored under a foreman to repair stucco
- Managed vehicles using a program to track location and schedule maintenance

**Head Sales Agent -** *Skyview Window Cleaning* May 2015 - October 2015

- Wrote 10-12 estimates a day for window cleaning
- Contacted home owners by cold calls and knocking doors
- Scheduled all work for laborers and personally dealt with customer service

## Skills

**Bilingual**

- Spanish (proficient in reading, writing and speaking)

**MSWord/MSExcel/AutoCad/Revit**

Learned in computational methods/drafting class and practiced while working at Solcius.

# Pablo Galvez de Leon

(502) 654-0938 | pablo.galvez@rsginc.com | Sandy, Utah

## Education

**Apr 2015 – Dec 2019**

Bachelor of Science, Civil Engineering, BYU, Provo Utah
- Member of ITE, ASCE, and SHPE.
- 3.24 GPA

## Experience

**Engineering Intern, RSG Inc., Salt Lake City Utah** **May 2018 – Current**

- Performed safety and warrant analysis for left-turn movements, new signals, pedestrian, speed, and safety-related studies.

**Research Assistant, Brigham Young University, Provo Utah** **Jan 2018 – Oct 2018**

- Led research project funded by RSG Inc. on driver's compliance at pedestrian crosswalks.

**Engineering Intern, Spanish Fork Public Works, Spanish Fork Utah** **Sep 2017 – May 2018**

- Executed traffic engineering studies on safety analysis and volume-based warrants.
- Implemented EPANET in the design of the Spanish Fork hydraulic systems.
- Advised traffic engineers on design improvements according to AASHTO standards.

## Other Jobs, Activities and Service

- International MTCs Specialist, Provo Utah **Mar 2015 – Sep 2017**
- Spanish Teacher at the Missionary Training Center, Provo Utah **Aug 2015 - Sep 2017**
- Multilingual missionary for The Church of Jesus Christ of Latter-Day Saints, Georgia. **Mar 2013-2015**
- Composer, guitar player and lead singer for Vacant Victory, Costa Rica **Nov 2009 – Jun 2012**
- Handball Player for the Guatemalan National Team, Guatemala City, Guatemala **2006-2009**

## Skills & Abilities

| | |
|---|---|
| Civil 3D | HDM |
| Revit | C++ |
| Microsoft Office | PC-Warrants |
| Jamar | Epanet |
| Spanish | Portuguese |

# Nicholas Linton

1224 Bear Hollow Cove, Draper, UT 84020 – C: 801-708-4354 – nlinton24@gmail.com

## Education

**Bachelor of Science: Civil Engineering** **Graduation 2019**

Brigham Young University
GPA 3.66
Minor in Mathematics
91 Credit Hours Completed

## Experience

**AECOM** **03/2018 to Present**
**Transportation Inspector** **Murray, UT**

- Preformed inspection on a multimillion dollar UDOT project in West Jordan Utah.
- Created and submitted over 500,000 dollars' worth of pay items.
- Preformed density tests as well as tested concrete.
- Communicated UDOT specifications to contractor.

**Research Assistant: Next Generation Liquefaction Project** **09/2017 to Present**
**Brigham Young University** **Provo, UT**

- Assist graduate students in collecting and analyzing data.
- Gather geotechnical data from engineering firms throughout Utah and Salt Lake counties.
- Check NGL database for accuracy.

**GIS Data Collection Internship** **06/2017 to Present**
**City of Saratoga Springs** **Saratoga Springs, UT**

- Collect GIS data related to new infrastructure projects.
- Coordinate with city inspectors to ensure all data is collected.
- Assist GIS administrator to identify areas with inaccurate or missing data.

## Skills

- Exceptional Plan Reading Ability
- UDOT SSRDT and CTT Certified
- Proficient with Microsoft Excel including the Ability to Write Code in VBA
- Experience Using ArcMap
- Exceptional Writing Abilities
- Trained in GIS Data Collection Methods
- Fluent in Spanish
- Active Learner
- Excellent People Skills
- Leadership Experience