SILVER HILLS - VILLAGE 1

TENTATIVE SUBDIVISION MAP

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REVISED - MAY 10, 2021

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TENTATIVE SUBDIVISION MAP

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Introduction

This application includes the following request:

A **Tentative Subdivision Map** to allow for a 358 unit single family subdivision with common open space within the Silver Hills Specific Plan.

Project Location

The Silver Hills Specific Plan (APN #'s 087-390-10, 087-390-13, 086-232-31, and 086-203-05) consists of 780.32± acres located within the North Valleys Areas Plan, contiguous to the City of Reno on the west. The Specific Plan encompasses land on the east and west sides of Red Rock Road, north of Silver Knolls. Village 1 (included with this application) is located at the northern portion of the Specific Plan area, west of Red Rock Road. Figure 1 (below) depicts the location of the overall Silver Hills Specific Plan, as well as Village 1.

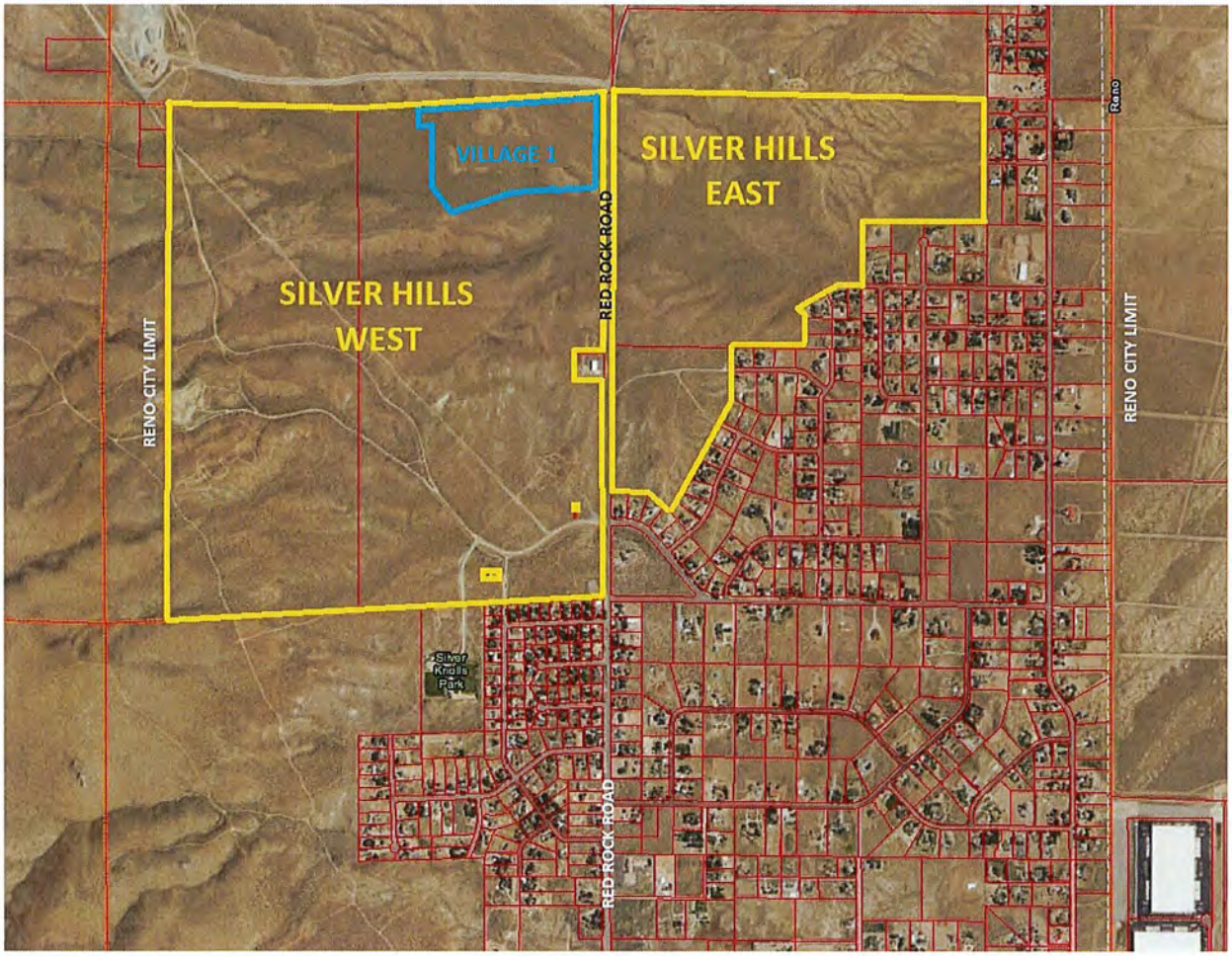


Figure 1 – Vicinity Map

Village 1 includes 120.48± acres of which 65.96± acres will be developed within a portion of APN # 087-390-10. The portion of the project site proposed for development is identified as a residential development area on the Silver Hills Land Use Plan, subject to the standards contained in the Silver Hills Specific Plan Development Standards Handbook (Handbook). The Silver Hills Land Use Plan indicates a 1-acre trailhead location in the area of Village 1. The plan clearly indicates that park and public recreation facilities (including trailheads) are subject to relocation. However, the Handbook requires that a 1-acre trailhead be constructed concurrently with the first phase of development. As such, a trailhead is incorporated into the Village 1 design and has only been slightly relocated from what is depicted on the Land Use Plan (as described later in this report).

Figure 2 (below) depicts the location of new development within Village 1 (in context of the Silver Hills Land Use Plan) while Figure 3 (following page) depicts all land included within the tentative map boundary.

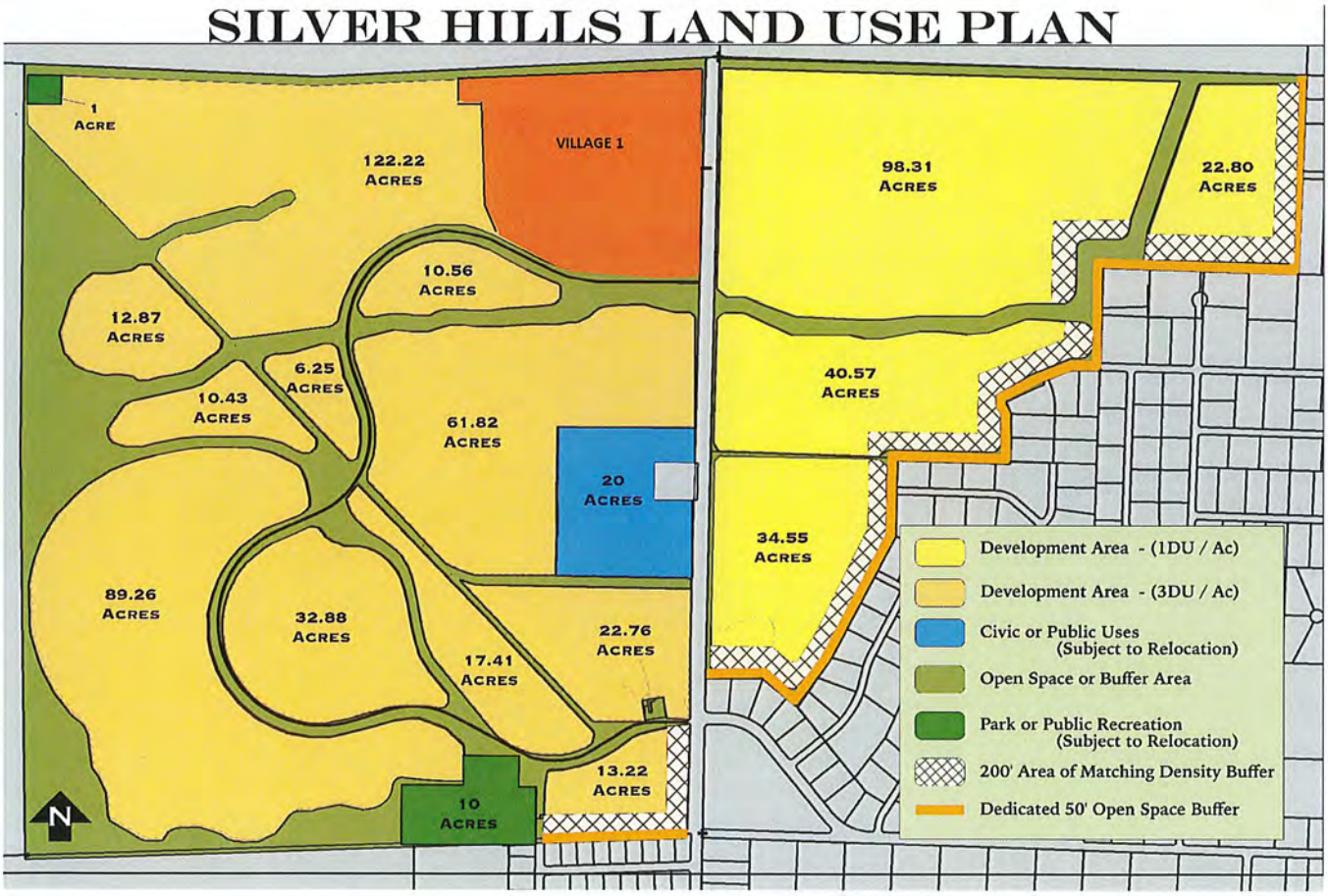


Figure 2 – Silver Hills Land Use Plan

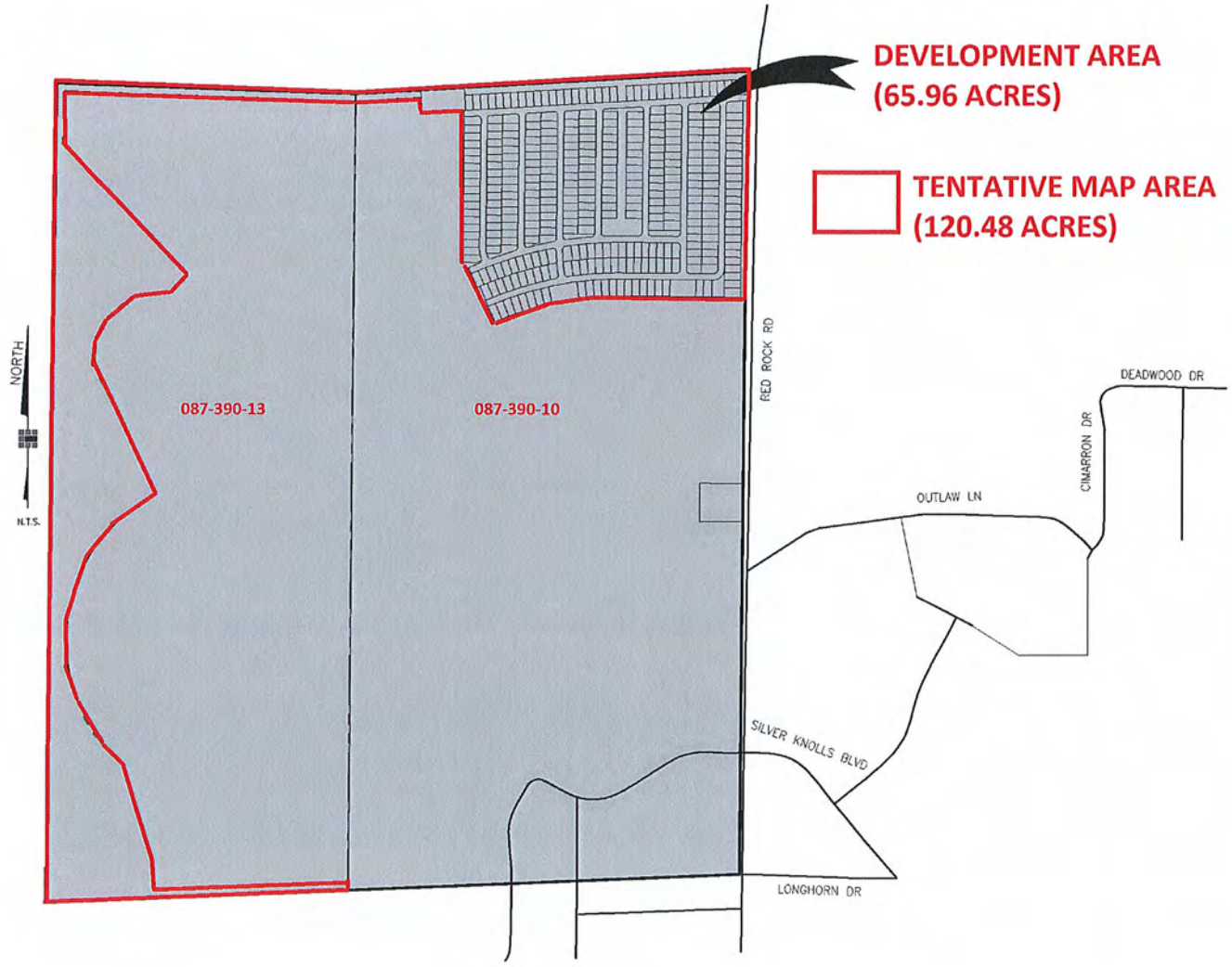


Figure 3 – Tentative Map Area

Existing Conditions

The Village 1 area proposed for development is currently vacant and generally includes flat to slightly rolling terrain. Site elevations increase as you move westward across the property with steeper terrain included at the west side of the tentative map area. Red Rock Road forms the eastern project boundary with public lands to the north (BLM). Property to the west and south are located within the Silver Hills Specific Plan and are identified as future development areas. The Truckee Meadows Fire Protection District Silver Knolls Volunteer Fire Station is located just south of the Village 1 area on the west side of Red Rock Road. Figure 4 (below) depicts the existing onsite conditions.

Figure 4 – Existing Conditions

Silver Hills is located within the Silver Hills Suburban Character Management Area adopted in the North Valleys Area Plan. The Area Plan designates the property as Suburban Residential with Specific Plan (SP) zoning. The SP zoning requires that the standards and requirements of the Silver Hills Specific Plan Development Standards Handbook be implemented for all projects within the Specific Plan Area.

Project Description

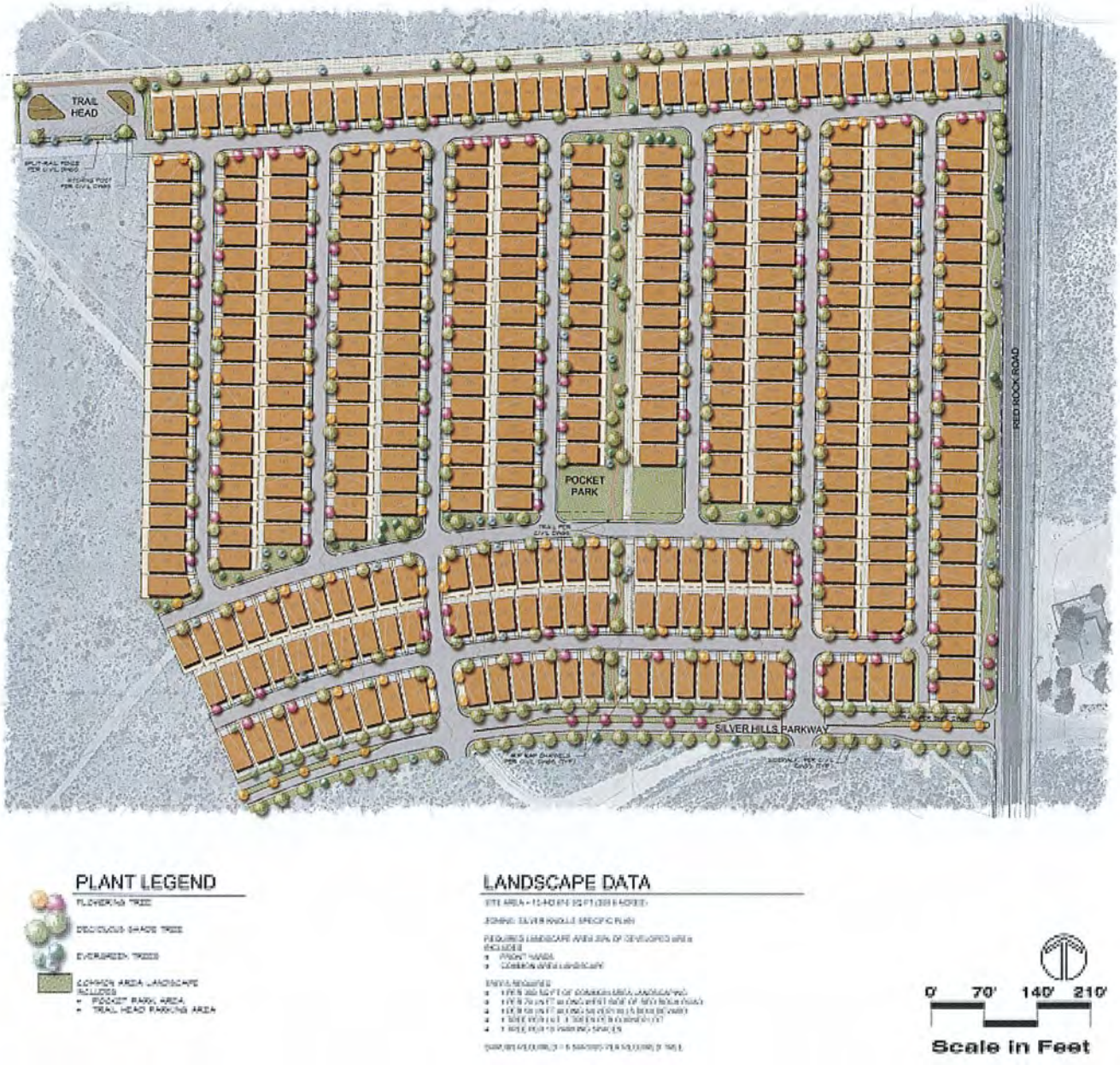
This application includes a Tentative Subdivision Map request for the first village of the overall Silver Hills master-planned community. Village 1 consists of 120.48± acres and is proposed to include 358 single family units. Access to the project will be from the first segment of Silver Hills Parkway which connects to Red Rock Road. As shown in the Silver Hills Land Use Plan, Silver Hills Parkway will ultimately loop through the Specific Plan area, connecting again to Red Rock Road to the south.

The Village 1 design is consistent with the requirements and theme described in the Handbook. This includes the implementation of the design standards related to Red Rock Road, exterior buffers, and the Silver Hills Parkway streetscape. The Red Rock Road frontage is designed to include a 25-foot landscape buffer that incorporates an enhanced natural landscape. A 6-foot meandering path is included along the Red Rock frontage as well.

A 50-foot open space buffer is incorporated on the north side of the project and will include an equestrian path, as described in the Handbook. This path will connect to a trailhead located adjacent to Village 1 development area at the northern portion of the tentative map boundary. This trailhead can be accessed by vehicles through Village 1 (along with future villages) and provides designated parking for vehicles and trailers with sufficient area to load/unload horses. Per the Specific Plan, this trailhead will be constructed concurrently with Village 1 and will be maintained by the Silver Hills Homeowners Association (HOA). The trailhead is 1.03± acres in size and will be open to the public, allowing all area residents safe and convenient access to public lands and the Silver Hills trail network, including that within Village 1 and future village extensions. A backbone trail network (detailed later) will also be completed with Village 1 per Handbook requirements.

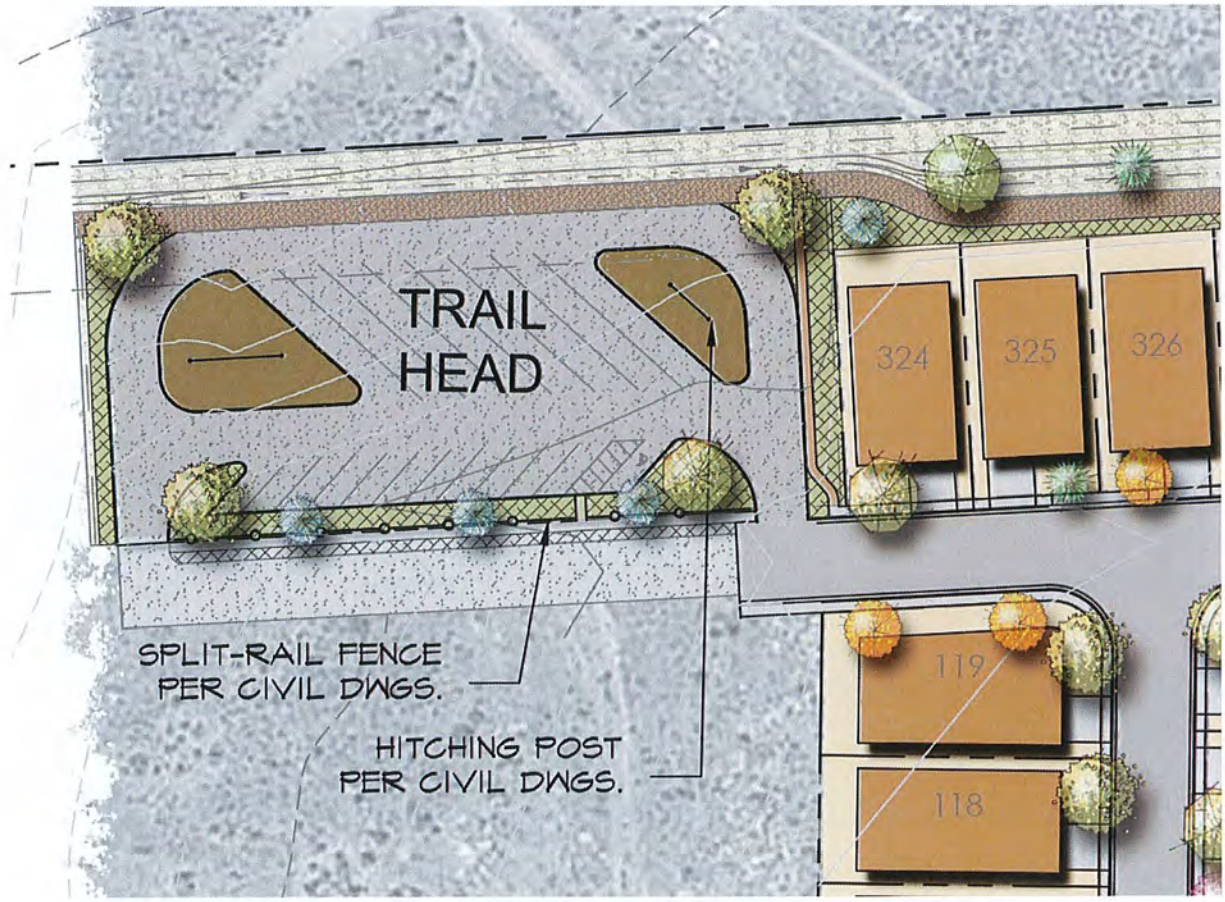
Neighborhood connectivity is a key element of the Silver Hills master plan. The overall Specific Plan is tied together through a series of trails, sidewalks, and greenbelts. Ultimately, community amenities such as an agrihood, community facilities (i.e. school, community center, etc.), and support retail services will be located central to the Specific Plan and linked to the community through trails and open space corridors. Village 1 commences implementation of this design approach by incorporating a north/south linear open space corridor central to the project. This will include a trail that connects residents with the trail that parallels the northern boundary, providing connection to the Red Rock path as well as future trail extensions. The linear park/open space will include informal landscape but leads to a formally developed pocket park that provides recreational opportunities for residents. East/west streetscape improvements are located central to the site, connecting with the pocket park. These improvements are in addition to the sidewalks located along the internal roadways and promote a safe walking/bicycling environment for residents, especially children. The lineal open space, streetscape improvements, and pocket park will be maintained by the Silver Hills HOA.

Figure 5 (below) depicts the overall Village 1 site plan while Figure 5 (following page) depicts the trailhead to be completed concurrently with Village 1.



Note: Building pads depicted for illustrative purposes. Final plot plans to include staggered setbacks per Handbook standards and further detailed herein. Refer to attached Preliminary Setback Plans.

Figure 5 – Preliminary Site Plan

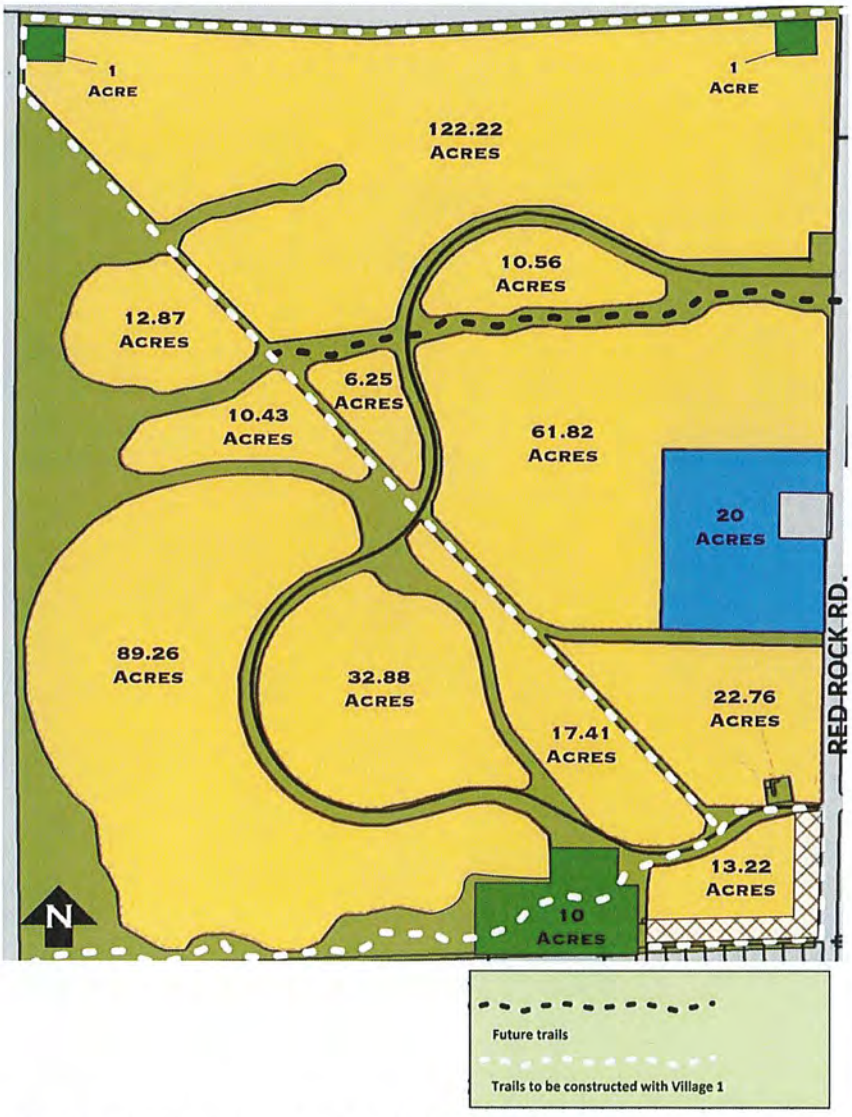


Note: Building pads depicted for illustrative purposes. Final plot plans to include staggered setbacks per Handbook standards and further detailed herein. Refer to attached Preliminary Setback Plans.

Figure 6 – Village 1 Trailhead

The Silver Hills Master Trails Plan included in the Handbook identifies a backbone trail network to be constructed with the initial phase of development. Thus, concurrent with Village 1 the trails depicted in white in Figure 7 (below) will be constructed as part of this tentative map request. This includes the northern and southern perimeter trails along with a "connector" trail that follows the existing power line that traverses the west side of the Specific Plan area. The northern trail will be included within common area to be dedicated with Village 1 with the remaining trails to be located within easements which may be relocated to common areas with future villages (provided they are consistent with the approved Trails Plan).

Silver Hills Village 1 – Trail Plan



Note: Trails to be constructed concurrently with first final map. Final location may vary but shall be consistent with that presented above.

Figure 7 – Village 1 Trail Plan

Silver Hills Parkway will provide the primary access in and out of the Village 1 neighborhood. Silver Hills Parkway is designed to the residential collector standard adopted with the Specific Plan and includes a 14-foot landscape median along with streetscape landscaping and a detached sidewalk. The Village 1 neighborhood is accessed via two north/south connections to Silver Hills Parkway. A secondary emergency access (to be gated) is located at the northeast corner of Village 1, ensuring proper emergency access during and after construction.

Per Handbook standards, an entry monument will be installed along Silver Hills Parkway with development with the initial phase of development. The Handbook provided several design options, including that depicted in Figure 8 (below). This entry monument will be constructed at the Silver Hills Parkway/Red Rock Road intersection and shall be located outside of the right-of-way and positioned as to not block sight distance for motorists.

Note: Final entry monument may include slight variations in materials, height, etc. but shall be substantially compliant with that depicted above.

Figure 8 – Entry Monument

Similar to the entry monument, the Handbook also provides options for neighborhood entry monumentation. Figure 9 (below) depicts the typical entry monument for Village 1. The tentative map plan includes additional common area at the entries to accommodate the entry features. Entry monuments will be located per Handbook standards and shall not conflict with motorist sight triangles. Final entry materials may vary slightly but shall substantially conform to that depicted below.

Figure 9 – Neighborhood Entry Monument

Wayfinding signs will be provided throughout the community to guide pedestrians and motorists to individual neighborhoods, community amenities, etc. Like other signage, concepts for wayfinding signs were included in the Handbook. Figure 10 (below) reflects the concept to be implemented with Village 1 and carried forth throughout the Specific Plan area. It should be noted that the signage concepts included with this tentative map will establish the overall theme for the community and will be carried forward with future villages.

Figure 10 – Wayfinding Signage

The tentative subdivision map is consistent with the "Mid-Range Single Family Neighborhood" (MRSF) standards defined in the Handbook. MRSF includes typical lot sizes ranging from 5,000 square feet to 15,000 square feet. As proposed, the Village 1 plan is consistent with these requirements and includes lots sizes ranging from 5,000 square feet minimum to over 8,000 square feet. As anticipated in the Handbook, neighborhoods within Silver Hills will be developed utilizing Washoe County's common open space subdivision provisions. This is true for Village 1. The MRSF standards require a minimum of 5% of the total project area be dedicated to common open space. Village 1 includes 7.15± acres of common area (11%) within the development area which primarily consists of linear open space and pocket park area. The 7.15± acres of common area within the developed portion of Village 1 are coupled with the 1.03± acre trail head and an additional 54.42± acres of dedicated open space/common area (as depicted in Figure 3). This results in a total 62.6± acres of common area/open space, a total project area of 120.48± acre, and an overall density of 2.97 dwelling units per acre. It should be noted that an excess of 1.15± acres of common area above that necessary to maintain 3 dwelling units per acre is provided and may be applied to future tentative maps within the Specific Plan.

The Handbook highly encourages the clustering of units to provide a mix of housing types and densities. As presented, the developed area of Village 1 includes an approximate density of 5.42 units per acre. However this is a clustered density that will be averaged with other villages within the project. The Master Developer is required to provide Washoe County with a "running total" of units to ensure that the maximum unit count of 1,872 units is not exceeded. The west side of Red Rock Road is allocated 1,654 units. With 358 units proposed, 1,296 available units remain available west of Red Rock Road with 1,514 remaining for the entire Specific Plan area.

The tentative map conforms to the Handbook in terms of roadway sections, including the first segment of Silver Hills Parkway and project entry standards. Internal local streets are designed to conform with Washoe County Development Code standards. Street lighting is dark skies compliant with overhead lights provided only at intersections to ensure pedestrian and vehicle safety while maintaining views of the night sky.

Fencing within Village 1 will include a mix of solid and open fencing per the Handbook design guidelines. Internal lots will include a 6-foot privacy fence. Homes backing to the internal north/south linear open space and pocket park will incorporate open rear yard fencing per the Handbook. Homes that abut the northern property line will not be permitted to have rear gates that access BLM land. No homes will take direct access from Silver Hills Parkway. However, for those with rear yards facing Silver Hills Parkway, a 6-foot solid fence will be installed with decorative pilasters installed at 150-foot intervals (on average). The exterior face of fences (along Silver Hills Parkway) will be maintained by the HOA to ensure long-term condition and aesthetics. Additional fencing details are provided later in this report.

Village 1 is anticipated to include up to four individual phases (final maps). Per the Handbook, no more than 150 units may be constructed on an annual basis until construction commences on the NDOT US Highway 395 North Valleys Project – Phase 1B. Therefore, the proposed phasing plan ensures conformance with the Handbook requirement.

The following table provides an overall development summary for Silver Hills Village 1.

Silver Hills Village 1 - Development Summary	
Project Component	**Proposed with Village 1**
Project Area	120.48± acres
Area to be Developed	65.96± acres
Total Units	358 single family homes
Remaining Permitted Units (west of Red Rock Rd.)	1,296
Remaining Permitted Units (cumulative Specific Plan)	1,514
Net Project Density (Village 1 – Development Area)	5.42 units per acre
Gross Project Density (Tentative Map Area)	2.97 units per acre
Smallest Lot Size	5,000± square feet
Largest Lot Size	8,072± square feet
Average Lot Size	5,326± square feet
Total Lot Area	43.77± acres
Public Right-of-Way Area	14.01± acres
Common Area	62.69± acres[1]

1 – Includes 7.15 acres within developed area.

As part of the Specific Plan approval process, a facilities plan is required concurrent with tentative map approval. Included within the appendices of this report are various engineering plans and reports that address this requirement. This includes a preliminary drainage study/hydrology report, preliminary sewer design report and wastewater generation analysis, and comprehensive traffic impact analysis. Emergency access to the site is facilitated via two connections to Silver Hills Parkway into the proposed neighborhood. Additionally, a secondary emergency-only access to Red Rock Road is provided at the northeast corner of the site. Roadways within Village 1, including Silver Hills Parkway and interior local streets, will be extended with future villages, providing internal connectivity and additional emergency access routes. As Truckee Meadows Water Authority (TMWA) service is extended into Silver Hills, water infrastructure will be extended to Silver Knolls Park (with adjoining village(s)) to address existing water service issues identified within the park during the Specific Plan review process. An acknowledgement of water service from TMWA will be forwarded to Washoe County prior to the approval of this tentative map request.

A traffic impact analysis has been prepared for Village 1 by Solaegui Engineers to evaluate the impacts to area roadways that will occur with the addition of Village 1. The project is anticipated to generate 3,408 average daily trips, with 267 am peak hour trips and 357 pm peak hour trip. The report identifies the need for improvements at the Red Rock Road/US 395 interchange to the south and includes potential mitigation measures that can be Implemented to maintain acceptable levels of service. A left turn lane will be added to northbound Red Rock Road at the Silver Hills Parkway intersection, providing a dedicated lane for vehicles entering the project from the south. The project will also be subject to Regional Road Impact Fees for each unit constructed within the project. Additionally, the North Valleys Area Plan requires that a level of service (LOS) "C" or better be maintained for roadways within the plan boundary, exceeding the LOS "D" standards adopted regionally.

As detailed in the attached drainage report, stormwater is retained at a rate of 1:1.5. As a result, stormwater flows from the Village 1 site will be reduced from pre-development conditions. This ensures that increased runoff to Swan and Silver Lakes will not occur. Additionally, common areas within all of Silver Hills will include infrastructure to accept effluent water for irrigation and will implement effluent reuse once available. This will occur through coordinated efforts between the Master Developer, Washoe County, and the City of Reno.

Specific Plan Compliance

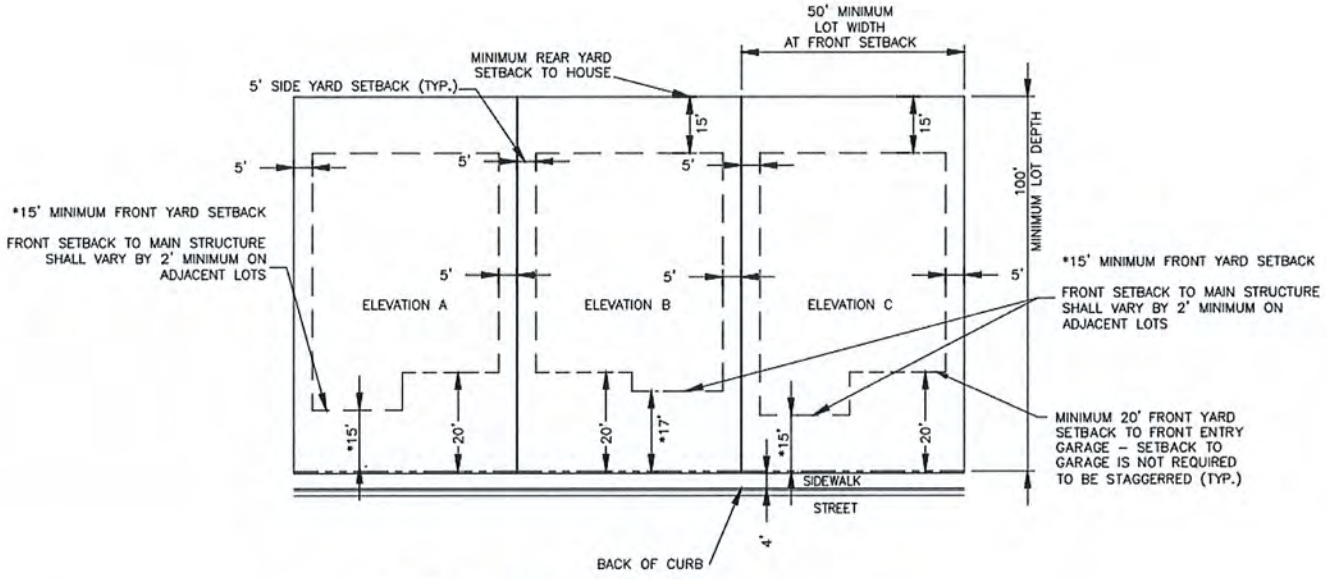
The adopted Handbook establishes standards and policies that guide and regulate new development within the Silver Hills Specific Plan. Village 1 will establish many of the underlying design concepts for the entire project such as the entry monuments previously presented. While all of the standards included in the Handbook do not pertain to Village 1, there are a handful of requirements that will be applied at the final map stage. The purpose of this section is to demonstrate how these standards will be implemented and provide Washoe County staff with a mechanism to condition this map, as they feel necessary, to ensure that the intent of the design standards is upheld.

- **Setback Variation**

The Village 1 tentative map depicts building envelopes for each proposed lot. Final setbacks for each individual home will be determined at the time of final map and plot plans. As defined in the Handbook section 3.2.1, there are a variety of ways this can be achieved. Typically, the individual home footprints will vary based on architectural design and floorplans. Architectural features such as porches, garage type (i.e. side load vs. front load) allow for varied home setbacks along the streetscape. The handbook mandates that identical elevations cannot be mirrored next to each other within the subdivision. This further reinforces varied setbacks.

As a measurable standard, a condition can be added to this tentative map that identical elevations/floorplans may not be located next to each other and that no two adjacent lots may include identical setbacks. Homes must have a 20-foot garage setback per Handbook standards (for front loaded garages). However, features such as porches, side-load garages, building projections, etc. may extend within 15 feet of the front property line. Therefore, a condition requiring that a minimum home footprint offset of at least 2 feet, excluding garages, shall occur between adjoining lots to be demonstrated with final plot plans.

Included with the tentative map are Preliminary setback plans that depict how setbacks can be varied at the time of construction. Additionally, setback specific notes and standards are called out on the tentative map plans and are included in Figure 11 (following page).



TYPICAL INTERIOR LOTS

VARIABLE SETBACK NOTES

BUILDING FOOTPRINTS DEPICTED IN THIS PLAN SET ARE FOR ILLUSTRATIVE PURPOSES AND SUBJECT TO CHANGE.

STAGGERING OF FRONT YARD SETBACKS SHALL OCCUR WITH FINAL BUILDING FOOTPRINTS. A MINIMUM 2-FOOT FRONT YARD SETBACK DEVIATION SHALL BE PROVIDED FROM ALL ADJOINING PARCELS (AS MEASURED TO BUILDING FAÇADE). FRONT-LOAD GARAGES SHALL INCLUDE A MINIMUM SETBACK OF 20-FEET AND ARE NOT SUBJECT TO THE 2-FOOT OFFSET. FINAL PLOT PLANS SHALL DEPICT ADJOINING PARCELS TO DEMONSTRATE COMPLIANCE WITH THIS STANDARD AND SHALL BE CERTIFIED BY THE MASTER DEVELOPER AND PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEVADA.

MASTER DEVELOPER SHALL CONFIRM COMPLIANCE WITH ALL APPLICABLE SPECIFIC PLAN STANDARDS AT THE TIME OF FINAL PLOT PLANS. UPON REQUEST BY WASHOE COUNTY, THE MASTER DEVELOPER SHALL PROVIDE SUPPLEMENTAL MATERIALS (AS APPROPRIATE) TO DEMONSTRATE COMPLIANCE WITH THE SILVER HILLS SPECIFIC PLAN DEVELOPMENT STANDARDS. THIS SHALL NOT RESULT IN DELAYS TO PROCESSING AND/OR CONSTRUCTION REVIEW.

LANDSCAPE AND GRADING PLANS DEPICT BUILDING PADS ONLY FOR ILLUSTRATIVE PURPOSES. FINAL LANDSCAPING PLANS AND PLOT PLANS ARE SUBJECT TO STAGGERING STANDARDS.

A MINIMUM OF THREE BUILDING ELEVATIONS FOR EACH FLOORPLAN WITHIN VILLAGE 1 WILL BE PROVIDED AT THE TIME OF FINAL MAP/PLOT PLANS. MASTER DEVELOPER SHALL DEMONSTRATE THAT IDENTICAL ELEVATIONS ARE NOT LOCATED ON ADJOINING LOTS WITH FINAL PLOT PLANS.

Figure 11 – Typical Setback Variation

- **Building Articulation**

Building articulation and standards are defined in Section 3.4.4 of the handbook. Front elevations or those facing streets shall avoid the use of flat planes and include articulation. This can be accomplished through the use of porches, dormers, bay windows, building offsets, recessed entries, etc. This will be demonstrated with final elevations.

The handbook does not mandate that elevations for individual homes be submitted concurrently with tentative maps and provides visual examples of home elevations that comply with the standards. The following tentative map condition is recommended:

"With plan review for any new dwelling unit within Silver Hills, building elevations shall be submitted to the Master Developer and Washoe County Department of Planning and Zoning for verification that elevations are consistent with the articulation standards defined in Section 3.4.4 of the Handbook Design Standards."

While final building elevations have not been developed for Village 1, Figure 12 (following page) provides sample elevations that fulfill Handbook requirements and can be used for comparative evaluation at the time of final map(s).

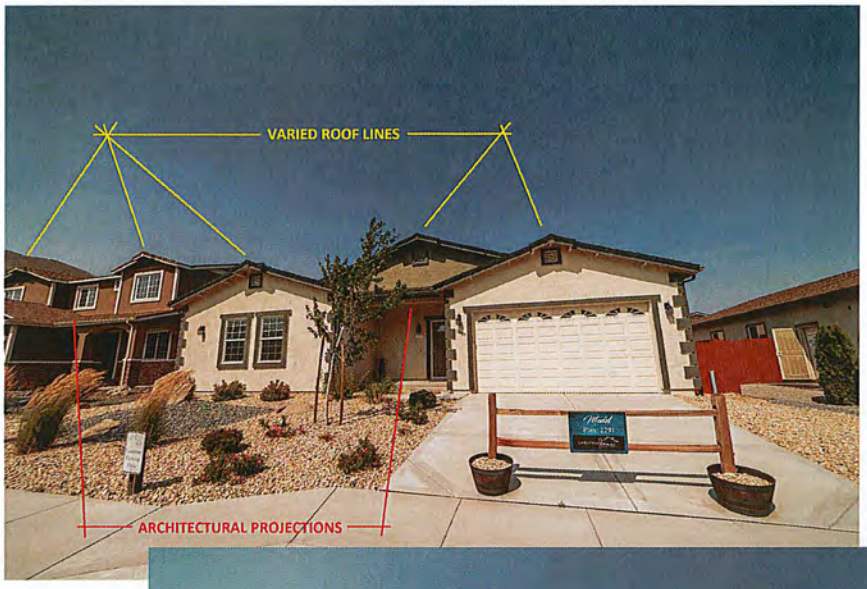


Figure 12 – Typical Building Elevations

- **Article 408 – Common Open Space Development**

The Handbook provides a comprehensive site analysis that determined allowed land uses and the location of areas to be developed within the Specific Plan boundary. The Village 1 tentative map fully complies with the allowed uses defined in the Mid-Range Single Family land use category and is consistent with the Silver Hills Land Use Plan.

Section 110.408.00 of the Washoe County Development Code states that the purpose of Common Open Space Development " *is to set forth regulations to permit variation of lot size, including density transfer subdivisions, in order to preserve or provide open space, protect natural and scenic resources, achieve a more efficient use of land, minimize road building, and encourage a sense of community.*" The Village 1 tentative map is consistent with the purpose of Common Open Space Development, as defined by Washoe County in that it provides for usable open space that can be accessed by the public (trails and community greens) as well as preservation of hillside areas/steeper terrain on the west side of the site. Open space provided with Village 1 also establishes a buffer between the project and undeveloped/public lands to the north.

Section 110.408.20 of the Development Code defines density and intensity within Common Open Space Developments as follows:

"Residential. The total number of dwelling units in the proposed common open space development shall not exceed the total number of dwelling units allowed by the underlying regulatory zones(s). The gross site area may include more than one (1) parcel."

Village 1 includes a net density of 5.42 units per acre within the developed portion of the tentative map boundary and is consistent with the density/intensity standards included in the Handbook. However, with the dedication of 54.52± acres of common area outside of the developed area, a gross density of 2.97 dwelling units per acre results, providing full compliance with Article 408 requirements. It should also be noted that excess open space (that which reduces gross density to less than 3 units per acre) may be applied to future tentative maps in determining overall gross density within the Specific Plan.

As noted in the Specific Plan, density is assigned through the tentative map process. Thus, all areas outside of the tentative map boundary are potentially common area until a tentative map is approved. Per the handbook standards (and included in the submitted application), the Master Developer is required to provide a running total of units to Washoe County to ensure that the maximum number of units permitted west of Red Rock Road (1,654) is not exceeded. This is provided in the previous table located on page 12 of this report.

- **Subsequent Review**

During the establishment of the Specific Plan and Handbook, Washoe County staff indicated the need for a County review committee to ensure that new subdivisions were compliant with the Handbook. The concern was that the Master Developer initially controls the Design Review Committee (DRC) and thus a "second set of eyes" was needed to reaffirm compliance. It was agreed that this would be reviewed administratively. As a result, the Washoe County Design Review Committee was added. Since the time of Handbook adoption, the Washoe County Design Review Committee has been dissolved. To ensure full compliance with Handbook standards, its recommended that a condition be added that the Department of Planning and Zoning shall review final building plans, plot plans, and elevations to determine substantial compliance with the Handbook and any conditions placed on this tentative map request. This is entirely consistent with the intent of the Handbook requirement and ensures that the DRC cannot grant project approvals without concurrence from Washoe County.

- **Parks and Trails**

As presented, a 1-acre trailhead and backbone trail network will be provided concurrent with the development of Village 1. The Washoe County Department of Regional Parks and Open Space has reviewed the trailhead location and does not have objection. It is recommended that the Bureau of Land Management (BLM) be consulted to ensure that the trailhead and planned trails do not conflict with any future BLM plans for a trail system, etc. This coordination can be included as a condition of approval on the tentative map.

The trailhead proposed fully complies with the Handbook requirements in terms of size and amenities. Regional Parks and Open Space staff has indicated the need for a kiosk and/or wayfinding signs at the trailhead facility. A wayfinding sign, similar to that depicted in Figure 10, can be added within the trailhead site. Provisions for restrooms are not a requirement for the trailhead as outlined in the Handbook and are not proposed to be included. Although the trailhead is open for public use, it will be included in dedicated common area that is owned and operated by the Silver Hills Homeowner's Association (HOA) and is not subject to Washoe County design requirements (i.e. restrooms).

A linear open space corridor and pocket park are included in the Village 1 design. As noted, this will provide residents with passive and active recreational opportunities. The park will be private (open to general public) and maintained by the HOA. The Handbook establishes no minimum or maximum size for private park facilities.

A Red Rock Road undercrossing is required as part of the Silver Hills master trail plan. However, only the trails identified in Figure 7 are required with the initial phase of development (Village 1). Thus, the undercrossing connection will occur with the initial phase of Silver Hills East and will be coordinated with a site specific plan. This is entirely consistent with the Handbook requirements and standards. With improvements and upgrades to Red Rock Road, the undercrossing may be added prior to development within Silver Hills East but is not mandated with this village.

Per Handbook requirements and standards, all trails will be constructed in conformance with Washoe County Greenbook standards.

- **Mailboxes**

As noted in Section 2.9 of the Handbook, the United States Postal Service will determine the final location of mailboxes and whether individual or group boxes will be required. As standard for all subdivisions, final plans will be routed to the USPS for final mailbox location.

- **Front Yard Landscaping**

The Handbook states that front yard landscaping will be installed by the builder or individual homeowner (with DRC approval). This will be determined with final map. However, typical front yard landscape concepts have been developed for Village 1 and are included on the updated landscape plan (attached) and depicted in Figure 13 (below). A xeriscape option is encouraged and subject to DRC approval per Handbook standards.

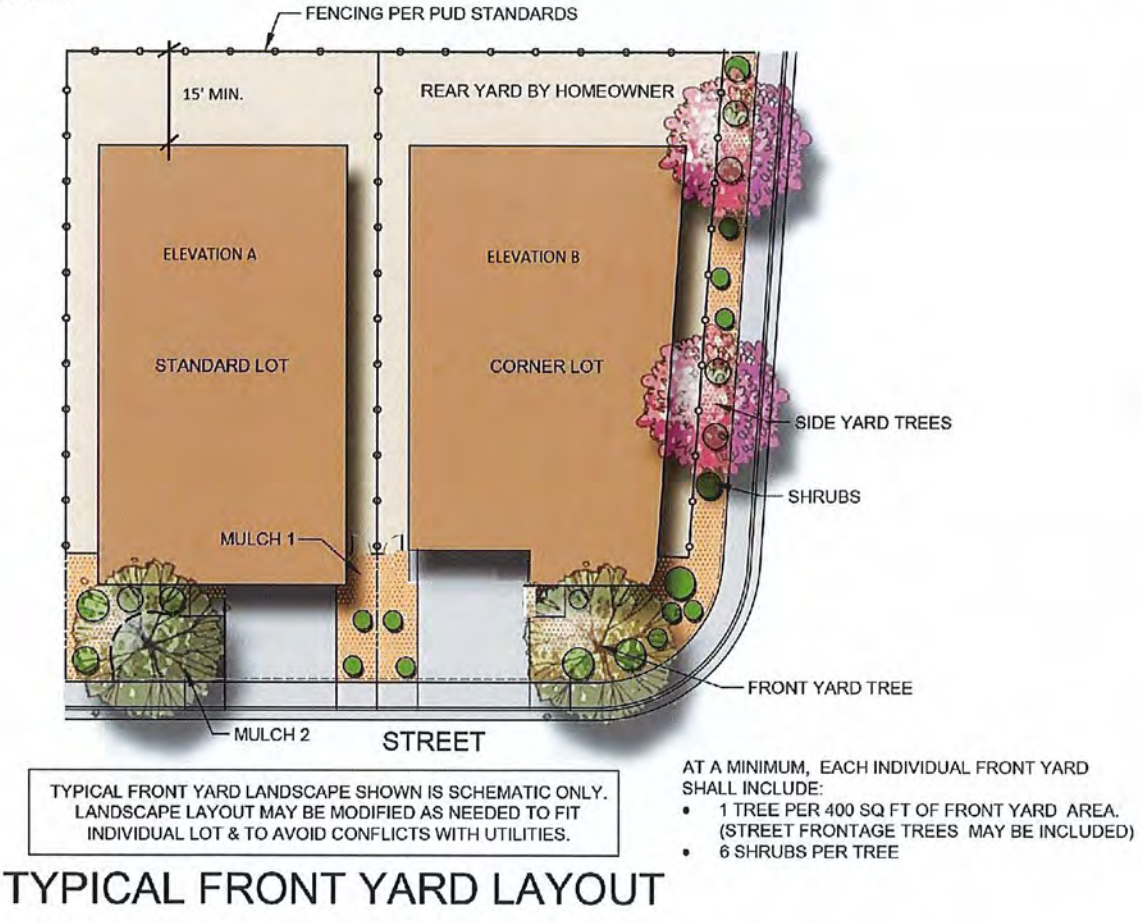
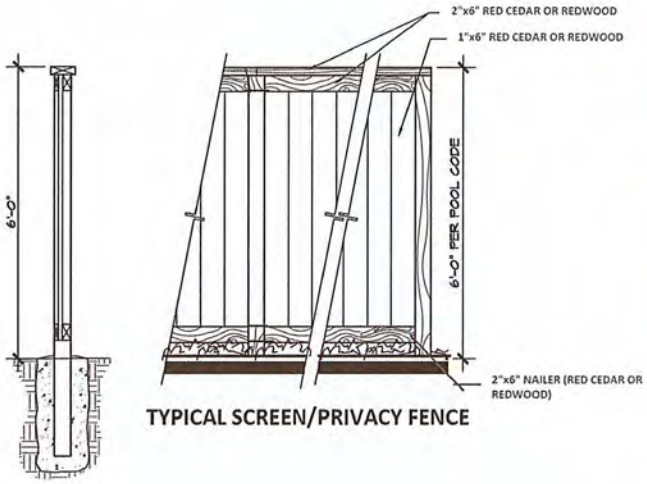


Figure 13 – Typical Front Yard Landscaping

- **Fencing**

The Handbook clearly defines allowed fencing types within the Specific Plan boundaries. As noted previously, a combination of solid and open fencing will be included within Village 1. Solid fencing will include 6-foot wood screen fence for internal lots and lots adjoining common area at the rear yards will include open fencing consistent with Handbook standards (to be selected by builder). Figure 14 (below) depicts the acceptable fencing types that may be used within Village 1. Final fencing type shall be applied consistently throughout Village 1. For example, if split-rail is chosen for open fencing, it shall be used uniformly throughout Village 1 and not combined with wrought-iron fencing or vise vera.



TYPICAL SCREEN/PRIVACY FENCE

Spacing between horizontal or vertical members must not exceed 4".

Fence height must be 48" or more.

Gap from bottom of the fence to the ground must not exceed 2"

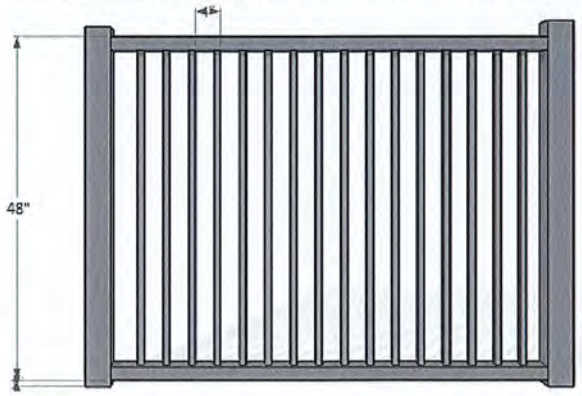


Figure 14 - Fencing

A 6-foot wood or vinyl fence with decorative pilasters (spaced at an average of 150-feet) shall be located at the rear yards of homes that back to Silver Hills Parkway. Final material and pilaster design shall be approved by the DRC and shall remain consistent throughout the Specific Plan area, per the adopted Handbook.

Fencing along Silver Hills Parkway shall be placed on the property line and shall be maintained by the HOA (exterior) and the adjoining property owner (interior). Figure 15 (below) is the adopted Silver Hills Parkway fencing standard for which Village 1 must comply (for lots backing to the collector right-of-way).

Figure 15 – Typical Silver Hills Parkway Fencing

North Valleys Area Plan

The Silver Hills Suburban Character Management Area (SCMA0 was adopted concurrently with the Silver Hills Specific Plan. The Village 1 design and density are fully compliant with Area Plan polices related to new development within Silver Hills. Specifically, the project complies with policies NV.7.3, NV.7.6, NV.7.8, NV.7.10, and NV.7.11. Policies NV.7.1, NV.7.2, NV.7.7, and NV.7.9 are not applicable to this request. Lastly, policies NV.7.4 and NV.7.5 will be implemented with the final map stages as construction of new homes commences.

In addition to the policies noted within the Silver Hills SCMA, the Village 1 plan also conforms with and/or implements several other policies contained within the North Valleys Area Plan, including the following:

NV.8.1 Washoe County's policy level of service (LOS) for local transportation facilities in the North Valleys planning area is LOS "C." All development proposals must demonstrate how the established level of service on local transportation facilities will be maintained.

NV.8.2 The Washoe County Regional Transportation Commission (RTC) sets levels of service on regional roads. Washoe County will advocate for the RTC to establish policy levels of service "C" for all regional roads in the North Valleys planning area.

NV.8.3 Washoe County will work with the RTC and neighboring jurisdictions to ensure that the mitigation of potential development impacts in neighboring jurisdictions is consistent with the intent of Policies NV.7.1 and NV.7.2.

NV.8.4 The necessary right-of-way and intersection requirements identified in the Regional Transportation Plan will be protected through dedication, setback or other method deemed adequate and appropriate by the Regional Transportation Commission and Washoe County.

NV.8.5 Washoe County will ensure that the details of all new road construction that implement the adopted Regional Transportation Plan will be subject to a comprehensive public review and comment process.

NV.11.2 New trails will be designed to accommodate equestrian, pedestrian and off-road bicycle traffic, unless technical or severe environmental or economic hardships warrant consideration of a more limited use.

NV.11.3 Trails that provide links to the facilities listed in Goal 10 should receive priority for funding, planning, and construction.

NV.11.4 Parking will be provided at all trailheads unless technical or safety issues prevent the construction of parking facilities or it is determined that the parking facility cannot be adequately screened or buffered from adjacent residential properties. Points of access other than trailheads may be depicted on the Recreational Opportunities Plan map but do not require parking facilities.

NV.11.5 As new residential and commercial properties develop in the North Valleys planning area, the Washoe County Department of Parks and Recreation will review development proposals for potential trail connections.

NV.11.6 Access to existing trails will be protected and improved whenever possible. During the process of development review, the Washoe County Departments of Community Development and Parks and Recreation will request dedication of property and/or easements when appropriate trail alignments have been identified that link significant nodes within the North Valleys planning area or connect existing trails or otherwise implement Goal 10.

NV.11.7 Development proposals and population trends will be evaluated on their impact to an established community standard of seven acres of Community Park per 1,000 residents. When warranted, the Washoe County Department of Parks and Recreation will request the dedication of an appropriate amount of community park acreage as property develops within the planning area.

NV.16.1 Development within the North Valleys will conform to Regional Water Plan Policy 3.1.c, "Flood Plain Storage Outside the Truckee River Watershed," as well as locally specific flood control requirements as adopted by Washoe County.

NV.17.1 New development shall comply with Regional Water Plan Policy 2.1.a: "Effluent Reuse – Efficient Use of Water Resources and Water Rights."

NV.17.2 Development proposals must be consistent with Regional Water Plan Policies 1.3.d, "Water Resources and Land Use," and 1.3.e, "Water Resource Commitments."

NV.20.1 Tentative subdivision maps will not be approved for any development until the water resource and infrastructure needs of that development have been evaluated by the Department of Water Resources and found consistent all applicable water and wastewater resources and facilities plan.

All of the policies listed above are either implemented through the design of the tentative map or will be as final maps are recorded and construction commences.

Tentative Map Findings

Section 110.608.20 of the Washoe County Development Code establishes legal findings that must be made by the Planning Commission or Board of County Commissioners in order to approve a Tentative Map request. These findings are listed below and are addressed in **bold face** type.

(a) Environmental and Health Laws. Environmental and health laws and regulations concerning water and air pollution, the disposal of solid waste, facilities to supply water, community or public sewage disposal and, where applicable, individual systems for sewage disposal;

Silver Hills will be served by municipal water through an extension of existing TMWA facilities. Solid waste disposal options are detailed in the attached engineering reports. This infrastructure will fully comply with all applicable Washoe County standards.

(b) Availability of Water. The availability of water which meets applicable health standards as well as requirements for water rights, quality or will-serve commitments;

The project will be served by the Truckee Meadows Water Authority and has completed a Discovery process through TMWA. Water rights will be dedicated to TMWA to serve the project, ensuring full compliance with this finding. An acknowledgement of water service from TMWA is being forwarded to Washoe County (under a separate cover).

(c) Utilities. The availability and accessibility of utilities;

The project will be served by all municipal utilities, infrastructure, and services as detailed within this report and on the attached engineering plans.

(d) Public Services. The availability and accessibility of public services such as schools, police and fire protection, transportation, recreation and parks;

Public services and infrastructure were heavily analyzed during the Silver Hills Specific Plan approval process. As a condition of that approval, all new development within Silver Hills will pay an additional impact fee for fire and police service. That will be fully implemented with Village 1 as construction commences.

As outlined in Chapter 4 of the Specific Plan Handbook, the site lies between the TMFPD Cold Springs and Stead stations. Current response times are consistent with TMFPD policy. There is an existing TMFPD volunteer station just south of Village 1 along Red Rock Road that is literally surrounded by the Specific Plan area. The Handbook requires that the Master Developer work with TMFPD at this tentative map stage to ensure appropriate response times exist and implement any additional mitigation measures that may be needed (i.e. fire sprinklers).

The Specific Plan calls for the potential to dedicate additional land (up to 5 acres) for the expansion of the Red Rock station to a manned station in the future. The Specific Plan further states that the expanded facility could be used to house a sheriff substation as well. Per the Handbook, the developer shall work with service providers as part of this tentative map review process to ensure all proper conditions and mitigation measures are implemented.

Similarly, the Specific Plan has provisions for dedication of a school site and parks. Consistent with the improvement "triggers" mandated in the Handbook, a 1-acre trailhead facility and backbone trail network will be dedicated and constructed concurrently with Village 1. Additionally, Village 1 provides a pocket park facility for residents that will be paid for by the developer and maintained by the HOA. Silver Knolls park is also within walking distance of Village 1.

Upgrades to transportation facilities triggered by the project are outlined in the attached traffic impact analysis. This includes mitigation measures that can be conditioned with the tentative map to ensure proper levels of service are maintained.

(e) Plan Consistency. General conformance with the Development Code and Master Plan;

As outlined in the previous section, the proposed tentative map fully complies with the Specific Plan standards, Silver Hills SCMA policies, and implements a number of other policies included in the North Valleys Area Plan.

(f) Impact on Existing Streets. The effect of the proposed subdivision on existing public streets and the need for new streets or highways to serve the subdivision;

A detailed traffic impact analysis is included with this application and identifies improvements needed to mitigate traffic impacts created by Village 1. These improvements can be conditioned with the Tentative Map and must be completed prior to the issuance of certificates of occupancy for new homes. This will ensure full compliance with this finding.

(g) Physical Characteristics. Physical characteristics of the land such as flood plain, slope and soil;

The site is well suited for the type and intensity of development proposed. The site area proposed to be developed contains no slope or soil conditions that would preclude development, nor does it contain any significant wildlife habitats, etc. Areas of slope located at the western edge of the tentative map area will be included in dedicated common open space.

(h) Agency Review. The recommendations and comments of the entities reviewing the tentative map; and

Copies of this report and the included plans will be circulated to all applicable reviewing agencies for review and comment. Specific requirements and relevant comments can be included as conditions tied to this request and implemented with final map(s).

(i) Impact on Existing Drainage System. The effect of the proposed subdivision on the existing natural and man-made drainage system.

The project will provide for onsite retention/detention at a rate of 1 to 1.5, far exceeding Washoe County standards. This will result in a reduction in site runoff from that of pre-development conditions. This ensures no additional impacts to Swan or Silver Lakes will occur as a result of development within Silver Hills.

APPENDICES

Washoe County Development Application

Your entire application is a public record. If you have a concern about releasing personal information, please contact Planning and Building staff at 775.328.6100.

Project Information	**Staff Assigned Case No.:**

Project Name: **Silver Hills - Phase 1**

Project Description: A tentative subdivision map to allow for the development of 358 single family units within the Silver Hills Specific Plan

Project Address: West side of Red Rock Road, north of Silver Knolls (see attached map)

Project Area (acres or square feet): 64.93 acres

Project Location (with point of reference to major cross streets **AND** area locator):

The site is located on the west side of Red Rock Road, north of the TMFPD station and Silver Knolls. Refer to attached map.

Assessor's Parcel No.(s):	Parcel Acreage:	Assessor's Parcel No.(s):	Parcel Acreage:
087-390-10	308.6		

Indicate any previous Washoe County approvals associated with this application:
Case No.(s). Silver Hills Specific Plan 2019

Applicant Information (attach additional sheets if necessary)

Property Owner:		**Professional Consultant:**	
Name: Lifestyle Homes TND, LLC		Name: Christy Corporation, Ltd.	
Address: 4790 Caughlin Pkwy., Suite 519		Address: 1000 Kiley Pkwy.	
Reno, NV	Zip: 89519	Sparks, NV	Zip: 89436
Phone: 775-813-0046	Fax:	Phone: 775-502-8552	Fax:
Email: lshreno@gmail.com		Email: mike@christynv.com	
Cell: 775-813-0046	Other:	Cell: 775-250-3455	Other:
Contact Person: Peter Lissner		Contact Person: Mike Railey	
Applicant/Developer:		**Other Persons to be Contacted:**	
Name: Same as Above		Name: Lewis Roca Rothgerber Christie	
Address:		Address: 1 E. Liberty St., Suite 300	
	Zip:	Reno, NV	Zip: 89501
Phone:	Fax:	Phone: 775-321-3420	Fax:
Email:		Email: ggordon@lrrc.com	
Cell:	Other:	Cell: 775-762-6765	Other:
Contact Person:		Contact Person: Garrett Gordon	

For Office Use Only

Date Received:	Initial:	Planning Area:
County Commission District:		Master Plan Designation(s):
CAB(s):		Regulatory Zoning(s):

Property Owner Affidavit

Applicant Name: Lifestyle Homes TND, LLC

The receipt of this application at the time of submittal does not guarantee the application complies with all requirements of the Washoe County Development Code, the Washoe County Master Plan or the applicable area plan, the applicable regulatory zoning, or that the application is deemed complete and will be processed.

STATE OF NEVADA)
)
COUNTY OF WASHOE)

I, Robert Lissner,
(please print name)

being duly sworn, depose and say that I am the owner* of the property or properties involved in this application as listed below and that the foregoing statements and answers herein contained and the information herewith submitted are in all respects complete, true, and correct to the best of my knowledge and belief. I understand that no assurance or guarantee can be given by members of Planning and Building.

(A separate Affidavit must be provided by each property owner named in the title report.)

Assessor Parcel Number(s): 087-390-10

Printed Name Robert Lissner

Signed RJ Lissner

Address 4790 Caughlin Pkwy
Reno 89519

Subscribed and sworn to before me this 1st day of February, 2021.

Notary Public in and for said county and state

My commission expires: 10/16/21

(Notary Stamp)

MICHELE DAVIS
Notary Public - State of Nevada
Appointment Recorded in Washoe County
No: 97-4108-2 - Expires October 16, 2021

*Owner refers to the following: (Please mark appropriate box.)

- ☐ Owner
- ☑ Corporate Officer/Partner (Provide copy of record document indicating authority to sign.)
- ☐ Power of Attorney (Provide copy of Power of Attorney.)
- ☐ Owner Agent (Provide notarized letter from property owner giving legal authority to agent.)
- ☐ Property Agent (Provide copy of record document indicating authority to sign.)
- ☐ Letter from Government Agency with Stewardship

Community Services Department

Planning and Building

TENTATIVE SUBDIVISION MAP APPLICATION

Community Services Department
Planning and Building
1001 E. Ninth St., Bldg. A
Reno, NV 89512-2845

Telephone: 775.328.6100

Tentative Subdivision Map Application
Supplemental Information

(All required information may be separately attached)

1. What is the location (address or distance and direction from nearest intersection)?

The project site is located on thwe west side of Red Rock Road, approximately 2,500 feet north of the TMFPD station.

2. What is the subdivision name (proposed name must not duplicate the name of any existing subdivision)?

Silver Hills - Phase 1

3. Density and lot design:

a. Acreage of project site	64.93 acres
b. Total number of lots	358
c. Dwelling units per acre	5.5 (cumulative for this phase only)
d. Minimum and maximum area of proposed lots	5,000 sq.ft. min./8,072 sq.ft. max.
e. Minimum width of proposed lots	50 feet
f. Average lot size	5,326 sq.ft.

4. What utility company or organization will provide services to the development:

a. Sewer Service	Connection to Stead Treatment Plant
b. Electrical Service	NV Energy
c. Telephone Service	AT&T or Charter Communications
d. LPG or Natural Gas Service	NV Energy
e. Solid Waste Disposal Service	Waste Management
f. Cable Television Service	AT&T or Charter Communications
g. Water Service	Truckee Meadows Water Authority

5. For common open space subdivisions (Article 408), please answer the following:

   a. Acreage of common open space:

7.15 acres

   b. What development constraints are within the development and how many acres are designated slope, wetlands, faults, springs, and/or ridgelines:

Not applicable.

   c. Range of lot sizes (include minimum and maximum lot size):

5,000 sq. ft. to 8,072 sq.ft.

d. Proposed yard setbacks if different from standard:

15' front (20' to garage), 5' side, 15' rear

e. Justification for setback reduction or increase, if requested:

Permitted per Silver Hills Specific Plan

f. Identify all proposed non-residential uses:

1-acre community trail head and interior open space/pocketpark

g. Improvements proposed for the common open space:

Pedestrian and equestrian trails, pocket park, enhanced lineal park/open space.

h. Describe or show on the tentative map any public or private trail systems within common open space of the development:

Refer to attached plans for depiction of trails - pedestrian and equestrian.

i. Describe the connectivity of the proposed trail system with existing trails or open space adjacent to or near the property:

The proposed trails will connect with the overall Silver Hills master trail plan.

j. If there are ridgelines on the property, how are they protected from development?

Not applicable.

k. Will fencing be allowed on lot lines or restricted? If so, how?

Yes, per Specific Plan standards. Refer to attached report.

l. Identify the party responsible for maintenance of the common open space:

The Silver Hills Homeowners Association

6. Is the project adjacent to public lands or impacted by "Presumed Public Roads" as shown on the adopted April 27, 1999 Presumed Public Roads (see Washoe County Engineering website at http://www.washoecounty.us/pubworks/engineering.htm). If so, how is access to those features provided?

A new trail head will is provided, providing access to public lands to the north.

7. Is the parcel within the Truckee Meadows Service Area?

■ Yes	❑ No

8. Is the parcel within the Cooperative Planning Area as defined by the Regional Plan?

☐ Yes	■ No	If yes, within what city?

9. Has an archeological survey been reviewed and approved by SHPO on the property? If yes, what were the findings?

Not applicable.

10. Indicate the type and quantity of water rights the application has or proposes to have available:

a. Permit #		acre-feet per year	
b. Certificate #		acre-feet per year	
c. Surface Claim #		acre-feet per year	
d. Other #		acre-feet per year	

a. Title of those rights (as filed with the State Engineer in the Division of Water Resources of the Department of Conservation and Natural Resources):

The project will be served by TMWA with water rights dedicated to serve the project.

11. Describe the aspects of the tentative subdivision that contribute to energy conservation:

The project incorporates clustering to reduce overall carbon footprint and homes will utilize energy efficient building materials.

12. Is the subject property in an area identified by Planning and Building as potentially containing rare or endangered plants and/or animals, critical breeding habitat, migration routes or winter range? If so, please list the species and describe what mitigation measures will be taken to prevent adverse impacts to the species:

Not applicable.

13. If private roads are proposed, will the community be gated? If so, is a public trail system easement provided through the subdivision?

Not applicable.

14. Are there any applicable policies of the adopted area plan in which the project is located that require compliance? If so, which policies and how does the project comply?

Refer to attached report for detailed analysis.

15. Are there any applicable area plan modifiers in the Development Code in which the project is located that require compliance? If so, which modifiers and how does the project comply?

The project complies with provisions of the Silver Hills Specific Plan.

16. Will the project be completed in one phase or is phasing planned? If so, please provide that phasing plan:

Up to 4 final maps are anticipated.

17. Is the project subject to Article 424, Hillside Development? If yes, please address all requirements of the Hillside Ordinance in a separate set of attachments and maps.

☐ Yes	■ No	If yes, include a separate set of attachments and maps.

18. Is the project subject to Article 418, Significant Hydrologic Resources? If yes, please address Special Review Considerations within Section 110.418.30 in a separate attachment.

☐ Yes	■ No	If yes, include separate attachments.

Grading

Please complete the following additional questions if the project anticipates grading that involves: (1) Disturbed area exceeding twenty-five thousand (25,000) square feet not covered by streets, buildings and landscaping; (2) More than one thousand (1,000) cubic yards of earth to be imported and placed as fill in a special flood hazard area; (3) More than five thousand (5,000) cubic yards of earth to be imported and placed as fill; (4) More than one thousand (1,000) cubic yards to be excavated, whether or not the earth will be exported from the property; or (5) If a permanent earthen structure will be established over four and one-half (4.5) feet high:

19. How many cubic yards of material are you proposing to excavate on site?

Refer to attached engineering plans and reports.

20. How many cubic yards of material are you exporting or importing? If exporting of material is anticipated, where will the material be sent? If the disposal site is within unincorporated Washoe County, what measures will be taken for erosion control and revegetation at the site? If none, how are you balancing the work on-site?

Site grading will balance onsite. Refer to attached plans.

21. Can the disturbed area be seen from off-site? If yes, from which directions, and which properties or roadways? What measures will be taken to mitigate their impacts?

No.

22. What is the slope (Horizontal/Vertical) of the cut and fill areas proposed to be? What methods will be used to prevent erosion until the revegetation is established?

Temporary irrigation will be used as needed to ensure revegetation is established.

23. Are you planning any berms and, if so, how tall is the berm at its highest? How will it be stabilized and/or revegetated?

Not applicable.

24. Are retaining walls going to be required? If so, how high will the walls be, will there be multiple walls with intervening terracing, and what is the wall construction (i.e. rockery, concrete, timber, manufactured block)? How will the visual impacts be mitigated?

Refer to attached engineering plans.

25. Will the grading proposed require removal of any trees? If so, what species, how many, and of what size?

Not applicable.

26. What type of revegetation seed mix are you planning to use and how many pounds per acre do you intend to broadcast? Will you use mulch and, if so, what type?

Refer to attached landscape plan. Reveg will include seed mix per Washoe Storey Conservation District standards.

27. How are you providing temporary irrigation to the disturbed area?

Temporary irrigation will be provided as needed.

28. Have you reviewed the revegetation plan with the Washoe Storey Conservation District? If yes, have you incorporated their suggestions?

The project will incorporate WSCD seed mix recommendations for reveg.

Tahoe Basin

Please complete the following questions if the project is within the Tahoe Basin:

29. Who is the Tahoe Regional Planning Agency (TRPA) project planner and what is his/her TRPA extension?

30. Is the project within a Community Plan (CP) area?

❑ Yes	❑ No	If yes, which CP?

31. State how you are addressing the goals and policies of the Community Plan for each of the following sections:

    a. Land Use:

    b. Transportation:

    c. Conservation:

    d. Recreation:

    e. Public Services:

32. Identify where the development rights for the proposed project will come from:

33. Will this project remove or replace existing housing?

❑ Yes	❑ No	If yes, how many units?

34. How many residential allocations will the developer request from Washoe County?

35. Describe how the landscape plans conform to the Incline Village General Improvement District landscaping requirements:

Request to Reserve New Street Name(s)

The Applicant is responsible for all sign costs.

Applicant Information

Name: Lifestyle Homes TND, LLC

Address: 4790 Caughlin Pkwy., Suite 519

The project site is located on thwe west side of Red Rock Road, approximately 2,500 feet north of the TMFPD station.

Phone : 775-502-8552 Fax: _____

℅ Private Citizen ℅ Agency/Organization

Street Name Requests

(No more than 14 letters or 15 if there is an "i" in the name. Attach extra sheet if necessary.)

Silver Hills Parkway	
Additional names to be requested at Final Map stage.	

If final recordation has not occurred within one (1) year, it is necessary to submit a written request for extension to the coordinator prior to the expiration date of the original

Location

Project Name: Silver Hills - Phase 1 - 100% Washoe County

℅ Reno ℅ Sparks ℅ Washoe County

Parcel Numbers: 087-390-10

℅ Subdivision ℅ Parcelization ℅ Private Street

Please attach maps, petitions and supplementary information.

Approved: _____ Date: _____

Regional Street Naming Coordinator

℅ Except where noted

Denied: _____ Date: _____

Regional Street Naming Coordinator

Washoe County Geographic Information Services
1001 E. Ninth Street
Reno, NV 89512-2845
Phone: (775) 328-2325 - Fax: (775) 328-6133

Washoe County Treasurer
P.O. Box 30039, Reno, NV 89520-3039
ph: (775) 328-2510 fax: (775) 328-2500
Email: tax@washoecounty.us

Washoe County Treasurer
Tammi Davis

Account Detail

Back to Account Detail | Change of Address | Print this Page

CollectionCart

	Items	Total	
Collection Cart	0	$0.00	Checkout View

Pay Online

No payment due for this account.

Washoe County Parcel Information

Parcel ID	Status	Last Update
08739010	Active	2/8/2021 1:41:06 AM

Current Owner:
LIFESTYLE HOMES TND LLC

4790 CAUGHLIN PKWY 519
RENO, NV 89519

SITUS:
11305 RED ROCK RD
WASHOE COUNTY NV

Taxing District
4000

Geo CD:

Tax Bill (Click on desired tax year for due dates and further details)

Tax Year	Net Tax	Total Paid	Penalty/Fees	Interest	Balance Due
2020	$2,695.89	$2,695.89	$0.00	$0.00	$0.00
2019	$2,567.39	$2,567.39	$0.00	$0.00	$0.00
2018	$2,449.80	$2,449.80	$0.00	$0.00	$0.00
2017	$2,449.80	$2,449.80	$0.00	$0.00	$0.00
2016	$2,449.81	$2,449.81	$0.00	$0.00	$0.00
				Total	$0.00

Disclaimer

- ALERTS: If your real property taxes are delinquent, the search results displayed may not reflect the correct amount owing. Please contact our office for the current amount due.
- For your convenience, online payment is available on this site. E-check payments are accepted without a fee. However, a service fee does apply for online credit card payments. See Payment Information for details.

Pay By Check

Please make checks payable to:
WASHOE COUNTY TREASURER

Mailing Address:
P.O. Box 30039
Reno, NV 89520-3039

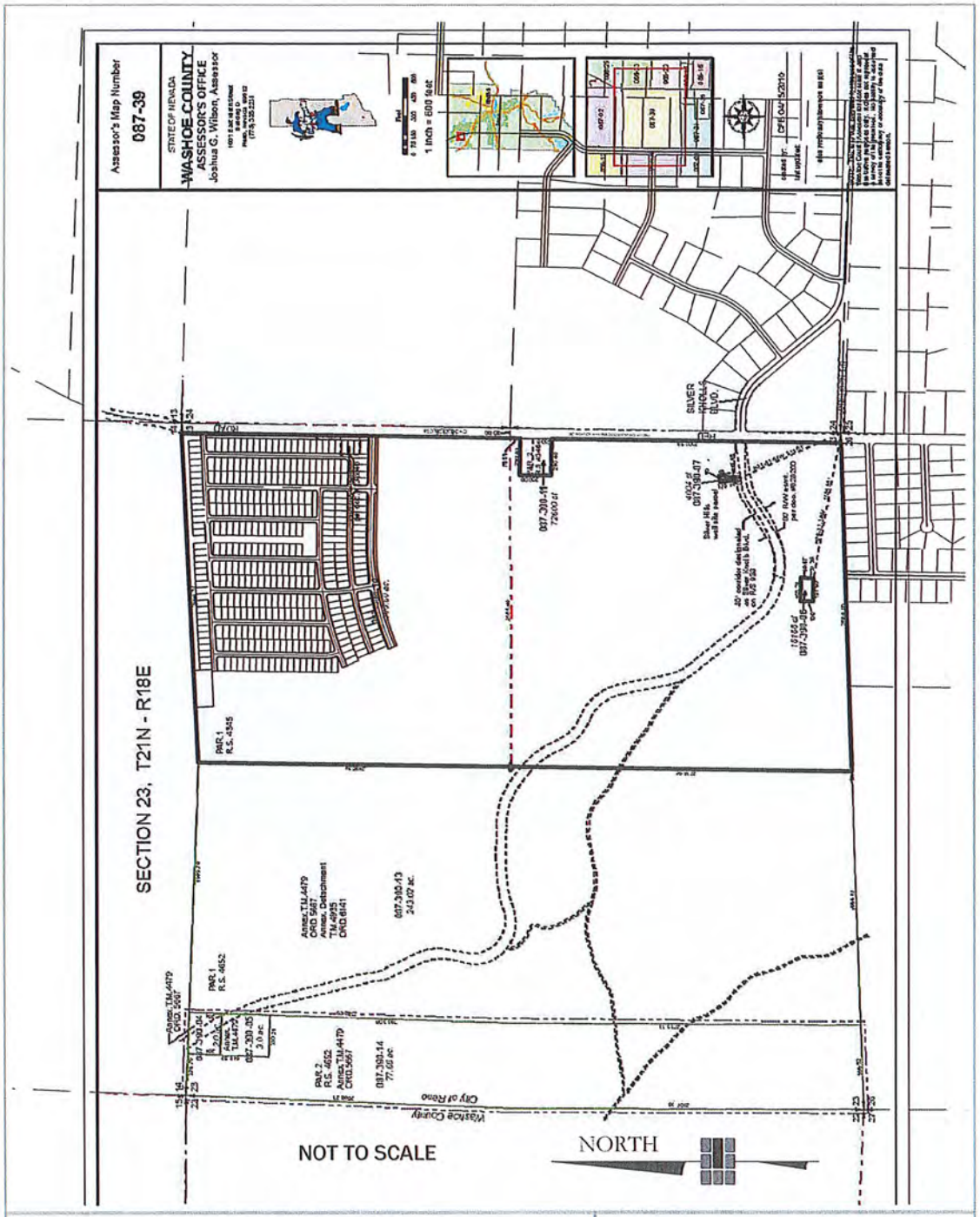
Overnight Address:
1001 E. Ninth St., Ste D140
Reno, NV 89512-2845

Payment Information

Special Assessment District

Installment Date Information

Assessment Information



SILVER HILLS WEST - PHASE 1
ASSESSOR'S SITE MAP
EAST 1/2 OF SECTION 23
TOWNSHIP 21 NORTH, RANGE 18 EAST
MOUNT DIABLO BASE AND MERIDIAN
COUNTY OF WASHOE STATE OF NEVADA

CHRISTY CORPORATION
1000 Kiley Pkwy | Sparks Nevada 89436
P 775.502.8552 W christynv.com

SHAW ENGINEERING
Trusted Engineering Expertise

October 22, 2020

Bob Lissner
Lifestyle Homes
4790 Caughlin Parkway PMB 519
Reno, NV 89519

Re: **Preliminary Sewer Interceptor Design Summary**
Evans Ranch, Silver Star, and Silver Hills

Dear Mr. Lissner,

At your request Shaw Engineering is pleased to submit this preliminary design summary of the sewer main extension to serve Evans Ranch, Silver Star, and Silver Hills developments.

Design Considerations
After review the existing conditions of the proposed alignment, a preliminary design was developed for a sewer interceptor to serve 9,000 single family units, not exceeding a depth to diameter ratio (d/D) of 0.5 at peak hour flow per City of Reno Design Standards.

The projected average daily flow from Evans Ranch, Silver Star, and Silver Hills was estimated to be 2.25 MGD (1,562.5 GPM). Utilizing a peak factor of 3.0, the calculated peak hour flow is estimated to be 6.75 MGD (4,687.5 GPM) which was utilized for the design of the interceptor

Critical Design Criteria
The proposed alignment contains diverse topography with a range of ground slopes from 0.3% to 16.1%. Taking into consideration the range of slopes, it was determined the pipe sizes listed in the table below are required to satisfy City of Reno design standards while being financially conscious. All pipes meet city requirements for 2.0 feet per second flushing velocity while flowing half full. The alignment shown in Attachment 1 shows a route at the north end, following Adobe Drive rather than extending North to the southern border of BLM Section 12. The alignment along Adobe Drive was required due to the topography of Red Rock Road at the southern boundary of section 12.

Table 1: Sewer Interceptor Sizes and Lengths

Size	Slope (%)	Section Start	Section End	Approx. Length
24-Inch	0.53-8.39	Silver Star Ranch	Silver Hills	8,900
27-Inch	0.13-5.9	Silver Hills	Silver Knolls Blvd	9,400
30-Inch	0.09-4.89	Silver Knolls Blvd	Bodie Drive	1,750
36-Inch	0.23-2.43	Bodie Drive	Echo Ave	3,300

Preliminary Cost Estimate
The estimate for the construction of the sewer interceptor to serve Evans Ranch, Silver Star and Silver Hills is approximately $7 million based on current construction costs. A breakdown of the estimated cost is included in Attachment 2.

Concluding Statements

This design summary is to be used as a planning document only. Further surveying and engineering design will be required to further identify potential construction conflicts/constraints and confirm property ownership and right of way. This report was conducted under the assumption the Reno-Stead Water Reclamation Facility and downstream sewer infrastructure has sufficient capacity to convey and treat the flows from Evans Ranch, Silver Star, and Silver Hills.

If you have any questions regarding the aforementioned design please feel free to contact me at cody@shawengineering.com or at (775) 329-5559.

SHAW ENGINEERING

Cody R. Black, P.E.
Principal Engineer

Attachments:

1. Sewer Interceptor Alignment Figure
2. Preliminary Cost Estimate

Silver Star Ranch

Silver Star Ranch Connection Point

Adobe Drive

Red Rock Road

Blackhawk Drive

RTAA

Silver Hills

Silver Knolls Boulevard

Osage Road

Bodie Drive

Echo Avenue Connection Point

Silver Lake

Legend

Manhole

48-Inch

60-Inch

Conduit

24-Inch

27-Inch

30-Inch

36-Inch

Parcels

Washoe County Parcels

Lifestyle Homes et al

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

0 700 1,400 Feet

Evans Ranch, Silver Star, and Silver Knolls Sewer Interceptor

SHAW ENGINEERING
Trusted Engineering Expertise

Prepared By SHAW ENGINEERING

Lifestyle Homes TND
Osage Road to Red Rock Sewer Interceptor Cost Estimate
22-Oct-20

Description	Qty	Unit	Unit Cost	Cost
48" Precast Manholes	38	EA	$ 12,000.00	$ 456,000.00
60" Precast Manholes	8	EA	$ 15,000.00	$ 120,000.00
24" PVC SDR 35 Sewer Main	8900	LF	$ 150.00	$ 1,335,000.00
27" PVC SDR 35 Sewer Main	9400	LF	$ 160.00	$ 1,504,000.00
30" PVC SDR 35 Sewer Main	1750	LF	$ 180.00	$ 315,000.00
36" PVC SDR 35 Sewer Main	3300	LF	$ 200.00	$ 660,000.00
Grind and Overlay	182,340	SF	$ 4.00	$ 729,360.00
Roadway Patch	91170	SF	$ 6.00	$ 547,020.00
			Subtotal	$ 5,666,380.00
Mobilization/Demobilization	10%	LS	-	$ 566,638.00
Contingency	15%	LS	-	$ 849,957.00
			Preliminary Estimate of Probable Costs	$ 7,082,975.00

TRUCKEE MEADOWS WATER AUTHORITY
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1355 Capital Blvd. • P.O. Box 30013 • Reno, NV 89520-3013
P 775.834.8080 • F 775.834.8003

TO: Pam Parenti **DATE:** December 22, 2015

THRU: Scott Estes SJE

FROM: Brooke Long BL

RE: Lifestyle Homes @ Red Rock_DISC, TMWA WO# 15-4490

SUMMARY:

The proposed project includes a 680 residential unit development off of Red Rock Road in Stead, Nevada. TMWA can provide water service to this project, however, the project lies outside TMWA's service territory and will require annexation prior to a water service agreement. As part of this discovery, the off-site facility improvements have been identified. The planning level cost opinion of the major off-site improvements for the project is $9,351,325.

Review of conceptual site plans or tentative maps by TMWA and/or agents of TMWA shall not constitute an application for service, nor implies a commitment by TMWA for planning, design or construction of the water facilities necessary for service. The extent of required off-site and on-site water infrastructure improvements will be determined by TMWA upon receiving a specific development proposal or complete application for service and upon review and approval of a water facilities plan by the local Health Authority. Because the NAC 445A Water System regulations are subject to interpretation, TMWA and/or agents of TMWA cannot guarantee that a subsequent water facility plan will be approved by the Health Authority or that a timely review and approval of the Project will be made. The Applicant should carefully consider the financial risk associated with committing resources to their Project prior to receiving all required approvals. After submittal of a complete Application for Service, the required facilities, the cost of these facilities, which could be significant, and associated fees will be estimated and will be included as part of the Water Service Agreement necessary for the Project. All fees must be paid to TMWA prior to water being delivered to the Project.

PURPOSE:

The purpose of this Discovery is to identify a planning level water service plan and an opinion of cost for the proposed off-site facilities required to serve the single family residential project in Stead, Nevada.

LOCATION:

The project is located off of Red Rock Road in Stead, Nevada (see Figure 1). The project can be supplied from the Stead water system. The project is located outside the Truckee Meadows Water Authority's (TMWA) retail service territory and will require annexation by TMWA prior to a water service agreement. The Project will be subject to TMWA's Area 10 charges.

Table 1. Project Parcel APN and Acreage:

APN	ACRES
087-390-14	77.66
087-390-13	243.02
086-203-05	38.67
087-390-10	308.6
086-232-31	190.03
Total Acreage	**857.98**

ASSUMPTIONS:

1. The applicant shall be responsible for all application, review, inspection, storage, treatment, permits, easements, and other fees pertinent to the Project as adopted by the TMWA at the time of execution of a water service agreement.
2. The cost opinions contained herein do not include new business fees, cost of water rights and related fees, or contribution to the water meter retrofit fund.
3. The Project includes construction of 680 single family residential units.
4. Demand calculations, and fees based on demands, are estimates; actual fees will be determined at the time of application for service.
5. The assumed fire flow requirement for this project is 1,500 gpm for two hours.
6. Project pressure criteria are:
    a. Maximum day pressure of at least 45 pounds per square inch (psi) at the ground surface elevation at the service connection with tank level at top of fire storage,
    b. Peak hour pressure of at least 40 psi at building pad elevation with tank level at top of emergency storage,
    c. Maximum day plus fire flow pressure of at least 20 psi at center of street elevation with tank level at bottom of fire storage, and
    d. TMWA does not calculate pressures for multi-story buildings. Confirmation that pressure will be adequate for upper stories is the responsibility of the Applicant.
7. A site grading plan with elevations was provided by the applicant. The project parcel elevations range from 5062 ft to 5330 ft.
8. Facility requirements for the Project are based on the site grading plan elevations, maximum day demand, and fire flow requirements. Changes in these may affect facility requirements.
9. Easements, permits and all pertinent Agency approvals are obtained for the design and construction of the water infrastructure necessary to serve the proposed Project.
10. All cost opinions are preliminary and subject to change. The costs presented in this study are planning level estimates based on the information available. Actual costs will be determined at the time of application for service. Cost opinions do not include on-site improvements made by the applicant.
11. This discovery is based on the current status of TMWA's system. Future development may alter the conclusions of this discovery. Capacity in TMWA's system is available on a first-come, first-served basis, and commitment to provide service is not established until a contract for service is executed and all fees are paid.

DISCUSSION:

Proposed Development

The proposed development consists of 680 single family residential units off of Red Rock Rd in Stead Nevada. ACAD drawings were received from Summit Engineering with street and lot layouts and a grading plan. This information was incorporated into TMWA's hydraulic model and was used to identify a Project water service plan in conformance to TMWA design criteria.

Project Improvements

Water service to the project site can be achieved with a connection to TMWA's 12" water main adjacent to the Army Aviation Well.

The major project improvements to serve the project are listed below in Table 1 and shown in Figure 1.

Description	Size	Comment
Tie-in to existing 12" TMWA main	1	• Tie-in location near TMWA's Army Aviation Well
Booster Pump Station	1	• Off-site Improvement • Design point of 300' TDH at 1,200 gpm • A project pump station will be required. The pump station site includes a dedicated lot within the planned subdivision. • Pump station discharge pressure of 275 psi
Main from TMWA connection to the project site.	3,500 LF	• 3,500 LF of 12" diameter main • Subject to TMWA acquiring easements along entire length.
Parallel tank feeder main	11,500 LF	• 12 inch diameter
Water Storage Tank	1	• 1.1 MGD • Pad elevation = 5430 ft
Pressure Regulating Stations (PRS)	4	• 2 PRS for both Zone 1 and Zone 2

To serve the full project area, three pressure zones will be required to maintain service pressures within a range of 100 PSI to 45 PSI. The pressure zone boundaries were developed to maximize looping, to the extent possible. Adequate looping and dead end mains will be an issue with the proposed subdivision layout. The street layout should be redeveloped to conform

to the pump zone boundaries and promote looping and eliminate dead end water mains, greater than 400-500 LF.

Project Phasing

Phased construction was not included in this Discovery, but is a possibility. With a phased development, the water facility plan could be changed to include a smaller intermediate elevation water storage tank.

Project Demands

The estimated total project, maximum day demand, is 1149.8 gpm. The demand was calculated for each lot of the 680 single family unit development using the following formula:

$Y = 1.05 * 0.008607 * \sqrt{X}$

Y= maximum day demand in gpm
X= lot size in square feet

Project demands are summarized in Table 2. A more detailed demand table can be found as an attachment.

Table 2. Estimated Project Demand Summary.

Demand Type	MDD (gpm)	ADD (gpm)
Residential	1149.8	440.5
Irrigation	-	-
Totals	**1149.8**	**440.5**

Storage Capacity

The project will require a dedicated storage tank of 1.1 MG. The project storage volume was calculated as follows:

Operating Storage Volume = 15% of MDD
*= 15% * 1440 min/day * 1152.4 gpm*
= 248,357 gallons

Emergency Storage Volume = 1 ADD
*= 1440 min/day * 441.5 gpm*
= 634,372 gallons

Fire Storage Volume = 1,500 gpm for 2 hours
*= 1,500 gpm * 2 hours * 60 minutes/hr*
= 180,000 gallons

Total: = 1,062,729 gallons

Supply Capacity

Currently, there is sufficient supply capacity to support the Project's estimated max day demand of 1,149.8 gpm.

Water Resource

The available water rights owned by TMWA within the Stead area are limited (<100 AF) and are available on a first come, first served basis.

Project Pressures

Project service elevations range from approximately 5062' to 5330'. Three pressure zones were established to fully serve the project area while maintaining the required service pressure range of 100 psi to 45 PSI. The proposed pressure zone boundaries are shown in Figure 1 and were developed to optimize system looping.

Dead Ends and Looping

Nevada Administrative Code section 445A.6712 requires systems to be designed, to the extent possible, to eliminate dead ends. This project supply will be considered looped with supply from both the pump station and the water storage tank. Each pressure zone will require a minimum of two supply points. Adequate looping and dead end mains will be an issue with the proposed subdivision layout. The street layout should be redeveloped to conform to the pump zone boundaries and promote looping and eliminate dead end water mains, greater than 400-500 LF.

Project Fire Flow

Fire flow requirements are established by the local fire authority. The required project fire flow is assumed to be 1,500 gpm for 2 hours.

Project Cost Opinion

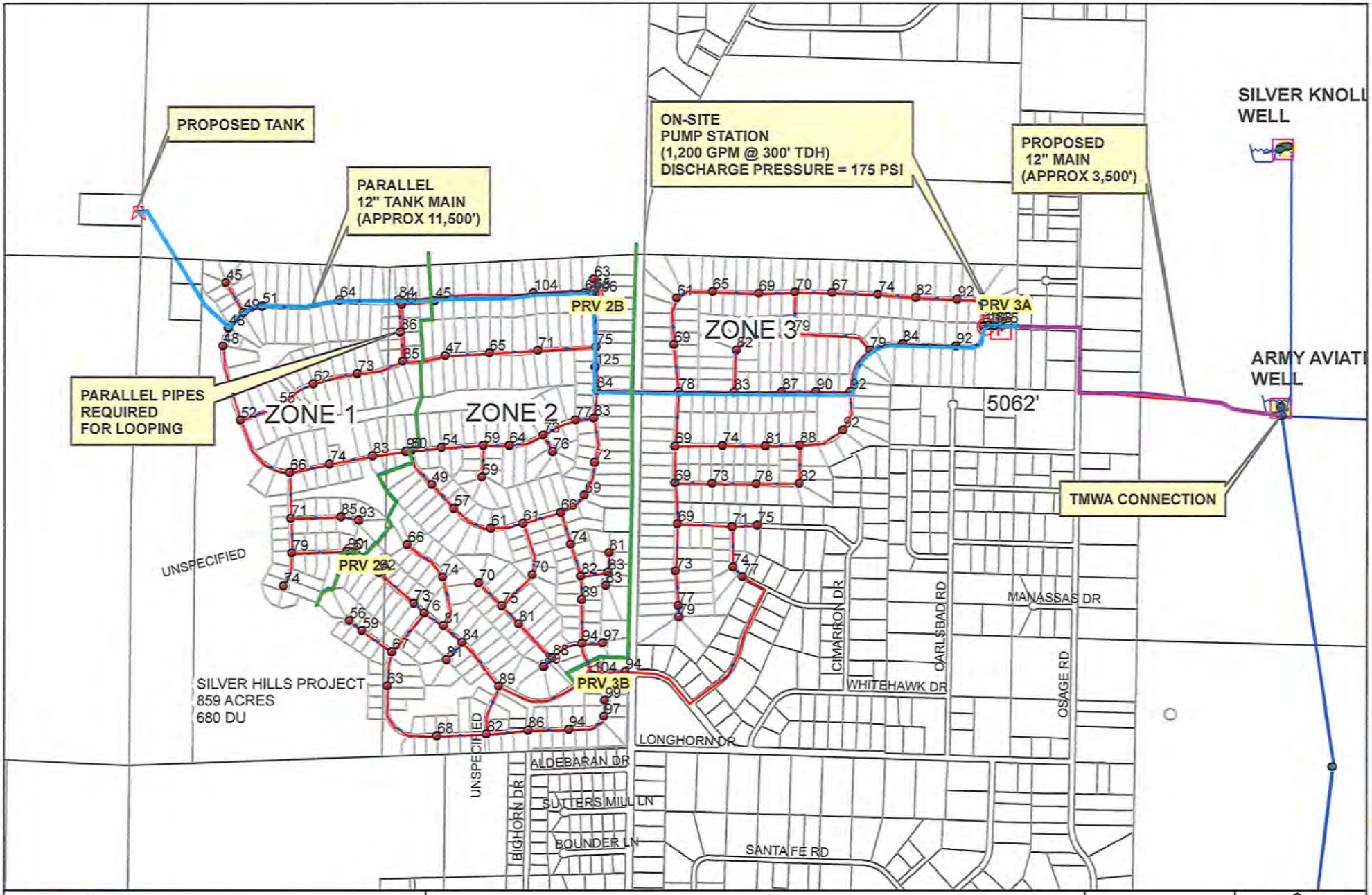
The cost opinions for the major off-site improvements are presented in Table 3. It is important to note that the on-site 12" dedicated parallel tank feeder main within the development (approx. 11,500 LF) was not included in the offsite improvement cost table below.

Table 3. Cost Opinion for Major Water Facility Improvements (Charge Area 10, Stead).

Description	Quantity	Unit	Unit Cost	Total Cost
Supply/Treatment Facility Charge[1]	1149.8	MDD, gpm	0	$0
Storage Facility Charge	1149.8	MDD, gpm	$0	$0
Area 10 Facility Charge[2]	1149.8	MDD, gpm	$5,623	$6,465,325
Tie-in to existing 12" TMWA Main	1	L.S.	$30,000	$30,000
Booster Pump Station	1	L.S.	$1,000,000	$1,000,000
Water Storage Tank	1	L.S.	$1,100,000	$1,100,000
Water Main to Project	3,500	L.F.	$216	$756,000
		Total		***$9,351,325***

[1] For Area 10 services, dedicating Fish Springs resources, TMWA S/T Fee = 0, otherwise = $4,163

Notes: MDD = Maximum Day Demand
L.F. = Linear Feet
L.S. = Lump Sum



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LIFESTYLE HOMES @ RED ROCK RD_DISC

PROPOSED IMPROVEMENTS
MAX DAY PRESSURES

DATE	NOV 2015
MAP BY:	BL
WORK ORDER #:	15-4490
SCALE:	1 inch = 1,400 feet

NORTH

NAD 83 NEVADA STATE PLANE WEST FEET

TENTATIVE SUBDIVISION MAP FOR

SILVER HILLS - VILLAGE 1

A SPECIFIC PLAN DEVLOPMENT

WASHOE COUNTY, NEVADA

SECTION 23, TOWNSHIP 21N, RANGE 18E

MAY 2021

APPLICANT/PROPERTY OWNER

LIFESTYLE HOMES TND, LLC
ATTN: PETER LISSNER
P.O.BOX 7548
RENO, NEVADA

CIVIL ENGINEER/PLANNER/SURVEYOR

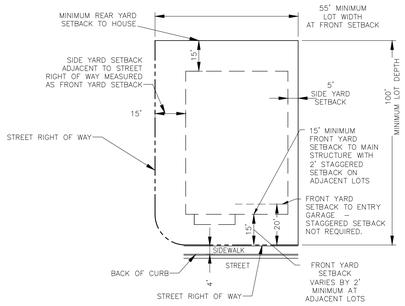
CHRISTY CORPORATION
ATTN: DOUGLAS BUCK, P.E.
1000 KILEY PARKWAY
SPARKS, NV 89436
(775) 502-8552

GEOTECHNICAL ENGINEER

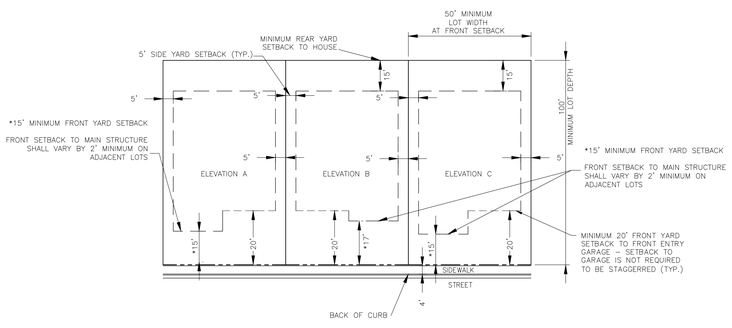
SUMMIT ENGINEERING CORPORATION
5405 MAE ANNE AVENUE
RENO, NEVADA 89523
(775) 747-8550

LANDSCAPE ARCHITECT

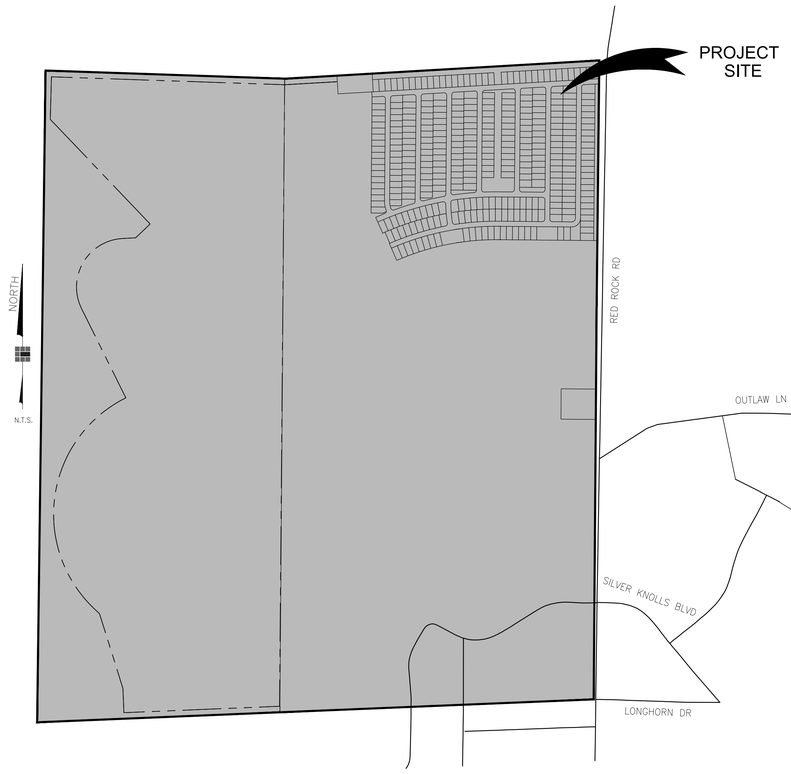
LA STUDIO, LLC
1552 C STREET
SPARKS, NV 89431
(775) 323-2223

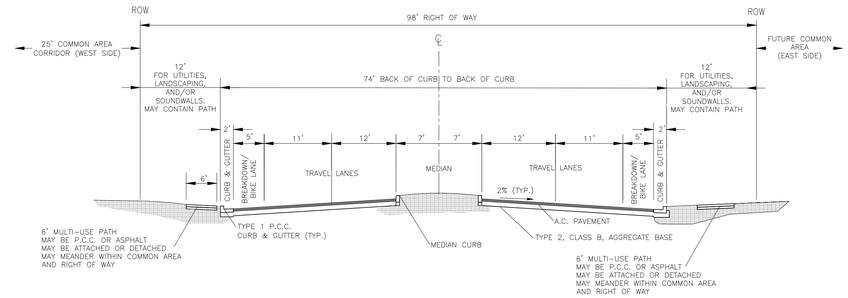


TYPICAL CORNER LOT



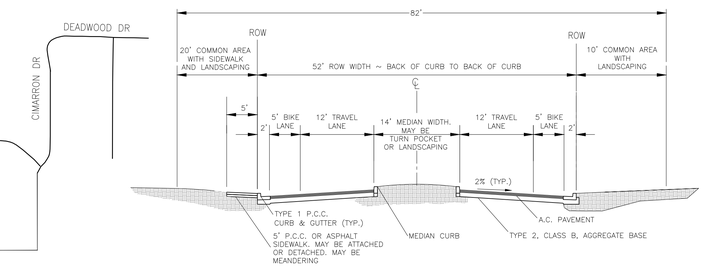
TYPICAL INTERIOR LOTS





FUTURE RED ROCK ROAD RIGHT OF WAY (PUBLIC) — 1/1

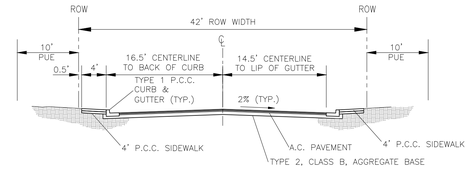
NOT TO SCALE



SILVER HILLS PARKWAY (COLLECTOR) (PUBLIC) — 2/1

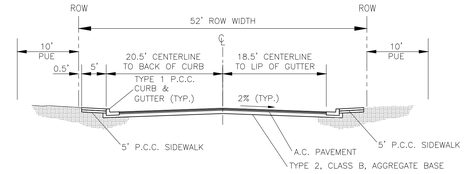
NOT TO SCALE

NOTE: LANDSCAPE MEDIAN LENGTH IS 100'. SECTION INCLUDES CENTER TURN LANE FOR REMAINDER OF ROADWAY SECTION.



LOCAL ROAD (PUBLIC) — 3/1

NOT TO SCALE



ENTRY ROAD (PUBLIC) — 4/1

NOT TO SCALE

SITE INFORMATION

ASSESSOR'S PARCEL NUMBERS 087-390-10 & 087-390-13

TOTAL PARCEL AREA = 551.62 AC

LOT STATISTICS

TOTAL NO. OF LOTS (DU): 358 LOTS
AVERAGE LOT SIZE: 5,326 SQ. FT. (0.12 ACRE)
LARGEST LOT SIZE: 8,072 SQ. FT. (0.19 ACRE)
SMALLEST LOT SIZE: 5,000 SQ. FT. (0.11 ACRE)
MAXIMUM BUILDING HEIGHT: 35 FT

TOTAL AREA TO BE DEVELOPED: 65.96 ACRES
LOT AREA: 43.77 ACRES
COMMON AREA: 7.15 ACRES
PARCEL 1-A (TRAILHEAD): 1.03 ACRES
RIGHT-OF-WAY AREA: 14.01 ACRES
COMMON AREA/OPEN SPACE: (PARCEL 1-C) 54.52 ACRES
TOTAL COMMON AREA/OPEN SPACE: 62.69 ACRES
RESIDENTIAL DENSITY (DEVELOPED AREA): 358 LOTS/65.96 ACRES = 5.42 DU/AC
RESIDENTIAL DENSITY (DEVELOPED + OPEN SPACE): 358 LOTS/120.48 ACRES = 2.97 DU/AC
MAXIMUM ALLOWABLE DENSITY = 3.0 DU/AC

COMMON AREA/OPEN SPACE: ANY COMMON AREA OR OPEN SPACE IDENTIFIED ON THIS TENTATIVE MAP IN EXCESS OF THAT REQUIRED TO MEET DENSITY REQUIREMENTS FOR THE DEVELOPED AREA OF THIS MAY BE UTILIZED TO MEET DENSITY REQUIREMENTS FOR FUTURE TENTATIVE MAPS. DEVELOPMENT ON COMMON AREA PARCELS IS RESTRICTED TO RECREATIONAL PURPOSES AND DRAINAGE AND UTILITY FACILITIES. TYPICAL USES MAY INCLUDE BUT ARE NOT LIMITED TO SIDEWALKS, TRAILS, PATHS, TRAIL HEADS, TRAIL HEAD PARKING AREAS, PARKS, PLAYGROUNDS, MISCELLANEOUS RECREATIONAL FACILITIES, RETENTION AND DETENTION BASINS, DRAINAGE CHANNELS, PUBLIC AND PRIVATE UTILITIES INCLUDING STORM DRAIN, SANITARY SEWER, WATER LINE, NATURAL GAS, ELECTRICAL AND COMMUNICATION FACILITIES AND MAINTENANCE ACCESS ROADS FOR RECREATIONAL, DRAINAGE, AND UTILITY FACILITIES.

MAINTENANCE OF FACILITIES

PUBLIC IMPROVEMENTS INCLUDING STREETS, SIDEWALKS, STORM DRAIN AND SANITARY SEWER FACILITIES WILL BE MAINTAINED BY WASHOE COUNTY.

COMMON AREA/OPEN SPACE INCLUDING LANDSCAPING AND TRAILS WILL BE OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION OR LANDSCAPE MAINTENANCE ASSOCIATION.

VARIABLE SETBACK NOTES

BUILDING FOOTPRINTS DEPICTED IN THIS PLAN SET ARE FOR ILLUSTRATIVE PURPOSES AND SUBJECT TO CHANGE.

STAGGERING OF FRONT YARD SETBACKS SHALL OCCUR WITH FINAL BUILDING FOOTPRINTS. A MINIMUM 2-FOOT FRONT YARD SETBACK DEVIATION SHALL BE PROVIDED FROM ALL ADJOINING PARCELS (AS MEASURED TO BUILDING FAÇADE). FRONT-LOAD GARAGES SHALL INCLUDE A MINIMUM SETBACK OF 20-FEET AND ARE NOT SUBJECT TO THE 2-FOOT OFFSET. FINAL PLOT PLANS SHALL DEPICT ADJOINING PARCELS TO DEMONSTRATE COMPLIANCE WITH THIS STANDARD AND SHALL BE CERTIFIED BY THE MASTER DEVELOPER AND PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEVADA.

MASTER DEVELOPER SHALL CONFIRM COMPLIANCE WITH ALL APPLICABLE SPECIFIC PLAN STANDARDS AT THE TIME OF FINAL PLOT PLANS. UPON REQUEST BY WASHOE COUNTY, THE MASTER DEVELOPER SHALL PROVIDE SUPPLEMENTAL MATERIALS (AS APPROPRIATE) TO DEMONSTRATE COMPLIANCE WITH THE SILVER HILLS SPECIFIC PLAN DEVELOPMENT STANDARDS. THIS SHALL NOT RESULT IN DELAYS TO PROCESSING AND/OR CONSTRUCTION REVIEW.

LANDSCAPE AND GRADING PLANS DEPICT BUILDING PADS ONLY FOR ILLUSTRATIVE PURPOSES. FINAL LANDSCAPING PLANS AND PLOT PLANS ARE SUBJECT TO STAGGERING STANDARDS.

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SHEET INDEX

BASIS OF ELEVATIONS

THE BASIS OF ELEVATION IS NORTH AMERICAN VERTICAL DATU OF 1988 (NAVD88).

BASIS OF BEARINGS

THE BASIS OF BEARINGS AND COORDINATES FOR THIS SURVEY WAS ESTABLISHED USING THE PUBLISHED COORDINATES (NAD 83/94, NEVADA WEST ZONE) FOR NGS POINTS "CHALK BLUFF" AND "RENO AIR BASE", MODIFIED BY A COMBINATION FACTOR OF 1.000170937 AND CONVERTING TO THE U.S. SURVEY FOOT. ALL COORDINATES SHOWN HEREON ARE MODIFIED COORDINATES. ALL DIMENSIONS ON THIS MAP ARE GROUND DISTANCES.

ENGINEERS STATEMENT

THESE PLANS, SHEETS 1 THROUGH 9, HAVE BEEN PREPARED IN ACCORDANCE WITH ACCEPTED ENGINEERS PROCEDURES AND GUIDELINES, AND ARE IN SUBSTANTIAL COMPLIANCE WITH WASHOE COUNTY DEVELOPMENT CODE, THE SPECIFIC PLAN HANDBOOK, APPLICABLE STATUTES, COUNTY ORDINANCES, STANDARDS, AND DEVELOPMENT HANDBOOK REQUIREMENTS. IN THE EVENT OF A CONFLICT BETWEEN ANY PORTION OF THESE PLANS AND WASHOE COUNTY STANDARDS OR THE SPECIFIC PLAN HANDBOOK, THE STANDARDS OR SPECIFIC PLAN SHALL APPLY.

DOUGLAS G. BUCK, P.E. 17163
CHRISTY CORPORATION

DOUGLAS G. BUCK — Exp. 12-31-22 — CIVIL — No. 17163 — STATE OF NEVADA — PROFESSIONAL ENGINEER

5/10/2021

CHRISTY CORPORATION
1000 Kiley Parkway | Sparks Nevada 89436
T 775.502.8552 | christynv.com

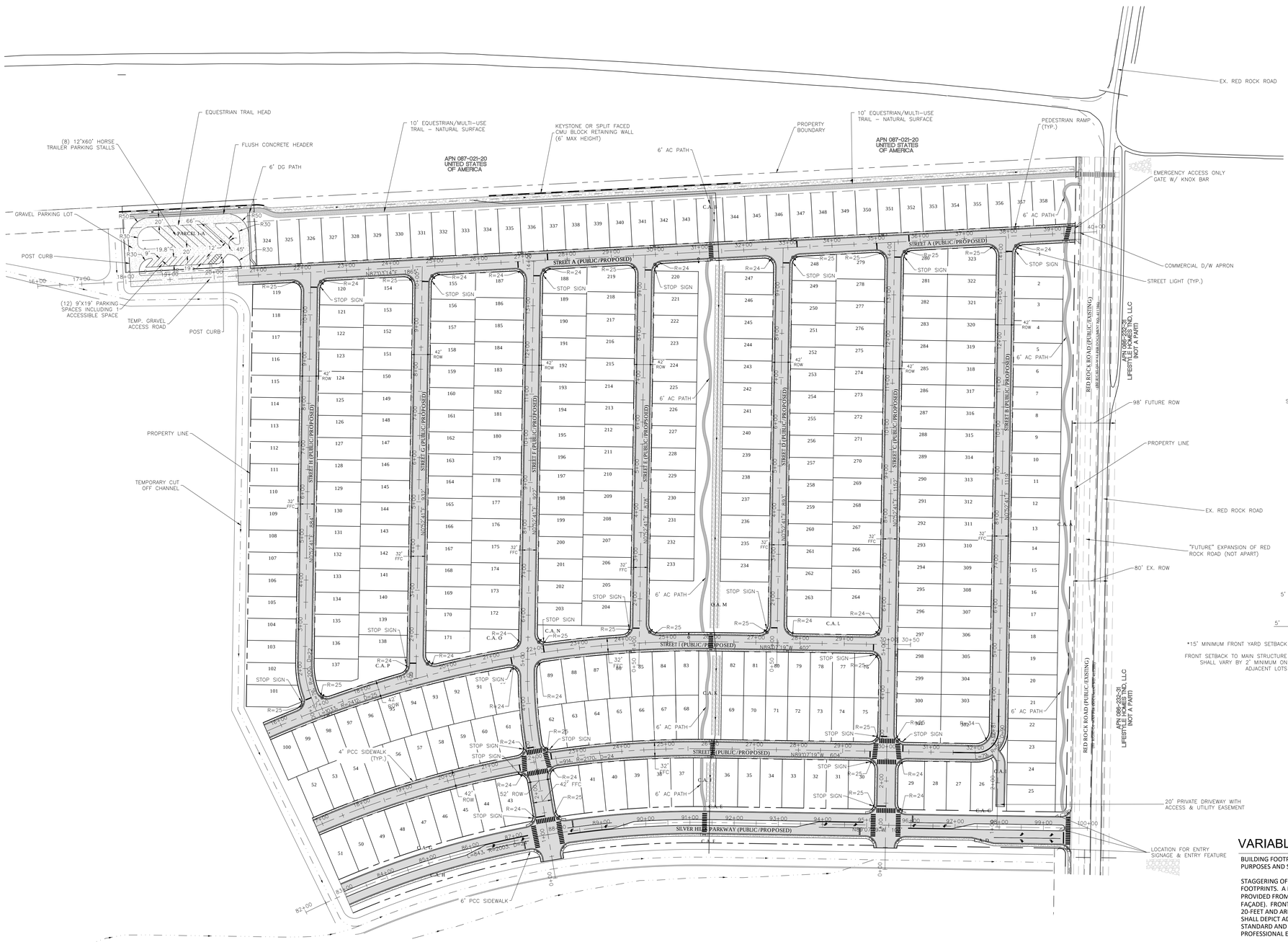
TITLE SHEET

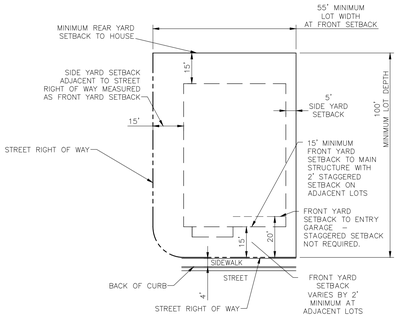
SHEET 1 OF 13

TENTATIVE SUBDIVISION MAP FOR

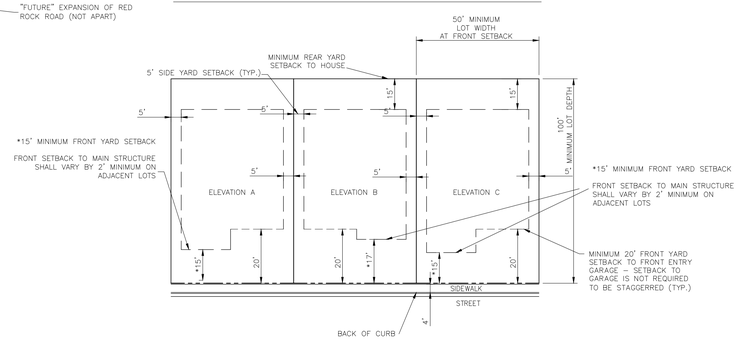
SILVER HILLS - VILLAGE 1

A SPECIFIC PLAN DEVELOPMENT





TYPICAL CORNER LOT



TYPICAL INTERIOR LOTS

VARIABLE SETBACK NOTES

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LEGEND

- STREET LIGHT
- ASPHALT PAVEMENT
- PCC CONCRETE
- GRAVEL/DECOMPOSED GRANITE
- RIPRAP

NOTE:
1. ALL PROPOSED STREETS SHALL BE PUBLIC

DOUGLAS G. BUCK
PROFESSIONAL ENGINEER STATE OF NEVADA
Exp. 12-31-22
CIVIL
No. 17165
5/10/2021

CHRISTY CORPORATION
1000 Kiley Parkway | Sparks Nevada 89436
P 775.502.8552 christynv.com

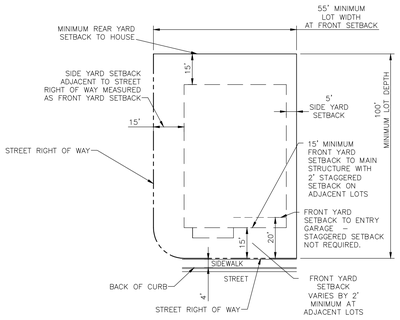
PRELIMINARY OVERALL SITE PLAN

SHEET 2 OF 9

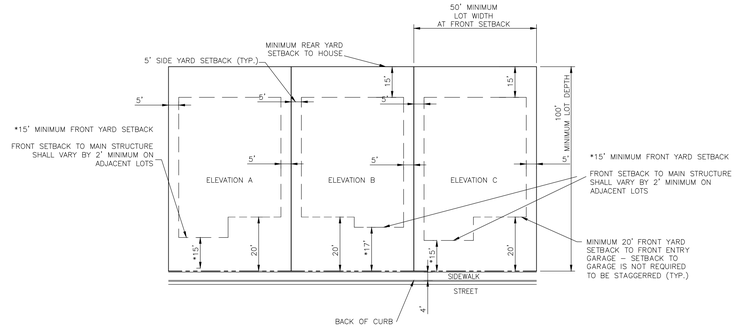
TENTATIVE SUBDIVISION MAP FOR

SILVER HILLS - VILLAGE 1 - VILLAGE 1

A SPECIFIC PLAN DEVLOPMENT



TYPICAL CORNER LOT



TYPICAL INTERIOR LOTS

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LEGEND

- STREET LIGHT
- ASPHALT PAVEMENT
- PCC CONCRETE
- GRAVEL/DECOMPOSED GRANITE
- RIPRAP

NOTE:
1. ALL PROPOSED STREETS SHALL BE PUBLIC

PRELIMINARY SETBACK PLAN

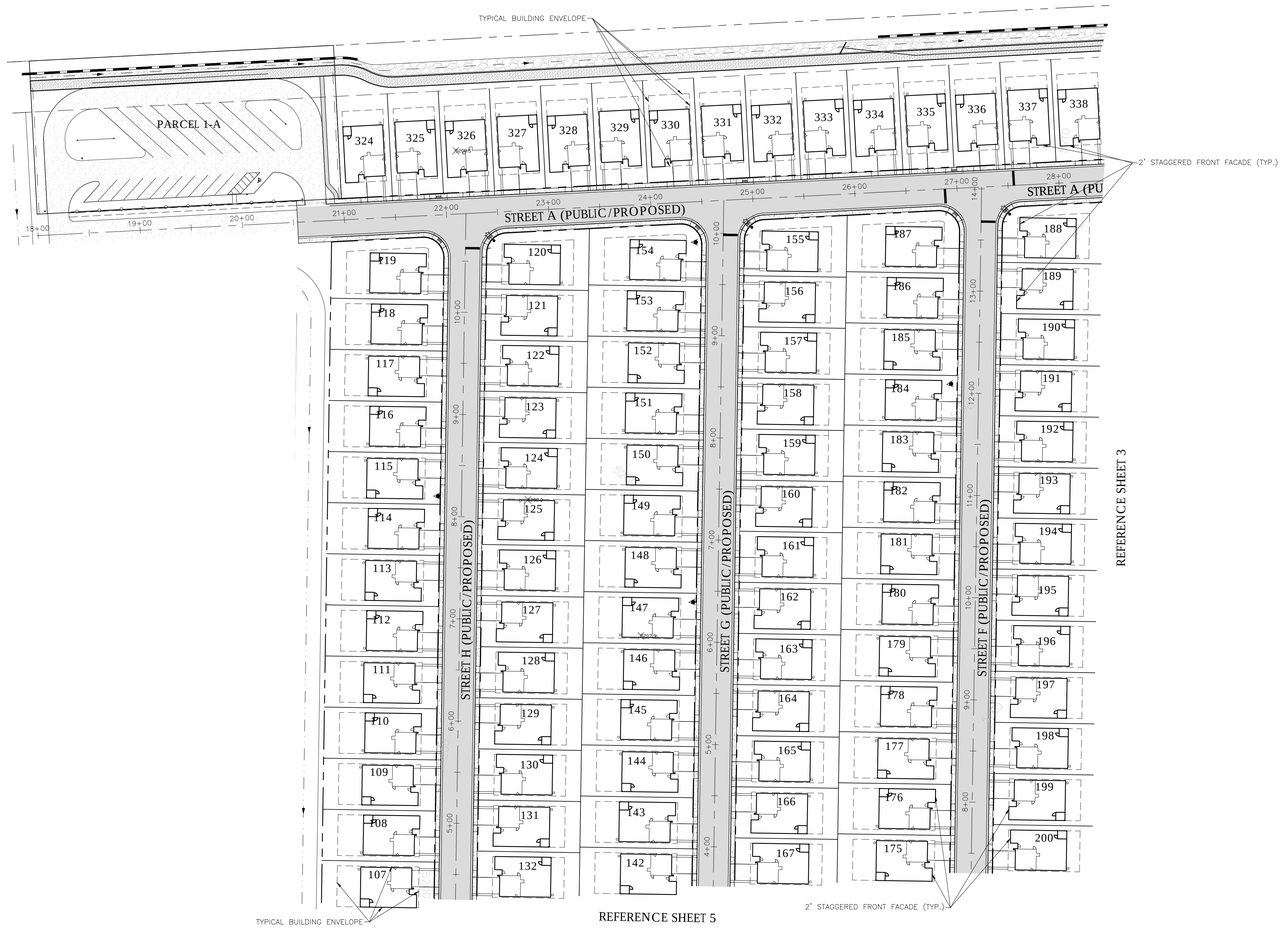
SHEET 3 OF 13

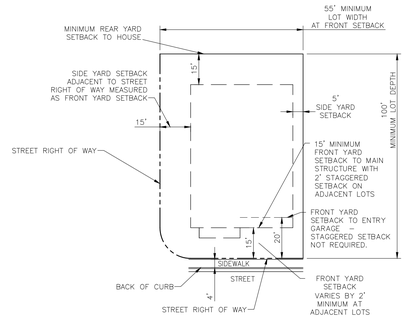
CHRISTY CORPORATION
1000 Kiley Parkway | Sparks Nevada 89436
P 775.502.8552 H christynv.com

TENTATIVE SUBDIVISION MAP FOR

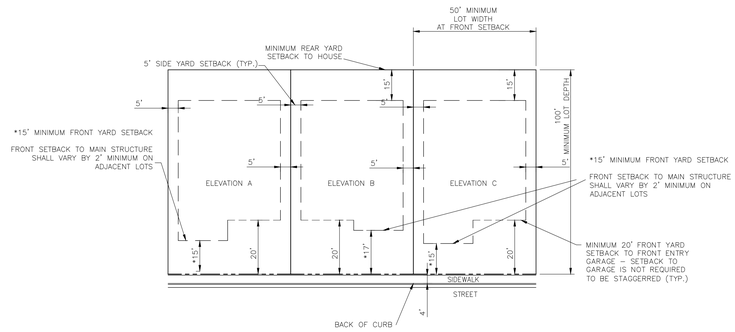
SILVER HILLS - VILLAGE 1 - VILLAGE 1

A SPECIFIC PLAN DEVLOPMENT





TYPICAL CORNER LOT



TYPICAL INTERIOR LOTS

VARIABLE SETBACK NOTES

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LEGEND

- STREET LIGHT
- ASPHALT PAVEMENT
- PCC CONCRETE
- GRAVEL/DECOMPOSED GRANITE
- RIPRAP

NOTE:
1. ALL PROPOSED STREETS SHALL BE PUBLIC

NORTH

0 60 120

PRELIMINARY SETBACK PLAN

SHEET 4 OF 13

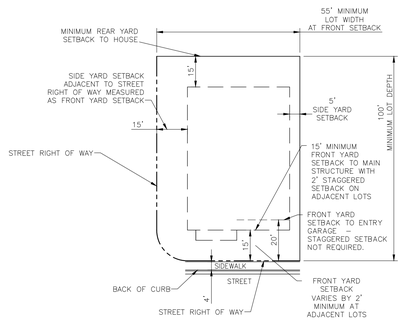
DOUGLAS G. BUCK
Exp. 12-31-22
CIVIL
No. 17160
STATE OF NEVADA
PROFESSIONAL ENGINEER
5/10/2021

CHRISTY CORPORATION
1000 Kiley Parkway | Sparks Nevada 89436
P 775.502.8552 christynv.com

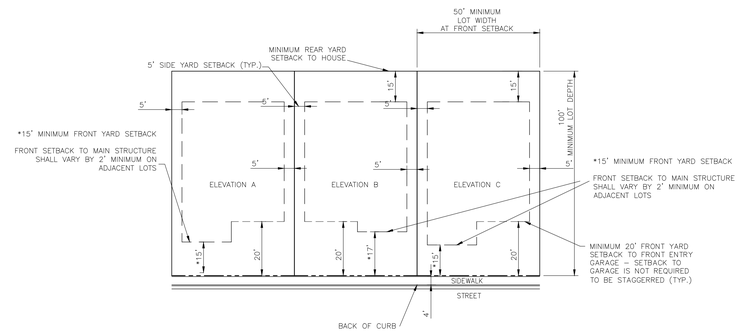
TENTATIVE SUBDIVISION MAP FOR

SILVER HILLS - VILLAGE 1 - VILLAGE 1

A SPECIFIC PLAN DEVLOPMENT



TYPICAL CORNER LOT



TYPICAL INTERIOR LOTS

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LEGEND

- STREET LIGHT
- ASPHALT PAVEMENT
- PCC CONCRETE
- GRAVEL/DECOMPOSED GRANITE
- RIPRAP

NOTE:
1. ALL PROPOSED STREETS SHALL BE PUBLIC

PRELIMINARY SETBACK PLAN

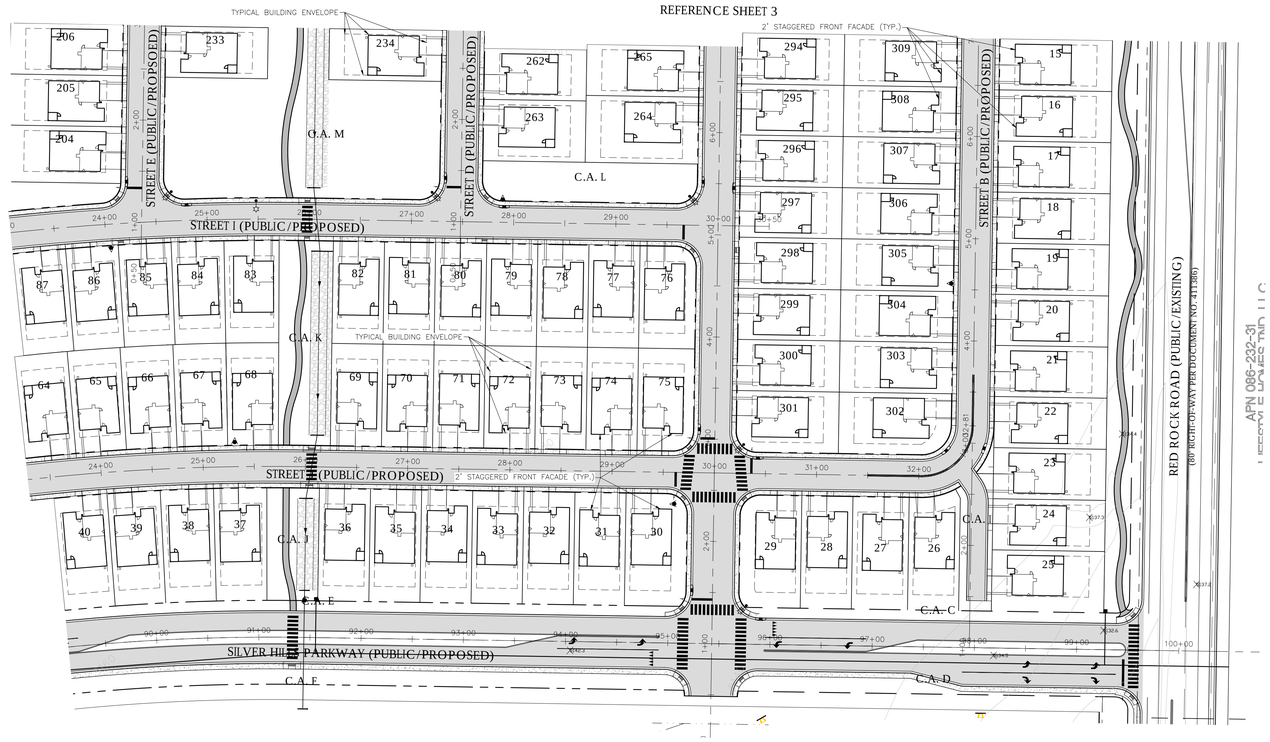
SHEET 5 OF 13

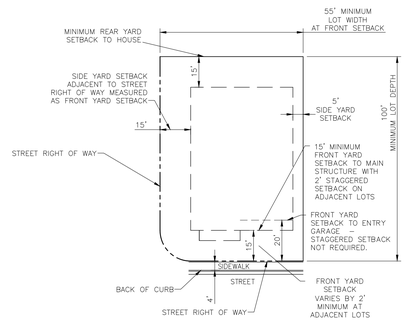
CHRISTY CORPORATION
1000 Kiley Parkway | Sparks Nevada 89436
775.502.8552 christynv.com

TENTATIVE SUBDIVISION MAP FOR

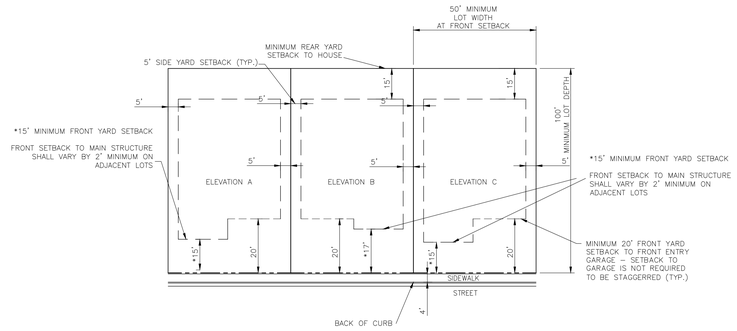
SILVER HILLS - VILLAGE 1 - VILLAGE 1

A SPECIFIC PLAN DEVLOPMENT





TYPICAL CORNER LOT



TYPICAL INTERIOR LOTS

LEGEND

- STREET LIGHT
- ASPHALT PAVEMENT
- PCC CONCRETE
- GRAVEL/DECOMPOSED GRANITE
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PRELIMINARY SETBACK PLAN

SHEET 6 OF 13

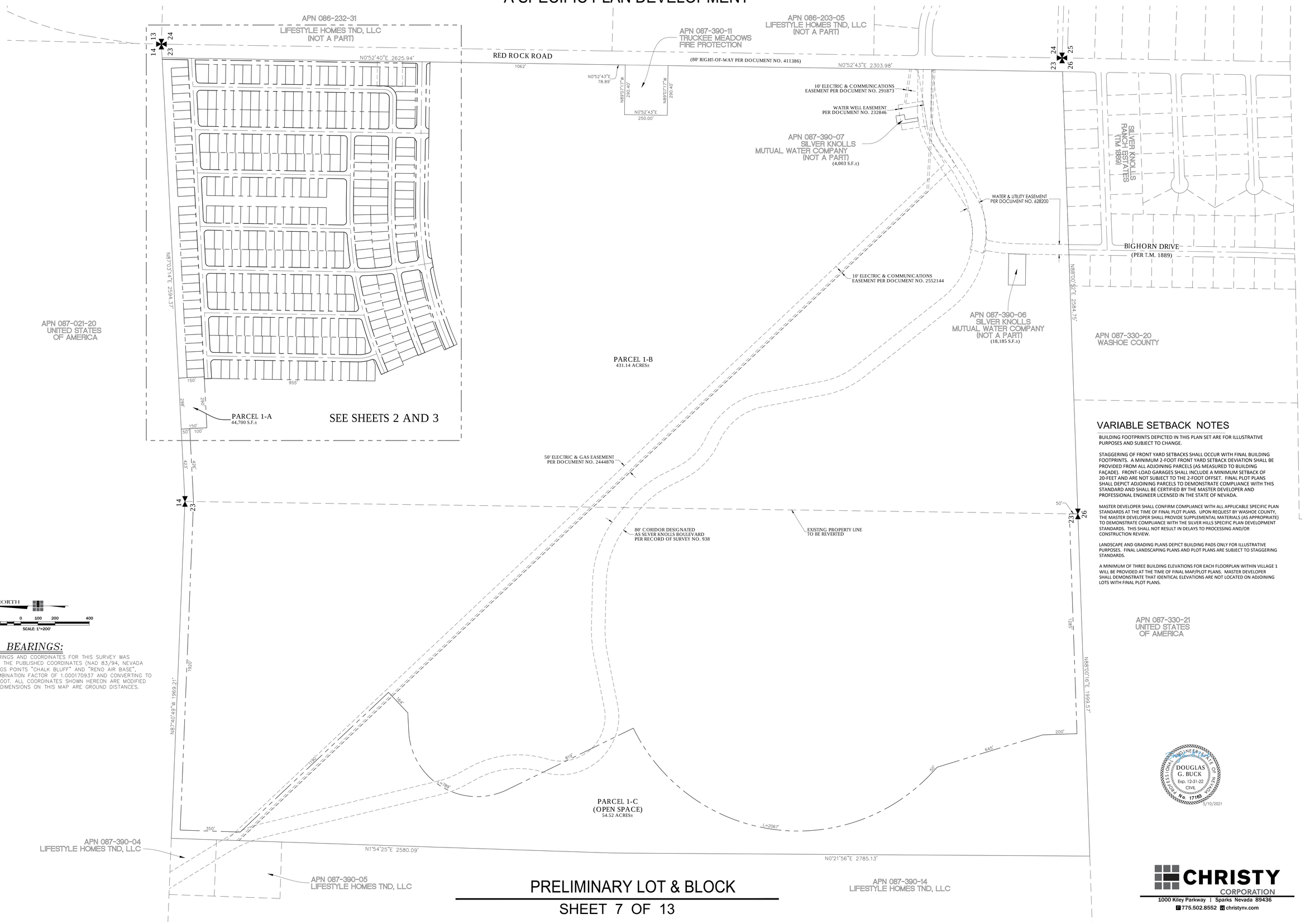
Professional Engineer
DOUGLAS G. BUCK
Exp. 12-31-22
CIVIL
No. 17163
STATE OF NEVADA
5/10/2021

CHRISTY CORPORATION
1000 Kiley Parkway | Sparks Nevada 89436
P 775.502.8552 christynv.com

TENTATIVE SUBDIVISION MAP FOR

SILVER HILLS - VILLAGE 1

A SPECIFIC PLAN DEVELOPMENT



BASIS OF BEARINGS:

THE BASIS OF BEARINGS AND COORDINATES FOR THIS SURVEY WAS ESTABLISHED USING THE PUBLISHED COORDINATES (NAD 83/94, NEVADA WEST ZONE) FOR NGS POINTS "CHALK BLUFF" AND "RENO AIR BASE", MODIFIED BY A COMBINATION FACTOR OF 1.000170937 AND CONVERTING TO THE U.S. SURVEY FOOT. ALL COORDINATES SHOWN HEREON ARE MODIFIED COORDINATES. ALL DIMENSIONS ON THIS MAP ARE GROUND DISTANCES.

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DOUGLAS G. BUCK
Exp. 12-31-22
CIVIL
No 17185
STATE OF NEVADA
3/10/2021

CHRISTY CORPORATION
1000 Kiley Parkway | Sparks Nevada 89436
P 775.502.8552 W christynv.com

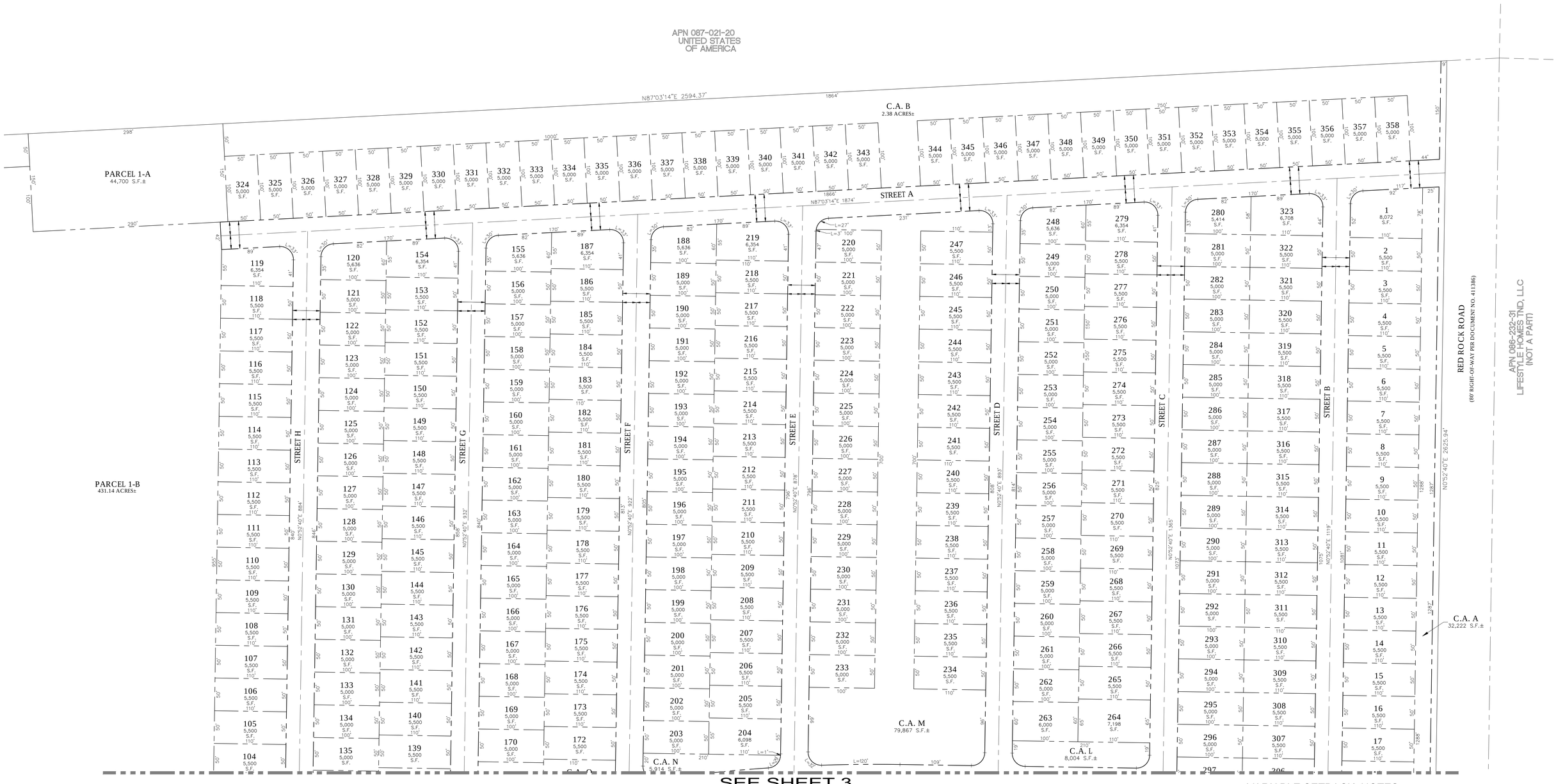
PRELIMINARY LOT & BLOCK

SHEET 7 OF 13

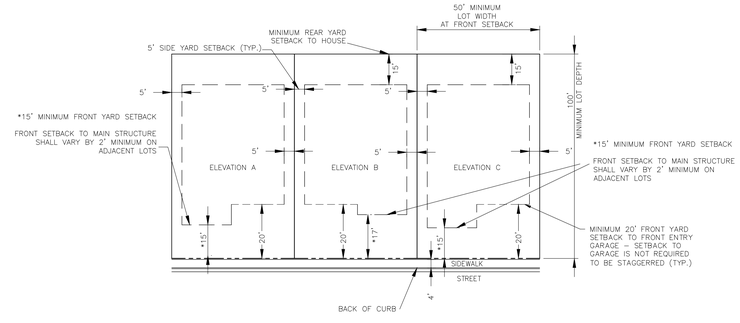
TENTATIVE SUBDIVISION MAP FOR

SILVER HILLS - VILLAGE 1

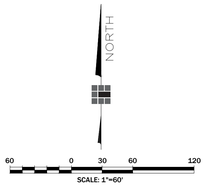
A SPECIFIC PLAN DEVELOPMENT



SEE SHEET 3

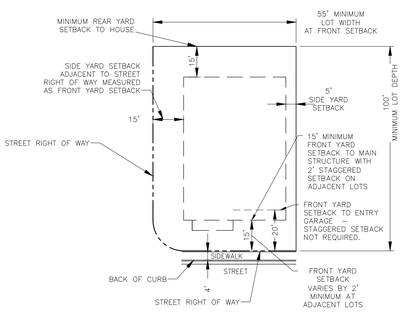


TYPICAL INTERIOR LOTS



PRELIMINARY LOT & BLOCK

SHEET 8 OF 13



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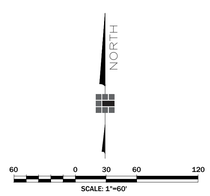
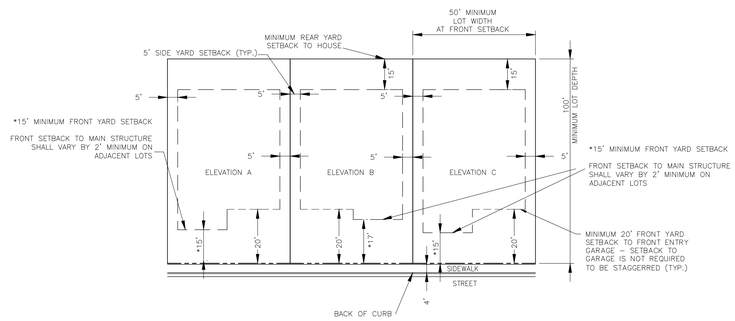
TENTATIVE SUBDIVISION MAP FOR

SILVER HILLS - VILLAGE 1

A SPECIFIC PLAN DEVELOPMENT

SEE SHEET 2





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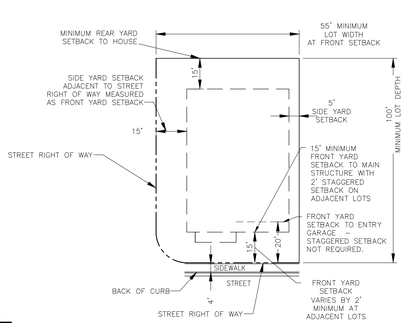

TYPICAL CORNER LOT

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5/10/2021

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P 775.502.8552 W christynv.com

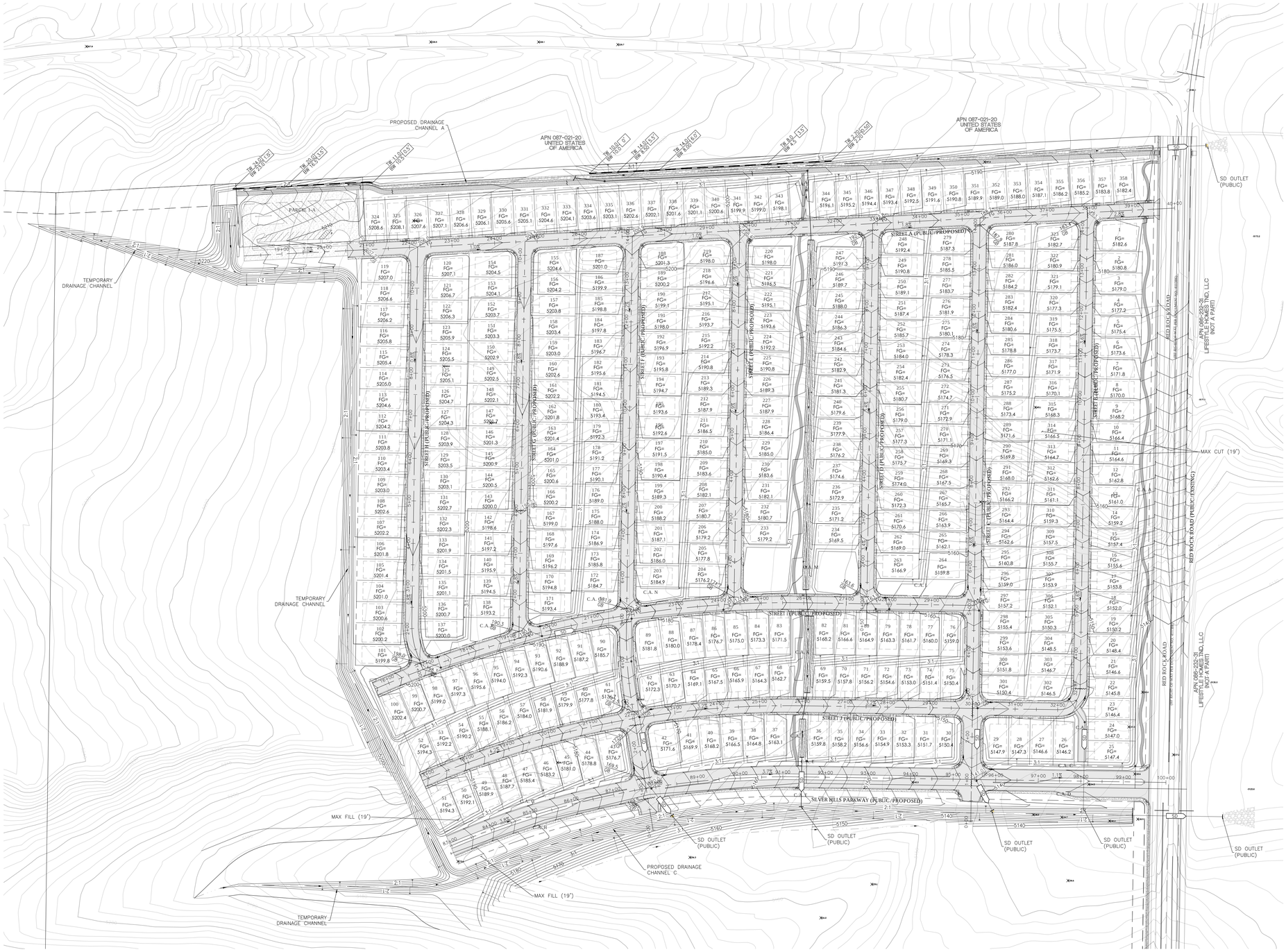
PRELIMINARY LOT & BLOCK

SHEET 9 OF 13

TENTATIVE SUBDIVISION MAP FOR

SILVER HILLS - VILLAGE 1

A SPECIFIC PLAN DEVELOPMENT



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LEGEND (GRADING)

- PORTLAND CEMENT CONCRETE (SIDEWALKS, RAMPS & GUTTERS)
- ASPHALT PAVEMENT
- 50.00 FG — ELEVATION TAG (EXISTING)
- 4.9% — SLOPE (PROPOSED)
- CATCH BASIN
- STORM DRAIN MANHOLE
- SD — STORM DRAIN
- GRADE BREAK
- RIPRAP
- RETAINING WALL
- T=134.5 BW=129.5 4.5' — WALL HEIGHT

TW=TOP OF WALL
BW=BOTTOM OF WALL @ FINISHED GRADE

NOTE:
1. SLOPES STEEPER THAN 3:1 WILL BE RIPRAPPED OR MECHANICALLY STABILIZED PER GEOTECHNICAL ENGINEER.

2. ADD 5200 TO ELEVATIONS IF NOT SHOWN

Cut/Fill Summary

	Cut	Fill	NET CUT/FILL
Totals	327712 Cu. Yd.	327712 Cu. Yd.	0 Cu. Yd.

PRELIMINARY GRADING PLAN

SHEET 10 OF 13

DOUGLAS G. BUCK
Exp. 12-31-22
Civil
No. 17165
PROFESSIONAL ENGINEER STATE OF NEVADA
5/10/2021

CHRISTY CORPORATION
1000 Kiley Parkway | Sparks Nevada 89436
P 775.502.8552 H christynv.com

TENTATIVE SUBDIVISION MAP FOR

SILVER HILLS - VILLAGE 1

SPECIFIC PLAN DEVELOPMENT

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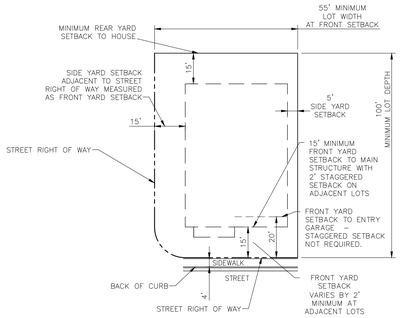
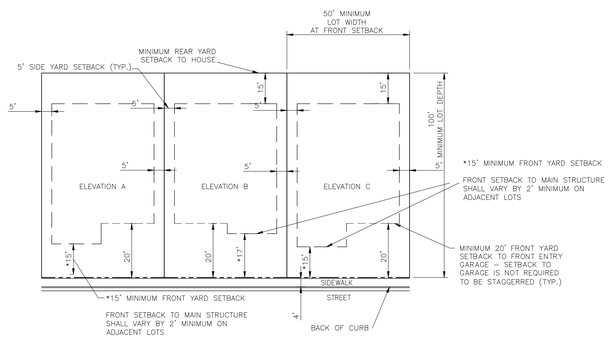


TYPICAL CORNER LOT



TYPICAL INTERIOR LOTS

LEGEND

- PORTLAND CEMENT CONCRETE (SIDEWALKS, RAMPS & GUTTERS)
- ASPHALT PAVEMENT
- RIPRAP
- GRAVEL/DECOMPOSED GRANITE
- STORM DRAIN MANHOLE
- STORM DRAIN
- CATCH BASIN
- SANITARY SEWER MANHOLE
- SANITARY SEWER
- SANITARY SEWER LATERAL (PRIVATE)
- STREET LIGHT
- FIRE HYDRANT
- WATER VALVE
- WATER SERVICE
- WTR — WATER MAIN
- RCW — RECLAIMED WATER MAIN

PRELIMINARY UTILITY PLAN

SHEET 11 OF 13

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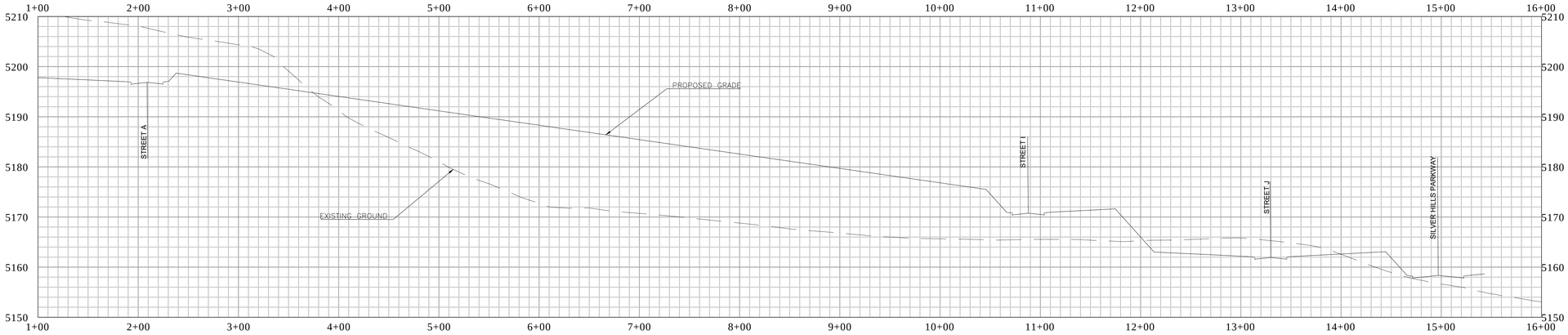
TENTATIVE SUBDIVISION MAP FOR

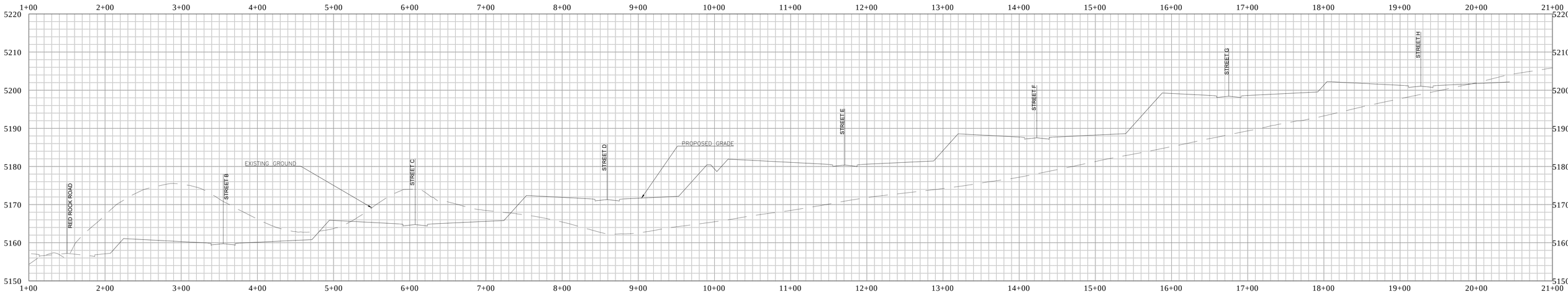
SILVER HILLS - VILLAGE 1

A SPECIFIC PLAN DEVELOPMENT



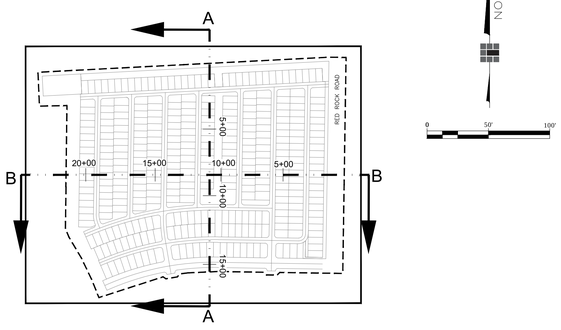
CROSS SECTION A-A

SCALE: 1"=50' HORIZ. / 1"=10' VERT.



CROSS SECTION B-B

SCALE: 1"=50' HORIZ. / 1"=10' VERT.



KEY PLAN

VARIABLE SETBACK NOTES

BUILDING FOOTPRINTS DEPICTED IN THIS PLAN SET ARE FOR ILLUSTRATIVE PURPOSES AND SUBJECT TO CHANGE.

STAGGERING OF FRONT YARD SETBACKS SHALL OCCUR WITH FINAL BUILDING FOOTPRINTS. A MINIMUM 2-FOOT FRONT YARD SETBACK DEVIATION SHALL BE PROVIDED FROM ALL ADJOINING PARCELS (AS MEASURED TO BUILDING FAÇADE). FRONT-LOAD GARAGES SHALL INCLUDE A MINIMUM SETBACK OF 20-FEET AND ARE NOT SUBJECT TO THE 2-FOOT OFFSET. FINAL PLOT PLANS SHALL DEPICT ADJOINING PARCELS TO DEMONSTRATE COMPLIANCE WITH THIS STANDARD AND SHALL BE CERTIFIED BY THE MASTER DEVELOPER AND PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEVADA.

MASTER DEVELOPER SHALL CONFIRM COMPLIANCE WITH ALL APPLICABLE SPECIFIC PLAN STANDARDS AT THE TIME OF FINAL PLOT PLANS. UPON REQUEST BY WASHOE COUNTY, THE MASTER DEVELOPER SHALL PROVIDE SUPPLEMENTAL MATERIALS (AS APPROPRIATE) TO DEMONSTRATE COMPLIANCE WITH THE SILVER HILLS SPECIFIC PLAN DEVELOPMENT STANDARDS. THIS SHALL NOT RESULT IN DELAYS TO PROCESSING AND/OR CONSTRUCTION REVIEW.

LANDSCAPE AND GRADING PLANS DEPICT BUILDING PADS ONLY FOR ILLUSTRATIVE PURPOSES. FINAL LANDSCAPING PLANS AND PLOT PLANS ARE SUBJECT TO STAGGERING STANDARDS.

A MINIMUM OF THREE BUILDING ELEVATIONS FOR EACH FLOORPLAN WITHIN VILLAGE 1 WILL BE PROVIDED AT THE TIME OF FINAL MAP/PLOT PLANS. MASTER DEVELOPER SHALL DEMONSTRATE THAT IDENTICAL ELEVATIONS ARE NOT LOCATED ON ADJOINING LOTS WITH FINAL PLOT PLANS.

PRELIMINARY CROSS SECTION PROFILES

SHEET 12 OF 13

5/10/2021

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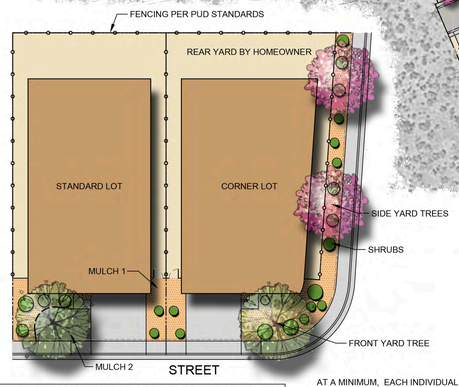

TYPICAL FRONT YARD LANDSCAPE SHOWN IS SCHEMATIC ONLY. LANDSCAPE LAYOUT MAY BE MODIFIED AS NEEDED TO FIT INDIVIDUAL LOT & TO AVOID CONFLICTS WITH UTILITIES.

TYPICAL FRONT YARD LAYOUT

AT A MINIMUM, EACH INDIVIDUAL FRONT YARD SHALL INCLUDE:
- 1 TREE PER 400 SQ FT OF FRONT YARD AREA (STREET FRONTAGE TREES MAY BE INCLUDED)
- 6 SHRUBS PER TREE

GENERAL NOTES

1. ALL PLANTING AND IRRIGATION SHALL BE INSTALLED PER LOCAL GOVERNING CODES.
2. TREES - FINAL QUANTITIES WILL BE DETERMINED DURING FINAL DESIGN.
   - DECIDUOUS TREES SHALL HAVE A 1-1/2" CA. AT TIME OF PLANTING.
   - EVERGREEN TREES SHALL BE A MIN. OF 6' HT. AT TIME OF PLANTING.
3. FINAL PLANT SELECTION AND LAYOUT WILL BE BASED ON SOUND HORTICULTURAL PRACTICES RELATING TO MICRO-CLIMATE, SOIL, AND WATER REGIMES. ALL TREES WILL BE STAKED SO AS TO REMAIN UPRIGHT AND PLUMB FOLLOWING INSTALLATION. PLANT SIZE AND QUALITY AT TIME OF PLANTING WILL BE PER CURRENT EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1).
4. ALL PLANTER BEDS WILL RECEIVE 3-INCH DEPTH OF MULCH WITH WEED CONTROL.
5. ALL LANDSCAPING WILL BE AUTOMATICALLY IRRIGATED UNLESS NOTED OTHERWISE ON THE PLAN. TURF GRASS WILL BE IRRIGATED USING LOW ANGLE SPRAY, ROTARY, AND/OR IMPACT HEADS TO REDUCE WIND DRIFT. CONTAINER PLANTINGS WILL BE DRIP IRRIGATED. A REDUCED-PRESSURE-TYPE BACKFLOW PREVENTOR WILL BE PROVIDED ON THE IRRIGATION SYSTEM AS REQUIRED PER CODE.
6. BUILDING FOOTPRINTS DEPICTED FOR ILLUSTRATIVE PURPOSES AND SUBJECT TO CHANGE.
7. STAGGERING OF FRONT YARD SETBACKS SHALL OCCUR WITH FINAL BUILDING FOOTPRINTS. A MINIMUM 2-FOOT FRONT YARD SETBACK DEVIATION SHALL BE PROVIDED FROM ALL ADJOINING PARCELS (AS MEASURED TO BUILDING FAÇADE). FRONT-LOAD GARAGES SHALL INCLUDE A MINIMUM SETBACK OF 20-FEET AND ARE NOT SUBJECT TO THE 2-FOOT OFFSET. FINAL PLOT PLANS SHALL DEPICT ADJOINING PARCELS TO DEMONSTRATE COMPLIANCE WITH THIS STANDARD AND SHALL BE CERTIFIED BY THE MASTER DEVELOPER AND PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEVADA.

PLANT LEGEND

- FLOWERING TREE
- DECIDUOUS SHADE TREE
- EVERGREEN TREES
- COMMON AREA LANDSCAPE INCLUDES
  - POCKET PARK AREA
  - TRAIL HEAD PARKING AREA

LANDSCAPE DATA

SITE AREA = 13,442,616 SQ FT (308.6 ACRES)

ZONING: SILVER KNOLLS SPECIFIC PLAN

REQUIRED LANDSCAPE AREA 20% OF DEVELOPED AREA INCLUDES
- FRONT YARDS
- COMMON AREA LANDSCAPE

TREES REQUIRED
- 1 PER 300 SQ FT OF COMMON AREA LANDSCAPING
- 1 PER 70 LN FT ALONG WEST SIDE OF RED ROCK ROAD
- 1 PER 50 LN FT ALONG SILVER HILLS BOULDEVARD
- 1 TREE PER LOT, 3 TREES PER CORNER LOT
- 1 TREE PER 10 PARKING SPACES

SHRUBS REQUIRED = 6 SHRUBS PER REQUIRED TREE

L.A. Studio Nevada
the landscape architecture studio
1552 C Street Sparks, NV 89431 (775) 323-2223 NV RLA #440
www.lastudionevada.com

REGISTERED LANDSCAPE ARCHITECT
RYAN HANSEN
440
5/10/2021
Expires: 6/30/2021
STATE OF NEVADA

Nevada

SILVER HILLS SPECIFIC PLAN

Lifestyle Homes

Washoe County

Preliminary Landscape Plan

No.	Revision Date

HLA No: 032-516-01-21
Designed: KRD
Drawn: KRD
Checked: RHH
Date: 5/10/2021

Sheet L1 of 1

SILVER HILLS WEST - PHASE 1
ASSESSOR'S SITE MAP
EAST 1/2 OF SECTION 23
TOWNSHIP 21 NORTH, RANGE 18 EAST
MOUNT DIABLO BASE AND MERIDIAN
COUNTY OF WASHOE STATE OF NEVADA

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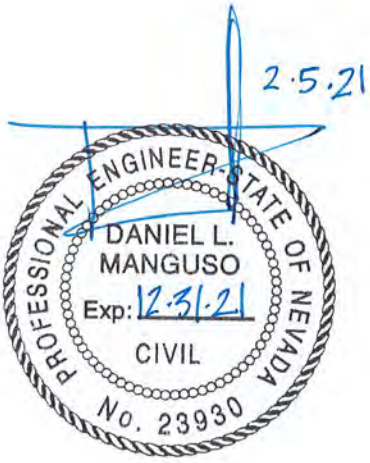
775.502.8552 christynv.com

CHRISTY
CORPORATION

PRELIMINARY DRAINAGE REPORT

SILVER HILLS



Prepared for:
Lifestyle Homes TND, LLC
4790 Caughlin Parkway, Suite 109
Reno, NV 89519

Prepared by:
Christy Corporation, Ltd.
1000 Kiley Parkway
Sparks, Nevada 89436

February 2021

PRELIMINARY DRAINAGE REPORT

SILVER HILLS

Prepared for:
Lifestyle Homes TND, LLC
4790 Caughlin Parkway, Suite 109
Reno, NV 89519

Prepared by:
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Sparks, Nevada 89436

February 2021

Introduction

This report presents the results of a hydrology analysis for Silver Hills in Red Rock, NV. Silver Hills consists of 780± acres located within the North Valleys Area Plan. Specifically, Silver Hills (APN #'s 087-390-10, 087-390-13, and 086-203-05) is located on the east and west sides of Red Rock Road, north of Silver Knolls. The project is separated from the Cold Springs Valley by a large ridgeline that runs along the western boundary of the project. Reference the attached vicinity map located in the appendix.

The purpose of this report is to summarize the off-site and on-site hydrology, and to provide preliminary volumetric hydraulic retention volumes. This report analyzes both the phase 1 and full buildout conditions.

Design Standards

Truckee Meadows Regional Drainage Manual - April 2009 (TMRDM)
NOAA Atlas 14 Point Precipitation Estimates (2013)

References

NOAA Atlas 14 Point Precipitation Estimates (2013)
USGS Web Soil Survey
Open-Channel Hydraulics [Chow, 1959]

Previous Studies

The following previous studies prepared in the general project site area were compiled and reviewed:
Preliminary Master Hydrology Report for Silver Hills Subdivision by Summit Engineering, March 2009
Preliminary Geotechnical Investigation for Silver Hills Subdivision by Summit Engineering, March 2009

Existing Conditions

The site topography consists of slopes from west – northwest to southeast, ranging from 2% to 20%. The site has native vegetation and is relatively undisturbed. The vegetation is primarily annual grasses and sagebrush, and the soils belong to the hydrologic soil groups A, C, and D as identified by the Natural Resources Conservation Services (NRCS). Refer to the Soil Map located in the Appendix of this report.

There are four offsite watersheds that drain to the site (reference the "Hydraulic Basin Map – Onsite/Existing" in the Appendix). Calculations for the offsite watersheds are summarized in Table A below.

TABLE A. MODEL PARAMETERS AND RESULTS – ONSITE/EXISTING

Basin	Area (AC)	CN	Q100 (cfs)
1A	230.5	71.69	291.7
2A	317.3	76.23	418.6
3A	168.2	77.00	272.6
4A	290.0	76.35	503.8

There are significant ephemeral drainages that run through Silver Hills and adjacent to the subject property. Silver Hills discharges to two separate points. The first is located southeast of the intersection of Red Rock Road and Silver Knolls Boulevard. The second is located south of Blackhawk Boulevard and discharges into existing ephemeral drainage. The drainages eventually discharge into Silver Lake southeast of the site.

FEMA's Flood Insurance Rate Maps (FIRM), lists the site as Zone X (unshaded), an area of minimal flooding. Please reference the FIRM in the appendix.

Methodology

SCS Curve Number

HEC-HMS by the U.S. Army Corp of Engineers was used to model the major onsite basins for both the existing and proposed conditions, and the required retention and detention storage volumes. The method used to determine loss rate and rainfall runoff method within the model was the SCS Curve number method. The SCS curve number Method uses the SCS runoff curve number (CN) loss rate, related to potential abstraction.

S=(100/CN)-10 where S (in.)=initial abstraction *(TMRDM 706)*

Curve numbers were chosen from Table 702 in the TMRDM (Appendix) by using data compiled from previous studies, the *Preliminary Geotechnical Investigation for Silver Hills Subdivision* by Summit Engineering, March 2009, and the soils map of the watershed is shown in the Appendix. Weighted curve numbers were calculated based on the soil types. Rainfall depth and intensity were determined using the NOAA Atlas 14 (Appendix).

Lag Times were calculated in tables 5 and 6 (Appendix) using formula 709 from the TMRDM. Formula 709 was used because all basins are all less than one square mile.

TLAG=0.6Tc (TRMD Equation 709)
TLAG = $(22.1)(k_n)(L*L_c/S^{0.5})^{0.33}$ = $(22.1)(0.013)((1.53)(0.7)/150^{0.5})^{0.33}$ (TRMD Equation 710)

The determination of the offsite drainage basin limits was obtained by analyzing USGS Quad Maps, Washoe County's GIS topography maps and Google Earth. Reference the basin maps located in the appendix.

The SCS curve number model did not take routing into consideration, therefore, the model is conservative. Routing of the peak flows will be included in the final design hydrology analysis to provide a more accurate attenuation of the peak flows.

Existing Onsite Hydrology

The overall site consists of 780± acres of undeveloped land and generates an existing total 5-year peak flow of 218.1 cfs and an existing total 100-year peak flow of 880.6 cfs. Reference Basins 5A through 10A in the "Onsite Existing Hydraulic Basin Map" located in the Appendix, and Table B below.

TABLE B. MODEL PARAMETERS AND RESULTS – EXISTING/ONSITE

Basin	Area (AC)	CN	Lag time (min)	Q5 (cfs)	Q100 (cfs)
5A	256.3	72.20	21.4	70.8	53.1
6A	284.0	62.25	18.8	31.6	291.9
7A	15.1	75.06	10.1	7.6	34.0
8A	203.0	73.60	10.9	89.3	422.5
9A	11.4	77.00	8.4	7.0	29.4
10A	18.9	77.00	8.1	11.8	49.7
			TOTAL	218.1	880.6

Proposed Onsite Hydrology

Proposed flows will be similar to the historical drainage patterns. Offsite and onsite flows will be captured and routed through and around the site via a network of channels, storm drains and ponds. Flows will be discharged to the two existing outlet points located southeast of the intersection of Red Rock Road and Silver Knolls Boulevard, and south of Blackhawk Boulevard. Reference the Proposed Onsite Hydraulic Basin Map located in the appendix of this report.

The two (2) separate outlet locations within Silver Hills were divided into 6 separate upstream drainage basins to facilitate a preliminary hydraulic analysis. A series of more detailed onsite basins will be created with the final development plans and corresponding hydrology report.

Detention / Retention

According to the Truckee Meadows Drainage Manual, any project must maintain the peak flow rates from the 5-year and 100-year 24-hour storm events at the same rate as before development. In addition, because the project site drains to ultimately drains to Silver Lake, flow volumes from the project area are not allowed to increase due to the impact that it could have on the water surface elevation in the Silver Lake Playa. 150% of the difference between the existing and proposed runoff volume must be retained on site and infiltrated. The design storm used to determine the volume of water that must be retained is the 100-year, 10-day storm event. Required detention and retention volumes were calculated.

HEC-HMS software was used to create a hydrologic model to calculate the flow rates from the design events for pre- and post-development conditions. In order to calculate the required detention storage volume for the site, the inflow hydrograph was calculated, the outflow limits were established and the required storage and outflow limitation was determined using a reservoir routing procedure. Retention volumes were calculated by taking the difference in runoff volumes between the existing and proposed conditions for the design storm event.

The parameters used in the models and the computed flow rates are summarized in Table C. The volume of runoff for both the 24-hour and 10-day periods were determined for both the pre- and post-conditions using data from NOAA Atlas 14 (at www.nws.noaa.gov/ohd/hdsc/). Weighted curve numbers were calculated based on soil types and a land use corresponding to "1/4 acre residential districts" per Table 702 in the Truckee Meadows Regional Drainage Manual.

Approximately 507.3 CFS and 1849.5 CFS of peak runoff are estimated for the proposed condition 5 and 100-year storm events respectively. Reference Table C below. Reference the Appendix for applicable HEC-HMS runoff volume calculations.

TABLE C. MODEL PARAMETERS AND RESULTS - PROPOSED

Basin	Area (AC)	CN	Lag time (min)	Q5 (cfs)	Q100 (cfs)
5A	256.3	84.17	13.2	180.2	623.2
6A	284.0	77.91	13.2	146.6	600.6
7A	15.1	85.85	9.8	13.3	44.1
8A	203.0	85.05	13.2	148.4	502.5
9A	11.4	77.00	8.4	7.0	29.4
10A	18.9	77.00	8.1	11.8	49.7
			TOTAL	507.3	1849.5

Basins 5A through 10A will require retention/detention basins to regulate flow to pre-development rates. The flow rates have increased in the Q5 24-hour event by 289.2 cfs and in the Q100 24-hour event by 968.9 cfs. The required retention volume for the 100 year 10-day storm is Q100 vol= 171.9 AC-FT which includes the 1.5 volume multiplier. Proposed retention basins will be placed within the site which will contain a total storage volume of 171.9± AC-FT. Detention basins will also be placed within the site to ensure that the 24-hour 5 year and 100 year peak discharges from each basin are limited to the pre-development rates.

Infiltration:

The design engineer shall design and provide supporting calculations for infiltration facilities. Design of said facilities are outside the scope of this study. Potential infiltration facility locations area shown on the "Infiltration Exhibit" located in the appendix.

The infiltration basins must be designed to infiltrate surface water into the ground. A properly designed infiltration basin will not hold water longer than 7 days. Additionally, the basin volume must be available for subsequent design storm events.

The final design infiltration rate used should be chosen by the design engineer in conjunction with the geotechnical engineer and should be based on the infiltration components selected, existing soil conditions, anticipated maintenance requirements, and an appropriate factor of safety to accommodate long term infiltration basin performance.

Phase 1 Hydrology

Phase 1 consists of 64.93± acres containing 358 single family residential units located at the north end of the Silver Hills site, west of Red Rock Road. Reference the vicinity map located in the appendix. Proposed Phase 1 flows will be similar to the historical drainage patterns. Offsite flows will be captured and routed through and around the site via a network of channels, storm drains and ponds. Flows will be discharged to an existing ephemeral channel located at the southeast corner of Silver Hills Phase 1, which ultimately discharges. Into the existing channel located near Blackhawk Boulevard. Reference the Existing Phase 1 Hydraulic Basin Map and Proposed Phase 1 Hydraulic Basin Map located in the appendix of this report.

Phase 1 Detention / Retention

Approximately 60.8 CFS and 203.9 CFS of peak runoff are estimated for the proposed condition 5 and 100-year storm events respectively. Reference Table E below. Reference the Appendix for applicable HEC-HMS runoff volume calculations.

TABLE D. MODEL PARAMETERS AND RESULTS – PHASE 1 EXISTING

Basin	Area (AC)	CN	Lag time (min)	Q5 (cfs)	Q100 (cfs)
4B	33.5	75.87	10.0	17.7	77.6
5B	31.2	72.78	10.3	13.4	65.3
			TOTAL	31.1	142.9

TABLE E. MODEL PARAMETERS AND RESULTS – PHASE 1 PROPOSED

Basin	Area (AC)	CN	Lag time (min)	Q5 (cfs)	Q100 (cfs)
4B	33.5	86.36	8.2	32.6	107.2
5B	31.2	84.59	8.2	28.2	96.7
			TOTAL	60.8	203.9

Basins 4B and 5B will require retention/detention basins to regulate flow to pre-development rates. The flow rates have increased in the Q5 24-hour event by 29.7 cfs and in the Q100 24-hour event by 61.0 cfs. The required retention volume for the 100 year 10-day storm is Q100 vol= 8.0 AC-FT which includes the 1.5 volume multiplier. Proposed retentions basins will be placed within the site which will contain a total storage volume of 8.0± AC-FT. Detention basins will also be placed within the site to ensure that the 24-hour 5 year and 100 year peak discharges from each basin are limited to the pre-development rates.

Conclusion

This report presents the findings of a detailed drainage analysis of Silver Hills. The project is located within the Silver Lake drainage basin. It receives flows from several ephemeral drainages, west of the site. The existing flows

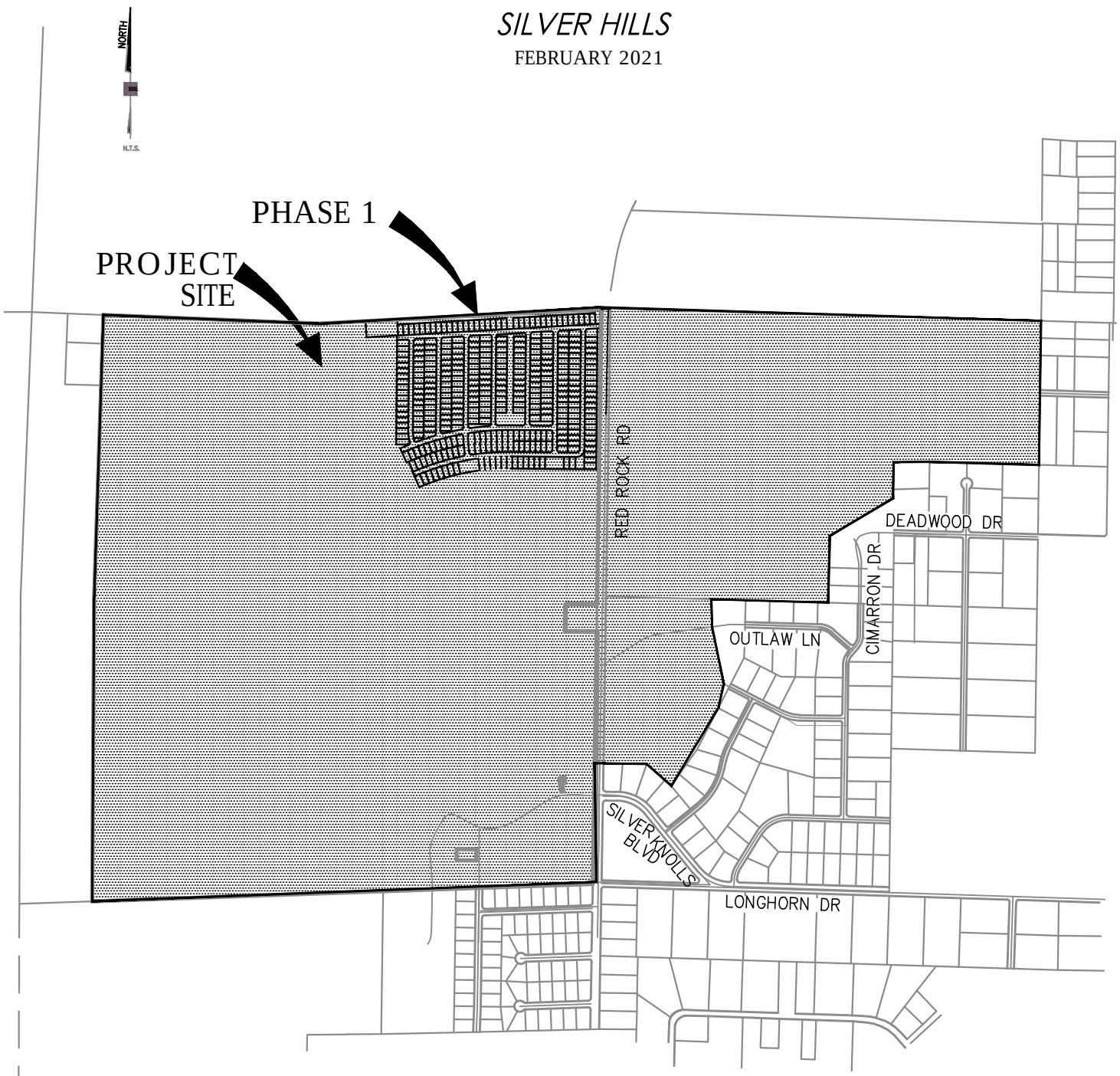
will be routed around and through the project site. The existing stormwater flows for the 5 and 100 year storm events have been analyzed. Onsite flow rates for the required design storms (5 and 100 year) will increase due to the paving of relatively permeable soils, and building construction on the project site. 150% of the increased volume from the 100-year, 10-day storm will be retained onsite and allowed to infiltrate within a retention/detention basin. Preliminary hydraulic volumetric retention calculations are provided with this report. The project can be developed without disturbing the integrity of the requirements outlined in the *Truckee Meadows Regional Drainage Manual*. The onsite storm drainage system is designed to convey storm flows per the TMRDM.

APPENDIX

VICINITY MAP

SILVER HILLS

FEBRUARY 2021



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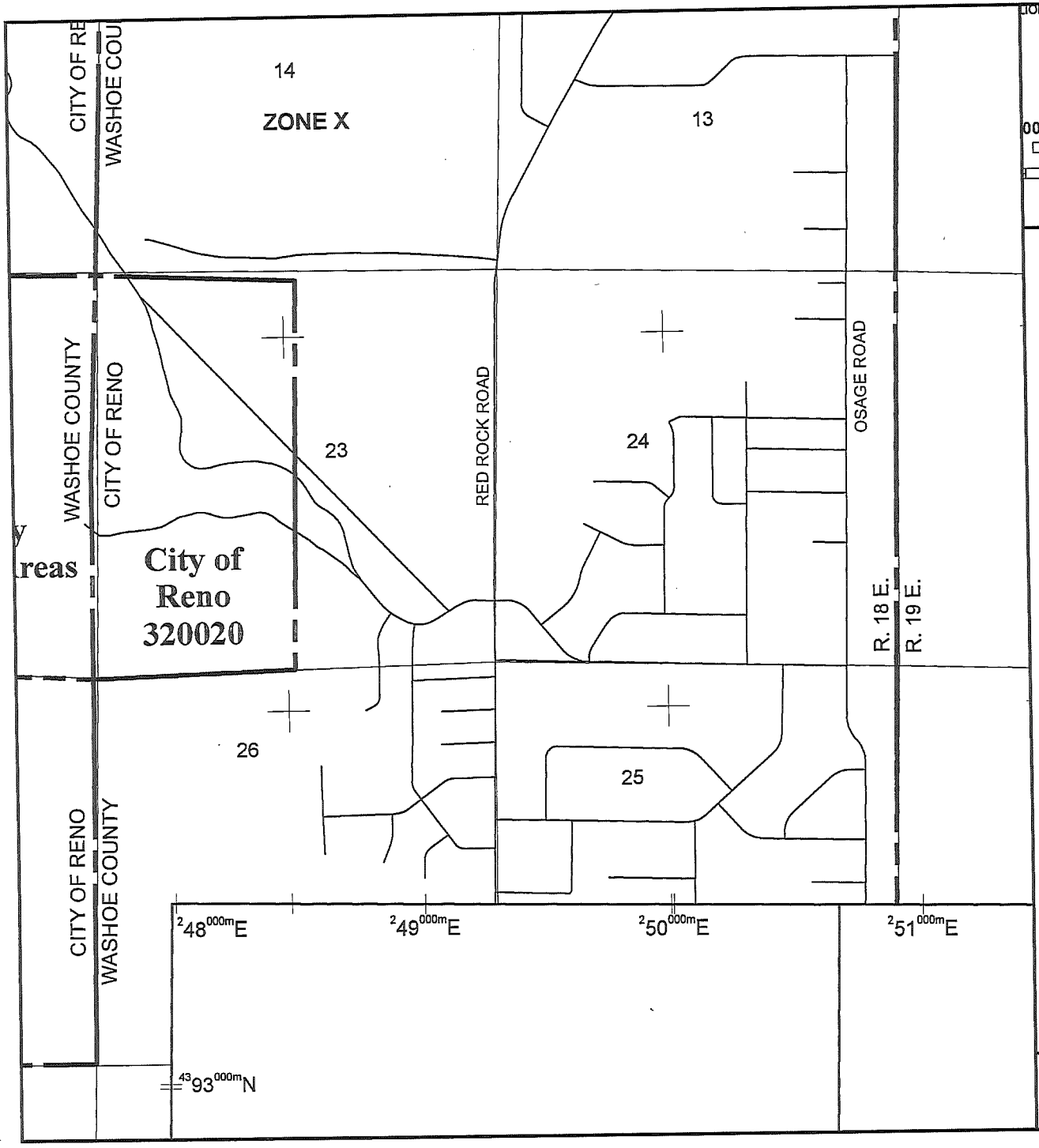
G:\Jobs\Silver Hills\Hydrology\Exh_Vicinity Map.dwg 2/03/21 3:28pm dmanguso



tional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

000 0 2000 4000

FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2825G

FIRM

FLOOD INSURANCE RATE MAP

WASHOE COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2825 OF 3475

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RENO, CITY OF	320020	2825	G
WASHOE COUNTY	320019	2825	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
32031C2825G

MAP REVISED
MARCH 16, 2009

Federal Emergency Management Agency

BASIN MAPS

HYDRAULIC BASIN MAP - OVERALL/EXISTING

SILVER HILLS

FEBRUARY 2021

BASIN 1
A= 229.4 AC
Q_{100P} :290.5 CFS

BASIN 2
A= 743.0 AC
Q_{100P} :803.4 CFS

BASIN 3
A= 574.6 AC
Q_{100P} :529.3 CFS

BASIN 4
A= 213.3 AC
Q_{100P} :293.1 CFS

BASIN 5
A= 11.4 AC
Q_{100P} :29.1 CFS

BASIN 6
A= 18.9 AC
Q_{100P} :49.1 CFS

BASIN 7
A= 15.1 AC
Q_{100P} :31.4 CFS

PROPERTY LINE

FLOW LINE (TYP)

RED ROCK ROAD

NORTH

0 600 1200
FEET

HYDRAULIC BASIN MAP - OVERALL/EXISTING

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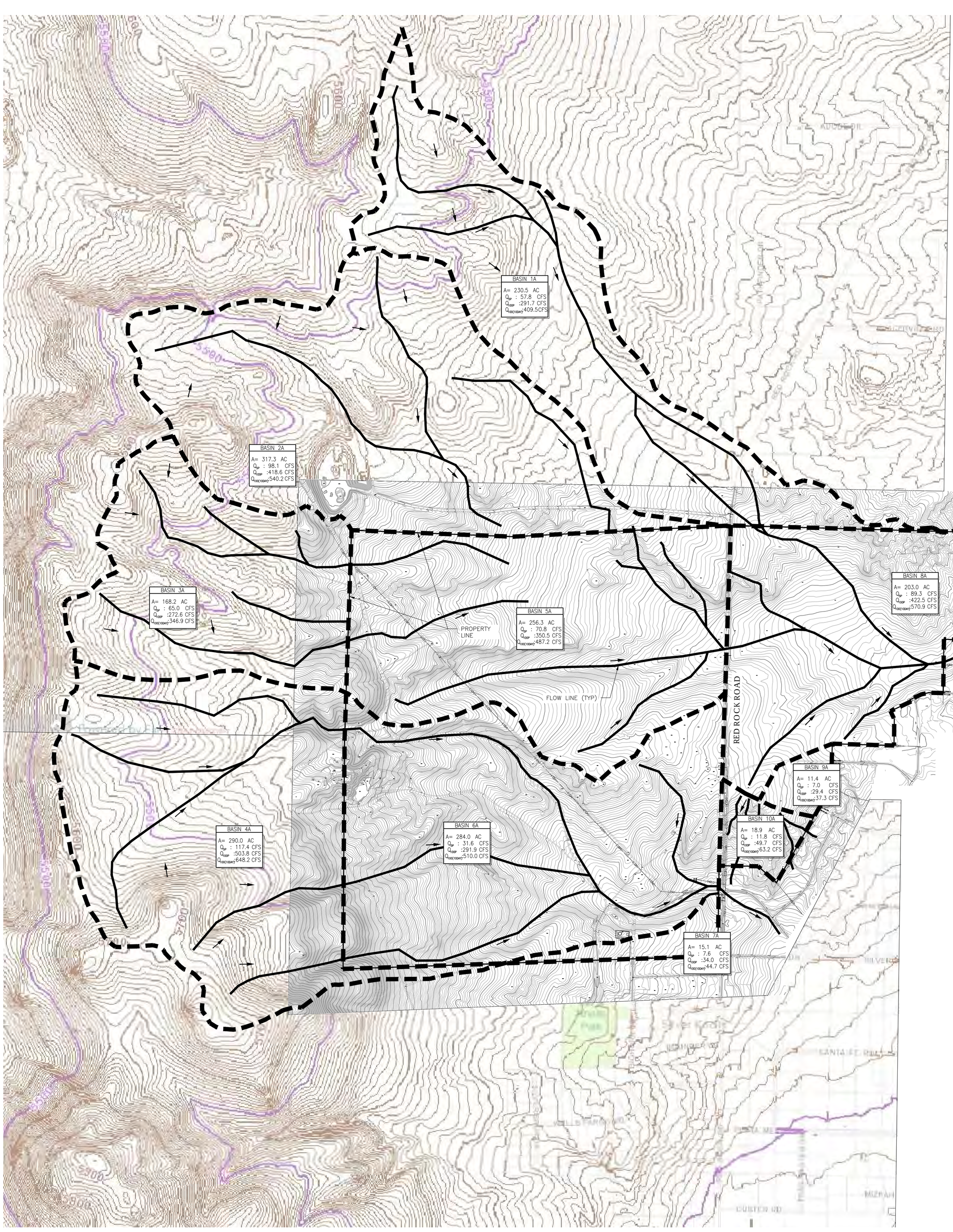
HYDRAULIC BASIN MAP - ONSITE/EXISTING

SILVER HILLS

FEBRUARY 2021



HYDRAULIC BASIN MAP - ONSITE/EXISTING

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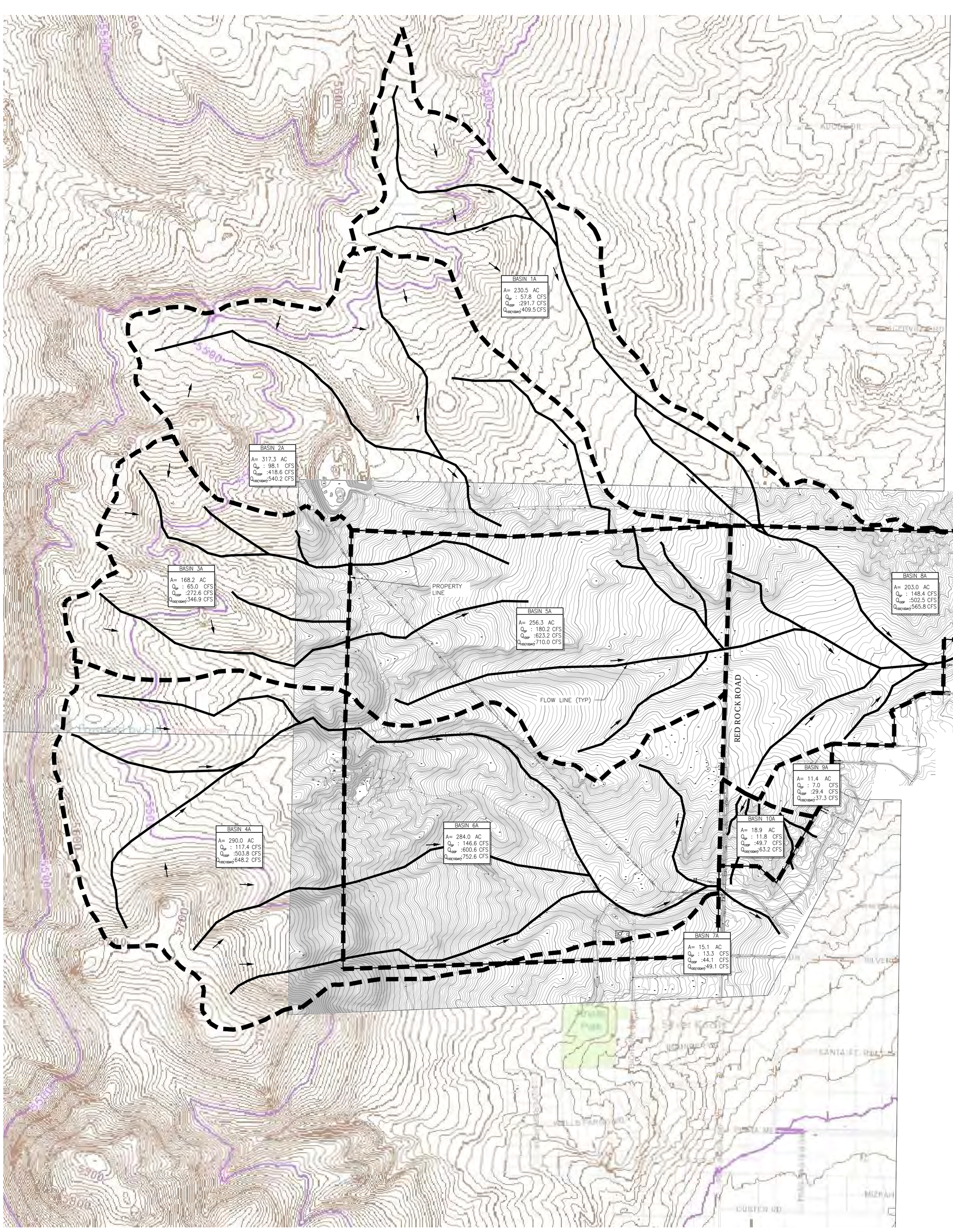
HYDRAULIC BASIN MAP - ONSITE/PROPOSED

SILVER HILLS

FEBRUARY 2021



HYDRAULIC BASIN MAP - ONSITE/PROPOSED

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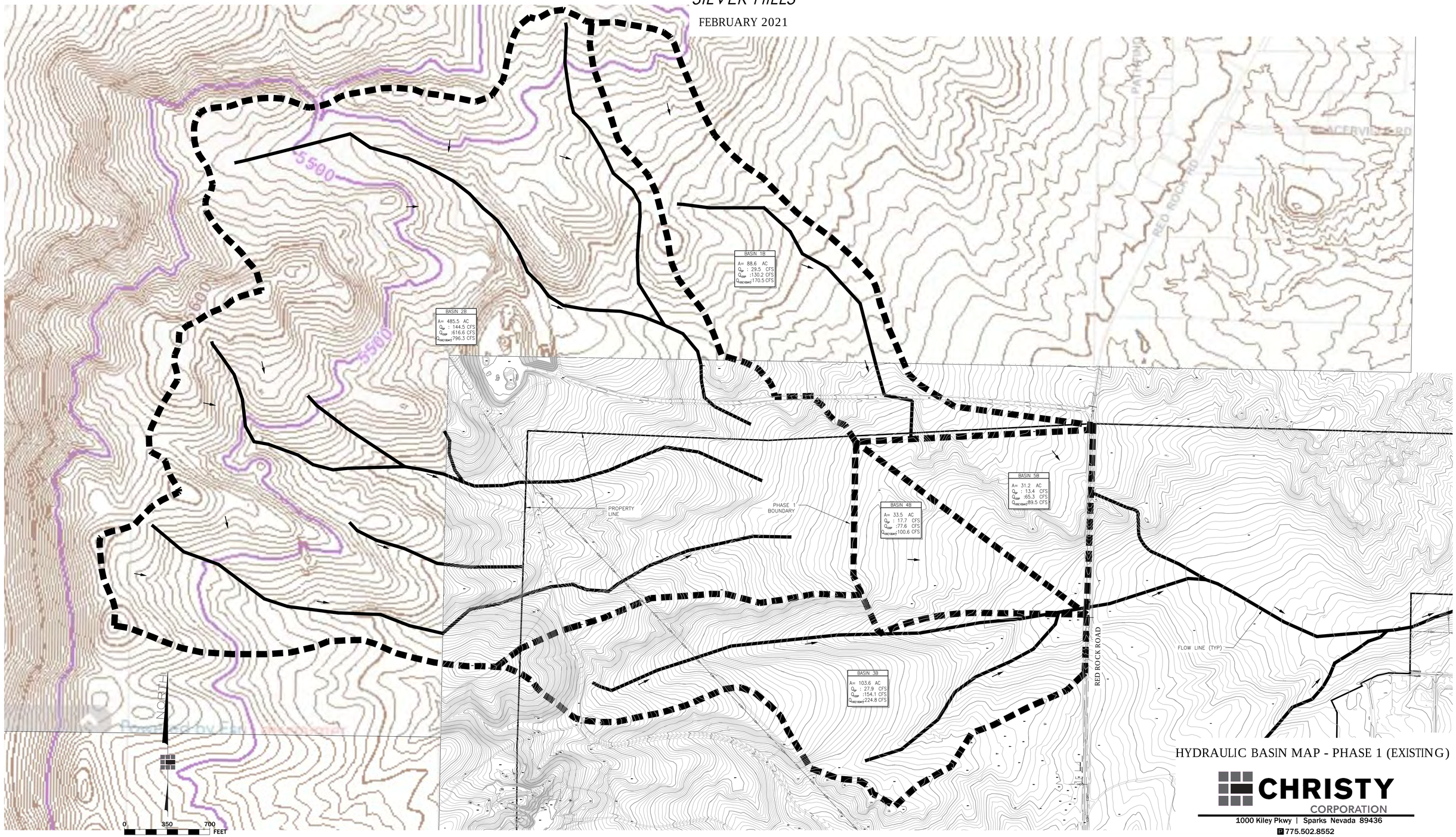
HYDRAULIC BASIN MAP - PHASE 1 EXISTING

SILVER HILLS

FEBRUARY 2021



HYDRAULIC BASIN MAP - PHASE 1 (EXISTING)

CHRISTY CORPORATION

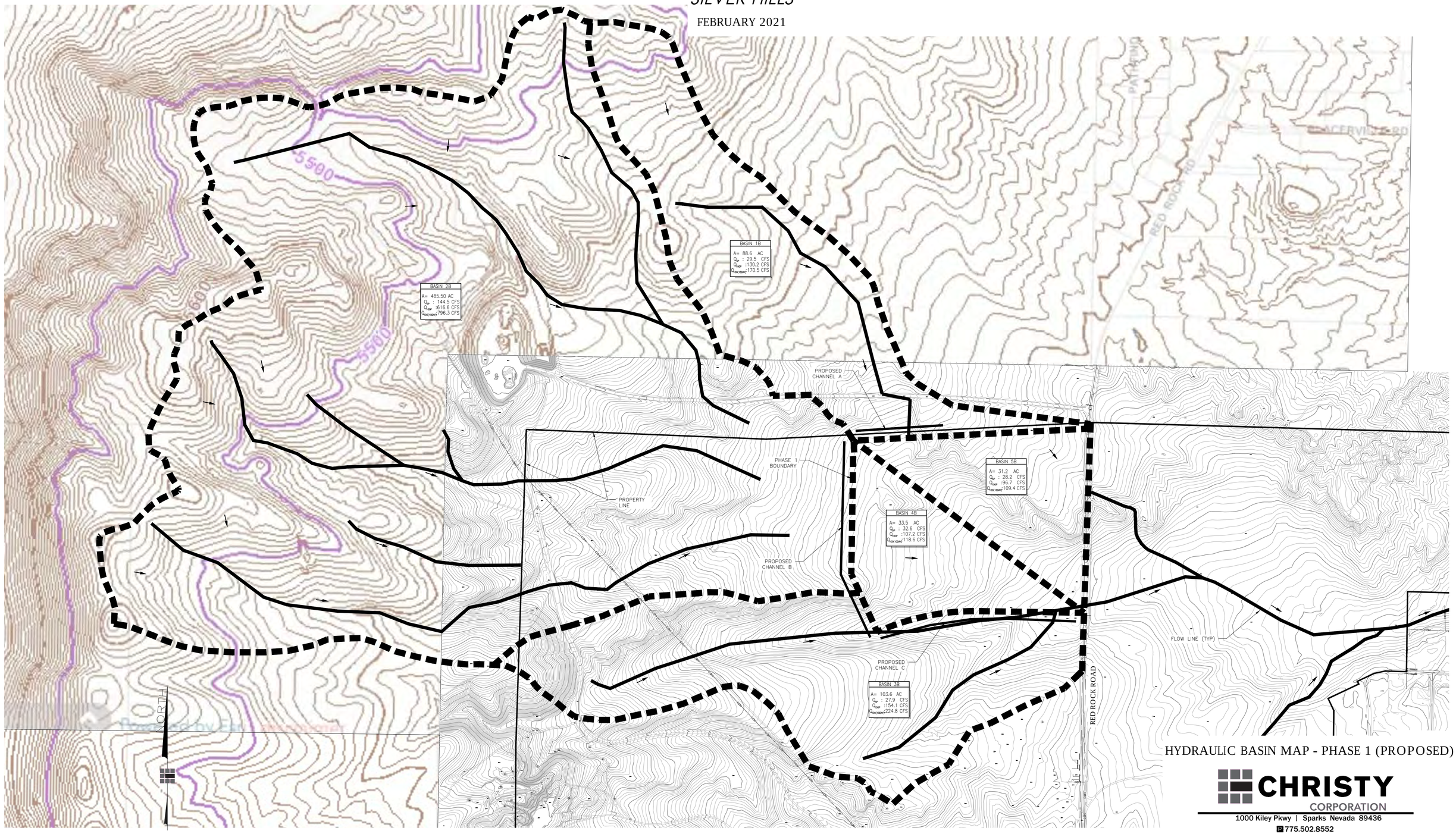
1000 Kiley Pkwy | Sparks Nevada 89436

P 775.502.8552

HYDRAULIC BASIN MAP - PHASE 1 (PROPOSED)

SILVER HILLS

FEBRUARY 2021



HYDRAULIC BASIN MAP - PHASE 1 (PROPOSED)

CHRISTY CORPORATION

1000 Kiley Pkwy | Sparks Nevada 89436

P 775.502.8552

NOAA ATLAS 14
PRECIPITATION FREQUENCY ESTIMATES

NOAA Atlas 14, Volume 1, Version 5
Location name: Reno, Nevada, USA*
Latitude: 39.6694°, Longitude: -119.9296°
Elevation: 5150.17 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.112** (0.094-0.129)	**0.139** (0.117-0.162)	**0.185** (0.157-0.218)	**0.230** (0.195-0.273)	**0.306** (0.254-0.368)	**0.378** (0.306-0.461)	**0.466** (0.366-0.576)	**0.575** (0.435-0.723)	**0.753** (0.540-0.977)	**0.921** (0.633-1.22)
10-min	**0.171** (0.143-0.196)	**0.212** (0.178-0.247)	**0.282** (0.239-0.333)	**0.350** (0.297-0.415)	**0.466** (0.387-0.560)	**0.576** (0.467-0.702)	**0.710** (0.558-0.878)	**0.874** (0.662-1.10)	**1.15** (0.822-1.49)	**1.40** (0.964-1.86)
15-min	**0.212** (0.178-0.243)	**0.263** (0.221-0.306)	**0.349** (0.297-0.412)	**0.434** (0.368-0.515)	**0.578** (0.480-0.695)	**0.714** (0.578-0.870)	**0.880** (0.691-1.09)	**1.08** (0.821-1.37)	**1.42** (1.02-1.85)	**1.74** (1.20-2.31)
30-min	**0.285** (0.239-0.328)	**0.354** (0.298-0.412)	**0.471** (0.399-0.556)	**0.584** (0.495-0.693)	**0.778** (0.646-0.935)	**0.962** (0.779-1.17)	**1.19** (0.930-1.47)	**1.46** (1.11-1.84)	**1.91** (1.37-2.48)	**2.34** (1.61-3.11)
60-min	**0.353** (0.296-0.406)	**0.438** (0.369-0.510)	**0.583** (0.494-0.688)	**0.723** (0.613-0.858)	**0.963** (0.800-1.16)	**1.19** (0.964-1.45)	**1.47** (1.15-1.81)	**1.81** (1.37-2.28)	**2.37** (1.70-3.08)	**2.90** (1.99-3.84)
2-hr	**0.471** (0.418-0.539)	**0.586** (0.521-0.671)	**0.749** (0.658-0.859)	**0.894** (0.776-1.02)	**1.12** (0.951-1.29)	**1.33** (1.10-1.54)	**1.57** (1.27-1.85)	**1.89** (1.49-2.30)	**2.48** (1.87-3.11)	**3.03** (2.22-3.88)
3-hr	**0.579** (0.521-0.653)	**0.718** (0.650-0.814)	**0.894** (0.804-1.01)	**1.04** (0.929-1.18)	**1.26** (1.10-1.43)	**1.45** (1.25-1.66)	**1.67** (1.42-1.94)	**2.00** (1.67-2.35)	**2.57** (2.08-3.14)	**3.11** (2.45-3.92)
6-hr	**0.871** (0.789-0.970)	**1.08** (0.980-1.21)	**1.33** (1.20-1.48)	**1.52** (1.36-1.70)	**1.77** (1.57-1.99)	**1.96** (1.72-2.22)	**2.15** (1.87-2.45)	**2.39** (2.05-2.76)	**2.90** (2.44-3.39)	**3.40** (2.83-4.01)
12-hr	**1.24** (1.11-1.37)	**1.54** (1.39-1.72)	**1.93** (1.73-2.15)	**2.24** (2.00-2.50)	**2.64** (2.34-2.97)	**2.96** (2.59-3.35)	**3.28** (2.84-3.75)	**3.60** (3.08-4.16)	**4.04** (3.37-4.74)	**4.40** (3.61-5.24)
24-hr	**1.65** (1.48-1.86)	**2.08** (1.86-2.34)	**2.66** (2.37-2.99)	**3.13** (2.78-3.52)	**3.79** (3.34-4.28)	**4.32** (3.77-4.89)	**4.87** (4.21-5.57)	**5.45** (4.65-6.28)	**6.27** (5.25-7.31)	**6.91** (5.69-8.16)
2-day	**2.07** (1.82-2.36)	**2.62** (2.31-3.00)	**3.42** (3.00-3.91)	**4.08** (3.57-4.67)	**5.02** (4.34-5.78)	**5.79** (4.94-6.71)	**6.60** (5.57-7.73)	**7.48** (6.22-8.85)	**8.73** (7.10-10.5)	**9.74** (7.78-11.9)
3-day	**2.30** (2.02-2.63)	**2.93** (2.58-3.36)	**3.89** (3.40-4.46)	**4.68** (4.07-5.38)	**5.82** (5.01-6.73)	**6.76** (5.75-7.86)	**7.78** (6.52-9.12)	**8.87** (7.33-10.5)	**10.4** (8.42-12.6)	**11.8** (9.29-14.4)
4-day	**2.53** (2.22-2.91)	**3.24** (2.84-3.73)	**4.35** (3.80-5.01)	**5.28** (4.58-6.08)	**6.62** (5.68-7.67)	**7.73** (6.55-9.01)	**8.95** (7.47-10.5)	**10.3** (8.43-12.2)	**12.2** (9.74-14.7)	**13.8** (10.8-16.8)
7-day	**3.02** (2.62-3.52)	**3.90** (3.37-4.55)	**5.30** (4.57-6.19)	**6.45** (5.54-7.54)	**8.11** (6.88-9.52)	**9.47** (7.95-11.2)	**11.0** (9.07-13.1)	**12.5** (10.2-15.1)	**14.8** (11.8-18.2)	**16.7** (13.1-20.8)
10-day	**3.47** (3.01-4.03)	**4.49** (3.90-5.21)	**6.11** (5.29-7.10)	**7.41** (6.40-8.62)	**9.25** (7.89-10.8)	**10.7** (9.07-12.6)	**12.3** (10.3-14.6)	**14.0** (11.5-16.8)	**16.4** (13.2-20.0)	**18.4** (14.5-22.6)
20-day	**4.52** (3.94-5.22)	**5.87** (5.11-6.79)	**7.97** (6.93-9.21)	**9.59** (8.31-11.1)	**11.8** (10.1-13.6)	**13.4** (11.5-15.6)	**15.2** (12.8-17.8)	**17.1** (14.3-20.3)	**19.8** (16.2-23.8)	**21.9** (17.6-26.7)
30-day	**5.41** (4.72-6.27)	**7.04** (6.15-8.15)	**9.55** (8.32-11.0)	**11.5** (9.95-13.2)	**14.0** (12.1-16.2)	**16.0** (13.7-18.5)	**18.0** (15.3-21.0)	**20.1** (16.8-23.7)	**23.1** (19.1-27.6)	**25.6** (20.8-30.9)
45-day	**6.60** (5.77-7.50)	**8.60** (7.51-9.77)	**11.6** (10.1-13.2)	**13.8** (12.0-15.7)	**16.7** (14.5-19.0)	**18.9** (16.3-21.6)	**21.1** (18.0-24.3)	**23.3** (19.7-27.1)	**26.6** (22.2-31.2)	**29.2** (24.1-34.6)
60-day	**7.60** (6.61-8.66)	**9.95** (8.65-11.3)	**13.4** (11.7-15.3)	**15.9** (13.8-18.0)	**19.0** (16.4-21.6)	**21.2** (18.2-24.3)	**23.5** (20.0-27.0)	**25.6** (21.7-29.7)	**28.8** (24.0-33.6)	**31.1** (25.7-36.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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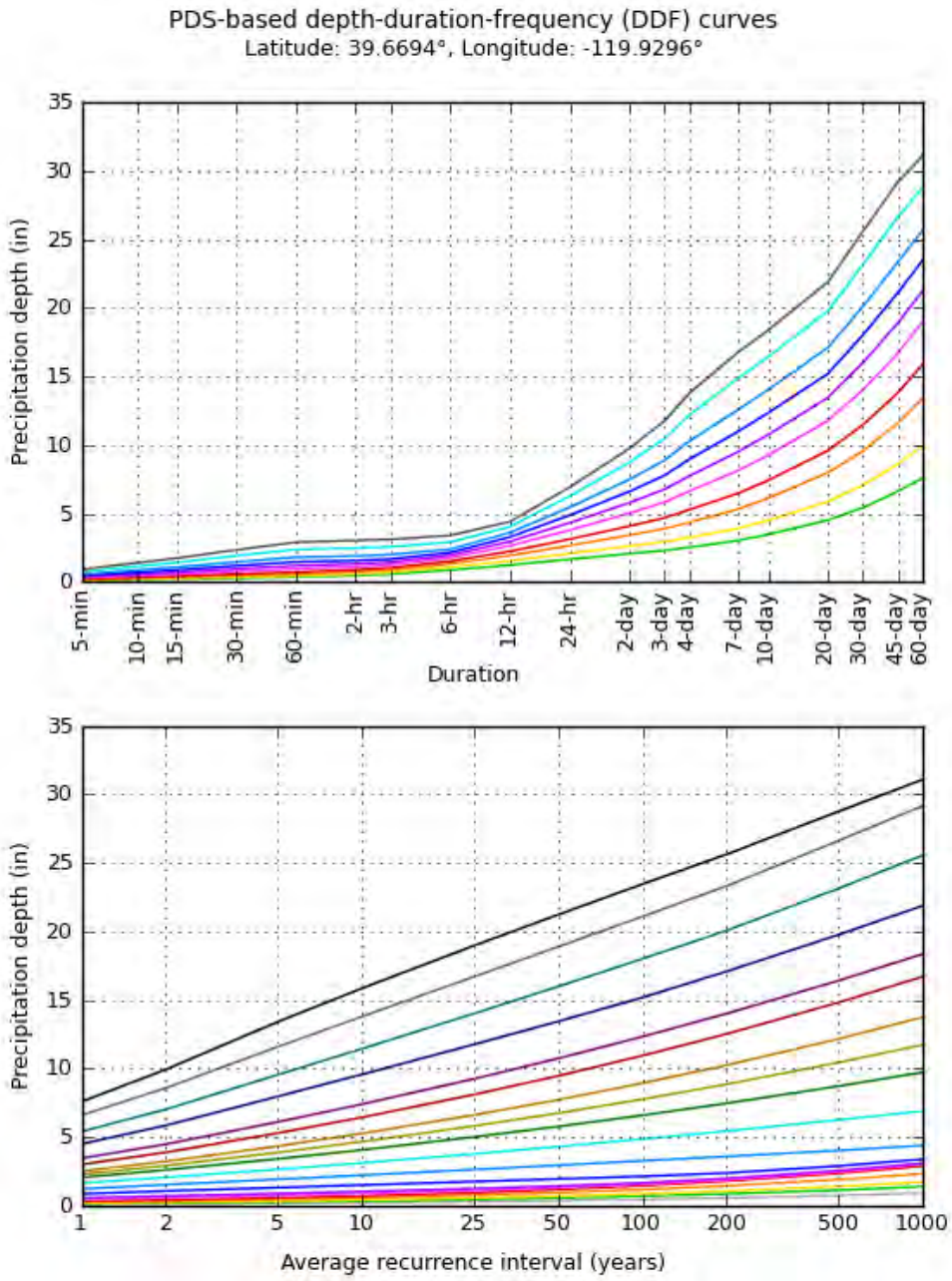
PF graphical



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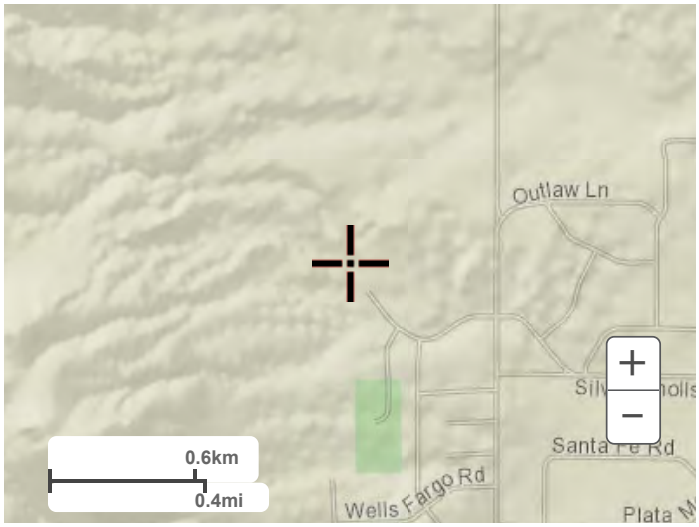
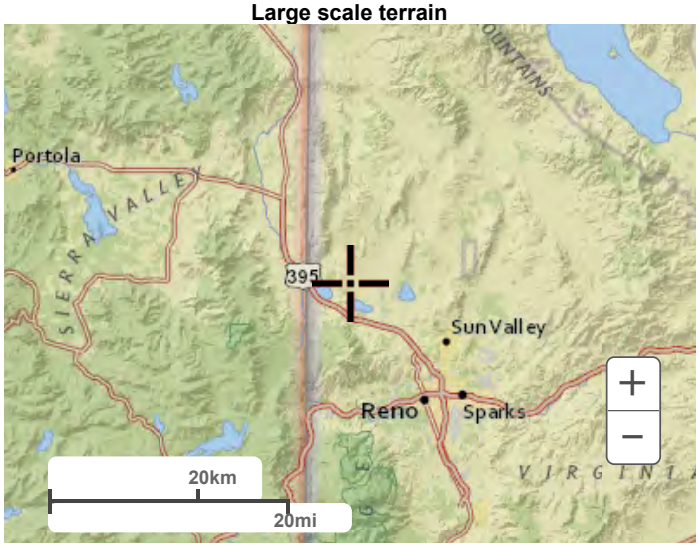
Maps & aerials

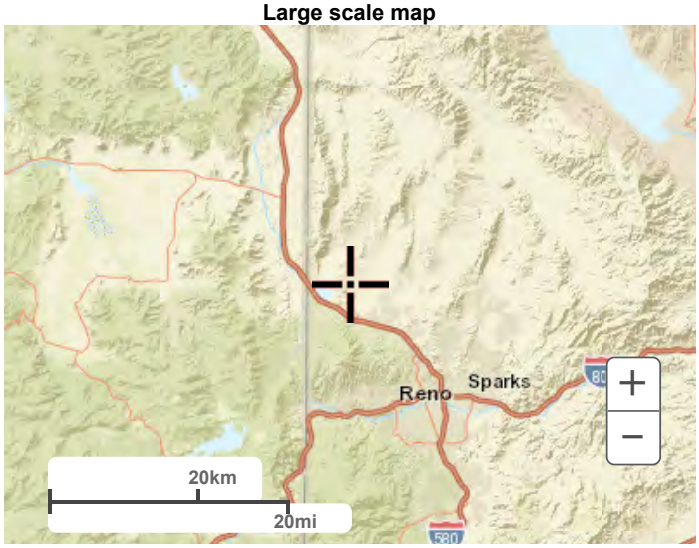
Small scale terrain



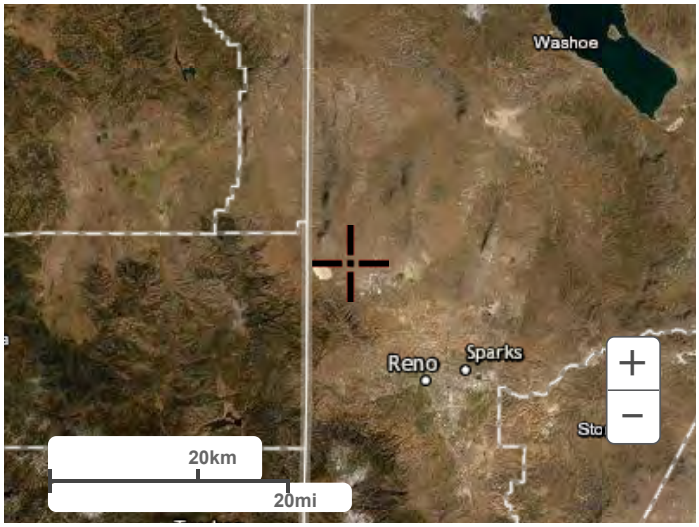
Large scale terrain



Large scale map



Large scale aerial



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SCS METHOD

CHRISTY CORPORATION

CURVE NUMBER CALCULATIONS

EXISTING

Basin	Acreage	Soil Group A (35)	B (56)	C (70)	D (77)	Curve Number
1	229.38	22.44	0	43.8	163.14	71.55
2	743.017	13.54	0	127.3	602.18	75.04
3	574.5543	97.82	0	35.14	441.59	69.42
4	213.3007	0.00	0	108.4	104.90	73.44
5	11.35396	0.00	0	0	11.35	77.00
6	18.91341	0.00	0	0	18.91	77.00
7	15.0681	0.33	0	2.85	11.89	74.76

Basin	Acreage	Soil Group A (35)	B (56)	C (70)	D (77)	Curve Number
1A	230.46	22.01	0	42.85	165.60	71.69
2A	317.29	2.50	0	19.7	295.09	76.23
3A	168.24	0.00	0	0	168.24	77.00
4A	290.01	3.65	0	4.95	281.41	76.35
5A	256.26	11.51	0	106.76	137.99	72.20
6A	284.00	93.85	0	35.34	154.81	62.25
7A	15.07	0.28	0	2.5	12.29	75.06
8A	203.04	0.00	0	98.74	104.30	73.60
9A	11.35	0.00	0	0	11.35	77.00
10A	18.91	0.00	0	0	18.91	77.00

Basin	Acreage	Soil Group A (35)	B (56)	C (70)	D (77)	Curve Number
1B	88.60	2.54	0	5.73	80.33	75.34
2B	485.50	0.00	0	57.44	428.06	76.17
3B	103.64	11.14	0	40.16	52.34	69.77
4B	33.50	0.00	0	5.4	28.10	75.87
5B	31.20	0.00	0	18.81	12.39	72.78

PROPOSED

Basin	Acreage	Soil Group A (61)	B (75)	C (83)	D (87)	Curve Number
5A	256.26	11.51	0	106.76	137.99	84.17
6A	284.00	93.85	0	35.34	154.81	77.91
7A	15.07	0.28	0	2.5	12.29	85.85
8A	203.04	0.00	0	98.74	104.30	85.05
4B	33.50	0.00	0	5.4	28.10	86.36
5B	31.20	0.00	0	18.81	12.39	84.59

CHRISTY CORPORATION

TABLE 1
TIME OF CONCENTRATION - OVERALL/EXISTING
Silver Hills

STANDARD FORM 2

SUB-BASIN DATA				INITIAL / OVERLAND TIME (t_i)			TRAVEL TIME (t_t)				t_c ($t_i + t_t$)	t_c URBANIZED BASINS CHECK		FINAL t_c	FINAL t_c	REMARKS
Desig:	R	Area Ac	Urban? Y / N	Length Ft	Slope %	t_i Min	Length Ft	Slope %	Vel. FPS	t_t Min	t_c Min	Len Ft	t_c (L/180) + 10 Min	Min	Hr	
(1)	(2)	(3)		(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)		
PROPOSED CONDITIONS																
1		229.38	Y	250	20.0	11.5	7921	5.6	4.8	27.6	39.1	8171	55.4	39.1	0.65	
2		743.02	Y	950	13.7	25.5	8476	4.6	4.4	32.3	57.8	9426	62.4	57.8	0.96	
3		574.55	Y	1000	15.0	25.4	9174	5.7	4.8	31.7	57.0	10174	66.5	57.0	0.95	
4		213.30	Y	550	4.4	28.3	4433	2.6	3.3	22.6	50.9	4983	37.7	37.7	0.63	
5		11.35	Y	50	2.0	11.1	850	4.8	4.5	3.2	14.3	900	15.0	14.3	0.24	
6		18.91	Y	50	2.0	11.1	847	6.8	5.3	2.7	13.8	897	15.0	13.8	0.23	
7		15.07	Y	50	2.0	11.1	2161	4.5	4.3	8.4	19.5	2211	22.3	19.5	0.32	

(9) Travel time velocity curves from Figure 701:

Non-urban = "nearly bare and untilled"

$$t_i = 1.8\,(1.1 - R)\,L^{1/2} / S^{1/3}$$

Urban = "paved area (sheet flow) and shallow gutter flow"

CHRISTY CORPORATION

TABLE 2
TIME OF CONCENTRATION - EXISTING / ONSITE
Silver Hills

STANDARD FORM 2

SUB-BASIN DATA				INITIAL / OVERLAND TIME (t_i)			TRAVEL TIME (t_t)				t_c ($t_i + t_t$)	t_c URBANIZED BASINS CHECK		FINAL t_c	FINAL t_c	REMARKS
Desig: (1)	R (2)	Area Ac (3)	Urban? Y / N	Length Ft (4)	Slope % (5)	t_i Min (6)	Length Ft (7)	Slope % (8)	Vel. FPS (9)	t_t Min (10)	t_c Min (11)	Len Ft (12)	t_c (L/180) + 10 Min (13)	Min (14)	Hr	
PROPOSED CONDITIONS																
1A		230.46	Y	250	20.0	11.5	7963	5.5	4.7	28.0	39.5	8213	55.6	39.5	0.66	
2A		317.29	Y	950	13.7	25.5	5403	5.0	4.5	19.9	45.4	6353	45.3	45.3	0.75	
3A		168.24	Y	917	3.1	41.1	3370	7.2	5.4	10.3	51.4	4287	33.8	33.8	0.56	
4A		290.01	Y	550	20.0	17.1	4341	8.7	6.0	12.1	29.2	4891	37.2	29.2	0.49	
5A		256.26	Y	550	20.0	17.1	4279	3.6	3.9	18.5	35.6	4829	36.8	35.6	0.59	
6A		284.00	Y	100	20.0	7.3	5844	4.0	4.0	24.1	31.4	5944	43.0	31.4	0.52	
7A		15.07	Y	100	20.0	7.3	2299	3.9	4.0	9.6	16.9	2399	23.3	16.9	0.28	
8A		203.04	Y	50	20.0	5.2	3033	3.7	3.9	12.9	18.1	3083	27.1	18.1	0.30	
9A		11.35	Y	50	2.0	11.1	796	4.8	4.5	3.0	14.1	846	14.7	14.1	0.23	
10A		18.91	Y	50	2.0	11.1	776	6.8	5.3	2.4	13.6	826	14.6	13.6	0.23	

(9) Travel time velocity curves from Figure 701:

Non-urban = "nearly bare and untilled"

$$t_i = 1.8\,(1.1 - R)\,L^{1/2} / S^{1/3}$$

Urban = "paved area (sheet flow) and shallow gutter flow"

CHRISTY CORPORATION

TABLE 3
TIME OF CONCENTRATION - PROPOSED / ONSITE
Silver Hills

SUB-BASIN DATA				INITIAL / OVERLAND TIME (t_i)			TRAVEL TIME (t_t)				t_c ($t_i + t_t$)	t_c URBANIZED BASINS CHECK		FINAL t_c	FINAL t_c	REMARKS
Desig:	R	Area Ac	Urban? Y / N	Length Ft	Slope %	t_i Min	Length Ft	Slope %	Vel. FPS	t_t Min	t_c Min	Len Ft	t_c (L/180) + 10 Min	Min	Hr	
(1)	(2)	(3)		(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)		
PROPOSED CONDITIONS																
5A		256.26	Y	150	2.0	19.2	2000	2.0	2.9	11.6	30.9	2150	21.9	21.9	0.37	
6A		284.00	Y	150	2.0	19.2	2000	2.0	2.9	11.6	30.9	2150	21.9	21.9	0.37	
7A		15.07	Y	150	2.0	19.2	1000	2.0	2.9	5.8	25.1	1150	16.4	16.4	0.27	
8A		203.04	Y	150	2.0	19.2	2000	2.0	2.9	11.6	30.9	2150	21.9	21.9	0.37	

STANDARD FORM 2

(9) Travel time velocity curves from Figure 701:

Non-urban = "nearly bare and untilled"

Urban = "paved area (sheet flow) and shallow gutter flow"

$$t_i = 1.8\,(1.1 - R)\,L^{1/2} / S^{1/3}$$

CHRISTY CORPORATION

TABLE 4
TIME OF CONCENTRATION - EXISTING / PHASE 1
Silver Hills

STANDARD FORM 2

SUB-BASIN DATA				INITIAL / OVERLAND TIME (t_i)			TRAVEL TIME (t_t)				t_c ($t_i + t_t$)	t_c URBANIZED BASINS CHECK		FINAL t_c	FINAL t_c	REMARKS
Desig:	R	Area Ac	Urban? Y / N	Length Ft	Slope %	t_i Min	Length Ft	Slope %	Vel. FPS	t_t Min	t_c Min	Len Ft	t_c (L/180) + 10 Min	Min	Hr	
(1)	(2)	(3)		(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)		
PROPOSED CONDITIONS																
1B		88.60	Y	1700	10.0	37.9	3165	2.6	3.3	16.1	54.0	4865	37.0	37.0	0.62	
2B		485.50	Y	520	3.8	28.9	6291	5.0	4.5	23.2	52.1	6811	47.8	47.8	0.80	
3B		103.64	Y	550	20.0	17.1	3942	9.9	6.4	10.3	27.4	4492	35.0	27.4	0.46	
4B		33.50	Y	50	2.0	11.1	1440	4.6	4.4	5.5	16.6	1490	18.3	16.6	0.28	
5B		31.20	Y	50	2.0	11.1	1575	4.6	4.4	6.0	17.1	1625	19.0	17.1	0.29	

(9) Travel time velocity curves from Figure 701:

Non-urban = "nearly bare and untilled"

$$t_i = 1.8\,(1.1 - R)\,L^{1/2} / S^{1/3}$$

Urban = "paved area (sheet flow) and shallow gutter flow"

CHRISTY CORPORATION

TABLE 5
TIME OF CONCENTRATION - PROPOSED / PHASE 1
Silver Hills

SUB-BASIN DATA				INITIAL / OVERLAND TIME (t_i)			TRAVEL TIME (t_t)				t_c ($t_i + t_t$)	t_c URBANIZED BASINS CHECK		FINAL t_c	FINAL t_c	REMARKS
Desig:	R	Area Ac	Urban? Y / N	Length Ft	Slope %	t_i Min	Length Ft	Slope %	Vel. FPS	t_t Min	t_c Min	Len Ft	t_c (L/180) + 10 Min	Min	Hr	
(1)	(2)	(3)		(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)		
PROPOSED CONDITIONS																
4B		33.50	Y	150	2.0	19.2	500	2.0	2.9	2.9	22.1	650	13.6	13.6	0.23	
5B		31.20	Y	150	2.0	19.2	500	2.0	2.9	2.9	22.1	650	13.6	13.6	0.23	

STANDARD FORM 2

(9) Travel time velocity curves from Figure 701:

Non-urban = "nearly bare and untilled"

Urban = "paved area (sheet flow) and shallow gutter flow"

$$t_i = 1.8\,(1.1 - R)\,L^{1/2} / S^{1/3}$$

CHRISTY CORPORATION

TABLE 6
SCS LAG TIME CALCULATIONS - OVERALL/EXISTING
Silver Hills

SUB-AREA	Tc	Kn	SLOPE (ft/ft)	LENGTH (ft)	Lc (ft)	Tlag (min)
1	39.14	-	-	-	-	23.5
2	57.85	-	-	-	-	34.7
3	57.05	-	-	-	-	34.2
4	37.68	-	-	-	-	22.6
5	14.28	-	-	-	-	8.6
6	13.78	-	-	-	-	8.3
7	19.48	-	-	-	-	11.7

METHODOLOGY

Tlag=22.1(Kn)[(LLc/S^0.5)]^0.33 (formula 710) For larger drainage basins (greater than one square mile) and basins with a basin slope equal to or greater than ten percent

Kn=0.10 (see table 703)

Tlag=0.6Tc (formula 709) For small drainage basins (less than one square mile) and basin slopes less than ten percent

CHRISTY CORPORATION

TABLE 7
SCS LAG TIME CALCULATIONS - EXISTING / ONSITE
Silver Hills

SUB-AREA	Tc	Kn	SLOPE (ft/ft)	LENGTH (ft)	Lc (ft)	Tlag (min)
1A	39.54	-	-	-	-	23.7
2A	45.30	-	-	-	-	27.2
3A	33.82	-	-	-	-	20.3
4A	29.19	-	-	-	-	17.5
5A	35.62	-	-	-	-	21.4
6A	31.41	-	-	-	-	18.8
7A	16.85	-	-	-	-	10.1
8A	18.10	-	-	-	-	10.9
9A	14.08	-	-	-	-	8.4
10A	13.56	-	-	-	-	8.1

METHODOLOGY

Tlag=22.1(Kn)[(LLc/S^0.5)]^0.33 (formula 710) For larger drainage basins (greater than one square mile) and basins with a basin slope equal to or greater than ten percent

Kn=0.10 (see table 703)

Tlag=0.6Tc (formula 709) For small drainage basins (less than one square mile) and basin slopes less than ten percent

CHRISTY CORPORATION

TABLE 8
SCS LAG TIME CALCULATIONS - PROPOSED / ONSITE
Silver Hills

SUB-AREA	Tc	Kn	SLOPE (ft/ft)	LENGTH (ft)	Lc (ft)	Tlag (min)
5A	21.94	-	-	-	-	13.2
6A	21.94	-	-	-	-	13.2
7A	16.39	-	-	-	-	9.8
8A	21.94	-	-	-	-	13.2

METHODOLOGY

Tlag=22.1(Kn)[(LLc/S^0.5)]^0.33 (formula 710) For larger drainage basins (greater than one square mile) and basins with a basin slope equal to or greater than ten percent

Kn=0.10 (see table 703)

Tlag=0.6Tc (formula 709) For small drainage basins (less than one square mile) and basin slopes less than ten percent

CHRISTY CORPORATION

TABLE 9
SCS LAG TIME CALCULATIONS - EXISTING / PHASE 1
Silver Hills

SUB-AREA	Tc	Kn	SLOPE (ft/ft)	LENGTH (ft)	Lc (ft)	Tlag (min)
1B	37.03	-	-	-	-	22.2
2B	47.84	-	-	-	-	28.7
3B	27.39	-	-	-	-	16.4
4B	16.63	-	-	-	-	10.0
5B	17.14	-	-	-	-	10.3

METHODOLOGY

Tlag=22.1(Kn)[(LLc/S^0.5)]^0.33 (formula 710) For larger drainage basins (greater than one square mile) and basins with a basin slope equal to or greater than ten percent

Kn=0.10 (see table 703)

Tlag=0.6Tc (formula 709) For small drainage basins (less than one square mile) and basin slopes less than ten percent

CHRISTY CORPORATION

TABLE 10
SCS LAG TIME CALCULATIONS - PROPOSED / PHASE 1
Silver Hills

SUB-AREA	Tc	Kn	SLOPE (ft/ft)	LENGTH (ft)	Lc (ft)	Tlag (min)
4B	13.61	-	-	-	-	8.2
5B	13.61	-	-	-	-	8.2

METHODOLOGY

Tlag=22.1(Kn)[(LLc/S^0.5)]^0.33 (formula 710) For larger drainage basins (greater than one square mile) and basins with a basin slope equal to or greater than ten percent

Kn=0.10 (see table 703)

Tlag=0.6Tc (formula 709) For small drainage basins (less than one square mile) and basin slopes less than ten percent

RUNOFF CURVE NUMBERS FOR OTHER AGRICULTURAL LANDS[1]

Cover Type	Hydrologic Condition	Runoff Curve Numbers: Soil Comp A	Soil Comp B	Soil Comp C	Soil Comp D
Pasture, grassland, or range – continuous forage for grazing[2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow – continuous grass, protected from grazing and generally mowed for hay	-	30	58	71	78
Brush – brush-weed-grass mixture with brush the major element[3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30[4]	48	65	73
Woods – grass combination (orchard or tree farm)[5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods[6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30[4]	55	70	77
Farmsteads – buildings, lanes, driveways, and surrounding lots	-	59	74	82	86

[1]Average runoff condition, and $I_a = 0.2S$

[2]*Poor*: < 50% ground cover or heavily grazed with no mulch
Fair: 50 to 75% ground cover and not heavily grazed
Good: > 75% ground cover and lightly or only occasionally grazed

[3]*Poor*: < 50% ground cover
Fair: 50 to 75% ground cover
Good: >75% ground cover

[4]Actual curve number is less than 30; use CN = 30 for runoff computations.

[5]CNs shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CNs for woods and pasture.

[6]*Poor*: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

RUNOFF CURVE NUMBERS FOR URBAN AREAS[1]

Cover Type and Hydrologic Condition	Aver. % Impervious Area[2]	Runoff Curve Numbers Soil Comp A	Soil Comp B	Soil Comp C	Soil Comp D
Fully developed urban area (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50 to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious only, no vegetation)[5]		77	86	91	94
Idle lands (CNs are determined using cover types similar to those Table 702 - 3 of 4)					

[1]Average runoff condition, and $I_a = 0.2S$

[2]The average percent impervious area shown was used to develop the composite CNs. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CNs for other combinations of conditions may be computed using figure 2-3 or 2-4 in TR-55 (SCS, 1986).

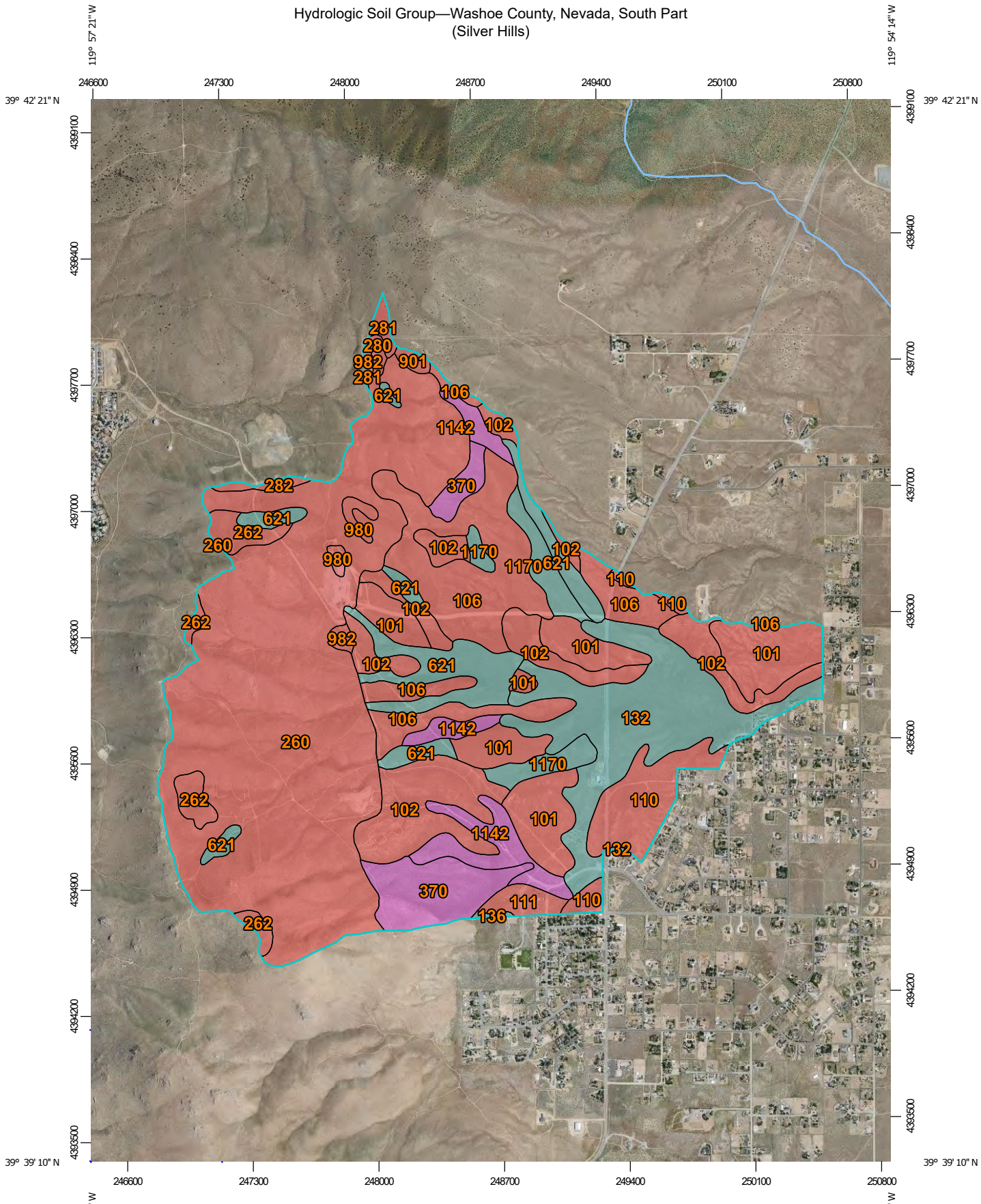
[3]CNs shown are equivalent to those of pasture. Composite CNs may be computed for other combinations of open space cover type.

[4]Composite CNs for natural desert landscaping should be computed using figure 2-3 or 2-4 in TR-55 (SCS, 1986) based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CNs are assumed equivalent to desert shrub in poor hydrologic condition.

[5]Composite CNs to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 in TR-55 (SCS, 1986) based on the degree of development (impervious area percentage) and the CNs for the newly graded pervious areas.

SCS SOILS

Hydrologic Soil Group—Washoe County, Nevada, South Part
(Silver Hills)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washoe County, Nevada, South Part
Survey Area Data: Version 17, Aug 26, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 1, 2018—Oct 1, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
101	Aquinas sandy loam, 4 to 8 percent slopes	D	155.7	8.6%
102	Aquinas sandy loam, 8 to 15 percent slopes	D	174.2	9.6%
106	Aquinas sandy loam, 8 to 15 percent slopes, eroded	D	193.3	10.7%
110	Jowec variant sandy loam, 4 to 8 percent slopes	D	66.7	3.7%
111	Jowec variant-Greenbrae sandy loams, 4 to 15 percent slopes	D	14.8	0.8%
132	Greenbrae sandy loam, 2 to 4 percent slopes	C	177.1	9.8%
136	Greenbrae sandy loam, 4 to 8 percent slopes	C	1.5	0.1%
260	Acrelane-Rock outcrop complex, 15 to 50 percent slopes	D	669.5	37.1%
262	Acrelane very stony sandy loam, 8 to 15 percent slopes	D	35.7	2.0%
280	Wedekind gravelly loam, 8 to 15 percent slopes	D	4.0	0.2%
281	Wedekind gravelly loam, 15 to 30 percent slopes	D	6.0	0.3%
282	Wedekind gravelly sandy loam, 30 to 50 percent slopes	D	5.6	0.3%
370	Lemm very gravelly coarse sandy loam, 4 to 8 percent slopes	A	73.7	4.1%
621	Orr stony sandy loam, 4 to 15 percent slopes	C	102.4	5.7%
901	Flex very gravelly sandy loam, 30 to 50 percent slopes	D	4.4	0.2%
980	Koontz gravelly loam, 8 to 15 percent slopes	D	8.8	0.5%
982	Koontz stony loam, 15 to 30 percent slopes	D	5.9	0.3%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1142	Bedell loamy sand, 4 to 8 percent slopes	A	61.5	3.4%
1170	Wedertz sandy loam, 2 to 4 percent slopes	C	45.4	2.5%
Totals for Area of Interest			**1,806.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

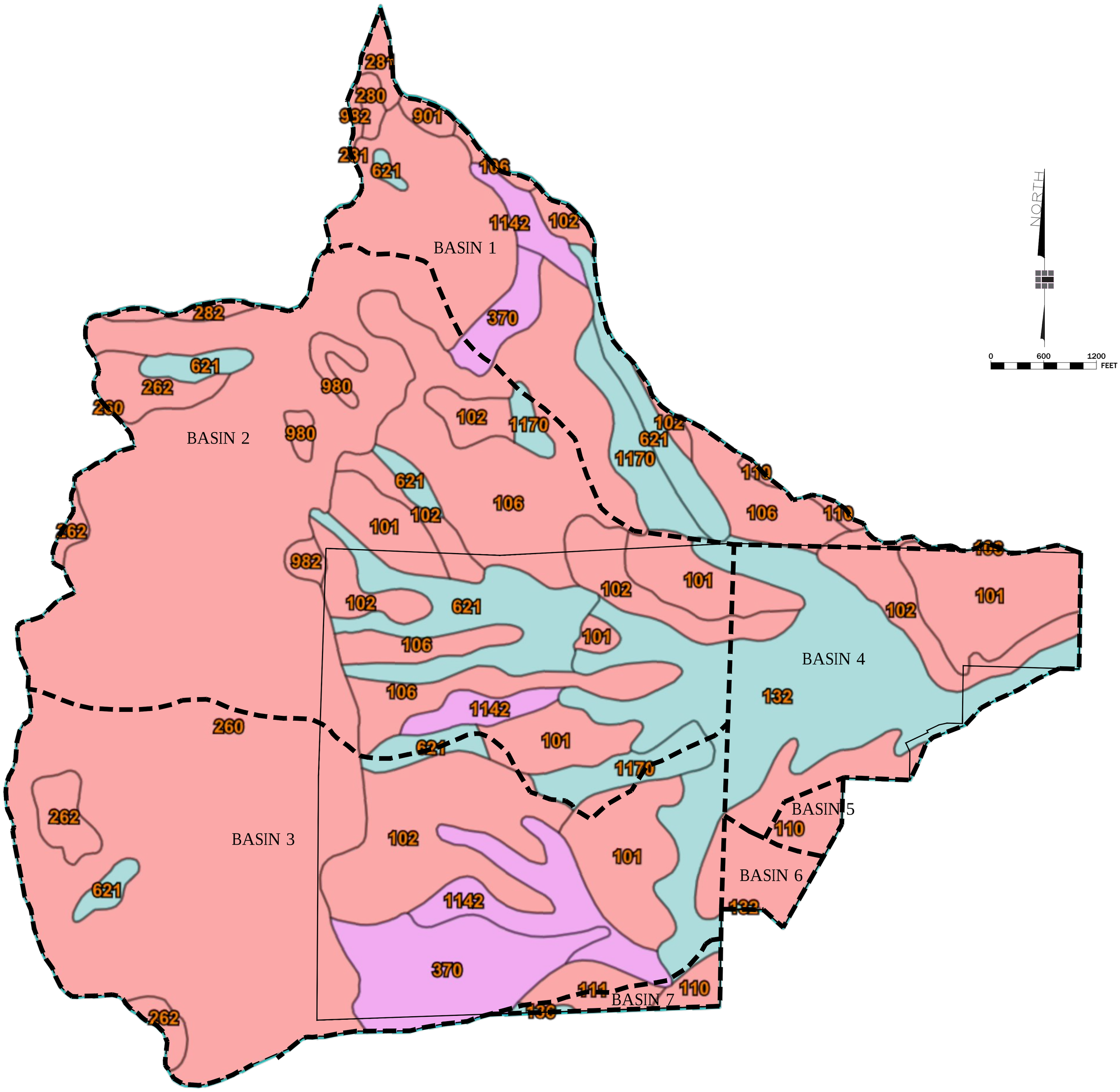
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NRCS SOILS DISPLAY MAP - OVERALL/EXISTING

SILVER HILLS

FEBRUARY 2021



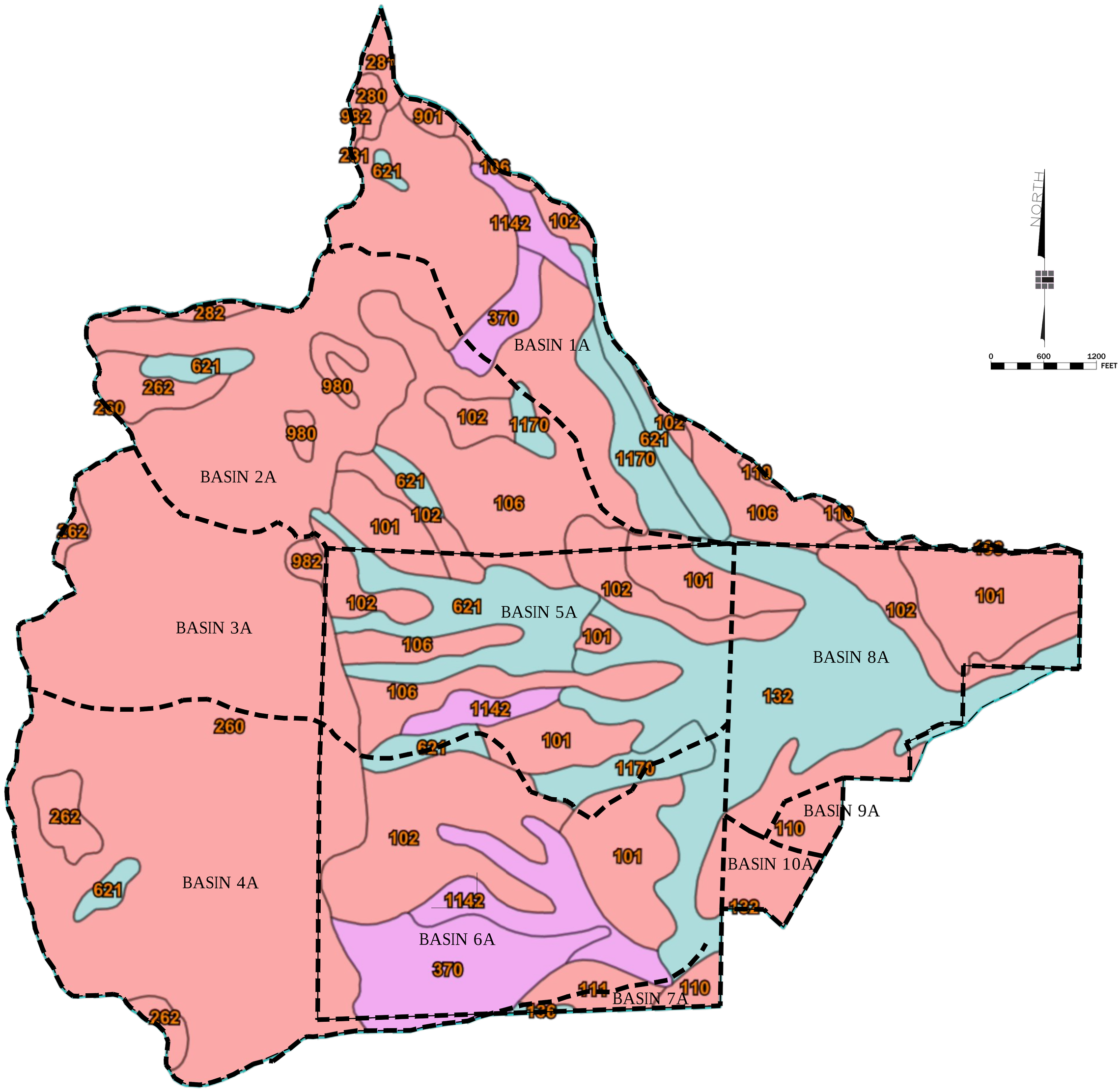
NRCS SOILS DISPLAY MAP - OVERALL/EXISTING

CHRISTY CORPORATION
1000 Kiley Pkwy | Sparks Nevada 89436
P 775.502.8552

NRCS SOILS DISPLAY MAP - ONSITE/EXISTING

SILVER HILLS

FEBRUARY 2021



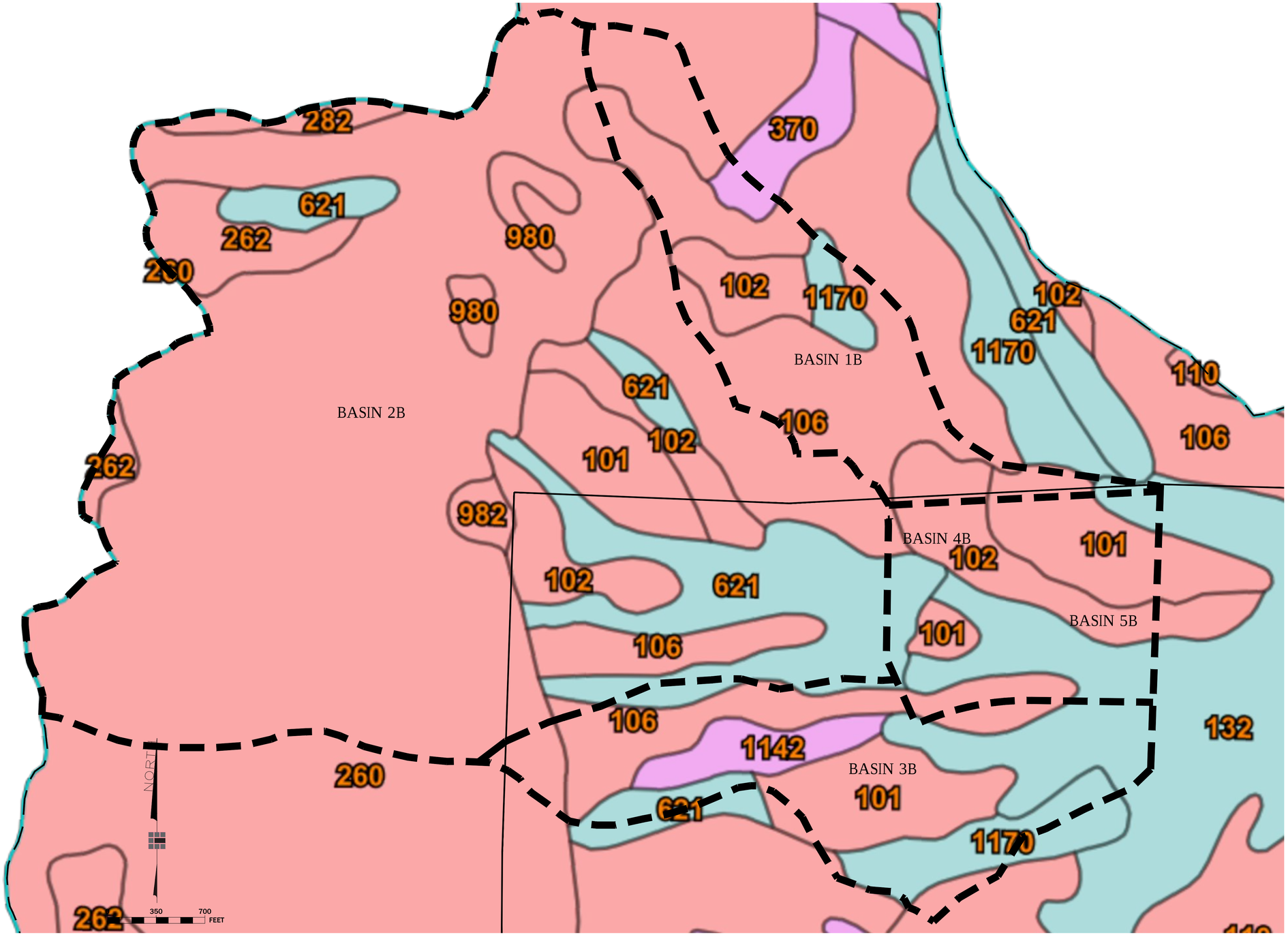
NRCS SOILS DISPLAY MAP - ONSITE/EXISTING

CHRISTY CORPORATION
1000 Kiley Pkwy | Sparks Nevada 89436
P 775.502.8552

NRCS SOILS DISPLAY MAP - PHASE 1 EXISTING

SILVER HILLS

FEBRUARY 2021



NRCS SOILS DISPLAY MAP - PHASE 1 (EXISTING)

CHRISTY CORPORATION
1000 Kiley Pkwy | Sparks Nevada 89436
P 775.502.8552

HEC-HMS OUTPUT

Project: Silver Hills Preliminary Simulation Run: 24 Hour 100YR Offsite

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:01
Compute Time: 03Feb2021, 14:21:29

Basin Model: Overall / EX
Meteorologic Model: 100 YR - 24 Hr
Control Specifications: 24-Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Basin 1	0.35841	290.5	01Jan2000, 18:26	38.2
Basin 2	1.1610	803.4	01Jan2000, 18:37	138.7
Basin 3	0.89774	529.3	01Jan2000, 18:37	86.3
Basin 4	0.33328	293.1	01Jan2000, 18:25	38.2
Basin 5	0.0177406	29.1	01Jan2000, 18:10	2.4
Basin 6	0.0295522	49.1	01Jan2000, 18:09	3.9
Basin 7	0.0235439	31.4	01Jan2000, 18:13	2.9

Project: Silver Hills Preliminary Simulation Run: 24 Hour 5YR EX

Start of Run: 01Jan2000, 00:00 Basin Model: Existing
End of Run: 02Jan2000, 00:01 Meteorologic Model: 5 YR
Compute Time: 03Feb2021, 14:21:43 Control Specifications: 24-Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Basin 1A	0.36010	57.8	01Jan2000, 18:26	10.0
Basin 2A	0.49576	98.1	01Jan2000, 18:30	18.7
Basin 3A	0.26287	65.0	01Jan2000, 18:22	10.5
Basin 4A	0.453	117.4	01Jan2000, 18:19	17.5
Basin 5A	0.400	70.8	01Jan2000, 18:24	11.6
Basin 6A	0.44374	31.6	01Jan2000, 18:23	5.5
Basin 7A	0.0235439	7.6	01Jan2000, 18:12	0.8
Basin 8A	0.31725	89.3	01Jan2000, 18:12	10.3
Basin 9A	0.0177406	7.0	01Jan2000, 18:10	0.7
Basin 10A	0.0295522	11.8	01Jan2000, 18:09	1.2
Basin 1B	0.13844	29.5	01Jan2000, 18:24	5.0
Basin 2B	0.75859	144.5	01Jan2000, 18:31	28.4
Basin 3B	0.16193	27.9	01Jan2000, 18:19	4.0
Basin 4B	0.0523427	17.7	01Jan2000, 18:11	2.0
Basin 5B	0.0487574	13.4	01Jan2000, 18:12	1.5

Project: Silver Hills Preliminary Simulation Run: 24 Hour 5 YR Proposed

Start of Run: 01Jan2000, 00:00 Basin Model: Proposed
End of Run: 02Jan2000, 00:01 Meteorologic Model: 5 YR
Compute Time: 03Feb2021, 14:21:48 Control Specifications: 24-Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Basin 5A	0.40041	180.2	01Jan2000, 18:15	24.5
Basin 6A	0.44374	146.6	01Jan2000, 18:15	19.0
Basin 7A	0.0235439	13.3	01Jan2000, 18:11	1.6
Basin 8A	0.31725	148.4	01Jan2000, 18:15	20.4
Basin 4B	0.0523427	32.6	01Jan2000, 18:09	3.6
Basin 5B	0.0487574	28.2	01Jan2000, 18:09	3.1

Project: Silver Hills Preliminary Simulation Run: 24 Hour 100YR EX

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:01
Compute Time: 03Feb2021, 14:21:23

Basin Model: Existing
Meteorologic Model: 100 YR - 24 Hr
Control Specifications: 24-Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Basin 1A	0.36010	291.7	01Jan2000, 18:26	38.6
Basin 2A	0.49576	418.6	01Jan2000, 18:29	62.6
Basin 3A	0.26287	272.6	01Jan2000, 18:22	34.4
Basin 4A	0.453	503.8	01Jan2000, 18:19	58.1
Basin 5A	0.400	350.5	01Jan2000, 18:23	43.8
Basin 6A	0.44374	291.9	01Jan2000, 18:21	31.6
Basin 7A	0.0235439	34.0	01Jan2000, 18:11	2.9
Basin 8A	0.31725	422.5	01Jan2000, 18:12	37.2
Basin 9A	0.0177406	29.4	01Jan2000, 18:10	2.4
Basin 10A	0.0295522	49.7	01Jan2000, 18:09	3.9
Basin 1B	0.13844	130.2	01Jan2000, 18:24	17.0
Basin 2B	0.75859	616.6	01Jan2000, 18:31	95.3
Basin 3B	0.16193	154.1	01Jan2000, 18:18	16.2
Basin 4B	0.0523427	77.6	01Jan2000, 18:11	6.7
Basin 5B	0.0487574	65.3	01Jan2000, 18:12	5.5

Project: Silver Hills Preliminary Simulation Run: 24 Hour 100YR Proposed

Start of Run: 01Jan2000, 00:00
End of Run: 02Jan2000, 00:01
Compute Time: 03Feb2021, 14:21:36

Basin Model: Proposed
Meteorologic Model: 100 YR - 24 Hr
Control Specifications: 24-Hour

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Basin 5A	0.40041	623.2	01Jan2000, 18:14	66.7
Basin 6A	0.44374	600.6	01Jan2000, 18:15	60.4
Basin 7A	0.0235439	44.1	01Jan2000, 18:11	4.1
Basin 8A	0.31725	502.5	01Jan2000, 18:14	54.3
Basin 4B	0.0523427	107.2	01Jan2000, 18:09	9.4
Basin 5B	0.0487574	96.7	01Jan2000, 18:09	8.3

DETENTION / RETENTION CALCULATIONS

Project: Silver Hills Preliminary Simulation Run: 10 Day EX

Start of Run: 01Jan2000, 00:00
End of Run: 10Jan2000, 00:01
Compute Time: 03Feb2021, 14:20:52

Basin Model: Existing
Meteorologic Model: 100 YR - 10 DAY
Control Specifications: 10 Day

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Basin 1A	0.36010	409.5	08Jan2000, 12:25	147.8
Basin 2A	0.49576	540.2	08Jan2000, 12:29	219.8
Basin 3A	0.26287	346.9	08Jan2000, 12:22	118.1
Basin 4A	0.453	648.2	08Jan2000, 12:19	201.5
Basin 5A	0.400	487.2	08Jan2000, 12:23	165.7
Basin 6A	0.44374	510.0	08Jan2000, 12:20	150.4
Basin 7A	0.0235439	44.7	08Jan2000, 12:11	10.3
Basin 8A	0.31725	570.9	08Jan2000, 12:12	134.9
Basin 9A	0.0177406	37.3	08Jan2000, 12:09	8.0
Basin 10A	0.0295522	63.2	08Jan2000, 12:09	13.3
Basin 1B	0.13844	170.5	08Jan2000, 12:24	60.5
Basin 2B	0.75859	796.3	08Jan2000, 12:30	335.9
Basin 3B	0.16193	224.8	08Jan2000, 12:18	64.2
Basin 4B	0.0523427	100.6	08Jan2000, 12:11	23.1
Basin 5B	0.0487574	89.5	08Jan2000, 12:11	20.4

Project: Silver Hills Preliminary Simulation Run: 10 Day Proposed

Start of Run: 01Jan2000, 00:00
End of Run: 10Jan2000, 00:01
Compute Time: 03Feb2021, 14:20:59

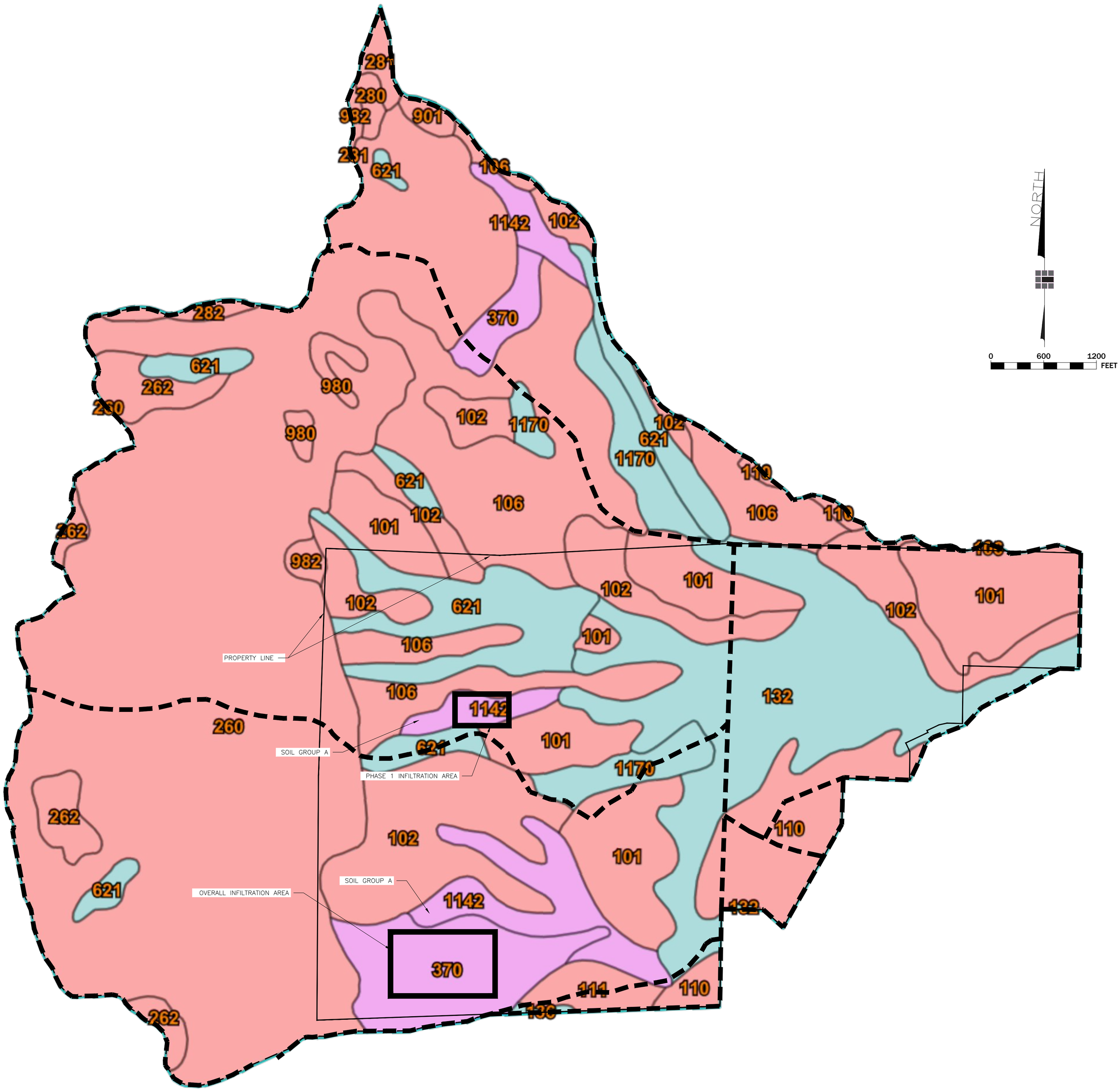
Basin Model: Proposed
Meteorologic Model: 100 YR - 10 DAY
Control Specifications: 10 Day

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Basin 5A	0.40041	710.1	08Jan2000, 12:14	200.5
Basin 6A	0.44374	752.6	08Jan2000, 12:14	202.5
Basin 7A	0.0235439	49.1	08Jan2000, 12:11	12.1
Basin 8A	0.31725	565.8	08Jan2000, 12:14	160.8
Basin 4B	0.0523427	118.6	08Jan2000, 12:09	27.0
Basin 5B	0.0487574	109.4	08Jan2000, 12:09	24.6

INFILTRATION EXHIBIT

SILVER HILLS

FEBRUARY 2021



INFILTRATION EXHIBIT

CHRISTY CORPORATION
1000 Kiley Pkwy | Sparks Nevada 89436
P 775.502.8552

CHANNEL CALCULATIONS

Worksheet for CHANNEL A

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	0.010 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	0.00 ft
Discharge	130.20 cfs

Results	
Normal Depth	3.4 ft
Flow Area	23.2 ft²
Wetted Perimeter	15.2 ft
Hydraulic Radius	1.5 ft
Top Width	13.62 ft
Critical Depth	3.0 ft
Critical Slope	0.018 ft/ft
Velocity	5.62 ft/s
Velocity Head	0.49 ft
Specific Energy	3.89 ft
Froude Number	0.759
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	3.4 ft
Critical Depth	3.0 ft
Channel Slope	0.010 ft/ft
Critical Slope	0.018 ft/ft

Worksheet for CHANNEL B

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	0.008 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	5.00 ft
Discharge	616.80 cfs

Results	
Normal Depth	5.2 ft
Flow Area	80.8 ft²
Wetted Perimeter	28.4 ft
Hydraulic Radius	2.8 ft
Top Width	25.92 ft
Critical Depth	4.6 ft
Critical Slope	0.014 ft/ft
Velocity	7.63 ft/s
Velocity Head	0.90 ft
Specific Energy	6.13 ft
Froude Number	0.762
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.2 ft
Critical Depth	4.6 ft
Channel Slope	0.008 ft/ft
Critical Slope	0.014 ft/ft

Worksheet for CHANNEL C

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.035
Channel Slope	0.033 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	5.00 ft
Discharge	1,104.80 cfs

Results	
Normal Depth	4.9 ft
Flow Area	73.6 ft²
Wetted Perimeter	27.1 ft
Hydraulic Radius	2.7 ft
Top Width	24.78 ft
Critical Depth	6.1 ft
Critical Slope	0.013 ft/ft
Velocity	15.01 ft/s
Velocity Head	3.50 ft
Specific Energy	8.45 ft
Froude Number	1.535
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 ft
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 ft
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.9 ft
Critical Depth	6.1 ft
Channel Slope	0.033 ft/ft
Critical Slope	0.013 ft/ft

PRELIMINARY REPORT

Assessor's Parcel No.: 087-390-10 Order No.: 124624-RTO

Property Address: 11305 Red Rock Road
Reno NV, 89508
Buyers/Borrowers: Lifestyle Homes TND LLC

In response to the above referenced application for a Policy of Title Insurance, **Stewart Title Guaranty Company** hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein, hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms. The printed Exceptions and Exclusions from the coverage of said Policy or Policies are set forth on the attached cover. The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than that set forth in the arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties. Limitations on Covered Risks applicable to the CLTA and ALTA Homeowner's Policies of Title Insurance which establish a Deductible Amount and a Maximum Dollar Limit of Liability for certain coverages are also set forth on the attached cover. Copies of the Policy forms should be read. They are available from the office which issued this report.

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.

Dated as of 01/15/2021 at 07:30 am

Western Title Company, an authorized agent

The form of Policy of Title Insurance contemplated by this report is:

Report Only

The estate or interest in the land hereinafter described or referred to covered by this Report is:

Fee Simple

Title to said estate or interest at the date hereof is vested in: **Lifestyle Homes, TND, LLC, a Nevada Limited Liability Company**

_____	_____	_____	_____
Initial	**Initial**	**Initial**	**Initial**

Please read the exceptions shown or referred to below and the Exceptions and Exclusions set forth on the attached cover of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered. It is important to note that this Preliminary Report is not a written representation as to the condition of title and may not list all liens, defects, and encumbrances affecting title to the land.

Order No. **124624-RTO**

EXCEPTIONS

At the date hereof exceptions to coverage in addition to the printed Exceptions and Exclusions in said policy form would be as follows:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records. Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.

2. Any facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.

3. Easements, liens or encumbrances, or claims thereof, which are not shown by the public records.

4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.

5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.

6. Any lien or right to a lien for services, labor or material not shown by the Public Records.

7. The lien, if any, of supplemental taxes, assessed pursuant to the provision of the Nevada Revised Statutes.

8. Any liens that may be created for Delinquent Sewer Charges by reason of said premises lying within the**City of Reno/Sparks, the County of Washoe (Sewer)**. Contact the following for Sewer/Water, and/or Tax Assessment information: **City of Reno Sewer at (775) 334-2095; City of Sparks Sewer at (775) 353-2360; County of Washoe Sewer at (775) 954-4601; Washoe County Treasurer at (775) 328-2510**. Delinquent amounts may be added to and collected through the secured real property tax roll of the **Washoe County Assessor's Office** and included in the tax installments referenced above.

9. Any liens that may be created for delinquent waste management charges pursuant to NRS 444.520.

10. Water rights, claims or title to water, whether or not recorded.

11. Minerals of whatsoever kind, subsurface and surface substances, including but not limited to coal, lignite, oil, gas, uranium, clay, rock, sand and gravel in, on, under and that may be produced from the Land, together with all rights, privileges, and immunities relating thereto, whether or not appearing in the Public Records or listed in Schedule B. The Company makes no representation as to the present ownership of any such interests. There may be leases, grants, exceptions or reservations of interest that are not listed.

_____ _____ _____ _____

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12. Rights of way for any existing roads, trails, canals, streams, ditches, drain ditches, pipe, pole or transmission lines traversing said premises.

13. Provisions, Reservations, Easements and the effect thereof, contained in the Patent from the **United States of America**, recorded on **July 20, 1962**, **in Book G, Page 203** as Document No. **363425**, Patent Records of Washoe County, Nevada.

14. Easement for drilling, installing and maintaining two (2) water wells for irrigation, domestic and quasi municipal purposes, and incidental purposes, granted by **an instrument**, recorded on **January 26, 1972**, **in Book 609, Page 445** as Document No. **232846**, Official Records of Washoe County, Nevada.

15. Easement for public utilities, and incidental purposes, granted by **an instrument**, recorded on **June 28, 1973**, **in Book 742, Page 725** as Document No. **291873**, Official Records of Washoe County, Nevada.

16. Matters as disclosed on Record of Survey filed in the office of the County Recorder of Washoe County, State of Nevada on **February 13, 1976**, as Document No. **396369**. Survey Map No. **938**.

17. Easement for underground conduits, and incidental purposes, granted by **an instrument**, recorded on **March 9, 1978**, **in Book 1207, Page 445** as Document No. **518573**, Official Records of Washoe County, Nevada.

18. A document entitled "License," recorded on **April 6, 1979**, **in Book 1375, Page 891** as Document No. **598136**, Official Records of Washoe County, Nevada.

19. Easement for underground utility lines, and incidental purposes, granted by **an instrument**, recorded on **September 7, 1979**, **in Book 1427, Page 644** as Document No. **628200**, Official Records of Washoe County, Nevada.

20. Easement for overhead and underground electric distribution, communication and gas distribution & transmission, and incidental purposes, granted by **an instrument**, recorded on **May 5, 2000**, as Document No. **2444870**, Official Records of Washoe County, Nevada.

21. Easement for overhead electric distribution and communication, and incidental purposes, granted by **an instrument**, recorded on **May 10, 2001**, as Document No. **2552144**, Official Records of Washoe County, Nevada.

22. Matters as disclosed on Record of Survey filed in the office of the County Recorder of Washoe County, State of Nevada on **March 4, 2004**, as Document No. **3002373**. Survey Map No. **4345**.

23. Easement for public access road, and incidental purposes, granted by **an instrument**, recorded on **March 16, 2004**, as Document No. **3007444**, Official Records of Washoe County, Nevada.

24. Easement for ingress and egress, and incidental purposes, granted by **an instrument**, recorded on **November 23, 2005**, as Document No. **3312069**, Official Records of Washoe County, Nevada.

25. A document entitled "Bill No. 1660, Ordinance No. 1484, An Ordinance pursuant to Nevada Revised Statutes 278.0201 Through 278.0207 Adopting a Development Agreement With Lifestyle Homes TND, LLC (Case No. DA 09-001) for Tentative Subdivision Map (Case No. TM 09-001) for Silver Hills Subdivision, recorded on **March 6, 2012**, as Document No. **4090817**, Official Records of Washoe County, Nevada.

26. A document entitled "Amended and Restated Development Agreement (Silver Hills Subdivision), recorded on **February 28, 2017**, as Document No. **4683580**, Official Records of Washoe County, Nevada.

27. A document entitled Ordinance Approving "Amended and Restated Development Agreement (Silver Hills)" recorded on **February 28, 2017**, as Document No. **4683579**, Official Records of Washoe County, Nevada.

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Said document was re-recorded on **March 1, 2017**, as Document No. **4684254**, Official Records of Washoe County, Nevada.

28. Rights of parties in possession.

29. The requirement that an Owner's Declaration/Affidavit be completed, and supplied for review prior to the issuance of a policy of title insurance.

30. A property inspection will be made prior to recording the trust deed to be insured. If such inspection discloses any evidence of commencement of a work of improvement, the coverage for mechanic's lien insurance will be deleted from the policy, unless all the necessary documents for indemnification have been submitted to the Company and such indemnification has been formally approved by the Company, prior to recording the trust deed.

31. Any liens that may be filed for work of improvement in progress or recently completed on said land. (NO NOTICE OF COMPLETION HAS BEEN RECORDED)

32. Prior to the issuance of any policy of title insurance, the following must be furnished to the Company with respect to **Lifestyle Homes, TND, LLC, a Nevada Limited Liability Company**:

This Company will require a copy of the articles of organization for **Lifestyle Homes, TND, LLC, a Nevada Limited Liability Company**, and any certificates of amendments filed with the Secretary of State, together with copies of any management agreements or operating agreements, together with a current list of all members of said limited liability company.

33. Any notes following the legal description herein referencing NRS 111.312 are required for recording purposes only and will not be insured in any policy of title insurance.

NOTE: Taxes for the fiscal year **2020-2021**, in the amount of **$2,695.89** have been paid in full. **(APN 087-390-10)**

NOTE: THIS REPORT IS BEING ISSUED FOR INFORMATION PURPOSES ONLY, NO LIABILITY ASSUMED.

THE FOLLOWING NOTES ARE FOR INFORMATION PURPOSES ONLY:

WESTERN TITLE COMPANY RESERVES THE RIGHT TO AMEND THIS COMMITMENT/REPORT AT ANY TIME.

*************ATTENTION LENDERS************

THE 100 ENDORSEMENT IS NO LONGER BEING OFFERED. THE REPLACEMENT ALTERNATIVE IS THE ALTA 9.10-06 AND IS NOW REFLECTED IN THE ALTA SUPPLEMENT IN THE COMMITMENT/REPORT.

NOTE: Any notes following the legal description (if any) referencing NRS 111.312 are required for recording purposes only and will not be insured in any policy of title insurance.

NOTE: A search of the Official Records for the county referenced in the above order number, for the **24** months immediately preceding the date above discloses the following instruments purporting to convey the title to said land: **NONE**

_____ _____ _____ _____
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NOTE: If any current work of improvements have been made on the herein described real property (within the last 90 days) and this Commitment/Report is issued in contemplation of a Policy of Title Insurance which affords mechanic lien priority coverage (i.e. ALTA POLICY); the following information must be supplied for review and approval prior to the closing and issuance of said Policy: (a) Copy of Indemnity Agreement; (b) Financial Statements; (c) Construction Loan Agreement; (d) If any current work of improvements have been made on the herein described real property Building Construction Contract between borrower and contractor; (e) Cost breakdown of construction; (f) Appraisal; (g) Copy of Voucher or Disbursement Control Statement (if project is complete).

NOTE: This commitment/report makes no representations as to water, water rights, minerals or mineral rights and no reliance can be made upon this commitment/report or a resulting title policy for such rights or ownership.

NOTE: Notwithstanding anything to the contrary in this commitment/report, if the policy to be issued is other than an ALTA Owner's Policy (6/17/06) or ALTA Loan Policy (6/17/06), the policy may not contain an arbitration clause, or the terms of the arbitration clause may be different from those set forth in this commitment/report. If the policy does contain an arbitration clause, and the Amount of Insurance is less than the amount, if any, set forth in the arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties.

NOTE: The map, if any, attached hereto is subject to the following disclaimer:

WESTERN TITLE COMPANY does not represent this plat as a survey of the land indicated hereon, although believed to be correct, no liability is assumed as to the accuracy thereof.

_____ _____ _____ _____

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Legal Description

All that certain real property situate in the County of Washoe, State of Nevada, described as follows:

A parcel of land situate within the East Half of Section 23, Township 21 North, Range 18 East, MDM, Washoe County, Nevada more particularly described as follows:

Beginning at the intersection of the Westerly Right-of-Way of Red Rock Road and the South Line of said Section from which the Southeast Corner of said Section bears North 88°00'52" East a distance of 80.10 feet;

thence with said Section Line South 88°00'52" West a distance of 2584.75 feet to the South Quarter Corner of said Section;

thence with the center Section Line of said Section North 00°48'19" East a distance of 2718.57 feet to the Center Section;

thence continuing with said Center Section Line North 00°47'43" East a distance of 2496.34 feet to the North Quarter Corner of said Section;

thence with the North Line of said Section North 87°03'14" East a distance of 2594.37 feet to a point on said Right-of-Way;

thence with said Right-of-Way South 00°52'40" West a distance of 2625.94 feet;

thence South 00°52'43" West a distance of 78.89 feet;

thence departing said Right-of-Way North 89°07'17" West a distance of 290.40 feet;

thence South 00°52'43" West a distance of 250.00 feet;

thence South 89°07'17" East a distance of 290.40 feet to a point on said Right-of-Way;

thence with said Right-of-Way South 00°52'43" West a distance of 2303.98 feet to the Point of Beginning.

EXCEPTING THEREFROM all that land described in Exhibit "A" of Deed Document 631016, recorded September 21, 1979 in Book 1432, Page 384 more particularly described as follows:

Beginning at a point from which the Southeast Corner of said Section bears South 79°32'24" East a distance of 1165.52 feet;

thence North 89°08'48" West a distance of 181.50 feet;

thence North 00°51'12" East a distance of 100.00 feet;

thence South 89°08'48" East a distance of 183.24 feet;

thence from a tangent which bears South 04°08'56" West, along a circular curve to the left with a radius of 1054.82 feet and a central angle of 03°17'44" an arc length of 60.67 feet;

thence South 00°51'12" West a distance of 39.36 feet to the Point of Beginning.

ALSO EXCEPTING THEREFROM all that land described in Exhibit "B" of Deed Document 631016, recorded September 21, 1979 in Book 1432, Page 384 more particularly described as follows:

Beginning at a point from which the Southeast Corner of said Section bears South 23°43'54" East a distance of 917.01 feet;

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thence North 08°48'38" West a distance of 125.00 feet;

thence North 81°11'22" East a distance of 50.00 feet;

thence South 08°48'38" East a distance of 50.00 feet;

thence South 81°11'22" West a distance of 30.00 feet;

thence South 08°48'38" East a distance of 75.45 feet;

thence from a tangent which bears South 83°47'41" West along a circular curve to the left with a radius of 440.00 feet and a central angle of 02°36'19" a distance of 20.01 feet to the Point of Beginning.

NOTE: The above metes and bounds description appeared previously in that certain Boundary Line Adjustment recorded in the office of the County Recorder of Washoe County, Nevada on March 4, 2004, as Document No. 3002372 of Official Records.

Assessor's Parcel Number(s):
087-390-10

_____ _____ _____ _____
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Exhibit A (Revised 02-07-14)

CALIFORNIA LAND TITLE ASSOCIATION
STANDARD COVERAGE POLICY – 1990

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building or zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien, or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.

   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.

2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.

3. Defects, liens, encumbrances, adverse claims or other matters:

   (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;

   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;

   (c) resulting in no loss or damage to the insured claimant;

   (d) attaching or created subsequent to Date of Policy; or

   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage or for the estate or interest insured by this policy.

4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with the applicable doing business laws of the state in which the land is situated.

5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.

6. Any claim, which arises out of the transaction vesting in the insured the estate of interest insured by this policy or the transaction creating the interest of the insured lender, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws.

_____ _____ _____ _____
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EXCEPTIONS FROM COVERAGE - SCHEDULE B, PART I

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.

   Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.

2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.

3. Easements, liens or encumbrances, or claims thereof, not shown by the public records.

4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.

5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.

6. Any lien or right to a lien for services, labor or material not shown by the public records.

CLTA HOMEOWNER'S POLICY OF TITLE INSURANCE (12-02-13)
ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE

EXCLUSIONS

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of those portions of any law or government regulation concerning:

   a. building;
   b. zoning;
   c. land use;
   d. improvements on the Land;
   e. land division; and
   f. environmental protection.

This Exclusion does not limit the coverage described in Covered Risk 8.a., 14, 15, 16, 18, 19, 20, 23 or 27.

2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not limit the coverage described in Covered Risk 14 or 15.

3. The right to take the Land by condemning it. This Exclusion does not limit the coverage described in Covered Risk 17.

4. Risks:

   a. that are created, allowed, or agreed to by You, whether or not they are recorded in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they are recorded in the Public Records at the Policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.e., 25, 26, 27 or 28.

5. Failure to pay value for Your Title.

6. Lack of a right:

_____ _____ _____ _____
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a. to any land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
b. in streets, alleys, or waterways that touch the Land.

This Exclusion does not limit the coverage described in Covered Risk 11 or 21.

7. The transfer of the Title to You is invalid as a preferential transfer or as a fraudulent transfer or conveyance under federal bankruptcy, state insolvency, or similar creditors' rights laws.

8. Contamination, explosion, fire, flooding, vibration, fracturing, earthquake, or subsidence.

9. Negligence by a person or an Entity exercising a right to extract or develop minerals, water, or any other substances.

LIMITATIONS ON COVERED RISKS

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows:

- For Covered Risk 16, 18, 19, and 21 Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.

The deductible amounts and maximum dollar limits shown on Schedule A are as follows:

	Your Deductible Amount	Our Maximum Dollar Limit of Liability
Covered Risk 16:	1.00% of Policy Amount Shown in Schedule A or $2,500.00 (whichever is less)	$ 10,000.00
Covered Risk 18:	1.00% of Policy Amount Shown in Schedule A or $5,000.00 (whichever is less)	$25,000.00
Covered Risk 19:	1.00 % of Policy Amount Shown in Schedule A or $5,000.00 (whichever is less)	$25,000.00
Covered Risk 21:	1.00 % of Policy Amount Shown in Schedule A or $2,500.00 (whichever is less)	$ 5,000.00

2006 ALTA LOAN POLICY (06-17-06)
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to

(i) the occupancy, use, or enjoyment of the Land;
(ii) the character, dimensions, or location of any improvement erected on the Land;
(iii) the subdivision of land; or
(iv) environmental protection;

or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.

Initial **Initial** **Initial** **Initial**

(b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.

2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.

3. Defects, liens, encumbrances, adverse claims, or other matters

(a) created, suffered, assumed, or agreed to by the Insured Claimant;
(b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
(c) resulting in no loss or damage to the Insured Claimant;
(d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13 or 14); or
(e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.

4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.

5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.

6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is

(a) a fraudulent conveyance or fraudulent transfer, or
(b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.

7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

EXCEPTIONS FROM COVERAGE

Except as provided in Schedule B - Part II, This policy does not insure against loss or damage, and the Company will not pay costs, attorneys' fees or expenses, that arise by reason of:

PART I

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.

2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.

3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.

4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.

Initial **Initial** **Initial** **Initial**

5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.

6. Any lien or right to a lien for services, labor or material not shown by the Public Records.

PART II

In addition to the matters set forth in Part I of this Schedule, the Title is subject to the following matters, and the Company insures against loss or damage sustained in the event that they are not subordinate to the lien of the Insured Mortgage:

2006 ALTA OWNER'S POLICY (06-17-06)

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to

   (i) the occupancy, use, or enjoyment of the Land;

   (ii) the character, dimensions, or location of any improvement erected on the Land;

   (iii) the subdivision of land; or

   (iv) environmental protection;

   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.

   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.

2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.

3. Defects, liens, encumbrances, adverse claims, or other matters

   (a) created, suffered, assumed, or agreed to by the Insured Claimant;

   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;

   (c) resulting in no loss or damage to the Insured Claimant;

   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or

   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.

4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is

   (a) a fraudulent conveyance or fraudulent transfer; or

   (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.

5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

EXCEPTIONS FROM COVERAGE

_____ _____ _____ _____

Initial **Initial** **Initial** **Initial**

This policy does not insure against loss or damage, and the Company will not pay costs, attorneys' fees or expenses, that arise by reason of:

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.

2. Any facts, rights, interests, or claims that are not shown in the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.

3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.

4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and that are not shown by the Public Records.

5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.

6. Any lien or right to a lien for services, labor or material not shown by the Public Records.

7. Variable exceptions such as taxes, easements, CC&R's, etc. shown here.

ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (12-02-13)

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27 or 28); or

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(e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.

4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.

5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, or any consumer credit protection or truth-in-lending law. This Exclusion does not modify or limit the coverage provided in Covered Risk 26.

6. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to Advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11.

7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching subsequent to Date of Policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11(b) or 25.

8. The failure of the residential structure, or any portion of it, to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6.

9. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is

   (a) a fraudulent conveyance or fraudulent transfer, or

   (b) a preferential transfer for any reason not stated in Covered Risk 27(b) of this policy.

10. Contamination, explosion, fire, flooding, vibration, fracturing, earthquake, or subsidence.

11. Negligence by a person or an Entity exercising a right to extract or develop minerals, water, or any other substances.

PRIVACY POLICY

The Financial Services Modernization Act recently enacted by Congress has brought many changes to the financial services industry, which includes insurance companies and their agents. One of the changes requires Western Title Company, LLC, a Nevada limited liability company, to explain to you how we collect and use customer information.

Western Title Company has always and will continue to adhere to strict standards of confidentiality when it comes to protecting the privacy, accuracy and security of customer information provided to us.

PERSONAL INFORMATION WE MAY COLLECT:

Western Title collects information about you (for instance, your name, address and telephone number), and information about your transaction, including the identity of the real property you are buying or refinancing. We obtain copies of deeds, notes or mortgages that may be involved in the transaction. We may obtain this information directly from you or from the lender, attorney, or real estate broker or agent that you have chosen. When we provide escrow, or settlement services, or mortgage loan servicing, we may obtain your social security number, along with other information from third parties including appraisals, credit reports, land surveys, loan account balances, and sometimes your bank account information in order to facilitate your transaction.

HOW WE USE THIS INFORMATION:

_____ _____ _____ _____

Initial **Initial** **Initial** **Initial**

Western Title Company does *NOT* share your information with marketers outside our own family. There is *NO* need to tell us to keep your information to ourselves because we share your information only to provide the service requested by you, your lender or in other ways permitted by law. The privacy law permits some sharing of information without your approval. We may share your information internally and with nonaffiliated third parties in order to carry out and service your transaction, to protect against fraud or unauthorized transactions, for institutional risk control and to provide information to government and law enforcement agencies. Companies within a family may share certain information among themselves in order to identify and market their own products that they think may be useful to you. Credit information about you is shared only to facilitate your transaction or for some other purpose permitted by law.

HOW WE PROTECT YOUR INFORMATION:

We restrict access to nonpublic information about you to our employees that need the information to provide products and services to you. We maintain physical, electronic and procedural safeguards that comply with the law to guard your nonpublic information. We reinforce Western Title's privacy policy with our employees.

You do not need to respond to this notice, unless you have concerns about any information we have obtained. You can write us at:

Western Title Company, LLC, a Nevada limited liability company
Attention: Operations Manager
P.O. Box 3059
Reno, NV 89505

Western Title Company, LLC, is an agent for Chicago Title Insurance, Westcor Land Title Insurance Company, First American Title Insurance Company, Fidelity National Title Insurance Company, Old Republic National Title Insurance Company, Commonwealth Land Title, and Stewart Title Guaranty Company. You may receive additional Privacy Policy information from these companies.

_____ _____ _____ _____
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CHRISTY
CORPORATION

February 2, 2021

Washoe County
Community Services Department
1001 E. 9th Street,
Reno, NV 89512

Wastewater Generation-Silver Hills West - Phase 1

Introduction

Set forth below are the wastewater generation calculations for the sanitary sewer facilities for the above project, which consists of 358 single family units on 64.93± acres. The project is within the Silver Hills West development area, located in Section 23, Township 21 N., Range 18 E., within Washoe County, Nevada. The site is located along the west side of Red Rock Road and north of Silver Knolls Boulevard.

Previous Studies

Preliminary Sewer Interceptor Design Summary Evans Ranch, Silver Star, and Silver Hills; Cody R. Black, P.E.; Shaw Engineering; October 2020

Wastewater Generation

Sewage generation for the project was calculated utilizing accepted practice for estimating flow rates. Proposed flows for this phase of the project were calculated as follows:

Proposed Project – Buildout

Land Use	Use	Units	Wastewater rate (gpdupd)	Peak Factor	Peak Flow (gpd)
Silver Hills West	SF	358	250	3	268,500

Total proposed project peak flow, MGD: 0.269

The peak wastewater generation from the project is estimated to be 268,500 gallons per day (0.269 MGD).

Collection System

The sewage flows generated by this project will be conveyed in conformance with the Shaw Engineering study.

Conclusion

The proposed Silver Hills West project is a master plan development and is in compliance with the master sewer report provided by Shaw Engineering.

If you have any questions or require any additional information, please contact me by email at doug@christynv.com or by telephone at 775-527-0707.

Regards,
CHRISTY CORPORATION, LTD.

Douglas Buck, P.E.
Engineering Manager

PRELIMINARY
GEOTECHNICAL INVESTIGATION
SILVER HILLS
RENO, NEVADA

File No. 28813

March 10, 2009

SUMMIT™ ENGINEERING CORPORATION

Prepared For:

Mr. Robert Lissner
Lifestyle Homes TND, LLC
P.O. Box 7548
Reno, Nevada 89510

Prepared By:

Summit Engineering Corporation
5405 Mae Anne Avenue
Reno, Nevada 89523

PROFESSIONAL ENGINEER STATE OF NEVADA
JOHN K. GLYNN III
Exp. 6-30-09
CIVIL
No. 8517

Tom Harding
Staff Geotechnician

Jack K. Glynn III, P.E.
Geotechnical Manager

March 10, 2009 Job No. 28813

Mr. Robert Lissner
Lifestyle Homes TND, LLC
P.O. Box 7548
Reno, NV 89510

RE: Preliminary
Geotechnical Investigation
Silver Hills
Reno, Nevada

Dear Mr. Lissner:

Attached please find the results of our preliminary geotechnical investigation for the proposed Silver Hills development approximately 3 miles northwest of the intersection of US 395 and Red Rock Road in Reno, Nevada. Summit excavated 15 test pits and 3 fault trenches to characterize the site. Material testing was performed on samples from the site. Results of the analyses and logs of the test pits are included as sheets in this report.

The material found on site classifies predominately as a sandstone bedrock that has been slightly to moderately altered which excavates to a silty sand (SM), clayey sand (SC), silty clayey sand (SC-SM), poorly graded sand with silt (SP-SM), and well graded sand with silt (SW/SM). The majority of the native material uncovered during the geotechnical exploration shall provide foundation support. No groundwater was encountered in any of the 15 test pits.

Design plans and traffic studies were not available during the preparation of this report. Summit Engineering should be afforded the opportunity of reviewing plans, particularly any deep foundations or depressed floor/pit areas to verify the applicability of our recommendations. The following report provides geotechnical recommendations and guidelines for the design and construction of the project. We wish to thank you for the opportunity of providing our services. We are readily available to answer any related questions.

Sincerely,

SUMMIT ENGINEERING CORPORATION

Jack K. Glynn III, P.E.
Geotechnical Department Manager

TABLE OF CONTENTS

LIST OF SHEETS

PRELIMINARY
GEOTECHNICAL INVESTIGATION
SILVER HILLS
RENO, NEVADA

I. INTRODUCTION

A. Project Description

This report presents the results of our Geotechnical Investigation to evaluate the Silver Hills project with respect to geotechnical and geologic site conditions. Exploration, laboratory testing and engineering analyses were conducted to provide geotechnical recommendations for the design and construction of the project.

Proposed development is to be single-family residential subdivision and will likely be 1 to 2 story wood frame construction. Foundations are anticipated to be either conventional spread footings or slab-on-grade with moderate structural loads. Sheet 1 presents a vicinity map and Sheet 2 presents the project site with test pit locations.

B. Purpose and Scope

The purpose of this investigation was to determine subsurface soil conditions and to provide geotechnical design criteria for the Silver Hills project. The scope of this investigation included surface reconnaissance, subsurface exploration, analysis of field and laboratory data, research of pertinent geologic literature and report preparation. This report provides conclusions and recommendations concerning:

- General subsurface conditions and geology
- Site preparation and earthwork
- Engineering properties of the soils that will influence design of future structures, including:
  - Bearing capacities
  - Settlement potential
  - Lateral earth pressures
  - Portland cement concrete
  - Asphalt concrete
  - Seismic design criteria

C. Field Exploration and Laboratory Testing

Summit Engineering Corporation conducted the subsurface investigation by excavating fifteen test pits to a maximum depth of 14 feet. No grading planes were available at the time of the field exploration. Additional exploration (test pits) will be needed prior to completion of the final report. All test pits were excavated with a Cat 420 D Backhoe. Representative samples of the soil were collected from the test pits. Selected samples were tested at Summit's laboratory and two outside laboratories. Sheet 1 shows the vicinity map and Sheet 2 presents a site map with the locations of the test pits. General site geology is shown on sheet 3. Sheets 4 through 18 display the logs of soils encountered in the excavations. Sheet 19 provides a key to the test pit logs as well as a copy of the Unified Soil Classification System used to identify the site soils.

Representative bulk samples were taken from the excavations every three feet of depth or every significant lithologic change. Representative samples were tested as follows: 1) sieve analyses tests (ASTM D422); 2) moisture content tests (ASTM D2216); 3) Atterberg limits tests (ASTM 4318), to confirm field soil classifications; 4) a soluble sulfates test to determine if the native soils are reactive with Portland cement concrete; and 5) an R-value test (ASTM D2844), to determine a flexible pavement structural section. The index test results can be used to estimate engineering properties of the native soil. Results of the laboratory tests are displayed on the test pit logs, and presented independently in Sheets 20 through 25. All laboratory testing was conducted in accordance with the applicable standards.

II. DISCUSSION

A. Site Description

The proposed site will consist of a single-family residential subdivision approximately 3 miles northwest of the intersection of US 395 and Red Rock Road in Reno, Nevada. The site is situated in Section 23, Township 21 North, and Range 18 East, and North ½ of Section 24, Township 21 North, Range 18 East, SW ¼ of Section 24, Township 21 North, and Range 18 East (M.D.B.M). The site is in a rural area surrounded by an undeveloped desert to the east and desert with some older homes on the remaining sides. The property on the west side of Red Rock Road has overhead power lines that run northwest to southeast with a gas line below ground. Also the west property there is cable running underground parallel to the

power lines. There are currently old tires, furniture, and typical trash around the site. The site is has some small hills and drainages running through out the site. Access to the site is from Red Rock Road.

B. Site Geology

The primary geologic reference reviewed was the Reno NW Quad 4Dg Geologic Map (S.A. Soeller and R.L. Nielsen, 1980). The bulletin and its geologic map (Sheet 3) provided information about the general geology and earthquake hazards for the subject property and surrounding area. The site was described as a "Qsw, Ts, Qpg, Mzgd ". The authors characterized the site geology as the following:

> **Qsw: Sheetwash Alluvium:** "Thin deposits of moderately to poorly sorted medium to fine sand, granular coarse to medium sand, and sandy pebble gravel. Color and texture closely related to local bedrock source areas."
>
> **Ts: Lacustrine and Alluvial Sediments:** "Thick basin-fill deposits of grayish-orange to pale-brown, coarse to medium sand, granular sand, siltstone, silty to pebbly sandstone, and minor sandy pebble conglomerate, very thin-bedded ash and diatomite. Sediments are generally unconsolidated and bedding is usually indistinct. In part includes much younger alluvium near the surface. Probably equivalent in age to the sandstone of Hunter Creek" (Bonham and Bingler, 1973).
>
> **Qpg: Pediment gravel:** "Thin sheets of pale-brown and pale yellowish-brown, sandy granule to cobble gravel, and pebbly very coarse sand. Clasts comprise a wide range of lithologic compositions and locally from a desert pavement."
>
> **Mzgd: Granodiorite:** "Medium- to coarse-grained, massive, plutonic, dark-gray biotite and hornblende granodiorite. Includes aplite and pegmatite dikes. Resistant to erosion and forms abundant knobby outcrops."

According to the map (#32031C2825G) available by F.E.M.A. (Federal Emergency Management Agency) the site is within Zone X. According to F.E.M.A., Zone X is "areas determined to be outside the 0.2% annual chance floodplain".

C. Regional Seismicity

The property, according to U.S. Geological Survey, may be subject to strong seismic acceleration, 0.504g

ground acceleration, and therefore has a strong probability for experiencing a major seismic event. The effect of seismic shaking, therefore, is an important consideration. The site has native soil profiles of D, "stiff soil." The following table summarizes seismic design parameters for the 2006 International Building Code criteria for structural design of the project:

IBC SEISMIC DESIGN

Site Class		D
Soil Profile Type		Stiff Soil
Seismic Source Type		B
Soil Shear Wave Velocity ($\ddot{v}_s$)		600-1200
Standard penetration resistance (N)		15-50
Soil undrained shear strength (s_u)		1000-2000
Site Coefficient (F_a) w/ short accel. (s_s)		1.005
Site Coefficient (F_v) w/ 1-sec. accel. (s_1)		1.534
Max. ground motion, 0.2-sec SA (S_s), g		1.237
Max. ground motion, 1.0-sec SA (S_1), g		0.466
Design acceleration, S_{DS}, g		0.829
Design acceleration, S_{D1}, g		0.477

Design of improvements shall be based on Site Class D as per IBC 2006 standards. The Peak Ground Acceleration (PGA) of the site with a Probability of Exceedance of 5% and Exposure Time of 50 was calculated to be a $K_H = 0.3708g$.

Earthquake activity is difficult to predict and it is not known which documented fault system may produce an earthquake event and associated surface rupture. Current research by the Nevada Bureau of Mines and Geology and the University of Nevada, Reno indicates that a local earthquake event of Magnitude 7.0 would be likely. The nearest active faults known to be capable of producing such an event are located approximately 17 miles northeast, 20 miles southeast and 25 miles east of the site (dePolo and Ramelli, 2004; dePolo, 1996; and dePolo and dePolo, 1999, respectively).

At the present time, there are not any local codes that provide guidelines for the evaluation of seismic risk or surface rupture hazard associated with Quaternary (Holocene and Pleistocene) faults. The State of Nevada requires the use of seismic provisions set by the IBC, as well as adoptions of appropriate local standards (NRS 278.580.5). For the purposes of assessing seismic hazard and potential fault rupture hazard, standard engineering practice is to pursue the most diligent investigation of those faults deemed to be most likely to

be active. Most geological consultants in Nevada follow the conventions established by the Nevada Earthquake Safety Council, whose guidelines are based on the Alquist-Priolo Act of 1972 in California. Per these guidelines, faults with evidence of movement in Holocene time (past 10,000 years) are considered "Holocene active". Those faults with evidence of displacement during Late Pleistocene time (10,000 to 130,000 years ago) would be considered "Late Quaternary active". Faults with evidence of last displacement having occurred during middle and early Quaternary time (130,000 years to 1,600,000 years ago) are considered "Quaternary Active Faults". Faults with last displacement older than 1,600,000 years are deemed "inactive". Active faults are afforded a greater degree of study and analysis than those regarded as inactive.

Normally, any fault suspected of being active, as demonstrated by presence of scarps, offset of the argillic (topsoil) horizon, and other criteria, poses a greater risk to development and requires a minimum setback of 50 feet for occupied structures. **Three mapped faults cross the site (Sheet 3). Two of these faults were encountered during this investigation and interpreted to be active (Appendix C).** The seismic hazard at the Silver Hills site is probably no greater than other comparable locations in the area that are located at comparable distances to similar faults. Occupied structures have been built over and adjacent to inactive faults in the area for decades, without significant harm to residents from temblors affecting the area. Building codes have evolved in recent years to provide adequate structural protection to residents for the level of tremors experienced to date. **Summit Engineering does not recommend siting occupied structures over any faults.**

Groundwater was not encountered in any of the test pit excavations. Liquefaction, a hazard in seismic zones where water-saturated granular cohesionless soils lose their bearing during seismic shaking, is not anticipated to be a problem on the project site because of cohesive soils and groundwater depth.

D. Subsurface Materials and Conditions

Fifteen test pits were excavated on this site to a maximum depth of 14 feet. The native materials encountered included sandstone bedrock that has been slightly to moderately altered which excavates to a silty sand (SM), clayey sand (SC), silty clayey sand (SC-SM), poorly graded sand with silt (SP-SM), and well graded sand with silt (SW/SM).

Groundwater was not encountered in any of the test pits and is not likely to affect development of the site.

III. CONCLUSIONS AND RECOMMENDATIONS

From a geotechnical engineering standpoint, it is our opinion that the Silver Hills site is suitable for the construction of the proposed subdivision provided that the recommendations contained in this report are incorporated into design and construction. The following sections present our conclusions and recommendations concerning the proposed project.

A. Foundation Considerations

All expansive materials shall not provide direct foundation support. The primary geotechnical recommendation is to remove this material entirely from all structural areas and replace it with structural fill to footing grade and pavement and concrete slab subgrade. A less preferable, but less costly, alternative with more risk is to minimize the potential for post-construction differential foundation and subgrade movement by providing a minimum of 3 feet of structural fill beneath footings, and 2 feet of structural fill beneath all pavement and concrete slab subgrades.

The near-surface native materials uncovered during the course of the investigation may not provide direct foundation support. If any other materials are encountered in the course of construction, they may provide direct foundation support provided they meet parameters for structural fill as provided in this report. Analysis obtained from field and laboratory testing indicates the imported material (silty sand with gravel) can typically support up to 2,000 pounds per square foot for dead plus long term live loads (per IBC 2006 Table 1804.2) on spread type footings with less than 1 inch of total settlement and less than 1/2 inch of differential settlement across the length of the structures.

The design coefficient of friction for the majority of the native material on site is 0.25. The passive soil pressure was calculated as 407 pounds per cubic foot (407 psf per foot of depth). The active soil pressure was similarly was calculated as 35 pounds per cubic foot (35 psf per foot of depth). The at-rest soil pressure, when walls are braced on the top and the bottom, was calculated as 55 pounds per cubic foot (55 psf per foot of depth). These design values assume the non-expansive granular soils that meet the outlined parameters are providing vertical and lateral support. All exterior footings shall be embedded a minimum 24 inches below adjacent finished grade for frost protection, and a minimum of four feet above groundwater.

B. Grading and Filling

All expansive materials that are encountered within 3 feet of the bottom of footings, shall be removed prior to placing any fill. These materials are unsuitable for use as fill in structural areas due to their potentially detrimental properties. Therefore, these materials shall only be placed as the final lift of fill in landscaped areas. **If any uncontrolled fill is encountered, it will require complete removal, or if the material is suitable for fill according to the Geotechnical Engineer, removed and properly recompacted.**

All areas that are to receive fill or structural loading shall be scarified to a depth of at least 12 inches, moisture conditioned to within 2 percent of optimum, and recompacted to at least 90 percent relative compaction (ASTM D 1557). If the native subgrade is too coarse to density test, then moisture conditioning and compaction shall be completed to the satisfaction of the Geotechnical Engineer. A proof-rolling program of a minimum 5 complete passes with a minimum 10-ton roller or a Cat 825 self propelled sheepfoot may be acceptable. For footing trenches, three complete passes with hand compactors may be adequate.

All fill, except rock fill, shall be placed in 12-inch maximum lifts, moisture conditioned to within 2 percent of optimum, and compacted to at least 90 percent (ASTM D1557). If any of the on-site materials are too coarse for density testing (>30% retained on the ¾" sieve), these materials must be treated as rock fill. Whenever structural foundations will be placed partially in cut and partially in structural fill, over-excavation and replacement of material on the cut side may be necessary in order to reduce the potential for differential settlement. Any differential fills shall be reduced to a maximum of 8 feet within the building envelope.

The maximum particle size shall be 12 inches up to 5 feet below finished grade and 6 inches from 5 feet below finished grade to finished grade. This material shall be placed in 12-inch lifts (maximum), moisture conditioned, and compacted to the satisfaction of the Geotechnical Engineer. Care should be taken to insure that voids between cobbles and boulders are filled with finer materials. Five complete passes of a minimum 10-ton roller or Cat 825 sheepsfoot compactor may achieve adequate compaction. Acceptance of density requirements for this type of rock fill shall be by observation of lift thickness, moisture conditioning, and applied compactive effort. The maximum allowable particle size shall be decreased if the Geotechnical Engineer is not satisfied with the achieved compaction and/or "nesting" of particles is observed.

Native materials are suitable to be utilized as structural cap material. Structural cap materials are materials within 3 feet below bottom of footing and within 2 feet below pavement and concrete subgrade. Any native

materials encountered that do not meet the requirements of structural fill will not be permitted within 3 feet of footings or 2 feet of roadway improvements without approval of the Geotechnical Engineer.

Any expansive soils, if encountered during the course of excavation, may not be utilized for direct support of improvements (including streets), nor may they be reused as structural fill. The primary geotechnical recommendation is to remove this material entirely from all structural areas and replace it with structural fill to footing grade and pavement and concrete slab subgrade. A less preferable, but less costly alternative with more risk is to minimize the potential for post-construction differential foundation and subgrade movement by providing a minimum of 3 feet of structural fill beneath footings, and 2 feet of structural fill beneath all pavement and concrete slab subgrades. This may be accomplished entirely by fill or by over-excavation and replacement with structural fill, or any combination thereof. Soils at the bottom of the over excavation shall be scarified to a minimum depth of 6 inches; moisture conditioned to at least optimum moisture, and recompacted to 90 percent (ASTM D1557). If the Owner/Developer elects to implement this alternate method and not remove all clays from structural areas, he will assume the risk of potential post-construction differential foundation movement, and will hold harmless the Geotechnical Engineer for this decision.

Expansive soil shall be defined as any soil or bedrock with more than 30 percent (by weight) passing the No. 200 sieve and/or a plasticity index of 16 or greater and/or an expansion index of at least 21. Expansive soils may only be placed as fill in non-structural areas, or as structural fill to within 3 feet of footing grade or 2 feet of pavement subgrade. Expansive soils utilized as fill shall be moisture conditioned to at least optimum and compacted to a minimum of 90 percent. All direct structural support shall be provided by non-expansive material. Any imported structural fill for this project should meet or exceed the following guideline specifications:

Sieve Sizes	Percentage Passing (by weight)
4 Inch	100
3/4 Inch	70-100
No. 40	15-50
No. 200	10-30
Additional Requirements are as follows:	
Water Soluble Sulfate (SO_4)(max)	0.1%
Total Available Water Soluble Sodium Sulfate (Na_2SO_4)(max)	0.2%
Solubility (max)(AWWA 2540C)	0.5%
Liquid Limit (max.)	38
Plasticity Index (max.)	15
Expansion Index (max.)	20

This specification is meant as a guideline to pre-approve imported structural fill. Other materials not meeting this specification may be suitable, but will require approval from the Geotechnical Engineer.

Mining of structural fill material on-site is not permissible unless taken from non-structural areas, or from re-using suitable material as structural fill taken from areas of designated cut.

C. Surface and Subsurface Drainage

Surface drainage shall be diverted away from all buildings and not be permitted to pond or pool adjacent to foundations. If crawlspaces are utilized it is recommended that all crawlspaces be lined with Visqueen sheeting, and that positive crawlspace drainage be provided to a collection point. A small diameter pipe (2 to 4-inch) may be placed beneath and perpendicular to the footing, sloped to drain to daylight, or the drain rock bedding of the storm water catchment basin lateral to the street may be utilized to drain the crawlspace. Slab-on-grade foundation systems may require subsurface drainage dependent on conditions encountered during grading. The Geotechnical Engineer shall determine whether subsurface drainage is required at that time.

Grading plans should be designed to minimize the potential for infiltrated precipitation or landscaping irrigation to migrate laterally and downslope along the cut/fill interface and surfacing in downslope lots. Roof gutters and downspouts are recommended to discharge water well away from foundation areas. Steps should also be taken to minimize the moisture seepage at the joint between the stem wall and the footing.

D. Slope Stability and Erosion Control

The results of our exploration and testing indicate that 2:1 (H:V) slopes will be stable for on-site materials in cut and fill. All cut and fill slopes should incorporate brow ditches to divert surface drainage away from the slope face. Any major cut or fill slopes shall include mid-height benches in accordance with International Building Code standards.

The potential for dust generation, both during and after construction, is high at this project. Dust control will be mandatory on this project in order to comply with air quality standards. The contractor shall submit a dust control plan and obtain the required permits from Washoe County and the City of Reno prior to commencing site grading.

Stabilization of all slopes and areas disturbed by construction will be required to prevent erosion and to control dust. Stabilization may consist of riprap, revegetation and landscaping, or dust palliative. Slopes steeper than 3:1 (H:V) will require stabilization.

Where the fill extends onto native slopes with gradients greater than 5:1, the fill shall be keyed into the native soils. The keys will have a minimum width of equipment width or 10 feet, whichever is lesser, and constructed with a minimum 5 percent slope into the hillside.

E. Trenching and Excavation

All trenching and excavation shall be conducted in accordance with all local, state, and federal (OSHA) standards. In general, the soil, encountered during exploration meets the criteria for OSHA Type A and B soils. Any oversized material loosened during excavation will require scaling prior to permitting workmen to enter the trench.

Any area in question should be examined by the Geotechnical Engineer. The following table is reproduced from Occupational Safety and Health, Subpart P, 1926.652, Appendix B:

TABLE B-1

MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V) [1] FOR EXCAVATIONS LESS THAN 20 FEET DEEP [3]	
STABLE ROCK	VERTICAL	(90°)
TYPE A [2]	3/4:1	(53°)
TYPE B	1:1	(45°)
TYPE C	1 1/2:1	(34°)

NOTES

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
2. A short-term maximum allowable slope of 1/2 H:1V (63°) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4 H:1V (53°).
3. Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

Bedding and initial backfill over the pipe will require import to meet the specifications of the utility having jurisdiction. On-site soils may be used for trench backfill, provided particles over 4 inches in diameter are removed. Imported structural cap material or native material meeting the requirements for structural fill will be required within 3 feet below bottom of footing and 2 feet below bottom of pavement subgrade. All trench backfill shall be placed in 8 inch (max.) finished lifts, moisture conditioned to within 2 percent of optimum, and densified to at least 90 percent relative compaction (ASTM D1557). If metal pipes are to be utilized, corrosion protective measures shall be taken.

F. Asphaltic Concrete Design

Truck traffic counts and the type of trucks were not available during the preparation of this report so assumptions were made for the pavement design. A sample from TP-5 was analyzed to determine a representative R-value for the existing materials found on site. The R-value for this sample is 33. This material can provide adequate support for the intended improvements (Appendix B), provided the recommendations in this report are incorporated into design and construction. A Type 2 (3/4 inch size) or Type 3 (1/2 inch size) may be used for the bottom layer, but a Type 3 (1/2 inch size) mix is recommended for the access ways and parking areas for a smoother, more flush finished surface, which is less susceptible

to moisture penetration. A 50 Blow, Marshall mix design with 3-5 percent air voids is recommended for this project. The use of PG64-28NV is also recommended in order to increase the resistance to thermal cracking and help reduce pavement maintenance over the life of the pavement. A mix design shall be submitted to the Geotechnical Engineer for approval one week prior to paving.

Subgrade material shall be scarified to a minimum depth of 12 inches below finished asphalt grade, moisture conditioned to within 2 percent of optimum, and compacted to at least 90 percent. Next, 8 inches of aggregate base materials (Type 2, Class B) shall be placed on top of the subgrade. The aggregate base materials shall be approved by the Geotechnical Engineer prior to incorporation into the pavement structure. Aggregate base shall be moisture conditioned to within 2 percent of optimum and compacted to at least 95 percent compaction (ASTM D 1557). Finally, 4 inches of asphaltic concrete shall be placed on top of the base in two approximately equal lifts.

G. Concrete Slabs

All dedicated concrete walkways and driveways should be directly underlain by aggregate base per accepted standards. Decomposed granite, the same unit thickness as aggregate base, can be used in lieu of aggregate base under private walks and driveways. The concrete mix design for exterior concrete shall have a minimum of 6 sacks of Portland cement, with a maximum water to cement ratio of 0.45, and air content between 4.5 and 7.5 percent. This recommendation is to provide resistance to freeze-thaw cycles that occur in the Reno area. Additional requirements for exterior concrete are as follows:

Minimum compression strength = 4,000 psi,
Maximum slump = 4"

Interior slab-on-grade and foundation concrete shall follow criteria established by the project structural engineer. One sample was tested for soluble sulfates. Soluble sulfates have a detrimental effect on Portland cement concrete. The results (Sheet 25) indicate that there are 0.01 percent soluble sulfates in the native soils. Therefore, the sulfate exposure is ranked "negligible". This is according to Table 4.3.1 of the ACI Building Code Requirements (as per IBC, 2006), as follows:

TABLE 4.3.1

REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOLUTIONS

SULFATE EXPOSURE	WATER SOLUBLE SULFATE (SO_4) IN SOIL, PERCENT BY WEIGHT	SULFATE (SO_4) IN WATER (ppm)	CEMENT TYPE	MAXIMUM WATER-CEMENTITIOUS MATERIAL RATIO, BY WEIGHT, NORMAL WEIGHT AGGREGATE CONCRETE *	MINIMUM f'_c NORMAL-WEIGHT AND LIGHTWEIGHT AGGREGATE CONCRETE (psi)*
Negligible	$0.00 \leq SO_4 < 0.10$	$0 \leq SO_4 < 150$	-	-	-
Moderate†	$0.10 \leq SO_4 < 0.20$	$150 \leq SO_4 < 1500$	II, IP(MS), IS(MS), P(MS), I(PM)(MS), I(SM)(MS)	0.50	4,000
Severe	$0.20 \leq SO_4 < 2.00$	$1500 \leq SO_4 < 10,000$	V	0.45	4,500
Very severe	$SO_4 > 0.20$	$SO_4 > 10,000$	V plus pozzolan‡	0.45	4,500

* When both Table 4.3.1 and Table 4.2.2 are considered, the lowest applicable maximum water-cementitious material ratio and highest applicable minimum f'_c shall be used.

† Seawater.

‡ Pozzolan that has been determined by test or service record to improve sulfate resistance when used in concrete containing Type V cement.

Structural concrete mix designs for interior and private improvements only should meet one of the additional following criteria:

TYPE OF CEMENT	MINIMUM SACKS OF CEMENT PER CUBIC YARD (prior to replacement with fly ash)	MAXIMUM WATER TO CEMENTIOUS MATERIALS RATIO
Type II	6	0.5
Type II and fly ash	5.5	0.53
Type IP	5.5	0.53
Type V	5.5	0.53
Type V and fly ash	5.5	0.53

Concrete mix designs shall be determined per Chapter 7 of "Design and Control of Concrete Mixtures" by the Portland Cement Association and as further modified by IBC 2006 standards, and submitted to the Geotechnical Engineer for approval at least one week prior to pouring the concrete.

The greater Elko area is in a climatic zone of low humidity and concrete is susceptible to shrinkage cracking and curling during curing. All concrete work shall follow the procedures of the American Concrete Institute.

H. Anticipated Construction Problems

The site has a high potential for dust generation, and will require constant dust suppression measures during construction. The disposal of construction waste may also cause problems due to the lack of nearby washouts. Furthermore, proximity of the site to existing residences may limit the hours during which certain work can be done.

LIMITATIONS

This report is prepared solely for the use of Summit Engineering's client. Any entity wishing to utilize this report must obtain permission from them prior to doing so. Our services consist of professional opinions and recommendations made in accordance with generally accepted soil and foundation engineering principles and practices. The analyses and recommendations contained in this report are based on our site reconnaissance, the information derived from our field exploration and laboratory testing, our understanding of the proposed development, and the assumption that the soil conditions in the proposed building and grading areas do not deviate from the anticipated conditions.

Unanticipated variations in soil conditions could exist in unexplored areas on the site. If any soil or groundwater conditions are encountered at the site that are different from those discussed in this report, our firm should be immediately notified so that our recommendations can be modified to accommodate the situation. In addition, if the scope of the proposed construction, including proposed loads or structural location, changes from that described in this report, our firm should be notified.

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

- Review of site construction plans for conformance with soils investigation.
- Observation and testing during site preparation, grading, excavation and placement of fill.
- Observation and testing of materials and placement of asphalt concrete and site concrete.
- Foundation observation and review.
- Consultation as may be required during construction.

The findings in this report are valid as of the present date; however, changes in the conditions of the property can occur with the passage of time, whether they are due to natural processes or to the works of man on this or adjacent lands. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or from the broadening of knowledge. Accordingly, the findings in this report might be invalidated, wholly or partially, by changes outside of our control.

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APPENDIX A

APPENDIX A
SPECIFICATIONS FOR
SITE PREPARATION, EXCAVATION, COMPACTION
STRUCTURAL FILL, AND SUBGRADE PREPARATION

1.0 GENERAL

1.1 Standard Specifications - Where referred to in these specifications, "Standard Specifications" shall mean the Standard Specifications for Public Works Construction sponsored and distributed by the Regional Transportation Commission of Washoe County, *et al.* (2007 edition).

1.2 Scope - All work shall be done in accordance with the Standard Specifications except as may be modified by the specifications outlined below. The work done under these specifications shall include clearing, stripping, removal of unsuitable material, excavation and preparation of natural soil, placement and compaction of on-site and/or imported fill material, or as specifically referred to in the plans or specifications.

1.3 Geotechnical Engineer - When used herein, Geotechnical Engineer shall mean the engineer or a representative under the engineer's supervision. The work covered by these specifications shall be inspected by a Geotechnical Engineer, who shall be retained by the Owner. The Geotechnical Engineer will be present during the site preparation and grading to inspect the work and to perform the tests necessary to evaluate material quality and compaction. The Geotechnical Engineer shall submit a report to the Owner, including a tabulation of all tests performed.

1.4 Soils Report - A "Geotechnical Investigation" report, prepared by Summit Engineering Corporation, is available for review and may be used as a reference to the surface and subsurface soil and groundwater conditions on these projects. The Contractor shall make his own interpretation with regards to the methods and equipment necessary to perform the excavations.

1.5 Percent Relative Compaction - Where referred to herein, percent relative compaction shall mean the in-place dry unit weight of soil expressed as a percentage of the maximum dry unit weight of the same material, as determined by ASTM D-1557, laboratory compaction test procedure. Optimum moisture content is the moisture content corresponding to the maximum dry density determined by ASTM D-1557.

2.0 SITE PREPARATION AND EARTHWORK

2.1 All earthwork and site preparation should be performed in accordance with the requirements of this report and attached specifications, and the Standard Specifications.

2.2 Clearing - Areas to be graded shall be cleared of brush and debris. These materials shall be removed from the site and discarded by an acceptable means approved by the owner.

2.3 Stripping - Surface soils containing roots and organic matter shall be stripped from areas to be graded and stockpiled or discarded as specified by the plans and specifications or at the discretion of the owner. Strippings may be used as the final lift of fill for areas to be planted.

2.4 Dust Control - The contractor shall prevent and maintain control of all dust generated during construction in compliance with all federal, state, and county regulations. The project specifications should include an indemnification by the contractor of the engineer and owner for all dust generated during the entire construction period.

2.5 Materials - All material not suitable for use as structural fill, shall be removed from the sites by the Contractor, or placed in non-structural fill areas. The Geotechnical Engineer shall determine the suitability of material for reuse as structural fill.

2.6 Ground Surface - The ground surface exposed by stripping and/or excavation shall be scarified to a minimum depth of 12 inches, moisture conditioned, by aerating or adding water, to within 2 percent of optimum moisture content and compacted to 90 percent relative compaction, unless otherwise specified. Compaction of the ground surface shall be approved by the Geotechnical Engineer prior to placement of fill, structural fill, aggregate base, and/or Portland cement concrete.

2.7 Backfill of test pits and trenches – Our exploration pits and trenches were backfilled without mechanical compaction. In structural areas, backfill in the pits should be removed and replaced in lifts with compactive effort.

3.0 FILL MATERIAL

3.1 Fill material shall be free of perishable, organic material. Rock used in the fill shall be placed in such a manner that no voids are present, either between or around the rock, after compacting the layer.

3.2 Structural Fill Material - Material shall consist of suitable non-expansive soils having a plasticity index less than 16, and a minimum R-value of 30. The gradation requirements shall be as follows:

Sieve Sizes	Percentage Passing (by weight)
4"	100
3/4"	70 - 100
#40	15 - 50
#200	10 - 30

Materials not meeting the above requirements may be suitable for use as structural cap material at the discretion of the Geotechnical Engineer. Samples of imported fill proposed for use as structural cap material shall be submitted to the Geotechnical Engineer and approved before it is delivered to a site.

3.3 Rock Fill - Fill material containing over 30 percent (by weight) of rock larger than 3/4 inches in greatest dimension is defined as rock fill. Rock Fill located five or more feet below finished grade may be constructed in loose lifts up to the maximum size of the rock in the material but not exceeding diameters of 18 inches. The voids around the rock in each rock fill lift shall be filled with granular material and fines and compacted to the satisfaction of the Geotechnical Engineer. Rocks larger than 18 inches in diameter shall be placed in non-structural areas or in deep fills at the discretion of the geotechnical engineer. Care should be taken to fill all voids with finer grained materials. No nesting of larger rocks shall be allowed. Rock fill shall not be used for slab-on-grade construction without

the approval of the Geotechnical Engineer. The maximum allowable particle size shall be decreased by the Geotechnical Engineer if the achieved compaction is not satisfactory to the Geotechnical Engineer or "nesting" is observed by the Geotechnical Engineer.

4.0 EARTHWORK AND FILL PLACEMENT

4.1 Placement - Fill material shall be placed in layers that shall not exceed 12 inches of compacted thickness, unless otherwise approved by the Geotechnical Engineer. Each layer shall be evenly spread and moisture conditioned to within 2 percent of optimum moisture content. Unless otherwise specified, each layer of earth fill shall be compacted to 90 percent relative compaction. Compaction shall be approved by the Geotechnical Engineer. Rock fill shall be placed in accordance with the appropriate sections of the Standard Specifications. Rock fill placement and compaction shall be approved by the Geotechnical Engineer. Full time inspection of fill placement is required in structural areas and areas designated as dedicated improvement for the Washoe County, unless otherwise approved by the Engineer.

4.2 Keyways - Where the fill extends onto native slopes with gradients greater than 5:1, the fill shall be keyed into the native soils. The keys will have a minimum width of equipment width or 10 feet, whichever is lesser, and constructed with a minimum 5 percent slope into the hillside.

4.3 Compaction Equipment - The Contractor shall provide and use equipment of a type and weight suitable for the conditions encountered in the field. The equipment shall be capable of obtaining the required degree of compaction in all areas including those that are inaccessible to ordinary rolling equipment.

4.4 Reworking - When, in the judgment of the Geotechnical Engineer, sufficient compaction effort has not been used, or where the field density tests indicate that the required compaction or moisture content has not been obtained, subgrade and/or fill materials shall be reworked and compacted as needed to obtain the required density and moisture content. This reworking shall be accomplished prior to the placement of fill, structural fill, aggregate base, and/or Portland cement concrete.

4.5 Unstable Areas - If pumping or other indications of instability are noted, fill and/or subgrade materials shall be evaluated by the Geotechnical Engineer, scarified, left to dry, and recompacted or removed and replaced as needed to obtain the required density and moisture content. This work shall be accomplished prior to the placement of fill, structural fill, aggregate base, and/or Portland cement concrete.

4.6 Frozen Materials – Fill shall not be placed on frozen materials, nor shall frozen material be utilized as fill.

5.0 EXCAVATION AND SLOPE REQUIREMENTS

5.1 Finished cut slopes shall not exceed 2 horizontal to 1 vertical and fill slopes should not exceed ratios of 2 horizontal to 1 vertical. Slopes steeper than three horizontal to one vertical or more than ten feet in height should be protected from erosion using riprap, vegetation, or a similar designated and acceptable means meeting the applicable standards.

5.2 Temporary, unsupported construction slopes less than ten feet in height may stand at a slope as steep as 1½:1 (H:V) provided that the length of the unsupported slope does not exceed twenty feet. These temporary slopes should not remain unsupported for extended periods of time.

6.0 FOUNDATIONS AND FOOTING DESIGN

6.1 Spread type continuous and column footings should be designed to impose a maximum net dead plus long-term live load of 2,000 pounds per square foot (per IBC 2006 Table 1804.2). Net bearing pressures of up to one-third in excess of the given bearing value are permitted for transient live loads from wind and earthquake.

6.2 Exterior footings should be embedded a minimum of 30 inches below the lowest adjacent final compacted subgrade to provide adequate frost protection and confinement. Isolated interior footings should be imbedded per IBC requirements. The recommendations of this report are applicable to all footings.

6.3 Passive soil resistance to lateral footing pressures may be calculated as 407 pounds per square foot per foot of depth and a base coefficient of friction of 0.25 for footings. Active soil pressure may be calculated as 35 pounds per square foot per foot of depth. At-rest soil pressure may be calculated as 55 pounds per square foot per foot of depth.

6.4 Backfill of footing excavations or formed footings should be moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 90 percent relative compaction.

6.5 All footing excavations should be clear of loose material prior to placement of concrete. The bottom of the footing excavation should be scarified to a depth of 12 inches, moisture conditioned to within 2 percent of optimum moisture content, and compacted to a minimum of 90 percent relative compaction.

7.0 UTILITY TRENCH BACKFILL

7.1 Bedding Material - Bedding material shall meet one of the following gradation requirements listed below and shall be nonplastic:

Bedding will require import to meet one of the following specifications:

	CLASS A BACKFILL	CLASS B BACKFILL	CLASS C BACKFILL
SIEVE SIZE	% PASSING	%PASSING	% PASSING
1"	-	-	100
¾"	-	-	90-100
½"	-	100	-
3/8"	100	-	10-55
#4	90-100	0-15	0-10
#50	10-40	-	-
#100	3-20	-	-
#200	0-15	0-3	-

Bedding as defined in this report shall be within 6 inches of the bottom of the pipe, within 12 inches of the sides of the pipe, and within 12 inches, or to a depth required from the top of the pipe to the top of the groundwater table, whichever is greater, over the pipe. Where groundwater is encountered, filter fabric or filter material shall encapsulate the bedding, if Class B or Class C backfill is utilized. The filter fabric shall be a 10 oz./sq. yd. nonwoven geotextile.

Individual utility companies may have additional specifications, which should also be followed.

7.2 Placement and Compaction - Bedding material shall first be placed so that the pipe is supported for the full length of the barrel with full bearing on the bottom segment of the pipe equal to a minimum of 0.4 times the outside diameter of the barrel. Bedding shall also extend to one foot above the top of the pipe. Pipe bedding within 6 inches of the pipe shall be placed in thin layers not exceeding 8 inches in loose thickness, conditioned to the proper moisture content for compaction. Class A backfill shall be compacted to at least 90 percent relative compaction. Class B and/or C backfill shall be compacted to the satisfaction of the Geotechnical Engineer. All other trench backfill shall be placed in thin layers not exceeding 8 inches in loose thickness, conditioned to within 2 percent of optimum moisture content, and compacted as required for adjacent fill, or if not specified, to at least 90 percent compaction in areas under structures, utilities, roadways, parking areas, and concrete flatwork.

7.3 Drain Rock - Any necessary subsurface drainage systems shall use drain rock conforming to the following Class C gradation:

Sieve Sizes	Percentage Passing (by weight)
1"	100
3/4"	90-100
3/8"	10-55
#4	0-10

8.0 CONCRETE SLAB-ON-GRADE AND FLATWORK CONSTRUCTION

8.1 Slab-on-grade - When used in this report, slab-on-grade shall refer to all interior concrete floors.

8.2 Concrete flatwork - A general term, flatwork refers to all exterior concrete site work including sidewalks, driveways, curb and gutters, and patios.

8.3 Subgrade - The upper twelve inches of subgrade beneath the aggregate base under concrete flatwork and slabs-on-grade shall be scarified, moisture conditioned to within 2 percent of optimum moisture content, and compacted to 90 percent relative compaction. Compaction shall be approved by the Geotechnical Engineer.

8.4 Concrete Mix Design - The contractor shall submit a concrete mix design to the Geotechnical Engineer for review and approval at least 1 week prior to placement of any concrete. The exterior concrete mix design shall utilize a minimum of 6 sacks of Portland Cement Concrete and a maximum water cement ratio of 0.45. Exterior concrete shall also meet the following specifications:

Minimum 28 day compressive strength = 4000 psi.
Air content = 4.5 – 7.5%
Maximum slump = 4 inches

Interior concrete mix designs shall comply with the structural plans and the tables included in Section G of this report.

Admixtures - All admixtures incorporated in the mix design shall be approved by the Geotechnical Engineer.

Finishing - All finishing shall be done in the absence of bleed water. No water shall be added to placed concrete during finishing.

8.5 Overexcavation - If encountered, expansive soils within two feet of flatwork or three feet of slab-on-grade shall be overexcavated. Overexcavations should extend at least two feet laterally beyond the edge of the flatwork/slab-on-grade section.

8.6 Base - Base material shall be compacted to 95 percent relative compaction. Compaction shall be approved by the Geotechnical Engineer. Type II Class B aggregate base meeting the following requirements shall be used:

Gradation Requirements

Sieve Size	Percentage Passing (by weight)
1"	100
3/4"	90-100
#4	35-65
#16	15-40
#200	2-10

Plasticity Index should meet the following requirements:

Percentage Passing #200 (by weight)	Plasticity Index Maximum
0.1 to 3.0	15
3.1 to 4.0	12
4.1 to 5.0	9
5.1 to 8.0	6
8.0 to 11.0	4

Other Requirements

R-value	Minimum of 70
Fractured faces	Minimum of 35%
LA Abrasion	Maximum of 45%
Liquid Limit	Maximum of 35%

8.7 Concrete slab-on-grade thickness and compressive strength requirements shall be in accordance with design criteria provided by the Structural Engineer. Minimum slab thickness and compressive strength for flatwork shall be in accordance with the applicable requirements.

8.8 Concrete work shall conform to all requirements of ACI 301-84, Specifications for Structural Concrete for Buildings, except as modified by supplemental requirements.

8.9 To facilitate curing of the slab, base materials shall be kept moist until placement of the concrete.

8.10 Excessive slump (high water cement ratio) of the concrete and/or improper curing procedures used during hot or cold weather could lead to excessive shrinkage, cracking or curling of slabs and other flatwork.

9.0 RETAINING WALLS

9.1 Retaining walls should be designed using a passive pressure calculated as 407 pounds per square foot per foot of depth and active soil pressure should be calculated as 35 pounds per square foot per foot of depth. A base coefficient of 0.25 should be used for resistance to sliding.

9.2 Footings should be placed at least 24 inches below the lowest adjacent finished grade. Subgrade shall be prepared as per these specifications.

9.3 In addition to active soil pressures the effects of any surcharge from adjacent structures or roadways should be included in calculating lateral pressures on retaining walls.

9.4 The design pressures given assume the soils retained are granular, non-expansive and free draining.

9.5 Retaining wall backfill should be moisture conditioned to within 2 percent of optimum and compacted to 85 percent in non-structural areas and 90 percent in structural areas. The use of heavy compaction equipment could cause excessive lateral pressures, which may cause failure of the wall.

9.6 Installation of weep holes or a continuous drain along the base of the wall is recommended to prevent water from being retained behind the wall.

9.7 An interceptor swale should be provided at the top of all retaining walls.

10.0 ASPHALTIC CONCRETE PAVEMENT

10.1 Material and Procedure - The asphalt-concrete material and placement procedures shall

conform to appropriate sections of the "Standard Specifications". Aggregate materials for asphaltic concrete shall conform to the requirements listed for Type 2 and Type 3 aggregate in Section 200.02.02 of the "Standard Specifications, 2007". A Type 3, 50-blow, Marshall mix design with 3 to 5 percent air voids is recommended. An asphaltic cement grade PG64-22 or equivalent is recommended for top layer for this project. The Contractor shall submit proposed asphalt-concrete mix designs to the Geotechnical Engineer for review and approval at least one week prior to paving. Asphalt materials should be compacted to a minimum of 92 percent of its theoretical maximum specific gravity or 96 percent of its Marshall density.

10.2 Subgrade Preparation - After completion of the utility trench backfill and prior to the placement of aggregate base, the upper 12 inches of finished subgrade soil or structural fill material shall be moisture conditioned to at within 2 percent of optimum and compacted to at least 90 percent. This may require scarifying, moisture conditioning and compacting.

10.3 Aggregate Base Rock - After the subgrade and/or structural fill is properly prepared, the aggregate base material shall be placed uniformly on the approved areas. Aggregate base shall be placed in such a manner as to prevent segregation of the different sizes of material and any such segregation, unless satisfactorily corrected, shall be cause for rejection at the discretion of the Geotechnical Engineer. The aggregate base material shall be spread for compaction in layers not to exceed six inches; moisture conditioned to within 2 percent of optimum, and compacted to at least 95 percent compaction. Aggregate base materials shall meet the requirements of Section 200.01.03 of the "Standard Specifications, 2007" for Type 2, Class B aggregate base. The aggregate base materials shall be approved by the Geotechnical Engineer prior to incorporation into the pavement structure.

11.0 SEISMIC DESIGN

11.1 Design of structures should include an allowance for earthquake loading. Structures should be designed in conjunction with IBC 2006 criteria for seismic acceleration of 0.504g in soil profile D.

APPENDIX B

SILVER HILLS

Truck Type	Daily Traffic Count	Number of Vehicles/Year	Number of Vehicles/Year in Design Lane	Truck Factor	Growth Factor	ESAL
Single-Unit Trucks						
2-Axle, 4-Tire	1000	365000	182500	0.006	29.8	32631
2-Axle, 6-Tire (includes school buses)	4	1460	730	0.13	29.8	2828
3-Axle or more (includes RTC buses)	4	1460	730	0.72	29.8	15663
Tractor Semi-Trailers and Combinations						
4-Axle or less	2	730	365	0.4	29.8	4351
5-Axle	1	365	183	0.63	29.8	3426
6-Axle or more	0	0	0	0.64	29.8	0
				Total ESAL		**58,899**

Percentage of Truck in Design Lane **50**

Key Assumptions
Urban Collector
20 year design @ 4% growth

1993 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Don M. McHarg

Flexible Structural Design Module

Asphalt Section

Flexible Structural Design

18-kip ESALs Over Initial Performance Period	60,000
Initial Serviceability	4.2
Terminal Serviceability	3
Reliability Level	90 %
Overall Standard Deviation	0.49
Roadbed Soil Resilient Modulus	12,949 psi
Stage Construction	1
Calculated Design Structural Number	1.81 in

Layered Thickness Design

Thickness precision: Actual

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Spec Thickness (Di)(in)	Min Thickness (Di)(in)	Elastic Modulus (psi)	Width (ft)	Calculated Thickness (in)	Calculated SN (in)
1	Asphalt	0.44	1	-	3	350,000	12	3.00	1.32
2	Base	0.12	1	6	-	27,500	12	6.00	0.72
Total	-	-	-	-	-	-	-	9.00	2.04

APPENDIX C

PRELIMINARY FAULTLINE EXPLORATION
SILVER HILLS AREA
WASHOE COUNTY, NEVADA

A Professional Geologist supervised the excavation of three trenches across mapped faults on this proposed development. Two of the faults (FT-2 and FT-3) were determined to be active; the other fault (FT-1) was not encountered during this program. The faults were generally excavated to depths of 4-5 feet below ground surface and ranged from 45 feet in length to 111 feet. Excavations were done using a CAT 420 backhoe.

Fault trench FT-1 was excavated at the southwestern corner of the development in an effort to transect a mapped northwesterly fault that parallels the Walker Lane fault zone. The mapped fault was plotted on a topographic map, and the trench was positioned to intersect the trace of the fault using both the topographic map and interpreted linears from orthophotography. The trench was 45 ft long and ranged in depth from 44 inches on western part to 40 inches on the eastern part (Sheet C1). The topsoil, a blocky dark brown clayey sand, ranged in thickness from 22 inches to 32 inches depth below ground surface (bgs), increasing in depth to the east. The underlying soil was a decomposed arkosic sandstone that excavates to a coherent coarse clayey or silty sand, or decomposed granite. No abrupt changes in soils were noted in the trench in either the topsoil or the underlying sands. The change in topsoil thickness was a gradual tapering thickness downslope. No fault appeared to be intersected in this trench, and no scarps were noted in the surrounding topography (Sheet C2).

Fault trench FT-2 was excavated at the northwestern part of the development. The trench was sited to intersect a mapped north-south rangefront fault where it intersected an abrupt northwesterly photolinear interpreted to be a northwesterly striking fault parallel the Walker Lane orientation. The trench was 57 feet long and ranged in depth from 52 inches bgs on the southwest terminus to 36 inches bgs on its northeast origin. Two faults were noted in the trench with an intervening damage zone (Sheets C3, C4). The first fault was at 0+35 feet, and separated an arkosic sandstone containing clasts of the Peavine Peak metamorphic rocks on the east from the fault zone breccia. The eastern unit is estimated to excavate to a silty sand with gravel (SM). The second fault was at 0+43 - 0+46 feet, and separated the fault zone breccia on the east from an arkosic sandstone containing clasts of coarse and fine grained granite. This western unit is estimated to excavate to a clayey sand (SC). A rotated clast of topsoil was noted and photographed at 0+46 in the hanging wall of the fault. The western unit contained veinlets of hydrothermal magnetite from approximately 0+46 - 0+48 feet. Clay alteration of the western unit prevailed to the terminus of the trench at 0+57 feet, presumably associated with the hydrothermal magnetite. This alteration may cause isolated problems during construction, and should be evaluated in greater detail. The intervening breccia between 0+35 feet and 0+43 feet was a brecciated arkosic sandstone with clasts of both granitic

and metamorphic rocks, and is estimated to excavate to the properties of a clayey sand (SC).

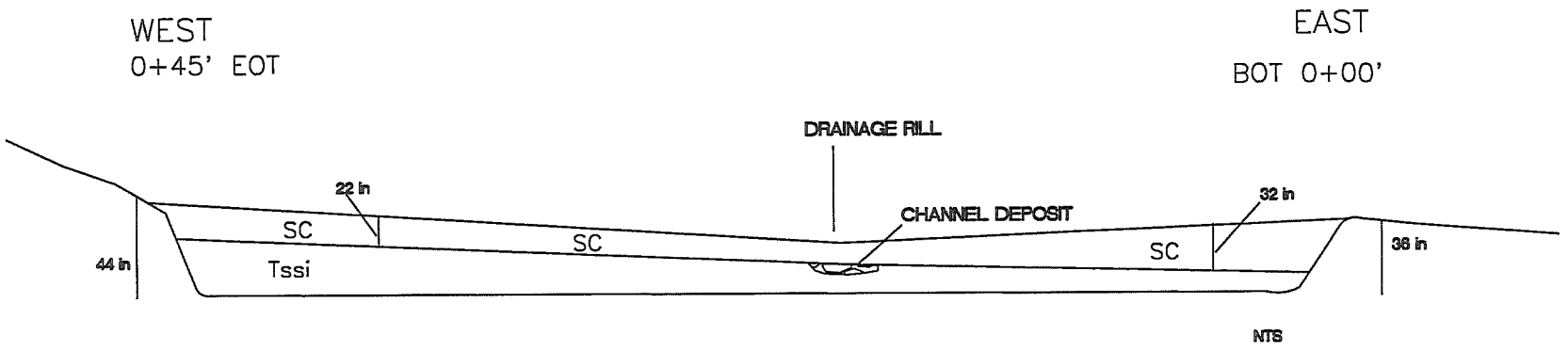
The topsoil, a dark brown blocky clayey sand, ranged in thickness from 24 inches on the southwest part of the trench to 12 inches on the northeast part of the trench. No abrupt thinning of topsoil was observed, but, as noted previously, a clast of topsoil was observed in the western fault within the arkosic sandstone (Sheet C5). The fault is interpreted to be active Holocene, with right lateral strike slip motion. A 50-foot offset of both sides of the faults is proscribed for occupied structures.

Fault trench FT-3 was excavated at the northeastern part of the proposed Silver Hills development (Sheet C6). The trench was sited to intersect a mapped north-south fault situated approximately 1 mile east of the rangefront (see geologic map). When reconnoitering the area in the field, a scarp was noticed and the trench was sited to intersect the scarp (Sheet C7). The trench was 111 feet long and ranged in depth from 56 inches bgs near the terminus on the western end to 40 inches depth at the origin on the eastern end. Topsoil, a dark brown clayey sand (SC) with blocky break, averaged approximately 24 inches thickness bgs, but thinned to approximately 15 inches in two faults.

The main fault zone occurred at the surface scarp between 0+65 – 0+82 feet. The fault separates a fine-grained medium reddish brown sandstone on the east from a medium greenish gray shale on the west (Sheet C8). The sandstone is estimated to excavate to a dense well graded sand (SW). The shale is estimated to excavate to a very stiff sandy silt (ML).

The second smaller fault zone occurred at 1+03 – 1+08, apparently parallel to the main fault. This second fault separates the shale on the east side from a dark greenish gray poorly consolidated conglomerate on the west (Sheet C9). The conglomerate is estimated to excavate to a medium dense silty gravel with sand (GM). The topsoil thins over this fault to 15-17 inches. Because the topsoil is thinned over both faults, they are interpreted to be active Holocene, with indeterminate dip slip motion. A 50-foot offset of both sides of the faults is proscribed for occupied structures.

FAULT TRENCH FT-1 SCHEMATIC SECTION



SC - TOPSOIL, CLAYEY SAND

Tssi - arkosic sandstone, excavates to a CLAYEY SAND

SHEET C1

OF APP. C

SUMMIT ENGINEERING CORPORATION
5405 MAE ANNE AVENUE, RENO, NV. 89523
PHONE:(775) 747-8550 FAX:(775) 747-8559

JOB NO.: 28813
APPR.: JKG
BY: WMM
9:22 AM * 05-MAR-2009

FAULT TRENCH SCHEMATIC
SILVER HILLS
WASHOE CO., NV

N:\DWGS\J28813_SilverHills\Geotech\ft1_sxn_silverhills.DWG

PHOTO OF TRENCH FT-1
SILVER HILLS
WASHOE CO., NV

JOB NO.: 28813
APPR.: JKG
BY: WMM

N:\DWGS\J28813_SilverHills\Geotech\FT-1_pix.DWG ~ 9:19 AM * 05-MAR-2009

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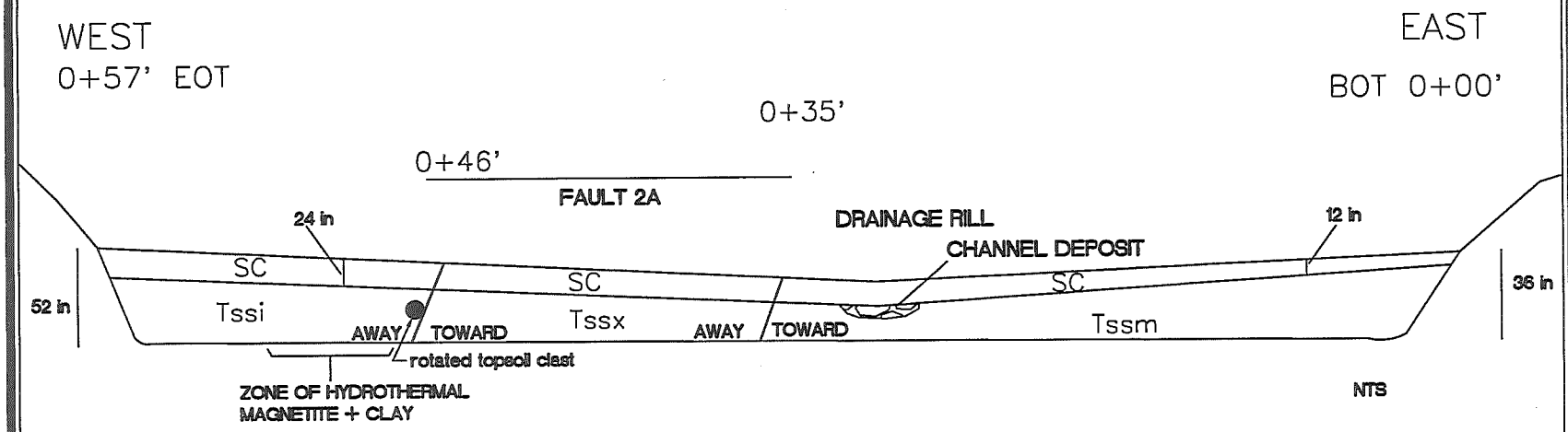
SHEET C2
OF APP. C

FAULT TRENCH FT-2 SCHEMATIC SECTION



SC - TOPSOIL, CLAYEY SAND

Tssx - brecciated arkosic sandstone w/ granite + metamorphic clasts, excavates to a CLAYEY SAND

Tssi - arkosic sandstone w/granite clasts, excavates to a CLAYEY SAND

Tssm - arkosic sandstone w/metamorphic clasts, excavates to a SILTY SAND W/GRAVEL

SHEET C3 OF APP. C

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JOB NO.: 28813
APPR.: JKG
BY: WMM
9:29 AM * 05-MAR-2009

FAULT TRENCH SCHEMATIC
SILVER HILLS
WASHOE CO., NV

N:\DWGS\J28813_SilverHills\Geotech\ft2_sxn_silverhills.DWG

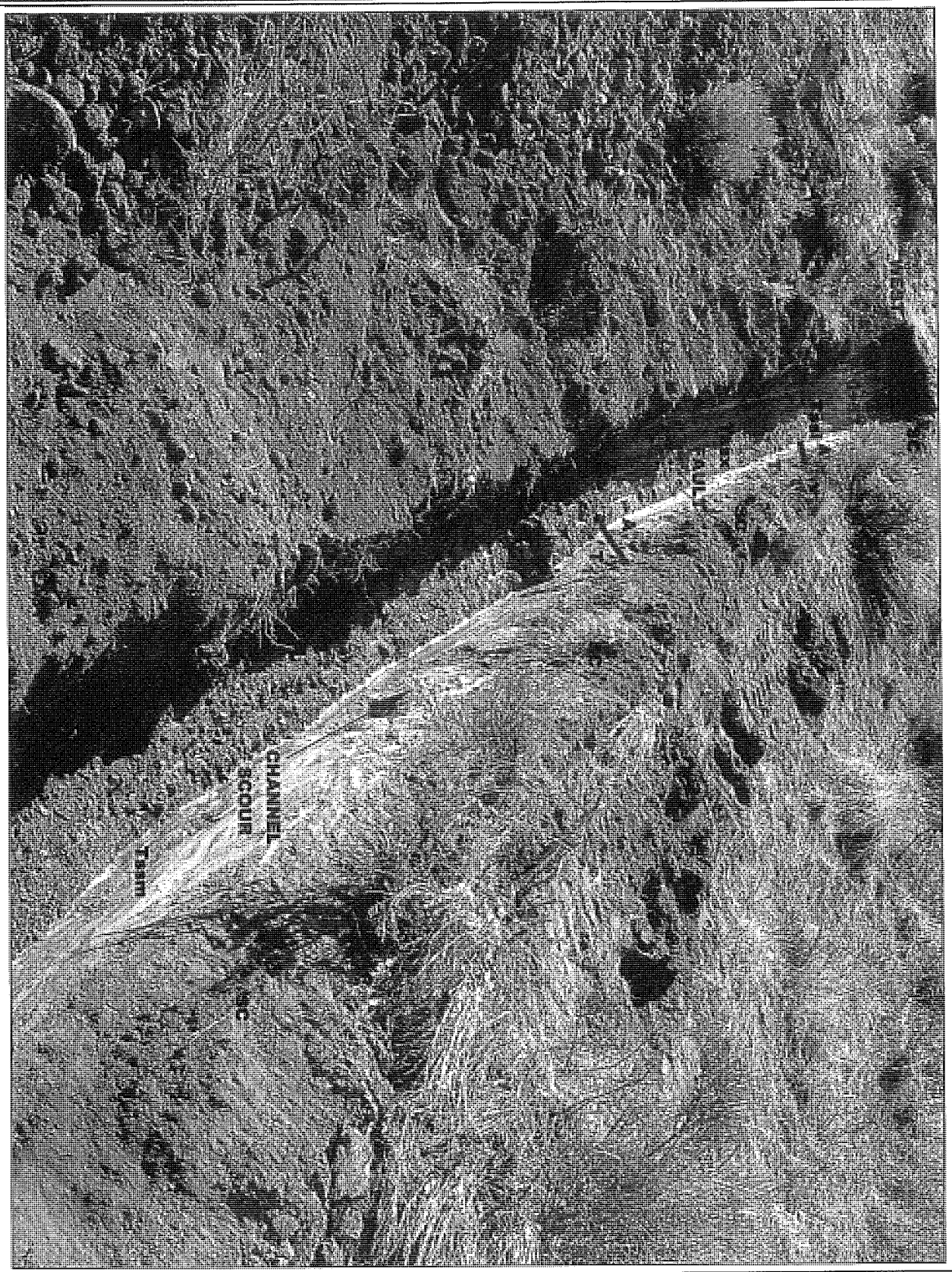

PHOTO OF TRENCH FT-2
SILVER HILLS
WASHOE CO., NV

JOB NO.:	28813
APPR.:	JKG
BY:	WMM
	9:23 AM * 05-MAR-2009

N:\DWGS\J28813_SilverHills\Geotech\FT-2_pix1.DWG

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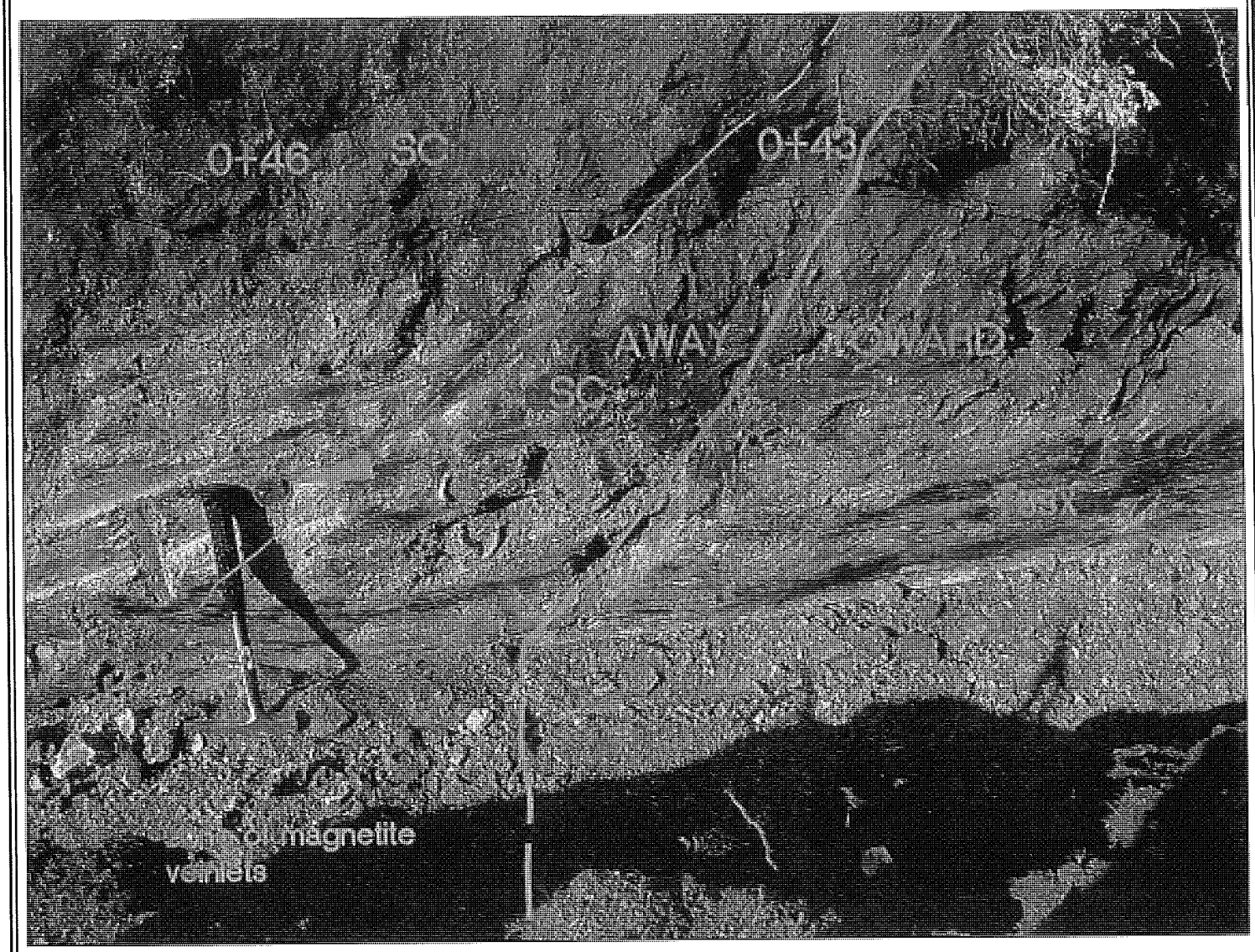
SHEET C4

OF APP. C



DETAIL- FAULT TRENCH 2
SILVER HILLS
WASHOE COUNTY, NV

JOB NO.: 28813
APPR.: JKG
BY: WMM
9:26 AM * 05-MAR-2009

N:\DWGS\J28813_SilverHills\Geotech\FT-2_pix2.DWG

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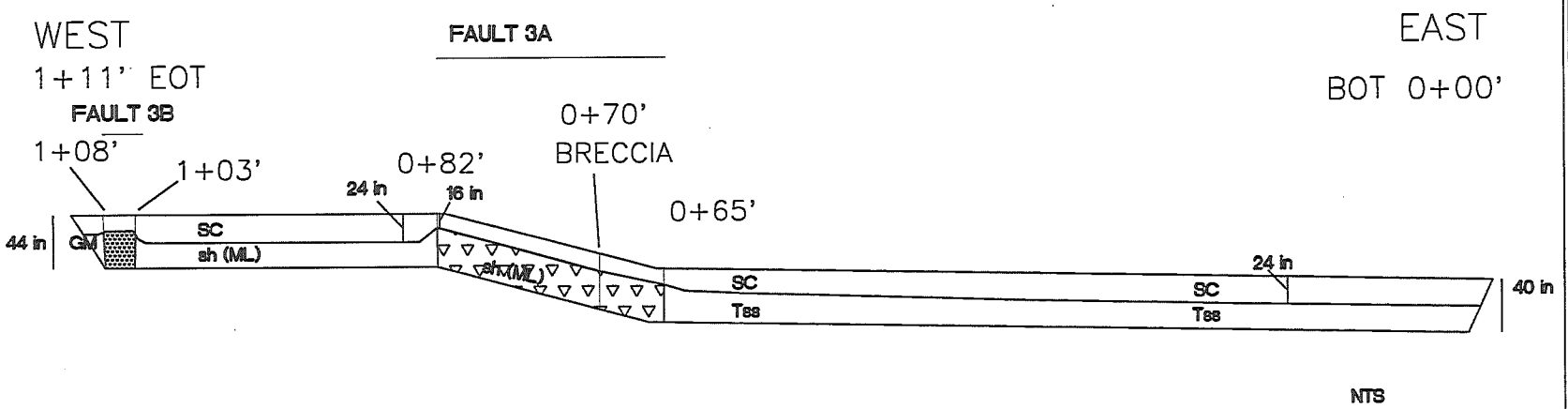
SHEET C5
OF APP. C

FAULT TRENCH FT-3 SCHEMATIC SECTION



NTS

SC - TOPSOIL, CLAYEY SAND

GM - SILTY GRAVEL W/SAND

sh (ML) - SHALE, excavtes to a SANDY SILT

Tss - Tertiary sandstone, excavates to a POORLY GRADED SAND

SHEET C6

OF APP. C

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PHONE:(775) 747-8550 FAX:(775) 747-8559

JOB NO.: 28813
APPR.: JKG
BY: WMM
9:49 AM * 05-MAR-2009

FAULT TRENCH SCHEMATIC
SILVER HILLS
WASHOE CO., NV

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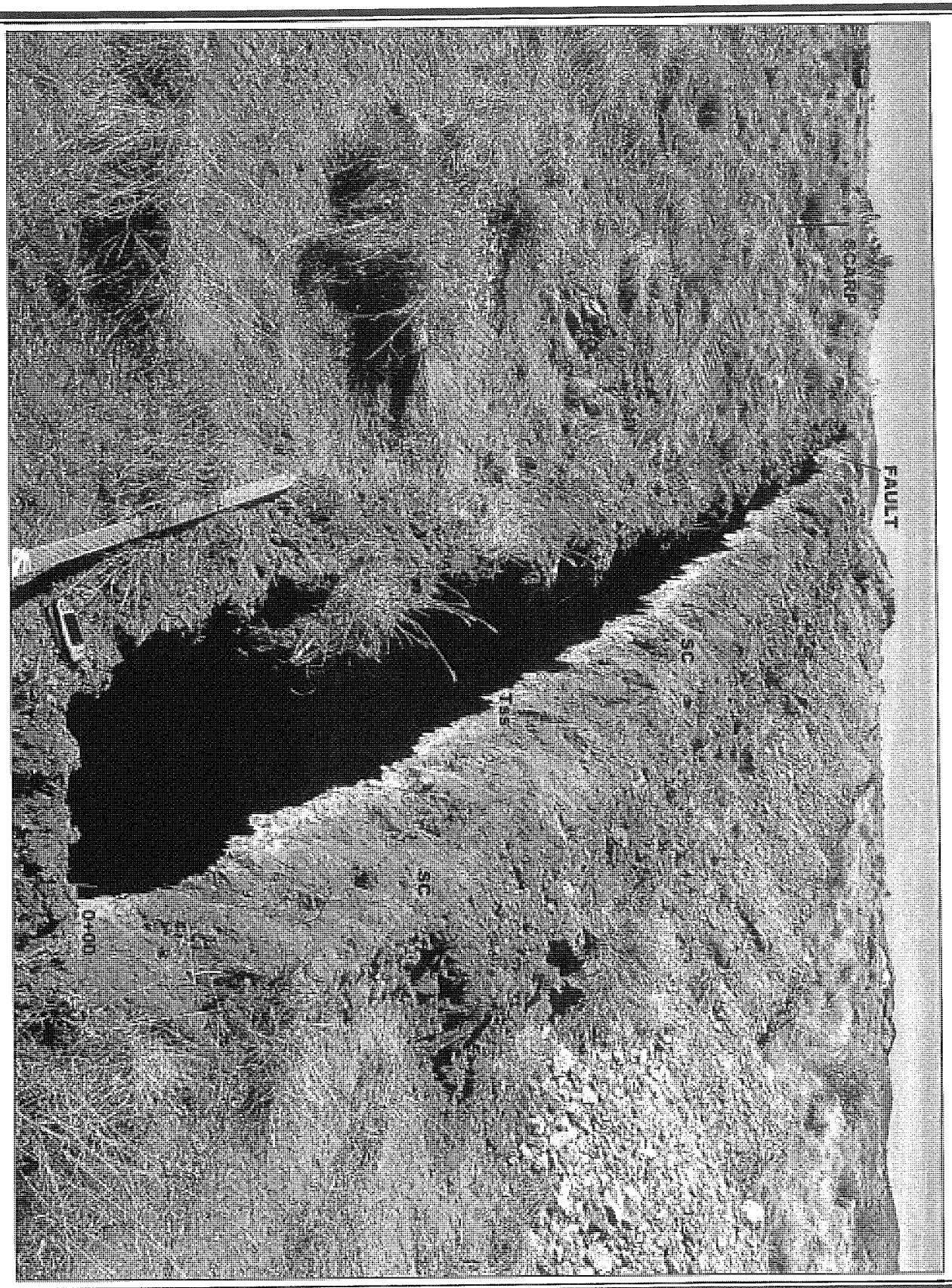

PHOTO OF TRENCH FT-3
SILVER HILLS
WASHOE CO., NV

JOB NO.: 28813
APPR. JKG
BY: WMM
9:43 AM * 05-MAR-2009

N:\DWGS\J28813_SilverHills\Geotech\FT-3_pix1.DWG

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SHEET C7
OF APP. C

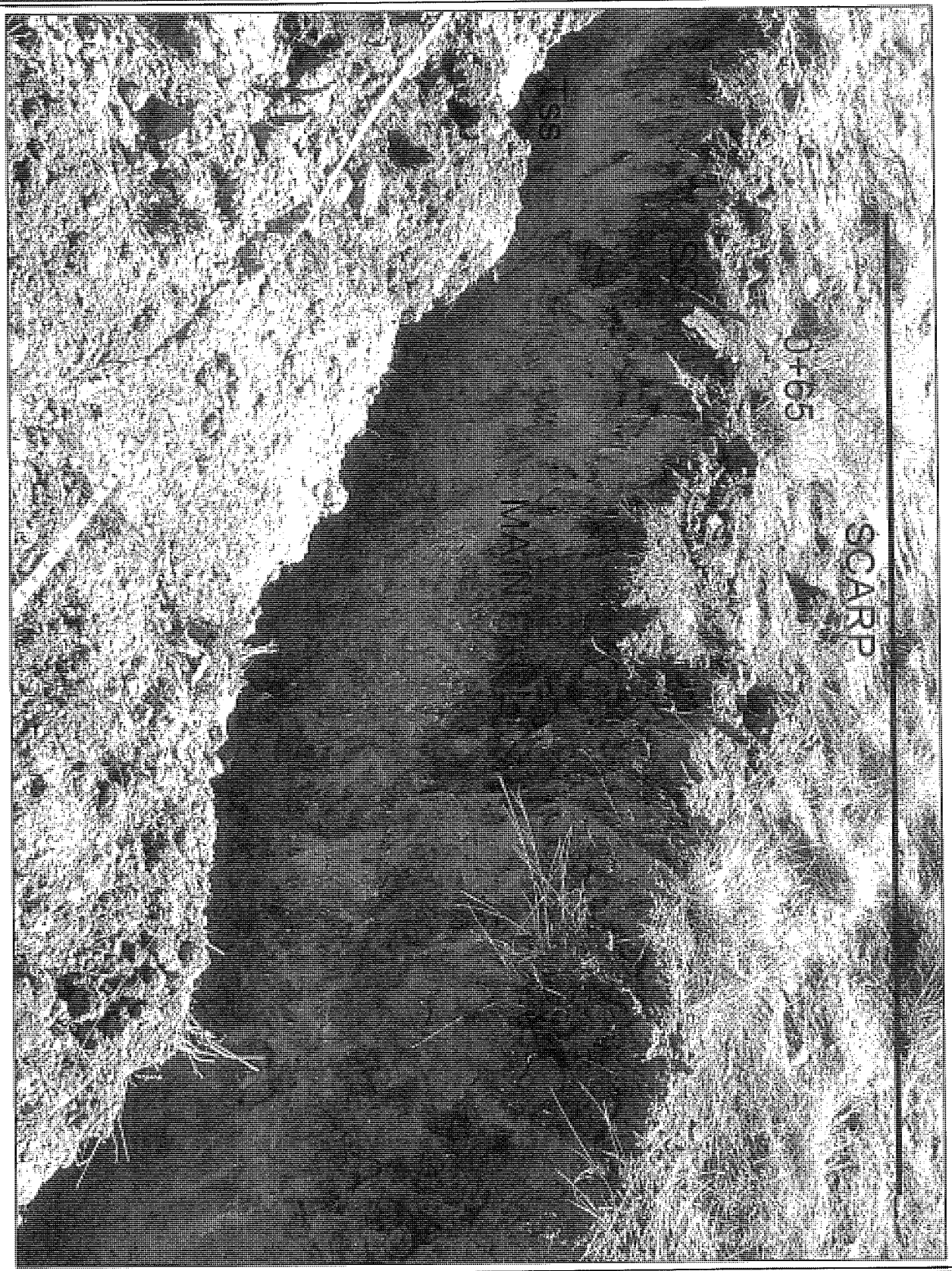

PHOTO OF TRENCH FT-3
SILVER HILLS
WASHOE CO., NV

JOB NO.: 28813
APPR.: JKG
BY: WMM
9:31 AM * 05-MAR-2009

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SHEET C8
OF APP. C

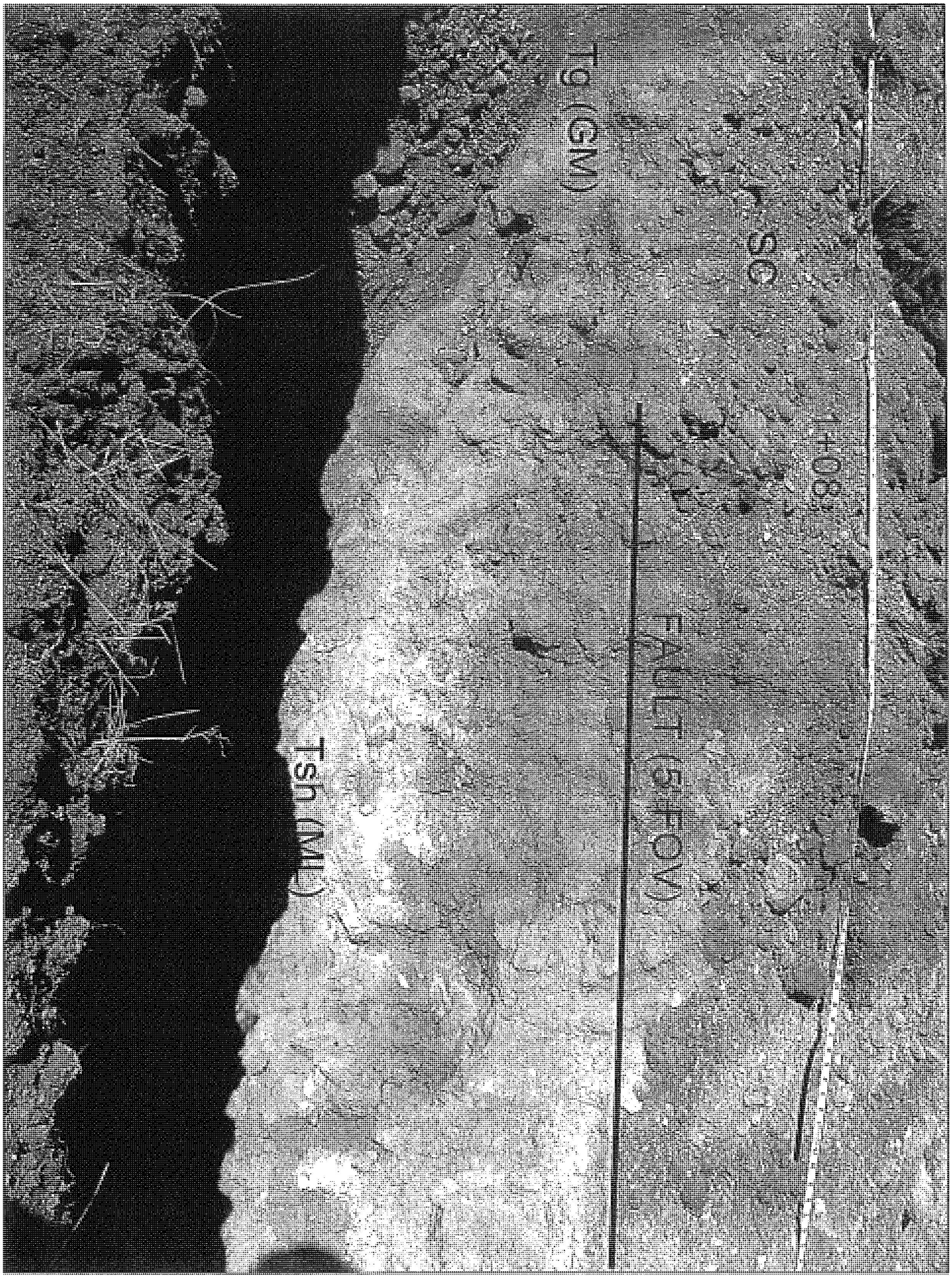

PHOTO OF TRENCH FT-3 SILVER HILLS WASHOE CO., NV	JOB NO.: 28813 APPR.: JKG BY: WMM 9:45 AM * 05-MAR-2009	SUMMIT ENGINEERING CORPORATION 5405 MAE ANNE AVENUE, RENO, NV. 89523 PHONE:(775) 747-8550 FAX:(775) 747-8559	SHEET C9 OF APP. C

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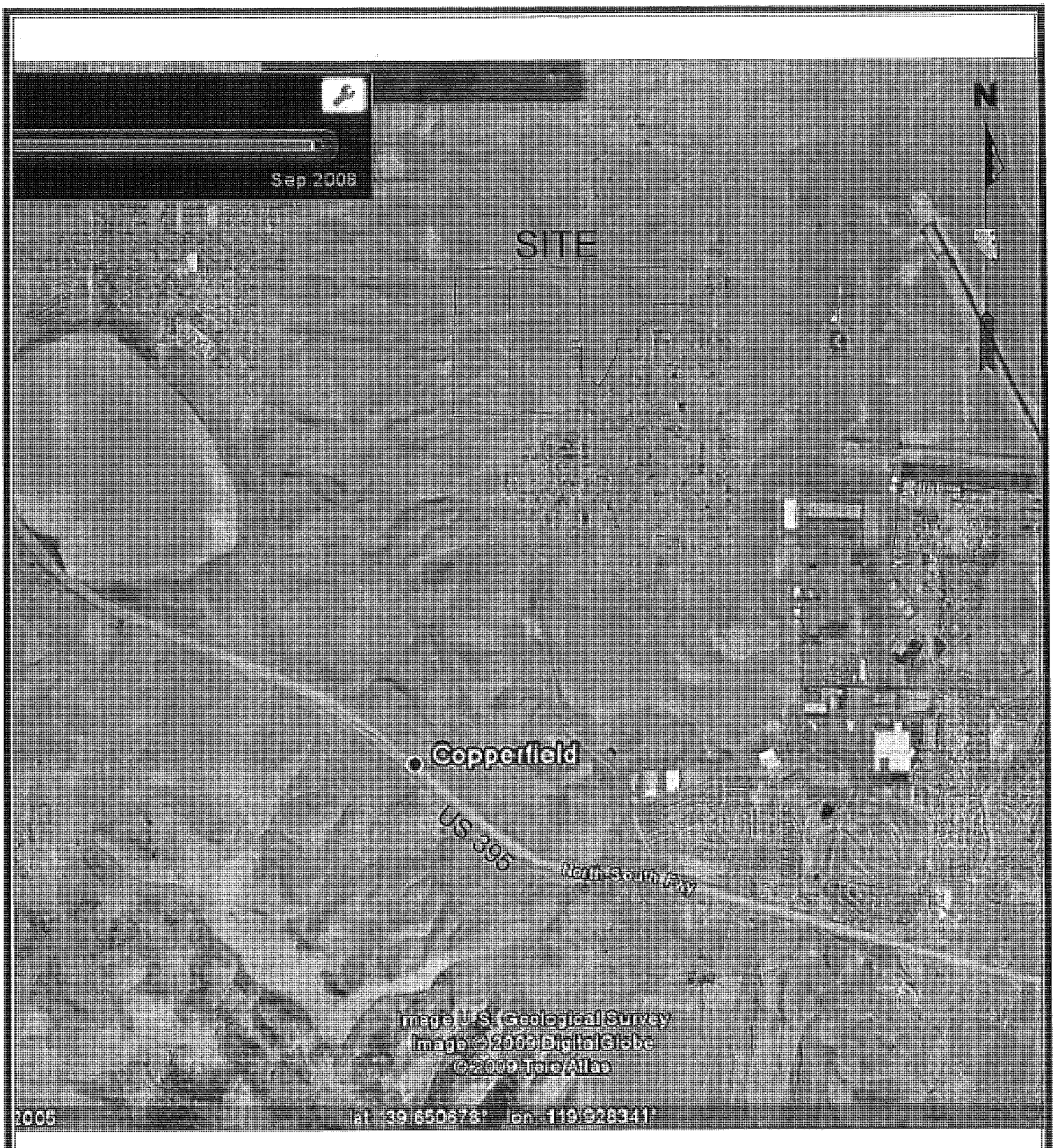
SHEETS



VICINITY MAP
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY.: TMH

N:\DWGS\J28813_SilverHills\Geotech\VICINITY.DWG — 2:41 PM • 06-MAR-2009

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SHEET 1
OF 25

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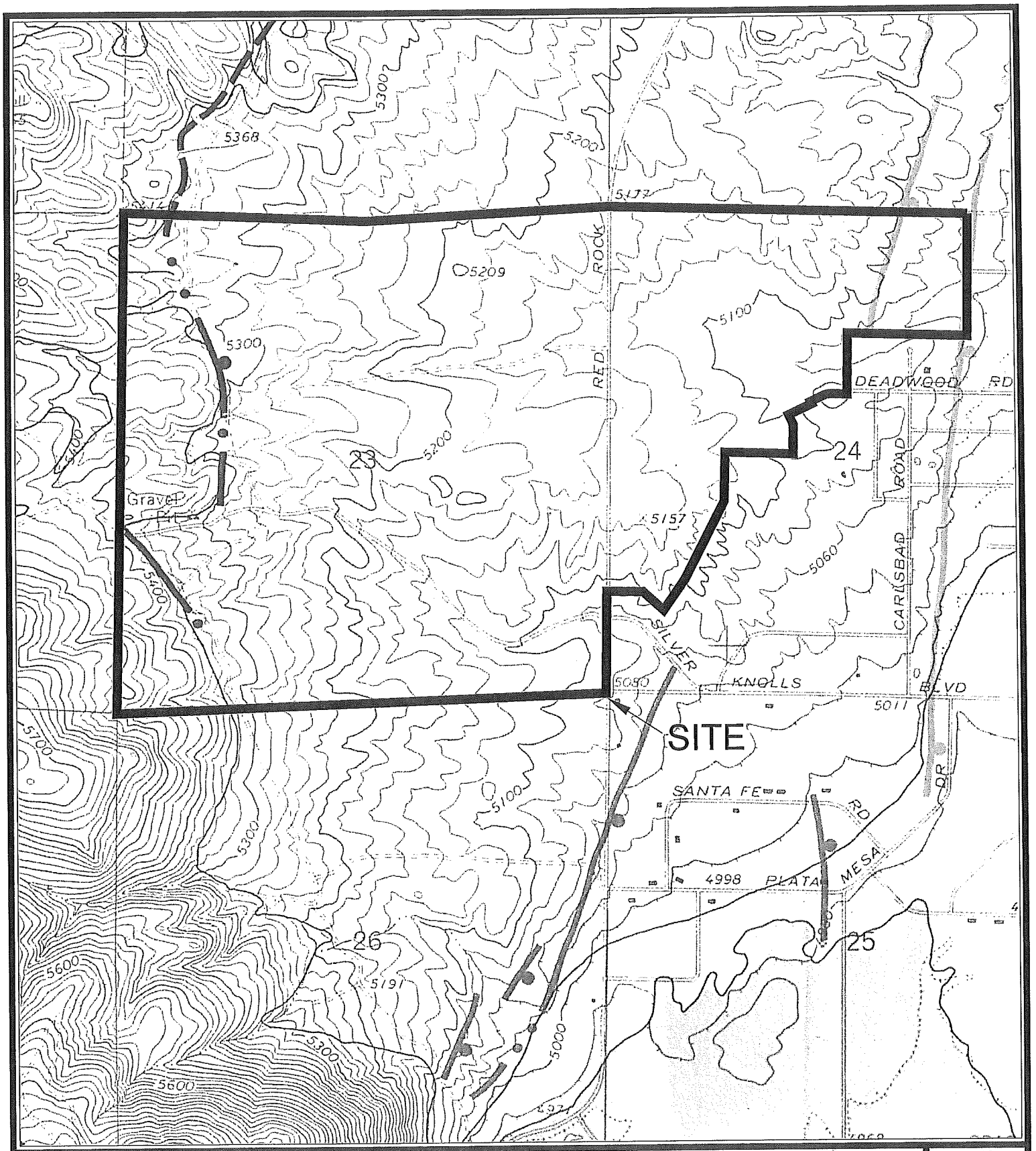
SCALE: 1"=700'	DESIGNED BY:
JOB #: 28813	CHECKED BY: JKG
Copyright SUMMIT ENG 2009	DRAWN BY: tmh

N:\DWGS\J28813_SilverHills\Geotech\site.DWG ~ 2:39 PM * 06-MAR-2009

SITE MAP
SILVER HILLS
RENO, NEVADA

SHEET 2 OF 25



GEOLOGY MAP
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

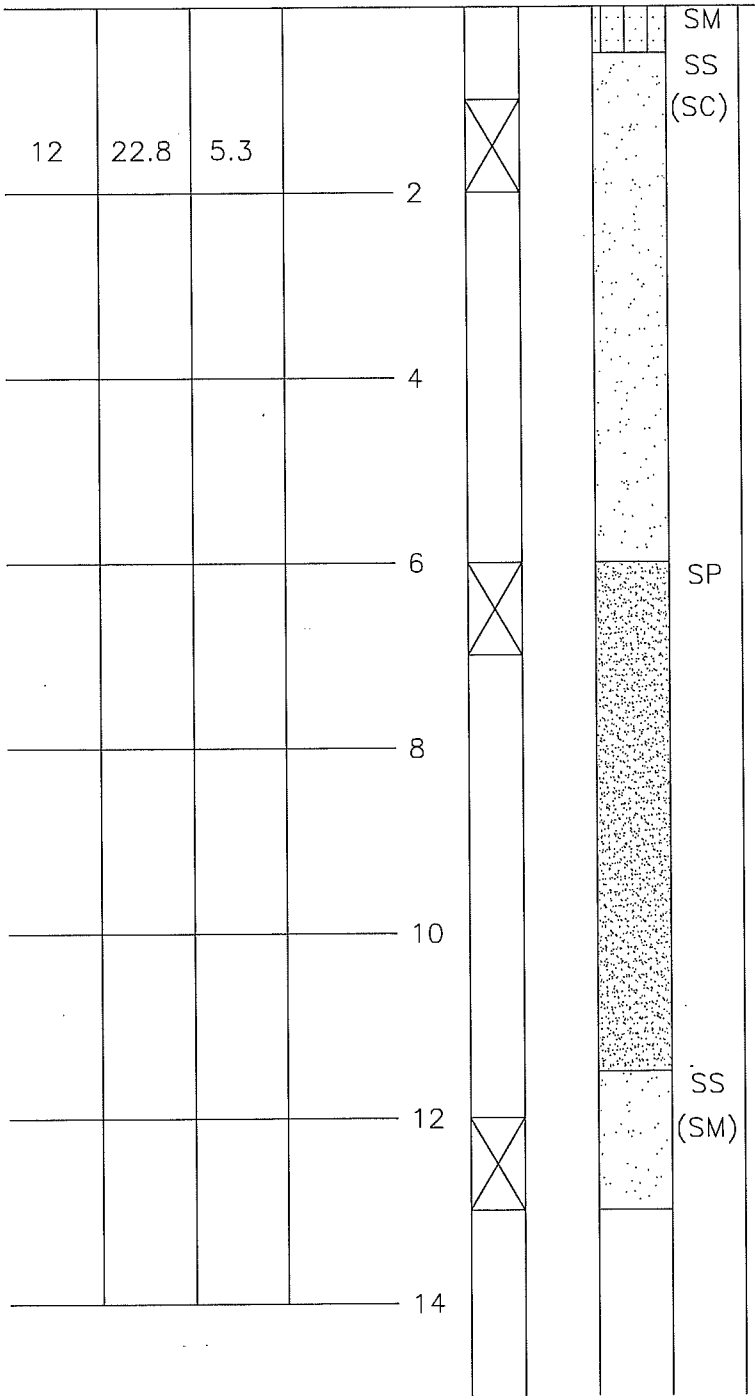
N:\DWGS\J28813_SilverHills\Geotech\geomap.DWG ~ 2:41 PM * 06-MAR-2009

SUMMIT ENGINEERING CORPORATION
5405 MAE ANNE AVE. RENO, NV. 89523

LOG OF TEST PIT 1

EQUIPMENT: CAT 420 D

DATE: 2-23-09 ELEV.



0-0.5': Silty Sand, dark brown, medium dense, slightly moist. Estimated 20% non plastic silt, 80% fine to coarse sand, trace gravel to 0.5".

0.5'-6': Bedrock: brown, medium dense, fine grained, Sandstone, slightly moist. Excavates to the properties of a Clayey Sand (SC), Approximately 25% medium plastic clay, 70% fine to coarse sand, 5% fine gravel to 0.5".

4': dense.

6'-11.5': Poorly Graded Sand with Silt, tan, medium dense, slightly moist. Estimated 5% non plastic silt, 95% fine to coarse sand, trace gravel to 0.5". organics to 9' (roots)

11.5'-13': Bedrock: brown, medium dense, fine grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Estimated 20% non plastic silt, 70% fine to coarse sand, 10% fine gravel to 0.5".

Bottom of hole @ 13'
No Groundwater Encountered.

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

SUMMIT ENGINEERING CORPORATION
5405 MAE ANNE AVE. RENO, NV. 89523

SHEET 4 OF 25

N:\DWGS\J28813_SilverHills\Geotech\TP-1.DWG ~ 2:51 PM * 06-MAR-2009

LOG OF TEST PIT 2

EQUIPMENT: CAT 420 D

DATE: 2-23-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT		
				2			SC	0-1': Clayey Sand, dark brown, medium dense, slightly moist. Estimated 20% low plastic clay, 80% fine to coarse sand.
							CL	
							SS (SC)	1-1.5': Lean Clay with Sand, dark brown, stiff, slightly moist. Estimated 60% medium plastic clay, 40% fine to coarse sand.
NP	42.4	16.4		4			SS (SM)	1.5'-3': Bedrock: brown, medium dense, fine grained, Sandstone, moist. Excavates to the properties of a Clayey Sand (SC), Estimated 20% low plastic clay, 80% fine to coarse sand.
				6				3'-8': Bedrock: white, medium dense, fine grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Approximately 40% non plastic silt, 60% fine sand.
				8			SP	8'-11': Poorly Graded Sand with Silt, tan, medium dense, slightly moist. Estimated 5% non plastic silt, 95% fine to coarse sand, trace gravel to 0.5".
				10				
				12			SS (SM)	11'-13': Bedrock: brown, medium dense, fine grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Estimated 45% low plastic silt, 55% very fine to fine sand.
				14				Bottom of hole @ 13' No Groundwater Encountered.

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813

APPR.: JKG

BY: TMH

SUMMIT ENGINEERING CORPORATION
5405 MAE ANNE AVE. RENO, NV. 89523

SHEET 5 OF 25

N:\DWGS\J28813_SilverHills\Geotech\TP-2.DWG ~ 2:52 PM * 06-MAR-2009

LOG OF TEST PIT 3

EQUIPMENT: CAT 420 D

DATE: 2-23-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT	
				2		SC SS (SC)	0-1': Clayey Sand, dark brown, medium dense, slightly moist. Estimated 20% low plastic clay, 80% fine to coarse sand. 1'-6': Bedrock: brown, medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Clayey Sand (SC), Estimated 40% low plastic clay, 60% fine to coarse sand.
				4			
				6		SS (SM)	6'-13': Bedrock: tan, orange, brown, medium dense, fine grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Approximately 20% non plastic silt, 75% fine to medium sand, 5% gravel to 0.5". Slightly cemented 9' white
NP	19.9	7.4		8			
				10			
				12			
				14			Bottom of hole @ 13' No Groundwater Encountered.

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813

APPR.: JKG

BY: TMH

N:\DWGS\J28813_SilverHills\Geotech\TP-3.DWG ~ 2:52 PM * 06-MAR-2009

SUMMIT ENGINEERING CORPORATION
5405 MAE ANNE AVE. RENO, NV. 89523

LOG OF TEST PIT 4

EQUIPMENT: CAT 420 D

DATE: 2-23-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT		
				2			SS (SM)	0-14': Bedrock: brown, medium dense, fine grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Estimated 20% non plastic silt, 80% fine to coarse sand, trace gravel.
				4				3' slightly cemented
				6				
				8				8': tan, 10% non plastic silt, 90% fine to coarse sand, trace gravel.
				10				
				12				
				14				Bottom of hole @ 14' No Groundwater Encountered.

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

SUMMIT ENGINEERING CORPORATION
5405 MAE ANNE AVE. RENO, NV. 89523

SHEET 7 OF 25

N:\DWGS\J28813_SilverHills\Geotech\TP-4.DWG ~ 2:52 PM * 06-MAR-2009

LOG OF TEST PIT 5

EQUIPMENT: CAT 420 D

DATE: 2-23-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT	
				2			SM SS (SC) — 0-0.5': Silty Sand, dark brown, medium dense, slightly moist. Estimated 20% non plastic silt, 80% fine to coarse sand.
12	21.2	6.2					0.5'-3.5': Bedrock: brown, medium dense, fine grained, Sandstone, slightly moist. Excavates to the properties of a Clayey Sand (SC), Approximatly 20% medium plastic clay, 70% fine to coarse sand, 10% fine gravel to 0.5".
				4			SS (SM)
				6			3.5'-9': Bedrock: brown, tan, orange, medium dense, medium grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Estimated 15% non plastic silt, 85% very fine to coarse sand, trace gravel.
				8			coarse sand bedding, fine gravel bedding. 8.5' dense.
				10			SS (SC) — 9'-12': Bedrock: brown, tan, orange medium dense, fine grained, Sandstone, slightly moist. Excavates to the properties of a Clayey Sand (SC), Estimated 20% low plastic clay, 70% fine to coarse sand, 10% fine gravel to 0.5".
				12			Bottom of hole @ 12' No Groundwater Encountered.
				14			

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

N:\DWGS\J28813_SilverHills\Geotech\TP-5.DWG ~ 2:53 PM * 06-MAR-2009

SUMMIT ENGINEERING CORPORATION
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LOG OF TEST PIT 6

EQUIPMENT: CAT 420 D

DATE: 2-24-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT	
				2			SC SS (SC)
				4			
				6			
				8			
15	35.1	7.7		10			
				12			
				14			

0-1.5': Clayey Sand, dark brown, medium dense, slightly moist. Estimated 30% low plastic clay, 70% fine to coarse sand, trace cobbles.

1.5'-11': Bedrock: tan, medium dense, fine grained, Sandstone, slightly moist. Excavates to the properties of a Clayey Sand (SC), Approximatly 20% low plastic clay, 80% fine to coarse sand.

4': very dense.

8': 35% medium plastic clay, 65% fine to medium sand.

Bottom of hole @ 11'
No Groundwater Encountered.

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

SUMMIT ENGINEERING CORPORATION
5405 MAE ANNE AVE. RENO, NV. 89523

SHEET 9 OF 25

N:\DWGS\J28813_SilverHills\Geotech\TP-6.DWG ~ 2:53 PM * 06-MAR-2009

LOG OF TEST PIT 7

EQUIPMENT: CAT 420 D

DATE: 2-24-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT		
				2			SC CL	0-0.5': Clayey Sand, dark brown, medium dense, slightly moist. Estimated 30% low plastic clay, 70% fine to coarse sand, trace gravel.
							SS (SM)	0.5'-1.5': Lean Clay with Sand, dark brown, stiff, slightly moist. Estimated 60% medium plastic clay, 40% fine to coarse sand, trace gravel to 1".
NP	15.2	5.1		4				1.5'-8': Bedrock: brown, tan, red, yellow, medium dense, medium grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Approximately 15% non plastic silt, 80% very fine to coarse sand, 5% fine gravel to 0.5", slightly cemented.
				6				
				8			SP	8'-10.5': Poorly Graded Sand with Silt, tan, medium dense, slightly moist. Estimated 5% non plastic silt, 95% fine to coarse sand, trace gravel to 0.5".
				10			SS (SM)	10.5'-13': Bedrock: tan, medium dense, fine grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Estimated 40% low plastic silt, 60% very fine to coarse sand.
				12				Bottom of hole @ 13' No Groundwater Encountered.
				14				

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

SUMMIT ENGINEERING CORPORATION
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SHEET 10 OF 25

N:\DWGS\J28813_SilverHills\Geotech\TP-7.DWG ~ 2:54 PM * 06-MAR-2009

LOG OF TEST PIT 8

EQUIPMENT: CAT 420 D

DATE: 2-24-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT		
				0			SM	0-1': Silty Sand, dark brown, medium dense, slightly moist. Estimated 25% non plastic silt, 75% fine to coarse sand, trace gravel.
20	42.3	11.9		2			SC	1'-2': Clayey Sand, dark brown, medium dense, slightly moist. Approximately 40% medium plastic clay, 60% fine to coarse sand, trace gravel.
				4			SS (SM)	2'-11': Bedrock: red, tan, yellow medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Approximatly 10% non plastic silt, 80% fine to coarse sand, 10% gravel to 0.5", slightly cemented.
				6				6' tan to brown.
				8				9' moist.
				10				
				12			SS (SW) (SM)	11'-13': Bedrock: tan, medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Well Graded Sand with Silt (SW/SM), Approximatly 10% non plastic silt, 80% fine to coarse sand, 10% gravel to 0.5", slightly cemented.
NP	10.1	6.5		14				Bottom of hole @ 13' No Groundwater Encountered.

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813

APPR.: JKG

BY: TMH

SUMMIT ENGINEERING CORPORATION
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N:\DWGS\J28813_SilverHills\Geotech\TP-8.DWG ~ 2:54 PM * 06-MAR-2009

LOG OF TEST PIT 9

EQUIPMENT: CAT 420 D

DATE: 2-24-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT		
				2			SM SC	0-1': Silty Sand, dark brown, medium dense, slightly moist. Estimated 25% non plastic silt, 75% fine to coarse sand, trace gravel. 1'-2.5': Clayey Sand, dark brown, medium dense, slightly moist. Estimated 40% medium plastic clay, 60% fine to coarse sand, trace gravel.
				4			SS (SC) (SM)	
5	27.8	5.9		6				2.5'-12': Bedrock: tan, orange, medium dense, medium grained, Sandstone, slightly moist. Excavates to the properties of a Silty Clayey Sand (SC/SM), Approximately 30% low plastic clay/silt, 70% very fine to medium sand, trace gravel to 0.5".
				8				
				10				10' 35% non plastic silt, 65% very fine to fine sand.
				12				Bottom of hole @ 12' No Groundwater Encountered.
				14				

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813

APPR.: JKG

BY: TMH

N:\DWGS\J28813_SilverHills\Geotech\TP-9.DWG ~ 2:55 PM * 06-MAR-2009

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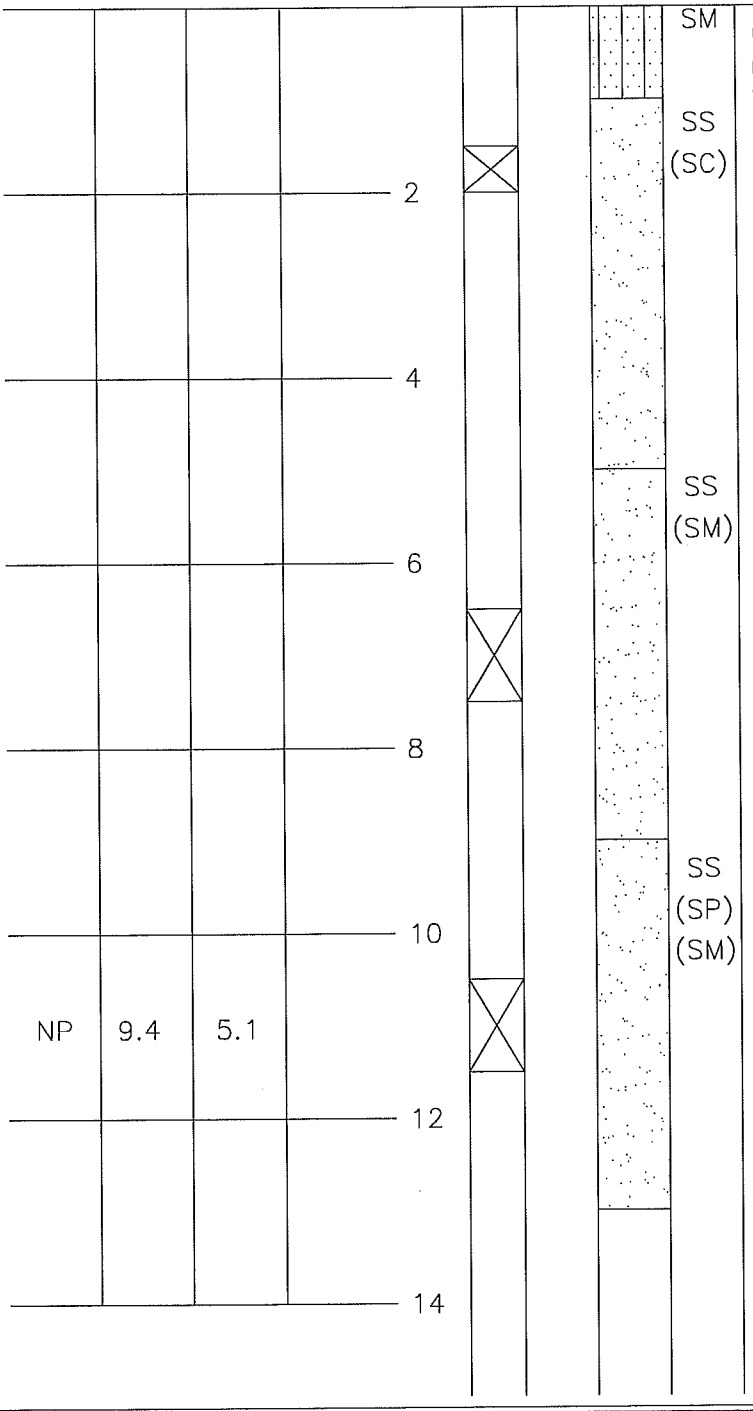
LOG OF TEST PIT 10

EQUIPMENT: CAT 420 D

DATE: 2-24-09 ELEV.



SM

SS (SC)

0-1': Silty Sand, dark brown, medium dense, slightly moist. Estimated 25% non plastic silt, 75% fine to coarse sand, trace gravel.

1'-5': Bedrock: brown to tan, medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Clayey Sand (SC), Estimated 20% low plastic clay, 80% fine to coarse sand, trace gravel

SS (SM)

5'-9': Bedrock: brown to red, medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Estimated 25% non plastic silt, 75% very fine to coarse sand, trace gravel to 0.5".

SS (SP) (SM)

9'-13': Bedrock: tan, yellow, gray medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Poorly Graded Sand with Silt (SP/SM), Approximatly 10% non plastic silt, 90% fine to medium sand.

Bottom of hole @ 13'
No Groundwater Encountered.

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

SUMMIT ENGINEERING CORPORATION
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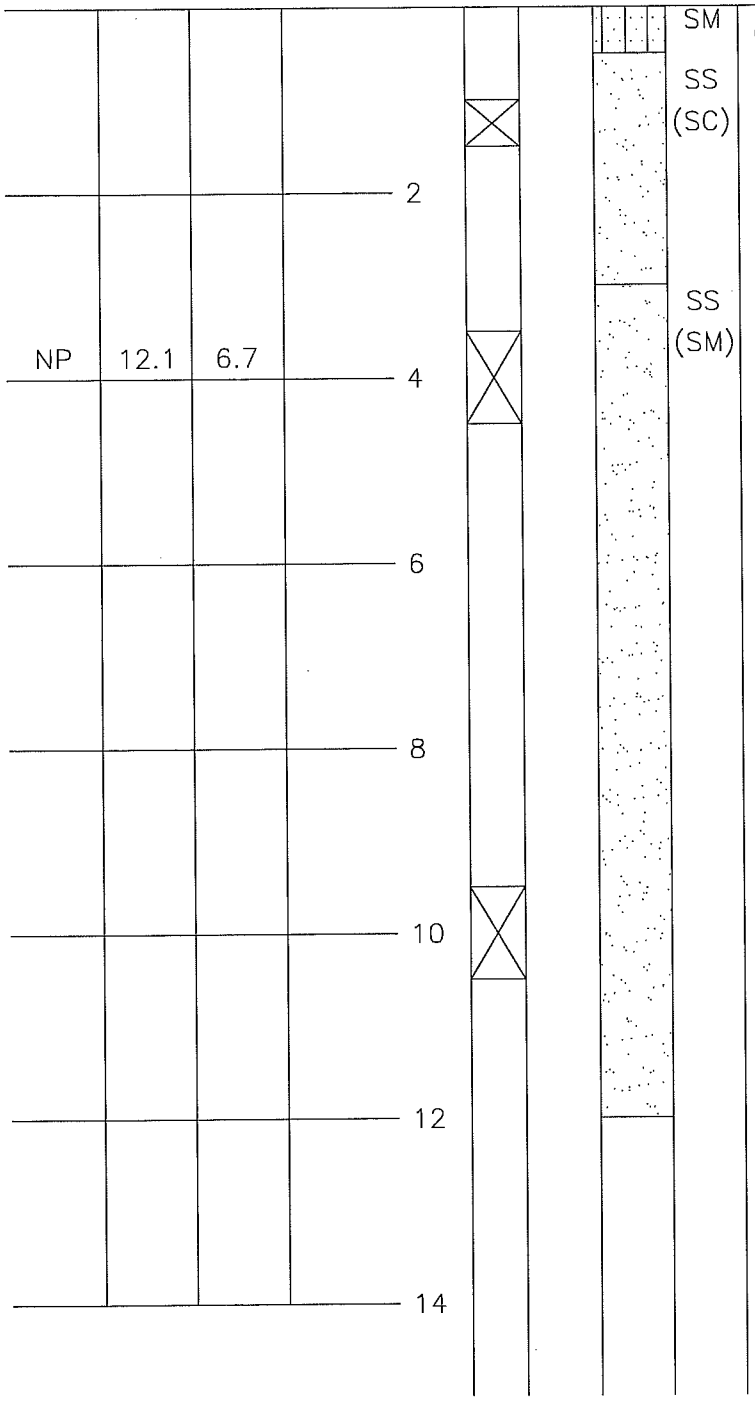
SHEET 13 OF 25

N:\DWGS\J28813_SilverHills\Geotech\TP-10.DWG ~ 2:55 PM * 06-MAR-2009

LOG OF TEST PIT 11

EQUIPMENT: CAT 420 D

DATE: 2-24-09 ELEV.



0-0.5': Silty Sand, dark brown, medium dense, slightly moist. Estimated 20% non plastic silt, 80% fine to coarse sand, trace gravel.

0.5'-3': Bedrock: tan, medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Clayey Sand (SC), Estimated 30% low plastic clay, 70% fine to coarse sand, trace gravel

3'-12': Bedrock: brown to tan, medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Approximately 10% non plastic silt, 85% very fine to coarse sand, 5% gravel to 0.5".

Bottom of hole @ 12'
No Groundwater Encountered.

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

SUMMIT ENGINEERING CORPORATION
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N:\DWGS\J28813_SilverHills\Geotech\TP-11.DWG ~ 2:56 PM * 06-MAR-2009

LOG OF TEST PIT 12

EQUIPMENT: CAT 420 D

DATE: 2-24-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT		
				2			SM SS (SC)	0-1': Silty Sand, dark brown, medium dense, slightly moist. Estimated 25% non plastic silt, 75% fine to coarse sand, trace gravel. 1'-8': Bedrock: brown, medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Clayey Sand (SC), Estimated 25% medium plastic clay, 75% fine to coarse sand, trace gravel
				4				
				6				
				8				
14	28.5	6.0		10			SS (SC)	8'-11.5': Bedrock: brown, tan, red, dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Clayey Sand (SC), Approximately 30% medium plastic clay, 70% fine to coarse sand, trace gravel to 0.5" Bottom of hole @ 11.5' No Groundwater Encountered.
				12				
				14				

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813

APPR.: JKG

BY: TMH

N:\DWGS\J28813_SilverHills\Geotech\TP-12.DWG ~ 2:56 PM * 06-MAR-2009

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5405 MAE ANNE AVE. RENO, NV. 89523

LOG OF TEST PIT 13

EQUIPMENT: CAT 420 D

DATE: 2-24-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT		
				2			SM SS (SM)	0-1': Silty Sand, dark brown, medium dense, slightly moist. Estimated 20% non plastic silt, 80% fine to coarse sand, trace gravel.
3	21.4	3.5		4				1'-12': Bedrock: brown to tan, medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Approximately 20% low plastic silt, 80% fine to coarse sand, trace gravel to 0.5".
				6				
				8				
				10				
				12			SS (SC)	12'-14': Bedrock: brown, dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Clayey Sand (SC), Estimated 30% low plastic clay, 70% fine to medium sand, trace gravel
				14				Bottom of hole @ 14' No Groundwater Encountered.

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813

APPR.: JKG

BY: TMH

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SHEET 16 OF 25

N:\DWGS\J28813_SilverHills\Geotech\TP-13.DWG ~ 2:57 PM * 06-MAR-2009

LOG OF TEST PIT 14

EQUIPMENT: CAT 420 D

DATE: 2-24-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT		
				0			CL	0'-1': Lean Clay with Sand, dark brown, stiff, slightly moist. Estimated 50% medium plastic clay, 50% fine to coarse sand, trace gravel to 0.5".
				2			SS (SM)	1'-6': Bedrock: gray to tan, dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Estimated 30% low plastic silt, 70% fine to coarse sand, trace gravel to 0.5".
				4				
				6			SS (SM)	6'-11': Bedrock: tan, medium dense, fine grained, Sandstone, moist. Excavates to the properties of a Silty Sand (SM), Approximately 40% non plastic silt, 60% very fine to fine sand.
NP	42.3	19.0		8				
				10			SS (SM)	11'-13.5': Bedrock: tan, medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Estimated 10% non plastic silt, 90% fine to medium sand.
				12				Bottom of hole @ 13.5' No Groundwater Encountered.
				14				

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

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SHEET 17 OF 25

N:\DWGS\J28813_SilverHills\Geotech\TP-14.DWG ~ 2:57 PM * 06-MAR-2009

LOG OF TEST PIT 15

EQUIPMENT: CAT 420 D

DATE: 2-24-09 ELEV.

PLASTICITY INDEX	% PASSING #200	MOISTURE CONTENT % OF DRY WT.	DRY DENSITY (PCF)	DEPTH (FT.)	SAMPLE LOCATION	BLOWS / FOOT		
				2			SM SS (SC)	0-1': Silty Sand, dark brown, medium dense, slightly moist. Estimated 20% non plastic silt, 80% fine to coarse sand, trace gravel.
				4				1'-5': Bedrock: dark brown, medium dense, fine grained, Sandstone, moist. Excavates to the properties of a Clayey Sand (SC), Estimated 30% low plastic clay, 70% fine to coarse sand, trace gravel to 0.5".
NP	29.3	13.9		6			SS (SM)	5'-13': Bedrock: gray, tan, brown, medium dense, fine to medium grained, Sandstone, slightly moist. Excavates to the properties of a Silty Sand (SM), Approximately 30% non plastic silt, 70% fine to medium sand.
				8				
				10				
				12				
				14				Bottom of hole @ 13' No Groundwater Encountered.

TEST PIT LOG
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

N:\DWGS\J28813_SilverHills\Geotech\TP-15.DWG ~ 2:58 PM * 06-MAR-2009

SUMMIT ENGINEERING CORPORATION
5405 MAE ANNE AVE. RENO, NV. 89523

	MAJOR DIVISIONS		GRAPHIC SYMBOL	GROUP SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS LESS THAN 50% PASSING No. 200 SIEVE	GRAVELS LESS THAN 50% COARSE FRACTION PASSES THE No.4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES		GW	WELL GRADED GRAVELS, GRAVEL/SAND MIXTURE
				GP	POORLY GRADED GRAVELS, GRAVEL/SAND MIXTURE
		GRAVELS WITH OVER 12% FINES		GM	SILTY GRAVEL, POORLY GRADED GRAVEL/SAND/SILT MIXTURE
				GC	CLAYEY GRAVEL, POORLY GRADED GRAVEL/SAND/CLAY MIXTURE
	SANDS MORE THAN 50% COARSE FRACTION PASSES THE No.4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES		SW	WELL GRADED SANDS, GRAVELLY SANDS
				SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES		SM	SILTY SANDS, POORLY GRADED SAND/CLAY MIXTURES
				SC	CLAYEY SAND, POORLY GRADED SAND/CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING No. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS & VERY FINE SANDS OF LOW PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS
				OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
ORGANIC RICH SOILS				PT	TOPSOIL, PEAT, ORGANIC RICH SOILS
OTHER SOILS				F	FILL MATERIALS

UNIFIED SOIL CLASSIFICATION SYSTEM

UNDISTURBED SAMPLE

BULK SAMPLE

NO RECOVERY

MEASURED DEPTH TO GROUNDWATER

KEY TO TEST PIT LOGS
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

N:\DWGS\J28813_SilverHills\Geotech\SoilKey.DWG ~ 2:58 PM * 06-MAR-2009

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SHEET 19 OF 25

SAMPLE LOCATION	SAMPLE DEPTH	% PASSING 3"	% PASSING #4	% PASSING #40	% PASSING #200	LIQUID LIMIT	PLASTICTY INDEX	EXPANSION INDEX	USCS
TP-1	1'-2'	100	94	44	22.8	27	12	-	SC
TP-2	3.5'-4'	100	94	65	42.4	NP	NP	-	SM
TP-3	8'-9'	100	94	57	19.9	NP	NP	-	SM
TP-5	2'-3'	100	93	39	21.2	27	12	-	SC
TP-6	10'-11'	100	99	56	35.1	31	15	-	SC
TP-7	4'	100	95	56	15.2	NP	NP	-	SM
TP-8	1'-2'	100	99	71	42.3	42	20	-	SC
TP-8	12'-13'	100	90	32	10.1	NP	NP	-	SW-SM
TP-9	4'-5'	100	98	69	27.8	25	5	-	SC-SM
TP-10	10.5'-11.5'	100	100	67	9.4	NP	NP	-	SP-SM
TP-11	3.5'-4.5'	100	94	50	12.1	NP	NP	-	SM
TP-12	8.5'-9.5'	100	96	53	28.5	27	14	-	SC
TP-13	2'-3'	100	97	53	21.4	19	3	-	SM
TP-14	7'-8'	100	100	79	42.3	NP	NP	-	SM
TP-15	6'-7'	100	100	71	29.3	NP	NP	-	SM

SIEVE ANALYSIS
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

N:\DWGS\J28813_SilverHills\Geotech\Sieve_1.DWG ~ 2:59 PM * 06-MAR-2009

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GRADING ANALYSIS
SILVER HILLS
RENO, NEVADA

JOB NO: 28813
APPR: JKG
BY: TMH

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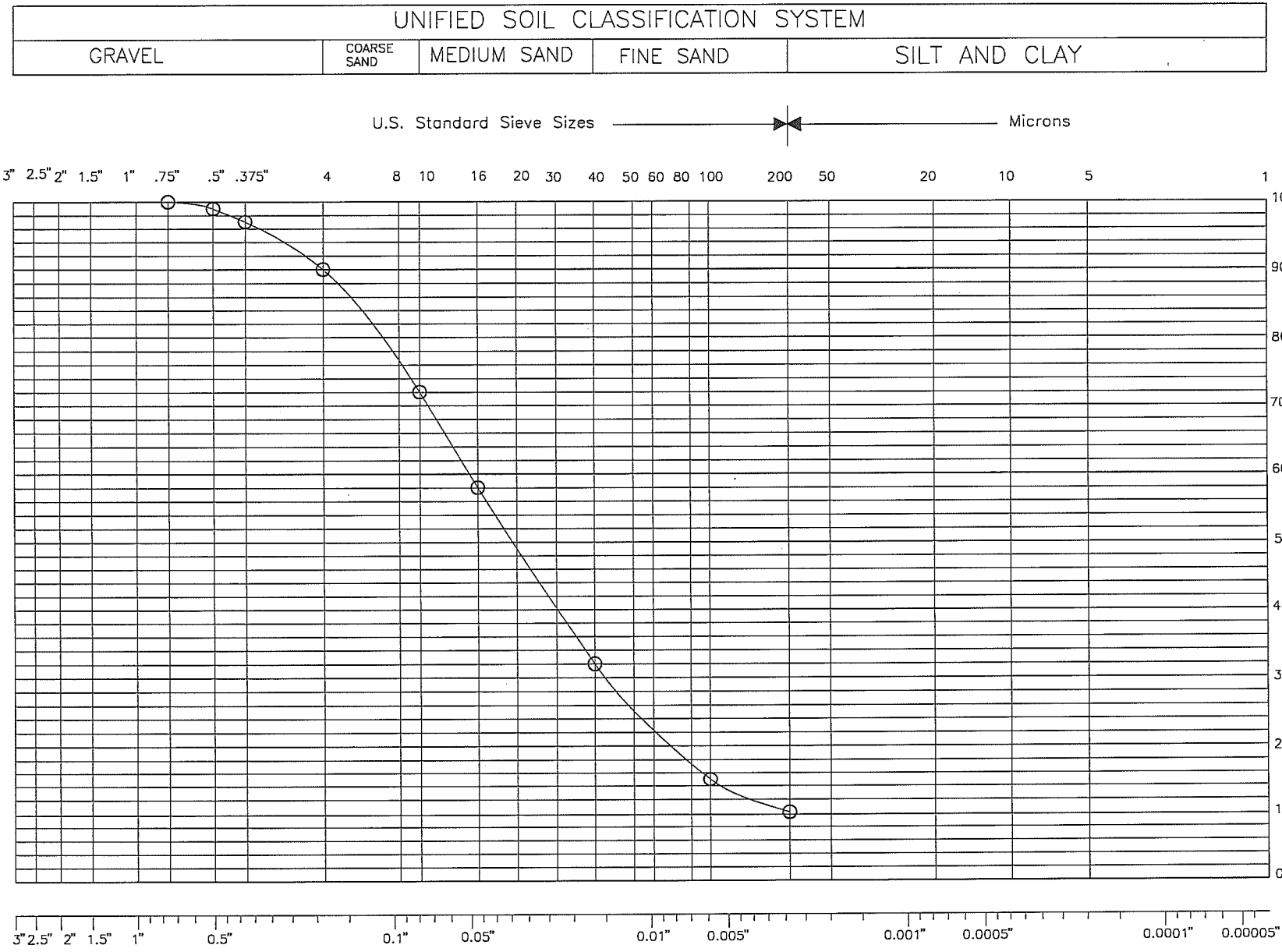
SHEET 21 OF 25

N:\DWGS\J28813_SilverHills\Geotech\SieveTP-8@12-13'.DWG ~ 2:59 PM * 06-MAR-2009



SAMPLE NO.: TP-8
LOCATION.: 12'-13'

SYMBOL: ○
D-60 = 0.05

D-30 = 0.015
D-10 = 0.00252

CU = 19.84
CC = 1.78

DESCRIPTION\
CLASSIFICATION: SW-SM
WELL GRADED SAND WITH SILT

GRADING ANALYSIS
SILVER HILLS
RENO, NEVADA

JOB NO: 28813
APPR: JKG
BY: TMH

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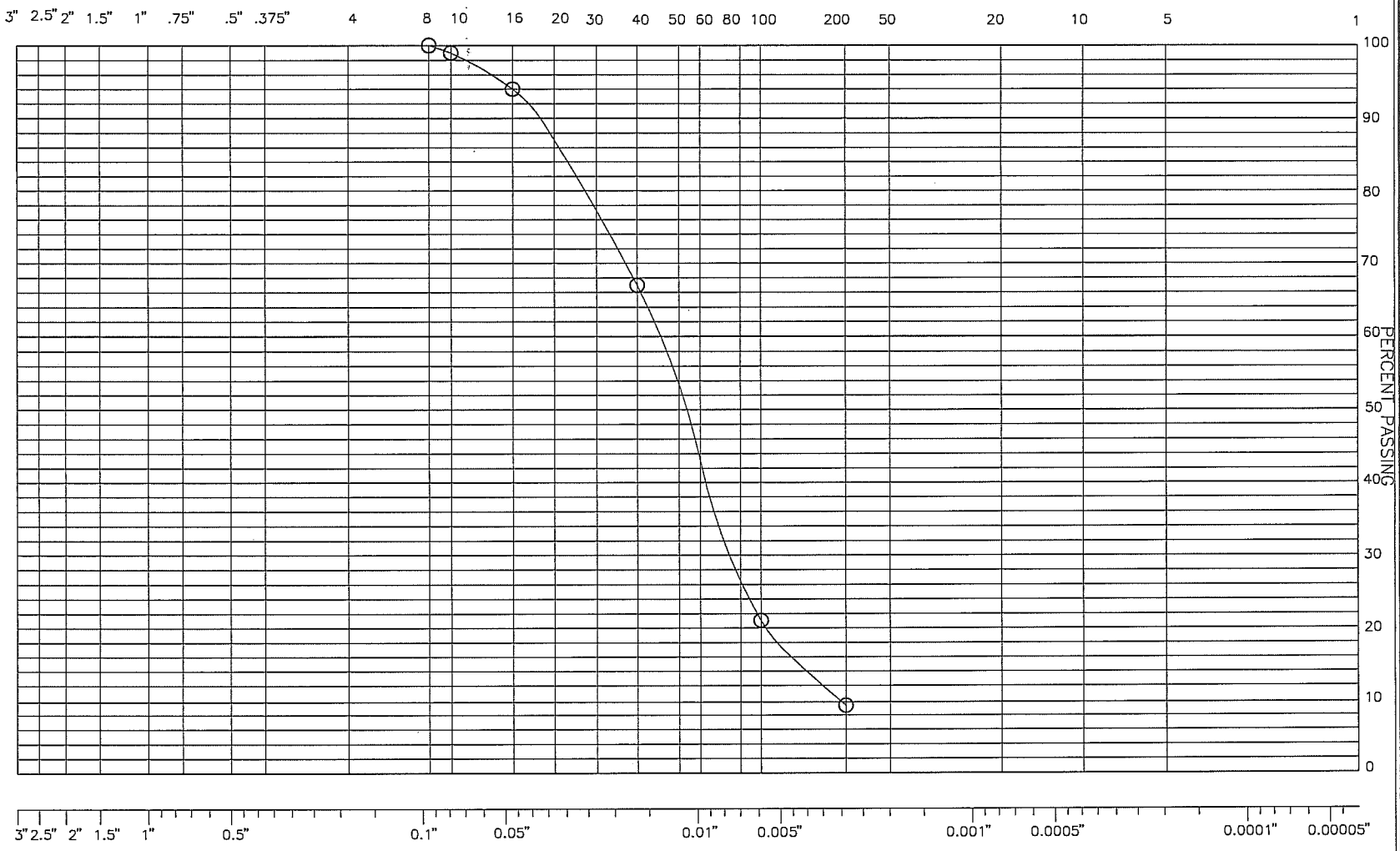
SHEET 22 OF 25

N:\DWGS\J28813_SilverHills\Geotech\SieveTP-10@10.DWG ~ 3:00 PM * 06-MAR-200

UNIFIED SOIL CLASSIFICATION SYSTEM

GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	SILT AND CLAY

U.S. Standard Sieve Sizes — Microns



SAMPLE NO.: TP-10
LOCATION.: 10.5'-11.5'

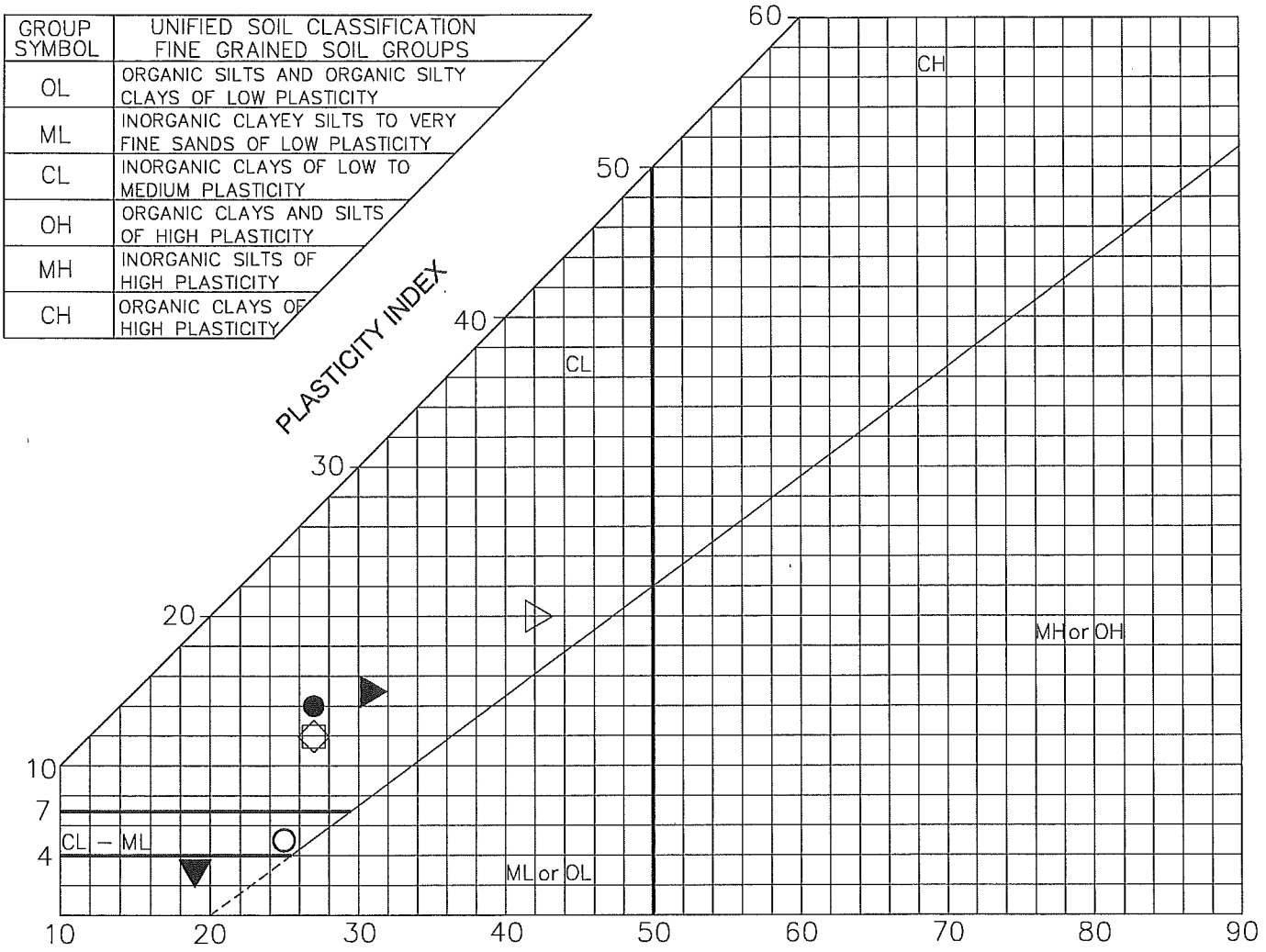
SYMBOL: ○
D-60 = 0.014

D-30 = 0.0078
D-10 = 0.003

CU = 4.66
CC = 1.448

DESCRIPTION\
CLASSIFICATION: SP-SM
POORLY GRADED SAND WITH SILT

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF LOW PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY
OH	ORGANIC CLAYS AND SILTS OF HIGH PLASTICITY
MH	INORGANIC SILTS OF HIGH PLASTICITY
CH	ORGANIC CLAYS OF HIGH PLASTICITY



TEST SYMBOL	SAMPLE LOCATION	SAMPLE DEPTH	% PASSING #200 SIEVE	LIQUID LIMIT	PLASTICITY INDEX	EXP. INDEX	CLASSIFICATION
□	TP–1	1'–2'	22.8	27	12		SC
◇	TP–5	2'–3'	21.2	27	12		SC
▶	TP–6	10'–11'	35.1	31	15		SC
▷	TP–8	1'–2'	42.3	42	20		SC
○	TP–9	4'–5'	27.8	25	5		SC–SM
●	TP–12	8.5'–9.5'	28.5	27	14		SC
▼	TP–13	2'–3'	21.4	19	3		SM

PLASTICITY INDEX
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR: JKG
BY: TMH

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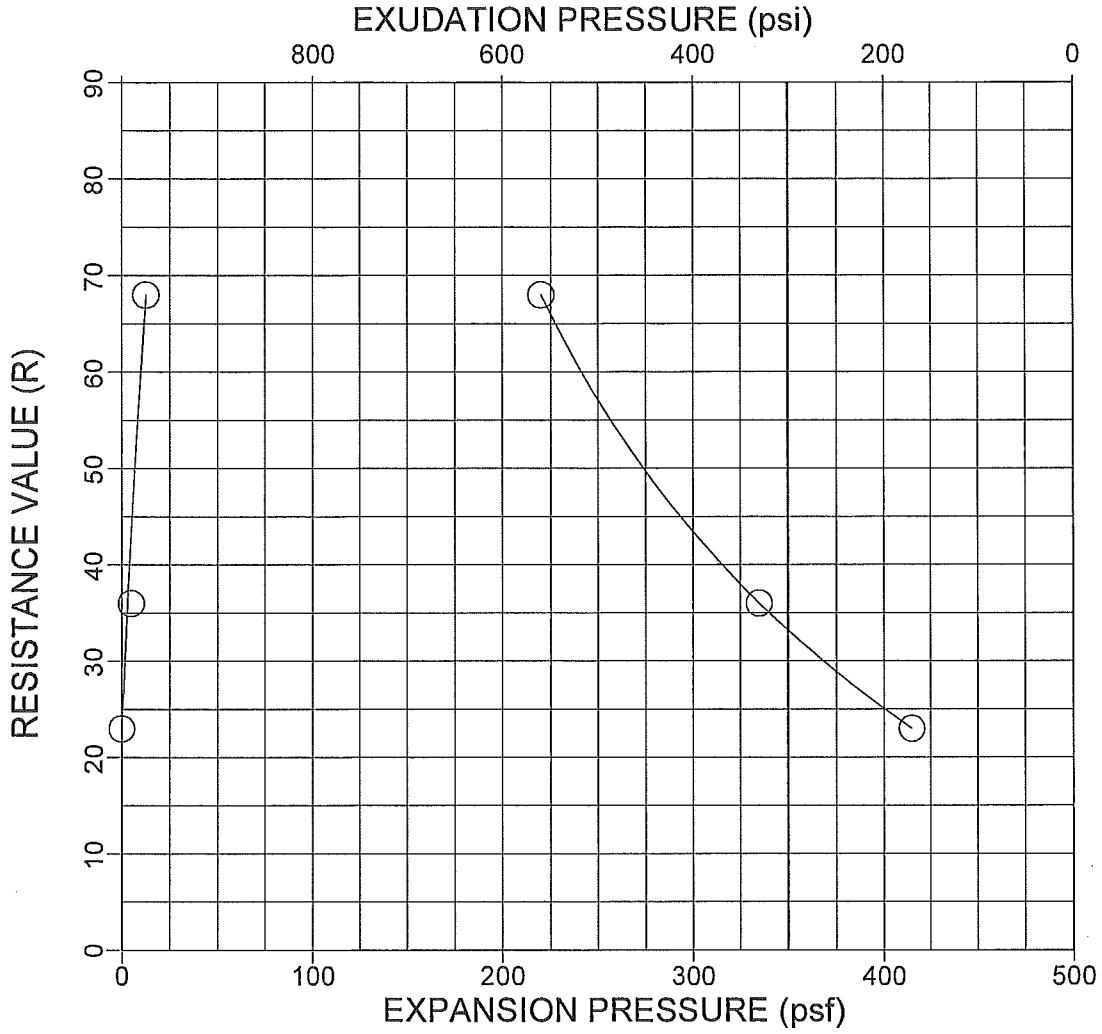

Specimen No.	1	2	3
Water Content (%)	11.5	12.5	10.5
Dry Density (pcf)	128.8	126.8	130.7
Exudation Pressure (psi)	330	167	561
Expansion Pressure (psf)	4.32	0.0	12.96
Resistance Value (R)	36	23	68

Sample Source	Classification	Sand Equivalent	Values Interpolated at 300 psi Exudation press.	
			Expansion Pressure	R-value
TP-5 2'-3'	CLAYEY SAND		3	33

R-VALUE
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

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OF 25

N:\DWGS\J28813_SilverHills\Geotech\R-ValueTP-5.DWG ~ 3:01 PM * 06-MAR-2009

Atlas Consultants, Inc.

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(702) 383-1199 • Fax (702) 383-4983

CHEMICAL
PHYSICAL

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AMERICAN SOCIETY FOR
TESTING MATERIALS

ACT LAB NO: 15425(a) **DATE:** February 27, 2009

PROJECT NO: 28813 **P.O.** 4196

SUBMITTED BY: Summit Engineering Corporation (Reno) **LAB ID:** 8995

ANALYZED BY: Kurt D. Ergun

Silver Hills

WATER SOLUBLE SALT ANALYSIS IN SOIL
1:5 (soil:water) Aqueous Extraction
AWWA 3500-Na D, AWWA 4500 E
AWWA 2540 C

SOIL SIEVE SIZE = -10 MESH

Sample No.	Location	Depth (feet)	Sodium (Percent)	Water Soluble Sulfate (SO_4) (Percent)	Total Available Water Soluble Sodium Sulfate (Na_2SO_4) (Percent)
	TP-1	1.0-2.0	<0.01	0.01	<0.01
Solubility = 0.05%					
	TP-8	1.0-2.0	<0.01	0.01	<0.01
Solubility = 0.05%					
	TP-13	2.0-3.0	<0.01	0.01	<0.01
Solubility = 0.06%					

Kurt D. Ergun
LABORATORY DIRECTOR

Notes: The results for each constituent denote the percentage of that analyte, at a 1:5 (soil:water) extraction ratio, which is present in the soil. Sodium was determined by flame photometry, sulfate turbidimetrically, and sodium sulfate by calculation.

TOTAL P.01

SULFATE ANALYSIS
SILVER HILLS
RENO, NEVADA

JOB NO.: 28813
APPR.: JKG
BY: TMH

SUMMIT ENGINEERING CORPORATION
5405 MAE ANNE AVE. RENO, NV. 89523

SHEET 25
OF 25

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SILVER HILLS PHASE 1

TRAFFIC ANALYSIS

FEBRUARY 2021

Prepared by:
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715 H Street
Sparks, Nevada 89431
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EXECUTIVE SUMMARY

The proposed Silver Hills development will be located in Washoe County, Nevada. The project site is located west of Red Rock Road in the vicinity of Silver Knolls Boulevard. Phase 1 is located in the northeast corner of the site. The entire project site is currently undeveloped land. The purpose of this study is to address the Phase 1 project impacts on the adjacent street network. The Red Rock Road intersections with the US-395 Northbound and Southbound Ramps, Silver Lake Road, Moya Boulevard, Osage Road, Bighorn Drive, Plata Mesa Drive, Silver Knolls Boulevard, and Silver Hills Parkway have been identified for capacity analysis for the existing, existing plus project, 2028 base, and 2028 base plus project scenarios. The Red Rock Road/Longhorn Drive intersection has been identified for qualitative analysis.

The proposed Silver Hills Phase 1 development will consist of the construction of 361 single family detached homes. Project access will be provided from the construction of Silver Hills Parkway west of Red Rock Road. The Silver Hills Phase 1 development is anticipated to generate 3,408 average daily trips with 267 trips occurring during the AM peak hour and 357 trips occurring during the PM peak hour.

Traffic generated by the Silver Hills Phase 1 development will have some impact on the adjacent street network. The following recommendations are made to mitigate project traffic impacts.

It is recommended that any required signing, striping, or traffic control improvements comply with Washoe County and Nevada Department of Transportation requirements.

It is recommended that traffic signal warrants be periodically reviewed at the Red Rock Road/US-395 Southbound Ramp intersection and traffic signal and/or capacity improvements be constructed when warranted through the Regional Transportation Commission's (RTC) Regional Road Impact Fee Program.

It is recommended that capacity improvements be constructed at the Red Rock Road/US-395 Northbound Ramp intersection when warranted through the Regional Transportation Commission's (RTC) Regional Road Impact Fee Program. A free right turn lane at the east off-ramp approach should be considered a priority improvement that the project developer pursue through RTC impact fee waivers with future development phases.

It is recommended that the Red Rock Road/Silver Hills Parkway intersection be constructed as an unsignalized three-leg intersection with stop sign control at the west approach and an exclusive left turn lane at the south approach.

INTRODUCTION

STUDY AREA

The proposed Silver Hills development is located in Washoe County, Nevada. The project site is located west of Red Rock Road in the vicinity of Silver Knolls Boulevard. Phase 1 is located in the northeast corner of the site. The location of the project site is shown in Figure 1. The purpose of this study is to address the Phase 1 project impacts on the adjacent street network. The Red Rock Road intersections with the US-395 Northbound and Southbound Ramps, Silver Lake Road, Moya Boulevard, Osage Road, Bighorn Drive, Plata Mesa Drive, Silver Knolls Boulevard, and Silver Hills Parkway have been identified for capacity analysis for the existing, existing plus project, 2028 base, and 2028 base plus project scenarios. The Red Rock Road/Longhorn Drive intersection has been identified for qualitative analysis.

EXISTING AND PROPOSED LAND USES

The project site is currently undeveloped land. Properties adjacent to the site include residential development to the east and south and undeveloped land to the north and west. The proposed Silver Hills Phase 1 development will consist of the construction of 361 single family homes. Project access will be provided from the construction of Silver Hills Parkway west of Red Rock Road.

EXISTING AND PROPOSED ROADWAYS AND INTERSECTIONS

Red Rock Road is a four-lane roadway with two through lanes in each direction from the US-395 Northbound Ramp intersection to Moya Boulevard and a two-lane roadway with one through lane in each direction south of the US-395 Northbound Ramp intersection and north of Moya Boulevard. The speed limit is posted for 35 miles per hour from US-395 to Moya Boulevard, 40 miles per hour from Moya Boulevard to south of Bighorn Drive, 25 miles per hour further north to Longview Drive, 40 miles per hour between Longview Drive and the fire station, and 50 miles per hour further north. Roadway improvements generally include curb, gutter and sidewalk on the four-lane segment and graded shoulders with striped edgelines on the two-lane section.

Silver Lake Road is a two-lane roadway with one through-lane in each direction. The speed limit is posted for 35 miles per hour. Roadway improvements generally include curb, gutter and sidewalk in some areas and graded shoulders with striped edgelines in other areas. Bike lanes exist on both sides of the street east of Red Rock Road.

Moya Boulevard is a two-lane roadway with one through lane in each direction east of Red Rock Road. The speed limit is posted for 45 miles per hour with a 35 mile per hour speed limit for trucks. Roadway improvements generally include curb, gutter, sidewalks, and bike lanes on both sides of the street with a center two-way left turn lane.

Osage Road is generally an unimproved gravel roadway with one through lane in each direction east of Red Rock Road. The speed limit is posted for 15 miles per hour.

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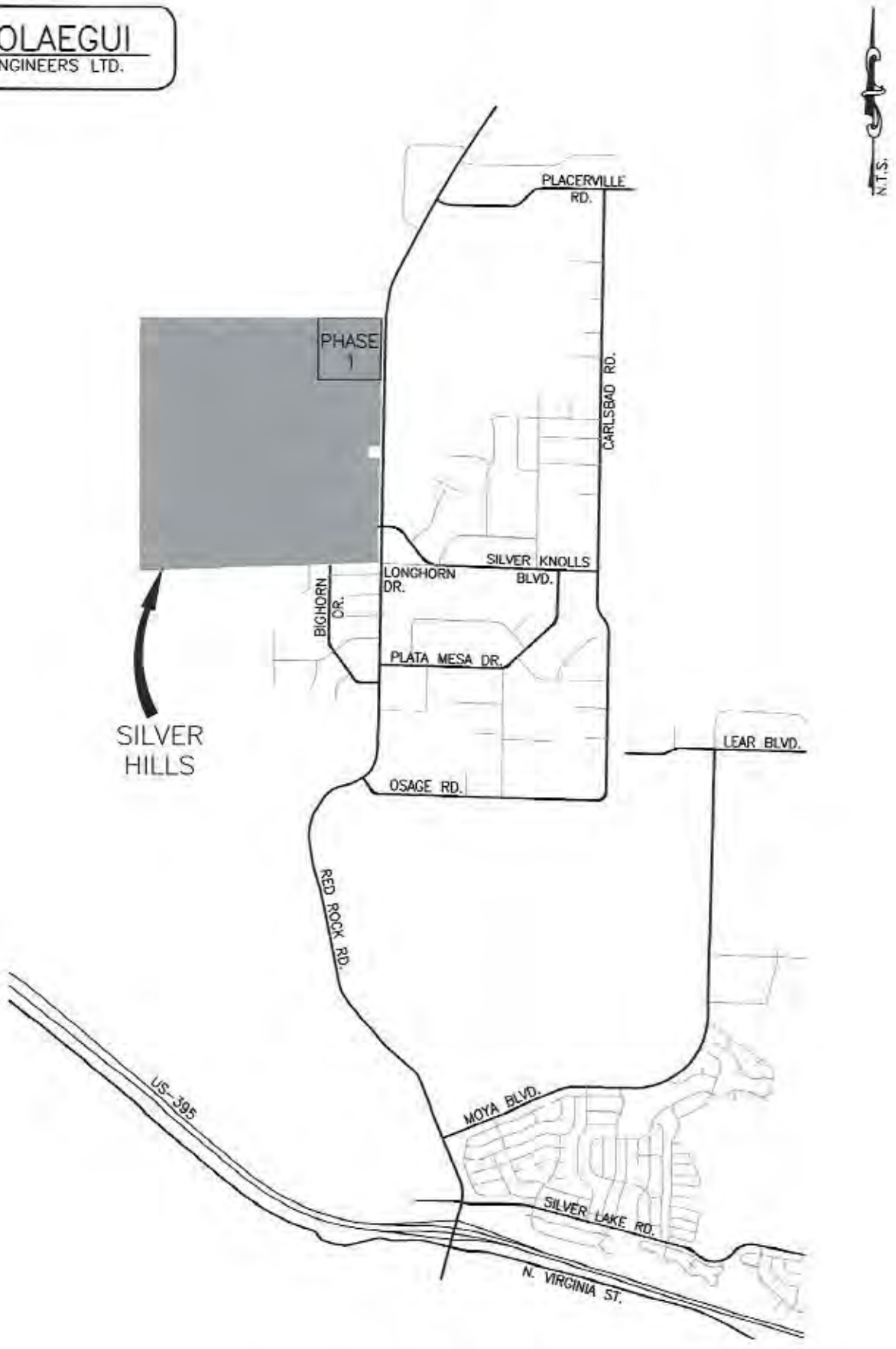

SILVER HILLS PHASE 1

VICINITY MAP
FIGURE 1

Bighorn Drive is a two-lane roadway with one through lane in each direction west of Red Rock Road. The speed limit is not posted. Roadway improvements generally include paved travel lanes with graded shoulders.

Plata Mesa Drive is a two-lane roadway with one through lane in each direction east of Red Rock Road. The speed limit is posted for 25 miles per hour. Roadway improvements generally include paved travel lanes with graded shoulders.

Silver Knolls Boulevard is a two-lane roadway with one through lane in each direction east of Red Rock Road. The speed limit is posted for 25 miles per hour. Roadway improvements include paved travel lanes with graded shoulders. An unimproved gravel road serving Silver Knolls Park aligns with Silver Knolls Boulevard on the west side of Red Rock Road.

Silver Hills Parkway does not currently exist but is anticipated to be constructed to serve phase one of the project. Silver Hills Parkway is anticipated to be a two-lane roadway with one through lane in each direction west of Red Rock Road.

The Red Rock Road/US-395 Southbound Ramp intersection is an unsignalized four-leg intersection with stop sign control at the off-ramp approach. The north Red Rock Road approach contains one shared left turn-through lane. The south Red Rock Road approach contains one shared through-right turn lane. The off-ramp approach contains one shared left turn-through-right turn lane. The east leg is the on-ramp to southbound US-395.

The Red Rock Road/US-395 Northbound Ramp intersection is an unsignalized four-leg intersection with stop sign control at the off-ramp approach. The north Red Rock Road approach contains one through lane and one right turn lane. The south Red Rock Road approach contains one left turn land and one through lane. The off-ramp approach contains one shared left turn-through-right turn lane. The west leg is the on-ramp to northbound US-395.

The Red Rock Road/Silver Lake Road intersection is a signalized four-leg intersection with flashing yellow arrow phasing at the north, south, and east approaches. The north and south approaches each contain one left turn lane, one through lane, and one shared through-right turn lane. The west approach contains one shared left turn-through-right turn lane. The east approach contains one left turn lane and one shared through-right turn lane.

The Red Rock Road/Moya Boulevard intersection is a signalized three-leg intersection with flashing yellow arrow phasing for the southbound left turn movement. The north approach contains one left turn lane and one through lane. The south approach contains one through lane and one right turn lane. The east approach contains one left turn lane and one shared left turn-right turn lane.

The Red Rock Road/Osage Road intersection is an unsignalized three-leg intersection with stop sign control at the east approach. The north approach contains one shared left turn-through lane. The south approach contains one shared through-right turn lane. The west approach contains one shared left turn-right turn lane.

The Red Rock Road/Bighorn Drive intersection is an unsignalized three-leg intersection with stop sign control at the west approach. The north approach contains one shared through-right turn lane. The south approach contains one shared left turn-through lane. The west approach contains one shared left turn-right turn lane.

The Red Rock Road/Plata Mesa Drive intersection is an unsignalized intersection with stop sign control at the east approach. A residential driveway aligns with Plata Mesa Drive west of Red Rock Road. All approaches contain one shared left turn-through-right turn lane.

The Red Rock Road/Silver Knolls Boulevard intersection is an unsignalized four-leg intersection with stop sign control at the east and west approaches. All approaches contain one shared left turn-through-right turn lane.

The Red Rock Road/Silver Hills Parkway intersection does not currently exist but will be constructed as an unsignalized three-leg intersection with stop sign control at the west approach. The intersection is anticipated to contain one shared through-right turn lane at the north approach, one left turn lane and one through lane at the south approach, and one shared left turn-right turn lane at the west approach.

TRIP GENERATION

In order to assess the magnitude of traffic impacts of the proposed project on the key intersections, trip generation rates and peak hours had to be determined. Trip generation rates were obtained from the 10th Edition of *ITE Trip Generation* (2018) for Land Uses 210: Single Family Detached Housing. The proposed Silver Hills Phase 1 development will consist of the construction of 361 single family homes. Trip generation was calculated for an average weekday and the weekday peak hours occurring between 7:00 and 9:00 AM and 4:00 and 6:00 PM. The periods correspond to the peak hours of adjacent street traffic. Table 1 shows a summary of the average daily traffic (ADT) and AM and PM peak hour volumes generated by the proposed project. The trip generation worksheets are included in the Appendix.

TABLE 1
TRIP GENERATION

LAND USE	ADT	AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single Family Detached Housing (361 DU)	3,408	67	200	267	225	132	357

As shown in Table 1, the proposed Silver Hills Phase 1 development is anticipated to generate 3,408 average daily trips with 267 trips occurring during the AM peak hour and 357 trips occurring during the PM peak hour.

TRIP DISTRIBUTION AND ASSIGNMENT

The distribution of the project traffic to the key intersections was based on existing and future peak hour traffic patterns and the locations of attractions and productions in the area. The anticipated trip distribution is shown on Figure 2. The peak hour trips shown in Table 1 were subsequently assigned to the key intersections based on the trip distribution percentages. Figure 3 shows the AM and PM peak hour project trip assignment at the key intersections.

EXISTING AND PROJECTED TRAFFIC VOLUMES

The existing peak hour traffic volumes at the Red Rock Road intersections with the US-395 Northbound and Southbound Ramps, Silver Lake Road, Moya Boulevard, Bighorn Drive, and Silver Knolls Boulevard were obtained from the previous traffic study for Silver Hills dated July of 2018. The existing peak hour traffic volumes at the Red Rock Road intersections with Osage Road and Plata Mesa Drive were obtained from traffic counts taken in January of 2021. The 2021 traffic counts were conducted during the COVID-19 pandemic which may have resulted in reduced traffic. The 2021 traffic counts were subsequently compared with the preCOVID-19 traffic volumes obtained from the previous traffic study and appropriate adjustments were made in order to ensure conservative traffic volumes. Figure 4 shows the existing traffic volumes at the key intersections during the AM and PM peak hours.

Figure 5 shows the existing plus project traffic volumes at the key intersections during the AM and PM peak hours. The existing plus project volumes were obtained by adding the trip assignment volumes shown on Figure 3 to the existing traffic volumes shown on Figure 4.

Figure 6 shows the 2028 base traffic volumes at the key intersections during the AM and PM peak hours. The 2028 base traffic volumes were estimated based on average daily and peak hour traffic volumes extrapolated from 2025 and 2030 traffic volumes obtained directly from the Regional Transportation Commission's traffic forecasting model.

Figure 7 shows the 2028 base plus project traffic volumes at the key intersections during the AM and PM peak hours. The 2028 base plus project traffic volumes were obtained by adding the trip assignment volumes shown on Figure 3 to the 2028 base traffic volumes shown on Figure 6.

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TRIP DISTRIBUTION
FIGURE 2

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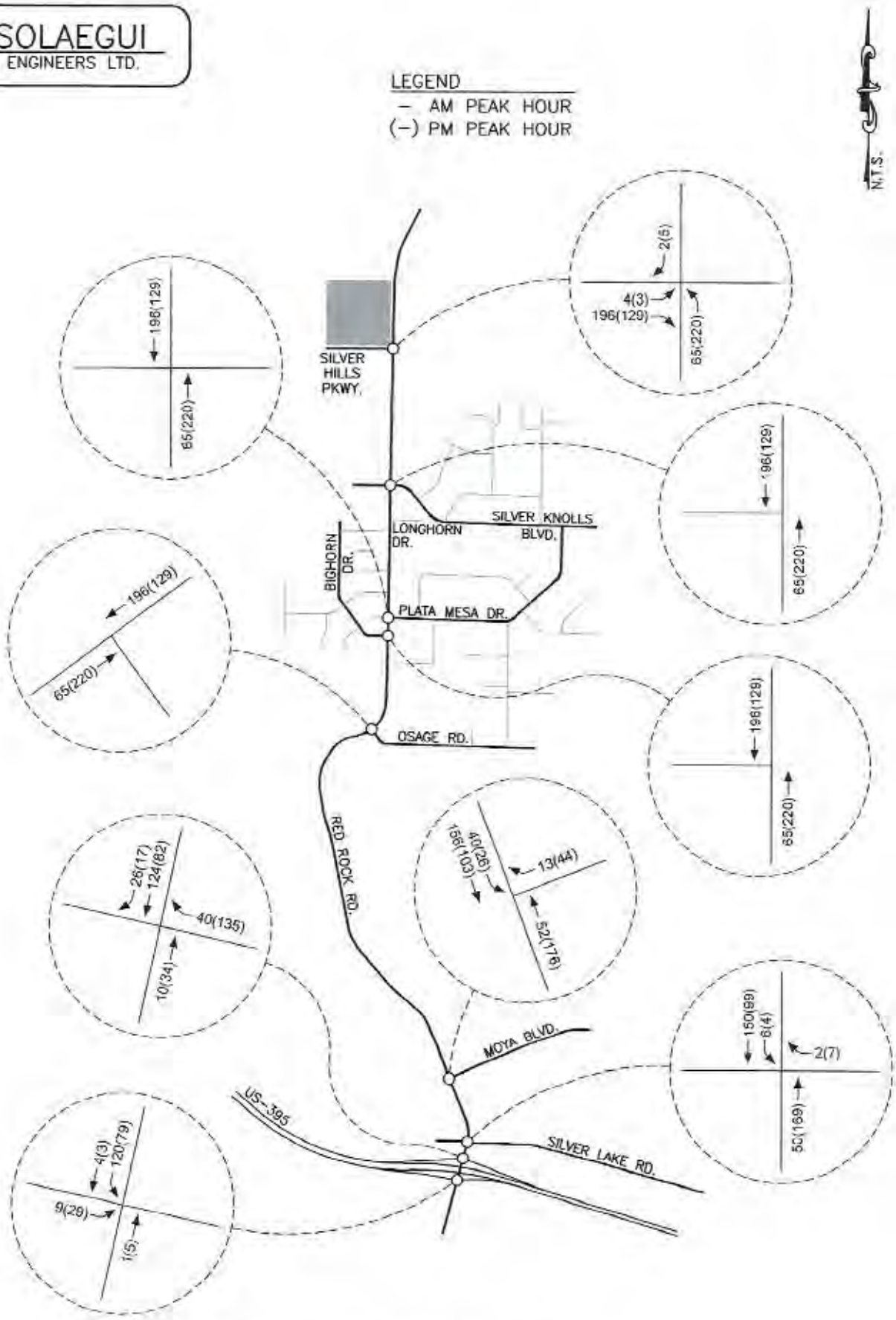

SILVER HILLS PHASE 1

TRIP ASSIGNMENT

FIGURE 3

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LEGEND
– AM PEAK HOUR
(–) PM PEAK HOUR

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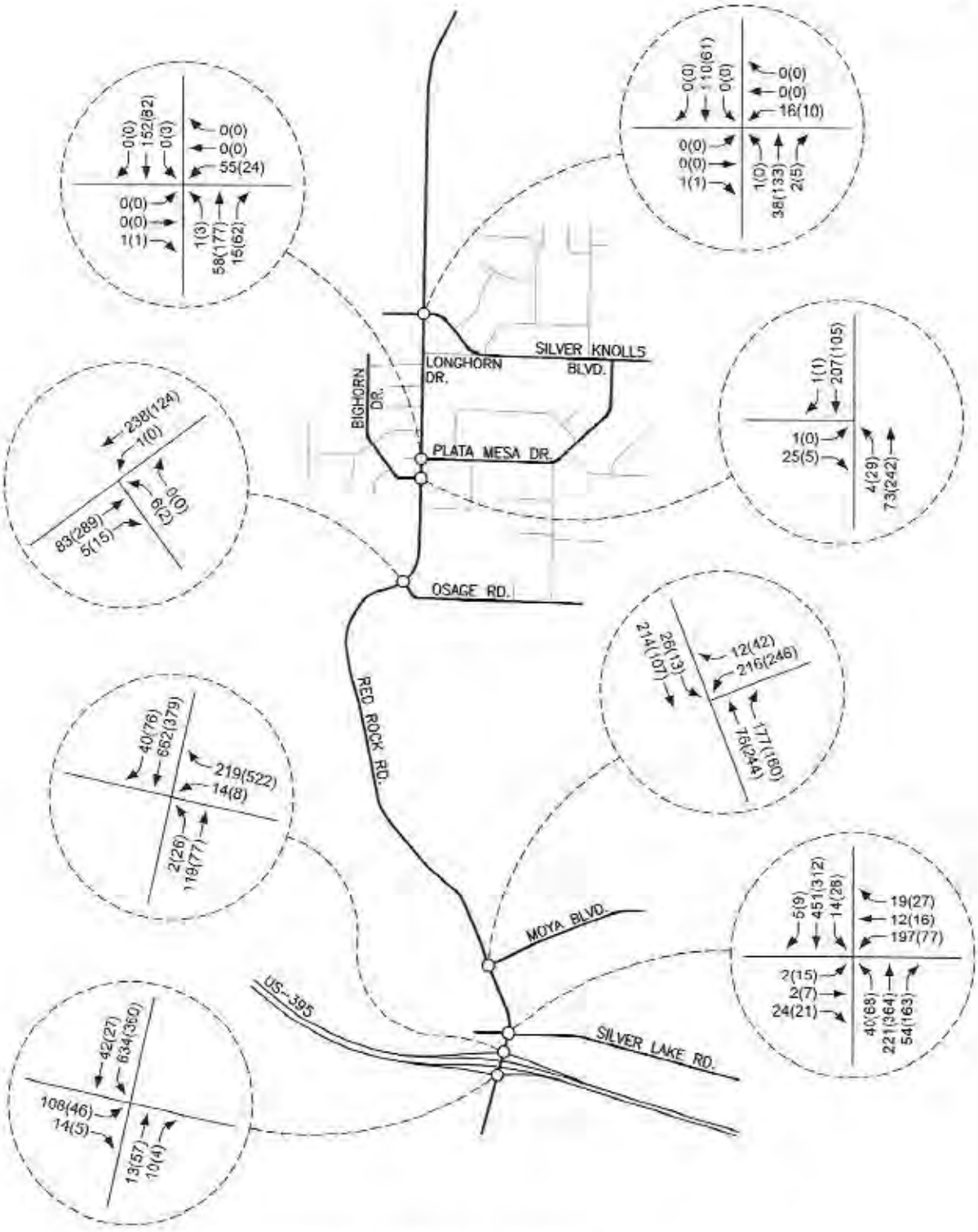

SILVER HILLS PHASE 1

EXISTING TRAFFIC VOLUMES
FIGURE 4

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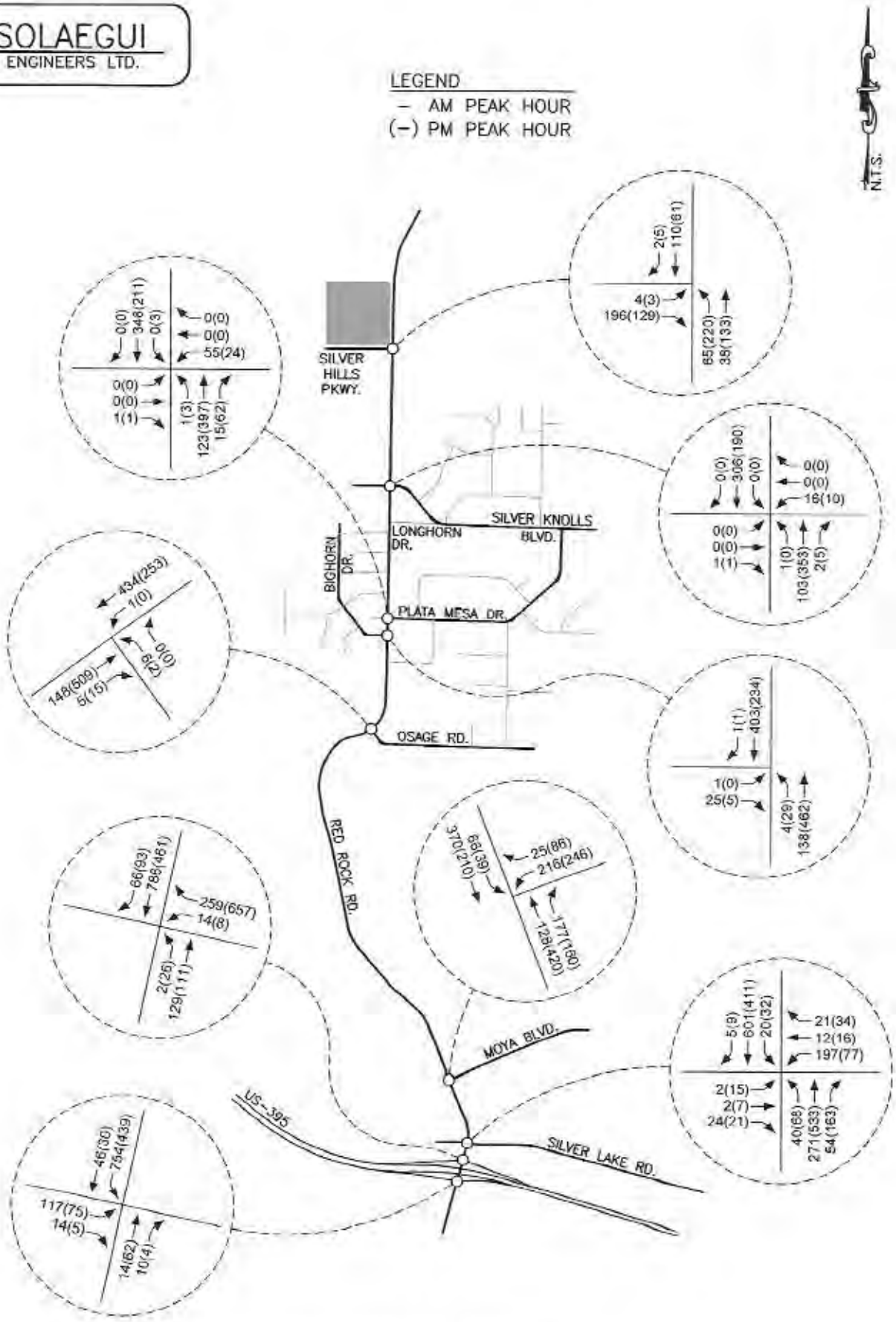

SILVER HILLS PHASE 1

EXISTING PLUS PROJECT TRAFFIC VOLUMES

FIGURE 5

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LEGEND
– AM PEAK HOUR
(–) PM PEAK HOUR

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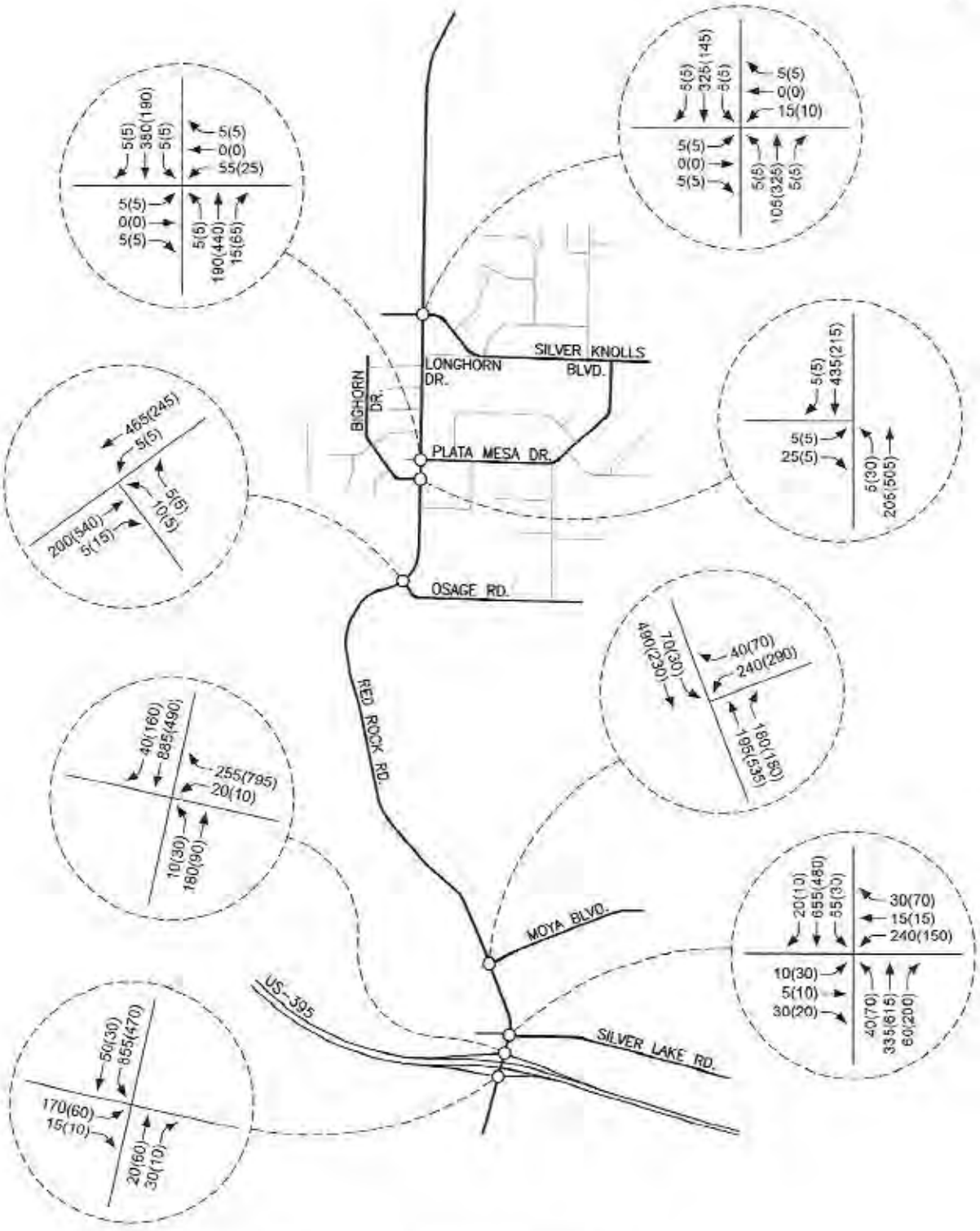

SILVER HILLS PHASE 1

2028 BASE TRAFFIC VOLUMES
FIGURE 6

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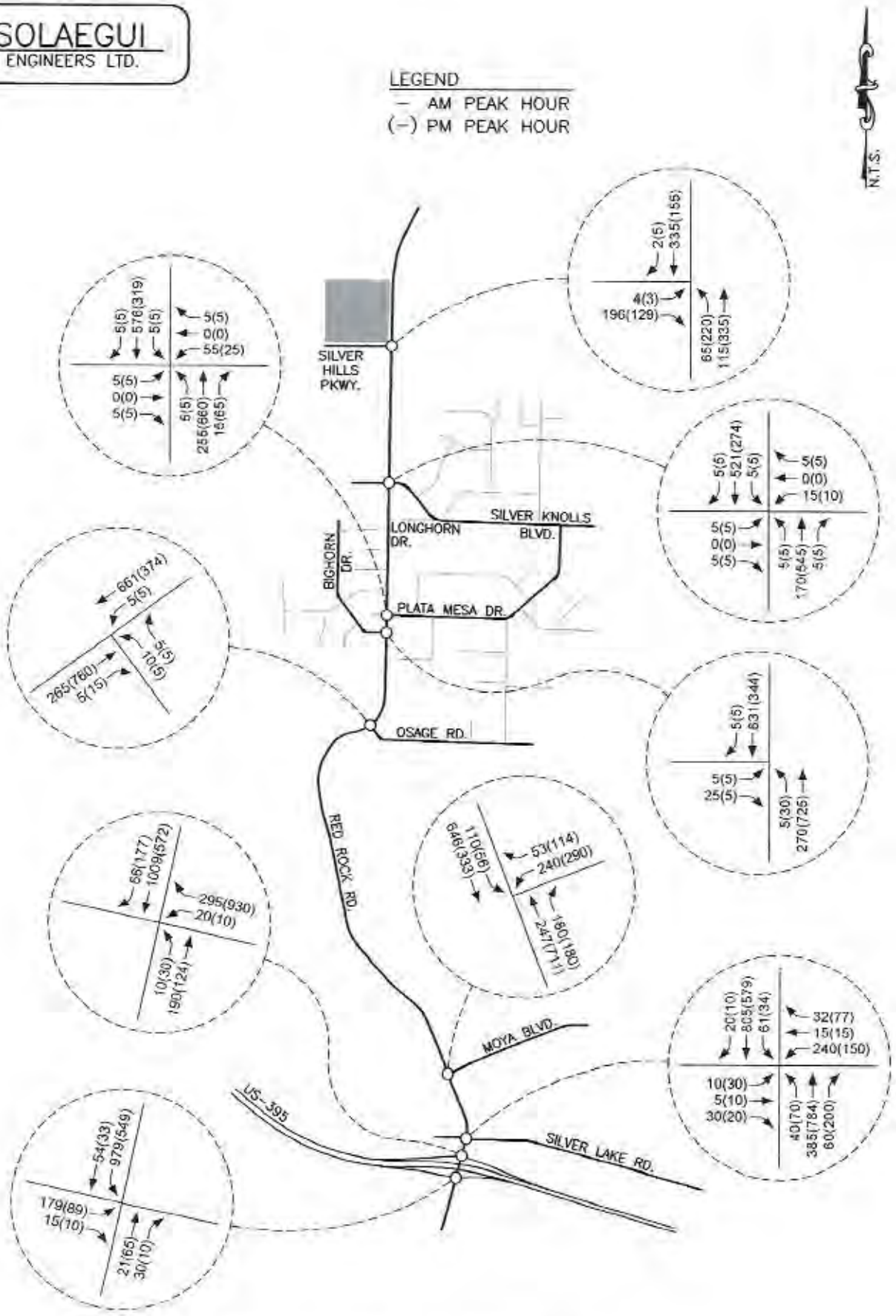


SILVER HILLS PHASE 1

2028 BASE PLUS PROJECT TRAFFIC VOLUMES

FIGURE 7

INTERSECTION CAPACITY ANALYSIS

The key intersections were analyzed for capacity based on procedures presented in the *Highway Capacity Manual (6th Edition)*, prepared by the Transportation Research Board, for unsignalized and signalized intersections using the latest version of the Highway Capacity software.

The result of capacity analysis is a level of service (LOS) rating for signalized intersections and minor movements at a partial stop controlled intersection. Level of service is a qualitative measure of traffic operating conditions where a letter grade "A" through "F", corresponding to progressively worsening traffic operation, is assigned to the intersection or minor movement.

The *Highway Capacity Manual* defines level of service for stop controlled intersections in terms of computed or measured control delay for each minor movement. Level of service is not defined for the intersection as a whole. The level of service criteria for unsignalized intersections is shown in Table 2.

TABLE 2
LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	DELAY RANGE (SEC/VEH)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Level of service for signalized intersections is stated in terms of the average control delay per vehicle for a peak 15 minute analysis period. The level of service criteria for signalized intersections is shown in Table 3.

TABLE 3
LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (SEC)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Table 4 shows a summary of the level of service and delay results at the key intersections. The intersection capacity worksheets are included in the Appendix.

TABLE 4
INTERSECTION LEVEL OF SERVICE AND DELAY RESULTS

	EXISTING		EXISTING + PROJECT		2028 BASE		2028 BASE + PROJECT	
INTERSECTION	AM	PM	AM	PM	AM	PM	AM	PM
Red Rock Road & US-395 SB Ramps								
Stop at West Leg								
EB Left-Thru-Right	F432.0	D25.2	F999+	F50.6	F999+	E49.9	F999+	F176.5
SB Left	A9.0	A8.1	A9.7	A8.4	B10.7	A8.6	B12.3	A8.9
Signalized w/Improvements	B10.7	B10.3	B12.4	B11.1	B19.7	B10.9	C34.6	B12.1
Red Rock Road & US-395 NB Ramps								
Stop at East Leg								
WB Left-Thru-Right	B11.3	B14.2	B12.2	C21.7	B14.5	E36.2	C16.7	F95.1
NB Left	A9.3	A8.5	A9.9	A8.8	B10.3	A9.2	B11.1	A9.6
Stop at East Leg w/Free WB Right								
WB Left-Thru	N/A	N/A	N/A	N/A	D27.4	C16.3	D34.4	C18.9
NB Left	N/A	N/A	N/A	N/A	B10.3	A9.2	B11.1	A9.6
Red Rock Road & Silver Lake Road								
Signalized	B18.3	B19.2	B19.6	C21.2	C20.4	C22.3	C22.6	C26.5
Red Rock Road & Moya Boulevard								
Signalized	B14.5	B16.5	B14.5	B17.1	B14.6	B19.6	B15.6	C29.3
Red Rock Road & Osage Road								
Stop at East Leg								
WB Left-Right	B10.7	B11.4	B13.3	C15.8	B13.0	B14.5	C16.4	C20.1
SB Left	A7.4	A7.9	A7.6	A8.6	A7.7	A8.7	A7.9	A9.6
Red Rock Road & Bighorn Drive								
Stop at West Leg								
EB Left-Right	A9.6	A8.9	B11.2	A9.6	B12.0	B13.1	B14.7	C17.8
NB Left	A7.7	A7.5	A8.2	A7.8	A8.3	A7.8	A9.0	A8.1
Red Rock & Plata Mesa Drive								
Stop at East & West Legs								
EB Left-Thru-Right	A9.1	A8.7	B10.4	A9.5	B12.8	B12.9	C16.6	C18.3
WB Left-Thru-Right	B10.5	B11.1	B13.9	C16.2	C16.0	C16.4	C24.1	C24.9
NB Left	A7.6	A7.4	A8.1	A7.7	A8.2	A7.7	A8.8	A8.0
SB Left	A7.4	A7.8	A7.5	A8.4	A7.7	A8.5	A7.9	A9.4
Red Rock & Silver Knolls								
Stop at East & West Legs								
EB Left-Thru-Right	A8.9	A8.6	B10.1	A9.3	B11.5	B11.2	B14.6	C15.0
WB Left-Thru-Right	A9.6	A9.9	B12.2	B13.9	B11.9	B12.4	C15.5	C17.8
NB Left	A7.5	A7.3	A7.9	A7.6	A8.0	A7.6	A8.6	A7.9
SB Left	A7.3	A7.5	A7.4	A8.1	A7.5	A8.0	A7.6	A8.7
Red Rock Road & Silver Hills								
Stop at West Leg								
EB Left-Right	N/A	N/A	B10.1	A9.4	N/A	N/A	B12.9	B10.3
NB Left	N/A	N/A	A7.6	A7.8	N/A	N/A	A8.2	A8.1

Red Rock Road/US-395 Southbound Ramp Intersection

The Red Rock Road/US-395 Southbound Ramp intersection was analyzed as an unsignalized four-leg intersection with stop sign control at the west approach for all scenarios. The intersection minor movements currently operate at LOS D or better except for the eastbound left turn movement which operates at level of service F during the AM peak hour. For the existing plus project traffic volumes the eastbound left turn movement operates at LOS F during the AM and PM peak hours. For the 2028 base traffic volumes the eastbound left turn movement operates at LOS F during the AM peak hour and LOS E during the PM peak hour. For the 2028 base plus project traffic volumes the eastbound left turn movement operates at LOS F during the AM and PM peak hours. The intersection was analyzed with the existing approach lanes for all scenarios. Capacity improvements that include exclusive left turn lanes at the north and west approaches will decrease delays but the unsignalized intersection will continue to operate at LOS F for all scenarios.

The Red Rock Road/US-395 Southbound Ramp intersection was subsequently analyzed as a signalized intersection with capacity improvements that include separate left turn and through lanes at the north approach. The signalized intersection is anticipated to operate at LOS C or better. Traffic signal warrant 3 per the *Manual on Uniform Traffic Control Devices* (MUTCD) does not appear to be met at the intersection. However, the MUTCD has eight additional warrants that should be evaluated when considering the need for the installation of a traffic signal. It is recommended that traffic signal warrants be periodically reviewed at the Red Rock Road/US-395 Southbound Ramp intersection and traffic signal and capacity improvements be constructed when warranted through RTC's Regional Road Impact Fee Program.

Red Rock Road/US-395 Northbound Ramp Intersection

The Red Rock Road/US-395 Northbound Ramp intersection was analyzed as an unsignalized four-leg intersection with stop sign control at the east approach for all scenarios. The intersection minor movements currently operate at LOS B or better during the AM and PM peak hours. For the existing plus project traffic volumes the intersection minor movements operate at LOS C or better during the AM and PM peak hours. For the 2028 base traffic volumes the intersection minor movements operate at LOS C or better except for the westbound left turn-through-right turn movement which operates at LOS E during the PM peak hour. For the 2028 base plus project traffic volumes the intersection minor movements operate at LOS C or better except for the westbound left turn-through-right turn movement which operates at LOS F during the PM peak hour. The intersection was analyzed with the existing approach lanes for all scenarios.

Capacity improvements that include a free westbound right turn lane on the off-ramp will result in LOS D or better operation during the AM and PM peak hours for the 2028 base and 2028 base plus project traffic volumes under unsignalized conditions. It is recommended that capacity improvements be constructed at the Red Rock Road/US-395 Northbound Ramp intersection when warranted through RTC's Regional Road Impact Fee Program. A free right turn lane at the east off-ramp approach should be considered a priority improvement that the project developer pursue through RTC impact fee waivers with future development phases.

Red Rock Road/Silver Lake Road Intersection

The Red Rock Road/Silver Lake Road intersection was analyzed as a signalized four-leg intersection for all scenarios. The intersection currently operates at LOS B with a delay of 18.3 seconds per vehicle during the AM peak hour and LOS B with a delay of 19.2 seconds per vehicle during the PM peak hour. For the existing plus project traffic volumes the intersection operates at LOS B with a delay of 19.6 seconds per vehicle during the AM peak hour and LOS C with a delay of 21.2 seconds per vehicle during the PM peak hour. For the 2028 base traffic volumes the intersection operates at LOS C with a delay of 20.4 seconds per vehicle during the AM peak hour and LOS C with a delay of 22.3 seconds per vehicle during the PM peak hour. For the 2028 base plus project traffic volumes the intersection operates at LOS C with a delay of 22.6 seconds per vehicle during the AM peak hour and LOS C with a delay of 26.5 seconds per vehicle during the PM peak hour. The intersection was analyzed with the existing approach lanes for all scenarios.

Red Rock Road/Moya Boulevard Intersection

The Red Rock Road/Moya Boulevard intersection was analyzed as a signalized three-leg intersection for all scenarios. The intersection currently operates at LOS B with a delay of 14.5 seconds per vehicle during the AM peak hour and LOS B with a delay of 16.5 seconds per vehicle during the PM peak hour. For the existing plus project traffic volumes the intersection operates at LOS B with a delay of 14.5 seconds per vehicle during the AM peak hour and LOS B with a delay of 17.1 seconds per vehicle during the PM peak hour. For the 2028 base traffic volumes the intersection operates at LOS B with a delay of 14.6 seconds per vehicle during the AM peak hour and LOS B with a delay of 19.6 seconds per vehicle during the PM peak hour. For the 2028 base plus project traffic volumes the intersection operates at LOS B with a delay of 15.6 seconds per vehicle during the AM peak hour and LOS C with a delay of 29.3 seconds per vehicle during the PM peak hour. The intersection was analyzed with the existing approach lanes for all scenarios.

Red Rock Road/Osage Road Intersection

The Red Rock Road/Osage Road intersection was analyzed as an unsignalized three-leg intersection with stop sign control at the east approach for all scenarios. The intersection minor movements currently operate at LOS B or better during the AM and PM peak hours. For the existing plus project traffic volumes the intersection minor movements operate at LOS C or better during the AM and PM peak hours. For the 2028 base traffic volumes the intersection minor movements operate at LOS B or better during the AM and PM peak hours. For the 2028 base plus project traffic volumes the intersection minor movements operate at LOS C or better during the AM and PM peak hours. The intersection was analyzed with the existing approach lanes.

Red Rock Road/Bighorn Drive Intersection

The Red Rock Road/Bighorn Drive intersection was analyzed as an unsignalized three-leg intersection with stop sign control at the west approach for all scenarios. The minor movements currently operate at LOS A during the AM and PM peak hours. For the existing plus project traffic volumes the minor movements operate at LOS B or better during the AM and PM peak hours.

For the 2028 base traffic volumes the minor movements at the Red Rock Road/Bighorn Drive intersection operate at LOS B or better during the AM and PM peak hours. For the 2028 base plus project traffic volumes the intersection minor movements operate at LOS C or better during the AM and PM peak hours. The intersection was analyzed with the existing approach lanes.

Red Rock Road/Plata Mesa Drive Intersection

The Red Rock Road/Plata Mesa Drive intersection was analyzed as an unsignalized four-leg intersection with stop sign control at the east and west approaches for all scenarios. The intersection minor movements currently operate at LOS B or better during the AM and PM peak hours. For the existing plus project traffic volumes the intersection minor movements operate at LOS C or better during the AM and PM peak hours. For the 2028 base traffic volumes the intersection minor movements operate at LOS C or better during the AM and PM peak hours. For the 2028 base plus project traffic volumes the intersection minor movements operate at LOS C or better during the AM and PM peak hours. The intersection was analyzed with the existing approach lanes.

Red Rock Road/Silver Knolls Boulevard Intersection

The Red Rock Road/Silver Knolls Boulevard intersection was analyzed as an unsignalized four-leg intersection with stop sign control at the east and west approaches for all scenarios. The intersection minor movements currently operate at LOS A during the AM and PM peak hours. For the existing plus project traffic volumes the intersection minor movements operate at LOS B or better during the AM and PM peak hours. For the 2028 base traffic volumes the intersection minor movements operate at LOS B or better during the AM and PM peak hours. For the 2028 base plus project traffic volumes the intersection minor movements operate at LOS C or better during the AM and PM peak hours. The intersection was analyzed with the existing approach lanes for all scenarios.

Red Rock Road/Silver Hills Parkway Intersection

The Red Rock Road/Silver Hills Parkway intersection was analyzed as an unsignalized three-leg intersection with stop sign control at the west approach for the existing plus project and 2028 base plus project scenarios. For the existing plus project traffic volumes the intersection minor movements operate at LOS B or better during the AM and PM peak hours. For the 2028 base plus project traffic volumes the intersection minor movements operate at LOS B or better during the AM and PM peak hours. The intersection was analyzed with one shared through-right turn lane at the north approach, one left turn lane and one through lane at the south approach; and one shared left turn-right turn lane at the west approach. It is recommended that the Red Rock Road/Silver Hills Parkway intersection be constructed as an unsignalized three-leg intersection with stop sign control at the west approach and an exclusive left turn lane at the south approach.

Red Rock Road/Longhorn Drive Intersection

The Red Rock Road/Longhorn Drive intersection was qualitatively reviewed for traffic operation per the request of Washoe County staff. The intersection is an unsignalized three-leg intersection with stop sign control at the east approach.

Longhorn Drive intersects Red Rock Road approximately 800 feet south of Silver Knolls Boulevard and therefore residents tributary to the eastern portion of Silver Knolls Boulevard utilize the Red Rock Road/Longhorn Drive intersection instead of the Red Rock Road/Silver Knolls Boulevard intersection. It is estimated that the Red Rock Road/Longhorn Drive intersection serves turning traffic volumes comparable to those at the Red Rock Road/Plata Mesa Drive intersection based on the location of existing residences in the area. However, through movements at the Red Rock Road/Longhorn Drive intersection are lower than those at the Red Rock Road/Plata Mesa Drive intersection. As previously discussed the Red Rock Road/Plata Mesa Drive intersection is anticipated to operate at LOS C or better for all study scenarios so it is estimated that the adjacent Red Rock Road/Longhorn Drive intersection will also operate at LOS C or better.

SITE PLAN REVIEW

A copy of the preliminary site plan for the Silver Hills Phase 1 development is included in this submittal. The site plan indicates that project access will be provided from Silver Hills Parkway west of Red Rock Road. The Red Rock Road/Silver Hills Parkway intersection will be located more than 3,000 feet north of the existing Red Rock Road/Silver Knolls Boulevard intersection which will meet Washoe County and RTC spacing requirements.

RECOMMENDATIONS

Traffic generated by the Silver Hills Phase 1 development will have some impact on the adjacent street network. The following recommendations are made to mitigate project traffic impacts.

It is recommended that any required signing, striping, or traffic control improvements comply with Washoe County and Nevada Department of Transportation requirements.

It is recommended that traffic signal warrants be periodically reviewed at the Red Rock Road/US-395 Southbound Ramp intersection and traffic signal and/or capacity improvements be constructed when warranted through the Regional Transportation Commission's (RTC) Regional Road Impact Fee Program.

It is recommended that capacity improvements be constructed at the Red Rock Road/US-395 Northbound Ramp intersection when warranted through the Regional Transportation Commission's (RTC) Regional Road Impact Fee Program. A free right turn lane at the east off-ramp approach should be considered a priority improvement that the project developer pursue through RTC impact fee waivers with future development phases.

It is recommended that the Red Rock Road/Silver Hills Parkway intersection be constructed as an unsignalized three-leg intersection with stop sign control at the west approach and an exclusive left turn lane at the south approach.

APPENDIX

Single-Family Detached Housing
(210)

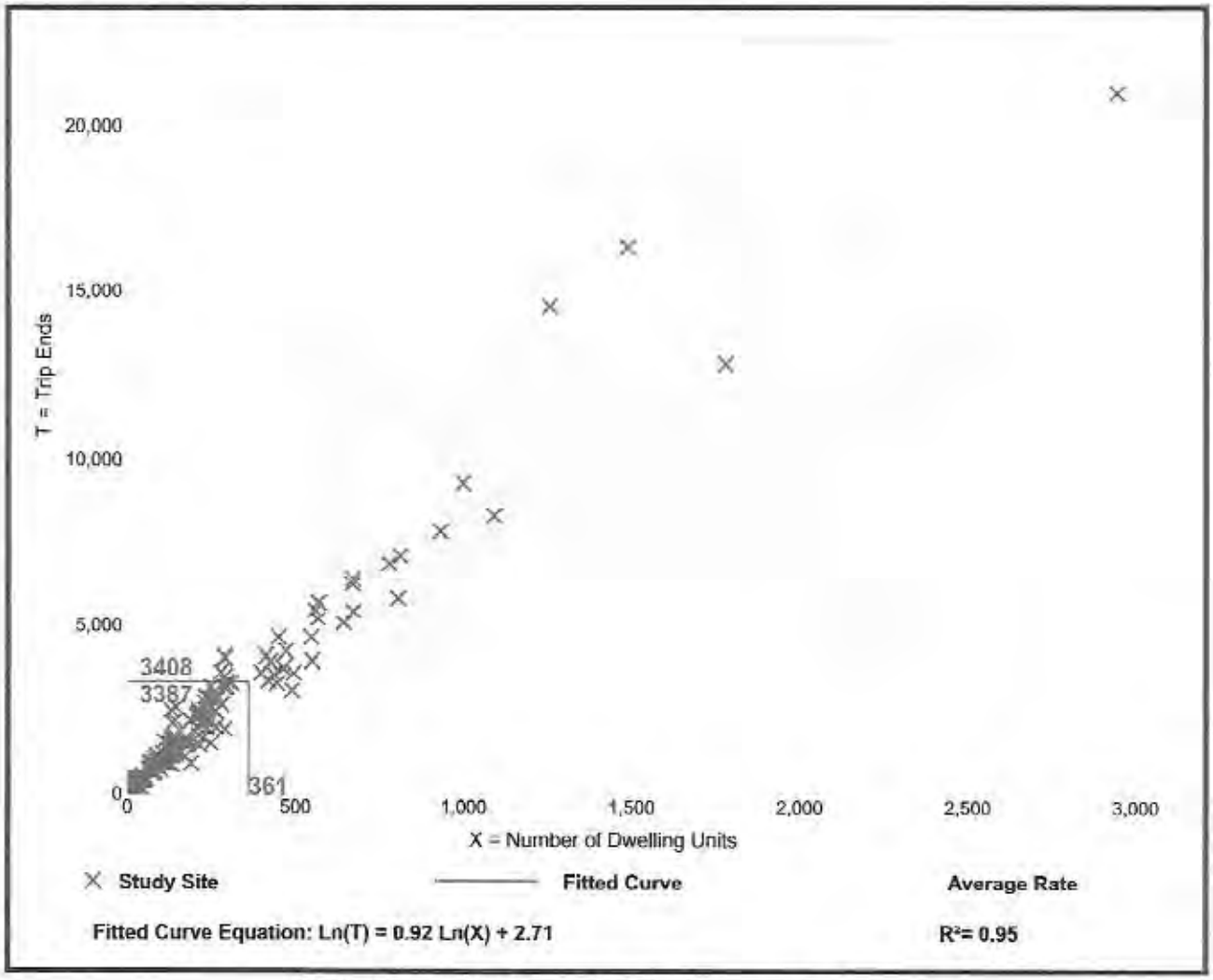
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 159
Avg. Num. of Dwelling Units: 264
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

Data Plot and Equation



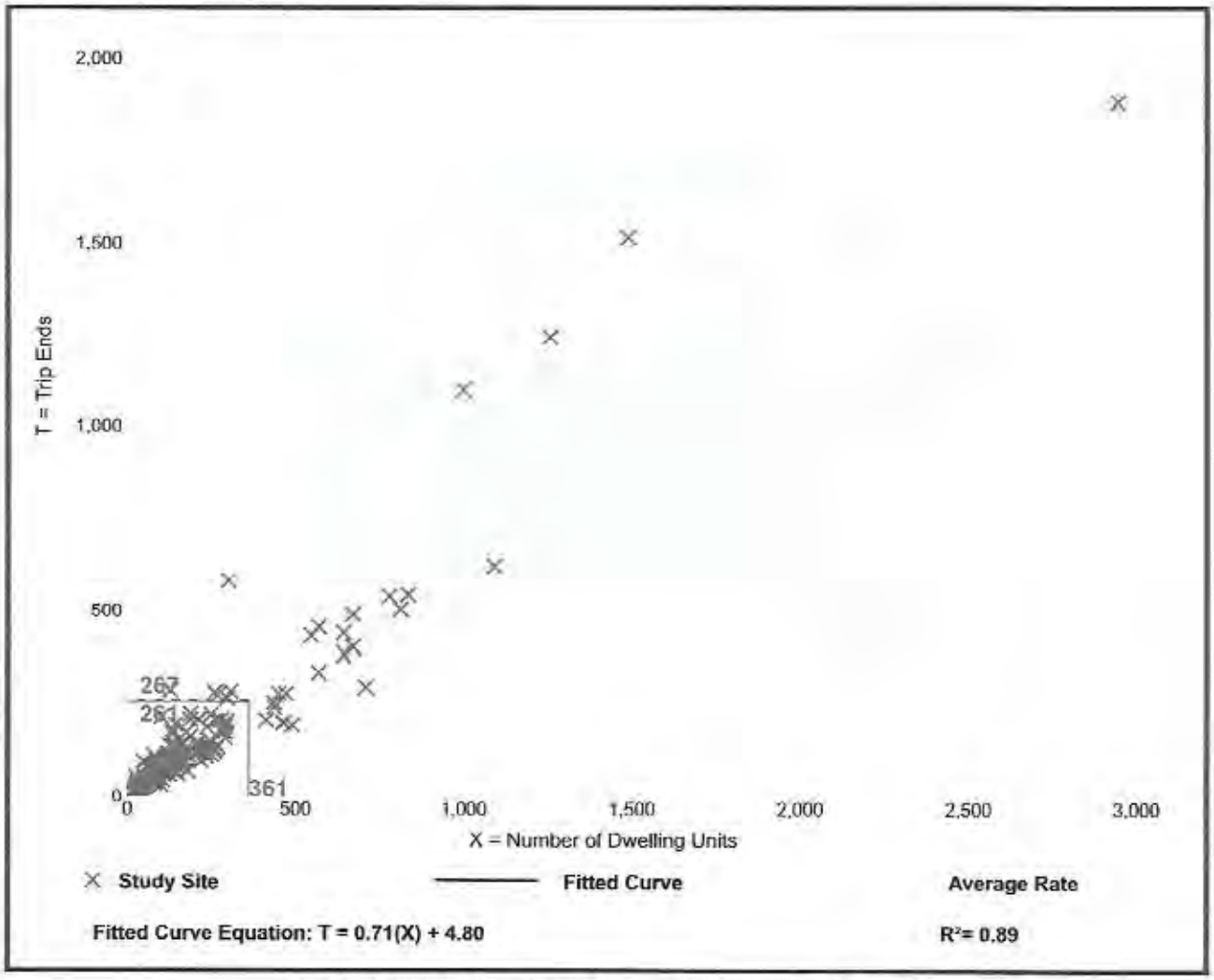
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 173
Avg. Num. of Dwelling Units: 219
Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

Data Plot and Equation



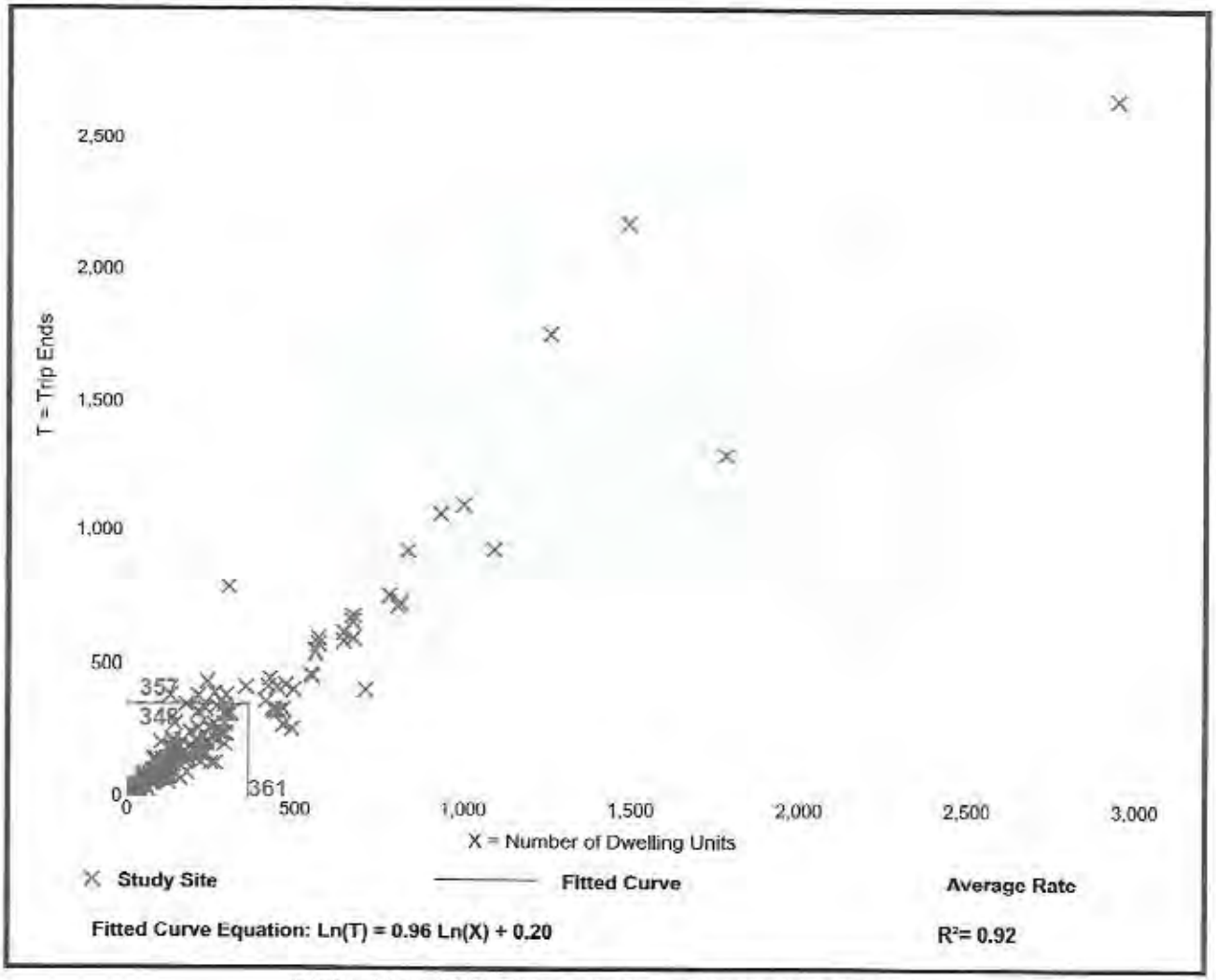
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 190
Avg. Num. of Dwelling Units: 242
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

Data Plot and Equation



HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 SB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 SB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LTR									TR		LT		
Volume (veh/h)		108	0	14							13	10		634	42	
Percent Heavy Vehicles (%)		2	2	2										2		
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2										4.1		
Critical Headway (sec)		7.12	6.52	6.22										4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3										2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32										2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			133											689		
Capacity, c (veh/h)			80											1588		
v/c Ratio			1.65											0.43		
95% Queue Length, Q_{95} (veh)			11.1											2.3		
Control Delay (s/veh)			432.2											9.0		
Level of Service (LOS)			F											A		
Approach Delay (s/veh)		432.2												8.7		
Approach LOS		F														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 SB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 SB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LTR									TR		LT		
Volume (veh/h)		46	0	5							57	4		360	27	
Percent Heavy Vehicles (%)		2	2	2										2		
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2										4.1		
Critical Headway (sec)		7.12	6.52	6.22										4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3										2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32										2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			55											391		
Capacity, c (veh/h)			233											1534		
v/c Ratio			0.24											0.26		
95% Queue Length, Q_{95} (veh)			0.9											1.0		
Control Delay (s/veh)			25.2											8.1		
Level of Service (LOS)			D											A		
Approach Delay (s/veh)		25.2												7.7		
Approach LOS		D														

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Red Rock/US-395 SB Ramps
Agency/Co.	Solaegui Engineers	Jurisdiction	Washoe County
Date Performed	2/3/2021	East/West Street	US-395 SB Ramps
Analysis Year	2021	North/South Street	Red Rock Road
Time Analyzed	AM Existing + Project	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LTR									TR		LT		
Volume (veh/h)		117	0	14							14	10		754	46	
Percent Heavy Vehicles (%)		2	2	2										2		
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2										4.1		
Critical Headway (sec)		7.12	6.52	6.22										4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3										2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32										2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			142											820		
Capacity, c (veh/h)			46											1587		
v/c Ratio			3.08											0.52		
95% Queue Length, Q_{95} (veh)			15.5											3.1		
Control Delay (s/veh)			1121.2											9.7		
Level of Service (LOS)			F											A		
Approach Delay (s/veh)		1121.2												9.4		
Approach LOS		F														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 SB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 SB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LTR									TR		LT		
Volume (veh/h)		75	0	5							62	4		439	30	
Percent Heavy Vehicles (%)		2	2	2										2		
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2										4.1		
Critical Headway (sec)		7.12	6.52	6.22										4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3										2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32										2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			87											477		
Capacity, c (veh/h)			162											1527		
v/c Ratio			0.54											0.31		
95% Queue Length, Q_{95} (veh)			2.7											1.3		
Control Delay (s/veh)			50.6											8.4		
Level of Service (LOS)			F											A		
Approach Delay (s/veh)		50.6												8.1		
Approach LOS		F														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 SB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 SB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LTR									TR		LT		
Volume (veh/h)		170	0	15							20	30		855	50	
Percent Heavy Vehicles (%)		2	2	2										2		
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2										4.1		
Critical Headway (sec)		7.12	6.52	6.22										4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3										2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32										2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			201											929		
Capacity, c (veh/h)			27											1550		
v/c Ratio			7.58											0.60		
95% Queue Length, Q_{95} (veh)			24.9											4.3		
Control Delay (s/veh)			3248.4											10.7		
Level of Service (LOS)			F											B		
Approach Delay (s/veh)		3248.4												10.5		
Approach LOS		F														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Base
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 SB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 SB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LTR									TR		LT		
Volume (veh/h)		60	0	10							60	10		470	30	
Percent Heavy Vehicles (%)		2	2	2										2		
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2										4.1		
Critical Headway (sec)		7.12	6.52	6.22										4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3										2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32										2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			76											511		
Capacity, c (veh/h)			153											1522		
v/c Ratio			0.50											0.34		
95% Queue Length, Q_{95} (veh)			2.4											1.5		
Control Delay (s/veh)			49.9											8.6		
Level of Service (LOS)			E											A		
Approach Delay (s/veh)		49.9												8.2		
Approach LOS		E														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 SB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 SB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LTR									TR		LT		
Volume (veh/h)		179	0	15							21	30		979	54	
Percent Heavy Vehicles (%)		2	2	2										2		
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2										4.1		
Critical Headway (sec)		7.12	6.52	6.22										4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3										2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32										2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			211											1064		
Capacity, c (veh/h)			14											1548		
v/c Ratio			14.98											0.69		
95% Queue Length, Q_{95} (veh)			27.5											6.0		
Control Delay (s/veh)			6814.4											12.3		
Level of Service (LOS)			F											B		
Approach Delay (s/veh)		6814.4												12.1		
Approach LOS		F														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 SB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 SB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LTR									TR		LT		
Volume (veh/h)		89	0	10							65	10		549	33	
Percent Heavy Vehicles (%)		2	2	2										2		
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2										4.1		
Critical Headway (sec)		7.12	6.52	6.22										4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3										2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32										2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			108											597		
Capacity, c (veh/h)			104											1515		
v/c Ratio			1.04											0.39		
95% Queue Length, Q_{95} (veh)			6.6											1.9		
Control Delay (s/veh)			176.5											8.9		
Level of Service (LOS)			F											A		
Approach Delay (s/veh)		176.5												8.6		
Approach LOS		F														

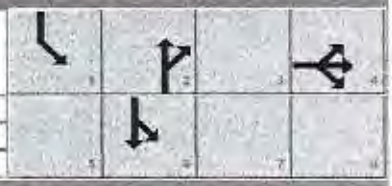
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Red Rock & US-395 SB...	File Name	RrSb18ax.xus		
Project Description					

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	108	0	14					13	10	634	42	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.0	25.0	11.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		12.0				8.3	1.0	4.0
Phase Duration, s		16.0				30.0	29.0	59.0
Change Period, ($Y+R_c$), s		5.0				5.0	5.0	5.0
Max Allow Headway (MAH), s		3.2				0.0	3.1	0.0
Queue Clearance Time (g_s), s		7.3					17.1	
Green Extension Time (g_e), s		0.1				0.0	1.1	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.59					0.19	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (v), veh/h		133						25		689	46	
Adjusted Saturation Flow Rate (s), veh/h/ln		1719						1707		1781	1870	
Queue Service Time (g_s), s		5.3						0.7		15.1	0.5	
Cycle Queue Clearance Time (g_c), s		5.3						0.7		15.1	0.5	
Green Ratio (g/C)		0.15						0.33		0.68	0.72	
Capacity (c), veh/h		252						569		1114	1347	
Volume-to-Capacity Ratio (X)		0.526						0.044		0.618	0.034	
Back of Queue (Q), ft/ln (95 th percentile)		99.6						13.5		192.2	6.6	
Back of Queue (Q), veh/ln (95 th percentile)		3.9						0.5		7.6	0.3	
Queue Storage Ratio (RQ) (95 th percentile)		0.00						0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		29.6						16.9		6.4	3.0	
Incremental Delay (d_2), s/veh		1.0						0.1		0.8	0.0	
Initial Queue Delay (d_3), s/veh		0.0						0.0		0.0	0.0	
Control Delay (d), s/veh		30.6						17.1		7.1	3.1	
Level of Service (LOS)		C						B		A	A	
Approach Delay, s/veh / LOS	30.6	C		0.0			17.1	B		6.9	A	
Intersection Delay, s/veh / LOS	10.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.72	B	1.95	B	1.39	A	1.32	A
Bicycle LOS Score / LOS	0.71	A			0.53	A	1.70	B

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Red Rock & US-395 SB...	File Name	RrSb18px.xus		
Project Description					

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	46	0	5					57	4	360	27	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.0	21.0	15.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

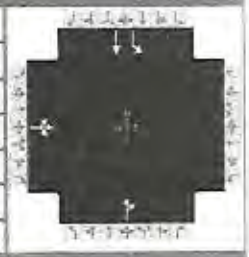
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		12.0				8.3	1.0	4.0
Phase Duration, s		20.0				26.0	29.0	55.0
Change Period, ($Y+R_c$), s		5.0				5.0	5.0	5.0
Max Allow Headway (*MAH*), s		3.2				0.0	3.1	0.0
Queue Clearance Time (g_s), s		4.0					9.9	
Green Extension Time (g_e), s		0.0				0.0	0.7	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.00					0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h		55						66		391	29	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1732						1843		1781	1870	
Queue Service Time (g_s), s		2.0						2.0		7.9	0.4	
Cycle Queue Clearance Time (g_c), s		2.0						2.0		7.9	0.4	
Green Ratio (*g/C*)		0.20						0.28		0.63	0.67	
Capacity (*c*), veh/h		346						516		1004	1247	
Volume-to-Capacity Ratio (*X*)		0.160						0.128		0.390	0.024	
Back of Queue (*Q*), ft/ln (95 th percentile)		35.8						40.7		107.5	5.8	
Back of Queue (*Q*), veh/ln (95 th percentile)		1.4						1.6		4.2	0.2	
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00						0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		24.8						20.2		6.9	4.2	
Incremental Delay (d_2), s/veh		0.1						0.5		0.1	0.0	
Initial Queue Delay (d_3), s/veh		0.0						0.0		0.0	0.0	
Control Delay (*d*), s/veh		24.9						20.7		6.9	4.3	
Level of Service (LOS)		C						C		A	A	
Approach Delay, s/veh / LOS	24.9	C		0.0			20.7	C		6.8	A	
Intersection Delay, s/veh / LOS	10.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.72	B	1.95	B	1.40	A	1.34	A
Bicycle LOS Score / LOS	0.58	A			0.60	A	1.18	A

HCS7 Signalized Intersection Results Summary

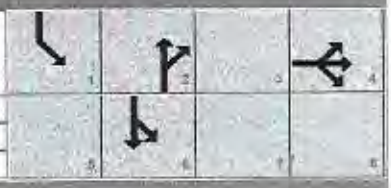
General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	Red Rock & US-395 SB...	File Name	RrSb18aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	117	0	14					14	10	754	46	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.0	25.0	11.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	



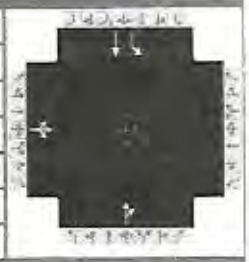
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		12.0				8.3	1.0	4.0
Phase Duration, s		16.0				30.0	29.0	59.0
Change Period, ($Y+R_c$), s		5.0				5.0	5.0	5.0
Max Allow Headway (MAH), s		3.2				0.0	3.1	0.0
Queue Clearance Time (g_s), s		7.8					22.5	
Green Extension Time (g_e), s		0.1				0.0	0.4	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.96					1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (v), veh/h		142						26		820	50	
Adjusted Saturation Flow Rate (s), veh/h/ln		1721						1713		1781	1870	
Queue Service Time (g_s), s		5.8						0.8		20.5	0.6	
Cycle Queue Clearance Time (g_c), s		5.8						0.8		20.5	0.6	
Green Ratio (g/C)		0.15						0.33		0.68	0.72	
Capacity (c), veh/h		252						571		1113	1347	
Volume-to-Capacity Ratio (X)		0.564						0.046		0.736	0.037	
Back of Queue (Q), ft/ln (95 th percentile)		109.8						14.1		256.3	7.2	
Back of Queue (Q), veh/ln (95 th percentile)		4.3						0.6		10.1	0.3	
Queue Storage Ratio (RQ) (95 th percentile)		0.00						0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		29.8						16.9		7.2	3.0	
Incremental Delay (d_2), s/veh		1.8						0.2		2.3	0.1	
Initial Queue Delay (d_3), s/veh		0.0						0.0		0.0	0.0	
Control Delay (d), s/veh		31.6						17.1		9.5	3.1	
Level of Service (LOS)		C						B		A	A	
Approach Delay, s/veh / LOS	31.6	C		0.0			17.1	B		9.1	A	
Intersection Delay, s/veh / LOS	12.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.72	B	1.95	B	1.39	A	1.32	A
Bicycle LOS Score / LOS	0.72	A			0.53	A	1.92	B

HCS7 Signalized Intersection Results Summary

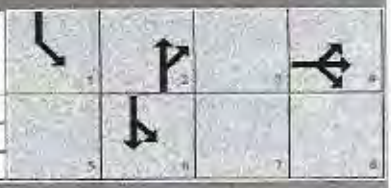
General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	Red Rock & US-395 SB...	File Name	RrSb18pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	75	0	5					62	4	439	30	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.0	21.0	15.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	



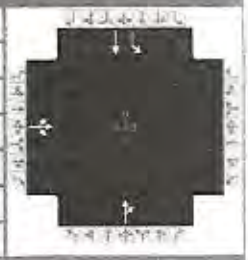
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		12.0				8.3	1.0	4.0
Phase Duration, s		20.0				26.0	29.0	55.0
Change Period, ($Y+R_c$), s		5.0				5.0	5.0	5.0
Max Allow Headway (MAH), s		3.2				0.0	3.1	0.0
Queue Clearance Time (g_s), s		5.2					12.2	
Green Extension Time (g_e), s		0.1				0.0	0.8	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.00					0.01	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (v), veh/h		87						72		477	33	
Adjusted Saturation Flow Rate (s), veh/h/ln		1742						1845		1781	1870	
Queue Service Time (g_s), s		3.2						2.2		10.2	0.4	
Cycle Queue Clearance Time (g_c), s		3.2						2.2		10.2	0.4	
Green Ratio (g/C)		0.20						0.28		0.63	0.67	
Capacity (c), veh/h		348						517		999	1247	
Volume-to-Capacity Ratio (X)		0.250						0.139		0.477	0.026	
Back of Queue (Q), ft/ln (95 th percentile)		57.3						44.2		139.8	6.4	
Back of Queue (Q), veh/ln (95 th percentile)		2.3						1.7		5.5	0.3	
Queue Storage Ratio (RQ) (95 th percentile)		0.00						0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		25.3						20.2		7.3	4.2	
Incremental Delay (d_2), s/veh		0.1						0.6		0.1	0.0	
Initial Queue Delay (d_3), s/veh		0.0						0.0		0.0	0.0	
Control Delay (d), s/veh		25.4						20.8		7.5	4.3	
Level of Service (LOS)		C						C		A	A	
Approach Delay, s/veh / LOS	25.4	C		0.0			20.8	C		7.3	A	
Intersection Delay, s/veh / LOS	11.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.72	B	1.95	B	1.40	A	1.34	A
Bicycle LOS Score / LOS	0.63	A			0.61	A	1.33	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base	Analysis Period	1> 7:00
Intersection	Red Rock & US-395 SB...	File Name	RrSb28ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	170	0	15					20	30	855	50	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.0	25.0	11.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

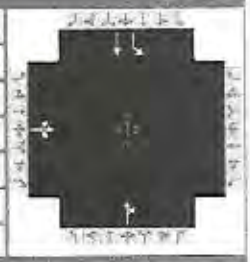
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		12.0				8.3	1.0	4.0
Phase Duration, s		16.0				30.0	29.0	59.0
Change Period, ($Y+R_c$), s		5.0				5.0	5.0	5.0
Max Allow Headway (MAH), s		3.2				0.0	3.1	0.0
Queue Clearance Time (g_s), s		10.4					26.0	
Green Extension Time (g_e), s		0.0				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		1.00					1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (v), veh/h		201						54		929	54	
Adjusted Saturation Flow Rate (s), veh/h/ln		1728						1652		1781	1870	
Queue Service Time (g_s), s		8.4						1.7		24.0	0.6	
Cycle Queue Clearance Time (g_c), s		8.4						1.7		24.0	0.6	
Green Ratio (g/C)		0.15						0.33		0.68	0.72	
Capacity (c), veh/h		253						551		1085	1347	
Volume-to-Capacity Ratio (X)		0.793						0.099		0.856	0.040	
Back of Queue (Q), ft/ln (95 th percentile)		197.8						30.2		348.1	7.9	
Back of Queue (Q), veh/ln (95 th percentile)		7.8						1.2		13.7	0.3	
Queue Storage Ratio (RQ) (95 th percentile)		0.00						0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		30.9						17.2		8.7	3.0	
Incremental Delay (d_2), s/veh		14.6						0.4		6.6	0.1	
Initial Queue Delay (d_3), s/veh		0.0						0.0		0.0	0.0	
Control Delay (d), s/veh		45.5						17.6		15.3	3.1	
Level of Service (LOS)		D						B		B	A	
Approach Delay, s/veh / LOS	45.5	D		0.0			17.6	B		14.6	B	
Intersection Delay, s/veh / LOS	19.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.72	B	1.95	B	1.39	A	1.32	A
Bicycle LOS Score / LOS	0.82	A			0.58	A	2.11	B

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base	Analysis Period	1> 7:00
Intersection	Red Rock & US-395 SB...	File Name	RrSb28px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	60	0	10					60	10	470	30	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.0	21.0	15.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		12.0				8.3	1.0	4.0
Phase Duration, s		20.0				26.0	29.0	55.0
Change Period, (*Y+R c*), s		5.0				5.0	5.0	5.0
Max Allow Headway (*MAH*), s		3.2				0.0	3.1	0.0
Queue Clearance Time (*g s*), s		4.8					13.3	
Green Extension Time (*g e*), s		0.1				0.0	0.9	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.00					0.01	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h		76						76		511	33	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1720						1813		1781	1870	
Queue Service Time (*g s*), s		2.8						2.4		11.3	0.4	
Cycle Queue Clearance Time (*g c*), s		2.8						2.4		11.3	0.4	
Green Ratio (*g/C*)		0.20						0.28		0.63	0.67	
Capacity (*c*), veh/h		344						508		995	1247	
Volume-to-Capacity Ratio (*X*)		0.221						0.150		0.514	0.026	
Back of Queue (*Q*), ft/ln (95 th percentile)		49.8						47.1		154.4	6.4	
Back of Queue (*Q*), veh/ln (95 th percentile)		2.0						1.9		6.1	0.3	
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00						0.00		0.00	0.00	
Uniform Delay (*d 1*), s/veh		25.1						20.3		7.5	4.2	
Incremental Delay (*d 2*), s/veh		0.1						0.6		0.2	0.0	
Initial Queue Delay (*d 3*), s/veh		0.0						0.0		0.0	0.0	
Control Delay (*d*), s/veh		25.2						20.9		7.7	4.3	
Level of Service (LOS)		C						C		A	A	
Approach Delay, s/veh / LOS	25.2	C		0.0			20.9	C		7.5	A	
Intersection Delay, s/veh / LOS	10.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.72	B	1.95	B	1.40	A	1.34	A
Bicycle LOS Score / LOS	0.61	A			0.61	A	1.38	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base + Project	Analysis Period	1> 7:00
Intersection	Red Rock & US-395 SB...	File Name	RrSb28aw.xus		
Project Description					

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	179	0	15					21	30	979	54	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.0	25.0	11.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

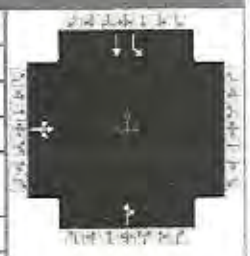
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		12.0				8.3	1.0	4.0
Phase Duration, s		16.0				30.0	29.0	59.0
Change Period, ($Y+R_c$), s		5.0				5.0	5.0	5.0
Max Allow Headway (MAH), s		3.2				0.0	3.1	0.0
Queue Clearance Time (g_s), s		10.6					26.0	
Green Extension Time (g_e), s		0.0				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		1.00					1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (v), veh/h		205						55		1064	59	
Adjusted Saturation Flow Rate (s), veh/h/ln		1736						1656		1781	1870	
Queue Service Time (g_s), s		8.6						1.7		24.0	0.7	
Cycle Queue Clearance Time (g_c), s		8.6						1.7		24.0	0.7	
Green Ratio (g/C)		0.15						0.33		0.68	0.72	
Capacity (c), veh/h		255						552		1084	1347	
Volume-to-Capacity Ratio (X)		0.807						0.100		0.981	0.044	
Back of Queue (Q), ft/ln (95 th percentile)		204.4						30.8		578	8.6	
Back of Queue (Q), veh/ln (95 th percentile)		8.0						1.2		22.8	0.3	
Queue Storage Ratio (RQ) (95 th percentile)		0.00						0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		31.0						17.2		12.0	3.0	
Incremental Delay (d_2), s/veh		16.1						0.4		22.7	0.1	
Initial Queue Delay (d_3), s/veh		0.0						0.0		0.0	0.0	
Control Delay (d), s/veh		47.0						17.6		34.8	3.1	
Level of Service (LOS)		D						B		C	A	
Approach Delay, s/veh / LOS	47.0	D		0.0			17.6	B		33.1	C	
Intersection Delay, s/veh / LOS	34.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.72	B	1.95	B	1.39	A	1.33	A
Bicycle LOS Score / LOS	0.83	A			0.58	A	2.34	B

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base + Project	Analysis Period	1> 7:00
Intersection	Red Rock & US-395 SB...	File Name	RrSb28pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	89	0	10					65	10	549	33	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	24.0	21.0	15.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4				2	1	6
Case Number		12.0				8.3	1.0	4.0
Phase Duration, s		20.0				26.0	29.0	55.0
Change Period, ($Y+R_c$), s		5.0				5.0	5.0	5.0
Max Allow Headway (*MAH*), s		3.2				0.0	3.1	0.0
Queue Clearance Time (g_s), s		6.0					16.1	
Green Extension Time (g_e), s		0.1				0.0	0.9	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.00					0.09	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14					2	12	1	6	
Adjusted Flow Rate (*v*), veh/h		108						82		597	36	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1731						1818		1781	1870	
Queue Service Time (g_s), s		4.0						2.5		14.1	0.5	
Cycle Queue Clearance Time (g_c), s		4.0						2.5		14.1	0.5	
Green Ratio (*g/C*)		0.20						0.28		0.63	0.67	
Capacity (*c*), veh/h		346						509		990	1247	
Volume-to-Capacity Ratio (*X*)		0.311						0.160		0.603	0.029	
Back of Queue (*Q*), ft/ln (95 th percentile)		71.9						50.7		197.9	7.1	
Back of Queue (*Q*), veh/ln (95 th percentile)		2.8						2.0		7.8	0.3	
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00						0.00		0.00	0.00	
Uniform Delay (d_1), s/veh		25.6						20.4		8.1	4.2	
Incremental Delay (d_2), s/veh		0.2						0.7		0.7	0.0	
Initial Queue Delay (d_3), s/veh		0.0						0.0		0.0	0.0	
Control Delay (*d*), s/veh		25.8						21.0		8.8	4.3	
Level of Service (LOS)		C						C		A	A	
Approach Delay, s/veh / LOS	25.8	C		0.0			21.0	C		8.6	A	
Intersection Delay, s/veh / LOS	12.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.72	B	1.95	B	1.40	A	1.34	A
Bicycle LOS Score / LOS	0.67	A			0.62	A	1.53	B

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 NB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 NB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration							LTR			L	T				T	R
Volume (veh/h)						14	0	219		2	119				662	40
Percent Heavy Vehicles (%)						2	2	2		2						
Proportion Time Blocked																
Percent Grade (%)							-2									
Right Turn Channelized														No		
Median Type | Storage				Undivided												

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1	6.5	6.2		4.1						
Critical Headway (sec)						6.72	6.12	6.02		4.12						
Base Follow-Up Headway (sec)						3.5	4.0	3.3		2.2						
Follow-Up Headway (sec)						3.52	4.02	3.32		2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							253			2						
Capacity, c (veh/h)							822			849						
v/c Ratio							0.31			0.00						
95% Queue Length, Q_{95} (veh)							1.3			0.0						
Control Delay (s/veh)							11.3			9.3						
Level of Service (LOS)							B			A						
Approach Delay (s/veh)						11.3				0.2						
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 NB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 NB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration							LTR			L	T				T	R
Volume (veh/h)						8	0	522		26	77				379	76
Percent Heavy Vehicles (%)						2	2	2		2						
Proportion Time Blocked																
Percent Grade (%)							-2									
Right Turn Channelized														No		
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1	6.5	6.2		4.1						
Critical Headway (sec)						6.72	6.12	6.02		4.12						
Base Follow-Up Headway (sec)						3.5	4.0	3.3		2.2						
Follow-Up Headway (sec)						3.52	4.02	3.32		2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							576			28						
Capacity, c (veh/h)							961			1068						
v/c Ratio							0.60			0.03						
95% Queue Length, Q_{95} (veh)							4.1			0.1						
Control Delay (s/veh)							14.2			8.5						
Level of Service (LOS)							B			A						
Approach Delay (s/veh)						14.2				2.1						
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 NB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 NB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration							LTR			L	T				T	R
Volume (veh/h)						14	0	259		2	129				786	66
Percent Heavy Vehicles (%)						2	2	2		2						
Proportion Time Blocked																
Percent Grade (%)						-2										
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1	6.5	6.2		4.1						
Critical Headway (sec)						6.72	6.12	6.02		4.12						
Base Follow-Up Headway (sec)						3.5	4.0	3.3		2.2						
Follow-Up Headway (sec)						3.52	4.02	3.32		2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							297			2						
Capacity, c (veh/h)							796			738						
v/c Ratio							0.37			0.00						
95% Queue Length, Q_{95} (veh)							1.7			0.0						
Control Delay (s/veh)							12.2			9.9						
Level of Service (LOS)							B			A						
Approach Delay (s/veh)						12.2				0.2						
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 NB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 NB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration							LTR			L	T				T	R
Volume (veh/h)						8	0	657		26	111				461	93
Percent Heavy Vehicles (%)						2	2	2		2						
Proportion Time Blocked																
Percent Grade (%)							-2									
Right Turn Channelized														No		
Median Type | Storage				Undivided												

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1	6.5	6.2		4.1						
Critical Headway (sec)						6.72	6.12	6.02		4.12						
Base Follow-Up Headway (sec)						3.5	4.0	3.3		2.2						
Follow-Up Headway (sec)						3.52	4.02	3.32		2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							723			28						
Capacity, c (veh/h)							919			975						
v/c Ratio							0.79			0.03						
95% Queue Length, Q_{95} (veh)							8.3			0.1						
Control Delay (s/veh)							21.7			8.8						
Level of Service (LOS)							C			A						
Approach Delay (s/veh)						21.7				1.7						
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

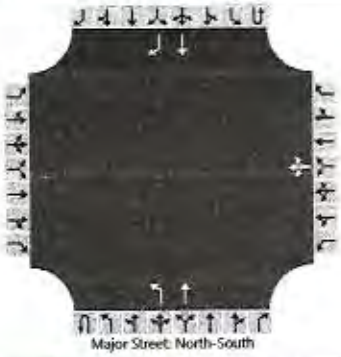
General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 NB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 NB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration							LTR			L	T				T	R
Volume (veh/h)						20	0	255		10	180				885	40
Percent Heavy Vehicles (%)						2	2	2		2						
Proportion Time Blocked																
Percent Grade (%)							-2									
Right Turn Channelized														No		
Median Type | Storage				Undivided												

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1	6.5	6.2		4.1						
Critical Headway (sec)						6.72	6.12	6.02		4.12						
Base Follow-Up Headway (sec)						3.5	4.0	3.3		2.2						
Follow-Up Headway (sec)						3.52	4.02	3.32		2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							299			11						
Capacity, c (veh/h)							674			689						
v/c Ratio							0.44			0.02						
95% Queue Length, Q_{95} (veh)							2.3			0.0						
Control Delay (s/veh)							14.5			10.3						
Level of Service (LOS)							B			B						
Approach Delay (s/veh)						14.5				0.5						
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Base
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 NB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 NB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration							LTR			L	T				T	R
Volume (veh/h)						10	0	795		30	90				490	160
Percent Heavy Vehicles (%)						2	2	2		2						
Proportion Time Blocked																
Percent Grade (%)						-2										
Right Turn Channelized														No		
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1	6.5	6.2		4.1						
Critical Headway (sec)						6.72	6.12	6.02		4.12						
Base Follow-Up Headway (sec)						3.5	4.0	3.3		2.2						
Follow-Up Headway (sec)						3.52	4.02	3.32		2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							875			33						
Capacity, c (veh/h)							940			891						
v/c Ratio							0.93			0.04						
95% Queue Length, Q_{95} (veh)							14.5			0.1						
Control Delay (s/veh)							36.2			9.2						
Level of Service (LOS)							E			A						
Approach Delay (s/veh)						36.2				2.3						
Approach LOS						E										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 NB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 NB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration							LTR			L	T				T	R
Volume (veh/h)						20	0	295		10	190				1009	66
Percent Heavy Vehicles (%)						2	2	2		2						
Proportion Time Blocked																
Percent Grade (%)							-2									
Right Turn Channelized														No		
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1	6.5	6.2		4.1						
Critical Headway (sec)						6.72	6.12	6.02		4.12						
Base Follow-Up Headway (sec)						3.5	4.0	3.3		2.2						
Follow-Up Headway (sec)						3.52	4.02	3.32		2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							342			11						
Capacity, c (veh/h)							644			597						
v/c Ratio							0.53			0.02						
95% Queue Length, Q_{95} (veh)							3.1			0.1						
Control Delay (s/veh)							16.7			11.1						
Level of Service (LOS)							C			B						
Approach Delay (s/veh)						16.7				0.6						
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock/US-395 NB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 NB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration							LTR			L	T				T	R
Volume (veh/h)						10	0	930		30	124				572	177
Percent Heavy Vehicles (%)						2	2	2		2						
Proportion Time Blocked																
Percent Grade (%)							-2									
Right Turn Channelized														No		
Median Type | Storage				Undivided												

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1	6.5	6.2		4.1						
Critical Headway (sec)						6.72	6.12	6.02		4.12						
Base Follow-Up Headway (sec)						3.5	4.0	3.3		2.2						
Follow-Up Headway (sec)						3.52	4.02	3.32		2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							1022			33						
Capacity, c (veh/h)							898			812						
v/c Ratio							1.14			0.04						
95% Queue Length, Q_{95} (veh)							28.8			0.1						
Control Delay (s/veh)							95.1			9.6						
Level of Service (LOS)							F			A						
Approach Delay (s/veh)						95.1				1.9						
Approach LOS						F										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base
Intersection Orientation	North-South
Project Description	Free WB Right

Site Information

Intersection	Red Rock/US-395 NB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 NB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration						LT				L	T				T	R
Volume (veh/h)						20	0			10	180				885	40
Percent Heavy Vehicles (%)						2	2			2						
Proportion Time Blocked																
Percent Grade (%)						-2										
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1	6.5			4.1						
Critical Headway (sec)						6.72	6.12			4.12						
Base Follow-Up Headway (sec)						3.5	4.0			2.2						
Follow-Up Headway (sec)						3.52	4.02			2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						22				11						
Capacity, c (veh/h)						182				689						
v/c Ratio						0.12				0.02						
95% Queue Length, Q_{95} (veh)						0.4				0.0						
Control Delay (s/veh)						27.4				10.3						
Level of Service (LOS)						D				B						
Approach Delay (s/veh)						27.4				0.5						
Approach LOS						D										

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	MSH	Intersection	Red Rock/US-395 NB Ramps
Agency/Co.	Solaegui Engineers	Jurisdiction	Washoe County
Date Performed	2/3/2021	East/West Street	US-395 NB Ramps
Analysis Year	2028	North/South Street	Red Rock Road
Time Analyzed	PM Base	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Free WB Right		

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration						LT				L	T				T	R
Volume (veh/h)						10	0			30	90				490	160
Percent Heavy Vehicles (%)						2	2			2						
Proportion Time Blocked																
Percent Grade (%)						-2										
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1	6.5			4.1						
Critical Headway (sec)						6.72	6.12			4.12						
Base Follow-Up Headway (sec)						3.5	4.0			2.2						
Follow-Up Headway (sec)						3.52	4.02			2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						11				33						
Capacity, c (veh/h)						330				891						
v/c Ratio						0.03				0.04						
95% Queue Length, Q_{95} (veh)						0.1				0.1						
Control Delay (s/veh)						16.3				9.2						
Level of Service (LOS)						C				A						
Approach Delay (s/veh)						16.3				2.3						
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base + Project
Intersection Orientation	North-South
Project Description	Free WB Right

Site Information

Intersection	Red Rock/US-395 NB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 NB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration						LT				L	T				T	R
Volume (veh/h)						20	0			10	190				1009	66
Percent Heavy Vehicles (%)						2	2			2						
Proportion Time Blocked																
Percent Grade (%)						-2										
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1	6.5			4.1						
Critical Headway (sec)						6.72	6.12			4.12						
Base Follow-Up Headway (sec)						3.5	4.0			2.2						
Follow-Up Headway (sec)						3.52	4.02			2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						22				11						
Capacity, c (veh/h)						144				597						
v/c Ratio						0.15				0.02						
95% Queue Length, Q_{95} (veh)						0.5				0.1						
Control Delay (s/veh)						34.4				11.1						
Level of Service (LOS)						D				B						
Approach Delay (s/veh)						34.4				0.6						
Approach LOS						D										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Base + Project
Intersection Orientation	North-South
Project Description	Free WB Right

Site Information

Intersection	Red Rock/US-395 NB Ramps
Jurisdiction	Washoe County
East/West Street	US-395 NB Ramps
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	1
Configuration						LT				L	T				T	R
Volume (veh/h)						10	0			30	124				572	177
Percent Heavy Vehicles (%)						2	2			2						
Proportion Time Blocked																
Percent Grade (%)						-2										
Right Turn Channelized														No		
Median Type | Storage		Undivided														

Critical and Follow-up Headways

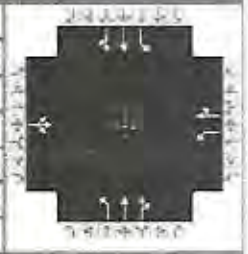
Base Critical Headway (sec)						7.1	6.5			4.1						
Critical Headway (sec)						6.72	6.12			4.12						
Base Follow-Up Headway (sec)						3.5	4.0			2.2						
Follow-Up Headway (sec)						3.52	4.02			2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						11				33						
Capacity, c (veh/h)						271				812						
v/c Ratio						0.04				0.04						
95% Queue Length, Q_{95} (veh)						0.1				0.1						
Control Delay (s/veh)						18.9				9.6						
Level of Service (LOS)						C				A						
Approach Delay (s/veh)						18.9				1.9						
Approach LOS						C										

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Red Rock & Silver Lake	File Name	RrSl18ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	2	2	24	197	12	19	40	221	54	14	451	5

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	26.0	6.0	22.0	0.0	0.0	
Yellow	4.0	4.0	0.0	4.0	0.0	0.0	
Red	1.0	1.0	0.0	1.0	0.0	0.0	

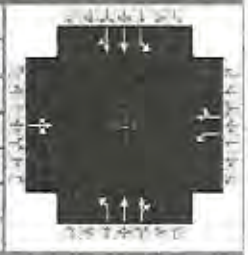
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4	3	8	5	2	1	6
Case Number		8.3	1.0	4.0	1.1	4.0	1.1	4.0
Phase Duration, s		27.0	6.0	33.0	11.0	31.0	11.0	31.0
Change Period, ($Y+R_c$), s		5.0	0.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway (*MAH*), s		3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time (g_s), s		3.0	8.0	3.0	3.1		2.4	
Green Extension Time (g_e), s		0.1	0.0	0.1	0.0	0.0	0.0	0.0
Phase Call Probability		1.00	1.00	1.00	1.00		1.00	
Max Out Probability		0.00	1.00	0.00	1.00		0.32	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		30		214	34		43	147	141	15	248	247
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1579		1781	1664		1781	1870	1741	1781	1870	1861
Queue Service Time (g_s), s		0.0		6.0	1.0		1.1	4.2	4.3	0.4	7.5	7.5
Cycle Queue Clearance Time (g_c), s		1.0		6.0	1.0		1.1	4.2	4.3	0.4	7.5	7.5
Green Ratio (*g/C*)		0.29		0.40	0.37		0.43	0.35	0.35	0.43	0.35	0.35
Capacity (*c*), veh/h		515		625	621		437	648	604	525	648	645
Volume-to-Capacity Ratio (*X*)		0.059		0.343	0.054		0.100	0.226	0.234	0.029	0.383	0.383
Back of Queue (Q), ft/ln (95 th percentile)		16.6		105.1	15.7		18.1	83	80.8	6.2	151.3	150.8
Back of Queue (Q), veh/ln (95 th percentile)		0.7		4.1	0.6		0.7	3.3	3.2	0.2	6.0	5.9
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		19.1		15.5	15.0		13.3	17.4	17.4	12.7	18.5	18.5
Incremental Delay (d_2), s/veh		0.0		0.1	0.0		0.0	0.8	0.9	0.0	1.7	1.7
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		19.1		15.6	15.0		13.3	18.2	18.3	12.7	20.2	20.2
Level of Service (LOS)		B		B	B		B	B	B	B	C	C
Approach Delay, s/veh / LOS	19.1	B		15.5	B		17.6	B		20.0	B	
Intersection Delay, s/veh / LOS	18.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.27	B	1.91	B	1.68	B
Bicycle LOS Score / LOS	0.54	A	0.90	A	0.76	A	0.91	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Red Rock & Silver Lake	File Name	RrSl18px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	15	7	21	77	16	27	68	364	163	28	312	9

Signal Information					EB			WB			NB			SB		
Cycle, s	75.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	6.0	26.0		6.0	22.0	0.0	0.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0		0.0	4.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0		0.0	1.0	0.0	0.0					

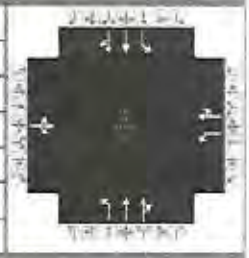
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4	3	8	5	2	1	6
Case Number		8.3	1.0	4.0	1.1	4.0	1.1	4.0
Phase Duration, s		27.0	6.0	33.0	11.0	31.0	11.0	31.0
Change Period, ($Y+R_c$), s		5.0	0.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway (MAH), s		3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time (g_s), s		3.5	4.2	3.4	3.9		2.7	
Green Extension Time (g_e), s		0.1	0.0	0.2	0.0	0.0	0.0	0.0
Phase Call Probability		1.00	1.00	1.00	1.00		1.00	
Max Out Probability		0.00	1.00	0.00	1.00		0.78	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h		47		84	47		74	296	266	30	175	174
Adjusted Saturation Flow Rate (s), veh/h/ln		1547		1781	1659		1781	1870	1645	1781	1870	1848
Queue Service Time (g_s), s		0.0		2.2	1.4		1.9	9.2	9.5	0.7	5.1	5.1
Cycle Queue Clearance Time (g_c), s		1.5		2.2	1.4		1.9	9.2	9.5	0.7	5.1	5.1
Green Ratio (g/C)		0.29		0.40	0.37		0.43	0.35	0.35	0.43	0.35	0.35
Capacity (c), veh/h		519		615	619		499	648	570	403	648	640
Volume-to-Capacity Ratio (X)		0.090		0.136	0.075		0.148	0.456	0.467	0.076	0.270	0.271
Back of Queue (Q), ft/ln (95 th percentile)		25.6		37.8	22		31.3	187.8	171.8	12.6	101.2	100.5
Back of Queue (Q), veh/ln (95 th percentile)		1.0		1.5	0.9		1.2	7.4	6.8	0.5	4.0	4.0
Queue Storage Ratio (RQ) (95 th percentile)		0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		19.3		14.3	15.2		13.2	19.0	19.1	13.4	17.7	17.7
Incremental Delay (d_2), s/veh		0.0		0.0	0.0		0.1	2.3	2.7	0.0	1.0	1.0
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh		19.3		14.3	15.2		13.3	21.3	21.8	13.5	18.7	18.7
Level of Service (LOS)		B		B	B		B	C	C	B	B	B
Approach Delay, s/veh / LOS	19.3	B		14.6	B		20.6	C		18.3	B	
Intersection Delay, s/veh / LOS	19.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.27	B	1.91	B	1.68	B
Bicycle LOS Score / LOS	0.56	A	0.70	A	1.01	A	0.80	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	Red Rock & Silver Lake	File Name	RrSI18aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	2	2	24	197	12	21	40	271	54	20	601	5

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	26.0	6.0	22.0	0.0	0.0	
Yellow	4.0	4.0	0.0	4.0	0.0	0.0	
Red	1.0	1.0	0.0	1.0	0.0	0.0	

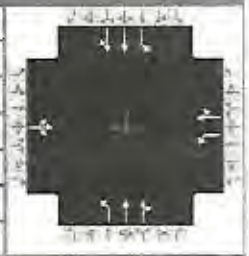
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4	3	8	5	2	1	6
Case Number		8.3	1.0	4.0	1.1	4.0	1.1	4.0
Phase Duration, s		27.0	6.0	33.0	11.0	31.0	11.0	31.0
Change Period, (Y+R c), s		5.0	0.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway (MAH), s		3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time (g s), s		3.0	8.0	3.0	3.1		2.5	
Green Extension Time (g e), s		0.1	0.0	0.1	0.0	0.0	0.0	0.0
Phase Call Probability		1.00	1.00	1.00	1.00		1.00	
Max Out Probability		0.00	1.00	0.00	1.00		0.49	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h		30		214	36		43	174	168	22	330	329
Adjusted Saturation Flow Rate (s), veh/h/ln		1579		1781	1657		1781	1870	1760	1781	1870	1864
Queue Service Time (g s), s		0.0		6.0	1.0		1.1	5.0	5.2	0.5	10.5	10.5
Cycle Queue Clearance Time (g c), s		1.0		6.0	1.0		1.1	5.0	5.2	0.5	10.5	10.5
Green Ratio (g/C)		0.29		0.40	0.37		0.43	0.35	0.35	0.43	0.35	0.35
Capacity (c), veh/h		515		625	618		378	648	610	499	648	646
Volume-to-Capacity Ratio (X)		0.059		0.343	0.058		0.115	0.269	0.276	0.044	0.509	0.509
Back of Queue (Q), ft/ln (95 th percentile)		16.6		105.1	16.7		18.1	100.4	97.7	8.9	210	209.5
Back of Queue (Q), veh/ln (95 th percentile)		0.7		4.1	0.7		0.7	4.0	3.8	0.4	8.3	8.2
Queue Storage Ratio (RQ) (95 th percentile)		0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d 1), s/veh		19.1		15.5	15.1		13.7	17.7	17.7	12.8	19.4	19.4
Incremental Delay (d 2), s/veh		0.0		0.1	0.0		0.0	1.0	1.1	0.0	2.8	2.9
Initial Queue Delay (d 3), s/veh		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh		19.1		15.6	15.1		13.8	18.7	18.8	12.8	22.3	22.3
Level of Service (LOS)		B		B	B		B	B	B	B	C	C
Approach Delay, s/veh / LOS	19.1	B		15.5	B		18.2	B		22.0	C	
Intersection Delay, s/veh / LOS	19.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.27	B	1.91	B	1.68	B
Bicycle LOS Score / LOS	0.54	A	0.90	A	0.81	A	1.05	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	Red Rock & Silver Lake	File Name	RrSI18pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	15	7	21	77	16	34	68	533	163	32	411	9

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	26.0	6.0	22.0	0.0	0.0	
Yellow	4.0	4.0	0.0	4.0	0.0	0.0	
Red	1.0	1.0	0.0	1.0	0.0	0.0	

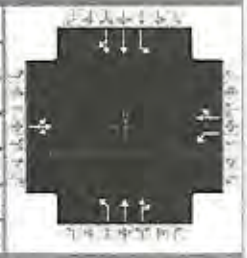
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4	3	8	5	2	1	6
Case Number		8.3	1.0	4.0	1.1	4.0	1.1	4.0
Phase Duration, s		27.0	6.0	33.0	11.0	31.0	11.0	31.0
Change Period, ($Y+R_c$), s		5.0	0.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway (MAH), s		3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time (g_s), s		3.5	4.2	3.6	3.9		2.9	
Green Extension Time (g_e), s		0.2	0.0	0.2	0.0	0.0	0.0	0.0
Phase Call Probability		1.00	1.00	1.00	1.00		1.00	
Max Out Probability		0.00	1.00	0.00	1.00		0.96	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h		47		84	54		74	390	356	35	229	227
Adjusted Saturation Flow Rate (s), veh/h/ln		1544		1781	1644		1781	1870	1696	1781	1870	1853
Queue Service Time (g_s), s		0.0		2.2	1.6		1.9	12.9	13.0	0.9	6.8	6.9
Cycle Queue Clearance Time (g_c), s		1.5		2.2	1.6		1.9	12.9	13.0	0.9	6.8	6.9
Green Ratio (g/C)		0.29		0.40	0.37		0.43	0.35	0.35	0.43	0.35	0.35
Capacity (c), veh/h		518		615	614		452	648	588	343	648	642
Volume-to-Capacity Ratio (X)		0.090		0.136	0.089		0.163	0.602	0.605	0.101	0.353	0.354
Back of Queue (Q), ft/ln (95 th percentile)		25.6		37.8	25.7		31.3	251.3	236.3	14.5	137.5	136.7
Back of Queue (Q), veh/ln (95 th percentile)		1.0		1.5	1.0		1.2	9.9	9.3	0.6	5.4	5.4
Queue Storage Ratio (RQ) (95 th percentile)		0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		19.3		14.3	15.2		13.4	20.2	20.3	14.1	18.2	18.2
Incremental Delay (d_2), s/veh		0.0		0.0	0.0		0.1	4.1	4.6	0.0	1.5	1.5
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh		19.3		14.3	15.3		13.5	24.3	24.8	14.2	19.7	19.8
Level of Service (LOS)		B		B	B		B	C	C	B	B	B
Approach Delay, s/veh / LOS	19.3	B		14.7	B		23.6	C		19.4	B	
Intersection Delay, s/veh / LOS	21.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.27	B	1.91	B	1.68	B
Bicycle LOS Score / LOS	0.56	A	0.72	A	1.16	A	0.89	A

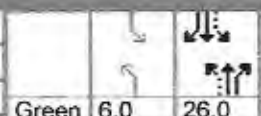
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base	Analysis Period	1> 7:00
Intersection	Red Rock & Silver Lake	File Name	RrSI28ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	10	5	30	240	15	30	40	335	60	55	655	20

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.0	26.0	6.0	22.0	0.0	0.0
Yellow	4.0	4.0	0.0	4.0	0.0	0.0
Red	1.0	1.0	0.0	1.0	0.0	0.0

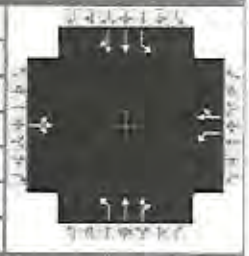
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4	3	8	5	2	1	6
Case Number		8.3	1.0	4.0	1.1	4.0	1.1	4.0
Phase Duration, s		27.0	6.0	33.0	11.0	31.0	11.0	31.0
Change Period, ($Y+R_c$), s		5.0	0.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway (MAH), s		3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time (g_s), s		3.6	8.0	3.4	3.1		3.5	
Green Extension Time (g_e), s		0.1	0.0	0.2	0.0	0.0	0.0	0.0
Phase Call Probability		1.00	1.00	1.00	1.00		1.00	
Max Out Probability		0.00	1.00	0.00	1.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h		49		261	49		43	213	205	60	369	365
Adjusted Saturation Flow Rate (s), veh/h/ln		1564		1781	1648		1781	1870	1768	1781	1870	1846
Queue Service Time (g_s), s		0.0		6.0	1.4		1.1	6.3	6.4	1.5	12.0	12.1
Cycle Queue Clearance Time (g_c), s		1.6		6.0	1.4		1.1	6.3	6.4	1.5	12.0	12.1
Green Ratio (g/C)		0.29		0.40	0.37		0.43	0.35	0.35	0.43	0.35	0.35
Capacity (c), veh/h		518		611	615		354	648	613	465	648	640
Volume-to-Capacity Ratio (X)		0.095		0.427	0.080		0.123	0.329	0.335	0.129	0.569	0.570
Back of Queue (Q), ft/ln (95 th percentile)		26.9		131.9	23		18.1	126.5	122.7	25.2	236.3	234.6
Back of Queue (Q), veh/ln (95 th percentile)		1.1		5.2	0.9		0.7	5.0	4.8	1.0	9.3	9.2
Queue Storage Ratio (RQ) (95 th percentile)		0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		19.3		16.6	15.2		14.0	18.1	18.1	13.3	19.9	19.9
Incremental Delay (d_2), s/veh		0.0		0.2	0.0		0.1	1.4	1.5	0.0	3.6	3.7
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh		19.3		16.7	15.2		14.1	19.4	19.6	13.3	23.5	23.6
Level of Service (LOS)		B		B	B		B	B	B	B	C	C
Approach Delay, s/veh / LOS	19.3	B		16.5	B		19.0	B		22.8	C	
Intersection Delay, s/veh / LOS	20.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.27	B	1.91	B	1.68	B
Bicycle LOS Score / LOS	0.57	A	1.00	A	0.87	A	1.14	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base	Analysis Period	1> 7:00
Intersection	Red Rock & Silver Lake	File Name	RrSI28px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	30	10	20	150	15	70	70	615	200	30	480	10

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	26.0	6.0	22.0	0.0	0.0	
Yellow	4.0	4.0	0.0	4.0	0.0	0.0	
Red	1.0	1.0	0.0	1.0	0.0	0.0	

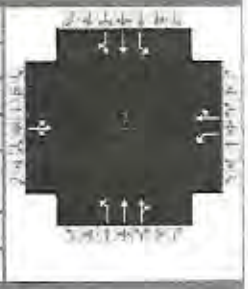
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4	3	8	5	2	1	6
Case Number		8.3	1.0	4.0	1.1	4.0	1.1	4.0
Phase Duration, s		27.0	6.0	33.0	11.0	31.0	11.0	31.0
Change Period, ($Y+R_c$), s		5.0	0.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway (*MAH*), s		3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time (g_s), s		4.1	6.5	4.9	3.9		2.8	
Green Extension Time (g_e), s		0.3	0.0	0.3	0.0	0.0	0.0	0.0
Phase Call Probability		1.00	1.00	1.00	1.00		1.00	
Max Out Probability		0.00	1.00	0.00	1.00		0.87	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		65		163	92		76	440	402	33	267	265
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1478		1781	1603		1781	1870	1708	1781	1870	1854
Queue Service Time (g_s), s		0.1		4.5	2.9		1.9	15.1	15.1	0.8	8.2	8.2
Cycle Queue Clearance Time (g_c), s		2.1		4.5	2.9		1.9	15.1	15.1	0.8	8.2	8.2
Green Ratio (*g/C*)		0.29		0.40	0.37		0.43	0.35	0.35	0.43	0.35	0.35
Capacity (*c*), veh/h		506		604	598		422	648	592	316	648	643
Volume-to-Capacity Ratio (*X*)		0.129		0.270	0.154		0.180	0.679	0.680	0.103	0.412	0.413
Back of Queue (Q), ft/ln (95 th percentile)		36.3		77.3	44.8		32.4	289.8	272.6	13.5	165.6	164.6
Back of Queue (Q), veh/ln (95 th percentile)		1.4		3.0	1.8		1.3	11.4	10.7	0.5	6.5	6.5
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		19.5		15.0	15.6		13.6	20.9	20.9	14.6	18.7	18.7
Incremental Delay (d_2), s/veh		0.0		0.1	0.0		0.1	5.6	6.2	0.1	1.9	2.0
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		19.5		15.1	15.7		13.7	26.6	27.1	14.7	20.6	20.6
Level of Service (LOS)		B		B	B		B	C	C	B	C	C
Approach Delay, s/veh / LOS	19.5	B		15.3	B		25.7	C		20.3	C	
Intersection Delay, s/veh / LOS	22.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.33	B	2.27	B	1.91	B	1.68	B
Bicycle LOS Score / LOS	0.60	A	0.91	A	1.25	A	0.95	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base + Project	Analysis Period	1> 7:00
Intersection	Red Rock & Silver Lake	File Name	RrSl28aw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	5	30	240	15	32	40	385	60	61	805	20

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	26.0	6.0	22.0	0.0	0.0	
Yellow	4.0	4.0	0.0	4.0	0.0	0.0	
Red	1.0	1.0	0.0	1.0	0.0	0.0	

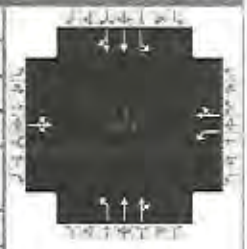
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4	3	8	5	2	1	6
Case Number		8.3	1.0	4.0	1.1	4.0	1.1	4.0
Phase Duration, s		27.0	6.0	33.0	11.0	31.0	11.0	31.0
Change Period, ($Y+R_c$), s		5.0	0.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway (*MAH*), s		3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time (g_s), s		3.6	8.0	3.5	3.1		3.7	
Green Extension Time (g_e), s		0.2	0.0	0.2	0.0	0.0	0.0	0.0
Phase Call Probability		1.00	1.00	1.00	1.00		1.00	
Max Out Probability		0.00	1.00	0.00	1.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		49		261	51		43	241	232	66	451	446
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1564		1781	1644		1781	1870	1779	1781	1870	1851
Queue Service Time (g_s), s		0.0		6.0	1.5		1.1	7.2	7.3	1.7	15.6	15.6
Cycle Queue Clearance Time (g_c), s		1.6		6.0	1.5		1.1	7.2	7.3	1.7	15.6	15.6
Green Ratio (*g/C*)		0.29		0.40	0.37		0.43	0.35	0.35	0.43	0.35	0.35
Capacity (*c*), veh/h		517		611	614		308	648	617	443	648	642
Volume-to-Capacity Ratio (*X*)		0.095		0.427	0.083		0.141	0.371	0.376	0.150	0.695	0.695
Back of Queue (*Q*), ft/ln (95 th percentile)		26.9		131.9	24.1		18.2	145.8	141.6	28	298.9	296.7
Back of Queue (*Q*), veh/ln (95 th percentile)		1.1		5.2	0.9		0.7	5.7	5.6	1.1	11.8	11.7
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		19.3		16.6	15.2		14.8	18.4	18.4	13.4	21.1	21.1
Incremental Delay (d_2), s/veh		0.0		0.2	0.0		0.1	1.6	1.7	0.1	6.1	6.1
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		19.3		16.7	15.2		14.9	20.0	20.2	13.5	27.2	27.2
Level of Service (LOS)		B		B	B		B	C	C	B	C	C
Approach Delay, s/veh / LOS	19.3	B		16.5	B		19.6	B		26.2	C	
Intersection Delay, s/veh / LOS	22.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.29	B	2.27	B	1.91	B	1.68	B
Bicycle LOS Score / LOS	0.57	A	1.00	A	0.91	A	1.28	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base + Project	Analysis Period	1> 7:00
Intersection	Red Rock & Silver Lake	File Name	RrSl28pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	30	10	20	150	15	77	70	784	200	34	579	10

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	26.0	6.0	22.0	0.0	0.0	
Yellow	4.0	4.0	0.0	4.0	0.0	0.0	
Red	1.0	1.0	0.0	1.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4	3	8	5	2	1	6
Case Number		8.3	1.0	4.0	1.1	4.0	1.1	4.0
Phase Duration, s		27.0	6.0	33.0	11.0	31.0	11.0	31.0
Change Period, ($Y+R_c$), s		5.0	0.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway (*MAH*), s		3.3	3.1	3.3	3.1	0.0	3.1	0.0
Queue Clearance Time (g_s), s		4.1	6.5	5.1	3.9		2.9	
Green Extension Time (g_e), s		0.3	0.0	0.3	0.0	0.0	0.0	0.0
Phase Call Probability		1.00	1.00	1.00	1.00		1.00	
Max Out Probability		0.00	1.00	0.00	1.00		1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		65		163	100		76	532	494	37	321	319
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1473		1781	1599		1781	1870	1736	1781	1870	1856
Queue Service Time (g_s), s		0.1		4.5	3.1		1.9	19.5	19.5	0.9	10.2	10.2
Cycle Queue Clearance Time (g_c), s		2.1		4.5	3.1		1.9	19.5	19.5	0.9	10.2	10.2
Green Ratio (*g/C*)		0.29		0.40	0.37		0.43	0.35	0.35	0.43	0.35	0.35
Capacity (*c*), veh/h		504		604	597		384	648	602	272	648	644
Volume-to-Capacity Ratio (*X*)		0.129		0.270	0.168		0.198	0.821	0.821	0.136	0.495	0.496
Back of Queue (*Q*), ft/ln (95 th percentile)		36.3		77.3	48.8		32.4	379.7	361.3	15.4	204.5	203.6
Back of Queue (*Q*), veh/ln (95 th percentile)		1.4		3.0	1.9		1.3	15.0	14.2	0.6	8.1	8.0
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		19.5		15.0	15.7		14.0	22.4	22.4	15.9	19.3	19.3
Incremental Delay (d_2), s/veh		0.0		0.1	0.0		0.1	11.2	11.9	0.1	2.7	2.7
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		19.5		15.1	15.8		14.1	33.5	34.3	16.0	22.0	22.0
Level of Service (LOS)		B		B	B		B	C	C	B	C	C
Approach Delay, s/veh / LOS	19.5	B		15.3	B		32.5	C		21.7	C	
Intersection Delay, s/veh / LOS	26.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.33	B	2.27	B	1.91	B	1.68	B
Bicycle LOS Score / LOS	0.60	A	0.92	A	1.40	A	1.05	A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Red Rock & Moya	File Name	RrMo18ax.xus		
Project Description					

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				216	0	12		76	177	26	214	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	32.0	22.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

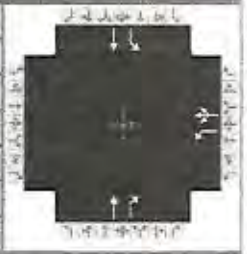
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				10.0		7.3	1.0	4.0
Phase Duration, s				27.0		37.0	11.0	48.0
Change Period, (*Y+R c*), s				5.0		5.0	5.0	5.0
Max Allow Headway (*MAH*), s				3.2		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				10.1			2.6	
Green Extension Time (*g e*), s				0.4		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.00			0.54	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (*v*), veh/h				235	13			83	149	28	233	
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1766	1530			1870	1537	1781	1870	
Queue Service Time (*g s*), s				8.1	0.5			2.0	4.6	0.6	4.5	
Cycle Queue Clearance Time (*g c*), s				8.1	0.5			2.0	4.6	0.6	4.5	
Green Ratio (*g/C*)				0.29	0.29			0.43	0.43	0.53	0.57	
Capacity (*c*), veh/h				518	449			798	656	765	1072	
Volume-to-Capacity Ratio (*X*)				0.453	0.029			0.104	0.227	0.037	0.217	
Back of Queue (*Q*), ft/ln (95 th percentile)				145.2	7			37.5	73.3	8.6	76.3	
Back of Queue (*Q*), veh/ln (95 th percentile)				5.7	0.3			1.5	2.9	0.3	3.0	
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh				21.6	18.9			12.9	13.6	8.4	7.8	
Incremental Delay (*d 2*), s/veh				0.2	0.0			0.3	0.8	0.0	0.5	
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				21.8	18.9			13.2	14.5	8.4	8.3	
Level of Service (LOS)				C	B			B	B	A	A	
Approach Delay, s/veh / LOS	0.0			21.7		C	14.0		B	8.3		A
Intersection Delay, s/veh / LOS	14.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Red Rock & Moya	File Name	RrMo18px.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				246	0	42		244	160	13	107	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	32.0	22.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				10.0		7.3	1.0	4.0
Phase Duration, s				27.0		37.0	11.0	48.0
Change Period, (Y+R c), s				5.0		5.0	5.0	5.0
Max Allow Headway (MAH), s				3.2		0.0	3.1	0.0
Queue Clearance Time (g s), s				11.5			2.3	
Green Extension Time (g e), s				0.5		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.00			0.25	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (v), veh/h				267	46			265	130	14	116	
Adjusted Saturation Flow Rate (s), veh/h/ln				1766	1530			1870	1537	1781	1870	
Queue Service Time (g s), s				9.5	1.6			7.1	4.0	0.3	2.1	
Cycle Queue Clearance Time (g c), s				9.5	1.6			7.1	4.0	0.3	2.1	
Green Ratio (g/C)				0.29	0.29			0.43	0.43	0.53	0.57	
Capacity (c), veh/h				518	449			798	656	608	1072	
Volume-to-Capacity Ratio (X)				0.516	0.102			0.332	0.199	0.023	0.108	
Back of Queue (Q), ft/ln (95 th percentile)				169.8	25.1			136	63.1	4.3	35.4	
Back of Queue (Q), veh/ln (95 th percentile)				6.7	1.0			5.4	2.5	0.2	1.4	
Queue Storage Ratio (RQ) (95 th percentile)				0.00	0.00			0.00	0.00	0.00	0.00	
Uniform Delay (d 1), s/veh				22.1	19.3			14.4	13.5	8.8	7.3	
Incremental Delay (d 2), s/veh				0.4	0.0			1.1	0.7	0.0	0.2	
Initial Queue Delay (d 3), s/veh				0.0	0.0			0.0	0.0	0.0	0.0	
Control Delay (d), s/veh				22.5	19.3			15.5	14.1	8.8	7.5	
Level of Service (LOS)				C	B			B	B	A	A	
Approach Delay, s/veh / LOS	0.0			22.0		C	15.0		B	7.6		A
Intersection Delay, s/veh / LOS	16.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	Red Rock & Moya	File Name	RrMo18aw.xus		
Project Description					

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				216	0	25		128	177	66	370	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	32.0	22.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

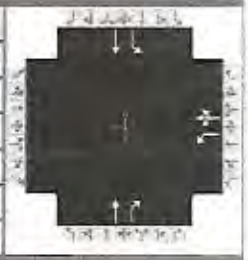
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				10.0		7.3	1.0	4.0
Phase Duration, s				27.0		37.0	11.0	48.0
Change Period, (*Y+R c*), s				5.0		5.0	5.0	5.0
Max Allow Headway (*MAH*), s				3.2		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				10.1			3.5	
Green Extension Time (*g e*), s				0.4		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.00			1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (*v*), veh/h				235	27			139	192	72	402	
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1766	1530			1870	1537	1781	1870	
Queue Service Time (*g s*), s				8.1	1.0			3.5	6.2	1.5	8.8	
Cycle Queue Clearance Time (*g c*), s				8.1	1.0			3.5	6.2	1.5	8.8	
Green Ratio (*g/C*)				0.29	0.29			0.43	0.43	0.53	0.57	
Capacity (*c*), veh/h				518	449			798	656	714	1072	
Volume-to-Capacity Ratio (*X*)				0.453	0.061			0.174	0.293	0.100	0.375	
Back of Queue (*Q*), ft/ln (95 th percentile)				145.2	14.8			65.4	98.1	22.5	148.5	
Back of Queue (*Q*), veh/ln (95 th percentile)				5.7	0.6			2.6	3.9	0.9	5.8	
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh				21.6	19.1			13.3	14.1	8.7	8.7	
Incremental Delay (*d 2*), s/veh				0.2	0.0			0.5	1.1	0.0	1.0	
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				21.8	19.1			13.8	15.2	8.7	9.7	
Level of Service (LOS)				C	B			B	B	A	A	
Approach Delay, s/veh / LOS	0.0			21.5	C		14.6	B		9.6	A	
Intersection Delay, s/veh / LOS	14.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	Existing + Project	Analysis Period	1> 7:00
Intersection	Red Rock & Moya	File Name	RrMo18pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				246	0	86		420	160	39	210	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	32.0	22.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

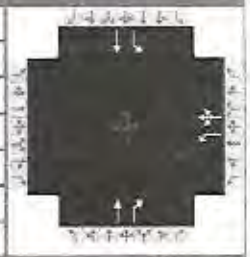
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				10.0		7.3	1.0	4.0
Phase Duration, s				27.0		37.0	11.0	48.0
Change Period, (*Y+Rc*), s				5.0		5.0	5.0	5.0
Max Allow Headway (*MAH*), s				3.2		0.0	3.1	0.0
Queue Clearance Time (g_s), s				11.5			2.9	
Green Extension Time (g_e), s				0.6		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.01			0.96	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (*v*), veh/h				267	93			457	130	42	228	
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1766	1530			1870	1537	1781	1870	
Queue Service Time (g_s), s				9.5	3.4			13.9	4.0	0.9	4.4	
Cycle Queue Clearance Time (g_c), s				9.5	3.4			13.9	4.0	0.9	4.4	
Green Ratio (*g/C*)				0.29	0.29			0.43	0.43	0.53	0.57	
Capacity (*c*), veh/h				518	449			798	656	464	1072	
Volume-to-Capacity Ratio (*X*)				0.516	0.208			0.572	0.199	0.091	0.213	
Back of Queue (*Q*), ft/ln (95 th percentile)				169.8	53.3			253.9	63.1	13.2	74.6	
Back of Queue (*Q*), veh/ln (95 th percentile)				6.7	2.1			10.0	2.5	0.5	2.9	
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh				22.1	19.9			16.3	13.5	10.1	7.8	
Incremental Delay (d_2), s/veh				0.4	0.1			3.0	0.7	0.0	0.5	
Initial Queue Delay (d_3), s/veh				0.0	0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				22.5	20.0			19.3	14.1	10.2	8.2	
Level of Service (LOS)				C	C			B	B	B	A	
Approach Delay, s/veh / LOS	0.0			21.8		C	18.1		B	8.5		A
Intersection Delay, s/veh / LOS	17.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base	Analysis Period	1> 7:00
Intersection	Red Rock & Moya	File Name	RrMo28ax.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				240	0	40		195	180	70	490	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	32.0	22.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				10.0		7.3	1.0	4.0
Phase Duration, s				27.0		37.0	11.0	48.0
Change Period, (*Y+Rc*), s				5.0		5.0	5.0	5.0
Max Allow Headway (*MAH*), s				3.2		0.0	3.1	0.0
Queue Clearance Time (*gs*), s				11.2			3.6	
Green Extension Time (*ge*), s				0.5		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.00			1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (*v*), veh/h				261	43			212	152	76	533	
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1766	1530			1870	1537	1781	1870	
Queue Service Time (*gs*), s				9.2	1.5			5.5	4.7	1.6	12.7	
Cycle Queue Clearance Time (*gc*), s				9.2	1.5			5.5	4.7	1.6	12.7	
Green Ratio (*g/C*)				0.29	0.29			0.43	0.43	0.53	0.57	
Capacity (*c*), veh/h				518	449			798	656	652	1072	
Volume-to-Capacity Ratio (*X*)				0.504	0.097			0.266	0.232	0.117	0.497	
Back of Queue (Q), ft/ln (95 th percentile)				164.3	23.9			104.6	74.9	24	212.5	
Back of Queue (Q), veh/ln (95 th percentile)				6.5	0.9			4.1	2.9	0.9	8.4	
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00	0.00	0.00	0.00	
Uniform Delay (*d1*), s/veh				22.0	19.3			13.9	13.7	8.9	9.5	
Incremental Delay (*d2*), s/veh				0.3	0.0			0.8	0.8	0.0	1.6	
Initial Queue Delay (*d3*), s/veh				0.0	0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				22.3	19.3			14.7	14.5	9.0	11.2	
Level of Service (LOS)				C	B			B	B	A	B	
Approach Delay, s/veh / LOS	0.0			21.9		C	14.6		B	10.9		B
Intersection Delay, s/veh / LOS	14.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base	Analysis Period	1> 7:00
Intersection	Red Rock & Moya	File Name	RrMo28px.xus		
Project Description					

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				290	0	70		535	180	30	230	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	32.0	22.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				10.0		7.3	1.0	4.0
Phase Duration, s				27.0		37.0	11.0	48.0
Change Period, ($Y+R_c$), s				5.0		5.0	5.0	5.0
Max Allow Headway (*MAH*), s				3.2		0.0	3.1	0.0
Queue Clearance Time (g_s), s				13.5			2.7	
Green Extension Time (g_e), s				0.6		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.03			0.65	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (*v*), veh/h				315	76			582	152	33	250	
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1766	1530			1870	1537	1781	1870	
Queue Service Time (g_s), s				11.5	2.8			19.4	4.7	0.7	4.9	
Cycle Queue Clearance Time (g_c), s				11.5	2.8			19.4	4.7	0.7	4.9	
Green Ratio (*g/C*)				0.29	0.29			0.43	0.43	0.53	0.57	
Capacity (*c*), veh/h				518	449			798	656	378	1072	
Volume-to-Capacity Ratio (*X*)				0.608	0.170			0.729	0.232	0.086	0.233	
Back of Queue (*Q*), ft/ln (95 th percentile)				208.4	42.8			344.8	74.9	10.1	83.1	
Back of Queue (*Q*), veh/ln (95 th percentile)				8.2	1.7			13.6	2.9	0.4	3.3	
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh				22.8	19.7			17.9	13.7	11.5	7.9	
Incremental Delay (d_2), s/veh				1.5	0.1			5.8	0.8	0.0	0.5	
Initial Queue Delay (d_3), s/veh				0.0	0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				24.3	19.8			23.7	14.5	11.5	8.4	
Level of Service (LOS)				C	B			C	B	B	A	
Approach Delay, s/veh / LOS	0.0			23.4		C	21.8		C	8.8		A
Intersection Delay, s/veh / LOS	19.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	AM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base + Project	Analysis Period	1> 7:00
Intersection	Red Rock & Moya	File Name	RrMo28aw.xus		
Project Description					

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				240	0	53		247	180	110	646	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	32.0	22.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

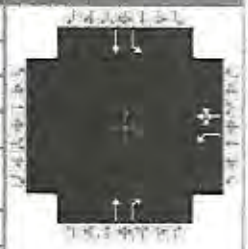
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				10.0		7.3	1.0	4.0
Phase Duration, s				27.0		37.0	11.0	48.0
Change Period, ($Y+R_c$), s				5.0		5.0	5.0	5.0
Max Allow Headway (MAH), s				3.2		0.0	3.1	0.0
Queue Clearance Time (g_s), s				11.2			4.5	
Green Extension Time (g_e), s				0.5		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.00			1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (v), veh/h				261	58			268	152	120	702	
Adjusted Saturation Flow Rate (s), veh/h/ln				1766	1530			1870	1537	1781	1870	
Queue Service Time (g_s), s				9.2	2.1			7.2	4.7	2.5	19.2	
Cycle Queue Clearance Time (g_c), s				9.2	2.1			7.2	4.7	2.5	19.2	
Green Ratio (g/C)				0.29	0.29			0.43	0.43	0.53	0.57	
Capacity (c), veh/h				518	449			798	656	606	1072	
Volume-to-Capacity Ratio (X)				0.504	0.128			0.336	0.232	0.197	0.655	
Back of Queue (Q), ft/ln (95 th percentile)				164.3	32			138	74.9	38.7	302.1	
Back of Queue (Q), veh/ln (95 th percentile)				6.5	1.3			5.4	2.9	1.5	11.9	
Queue Storage Ratio (RQ) (95 th percentile)				0.00	0.00			0.00	0.00	0.00	0.00	
Uniform Delay (d_1), s/veh				22.0	19.5			14.4	13.7	9.4	10.9	
Incremental Delay (d_2), s/veh				0.3	0.0			1.1	0.8	0.1	3.1	
Initial Queue Delay (d_3), s/veh				0.0	0.0			0.0	0.0	0.0	0.0	
Control Delay (d), s/veh				22.3	19.5			15.5	14.5	9.4	14.1	
Level of Service (LOS)				C	B			B	B	A	B	
Approach Delay, s/veh / LOS	0.0			21.8		C	15.2		B	13.4		B
Intersection Delay, s/veh / LOS	15.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Solaegui Engineers			Duration, h	0.250
Analyst	MSH	Analysis Date	Feb 3, 2021	Area Type	Other
Jurisdiction	Washoe County	Time Period	PM Peak Hour	PHF	0.92
Urban Street		Analysis Year	2028 Base + Project	Analysis Period	1> 7:00
Intersection	Red Rock & Moya	File Name	RrMo28pw.xus		
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h				290	0	114		711	180	56	333	

Signal Information			
Cycle, s	75.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.0	32.0	22.0	0.0	0.0	0.0	
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	
Red	1.0	1.0	1.0	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				10.0		7.3	1.0	4.0
Phase Duration, s				27.0		37.0	11.0	48.0
Change Period, (*Y+R c*), s				5.0		5.0	5.0	5.0
Max Allow Headway (*MAH*), s				3.2		0.0	3.1	0.0
Queue Clearance Time (*g s*), s				13.5			3.2	
Green Extension Time (*g e*), s				0.7		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.04			1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3	8	18		2	12	1	6	
Adjusted Flow Rate (*v*), veh/h				315	124			773	152	61	362	
Adjusted Saturation Flow Rate (*s*), veh/h/ln				1766	1530			1870	1537	1781	1870	
Queue Service Time (*g s*), s				11.5	4.7			30.3	4.7	1.2	7.7	
Cycle Queue Clearance Time (*g c*), s				11.5	4.7			30.3	4.7	1.2	7.7	
Green Ratio (*g/C*)				0.29	0.29			0.43	0.43	0.53	0.57	
Capacity (*c*), veh/h				518	449			798	656	255	1072	
Volume-to-Capacity Ratio (*X*)				0.608	0.276			0.968	0.232	0.239	0.338	
Back of Queue (*Q*), ft/ln (95 th percentile)				208.4	72.1			608.6	74.9	19.4	129.8	
Back of Queue (*Q*), veh/ln (95 th percentile)				8.2	2.8			24.0	2.9	0.8	5.1	
Queue Storage Ratio (*RQ*) (95 th percentile)				0.00	0.00			0.00	0.00	0.00	0.00	
Uniform Delay (*d 1*), s/veh				22.8	20.4			21.0	13.7	15.9	8.5	
Incremental Delay (*d 2*), s/veh				1.5	0.1			25.0	0.8	0.2	0.9	
Initial Queue Delay (*d 3*), s/veh				0.0	0.0			0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh				24.3	20.5			46.0	14.5	16.1	9.3	
Level of Service (LOS)				C	C			D	B	B	A	
Approach Delay, s/veh / LOS	0.0			23.2		C	40.9		D	10.3		B
Intersection Delay, s/veh / LOS	29.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Osage
Jurisdiction	Washoe County
East/West Street	Osage Road
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						6		0			83	5		1	238	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							7							1		
Capacity, c (veh/h)							643							1497		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							10.7							7.4		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)					10.7								0.0			
Approach LOS					B											

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Osage
Jurisdiction	Washoe County
East/West Street	Osage Road
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						2		0			289	15		0	124	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							2							0		
Capacity, c (veh/h)							561							1228		
v/c Ratio							0.00							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							11.4							7.9		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)						11.4							0.0			
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Osage
Jurisdiction	Washoe County
East/West Street	Osage Road
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						6		0			148	5		1	434	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							7							1		
Capacity, c (veh/h)							440							1410		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							13.3							7.6		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)						13.3							0.0			
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Osage
Jurisdiction	Washoe County
East/West Street	Osage Road
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						2		0			509	15		0	253	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							2							0		
Capacity, c (veh/h)							337							1002		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							15.8							8.6		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						15.8							0.0			
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Osage
Jurisdiction	Washoe County
East/West Street	Osage Road
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						10		5			200	5		5	465	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							16							5		
Capacity, c (veh/h)							466							1345		
v/c Ratio							0.03							0.00		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							13.0							7.7		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)						13.0								0.1		
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Base
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Osage
Jurisdiction	Washoe County
East/West Street	Osage Road
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						5		5			540	15		5	245	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							11							5		
Capacity, c (veh/h)							390							974		
v/c Ratio							0.03							0.01		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							14.5							8.7		
Level of Service (LOS)							B							A		
Approach Delay (s/veh)						14.5							0.2			
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Osage
Jurisdiction	Washoe County
East/West Street	Osage Road
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						10		5			265	5		5	661	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							16							5		
Capacity, c (veh/h)							332							1267		
v/c Ratio							0.05							0.00		
95% Queue Length, Q_{95} (veh)							0.2							0.0		
Control Delay (s/veh)							16.4							7.9		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						16.4					0.1					
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Osage
Jurisdiction	Washoe County
East/West Street	Osage Road
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						5		5			760	15		5	374	
Percent Heavy Vehicles (%)						2		2						2		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.42		6.22						4.12		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.52		3.32						2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							11							5		
Capacity, c (veh/h)							249							793		
v/c Ratio							0.04							0.01		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							20.1							9.6		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						20.1							0.2			
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Bighorn
Jurisdiction	Washoe County
East/West Street	Bighorn Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		1		25						4	73				207	1
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			28							4						
Capacity, c (veh/h)			807							1341						
v/c Ratio			0.04							0.00						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
Control Delay (s/veh)			9.6							7.7						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)		9.6								0.4						
Approach LOS		A														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Bighorn
Jurisdiction	Washoe County
East/West Street	Bighorn Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		0		5						29	242				105	1
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			5							32						
Capacity, c (veh/h)			937							1472						
v/c Ratio			0.01							0.02						
95% Queue Length, Q_{95} (veh)			0.0							0.1						
Control Delay (s/veh)			8.9							7.5						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)		8.9								1.0						
Approach LOS		A														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Bighorn
Jurisdiction	Washoe County
East/West Street	Bighorn Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		1		25						4	138				403	1
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			28							4						
Capacity, c (veh/h)			610							1120						
v/c Ratio			0.05							0.00						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
Control Delay (s/veh)			11.2							8.2						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		11.2								0.3						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Bighorn
Jurisdiction	Washoe County
East/West Street	Bighorn Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		0		5						29	462				234	1
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			5							32						
Capacity, c (veh/h)			783							1308						
v/c Ratio			0.01							0.02						
95% Queue Length, Q_{95} (veh)			0.0							0.1						
Control Delay (s/veh)			9.6							7.8						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)		9.6								0.7						
Approach LOS		A														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Bighorn
Jurisdiction	Washoe County
East/West Street	Bighorn Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		5		25						5	205				435	5
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			33							5						
Capacity, c (veh/h)			545							1083						
v/c Ratio			0.06							0.01						
95% Queue Length, Q_{95} (veh)			0.2							0.0						
Control Delay (s/veh)			12.0							8.3						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		12.0								0.2						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Bighorn
Jurisdiction	Washoe County
East/West Street	Bighorn Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		5		5						30	505				215	5
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11							33						
Capacity, c (veh/h)			456							1327						
v/c Ratio			0.02							0.02						
95% Queue Length, Q_{95} (veh)			0.1							0.1						
Control Delay (s/veh)			13.1							7.8						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		13.1								0.7						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Bighorn
Jurisdiction	Washoe County
East/West Street	Bighorn Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		5		25						5	270				631	5
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			33							5						
Capacity, c (veh/h)			402							903						
v/c Ratio			0.08							0.01						
95% Queue Length, Q_{95} (veh)			0.3							0.0						
Control Delay (s/veh)			14.7							9.0						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		14.7								0.2						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Bighorn
Jurisdiction	Washoe County
East/West Street	Bighorn Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		5		5						30	725				344	5
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11							33						
Capacity, c (veh/h)			292							1178						
v/c Ratio			0.04							0.03						
95% Queue Length, Q_{95} (veh)			0.1							0.1						
Control Delay (s/veh)			17.8							8.1						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)		17.8								0.7						
Approach LOS		C														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Plata Mesa
Jurisdiction	Washoe County
East/West Street	Plata Mesa Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	1		55	0	0		1	58	15		0	152	0
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			1				60			1				0		
Capacity, c (veh/h)			879				713			1412				1517		
v/c Ratio			0.00				0.08			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.3			0.0				0.0		
Control Delay (s/veh)			9.1				10.5			7.6				7.4		
Level of Service (LOS)			A				B			A				A		
Approach Delay (s/veh)		9.1				10.5				0.1				0.0		
Approach LOS		A				B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Plata Mesa
Jurisdiction	Washoe County
East/West Street	Plata Mesa Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	1		24	0	0		3	177	62		3	82	0
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			1				26			3				3		
Capacity, c (veh/h)			968				621			1505				1304		
v/c Ratio			0.00				0.04			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.1			0.0				0.0		
Control Delay (s/veh)			8.7				11.1			7.4				7.8		
Level of Service (LOS)			A				B			A				A		
Approach Delay (s/veh)		8.7				11.1				0.1				0.3		
Approach LOS		A				B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Plata Mesa
Jurisdiction	Washoe County
East/West Street	Plata Mesa Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	1		55	0	0		1	123	15		0	348	0
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			1				60			1				0		
Capacity, c (veh/h)			668				463			1179				1430		
v/c Ratio			0.00				0.13			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.4			0.0				0.0		
Control Delay (s/veh)			10.4				13.9			8.1				7.5		
Level of Service (LOS)			B				B			A				A		
Approach Delay (s/veh)		10.4				13.9				0.1				0.0		
Approach LOS		B				B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Plata Mesa
Jurisdiction	Washoe County
East/West Street	Plata Mesa Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	1		24	0	0		3	397	62		3	211	0
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			1				26			3				3		
Capacity, c (veh/h)			809				347			1338				1064		
v/c Ratio			0.00				0.08			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.2			0.0				0.0		
Control Delay (s/veh)			9.5				16.2			7.7				8.4		
Level of Service (LOS)			A				C			A				A		
Approach Delay (s/veh)		9.5				16.2				0.1				0.1		
Approach LOS		A				C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Plata Mesa
Jurisdiction	Washoe County
East/West Street	Plata Mesa Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	0	5		55	0	5		5	190	15		5	380	5
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11				65			5				5		
Capacity, c (veh/h)			471				391			1140				1345		
v/c Ratio			0.02				0.17			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.1				0.6			0.0				0.0		
Control Delay (s/veh)			12.8				16.0			8.2				7.7		
Level of Service (LOS)			B				C			A				A		
Approach Delay (s/veh)		12.8				16.0				0.2				0.1		
Approach LOS		B				C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Base
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Plata Mesa
Jurisdiction	Washoe County
East/West Street	Plata Mesa Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	0	5		25	0	5		5	440	65		5	190	5
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11				33			5				5		
Capacity, c (veh/h)			465				348			1357				1020		
v/c Ratio			0.02				0.09			0.00				0.01		
95% Queue Length, Q_{95} (veh)			0.1				0.3			0.0				0.0		
Control Delay (s/veh)			12.9				16.4			7.7				8.5		
Level of Service (LOS)			B				C			A				A		
Approach Delay (s/veh)		12.9				16.4				0.1				0.3		
Approach LOS		B				C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Plata Mesa
Jurisdiction	Washoe County
East/West Street	Plata Mesa Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	0	5		55	0	5		5	255	15		5	576	5
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11				65			5				5		
Capacity, c (veh/h)			320				253			950				1267		
v/c Ratio			0.03				0.26			0.01				0.00		
95% Queue Length, Q_{95} (veh)			0.1				1.0			0.0				0.0		
Control Delay (s/veh)			16.6				24.1			8.8				7.9		
Level of Service (LOS)			C				C			A				A		
Approach Delay (s/veh)		16.6				24.1				0.2				0.1		
Approach LOS		C				C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Plata Mesa
Jurisdiction	Washoe County
East/West Street	Plata Mesa Drive
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	0	5		25	0	5		5	660	65		5	319	5
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11				33			5				5		
Capacity, c (veh/h)			282				214			1206				831		
v/c Ratio			0.04				0.15			0.00				0.01		
95% Queue Length, Q_{95} (veh)			0.1				0.5			0.0				0.0		
Control Delay (s/veh)			18.3				24.9			8.0				9.4		
Level of Service (LOS)			C				C			A				A		
Approach Delay (s/veh)		18.3				24.9				0.1				0.2		
Approach LOS		C				C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Silver Knolls
Jurisdiction	Washoe County
East/West Street	Silver Knolls Boulevard
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	1		16	0	0		1	38	2		0	110	0
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			1				17			1				0		
Capacity, c (veh/h)			931				798			1467				1564		
v/c Ratio			0.00				0.02			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.1			0.0				0.0		
Control Delay (s/veh)			8.9				9.6			7.5				7.3		
Level of Service (LOS)			A				A			A				A		
Approach Delay (s/veh)		8.9				9.6				0.2				0.0		
Approach LOS		A				A										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Silver Knolls
Jurisdiction	Washoe County
East/West Street	Silver Knolls Boulevard
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	1		10	0	0		0	133	5		0	61	0
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			1				11			0				0		
Capacity, c (veh/h)			997				741			1534				1430		
v/c Ratio			0.00				0.01			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.0			0.0				0.0		
Control Delay (s/veh)			8.6				9.9			7.3				7.5		
Level of Service (LOS)			A				A			A				A		
Approach Delay (s/veh)		8.6				9.9				0.0				0.0		
Approach LOS		A				A										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Silver Knolls
Jurisdiction	Washoe County
East/West Street	Silver Knolls Boulevard
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	1		16	0	0		1	103	2		0	306	0
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			1				17			1				0		
Capacity, c (veh/h)			709				519			1226				1474		
v/c Ratio			0.00				0.03			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.1			0.0				0.0		
Control Delay (s/veh)			10.1				12.2			7.9				7.4		
Level of Service (LOS)			B				B			A				A		
Approach Delay (s/veh)		10.1				12.2				0.1				0.0		
Approach LOS		B				B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
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Time Analyzed	PM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Silver Knolls
Jurisdiction	Washoe County
East/West Street	Silver Knolls Boulevard
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	1		10	0	0		0	353	5		0	190	0
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			1				11			0				0		
Capacity, c (veh/h)			833				416			1364				1168		
v/c Ratio			0.00				0.03			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.1			0.0				0.0		
Control Delay (s/veh)			9.3				13.9			7.6				8.1		
Level of Service (LOS)			A				B			A				A		
Approach Delay (s/veh)		9.3				13.9				0.0				0.0		
Approach LOS		A				B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
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Site Information

Intersection	Red Rock & Silver Knolls
Jurisdiction	Washoe County
East/West Street	Silver Knolls Boulevard
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	0	5		15	0	5		5	105	5		5	325	5
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11				22			5				5		
Capacity, c (veh/h)			563				542			1199				1467		
v/c Ratio			0.02				0.04			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.1				0.1			0.0				0.0		
Control Delay (s/veh)			11.5				11.9			8.0				7.5		
Level of Service (LOS)			B				B			A				A		
Approach Delay (s/veh)		11.5				11.9				0.4				0.1		
Approach LOS		B				B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Base
Intersection Orientation	North-South
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Site Information

Intersection	Red Rock & Silver Knolls
Jurisdiction	Washoe County
East/West Street	Silver Knolls Boulevard
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	0	5		10	0	5		5	325	5		5	145	5
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11				16			5				5		
Capacity, c (veh/h)			592				505			1414				1199		
v/c Ratio			0.02				0.03			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.1				0.1			0.0				0.0		
Control Delay (s/veh)			11.2				12.4			7.6				8.0		
Level of Service (LOS)			B				B			A				A		
Approach Delay (s/veh)		11.2				12.4				0.1				0.3		
Approach LOS		B				B										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Silver Knolls
Jurisdiction	Washoe County
East/West Street	Silver Knolls Boulevard
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	0	5		15	0	5		5	170	5		5	521	5
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11				22			5				5		
Capacity, c (veh/h)			387				365			1000				1382		
v/c Ratio			0.03				0.06			0.01				0.00		
95% Queue Length, Q_{95} (veh)			0.1				0.2			0.0				0.0		
Control Delay (s/veh)			14.6				15.5			8.6				7.6		
Level of Service (LOS)			B				C			A				A		
Approach Delay (s/veh)		14.6				15.5				0.3				0.1		
Approach LOS		B				C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	PM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Silver Knolls
Jurisdiction	Washoe County
East/West Street	Silver Knolls Boulevard
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	0	5		10	0	5		5	545	5		5	274	5
Percent Heavy Vehicles (%)		2	2	2		2	2	2		2				2		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.12	6.52	6.22		7.12	6.52	6.22		4.12				4.12		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.52	4.02	3.32		3.52	4.02	3.32		2.22				2.22		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			11				16			5				5		
Capacity, c (veh/h)			369				298			1257				978		
v/c Ratio			0.03				0.05			0.00				0.01		
95% Queue Length, Q_{95} (veh)			0.1				0.2			0.0				0.0		
Control Delay (s/veh)			15.0				17.8			7.9				8.7		
Level of Service (LOS)			C				C			A				A		
Approach Delay (s/veh)		15.0				17.8				0.1				0.2		
Approach LOS		C				C										

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	AM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Silver Hills
Jurisdiction	Washoe County
East/West Street	Silver Hills Parkway
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		4		196						65	38				110	2
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			217							71						
Capacity, c (veh/h)			922							1464						
v/c Ratio			0.24							0.05						
95% Queue Length, Q_{95} (veh)			0.9							0.2						
Control Delay (s/veh)			10.1							7.6						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		10.1								4.8						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

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Date Performed	2/3/2021
Analysis Year	2021
Time Analyzed	PM Existing + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Silver Hills
Jurisdiction	Washoe County
East/West Street	Silver Hills Parkway
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		3		129						220	133				61	5
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			143							239						
Capacity, c (veh/h)			953							1527						
v/c Ratio			0.15							0.16						
95% Queue Length, Q_{95} (veh)			0.5							0.6						
Control Delay (s/veh)			9.4							7.8						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)		9.4								4.9						
Approach LOS		A														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
Agency/Co.	Solaegui Engineers
Date Performed	2/3/2021
Analysis Year	2028
Time Analyzed	AM Base + Project
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Silver Hills
Jurisdiction	Washoe County
East/West Street	Silver Hills Parkway
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		4		196						65	115				335	2
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			217							71						
Capacity, c (veh/h)			671							1191						
v/c Ratio			0.32							0.06						
95% Queue Length, Q_{95} (veh)			1.4							0.2						
Control Delay (s/veh)			12.9							8.2						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		12.9								3.0						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

General Information

Analyst	MSH
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Date Performed	2/3/2021
Analysis Year	2028
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Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Red Rock & Silver Hills
Jurisdiction	Washoe County
East/West Street	Silver Hills Parkway
North/South Street	Red Rock Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		3		129						220	335				155	5
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			143							239						
Capacity, c (veh/h)			817							1401						
v/c Ratio			0.18							0.17						
95% Queue Length, Q_{95} (veh)			0.6							0.6						
Control Delay (s/veh)			10.3							8.1						
Level of Service (LOS)			B							A						
Approach Delay (s/veh)		10.3								3.2						
Approach LOS		B														