



N E V A D A

AGENDA
Regular Meeting
Planning Commission

Wednesday, November 9, 2022 • 5:00 PM

Members

Barry Williams Sr. - Chairman
Cody Wagner - Vice Chair
Jan Hodges - Commissioner
Humayoon Lodhi - Commissioner
Angela Lewis - Commissioner
Shellie Severa - Commissioner
Jenni McCullar - Commissioner

Fernley City Council Chambers, 595 Silver Lace Boulevard, Fernley, NV 89408

Zoom information:

Please click the following link to join the webinar: <https://us02web.zoom.us/j/82966343247>, or one tap/mobile: 12532158782, Dial: 669 900 9128, Webinar ID: 829 6634 3247

Public Notice: This agenda has been physically posted in compliance with 241.020 at Fernley City Hall, 595 Silver Lace Blvd. In addition, this agenda has been electronically posted in compliance with NRS 241.020(3) at www.cityoffernley.org and NRS 232.2175 at <https://notice.nv.gov/> To obtain further documentation regarding posting, please contact the City Clerk's Office at (775) 784-9830 or cityclerk@cityoffernley.org

Public Comment: Those wishing to address the Planning Commission may submit public comment through the online public comment form found at <https://www.cityoffernley.org/forms>, or by sending an email to cityclerk@cityoffernley.org. Comments received prior to 4:00 pm the day of the meeting will be provided to the Planning Commission and added to the record but will not be read during the live meeting. Public comments received after 4 pm the day of the meeting will be included in the record but may not reach commissioners before action is taken. Public comment, whether on action items or public comment, is limited to three (3) minutes per person. Unused time may not be reserved by the speaker, nor allocated to another speaker. The public may comment on any matter that is not specifically included on an agenda as an action item or comment on a specific agenda item. Items not included on the agenda cannot be acted upon other than to place them on a future agenda. Additionally, if you wish you can comment in person at the meeting or use the Raise your Hand feature in Zoom (*9 if you are participating via phone).

Accommodations: The Planning Commission and staff will make reasonable efforts to assist and accommodate individuals with disabilities desiring to attend the meeting. Please contact the City Clerk's Office at (775) 784-9830 in advance so that arrangements can be made.

Supporting Material: Staff reports and supporting material for the meeting are available at the City Clerk's Office, and on the City's website at www.cityoffernley.org. Pursuant to NRS 241.020(6), supporting material is made available to the general public at the same time it is provided to the Planning Commission.

Order of Business: The presiding officer shall determine the order of the agenda. The Fernley Planning Commission may combine two or more agenda items for consideration; remove an item from the agenda; or delay discussion relating to an item on the agenda at any time. All items are action items unless otherwise noted. Items scheduled to be heard at a specific time will be heard no earlier than the stated time but may be heard later.

1. INTRODUCTORY ITEMS

1.1. Roll Call

1.2. Public Forum

1.3. (For Possible Action) Approval of Agenda

1.4. (For Possible Action) Approval of Minutes

2. PUBLIC HEARINGS

2.1. Public Hearing, DA22002 – Development Amendment for Sherwood Villages

Discussion and possible action authorizing the City of Fernley to enter into a Development Agreement (DA22002) with Fernley Sherwood QOZB, LLC regarding the details of 316 multi-family residential units on a site ±26.25-acres in size and generally located north of Fremont Street, south of US Interstate 80, west of Wildwood Drive, and east of Vine Street, Fernley, NV (APNs: 021-092-23, 021-092-26, 021-092-27, 021-092-46, 021-092-47, 021-092-54, and 021-092-55).

2.2. Public Hearing, DA22003 – Clements Ranch (FOR POSSIBLE ACTION)

Discussion and possible action authorizing the City of Fernley to enter into a Development Agreement (DA22003) with Clements Family 1992 Trust to enter into a Development Agreement on a 83.90 acre parcel. The DA is associated with Master Plan Amendment MPA22003 and Zoning Map Amendment ZMA22008.

2.3. Public Hearing, TSM22007 - Tentative Subdivision Map for Duets at Red Hawk Ranch

Consideration and possible action on a Tentative Subdivision Map request to allow for the development of a 282 lot single-family attached subdivision named "Duets at Red Hawk Ranch" on a site ±31.15 acres in size and generally located at the southwest corner of the Miller Lane and Main Street intersection (APN: 021-041-09) by request of Paradiso Communities.

3. CHAIR AND COMMISSION ITEMS

4. PLANNING ITEMS

5. ADDRESS REQUEST(S) FOR FUTURE AGENDA ITEMS

6. PUBLIC FORUM

7. ADJOURNMENT

Next Meeting: December 14, 2022 at 5 pm

**MINUTES OF THE
FERNLEY PLANNING COMMISSION MEETING
OCTOBER 12, 2022**

Planning Commission Vice Chair Wagner called the meeting to order at 5:00 PM.

1. INTRODUCTORY ITEMS

1.1. Roll Call

Present: Planning Commissioner Hodges, Planning Commissioner Severa, Planning Commission Vice-Chair Wagner, Commissioner McCullar, Planning Commissioner Lodhi, City Attorney Brandi Jensen, Deputy City Clerk Brenda Gosser, Planning Association Shay League, Administrative Specialist Bailie Scott, and Development Services Coordinator Alex Lopez-Martinez. **Absent:** Planning Commissioner Lewis, Planning Commission Chairman Williams.

1.2. Public Forum

Planning Commission Vice Chair Wagner opened public forum.
No comments were brought forward at that time.
The public forum was closed.

1.3. (For Possible Action) Approval of Agenda

Motion: MOVE TO APPROVE THE OCTOBER 12, 2022 FERNLEY PLANNING COMMISSION AGENDA. **Action:** Approve, **Moved by:** Planning Commissioner Shellie Severa, **Seconded by:** Planning Commissioner Lodhi. **Vote:** Passed, **Summary:** Yes 5, Absent 2. **Yes:** Planning Commissioner Hodges, Planning Commissioner Severa, Planning Commissioner McCullar, Planning Commission Vice-Chair Wagner, Planning Commissioner Lodhi. **Absent:** Planning Commissioner Lewis, Planning Commission Chairman Williams.

1.4. (For Possible Action) Approval of Minutes

Motion: MOVE TO APPROVE THE SEPTEMBER 14, 2022 FERNLEY PLANNING COMMISSION MINUTES. **Action:** Approve, **Moved by:** Planning Commissioner Lodhi, **Seconded by:** Planning Commissioner Hodges. **Vote:** Passed, **Summary:** Yes 5, Absent 2. **Yes:** Planning Commissioner Hodges, Planning Commissioner Severa, Planning Commissioner McCullar, Planning Commission Vice-Chair Wagner, Planning Commissioner Lodhi. **Absent:** Planning Commissioner Lewis, Planning Commission Chairman Williams.

2. PUBLIC HEARINGS

2.1. CUP21005-EXT Extension. Consideration and possible action on a request from Falcon Peak Properties LLC to grant a 1-year extension for a Conditional Use Permit to allow for the development of a 91 guest-room full-service hotel on a site approximately 1.85 acres in size within the C2 (General Commercial) zoning district, generally located north of Mesa Drive, west of Main Street, and south of

Interstate 80. (APN: 021-061-31)

Associate Planner, Shay League, presented an overview of the project. The applicant is requesting an extension of the project for 1 year. The applicant will need to make substantial progress within a year.

Planning Commission Vice Chair Wagner opened a public forum.
No comments were presented at that time.
The public forum closed.

Motion: MOVE TO APPROVE THE CONDITIONAL USE PERMIT ASSOCIATED WITH CUP21005, ADOPTING FINDINGS CU1 THROUGH CU6 AND THE FACTS SUPPORTING THESE FINDINGS AS SET FORTH IN THE STAFF REPORT AND SUBJECT TO THE CONDITIONS OF APPROVAL 1 THROUGH 34 AS LISTED IN THE STAFF REPORT. **Action:** Approve, **Moved by:** Planning Commissioner Jan Hodges, **Seconded by:** Planning Commissioner Humayoon Lodhi. **Vote:** Passed, **Summary:** Yes 5, Absent 2. **Yes:** Planning Commissioner Hodges, Planning Commissioner Severa, Planning Commissioner McCullar, Planning Commission Vice-Chair Wagner, Planning Commissioner Lodhi, **No:** None, **Absent:** Planning Commissioner Lewis, Planning Commission Chairman Williams.

3. CHAIR AND COMMISSION ITEMS

City Attorney, Brandi Jensen, is coordinating a series of training sessions. There will be 3 trainings with the first one being held on 12/2/22 at 4 PM, and will be held before the December City Council meetings.

4. PLANNING ITEMS

Associate Planner Shay League reported the Clements Ranch project will not come back to the Planning Commission. This project will be presented to City Council. Next month's meeting has a very heavy schedule.

5. ADDRESS REQUEST(S) FOR FUTURE AGENDA ITEMS

There were no requests for future agenda items.

6. PUBLIC FORUM

Planning Commission Vice Chair Wagner opened a public forum.
No comments were brought forward at that time.
The public forum was closed.

7. ADJOURNMENT

There being no further business to come before it, the Fernley Planning Commission meeting adjourned at 05:13 PM.

Next meeting 10/9/22 @ 5PM.

Approved by the Fernley Planning Commission on October 9, 2022, by a vote of:

AYES _____ NAYS: _____ ABSTENTIONS: _____
ABSENT: _____

Planning Commission Chair Barry Williams

ATTEST:



CITY OF FERNLEY

Planning Commission AGENDA REPORT

Meeting Date: November 9, 2022

REPORT TO: Fernley Planning Commission

REPORT FROM: Shay League

FINANCIAL IMPACT:

Yes: No: X

CURRENTLY BUDGETED:

Yes: No: X

FUND/ACCOUNT:

N/A

ACTION REQUESTED: Motion

AGENDA ITEM: (For Possible Action):

Public Hearing, DA22002 – Development Amendment for Sherwood Villages
Discussion and possible action authorizing the City of Fernley to enter into a Development Agreement (DA22002) with Fernley Sherwood QOZB, LLC regarding the details of 316 multi-family residential units on a site ±26.25-acres in size and generally located north of Fremont Street, south of US Interstate 80, west of Wildwood Drive, and east of Vine Street, Fernley, NV (APNs: 021-092-23, 021-092-26, 021-092-27, 021-092-46, 021-092-47, 021-092-54, and 021-092-55).

AGENDA ITEM BRIEF:

This development agreement is primarily intended to establish 3 distinct phases for the construction of the site and related civil improvements.

RECOMMENDED MOTION:

“I move to forward a recommendation of approval to the City Council for the Development Agreement associated with case number DA22002, based on the analysis and findings as listed in the staff report.”

BUSINESS IMPACT (per NRS Chapter 237):

A Business Impact Statement is not required because this is not a rule (term excludes vehicles by which legislative powers are exercised under NRS Chapters 271, 278, 278A, or 278B).

See attached report for background, analysis, alternatives.

ALTERNATIVES:

“Based on information received in written materials and at the public hearing on this matter, I move to forward a recommendation of denial to the City Council for the Development Agreement associated with case number DA22002.”

Note: Though no further motion language has been provided, any motion appropriate under City of Fernley Planning Commission parliamentary procedure is acceptable.

BACKGROUND:

In 2005, the City Council approved a Zoning Map Amendment for the initial Sherwood project. The zoning was changed from RR1/T (Rural Residential, 1-acre minimum with Trailer overlay) to E1 (Estate Residential, 12,000 square feet minimum lot size). On September 20, 2006, the City Council approved a Tentative Subdivision Map request for a 71-lot single family residential subdivision. The approval eventually lapsed.

On July 20, 2016, the City Council approved a new Tentative Subdivision Map to allow for a 69-lot single family residential subdivision. This approval has also since lapsed.

In 2018, the city’s comprehensive master plan was updated and shows a current land use of Mixed-Residential (MR). To bring the property’s zoning into conformance with the Master Plan land use, a Zoning Map Amendment request (ZMA20003) to change the zoning to MDR14 (Medium Density Residential, 14 dwelling units per acre maximum) was approved by the City Council on September 16, 2020.

On May 12, 2021, Planning Commission approved a conditional use permit to allow for the construction of a maximum of 320 multi-family residential units. On May 11, 2022, Planning Commission approved a one-year extension of this conditional use permit, which now expires May 12, 2023, and cannot be removed.

ANALYSIS

This development agreement is primarily intended to establish 3 distinct phases for the construction of the site and related civil improvements. Regarding the completion of infrastructure improvements deemed necessary to support this project, Fernley Municipal Code Section 32.13.030 requires that “before a final subdivision map, final parcel map or final division map for division of land into large parcels is signed by the city, or before a final certificate of occupancy is issued for a new development project, all required improvements ... must be completed by the developer and approved by the city”. This development agreement allows the developer to complete those improvements throughout the construction of the project instead of before the final map can be recorded. In exchange the developer is agreeing to the eventual improvement of both sides of Fremont street from the western boundary of their property to 95A, with the exception of any sections already improved upon by the Fremont apartments project.

FINDINGS

Approval Criteria

DA1. The development agreement must be consistent with the City’s Master Plan.

The City of Fernley Comprehensive Master Plan land use category of this site is Suburban Mixed Use (SMU). This land use is intended to have the following characteristics and location:

- Encourages a broad mix of uses including high-density residential in a suburban context within close proximity to services and employment
- Allows for vertical or horizontal mixing of uses on sites
- Should be connected to adjacent uses through a system of sidewalks and trails

- Primarily located near downtown core and highly encouraged along Main Street
- Municipal services are required

Any given site does not need to meet all these characteristics in order to be considered consistent with the City's Master Plan. This site embodies 3-4 out of 5 of these characteristics. First, it is an excellent example of high-density residential in a suburban context and is very near most of the City of Fernley's existing commercial development. Second, the developer has agreed to install sidewalks from the western border of their development to the improvements already agreed upon by the developer of the Fremont apartments. This will connect the project to adjacent uses via sidewalk, but it will also connect the existing neighbors. Third, this is infill development and municipal services are already available to this property. The fourth characteristic is arguable. Spatially, this project is very near our downtown core, but it is cut off from that core due to the railroad tracks south of the project site. As the City of Fernley works to integrate the northwest and southwest section of our city across that barrier, this location would be a natural extension of the downtown core.

Finally, the agreement itself spells out which of the City's goals and action strategies it supports. They are as follows:

Population, Housing, and Employment

HP.1.1 Enhance Fernley's vitality as a community by providing a variety of housing types, density and costs that accommodate the needs, desires, and financial abilities of the current and future households.

HP.1.2 Encourage housing that supports sustainable development patterns by promoting the efficient use of land, conservation of natural resources, easy access to services and public facilities such as parks, and resource efficient design and construction.

HP.1.3 Strive for viable mixed income neighborhoods throughout Fernley that collectively reflect the diversity of housing types and tenure (rental and ownership).

HP.1.4 Provide opportunities for high-density residential development near the downtown core and elsewhere in the community where appropriate.

Land Use

LU.1.1 Encourage and plan for new development in areas where adequate public services and facilities can be provided efficiently.

LU.1.2 Encourage new development to be in accordance with the Comprehensive Master Plan land use category, and other land use controls to accomplish community principles.

LU.1.5 Promote infill development.

DA2. The development agreement must be otherwise consistent with Nevada and federal law.

Staff certifies that they have examined this document and found no inconsistencies with Nevada or federal law.

RELEVANT LAWS, STATUTES, AND REGULATIONS:

- Nevada Revised Statutes, Chapter 278 – Planning and Zoning
- Fernley Municipal Code, Title 32 – Development Code
 - Specific section of note (though all sections are applicable):

Fernley Municipal Code, Section 32.03.100 (a) – Development agreements

FINANCIAL IMPLICATIONS:

N/A

ATTACHMENTS:

1. Draft Development Agreement

DRAFT AGREEMENT FOR DISCUSSION PURPOSES ONLY

When recorded, mail to:

City Clerk
City of Fernley
595 Silver Lace Boulevard
Fernley, NV 89408

DEVELOPMENT AGREEMENT

ARTICLE 1. PARTIES, DEFINITIONS AND PROPERTY DESCRIPTIONS.

This Development Agreement (“**Agreement**”) is by and between:

“Developer” FERNLEY SHERWOOD QOZB, LLC,
a Delaware limited liability company
3522 S. Emerson St.
Englewood, CO 80113
Email: matt@vertexcolorado.com

“City” City of Fernley,
a Nevada municipal corporation
595 Silver Lace Boulevard
Fernley, NV 89408
Email: pmarsh@cityoffernley.org

Key definitions in this Agreement are:

“Project” means the multi-family 316-residential unit development known as the Sherwood Villages, being developed pursuant to a conditional use permit (Case No. CUP20003), approved pursuant to Chapter 278 of the Nevada Revised Statutes (“**NRS**”) by the Planning Commission for the City of Fernley (“**Planning Commission**”), which site is located in the City of Fernley, Nevada (the “**City**”).

“Project Property” means that real property located in the City of Fernley, County of Lyon, State of Nevada, more particularly described as Exhibit “A” attached hereto.

“Record”, “Recording”, “Recordation”, or “Recorded”: To file, the filing, or filed of record with the Office of the County Recorder of Lyon County, Nevada. The date of Recording shall refer to that time at which a document or map is Recorded.

ARTICLE 2. RECITALS.

- A. Developer is the current owner of the Project Property and is a developer of multi-family subdivision lots in the Project.

- B. On May 12, 2021, the Planning Commission approved the conditional use permit (CUP20003) for Sherwood (the “**Entitlement**”) subject to Conditions of Approval as set forth in said letter (the “**Conditions**”) attached hereto as Exhibit “B”. The Entitlement is approved to be constructed in three phases, as shown on Exhibit “E” attached hereto (the “**Phasing Plan**”). On May 11, 2022, the Planning Commission approved an extension of the Entitlement to May 12, 2023.
- C. The development of the Project, including the Project Property, must be conducted pursuant to the provisions of the NRS, the Entitlement, the Conditions, and the City’s Municipal Code (“**Code**”).
- D. Pursuant to the Conditions, the Developer is required to make certain improvements to Fremont Street. The Conditions require the developer to provide a full width pavement section including street lighting, curb, gutter, and sidewalk along the entire length of Fremont Street from the intersection with U.S. Highway 95A to the westerly property line of the Sherwood Project. The Developer will complete these offsite improvements excluding the improvements already completed or the improvements required to be completed by the Fremont Apartments. It is the Developer’s understanding that the Fremont Apartments are required to complete the west Fremont/I95A left turn, through and right turn lanes. The Developer will complete the Chisholm Trail improvements in accordance with the Conditions. The Developer is further required to acquire all necessary right-of-way (“**ROW**”) to accommodate a 60-foot ROW. The Developer proposes completing the improvements related to Fremont Street in a series of phases as set forth herein as Exhibit “D” (the “**Improvements Phasing Plan**”).
- E. The City is authorized, pursuant to NRS 278.360, NRS 278.0201 through 278.0207, inclusive, and Code §32.03.100(a), to enter into binding development agreements with any person having a legal or equitable interest in land concerning the development of that land provided that such agreement is consistent with the City of Fernley Comprehensive Master Plan August 2018 (“**Master Plan**”).
- F. The Master Plan includes the following goals:
- Enhance Fernley’s vitality as a community by providing a variety of housing types, density and costs that accommodate the needs, desires and financial abilities of the current and future households. Master Plan §HP.1.1.
 - Encourage housing that supports sustainable development patterns by promoting the efficient use of land [...and] easy access to services and public facilities[...]. Master Plan §HP.1.2.
 - Strive for viable mixed income neighborhoods throughout Fernley that collectively reflect the diversity of housing types and tenure (rental and ownership). Master Plan §HP.1.3.
 - Provide opportunities for high-density residential development near the downtown core and elsewhere in the community where appropriate. Master Plan §HP.1.4.

- Encourage new development in areas where adequate public services and facilities can be provided efficiently. Master Plan §LU.1.1
- Encourage new development to be in accordance with the Comprehensive Master Plan land use category. Master Plan §LU.1.2.
- Promote infill development. Master Plan §LU.1.5.

G. By entering into this Agreement, the City will ensure the orderly development of the Project in accordance with the Conditions, and consistent with the City's goals set forth in the Master Plan as identified in Recital F above. As such, approval of this Agreement is consistent with the Master Plan, as required by NRS 278.0203 and Code §32.03.100(A)(6)(a).

H. Acknowledging the foregoing, the parties desire to enter into this Agreement to provide for the matters set forth herein.

NOW, THEREFORE, in exchange for mutual considerations, the sufficiency of which is hereby acknowledged, the parties agree as follows:

ARTICLE 3. DEVELOPMENT MATTERS.

Section 3.1 Development Standards.

The permitted uses of the Project Property, the density or intensity of its use, the maximum height and size of the proposed buildings, and any dedication of any portion of the Project Property to the City for public use shall be as provided in this Agreement, the Entitlements, the Conditions, the Code, and any future entitlements or approvals issued by the City for the Project or the Project Property, as the same may hereafter be revised, modified or amended from time to time in accordance with applicable law.

A. The density of the Project Property is 11.8 dwelling units per acre.

B. The permitted use of the Project Property is multi-family apartments.

C. As of the Effective Date, Chapter 32.09 of the Code of Ordinances for the City of Fernley, Nevada, shall be the applicable development standards for the Project Property.

Section 3.2 Limitation.

The provisions of NRS 278.0201 apply to this Agreement.

Section 3.3 Improvements related to Fremont Street.

Compliance with Condition No. 16 of the Conditions, shall be satisfied as follows:

A. Prior to the issuance of the certificate of occupancy for the first building in Phase 1 of the Entitlement, as shown on the Phasing Plan, the Developer shall complete (i) construction of back of curb to back of curb and all underground water, sanitary and storm facilities within the ROW, and (ii) construction of

the retention pond to generally be located at 1200 Fremont Street (the “**Phase 1 Improvements**”), as shown on the Improvements Phasing Plan.

B. Prior to the issuance of the certificate of occupancy for the first building in Phase 2 of the Entitlement, as shown on the Phasing Plan, the Developer shall complete (i) relocation of the dry utility on the south side of Fremont Street and the required sidewalk improvements related thereto, and (ii) landscaping improvements and street lights on the south side of Fremont Street (the “**Phase 2 Improvements**”), as shown on the Improvements Phasing Plan.

C. Prior to the issuance of the certificate of occupancy for the first building in Phase 3 of the Entitlement, as shown on the Phasing Plan, the Developer shall complete construction on all improvement shown on the final approved civil improvement plans (the “**Phase 3 Improvements**”), as shown on the Improvements Phasing Plan.

D. Phase 2 Improvements and Phase 3 Improvements will only be completed to the north side of Fremont Street, if and when, the Developer has acquired the ROW, as shown on Exhibit “E” (the “**Right of Way Map**”).

Section 3.4 Acquisition of ROW on Fremont Street

During the course of construction of the Phase 2 Improvements and the Phase 3 Improvements, the Developer shall make a good faith effort to acquire all necessary ROW for the required improvements to be completed. If, after a good faith effort, the Developer is unable to acquire sections of the ROW, the City shall allow improvements to be constructed on the ROW acquired for each parcel adjacent to Fremont Street. Prior to the start of Phase 3 of the Project, the Developer and City shall enter into a mutually beneficial plan to determine actions necessary to finish the improvements within the Fremont Street ROW. In the event of condemnation of any of the adjacent parcels to Fremont Street for purposes of the ROW, reimbursement shall occur in accordance with the provisions of NRS Chapter 37, which governs over fair compensation of properties subject to condemnation.

ARTICLE 4. GENERAL TERMS.

Section 4.1 Effective Date; approved by ordinance.

This Agreement is not effective until it has been approved by ordinance by the City Council for the City of Fernley (“**City Council**”) and Recorded.

Section 4.2 Term; Cancellation.

This Agreement shall continue in full force and effect in for 20 (twenty) years with an automatic one-year extension, unless cancelled in accordance with the terms NRS 278.0205. A cancellation of this Agreement is not effective or binding until approved by ordinance of the City Council and Recorded in accordance with NRS 278.0205.

Section 4.3 Modifications and Amendments.

Modifications and amendments to this Agreement are not effective or binding until approved by ordinance of the City Council and Recorded in accordance with NRS 278.0205.

Section 4.4 Breach.

A violation of this Agreement by either party shall be a breach of this Agreement by that party if, within 60 days after receipt of notice of such violation delivered in accordance with Section 4.7 below by the non-violating party, the party in violation fails to cure such violation. If the material breach is not corrected within 60-day cure period, the defaulting Party is in default, and the Party alleging material breach may elect any one or more of the following courses:

A. Amendment or Termination by City. After proper notice and the expiration of the above-referenced period for Developer to correct the alleged material breach, the City may give notice of intent to amend or terminate this Agreement as authorized by NRS Chapter 278. Following any such notice of intent to amend or terminate, the matter shall be scheduled and noticed as required by law for consideration and review solely by the City Council. Following consideration of the evidence presented before the City Council and a finding that a material breach has occurred by Developer and remains uncured, City may amend or terminate this Agreement. Developer shall have twenty-five (25) days after receipt of written notice of termination to institute legal action pursuant to this Section.

B. Termination by Developer. In the event City materially defaults under this Agreement, Developer shall have the right to terminate this Agreement after providing notice and an opportunity to cure as set forth in this Section. Developer shall have the option, in its discretion, to maintain this Agreement in effect and seek to enforce all of City's obligations by pursuing an action for specific performance or other appropriate judicial remedy.

Section 4.5 Entire Agreement.

With respect to the matters addressed herein (including the recitals), this Agreement integrates all of the terms and conditions mentioned herein or incidental hereto, and supersedes all negotiations or previous agreements between the parties.

Section 4.6 Assignments; Transfer of rights.

Developer shall have the right to assign all or any portion of its rights and delegate any obligations under this Agreement to third parties who acquire fee simple absolute ownership to any portion of the Project Property subject to approval by the City of Fernley. Approval shall be given by the City unless there is a substantial governmental interest to refuse the assignment. Any subsequent acquisition by a third party shall assume all of the Developer's obligations with respect to this agreement and any portion of the Project Property transferred.

Section 4.7 Notices; when deemed sufficiently given.

A. Formal notices, demands and communications between the City and Developer must be in writing and must be sent to the addresses stated in Article 1 above and to each successor or assign of Developer to the address given by such party in writing and if no written notice is given, then to the address stated in any

subsequent agreement(s), and/or to any address or number subsequently communicated to the sending party in writing.

B. If notice is sent by registered or certified mail to the correct address, postage prepaid, it will be deemed sufficiently given the earlier of when actually received by the addressee or three business days after it is received by the U.S. Post Office as indicated on the receipt.

C. If notice is sent by courier, or overnight delivery service (Federal Express, UPS Overnight, U.S. Postal Priority Mail), and is properly addressed, it will be deemed sufficiently given when delivered as indicated in the records of the courier or service.

Section 4.8 Further documents.

Each party agrees to honor any reasonable requests by the other party to complete, execute, and deliver any document necessary to accomplish the purposes hereof.

Section 4.9 Attorney's fees and costs.

If any party hereto institutes any action or proceeding (including arbitration, if authorized or mutually agreed upon) against the other or others arising out of or relating to this Agreement, the prevailing party shall be awarded attorney's fees and costs by the other party.

Section 4.10 Time of Essence.

Time is of the essence in the performance of this Agreement.

Section 4.11 Governing law.

The laws of the State of Nevada, without regard to conflicts of law principles, shall govern the interpretation and enforcement of this Agreement.

Section 4.12 Severability of invalid or unenforceable provisions.

If any provision contained in this Agreement is held to be unenforceable by a court of law or equity, this Agreement shall be construed as if such provision did not exist and the non-enforceability of such provision shall not be held to render any other provision or provisions of this Agreement unenforceable.

Section 4.13 Binding effect; successors and assigns; assignment/delegation.

This Agreement shall be binding upon and inure to the benefit of the heirs, executors, administrators, and permitted successors and assigns of the parties hereto. To the extent that any assignment of any right under this Agreement changes the duty of either party, increases the burden or risk involved, impairs the chances of obtaining the performance of this Agreement, attempts to operate as novation, or includes a waiver or abrogation of any defense to payment by the City, such offending portion of the assignment shall be void, and shall be a breach of this Agreement.

Section 4.14 No third-party beneficiaries intended.

Unless otherwise specifically identified in this Agreement, there are no third-party beneficiaries intended by this Agreement and no third parties have any standing to enforce any of the provisions of this Agreement.

Section 4.15 Representation and warranties by persons who sign this Agreement.

Each person who signs this Agreement represents and warrants to each other person who signs this Agreement that he or she is an authorized agent of and has actual authority to execute this Agreement on behalf of the party for whom he or she is signing, and that all required approvals and actions have been taken to authorize the execution of this Agreement with the intent and effect of binding the party to this Agreement.

Section 4.16 Counterparts.

This Agreement may be executed in any number of counterparts, each of which when so executed and delivered shall be deemed an original; and such counterparts shall constitute one and the same Agreement. Any signature page of the Agreement may be detached from any counterpart without impairing the legal effect of any signatures, and may be attached to another counterpart identical in form. This Agreement may be executed by signatures provided by facsimile or email, and such signatures shall be as binding and effective as original signatures.

Section 4.17 Construction.

This Agreement is the product of joint collaboration and negotiations among the parties and their counsel. The terms and conditions of this Agreement shall be construed as a whole according to their fair meaning, and not strictly for or against any party. Further, any ambiguities are to be resolved according to their fair meaning, and not construed against the drafting party.

Section 4.18 Council Approval.

This Agreement shall not be effective until executed by the City after its approval by the Fernley City Council.

[Signature Pages Follows]

EXECUTED on the dates indicated:

City:

CITY OF FERNLEY,

a Nevada municipal corporation

Dated _____, 2021

By: _____

Name _____

Its: _____

Attest: _____

City Clerk

State of Nevada

County of Lyon

This instrument was acknowledged before me on _____ by _____ as
_____ of City of Fernley, a Nevada municipal corporation.

(Signature of notarial officer)

(Seal, if any)

Developer:

FERNLEY SHERWOOD QOZB, LLC
a Delaware limited liability company

Dated _____, 2021

By: _____

Name _____

Its: _____

Attest: _____

State of _____

County of _____

This instrument was acknowledged before me on _____ by _____ as
_____ of FERNLEY SHERWOOD QOZB, LLC, a Delaware limited liability
company.

(Signature of notarial officer)

(Seal, if any)

EXHIBIT “A”
LEGAL DESCRIPTION

LEGAL DESCRIPTION

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

TRACT 1:

Parcel A as shown on the PARCEL MAP FOR KENNETH D. HORTON & JIMMIE DALE HORTON, filed for record in the office of the Recorder of Lyon County, Nevada, on June 13, 1995, as File No. 183107.

APN: 021-092-47

TRACT 2:

Parcel B as shown on the PARCEL MAP FOR KENNETH D. HORTON & JIMMIE DALE HORTON, filed for record in the office of the Recorder of Lyon County, Nevada, on June 13, 1995, as File No. 183107.

APN: 021-092-46

TRACT 3:

A parcel of land located in a portion of Southeast ¼ of Section 12, Township 20 North, Range 24 East, M.D.B.&M., bounded and described as follows:

Commencing at the Northeast corner of the Dolores Court right of way, as shown on the Horton Parcel Map, File No. 183107, Lyon County Records; thence North 86°21'14" West a distance of 328.92 feet to the point of beginning; thence North 03°38'46" East a distance of 50.00 feet; thence North 55°24'20" West a distance of 365.79 feet; thence South 00°20'58" West a distance of 238.51 feet; thence South 03°54'16" West a distance of 283.24 feet; thence South 84°45'19" East a distance of 138.94 feet; thence North 11°52'26" East a distance of 239.84 feet; thence around a curve to the left, concave Northeasterly, having a radial bearing of North 11°53'20" East, an arc length of 71.6 feet, a central angle of 82°02'39" and a radius of 50.0 feet; thence South 86°21'14" East a distance of 170.90 feet, to the point of beginning.

NOTE: The above metes and bounds description appeared previously in that certain Deed recorded in the office of the County Recorder of Lyon County, Nevada on December 23, 2005, as Document No. 371420 of Official Records.

APN: 021-092-54

TRACT 4:

A Parcel of land situate in the Southwest 1/4 of the Southeast 1/4 of Section 12, Township 20 North, Range 24 East, M.D.B.&M., more particularly bounded and described as follows, to-wit:

Commencing at the Southwest corner of the Southeast 1/4 of Section 12, Township 20 North, Range 24 East, M.D.B.&M., and running thence along the North and South center line of said Section 12 at a bearing of North 1°23'40" East, for a distance of 596 feet to a point and thence South 85°14'30" East, for a distance of 434.96 feet to a point and thence South for a distance of 26 feet to a point and thence South 87° East, for a distance of 628.85 feet to a point which said point is the Southwest corner of this parcel and the true point of beginning and thence around the parcel as follows:

North for a distance of 643.06 feet to the Northwest corner; South 87°30' East for a distance of 337.15 feet to the Northeast corner; South for a distance of 646.00 feet to the Southeast corner; North 87° West for a distance of 337.15 feet to the Southwest corner; the point of beginning.

NOTE: The above metes and bounds description appeared previously in that certain Indenture recorded

in the office of the County Recorder of Lyon County, Nevada on April 16, 2004, as Document No. 318471 of Official Records.

APN: 021-092-26

TRACT 5:

A Parcel of land situate in the Southwest 1/4 of the Southeast 1/4 of Section 12, Township 20 North, Range 24 East, M.D.B.&M., more particularly bounded and described as follows, to-wit:

Commencing at the Southwest corner of the Southeast 1/4 of Section 12, Township 20 North, Range 24 East, M.D.B.&M., and running thence along the North and Southcenter line of said Section 12 at a bearing of North 1°23'40" East, for a distance of 596 feet to a point and thence South 85°14'30" East, for a distance of 434.96 feet to a point and thence South for a distance of 26 feet to a point and thence South 87° East, for a distance of 291.70 feet to a point which said point is the Southwest corner of this Parcel and the true point of beginning and thence around the parcel as follows:

North for a distance of 640.12 feet to the Northwest corner; South 87°30' East for a distance of 337.15 feet to the Northeast corner; South for a distance of 643.06 feet to the Southeast corner; North 87° West for a distance of 337.15 feet to the Southwest corner; the point of beginning.

NOTE: The above metes and bounds description appeared previously in that certain Indenture recorded in the office of the County Recorder of Lyon County, Nevada on April 16, 2004, as Document No. 318471 of Official Records.

APN: 021-092-27

TRACT 6:

A parcel of land situate in the Northwest 1/4 of the Southeast 1/4 of Section 12, Township 20 North, Range 24 East, M.D.B.&M., more particularly bounded and described as follows:

Commencing at an iron bolt set in pavement which marks the Southeast corner of the West 1/2 of the Southeast 1/4 of Section 12, Township 20 North, Range 24 East, M.D.B.&M.; and running thence North along the East side of said West 1/2 of the Southeast 1/4 for a distance of 1786.03 feet to a point which said point is the Southeast corner of this parcel and the true point of beginning, and thence around the parcel as follows: North 87°30'00" West following generally parallel to an existing fence line for a distance of 632.70 feet to the Southwest corner; thence North 0°17'34" East for a distance of 354.20 feet to the Northwest corner; thence North 86°58'00" East for a distance of 352.49 feet to a point; and thence North 23°03'00" West for a distance of 37.85 feet to the South right of way line of Highway No. 80; and thence following said South line at a bearing of South 79°42'05" East, for a distance of 298 feet to the point of intersection with the East line of the Northwest 1/4 of the Southeast 1/4 aforesaid and thence running South along said East line of a distance of 382 feet to the point of beginning, and also the right of ingress and egress to the above property over a 30 foot road following generally parallel to the North right of way line of Fernley Drain Number One, from the existing County Road to the Southwest corner of this parcel.

NOTE: The above metes and bounds description appeared previously in that certain Deed recorded in the office of the County Recorder of Lyon County, Nevada on February 28, 2005, as Document No. 343926 of Official Records.

EXCEPTING THEREFROM any mobile home(s) situated thereon

APN: 021-092-23

TRACT 7:

A parcel of land located in a portion of the Southeast 1/4 of Section 12, Township 20 North, Range 24 East, M.D.B.&M., bounded and described as follows:

Commencing at the Northeast corner of the Dolores Court right of way, as shown on the Horton Parcel

Map, File No. 183107, Lyon County Records, the point of beginning; thence North 86°21'14" West a distance of 328.92 feet; thence North 03°38'46" East a distance of 50.00 feet; thence North 55°24'20" West a distance of 365.79 feet; thence North 00°20'58" East a distance of 69.64 feet; thence South 89°15'15" East a distance of 633.22 feet; thence South 01°14'53" West a distance of 339.97 feet; to the point of beginning.

NOTE: The above metes and bounds description appeared previously in that certain Deed recorded in the office of the County Recorder of Lyon County, Nevada on February 28, 2005, as Document No. 343926 of Official Records.

APN: 021-092-55

TRACT 8:

A parcel of land located in the Southwest 1/4 of the Southeast 1/4 of Section 12, Township 20 North, Range 24 East, M.D.B.&M., being further described as follows:

COMMENCING at the quarter Section corner between Sections 12 and 13, Township 20 North, Range 24 East, M.D.B.&M.; thence North 89°24' East along the Section line between Sections 12 and 13, to the Southeast corner of the West 1/2 of the Southeast 1/4 of Section 12; thence North along the Easterly line of the West 1/2 of the Southeast 1/4 of Section 12, a distance of 28.0 feet; thence West parallel to the Section line between Sections 12 and 13, a distance of 290.0 feet to the True Point of Beginning; thence North parallel to the Easterly line of the West 1/2 of the Southeast 1/4 of Section 12, a distance of 475.0 feet to a point; thence North 87°24' West, a distance of 183.53 feet to a point; thence South parallel to the Easterly line of the West 1/2 of the Southeast 1/4 of Section 12, a distance of 489.0 feet to a point; thence East parallel to the Section line between Sections 12 and 13, a distance of 183.0 feet to the POINT OF BEGINNING.

NOTE: The above metes and bounds description appeared previously in that certain deed re-recorded in the office of the County Recorder of Lyon County, Nevada on December 9, 2021, as Document No. 649464 of Official Records.

APN: 021-092-05

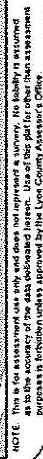


EXHIBIT “B”

CONDITIONS OF APPROVAL FOR CUP20003

1. APPROVAL:

THE PERMIT IS APPROVED AS SUBMITTED AND CONDITIONED. ANY SUBSTANTIVE CHANGE SHALL REQUIRE REVIEW AND APPROVAL BY THE PLANNING COMMISSION AS AN AMENDMENT TO THIS CONDITIONAL USE PERMIT.

2. EXPIRATION DATE:

THE DESIGN REVIEW SHALL EXPIRE WITHIN ONE (1) YEAR OF THE DATE OF APPROVAL, UNLESS THE PERMITTED USE HAS BEEN ESTABLISHED OR CONSTRUCTION TO ACCOMMODATE THAT USE HAS BEGUN AND IS BEING DILIGENTLY PURSUED. A ONE-YEAR EXTENSION MAY BE GRANTED BY THE ADMINISTRATOR IF REQUESTED PRIOR TO THE EXPIRATION DATE OF THE DESIGN REVIEW APPROVAL.

3. WATER RIGHTS:

THE DEVELOPER SHALL COMPLY WITH ALL CITY OF FERNLEY MUNICIPAL CODES REGARDING THE DEDICATION OF WATER RIGHTS, INCLUDING ASSOCIATED FEES, FOR THE CONNECTION TO THE CITY'S MUNICIPAL WATER SYSTEM IN THE AMOUNT THAT IS REQUIRED PRIOR TO THE ISSUANCE OF ANY BUILDING PERMIT FOR ANY PHASE OF THE PROJECT.

4. LANDSCAPING/IRRIGATION:

THE DEVELOPER SHALL SUBMIT A LANDSCAPING AND IRRIGATION PLAN FOR THE PROJECT IN CONFORMANCE WITH TITLE 32 OF THE FERNLEY MUNICIPAL CODE FOR REVIEW AND APPROVAL BY THE ADMINISTRATOR PRIOR TO ISSUANCE OF A BUILDING PERMIT FOR THE PROJECT. THE LANDSCAPING AND IRRIGATION SHALL BE INSTALLED PER THE APPROVED PLANS PRIOR TO ISSUANCE OF THE CERTIFICATE OF OCCUPANCY FOR EACH BUILDING TO THE APPROVAL OF THE ADMINISTRATOR.

5. WATER AND SEWER MAINS AND SERVICES:

THE DEVELOPER SHALL COMPLY WITH ALL CITY OF FERNLEY MUNICIPAL CODES REGARDING CONNECTION TO THE CITY'S SANITARY SEWER AND POTABLE WATER SYSTEMS, INCLUDING BUT NOT LIMITED TO: ASSOCIATED FEES, DESIGN STANDARDS, DEVELOPMENT CODE REQUIREMENTS, AND STATE REQUIREMENTS.

PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR THE PROJECT, THE DEVELOPER SHALL PROVIDE THE CITY WITH A UTILITY PLAN FOR WATER AND SANITARY SEWER THAT IS IN CONFORMANCE WITH THE CITY OF FERNLEY MUNICIPAL CODE, PUBLIC WORKS DESIGN MANUAL, AND THE NEVADA ADMINISTRATIVE CODE TO THE APPROVAL OF THE CITY ENGINEER, PUBLIC WORKS DIRECTOR AND ADMINISTRATOR.

THE PROJECT SHALL UTILIZE A MASTER METER FOR THE DOMESTIC WATER SERVICE FOR EACH BUILDING OR GROUP OF BUILDINGS. THE DEVELOPER MAY INSTALL SEPARATE IRRIGATION METER OR INSTALL THE IRRIGATION CONNECTION DOWNSTREAM OF THE DOMESTIC MASTER METER WITH APPROPRIATE BACKFLOW PREVENTION. INDIVIDUAL SERVICE METERS FOR EACH BUILDING WILL NOT BE ALLOWED. ALL INTERNAL WATER AND SEWER MAINS SHALL BE MAINTAINED BY THE PROPERTY OWNER UNLESS APPROVED FOR ACCEPTANCE BY THE CITY OF FERNLEY PUBLIC WORKS DIRECTOR AND CITY ENGINEER.

6. WATER SYSTEM LOOPING:

THE DEVELOPER SHALL PROVIDE THE CITY WITH A UTILITY PLAN FOR THE WATER SYSTEM THAT DEMONSTRATES ADEQUATE SYSTEM LOOPING PRIOR TO THE ISSUANCE OF A PERMIT. THE PLAN SHALL BE IN CONFORMANCE WITH THE CITY OF FERNLEY'S MUNICIPAL CODE, NEVADA ADMINISTRATIVE CODE AND PUBLIC WORKS DESIGN MANUAL TO THE APPROVAL OF THE CITY ENGINEER, PUBLIC WORKS DIRECTOR, AND ADMINISTRATOR.

7. WATER AND SEWER SYSTEM MODELING:

THE DEVELOPER SHALL COMPLETE WATER AND SEWER MODELING FOR THE PROJECT PRIOR TO THE ISSUANCE OF A PERMIT. THE DEVELOPER SHALL CONSTRUCT ANY IMPROVEMENTS IDENTIFIED BY THE MODELING AS NECESSARY TO SERVE THE PROJECT IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS.

8. NEVADA DEPARTMENT OF ENVIRONMENTAL PROTECTION:

THE DEVELOPER SHALL COMPLY WITH ALL REQUIREMENTS OF THE NEVADA DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF SAFE DRINKING WATER AND BUREAU OF WATER POLLUTION CONTROL FOR THE WATER AND SEWER INFRASTRUCTURE DESIGN AND CONSTRUCTION TO THE APPROVAL OF THE ADMINISTRATOR, PUBLIC WORKS DIRECTOR AND CITY ENGINEER.

9. GRADING PERMIT:

THE DEVELOPER SHALL SUBMIT A GRADING PLAN FOR ANY PHASE OF THE PROJECT TO THE APPROVAL OF THE CITY ENGINEER. PRIOR TO THE ISSUANCE OF A GRADING PERMIT FOR THE DEVELOPMENT THE DEVELOPER SHALL POST A SURETY BOND FOR REGRADING AND RECLAMATION OF THE SITE. DEVELOPER SHALL COMPLY WITH ALL GRADING REQUIREMENTS SET FORTH IN THE CITY OF FERNLEY DEVELOPMENT CODE AS WELL AS ALL STATE AND FEDERAL REGULATIONS INCLUDING, BUT NOT LIMITED TO, STORM WATER POLLUTION PREVENTION AND AIR QUALITY RELATED TO SURFACE AREA DISTURBANCE.

THE DEVELOPER SHALL PROVIDE VERIFICATION OF A STORM WATER DISCHARGE PERMIT FROM THE NEVADA DEPARTMENT OF ENVIRONMENTAL PROTECTION TO THE APPROVAL OF THE CITY ENGINEER PRIOR TO ISSUANCE OF A GRADING PERMIT OR BUILDING PERMIT FOR THE DEVELOPMENT.

10. STORM DRAINAGE:

THE DEVELOPER SHALL PROVIDE A FINAL DRAINAGE REPORT FOR THE PROJECT IN CONFORMANCE WITH THE FERNLEY MUNICIPAL CODE AND THE PUBLIC WORKS DESIGN MANUAL FOR REVIEW AND APPROVAL BY THE CITY ENGINEER PRIOR TO APPROVAL OF A BUILDING PERMIT FOR ANY PORTION OF THE PROJECT. EACH SUCCESSIVE PHASE OF THE PROJECT SHALL SUBMIT AN UPDATED DRAINAGE REPORT FOR REVIEW AND APPROVAL BY THE CITY ENGINEER SHOWING THE CUMULATIVE EFFECT OF THE DEVELOPED PORTION OF THE PROJECT ALONG WITH THE PROPOSED PHASE'S EFFECT ON THE TOTAL DISCHARGE INTO THE DRAINAGE SYSTEM. THE STORM WATER AND DRAINAGE PLANS FOR THE PHASES OF THE DEVELOPMENT SHALL BE REVIEWED AND APPROVED BY THE CITY ENGINEER PRIOR TO THE ISSUANCE OF A GRADING PERMIT FOR THE PHASES OF THE PROJECT.

ALL INTERNAL STORM DRAIN INFRASTRUCTURE SHALL BE MAINTAINED BY THE PROPERTY OWNER.

11. GEOTECHNICAL REPORT:

THE DEVELOPER SHALL PROVIDE A GEOTECHNICAL REPORT FOR THE PROJECT IN CONFORMANCE WITH THE REQUIREMENTS OF THE DEVELOPMENT CODE FOR REVIEW AND APPROVAL BY THE CITY ENGINEER PRIOR TO THE APPROVAL OF A GRADING PERMIT OR BUILDING PERMIT FOR ANY PORTION OF THE PROJECT.

12. STRUCTURAL CONTROLS:

THE DEVELOPER SHALL UTILIZE STRUCTURAL CONTROLS FOR THE TREATMENT OF STORM WATER RUNOFF IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES TO THE APPROVAL OF THE PUBLIC WORKS DIRECTOR AND CITY ENGINEER.

13. SANITARY SEWER REPORT:

THE DEVELOPER SHALL PROVIDE A FINAL SANITARY SEWER REPORT FOR THE PROJECT IN CONFORMANCE WITH THE FERNLEY MUNICIPAL CODE AND THE PUBLIC WORKS DESIGN MANUAL FOR REVIEW AND APPROVAL BY THE CITY ENGINEER PRIOR TO ISSUANCE OF A BUILDING PERMIT FOR ANY PORTION OF THE PROJECT.

14. DESIGN STANDARDS:

THE DEVELOPER SHALL COMPLY WITH ANY DESIGN STANDARDS AND REGULATIONS AS SET FORTH IN THE FERNLEY MUNICIPAL CODE OR ADOPTED DESIGN MANUAL INCLUDING BUT NOT LIMITED TO DIMENSIONAL STANDARDS (§32.06.080(B)); DESIGN STANDARDS (§32.06.080(I)) SUCH AS SITE PLANNING, PARKING AND CIRCULATION, COMMUNITY AMENITIES, LANDSCAPING AND SCREENING (§32.06.080 & §32.09.090), AND BUILDING ARCHITECTURE; ADJACENCY STANDARDS (§32.09.030); GRADING (§32.09.070); BUFFER REQUIREMENTS (§32.09.090(E)); LIGHTING (§32.09.100); STREETS (§32.09.140); AND UTILITY CONSIDERATIONS. THE DEVELOPER SHALL DEMONSTRATE IN WRITING COMPLIANCE WITH THESE REQUIREMENTS PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR THE PROJECT.

15. ENGINEERING/PUBLIC WORKS:

THE DEVELOPER SHALL COMPLY WITH ALL THE REQUIREMENTS OF THE CITY OF FERNLEY MUNICIPAL CODE, DEVELOPMENT CODE AND PUBLIC WORKS DESIGN MANUAL FOR THE CONSTRUCTION OF ANY PUBLIC OR PRIVATE INFRASTRUCTURE TO THE APPROVAL OF THE CITY ENGINEER AND PUBLIC WORKS DIRECTOR PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY FOR THE PROJECT.

16. FREMONT STREET IMPROVEMENTS:

IN ACCORDANCE WITH SECTION 32.09.140 OF THE FERNLEY MUNICIPAL CODE, THE EXISTING FREMONT STREET SHALL BE IMPROVED TO A FULL WIDTH PAVEMENT SECTION AND INCLUDE STREET LIGHTING, CURB, GUTTER, AND SIDEWALK. THE NEW ROADWAY SHALL COMPLY WITH THE CITY'S 60-FOOT RIGHT OF WAY STANDARD. THE IMPROVEMENTS ARE REQUIRED ALONG THE ENTIRE LENGTH OF FREMONT STREET FROM THE INTERSECTION WITH U.S. HIGHWAY 95A TO THE WESTERLY PROPERTY LINE OF THE PROJECT. ALL NECESSARY RIGHT-OF-WAY TO ACCOMMODATE THE IMPROVEMENTS SHALL BE ACQUIRED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT, OR IF APPLICABLE, PRIOR TO THE RECORDATION OF A FINAL MAP. ALL IMPROVEMENTS SHALL BE COMPLETED AND ACCEPTED PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY FOR THE FIRST BUILDING OF THE PROJECT.

17. NORTH LYON COUNTY FIRE PROTECTION DISTRICT:

THE DEVELOPER SHALL COMPLY WITH ALL REQUIREMENTS OF THE NORTH LYON COUNTY FIRE PROTECTION DISTRICT, INCLUDING BUT NOT LIMITED TO: DEVELOPING A PLAN TO PROVIDE ADEQUATE EMERGENCY ACCESS THROUGHOUT THE SITE, DEVELOPING A MASTER FIRE HYDRANT AND FIRE FLOW PLAN, DEVELOPING A MASTER FIRE DEPARTMENT CONNECTION (FDC) PLAN, AND INSTALLING FIRE SUPPRESSION AND/OR ALARM SYSTEMS TO THE APPROVAL OF THE FIRE CHIEF PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.

18. FREMONT INTERSECTION CAPACITY IMPROVEMENTS:

THE EXISTING TRAFFIC VOLUMES PLUS PROJECT TRAFFIC WILL CREATE A LEVEL OF SERVICE D ON THE FREMONT STREET/U.S. HIGHWAY 95A INTERSECTION.

PER THE CITY OF FERNLEY DESIGN STANDARDS SECTION 3.3.3.c.ii, THE DEVELOPER SHALL COMPLETE MITIGATION MEASURES FOR INTERSECTIONS THAT OPERATE AT A LEVEL OF SERVICE D OR LESS. POSSIBLE MEASURES INCLUDE, BUT ARE NOT LIMITED TO, SIGNALIZATION OR SIGNALIZATION IMPROVEMENTS, CHANNELIZED MEDIANS, TURNING LANES, STORAGE LANE INCREASE, RESTRICTED TURNS AND/OR ADDITIONAL LANES.

THE TRAFFIC REPORT IDENTIFIES RESTRIPING THE EASTBOUND APPROACH OF FREMONT STREET TO INCLUDE A SEPARATE RIGHT TURN LANE AS WELL AS THE ADDITION OF A SEPARATE RIGHT TURN LANE ON THE WESTBOUND APPROACH OF CHISHOLM TRAIL.

THE DEVELOPER SHALL SUBMIT IMPROVEMENT PLANS FOR THE MITIGATION MEASURE/S PRIOR TO THE ISSUANCE OF THE FIRST BUILDING PERMIT FOR THE PROJECT. THE MITIGATION MEASURE WILL NEED TO BE REVIEWED AND APPROVED BY THE ADMINISTRATOR, CITY ENGINEER, PUBLIC WORKS DIRECTOR, AND NDOT.

THE MITIGATION MEASURE/S SHALL BE CONSTRUCTED AND ACCEPTED PRIOR TO THE ISSUANCE OF THE CERTIFICATE OF OCCUPANCY FOR THE FIRST BUILDING PERMIT OF THE PROJECT.

19. BUILDING DEPARTMENT:

THE DEVELOPER SHALL COMPLY WITH ALL REQUIREMENTS OF THE BUILDING DEPARTMENT TO THE APPROVAL OF THE BUILDING OFFICIAL PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.

20. ACCESS AND CIRCULATION:

THE DEVELOPER SHALL USE APPROPRIATE STRIPING AND SIGNAGE AS MAY BE NECESSARY TO MINIMIZE TRAFFIC CONFLICT WITHIN THE DEVELOPMENT SITE TO THE APPROVAL OF THE ADMINISTRATOR AND CITY ENGINEER FOR THE LIFE OF THE PROJECT.

THE PROPOSED PINWOOD DRIVE EXTENSION SHALL BE A GATED VEHICULAR EMERGENCY ACCESS ONLY. THE DEVELOPER SHALL PROVIDE PEDESTRIAN ACCESS FROM THE PROJECT TO THE SINGLE-FAMILY RESIDENTIAL SUBDIVISION TO THE EAST. BOTH THE PINWOOD DRIVE EXTENSION AND THE PROPOSED SHERWOOD DRIVE SHALL REMAIN PRIVATE AND NOT DEDICATED TO THE CITY.

THE DEVELOPER SHALL COMPLY WITH ANY OTHER REQUIREMENTS PERTAINING TO ACCESS AND CIRCULATION OF THE CITY OF FERNLEY AND NORTH LYON COUNTY FIRE PROTECTION DISTRICT TO THE APPROVAL OF THE FIRE CHIEF, PUBLIC WORKS DIRECTOR, CITY ENGINEER, AND ADMINISTRATOR.

21. FEDERAL, STATE, AND LOCAL AGENCIES:

THE DEVELOPER SHALL COMPLY WITH ALL REQUIREMENTS OF ANY FEDERAL, STATE, OR LOCAL AGENCY WITH JURISDICTION OVER THE PROJECT TO THE APPROVAL OF THE ADMINISTRATOR.

22. TRAFFIC ANALYSIS REPORT:

THE DEVELOPER SHALL PROVIDE A TRAFFIC ANALYSIS REPORT FOR THE PROJECT IN CONFORMANCE WITH THE CITY OF FERNLEY'S MUNICIPAL CODE AND THE PUBLIC WORKS DESIGN MANUAL FOR REVIEW AND APPROVAL BY THE CITY ENGINEER AND PUBLIC WORKS DIRECTOR PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR ANY PORTION OF THE PROJECT. SUCCESSIVE PHASES OF THE PROJECT SHALL SUBMIT AN UPDATED TRAFFIC ANALYSIS REPORT FOR REVIEW AND APPROVAL BY THE CITY ENGINEER AND PUBLIC WORKS DIRECTOR SHOWING THE CUMULATIVE EFFECT OF THE DEVELOPED PORTION OF THE PROJECT ALONG WITH THE PROPOSED PHASE'S EFFECT.

23. PARKING:

VISITOR PARKING SHALL BE PROVIDED THROUGHOUT THE SITE. THE DEVELOPER SHALL SUBMIT IMPROVEMENT PLANS THAT SHOW APPROPRIATE STRIPING AND SIGNAGE FOR THE VISITOR PARKING STALLS.

24. PEDESTRIAN CIRCULATION:

THE DEVELOPER SHALL CONSTRUCT PEDESTRIAN PATHWAYS WITHIN THE DEVELOPMENT INCLUDING CONNECTIONS TO THE SIDEWALKS ALONG FREMONT STREET PER THE APPROVED IMPROVEMENT PLANS.

25. CONSTRUCTION MAINTENANCE:

THE DEVELOPER SHALL LOCATE AND UTILIZE A SUFFICIENT NUMBER OF TRASH CONTAINERS ON-SITE TO BE UTILIZED DURING THE CONSTRUCTION OF THE PROJECT TO MAINTAIN THE PROJECT SITE IN A CLEAN AND ORDERLY STATE TO THE APPROVAL OF THE ADMINISTRATOR.

26. CONSTRUCTION HOURS:

THE DEVELOPER SHALL LIMIT ALL CONSTRUCTION AND CONSTRUCTION RELATED ACTIVITIES TO BETWEEN THE HOURS OF 7:00 AM TO 7:00 PM, SEVEN DAYS A WEEK. THE DEVELOPER SHALL INSTALL SIGNS AT ALL ACCESS POINTS TO THE PROJECT THAT CLEARLY INDICATE THE HOURS OF ACTIVITY ON-SITE PRIOR TO THE START OF ANY CONSTRUCTION-RELATED ACTIVITIES TO THE APPROVAL OF THE ADMINISTRATOR. THE DEVELOPER SHALL MAINTAIN THESE SIGNS IN GOOD REPAIR FOR THE DURATION OF THE CONSTRUCTION OF THE PROJECT. ONCE CONSTRUCTION IS FINISHED, THE DEVELOPER SHALL REMOVE THESE SIGNS.

27. PROJECT CONTACT:

THE DEVELOPER SHALL DESIGNATE TO THE ADMINISTRATOR A PROJECT CONTACT PERSON RESPONSIBLE/AUTHORIZED TO CORRECT PROBLEMS REGARDING THE PROJECT ON A 24-HOUR/7-DAYS A WEEK BASIS. THE DEVELOPER SHALL DESIGNATE THE PROJECT CONTACT PERSON TO THE ADMINISTRATOR PRIOR TO ISSUANCE OF A GRADING PERMIT FOR THE PROJECT.

28. ARCHITECTURE/BUILDING ELEVATIONS:

THE DEVELOPMENT OF THE SUBJECT SITE SHALL BE IN SUBSTANTIAL CONFORMANCE WITH THE ARCHITECTURAL/BUILDING ELEVATIONS SUBMITTED AS PART OF THIS APPLICATION. SUBSTANTIAL CHANGES TO THE ARCHITECTURE/BUILDING ELEVATIONS SHALL REQUIRE REVIEW AND APPROVAL BY THE ADMINISTRATOR PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR THAT BUILDING. THE DEVELOPER SHALL ARTICULATE LONG FACADES BY VARYING BUILDING MASS, FORM, TEXTURE, MATERIALS, AND INTERPLAY OF SOLID AND OPEN AREAS.

29. TRASH ENCLOSURES:

THE DEVELOPER SHALL LOCATE AND INSTALL TRASH ENCLOSURES TO THE APPROVAL OF WASTE MANAGEMENT AND THE ADMINISTRATOR INCLUDING THE APPROPRIATE SIZE AND LOCATION. THE TRASH ENCLOSURES SHALL MATCH THE PROJECT'S ARCHITECTURE AND BUILDING MATERIALS TO THE APPROVAL OF THE ADMINISTRATOR PRIOR TO ISSUANCE OF THE CERTIFICATE OF OCCUPANCY FOR THE INDIVIDUAL BUILDINGS.

30. UTILITY SCREENING:

THE DEVELOPER SHALL WORK IN CONJUNCTION WITH THE UTILITY COMPANIES TO LOCATE UTILITY EQUIPMENT SUCH AS ELECTRICAL, GAS, AND WATER JUNCTION BOXES, INCLUDING TRANSFORMER BOXES, VAULTS, AND ELECTRICAL PANELS, IN AREAS WHERE THE EQUIPMENT IS SCREENED BY EITHER ARCHITECTURAL ELEMENTS THAT MATCH THE MAIN STRUCTURE'S COLORS AND MATERIALS OR BY ADJUSTING THE APPROVED LANDSCAPING TO COMPENSATE TO THE APPROVAL OF THE ADMINISTRATOR PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY FOR EACH INDIVIDUAL BUILDING.

31. SCREENING:

THE MECHANICAL EQUIPMENT SHALL BE SCREENED FROM VIEW OF THE PARKING LOT, ADJACENT PUBLIC STREETS, AND PUBLIC AREAS BY USING AN ARCHITECTURAL ELEMENT OF THE BUILDING CONSISTING OF SAME MATERIALS AND BE DURABLE MATERIALS TO THE APPROVAL OF ADMINISTRATOR. ANY LOADING DOCKS AND SERVICE AREAS INCLUDING TRASH COMPACTION AND/OR DUMPSTER(S) SHALL BE SCREENED FROM VIEW OF PARKING LOTS AND PUBLIC AREAS. LOADING DOCK SCREENING SHALL BE HIGH ENOUGH TO SCREEN THE TRUCKS. THE SCREENING SHALL BE REVIEWED AND APPROVED BY THE ADMINISTRATOR PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR EACH INDIVIDUAL BUILDING.

32. LIGHTING:

THE DEVELOPER SHALL SUBMIT A LIGHTING PLAN FOR REVIEW AND APPROVAL BY THE ADMINISTRATOR PRIOR TO THE ISSUANCE OF A BUILDING PERMIT. THE DEVELOPER IS REQUIRED TO COMPLY WITH THE LIGHTING STANDARDS AND REQUIREMENTS IN THE CITY OF FERNLEY MUNICIPAL CODE. TO REDUCE THE IMPACT OF GLARE AND MINIMIZE THE EFFECT OF FIELD AND PARKING LIGHTING, LIGHTING FIXTURES WITH EXTERNAL "HOODS" AND INTERNAL GLARE REDUCTION LOUVERS SHALL BE USED.

33. TRUCKEE CARSON IRRIGATION DISTRICT (TCID)/BUREAU OF RECLAMATION:

THE DEVELOPER SHALL PROVIDE WRITTEN DOCUMENTATION FROM THE BUREAU OF RECLAMATION AND TRUCKEE CARSON IRRIGATION DISTRICT THAT ANY PROPOSED IMPROVEMENTS AFFECTING ANY BUREAU OF RECLAMATION FACILITY HAS BEEN REVIEWED AND APPROVED BY THE BUREAU OF RECLAMATION AND/OR THE TRUCKEE CARSON IRRIGATION DISTRICT TO THE APPROVAL OF THE ADMINISTRATOR, CITY ENGINEER, AND PUBLIC WORKS DIRECTOR.

34. RECIPROCAL EASEMENTS:

THE DEVELOPER SHALL PROVIDE IRREVOCABLE RECIPROCAL PARKING, ACCESS, STORM DRAINAGE MAINTENANCE, WATER INFRASTRUCTURE MAINTENANCE, SANITARY SEWER INFRASTRUCTURE MAINTENANCE, AND LANDSCAPE MAINTENANCE EASEMENTS OVER THE ENTIRE SITE TO THE APPROVAL OF THE ADMINISTRATOR PRIOR TO THE ISSUANCE OF A BUILDING PERMIT. THESE EASEMENTS SHALL BE INCORPORATED INTO THE RECORDED DOCUMENTS FOR THE SITE.

35. NEVADA DEPARTMENT OF TRANSPORTATION:

THE DEVELOPER SHALL COMPLY WITH ALL REQUIREMENTS OF THE NEVADA DEPARTMENT OF TRANSPORTATION TO THE APPROVAL OF THE ADMINISTRATOR, PUBLIC WORKS DIRECTOR AND CITY ENGINEER.

36. MAPPING:

THE DEVELOPER SHALL SUBMIT AND PROCESS THE APPROPRIATE MAPPING APPLICATIONS WHICH MAY INCLUDE A COMBINATION OF THE FOLLOWING: A REQUEST FOR VACATION (ABANDONMENT); REVERSION TO ACREAGE; MERGER AND SUBDIVISION PARCEL OR SUBDIVISION MAP; TENTATIVE AND/OR FINAL PARCEL MAP; OR TENTATIVE AND FINAL SUBDIVISION MAP. NO FINAL MAP SHALL BE RECORDED UNTIL SUCH TIME AS ALL NECESSARY RIGHTS-OF-WAY HAVE BEEN ACQUIRED AND IMPROVEMENT PLANS, CONSISTING OF ALL NECESSARY PUBLIC FACILITIES TO SERVE THE PROJECT, HAVE BEEN REVIEWED AND APPROVED BY THE CITY.

EXHIBIT "C"

PHASING PLAN

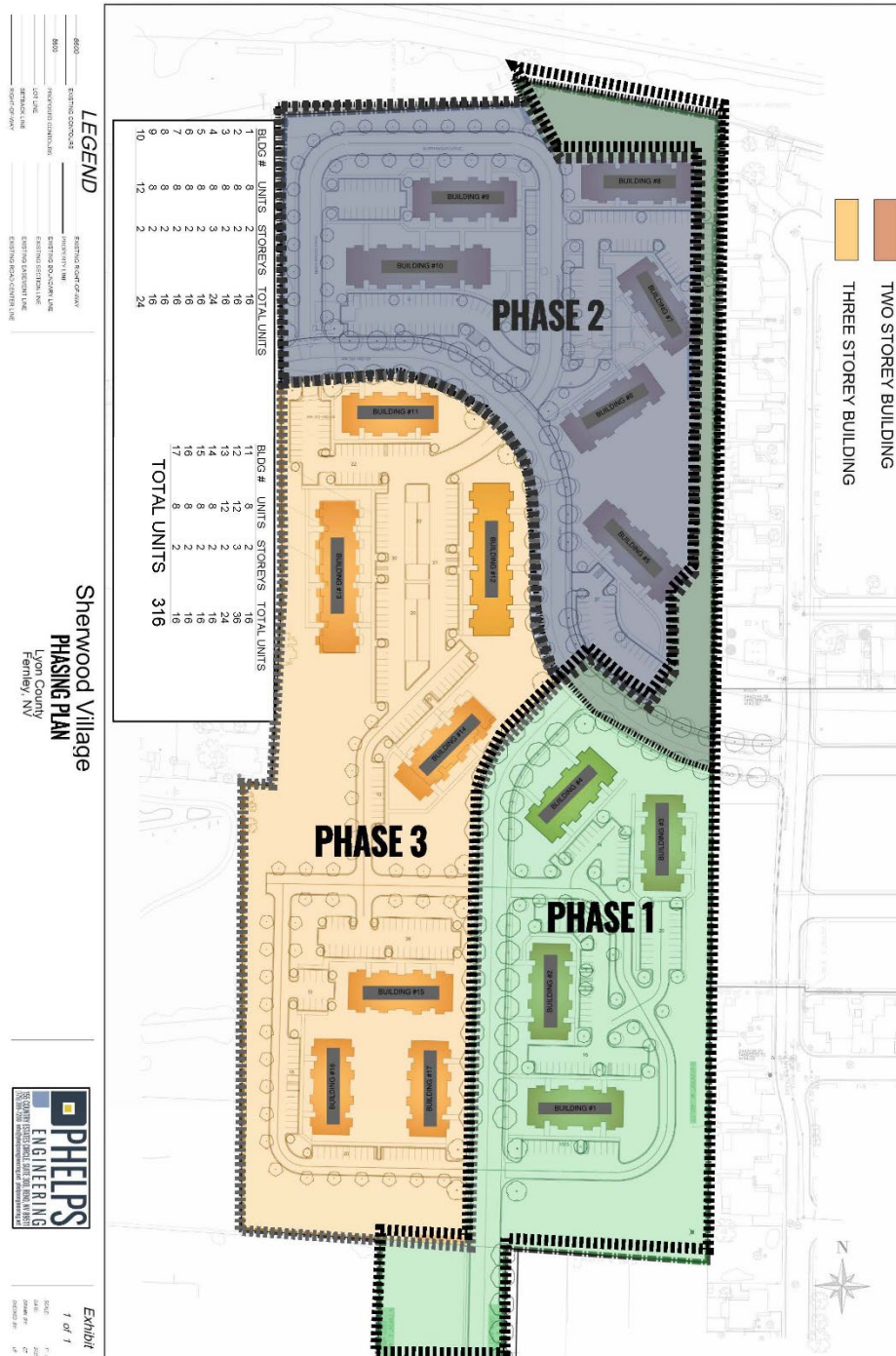
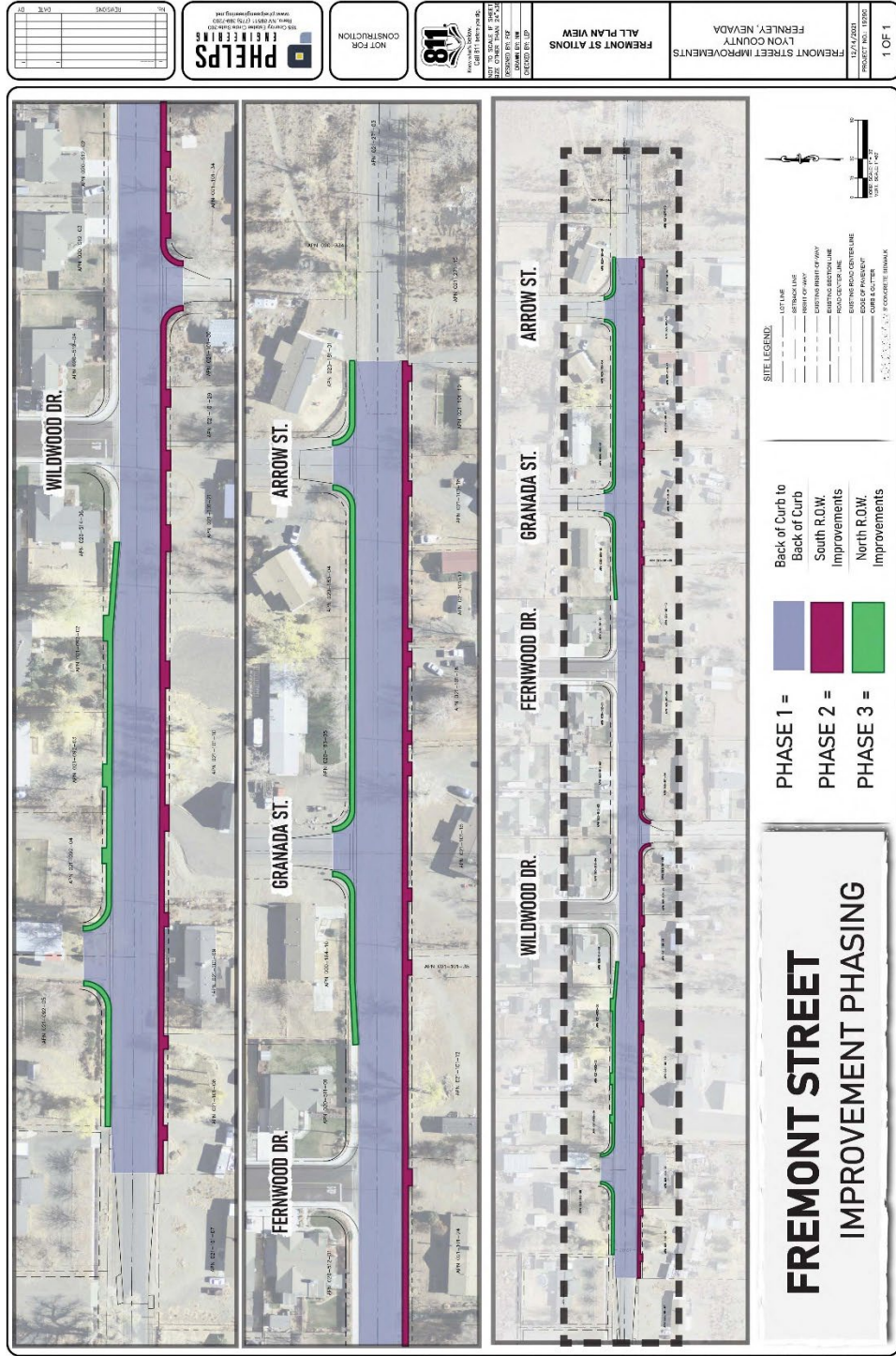


EXHIBIT "D" **IMPROVEMENTS PHASING PLAN**



[illegible]



CITY OF FERNLEY

Planning Commission AGENDA REPORT

Meeting Date: November 9, 2022

REPORT TO: Fernley Planning Commission

REPORT FROM: Shaveta Sharma, Contract Planner

FINANCIAL IMPACT:

Yes: No: X

CURRENTLY BUDGETED:

Yes: No: X

FUND/ACCOUNT:

N/A

ACTION REQUESTED: Motion

AGENDA ITEM: (For Possible Action):

Public Hearing, DA22003 – Clements Ranch (FOR POSSIBLE ACTION)
Discussion and possible action authorizing the City of Fernley to enter into a Development Agreement (DA22003) with Clements Family 1992 Trust to enter into a Development Agreement on a 83.90 acre parcel. The DA is associated with Master Plan Amendment MPA22003 and Zoning Map Amendment ZMA22008.

AGENDA ITEM BRIEF:

The purpose of this development agreement is to allow for of a Master Plan Amendment and Zoning Map Amendment for Clements Ranch pursuant to NRS 278.0201. This agreement will help to facilitate the continued development of this subdivision.

RECOMMENDED MOTION:

"I move to forward a recommendation of approval to City Council for the Development Agreement associated with DA22003, based on Approval Criteria and the facts supporting the Approval Criteria as set forth in the staff report."

BUSINESS IMPACT (per NRS Chapter 237):

A Business Impact Statement is not required because this is not a rule (term excludes vehicles by which legislative powers are exercised under NRS Chapters 271, 278, 278A, or 278B).

See attached report for background, analysis, alternatives.

ALTERNATIVES:

Further motion language has not been provided, but all motions possible in Planning Commission parliamentary procedure are appropriate.

BACKGROUND:

A Master Plan Map Amendment (MPA22003) and Zoning Map Amendment (ZMA22008) were submitted to the City of Fernley on July 19, 2022 for the Clements Ranch Property (APN 021-341-18). The Applicant is proposing certain buffering standards along the east and west property lines adjacent to the existing subdivisions. As a master plan and zoning map amendment cannot be conditioned the Applicant is proposing a Development Agreement to provide assurance that the buffering standards can be enforced going forward.

As part of a Master Plan Map Amendment (MPA22003) and Zoning Map Amendment (ZMA22008) recently submitted to the City of Fernley, the Applicant has proposed certain buffering standards along the west and east property boundary of the subject parcel. These proposed buffering standards are outlined as followed and are included in the attached Development Agreement:

- a. Minimum 0.40 acre lots with lot width matching, and future houses limited to single story along the western boundary;
- b. Minimum 14,000 square foot Lots with lot width matching, and future houses limited to single story along the eastern boundary and APN 021-341-13;
- c. The Clements Ranch Property will be limited to 400 units.

These proposed standards are consistent with the Development Code for Adjacency (Section 32.09.030(D)), and will provide further protections for existing residences along the eastern and western boundary where the SF6 zoning is proposed.

ANALYSIS

The project proposal to allow the proposed ± 68.4 acres of SF6 zoning is consistent with the current Master Plan designation of Single Family Residential (SFR). The proposed development agreement ensures the proposed zoning will remain compatible with the surrounding area. The proposed SF6 zoning and this development agreement also provide a buffer between the existing subdivisions and the proposed Master Plan Amendment to change ± 15.5 acres ($\pm 18\%$) of the subject parcel from SFR to MR adjacent to existing commercial along US 50 would help meet several of the goals identified in the City's Master Plan.

The proposed subdivision will be consistent with the city's master plan and is required to comply with the requirements of the development code. Staff sees this Development Agreement as an opportunity to work with a developer to meet the City's needs and goals. The City of Fernley can approve a development agreement if the project in question is both consistent with the cities master plan (NRS278.0284) and consistent with Nevada or Federal Law as stated in Fernley's municipal code (Sec. 32.03.100).

RELEVANT LAWS, STATUTES, AND REGULATIONS:

Nevada Revised Statutes 278A
Fernley Municipal Code, Title 32
City of Fernley Development Code, Section 32.03.100

FINANCIAL IMPLICATIONS:

N/A

ATTACHMENTS:

1. Draft Development Agreement

DRAFT AGREEMENT FOR DISCUSSION PURPOSES ONLY

When recorded, mail to:

City Clerk
City of Fernley
595 Silver Lace Boulevard
Fernley, NV 89408

DEVELOPMENT AGREEMENT

ARTICLE 1. PARTIES, DEFINITIONS AND PROPERTY DESCRIPTIONS.

This Development Agreement (“Agreement”) is by and between:

“Developer” Clements Ranching, LLC,
a Nevada limited liability company
3000 Farm District Road
Fernley, NV 89408
Email: mattpclements@gmail.com

“City” City of Fernley,
a Nevada municipal corporation
595 Silver Lace Boulevard
Fernley, NV 89408
Email: tthompson@cityoffernley.org

Key definitions in this Agreement are:

“Project” means the Master Plan Map Amendment (MPA22003) and Zoning Map Amendment (ZMA22008) were submitted to the City of Fernley, Nevada (the **“City”**) on July 19, 2022, and any future residential project located on the Project Property.

“Project Property” means that real property located in the City of Fernley, County of Lyon, State of Nevada, more particularly described as **Exhibit A** attached hereto, having Lyon County Assessor’s Parcel Number (**“APN”**) 021-341-18.

“Record”, “Recording”, “Recordation”, or “Recorded”: To file, the filing, or filed of record with the Office of the County Recorder of Lyon County, Nevada. The date of Recording shall refer to that time at which a document or map is Recorded.

ARTICLE 2. RECITALS.

- A. Developer is the current owner of the Project Property and anticipates proposing residential development on the Project Property.
- B. On July 19, 2022, Developer submitted applications to the City for a Master Plan Map Amendment and Zoning Map Amendment for the Project Property.

- C. Developer has proposed certain buffering standards along the west and east property boundary of the subject parcel consistent with the City's Development Code ("**Code**") standards for adjacency (Code §32.09.030(D)), and a limitation on the total number of units which may be provided.
- D. The City is authorized, pursuant to NRS 278.360, NRS 278.0201 through 278.0207, inclusive, and Code §32.03.100(a), to enter into binding development agreements with any person having a legal or equitable interest in land concerning the development of that land provided that such agreement is consistent with the City of Fernley Comprehensive Master Plan August 2018 ("**Master Plan**").
- E. The Master Plan includes the following goals:
- Enhance Fernley's vitality as a community by providing a variety of housing types, density and costs that accommodate the needs, desires and financial abilities of the current and future households. Master Plan §HP.1.1.
 - Encourage housing that supports sustainable development patterns by promoting the efficient use of land [...and] easy access to services and public facilities[...]. Master Plan §HP.1.2.
 - Strive for viable mixed income neighborhoods throughout Fernley that collectively reflect the diversity of housing types and tenure (rental and ownership). Master Plan §HP.1.3.
 - Provide a spectrum of high-quality housing to meet the City's need. §HP.1.6.
 - Encourage new development in areas where adequate public services and facilities can be provided efficiently. Master Plan §LU.1.1
 - Promote infill development. Master Plan §LU.1.5.
- F. By entering into this Agreement, the City will ensure the orderly development of the Projects and completion of the Project Conditions, which in turn would be consistent with the City's goals set forth in the Master Plan as identified in Recital E above. As such, approval of this Agreement is consistent with the Master Plan, as required by NRS 278.0203 and Code §32.03.100(A)(6)(a).
- G. Acknowledging the foregoing, the parties desire to enter into this Agreement to provide for the matters set forth herein.

NOW, THEREFORE, in exchange for mutual considerations, the sufficiency of which is hereby acknowledged, the parties agree as follows:

ARTICLE 3. DEVELOPMENT MATTERS.

Section 3.1 Development Standards.

The permitted uses of the Project Property, the density or intensity of its use, the maximum height and size of the proposed buildings, and any dedication of any portion of the Project Property to the City for public use shall be as provided in this Agreement, the Code, and any future entitlements or approvals issued by the City for the Project or the Project Property, as the same may hereafter be revised, modified or amended from time to time in accordance with applicable law.

Section 3.2 Limitation.

The provisions of NRS 278.0201 apply to this Agreement.

Section 3.3 Standards for Residential Adjacency; Limitation on Number of Dwelling Units.

The City and Developer agree that if the City approves the Master Plan Map Amendment (MPA22003) and Zoning Map Amendment (ZMA22008) submitted by the Developer on July 19, 2022, the Project Property and all future permits and approvals considered by the City in connection therewith, shall require the following development standards and impose the following development constraints upon the Project Property:

- (i) Along the western boundary of the Project Property, residential lots shall provide a minimum 0.40-acre lot area with lot width matching, and all residential structures shall be limited to a single story;
- (ii) Along the eastern boundary of the Project Property and along the boundary line shared between the Project Property and APN 021-341-13, residential lots shall provide a minimum of 14,000 square feet lot area with lot width matching, and all residential structures shall be limited to a single story; and
- (iii) The maximum density allowed on the Project Property shall not exceed 400 residential units.

Section 3.4 No Further Requirements

Provided the requirements of Section 3.3 are met and/or satisfied, the City shall not require any further exaction, condition, mitigation, or standard of Developer, the Project, or the Project Property in satisfaction of the Section 3.3.

ARTICLE 4. GENERAL TERMS.

Section 4.1 Effective Date; approved by ordinance.

This Agreement is not effective until it has been approved by ordinance by the City Council for the City of Fernley (“**City Council**”) and Recorded.

Section 4.2 Term; Cancellation.

This Agreement shall continue in full force and effect in perpetuity, unless cancelled in accordance with the terms NRS 278.0205. A cancellation of this Agreement is not effective or binding until approved by ordinance of the City Council and Recorded in accordance with NRS 278.0205.

Section 4.3 Modifications and Amendments.

Modifications and amendments to this Agreement are not effective or binding until approved by ordinance of the City Council and Recorded in accordance with NRS 278.0205.

Section 4.4 Breach.

A violation of this Agreement by a party shall be a breach of this Agreement by that party if, within 60 days after receipt of notice of such violation delivered in accordance with Section 4.7 below by the non-violating party, the party in violation fails to cure such violation.

Section 4.5 Entire Agreement.

With respect to the matters addressed herein (including the recitals), this Agreement integrates all of the terms and conditions mentioned herein or incidental hereto, and supersedes all negotiations or previous agreements between the parties.

Section 4.6 Assignments; Transfer of rights.

Developer shall have the right to assign all or any portion of its rights and delegate any obligations under this Agreement to third parties who acquire fee simple absolute ownership to any portion of the Project Property.

Section 4.7 Notices; when deemed sufficiently given.

A. Formal notices, demands and communications between the City and Developer must be in writing and must be sent to the addresses or facsimile numbers stated in Article 1 above and to each successor or assign of Developer to the address given by such party in writing and if no written notice is given, then to the address stated in the transfer agreement, and/or to any address or number subsequently communicated to the sending party in writing.

B. If notice is sent by registered or certified mail to the correct address, postage prepaid, it will be deemed sufficiently given the earlier of when actually received by the addressee or three business days after it is received by the U.S. Post Office as indicated on the receipt.

C. If notice is sent by courier, or overnight delivery service (Federal Express, UPS Overnight, U.S. Postal Priority Mail), and is properly addressed, it will be deemed sufficiently given when delivered as indicated in the records of the courier or service.

D. If notice is sent by facsimile, properly addressed to the addressee specified in Article 1 above and is actually sent to the correct facsimile number, it will be deemed sufficiently given when receipt is confirmed by either the receiving or sending facsimile machine, provided that that confirmation is in writing and sufficiently identifies the document, and indicates the time and date that the document was received by the receiving facsimile machine.

Section 4.8 Further documents.

Each party agrees to honor any reasonable requests by the other party to complete, execute, and deliver any document necessary to accomplish the purposes hereof.

Section 4.9 Attorney's fees and costs.

If any party hereto institutes any action or proceeding (including arbitration, if authorized or mutually agreed upon) against the other or others arising out of or relating to this Agreement, the prevailing party shall be awarded attorney's fees and costs by the other party.

Section 4.10 Time of Essence.

Time is of the essence in the performance of this Agreement.

Section 4.11 Governing law.

The laws of the State of Nevada, without regard to conflicts of law principles, shall govern the interpretation and enforcement of this Agreement.

Section 4.12 Severability of invalid or unenforceable provisions.

If any provision contained in this Agreement is held to be unenforceable by a court of law or equity, this Agreement shall be construed as if such provision did not exist and the non-enforceability of such provision shall not be held to render any other provision or provisions of this Agreement unenforceable.

Section 4.13 Binding effect; successors and assigns; assignment/delegation.

This Agreement shall be binding upon and inure to the benefit of the heirs, executors, administrators, and permitted successors and assigns of the parties hereto. To the extent that any assignment of any right under this Agreement changes the duty of either party, increases the burden or risk involved, impairs the chances of obtaining the performance of this Agreement, attempts to operate as novation, or includes a waiver or abrogation of any defense to payment by the City, such offending portion of the assignment shall be void, and shall be a breach of this Agreement.

Section 4.14 No third-party beneficiaries intended.

Unless otherwise specifically identified in this Agreement, there are no third-party beneficiaries intended by this Agreement and no third parties have any standing to enforce any of the provisions of this Agreement.

Section 4.15 Representation and warranties by persons who sign this Agreement.

Each person who signs this Agreement represents and warrants to each other person who signs this Agreement that he or she is an authorized agent of and has actual authority to execute this Agreement on behalf of the party for whom he or she is signing, and that all required approvals and actions have been taken to authorize the execution of this Agreement with the intent and effect of binding the party to this Agreement.

Section 4.16 Counterparts.

This Agreement may be executed in any number of counterparts, each of which when so executed and delivered shall be deemed an original; and such counterparts shall constitute one and the same Agreement. Any signature page of the Agreement may be detached from any counterpart without impairing the legal effect of any signatures, and may be attached to another counterpart identical in form. This Agreement may be executed by signatures provided by facsimile or email, and such signatures shall be as binding and effective as original signatures.

Section 4.17 Construction.

This Agreement is the product of joint collaboration and negotiations among the parties and their counsel. The terms and conditions of this Agreement shall be construed as a whole according to their fair meaning, and not strictly for or against any party. Further, any ambiguities are to be resolved according to their fair meaning, and not construed against the drafting party.

Section 4.18 Effective Date.

This Agreement shall be effective upon execution by Developer and the City after its approval by the Fernley City Council.

[Signature Pages Follows]

EXECUTED on the dates indicated:

City:

CITY OF FERNLEY,

a Nevada municipal corporation

Dated _____, 2022

By: _____

Name _____

Its: _____

Attest: _____

City Clerk

State of Nevada

County of Lyon

This instrument was acknowledged before me on _____ by
_____ as _____ of City of Fernley, a Nevada
municipal corporation.

(Signature of notarial officer)

(Seal, if any)

Developer:

CLEMENTS RANCHING, LLC
a Nevada limited liability company

Dated _____, 2022

By: _____

Name _____

Its: _____

Attest: _____

State of _____

County of _____

This instrument was acknowledged before me on _____ by
_____ as _____ of CLEMENTS RANCHING,
LLC, a Nevada limited liability company.

(Signature of notarial officer)

(Seal, if any)

EXHIBIT A
LEGAL DESCRIPTION

DRAFT

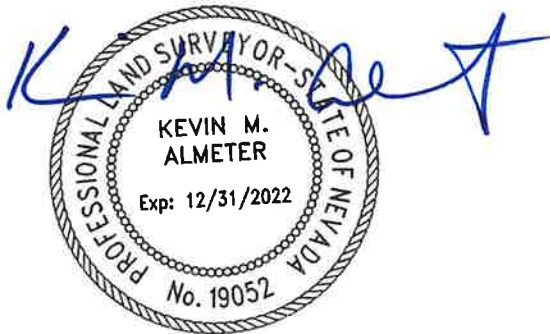
EXHIBIT A
LEGAL DESCRIPTION FOR PROJECT PROPERTY

All that certain real property situate within a portion of the Northeast One-Quarter (NE 1/4) of Section Twenty-One (21) and a portion of the Northwest One-Quarter (NW 1/4) of Section Twenty-Two (22), Township Twenty (20) North, Range Twenty-Five (25) East, Mount Diablo Meridian, City of Fernley, County of Lyon, State of Nevada, and being more particularly described as follows:

BEING Parcel 2-A of the Parcel Map for "Clements Ranching, LLC", recorded on December 8, 2017, as File No. 573596, filed in the Official Records of Lyon County, Nevada.

APN: 021-341-18

Prepared by:
Wood Rodgers, Inc.
1361 Corporate Blvd.
Reno, NV 89502



8-11-22

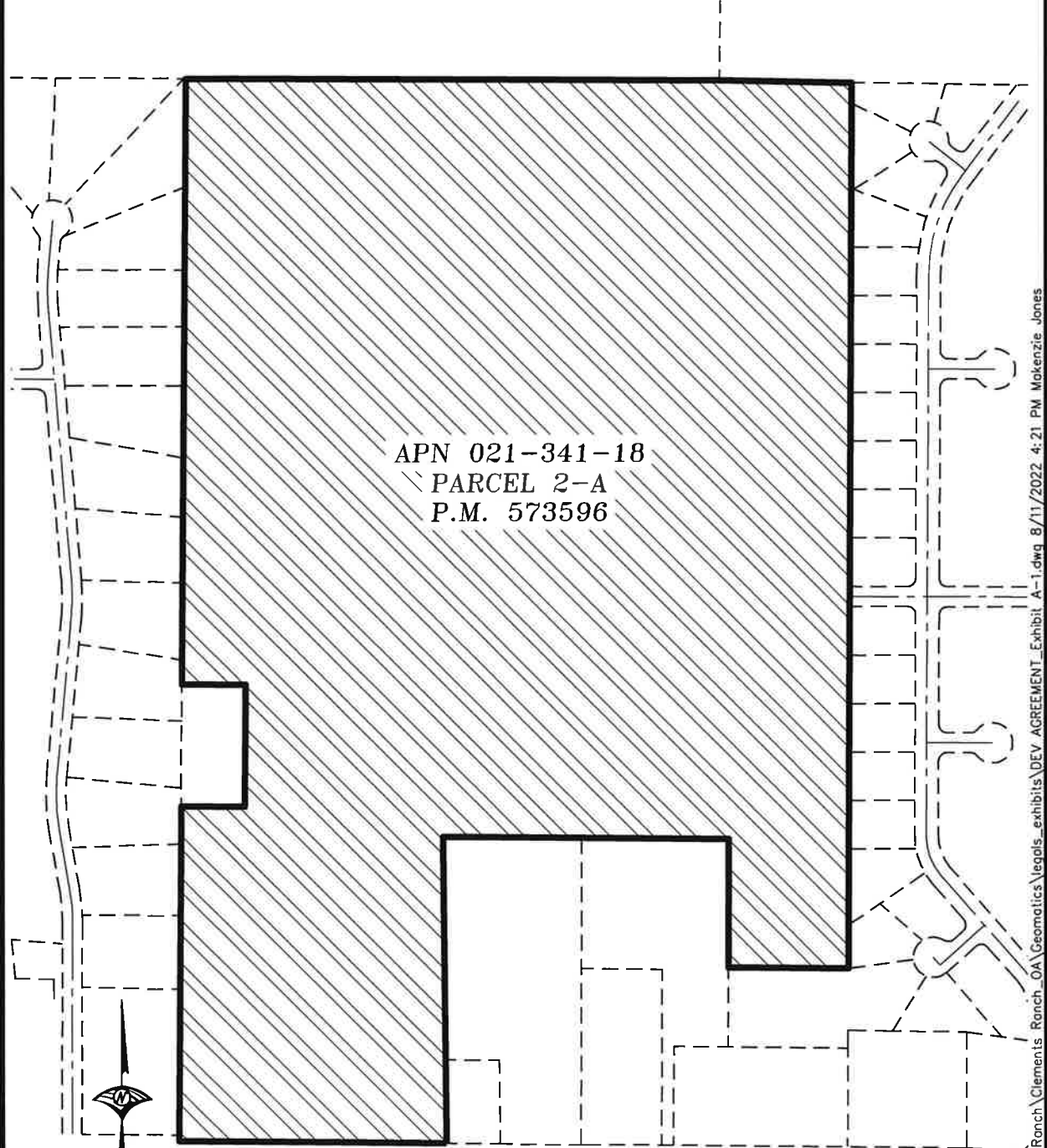
Kevin M. Almeter, P.L.S.
Nevada Certificate No. 19052

EXHIBIT A-1

PLAT TO ACCOMPANY

PROJECT PROPERTY

PORTIONS OF THE NE 1/4 OF SECTION 21 &
THE NW 1/4 OF SECTION 22
TOWNSHIP 20 NORTH, RANGE 25 EAST, M.D.M.
FERNLEY LYON COUNTY NEVADA



APN 021-341-18
PARCEL 2-A
P.M. 573596



1" = 400'

FARM DISTRICT ROAD

JOB NO. 3460004
SHEET 1 OF 1



WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME

1361 Corporate Blvd
Reno, NV 89502

Tel 775.823.4068
Fax 775.823.4066

J:\Jobs\3460_Clements Ranch\Clements Ranch_OA\Geomatics\egols_exhibits\DEV AGREEMENT_Exhibit A-1.dwg 8/11/2022 4:21 PM McKenzie Jones



CITY OF FERNLEY

Planning Commission AGENDA REPORT

Meeting Date: November 9, 2022

REPORT TO: Fernley Planning Commission

REPORT FROM: Shay League

FINANCIAL IMPACT:

Yes: No: X

CURRENTLY BUDGETED:

Yes: No: X

FUND/ACCOUNT:

N/A

ACTION REQUESTED: Motion

AGENDA ITEM: (For Possible Action):

Public Hearing, TSM22007 - Tentative Subdivision Map for Duets at Red Hawk Ranch
Consideration and possible action on a Tentative Subdivision Map request to allow for the development of a 282 lot single-family attached subdivision named "Duets at Red Hawk Ranch" on a site ±31.15 acres in size and generally located at the southwest corner of the Miller Lane and Main Street intersection (APN: 021-041-09) by request of Paradiso Communities.

AGENDA ITEM BRIEF:

This project is directly adjacent to the proposed Red Hawk Ranch development. It is located in a land use area of Fernley identified as Mixed Residential in the Fernley Comprehensive Plan. The zoning designation is MDR14 (Residential, Medium Density Residential - 14 dwelling units per acre maximum), which is an equivalent zoning category for the Mixed Residential land use.

RECOMMENDED MOTION:

Approval

"I move to forward a recommendation of approval to City Council for the tentative subdivision map associated with TSM22007 based on findings TM1 through TM11 and the facts supporting the criteria as set forth in the staff report and subject to conditions of approval 1 through 33 as listed in the staff report."

BUSINESS IMPACT (per NRS Chapter 237):

A Business Impact Statement is not required because this is not a rule (term excludes vehicles by which legislative powers are exercised under NRS Chapters 271, 278, 278A, or 278B).

See attached report for background, analysis, alternatives.

ALTERNATIVES:

Denial

"Based on information received in written materials and at the public hearings on this matter, I move to forward a recommendation of denial to City Council for the tentative subdivision map associated with TSM22007 because I have determined the proposed changes are detrimental to the public's health, safety, and general welfare and am unable to make the following required findings: I am unable to make the finding(s) _____ as it relates to _____. Therefore, I cannot approve the tentative subdivision map."

Note: Though further specific language has not been provided, all other motions acceptable under Planning Commission parliamentary procedure are possible.

BACKGROUND:

This project was previously reviewed by Planning Commission on July 13, 2022 through a zoning map amendment (ZMA22006) with the working name of "Miller-Main Street". Planning Commission recommend disapproval of a rezone from SF6 (Residential, Single-Family - 6,000 square foot minimum lot size) to MDR14 (Residential, Medium Density Residential - 14 dwelling units per acre maximum) by a vote of 4-1. City Council approved the rezone on September 7, 2022 by a vote of 4-1.

Analysis

The current zone of this site is MDR14 residential yield of 7 - 14 dwelling units per acre and the proposed density of just over 9 dwelling units per acre is appropriate for this zone. All exterior lots are in compliance with the dimensional standards outlined within Fernley Municipal Code. The developer is requesting approval of this map with some deviation from the dimensional standards as outlined within Fernley Municipal Code for lots on the interior. They make this request in order to make smaller lots that are more accommodating of duplex-style development, and to allow open common space between these homes. Those dimensional requests are as follows:

- Minimum lot size reduced from 6,000 square feet to 2,048 square feet
- Minimum lot width reduced from 45 feet to 30 feet
- Front yard setback reduced from 15 feet to 10 feet (to retain the required 20-foot setback requirement for the garage)
- Side yard setback reduced from 10 feet to zero (with the addition of 10 feet of common space in between each duplex)

There are further design deviations requested on page 3 of 11. Overall, planning staff supports these changes and have verified that none of the requested changes violate any public safety codes. These requests seem appropriate to fit duplexes within a zone that was designed for apartments or townhomes.; this is an appropriate compromise to get the desired look of a single-family neighborhood while increasing density.

Findings

Tentative subdivision maps shall be evaluated based on the following approval criteria:

- T1. Compliance with environmental and health laws and regulations concerning water and air pollution, solid waste disposal, water supply facilities, and community or public sewage disposal.
- T2. Availability of water that meets applicable health standards and is sufficient for the reasonably foreseeable needs of the subdivision.

- T3. Availability and accessibility of utilities.
- T4. Availability and accessibility of public services such as schools, police and fire protection, transportation, recreation facilities, and parks.
- T5. Consistency with zoning district regulations.
- T6. Conformity with the master streets and highways plan.
- T7. Effect of the proposed subdivision on existing public streets and the need for new streets or highways to serve the subdivision.
- T8. Physical land characteristics, such as floodplain, slope, soil, and elevation differentials with abutting properties.
- T9. Recommendations and comments of review bodies.
- T10. Conformity to the master sewer and water utility plan.
- T11. Compliance with Fernley Municipal Code and all other regulations.

The applicant provided a detailed assessment regarding how their project meets these tentative subject map findings. Staff has reviewed this assessment in depth and agrees with and endorses their assessment. Please refer to pages 8-11 of the attached Project Description.

RELEVANT LAWS, STATUTES, AND REGULATIONS:

- Nevada Revised Statutes, Chapter 278 - Planning and Zoning
- Fernley Municipal Code (FMC), Title 32 - Development Code

Items of particular interest:

- FMC Section 32.03.060 (f)(1) - Tentative subdivision maps
- FMC Section 32.06.080 - Residential - Multiple family (MDR14, MF21, and MF30)
- FMC Chapter 32.09 - Development Standards

FINANCIAL IMPLICATIONS:

N/A

ATTACHMENTS:

- 1. Conditions of Approval
- 2. Maps and Graphics
- 3. Project Description
- 4. Traffic Impact Study
- 5. Preliminary Drainage Report
- 6. Preliminary Sewer Report
- 7. Elevations
- 8. Floor Plans

Conditions of Approval for TSM22007

Tentative Subdivision Map

1. APPROVAL:

THE PROJECT IS APPROVED AS SUBMITTED AND CONDITIONED. ANY SUBSTANTIVE CHANGE SHALL REQUIRE REVIEW AND APPROVAL BY THE PLANNING COMMISSION AND CITY COUNCIL AS AN AMENDMENT TO THIS TENTATIVE MAP.

2. PROJECT DESCRIPTION:

THE PROJECT APPROVAL IS LIMITED TO SINGLE FAMILY RESIDENTIAL DEVELOPMENT WITH A MAXIMUM OF 282 ATTACHED SINGLE FAMILY RESIDENTIAL LOTS ON ±31.15 ACRES.

3. EXPIRATION DATE:

THE TENTATIVE MAP SHALL EXPIRE WITHIN FOUR (4) YEARS OF THE DATE OF THE CITY COUNCIL APPROVAL UNLESS THE FINAL MAP HAS BEEN RECORDED IN ACCORDANCE WITH NEVADA REVISED STATUTES (N.R.S.) 278.360.

4. WATER RIGHTS:

THE DEVELOPER SHALL COMPLY WITH ALL CITY OF FERNLEY MUNICIPAL CODES REGARDING THE DEDICATION OF WATER RIGHTS, INCLUDING ASSOCIATED FEES, FOR THE CONNECTION TO THE CITY'S MUNICIPAL WATER SYSTEM IN THE AMOUNT THAT IS REQUIRED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR THE PROJECT.

5. SANITARY SEWER:

THE DEVELOPER SHALL PROVIDE A SEWER REPORT DEMONSTRATING THE DEVELOPMENT CAN BE SERVED BY THE CITY'S SANITARY SEWER SYSTEM. THE DEVELOPER SHALL BE RESPONSIBLE FOR ANY IMPROVEMENTS DEEMED NECESSARY TO SERVE THE PROJECT TO THE APPROVAL OF THE CITY ENGINEER. THE DEVELOPER SHALL COMPLY WITH ALL CITY OF FERNLEY MUNICIPAL CODES REGARDING THE SANITARY SEWER SYSTEM, INCLUDING ASSOCIATED FEES, FOR THE CONNECTION TO THE CITY'S SANITARY SEWER SYSTEM IN THE AMOUNT THAT IS REQUIRED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR THE PROJECT.

6. WATER & SEWER MAINS AND SERVICES:

THE DEVELOPER SHALL COMPLY WITH ALL STANDARDS, CODES, AND REQUIREMENTS REGARDING CONNECTION TO THE CITY'S SANITARY SEWER AND POTABLE WATER SYSTEMS, INCLUDING BUT NOT LIMITED TO, ASSOCIATED FEES, EASEMENTS, DESIGN STANDARDS, SYSTEM LOOPING, DEVELOPMENT CODE REQUIREMENTS, AND STATE REQUIREMENTS.

THE DEVELOPER SHALL PROVIDE THE CITY WITH A UTILITY PLAN FOR WATER AND SANITARY SEWER THAT IS IN CONFORMANCE WITH THE CITY OF FERNLEY'S MUNICIPAL CODE AND PUBLIC WORKS DESIGN MANUAL TO THE APPROVAL OF THE CITY ENGINEER, PUBLIC WORKS DIRECTOR, AND ADMINISTRATOR. EACH PHASE MUST ALSO BE REVIEWED AND APPROVED BY THE NEVADA DEPARTMENT OF ENVIRONMENTAL PRIOR TO CONSTRUCTION.

7. UTILITY EASEMENTS:

THE DEVELOPER SHALL PROVIDE EASEMENTS TO THE CITY OF FERNLEY FOR THE MAINTENANCE OF THE PUBLIC INFRASTRUCTURE BEING INSTALLED ON PRIVATE PROPERTY. THE EASEMENTS SHALL INCLUDE THE CITY OF FERNLEY'S STANDARD EASEMENT LANGUAGE AND SHALL BE RECORDED ALONG WITH THE FINAL MAP.

Conditions of Approval for TSM22007

Tentative Subdivision Map

8. DESIGN STANDARDS:

THE DEVELOPER SHALL COMPLY WITH THE DESIGN STANDARDS AND REGULATIONS AS SET FORTH IN THE CITY OF FERNLEY'S DEVELOPMENT CODE AND PUBLIC WORKS DESIGN MANUAL UNLESS IN CONFLICT WITH THE LOCAL, STATE, OR FEDERAL REGULATIONS, IN WHICH CASE THE MORE STRINGENT REGULATION WILL TAKE PRECEDENCE.

9. LANDSCAPING/IRRIGATION:

THE DEVELOPER SHALL SUBMIT A LANDSCAPING AND IRRIGATION PLAN FOR THE PROJECT IN CONFORMANCE WITH TITLE 32 OF THE FERNLEY MUNICIPAL CODE FOR REVIEW AND APPROVAL BY THE ADMINISTRATOR PRIOR TO APPROVAL AND RECORDATION OF A FINAL MAP FOR EACH PHASE. THE LANDSCAPING AND IRRIGATION SHALL BE INSTALLED PER THE APPROVED PLANS TO THE APPROVAL OF THE ADMINISTRATOR.

10. ARCHITECTURE/BUILDING ELEVATIONS:

ARCHITECTURAL BUILDING ELEVATIONS SHALL COMPLY WITH THE DESIGN CRITERIA IN CHAPTER 32.06 OF THE FERNLEY MUNICIPAL CODE TO THE APPROVAL OF THE ADMINISTRATOR.

11. STREETS:

THE DEVELOPER SHALL CONSTRUCT ANY ROADWAY IMPROVEMENTS NECESSARY TO SERVE THE PROJECT IN ACCORDANCE WITH THE PUBLIC WORKS DESIGN MANUAL TO THE APPROVAL OF THE ADMINISTRATOR, CITY ENGINEER, AND PUBLIC WORKS DIRECTOR.

ALL INTERIOR STREETS WITHIN THE PROJECT SHALL BE MAINTAINED BY THE HOMEOWNER'S ASSOCIATION.

12. DRAINAGE & GRADING:

THE DEVELOPER SHALL COMPLY WITH ALL REQUIREMENTS OF THE FERNLEY MUNICIPAL CODE CHAPTER 32 (DRAINAGE AND GRADING) AND CHAPTER 10 OF THE CITY OF FERNLEY'S PUBLIC WORKS DESIGN MANUAL TO THE APPROVAL OF ADMINISTRATOR, CITY ENGINEER, AND PUBLIC WORKS DIRECTOR.

THE DEVELOPER SHALL PROVIDE A DRAINAGE REPORT FOR THE PROJECT IN CONFORMANCE WITH THE CITY'S DEVELOPMENT CODE, MUNICIPAL CODE, AND THE PUBLIC WORKS DESIGN MANUAL FOR REVIEW AND APPROVAL BY THE CITY ENGINEER. EACH SUCCESSIVE PHASE OF THE PROJECT SHALL SUBMIT AN UPDATED DRAINAGE REPORT FOR REVIEW AND APPROVAL BY THE CITY ENGINEER SHOWING THE CUMULATIVE EFFECT OF THE DEVELOPED PORTION OF THE PROJECT ALONG WITH THE PROPOSED PHASE'S EFFECT ON THE TOTAL DISCHARGE INTO THE DRAINAGE SYSTEM.

GRADING PERMIT:

THE DEVELOPER SHALL SUBMIT A GRADING PLAN FOR ANY PHASE OF THE PROJECT TO THE APPROVAL OF THE CITY ENGINEER. PRIOR TO THE ISSUANCE OF A GRADING PERMIT FOR THE DEVELOPMENT, THE DEVELOPER SHALL POST A SURETY BOND FOR REGRADING AND RECLAMATION OF THE SITE. THE DEVELOPER SHALL PROVIDE A STAMPED ENGINEER'S ESTIMATE FOR REGRADING AND RECLAMATION OF THE SITE. THE DEVELOPER SHALL COMPLY WITH ALL GRADING REQUIREMENTS SET FORTH IN THE CITY OF FERNLEY'S DEVELOPMENT CODE AS WELL AS ALL STATE AND FEDERAL REGULATIONS. THE DEVELOPER OR THEIR DESIGNEE SHALL BE

Conditions of Approval for TSM22007

Tentative Subdivision Map

RESPONSIBLE FOR OBTAINING AND MAINTAINING A STORM WATER POLLUTION PREVENTION PERMIT WITH THE STATE OF NEVADA AS WELL AS A SURFACE AREA DISTURBANCE PERMIT.

14. GEOTECHNICAL REPORT:

THE DEVELOPER SHALL PROVIDE A FINAL GEOTECHNICAL REPORT FOR THE PROJECT IN CONFORMANCE WITH THE DEVELOPMENT CODE FOR REVIEW AND APPROVAL BY THE ADMINISTRATOR, CITY ENGINEER, PUBLIC WORKS DIRECTOR PRIOR TO THE RECORDATION OF A FINAL MAP FOR ANY PORTION OF THE PROJECT.

15. NORTH LYON FIRE PROTECTION DISTRICT:

THE DEVELOPER SHALL COMPLY WITH ALL REQUIREMENTS OF THE NORTH LYON COUNTY FIRE PROTECTION DISTRICT, INCLUDING BUT NOT LIMITED TO PROVIDING SECONDARY EMERGENCY ACCESS TO THE APPROVAL OF THE ADMINISTRATOR AND FIRE CHIEF PRIOR TO THE ISSUANCE OF ANY PERMIT FOR THE PROJECT.

16. RESIDENTIAL CONSTRUCTION TAX:

THE DEVELOPER IS SUBJECT TO THE PROVISIONS OF FERNLEY MUNICIPAL CODE RELATED TO RESIDENTIAL CONSTRUCTION TAX. THE RESIDENTIAL CONSTRUCTION TAX FEE SHALL BE PAID PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR EACH SINGLE-FAMILY RESIDENCE.

17. ADDRESSING AND STREET NAMES:

THE DEVELOPER SHALL SUBMIT A REQUEST FOR ADDRESSING AND STREET NAME RESERVATION APPLICATION TO THE CITY OF FERNLEY FOR REVIEW AND APPROVAL. ALL ADDRESSING OF LOTS SHALL BE COMPLETED BY THE CITY. STREET NAMES SHALL BE APPROVED BY THE CITY PRIOR TO THE SUBMITTAL OF A FINAL MAP FOR THE PROJECT.

18. TRUCKEE CARSON IRRIGATION DISTRICT (TCID)/BUREAU OF RECLAMATION:

THE DEVELOPER SHALL COMPLY WITH ALL REQUIREMENTS OF THE NEVADA DEPARTMENT OF THE TRUCKEE CARSON IRRIGATION DISTRICT AND/OR THE BUREAU OF RECLAMATION RELATED TO ANY FACILITY OR EASEMENT WITHIN THE PROJECT BOUNDARY TO THE APPROVAL OF THE ADMINISTRATOR PRIOR TO THE APPROVAL AND RECORDATION OF A FINAL MAP.

19. NEVADA DEPARTMENT OF ENVIRONMENTAL PROTECTION:

THE DEVELOPER SHALL COMPLY WITH ALL REQUIREMENTS OF THE NEVADA DEPARTMENT OF ENVIRONMENTAL PROTECTION – BUREAU OF SAFE DRINKING WATER AND BUREAU OF WATER POLLUTION CONTROL FOR THE WATER AND SEWER INFRASTRUCTURE DESIGN AND CONSTRUCTION TO THE APPROVAL OF THE ADMINISTRATOR, CITY ENGINEER, AND PUBLIC WORKS DIRECTOR.

20. PROJECT PHASING:

THE PROJECT SHALL BE DEVELOPED IN ACCORDANCE WITH THE PHASING PLAN INCLUDED AS PART OF THIS APPROVAL. EACH PHASE SUBMITTED MUST BE DESIGNED TO MEET THE PUBLIC FACILITIES AND IMPROVEMENT STANDARDS AND BE ABLE TO OPERATE INDEPENDENTLY AND AS PART OF THE OVERALL DESIGN. CHANGES TO THE PHASING PLAN WILL REQUIRE REVIEW AND APPROVAL BY THE ADMINISTRATOR, CITY ENGINEER, AND PUBLIC WORKS DIRECTOR PRIOR TO BEING IMPLEMENTED.

Conditions of Approval for TSM22007 Tentative Subdivision Map

21. WASTE MANAGEMENT:

THE DEVELOPER SHALL PROVIDE A WILL SERVE FROM WASTE MANAGEMENT TO THE APPROVAL OF THE ADMINISTRATOR PRIOR TO THE APPROVAL AND RECORDATION OF A FINAL MAP.

22. UNITED STATES POSTAL SERVICE:

THE DEVELOPER SHALL PROVIDE AN EASEMENT FOR ANY NEW CLUSTER MAILBOX LOCATION TO THE APPROVAL OF THE ADMINISTRATOR AND LOCAL POSTAL INSPECTOR PRIOR TO THE APPROVAL AND RECORDATION OF A FINAL MAP.

23. NEVADA DEPARTMENT OF TRANSPORTATION (NDOT):

THE DEVELOPER SHALL COMPLY WITH ALL REQUIREMENTS OF THE NEVADA DEPARTMENT OF TRANSPORTATION FOR ALL WORK IMPACTING NDOT RIGHTS-OF-WAY.

24. FENCING PLANS:

AT THE TIME OF FINAL MAP SUBMITTAL, THE DEVELOPER SHALL SUBMIT A FENCING PLAN IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH IN THE CITY'S MUNICIPAL CODE TO THE APPROVAL OF THE ADMINISTRATOR, CITY ENGINEER, AND PUBLIC WORKS DIRECTOR.

25. COVENANTS, CONDITIONS, AND RESTRICTIONS (CC&R'S):

THE APPLICANT SHALL PROVIDE COVENANTS, CONDITIONS, AND RESTRICTIONS (CC&R'S) WITH THE FIRST FINAL MAP AND SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE ADMINISTRATOR AND CITY ATTORNEY. CC&R'S SHALL BE RECORDED CONCURRENTLY WITH THE FINAL SUBDIVISION MAP.

THE APPLICANT SHALL INCLUDE IN THE CC&R'S PROVISIONS OUTLINING PERPETUAL MAINTENANCE RESPONSIBILITIES OF COMMON AREAS, LANDSCAPE MEDIANS, PERIMETER FENCING, OR OTHER COMMON ELEMENTS TO THE APPROVAL OF THE ADMINISTRATOR, CITY ENGINEER, AND PUBLIC WORKS DIRECTOR.

THE CITY SHALL BE NAMED A THIRD-PARTY BENEFICIARY OF SAID MAINTENANCE OBLIGATIONS TO THE APPROVAL OF THE ADMINISTRATOR AND SHALL DISCLOSE THAT THE CITY MAY REQUIRE FORMATION OF A LANDSCAPE MAINTENANCE ASSESSMENT DISTRICT IN THE EVENT OF DEFAULT UNDER SUCH MAINTENANCE OBLIGATIONS.

26. RIGHT TO FARM:

THE DEVELOPER SHALL PLACE A NOTE ON THE FINAL MAP PROVIDING NOTICE TO ANY AND ALL SUBSEQUENT PURCHASERS OF "THE RIGHT TO FARM" PROVISIONS INCLUDED IN NEVADA REVISED STATUTES 40.140 AND THE DEVELOPMENT CODE.

27. SUBDIVISION IMPROVEMENT AGREEMENT:

THE DEVELOPER SHALL EXECUTE A SUBDIVISION IMPROVEMENT AGREEMENT WITH THE CITY OF FERNLEY PRIOR TO APPLYING FOR ANY BUILDING PERMITS FOR NEW HOME CONSTRUCTION IF THE PUBLIC IMPROVEMENTS ARE STILL NOT CONSTRUCTED BUT ARE ADEQUATELY SECURED IN ACCORDANCE WITH THE CITY OF FERNLEY DEVELOPMENT CODE. THE AGREEMENT SHALL BE DRAFTED BY THE CITY OF FERNLEY AND PROVIDED TO THE DEVELOPER FOR REVIEW AND EXECUTION. THE AGREEMENT SHALL BE RECORDED PRIOR TO THE ISSUANCE OF A BUILDING

Conditions of Approval for TSM22007

Tentative Subdivision Map

PERMIT. NO HOMES SHALL RECEIVE A FINAL CERTIFICATE OF OCCUPANCY UNTIL THE PUBLIC IMPROVEMENTS ARE COMPLETE AND ACCEPTED BY THE CITY OF FERNLEY.

28. FLOODPLAIN MANAGEMENT AND FEDERAL EMERGENCY MANAGEMENT AGENCY:

THE DEVELOPER SHALL COMPLY WITH CHAPTER 32.09.060 OF THE CITY OF FERNLEY DEVELOPMENT CODE TITLED: FLOODPLAIN MANAGEMENT AS WELL AS ALL FEDERAL EMERGENCY MANAGEMENT AGENCY, FEMA, NATIONAL FLOOD INSURANCE PROGRAM REQUIREMENTS FOR ALL FLOODPLAIN MODIFICATIONS. THE REQUIRED APPROVALS FROM THE CITY OF FERNLEY AND FEMA SHALL BE OBTAINED PRIOR TO WORK BEGINNING WITHIN THE MAPPPED FLOODPLAIN AREA. ALL REQUIRED IMPROVEMENTS SHALL BE CONSTRUCTED AND APPROVED PRIOR TO THE ISSUANCE OF THE FIRST CERTIFICATE OF OCCUPANCY.

29. SR-427/MAIN STREET IMPROVEMENTS

IN ACCORDANCE WITH SECTION 32.09.140 OF THE CITY OF FERNLEY DEVELOPMENT CODE AND THE CITY OF FERNLEY'S 2014 MAIN STREET REVITALIZATION STUDY, THE EXISTING SR-427 SHALL BE IMPROVED TO THE RECOMMENDED SHORT-TERM ALTERNATIVE IDENTIFIED IN THE STUDY. THIS ALTERNATIVE INCLUDES TWO 12-FOOT TRAVELS LANES, A 14-FOOT CENTER TURN LANE, AND A 10-FOOT MEANDERING PATH. THE IMPROVEMENTS SHALL BE CONSTRUCTED ALONG THE DEVELOPMENT BOUNDARY FROM THE INTERSECTION OF TRUCKEE LANE AND SR-427 TO THE INTERSECTION WITH MILLER LANE. THE IMPROVEMENTS SHALL BE COMPLETED PRIOR TO THE ISSUANCE OF THE FIRST CERTIFICATE OF OCCUPANCY. SHOULD THE IMPROVEMENTS ALREADY BE CONSTRUCTED BY THE REDHAWK RANCH PHASE 1 PROJECT OR BY OTHERS, THIS CONDITION IS NOT APPLICABLE.

30. MILLER LANE AND MAIN STREET INTERSECTION IMPROVEMENTS:

THE DEVELOPER SHALL SUBMIT A PROPOSED PLAN FOR THE TRUCKEE LANE/MAIN STREET INTERSECTION, TO THE APPROVAL OF THE CITY ENGINEER, ADMINISTRATOR, PUBLIC WORKS DIRECTOR, AND THE NEVADA DEPARTMENT OF TRANSPORTATION. THE PLAN SHALL INCLUDE THE RECOMMENDATIONS FOR THE INTERSECTION DESCRIBED IN THE AUGUST 9, 2022 TRAFFIC IMPACT STUDY FROM HEADWAY TRANSPORTATION. THESE RECOMMENDATIONS INCLUDE A STRIPED NORTHBOUND LEFT TURN LANE ON THE MILLER APPROACH, AN EASTBOUND RIGHT TURN LANE ON MAIN STREET AT MILLER LANE, AND A STRIPED CROSSWALK WITH ASSOCIATED ADA COMPLIANT PEDESTRIAN RAMPS.

31. MILLER LANE STREET IMPROVEMENTS:

THE DEVELOPER SHALL COMPLETE IMPROVEMENTS ON MILLER LANE FROM MAIN STREET TO SHADOW LANE IN ACCORDANCE WITH THE CITY OF FERNLEY DEVELOPMENT CODE. ADEQUATE RIGHT OF WAY SHALL BE DEDICATED AND/OR ACQUIRED BY THE DEVELOPER AND OFFERED FOR DEDICATION TO THE CITY OF FERNLEY. AT A MINIMUM, MILLER LANE SHALL BE IMPROVED TO THE CITY'S 60-FOOT RIGHT-OF-WAY STANDARD INCLUDING CURB AND GUTTER ON BOTH SIDES OF THE STREET AND SIDEWALK ALONG WESTERN BOUNDARY OF THE STREET.

32. MAIN STREET/SR-427 AND US 95A INTERSECTION PROPORTIONATE SHARE:

THE DEVELOPER SHALL PAY A PROPORTIONAL SHARE OF FUTURE IMPROVEMENTS TO THE MAIN STREET/SR-427 AND US 95A INTERSECTION TO THE APPROVAL OF THE CITY ENGINEER, PUBLIC WORKS DIRECTOR, NEVADA DEPARTMENT OF TRANSPORTATION, AND ADMINISTRATOR PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR THE PROJECT.

Conditions of Approval for TSM22007

Tentative Subdivision Map

33. THE PROJECT, AS SUBMITTED, INTENDS TO UTILIZE IMPROVEMENTS REQUIRED TO BE CONSTRUCTED BY THE APPROVED REDHAWK RANCH PHASE 1 PROJECT. THESE IMPROVEMENTS INCLUDE FLOODPLAIN MODIFICATIONS, CONSTRUCTION OF THE BACKBONE ROAD FROM MAIN STREET TO MILLER LANE, UTILITY EXTENSIONS, AND CONSTRUCTION OF A MEANDERING PATH AND TWO-WAY LEFT TURN LANE, TWLTL, ALONG MAIN STREET. SHOULD THE AFOREMENTIONED IMPROVEMENTS NOT BE COMPLETED BY THE REDHAWK RANCH PHASE 1 PROJECT PRIOR TO THE PERMITTING AND CONSTRUCTION OF THE DUETS AT REDHAWK RANCH PROJECT THEN THE DEVELOPER SHALL COMPLETE THE IMPROVEMENTS AS NECESSARY TO THE APPROVAL OF THE ADMINISTRATOR, CITY ENGINEER, AND PUBLIC WORKS DIRECTOR.





0 0.375 0.75
MILES

Vicinity Map

Duets at Red Hawk Ranch Tentative Map

August 2022



WOOD RODGERS
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Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066



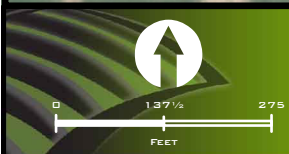

0 137 1/2 275
FEET

Aerial Map

Duets at Red Hawk Ranch Tentative Map

August 2022


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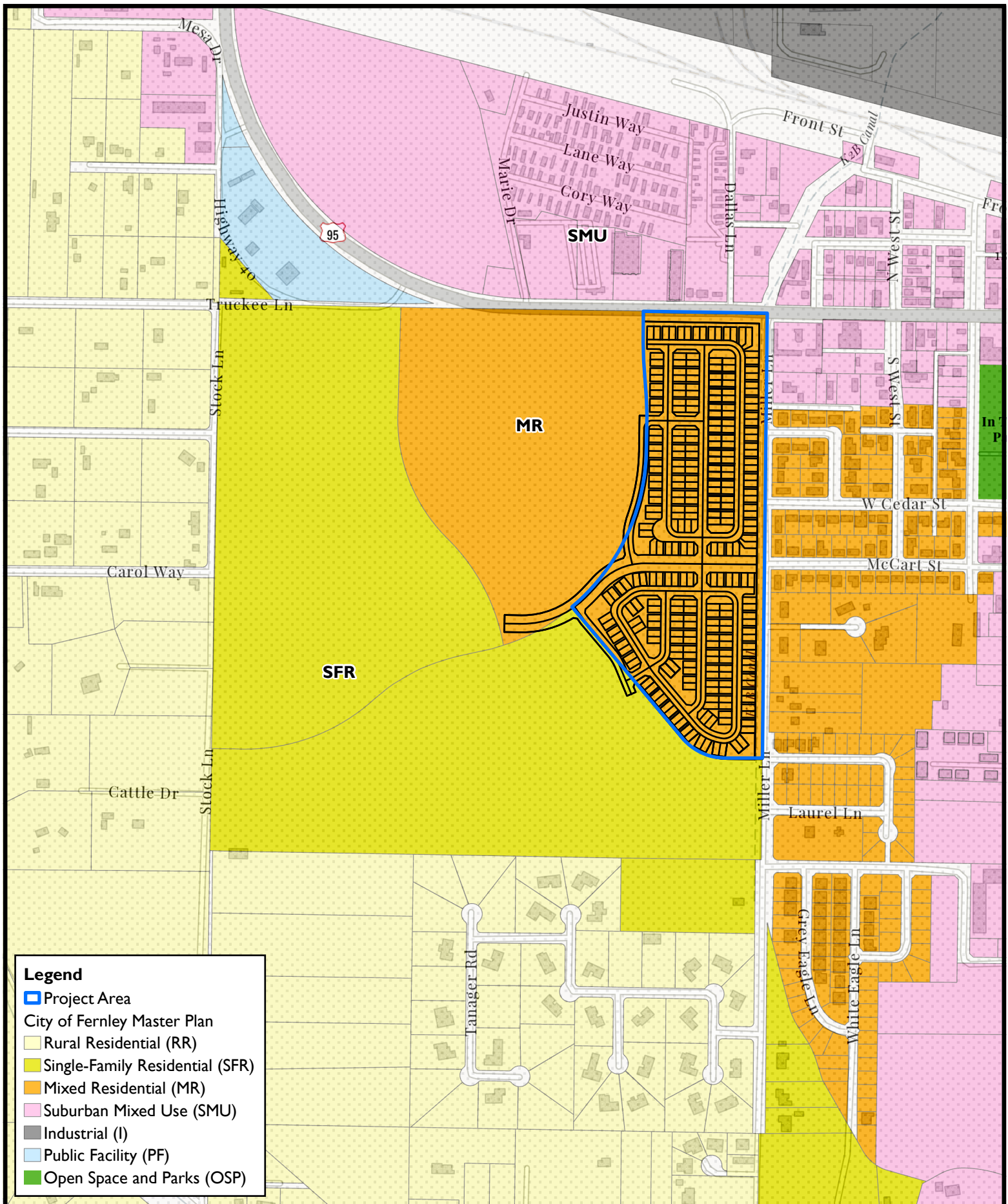


Aerial Map/Site Plan Map

Duets at Red Hawk Ranch Tentative Map

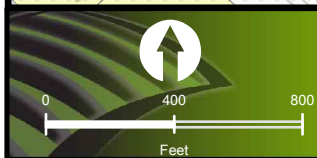
August 2022

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Reno, NV 89502 Fax: 775.823.4066



Legend

- Project Area
- City of Fernley Master Plan
- Rural Residential (RR)
- Single-Family Residential (SFR)
- Mixed Residential (MR)
- Suburban Mixed Use (SMU)
- Industrial (I)
- Public Facility (PF)
- Open Space and Parks (OSP)

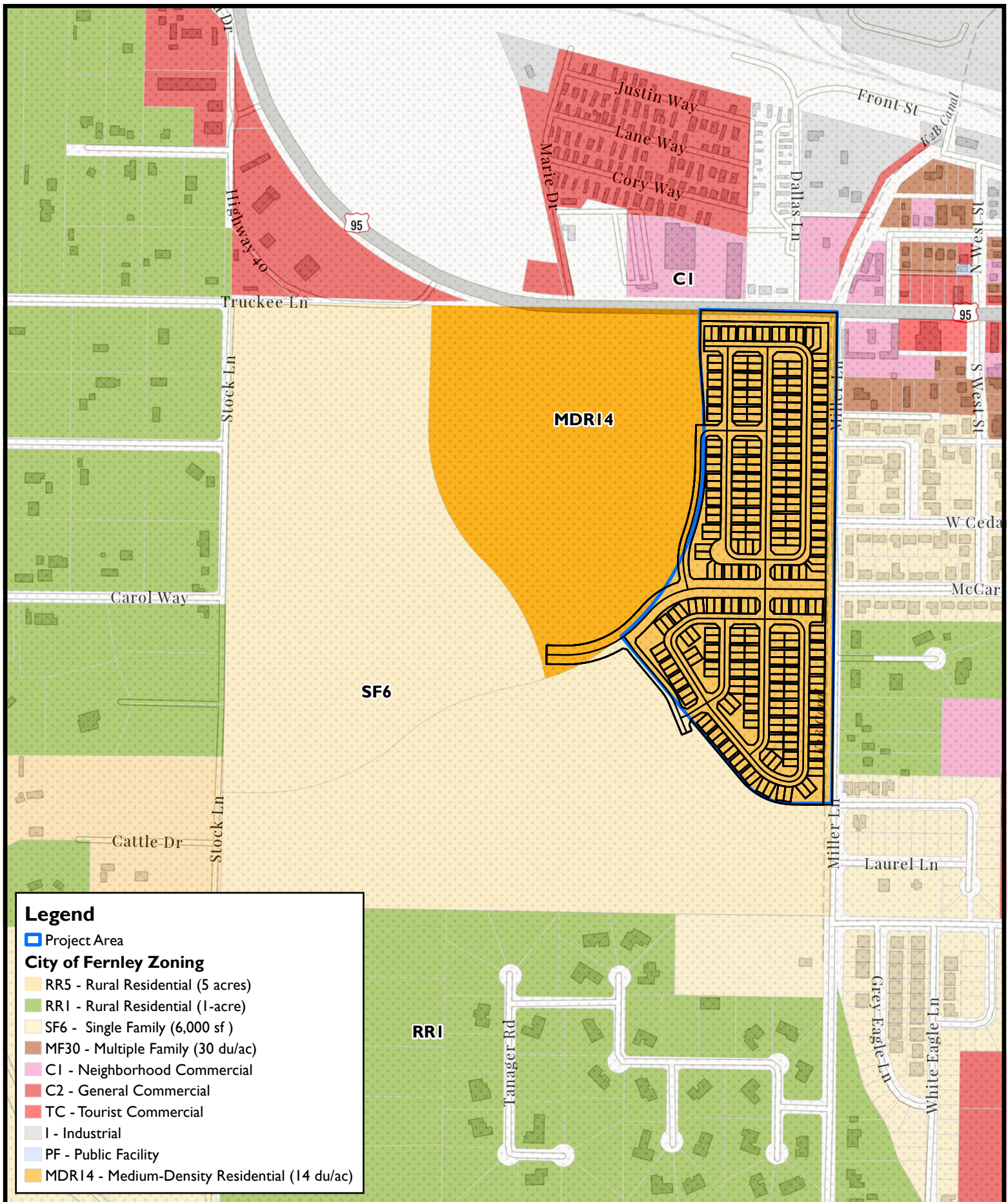


Master Plan

Duets at Red Hawk Ranch Tentative Map

August 2022

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DUETS AT
RED HAWK RANCH
TENTATIVE MAP
TITLE SHEET

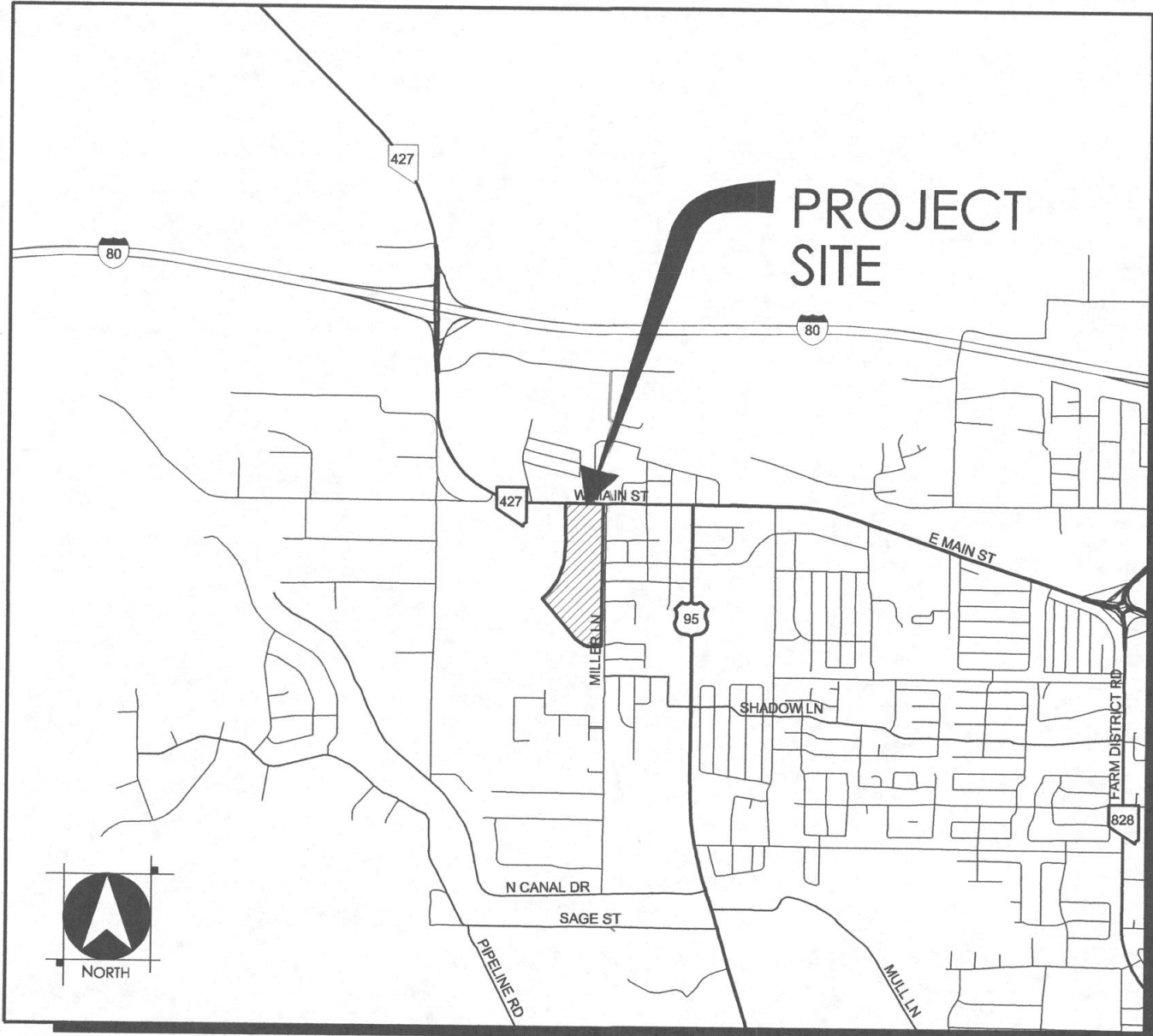
OWNER / DEVELOPER:
DB-BB INVESTMENTS I, LLC
539 RIVERSIDE DRIVE, STE. 2
RENO, NEVADA 89503
775.440.1982

BASIS OF BEARINGS

NEVADA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983/1994, HIGH ACCURACY REFERENCE NETWORK (NAD 83/94-HARN), AS DETERMINED USING REAL TIME KINEMATIC (RTK) GPS OBSERVATIONS WITH CORRECTIONS TRANSMITTED BY THE NEVADA GPS NETWORK, THE BEARING BETWEEN GPS REFERENCE STATION "MATT" AND "COP" IS TAKEN AS NORTH 2°05'56" EAST. ALL DIMENSIONS SHOWN ARE GROUND DISTANCES. GRID TO GROUND COMBINED FACTOR = 1.000269496

BASIS OF ELEVATION

BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) AS TAKEN FROM MATT, WITH A PUBLISHED ELEVATION OF 4129.85 FT. MATT IS DESCRIBED AS BEING 1/4" DIA. BRASS CAP SET IN CONCRETE PILLAR 1" 3/5" FLUSH WITH GROUND STAMPED "FERNLEY UTILITIES MATT #1 S 6922". LOCATED APPROX. 70° SE OF W END OF FREMONT ST. WITH JUNCTION OF ULY LN. AND APPROX. 70° NE OF RAIL ROAD TRACKS. 2-D ROTATED FROM TRI STATE CITY OF FERNLEY NAD 83/99 COORDS TO NAD 83/99.



VICINITY MAP
NOT TO SCALE



SITE PLAN
NOT TO SCALE

PROJECT NOTES

SITE INFORMATION:
TOTAL NUMBER OF LOTS = 282
TOTAL SITE AREA = 31.15 AC.
RIGHT OF WAY AREA = 12.29 AC.
LOT AREA = 13.42 AC.
COMMON AREA = 5.44 AC.

PROJECT DENSITY:
GROSS DENSITY = 9.1 DU/AC.
NET DENSITY = 10.6 DU/AC.

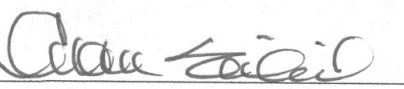
LOT SUMMARY:
MINIMUM LOT SIZE = 2,048 SF
MAXIMUM LOT SIZE = 3,454 SF
AVERAGE LOT SIZE = 2073 SF

ASSESSOR PARCEL NUMBER:
021-041-09

WATER AND SEWER UTILITIES:
PROPOSED WATER: CITY OF FERNLEY PUBLIC WATER SYSTEM
PROPOSED SEWER: CITY OF FERNLEY PUBLIC SANITARY SEWER SYSTEM

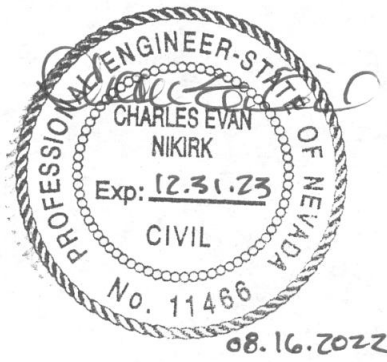
ENGINEERS STATEMENT:

I, C. EVAN NIKIRK, DO HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED BY ME OR UNDER MY SUPERVISION AND WAS COMPLETED ON THE 16th DAY OF AUGUST, 2022.


C. EVAN NIKIRK, P.E. #11466

SHEET INDEX

SHT No.	DWG ID	DRAWING DESCRIPTION
1	T-1	TITLE SHEET
2	DM-1	EXISTING CONDITIONS/DEMOLITION PLAN
3	LB-1	LOT AND BLOCK PLAN
4	LB-2	LOT AND BLOCK PLAN
5	G-1	PRELIMINARY GRADING PLAN
6	G-2	PRELIMINARY GRADING PLAN
7	U-1	PRELIMINARY UTILITY PLAN
8	U-2	PRELIMINARY UTILITY PLAN
9	LS-1	PRELIMINARY LANDSCAPE PLAN



DUETS AT RED HAWK RANCH
TITLE SHEET



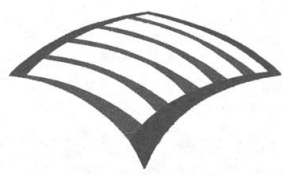
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Reno, NV 89502 Fax 775.823.4066

JOB NO. 1557.019 AUGUST, 2022
SHEET T-1 OF 9

DUETS AT
RED HAWK RANCH
TENTATIVE MAP
EXISTING CONDITIONS AND DEMOLITION PLAN

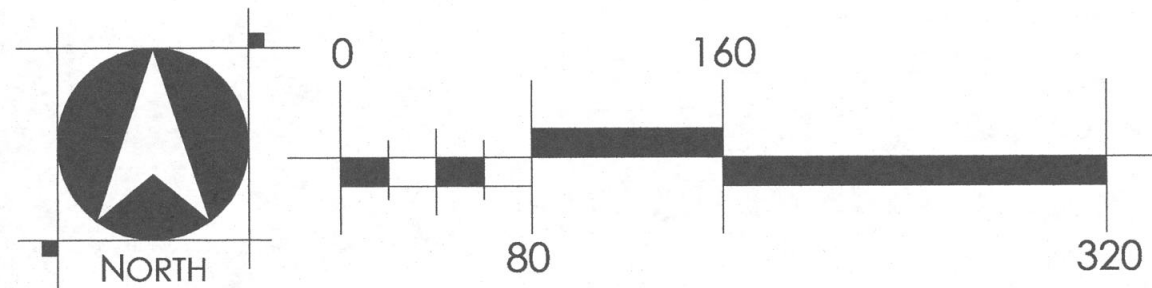


DUETS AT RED HAWK RANCH
LOT AND BLOCK PLAN

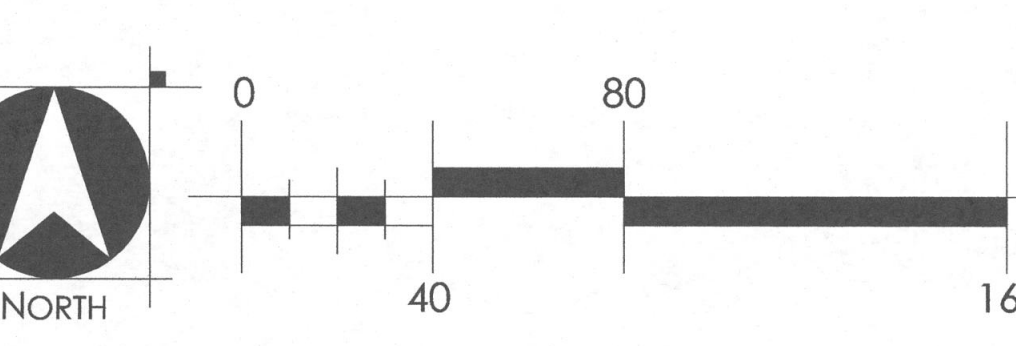
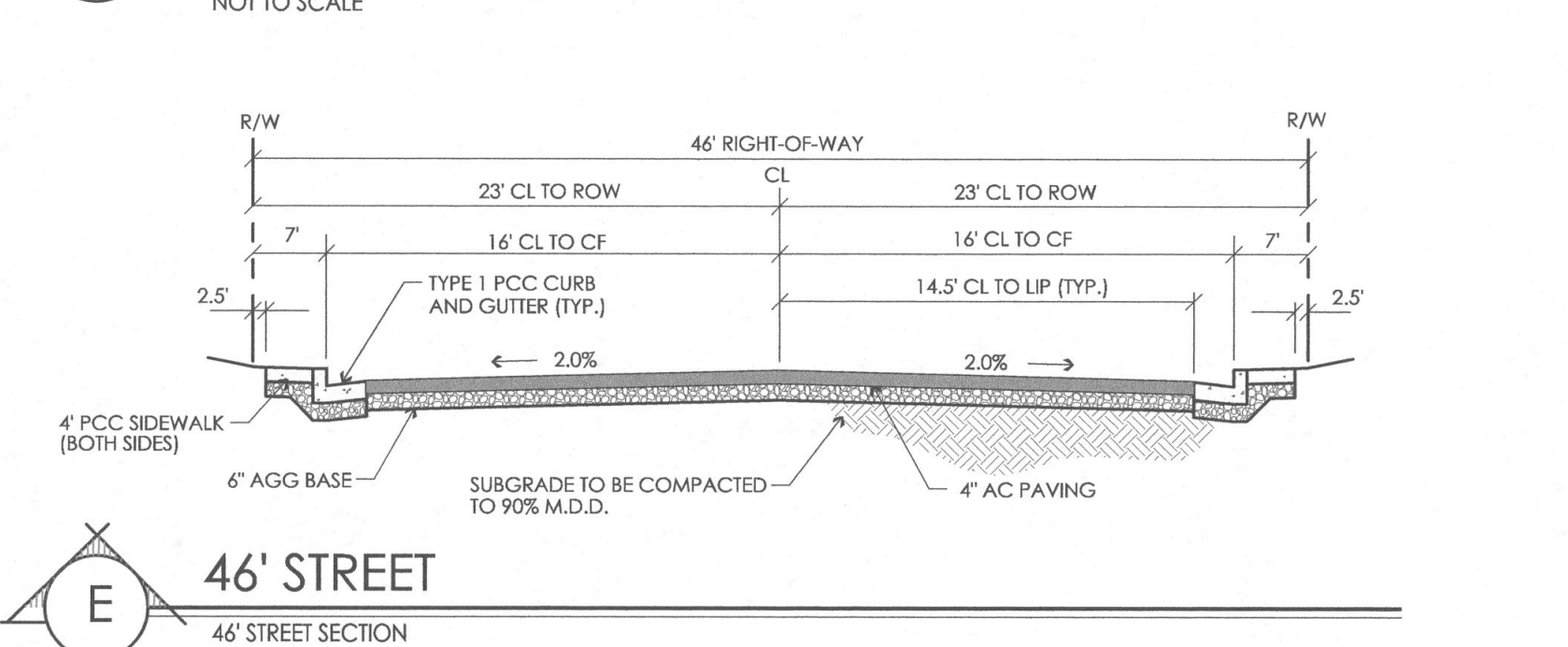
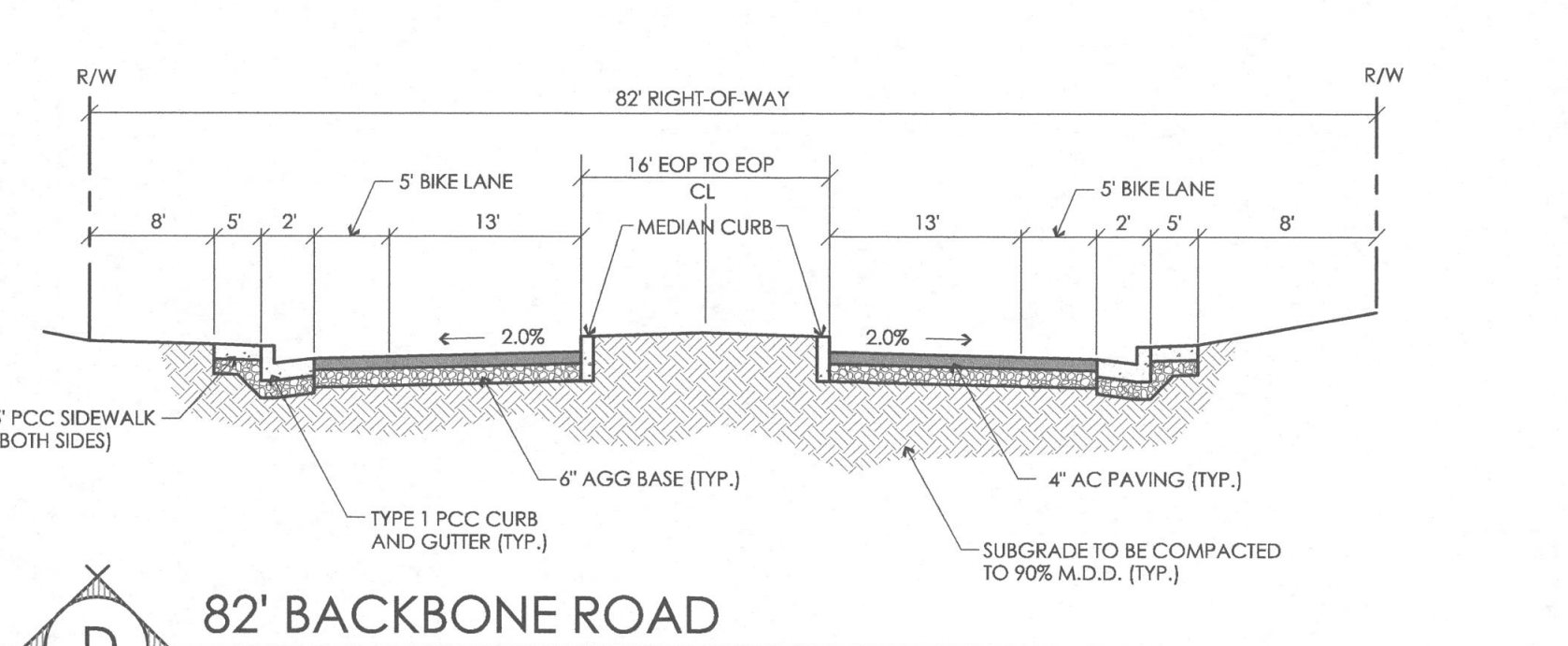
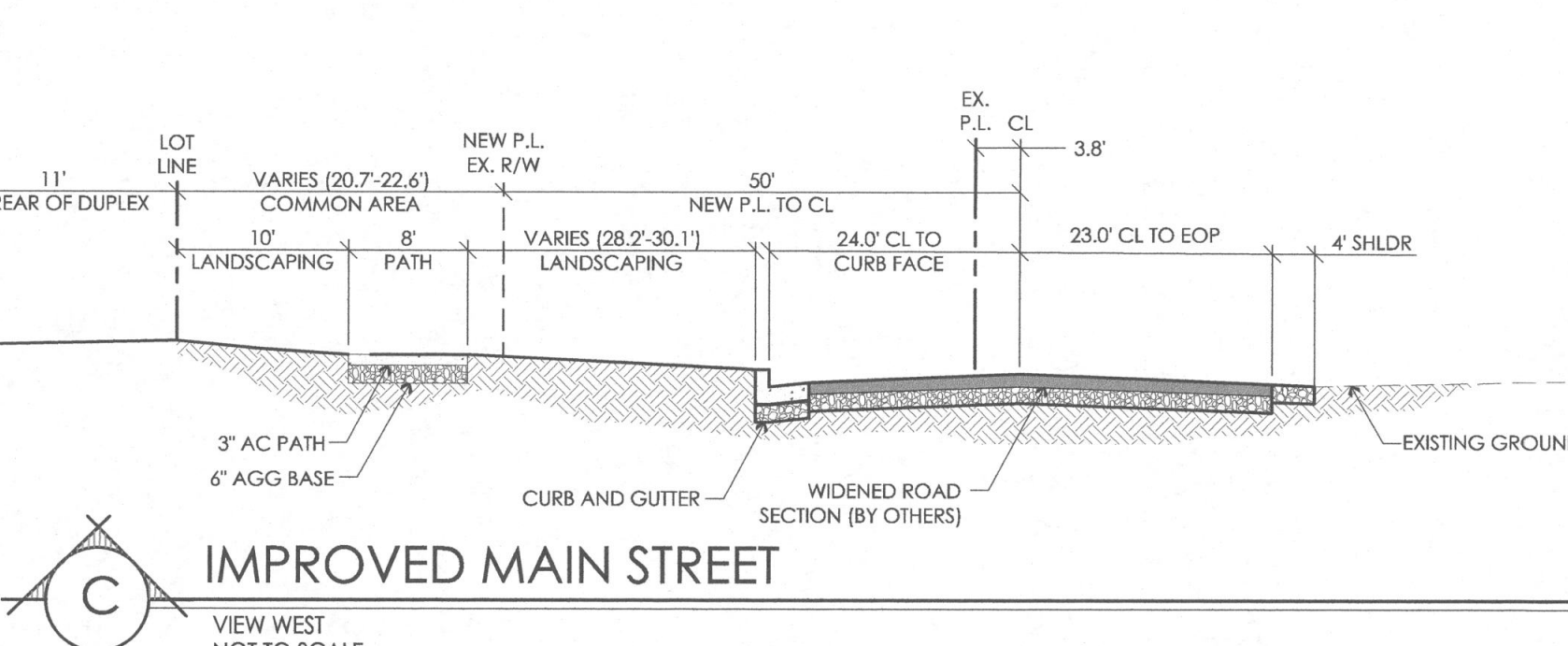
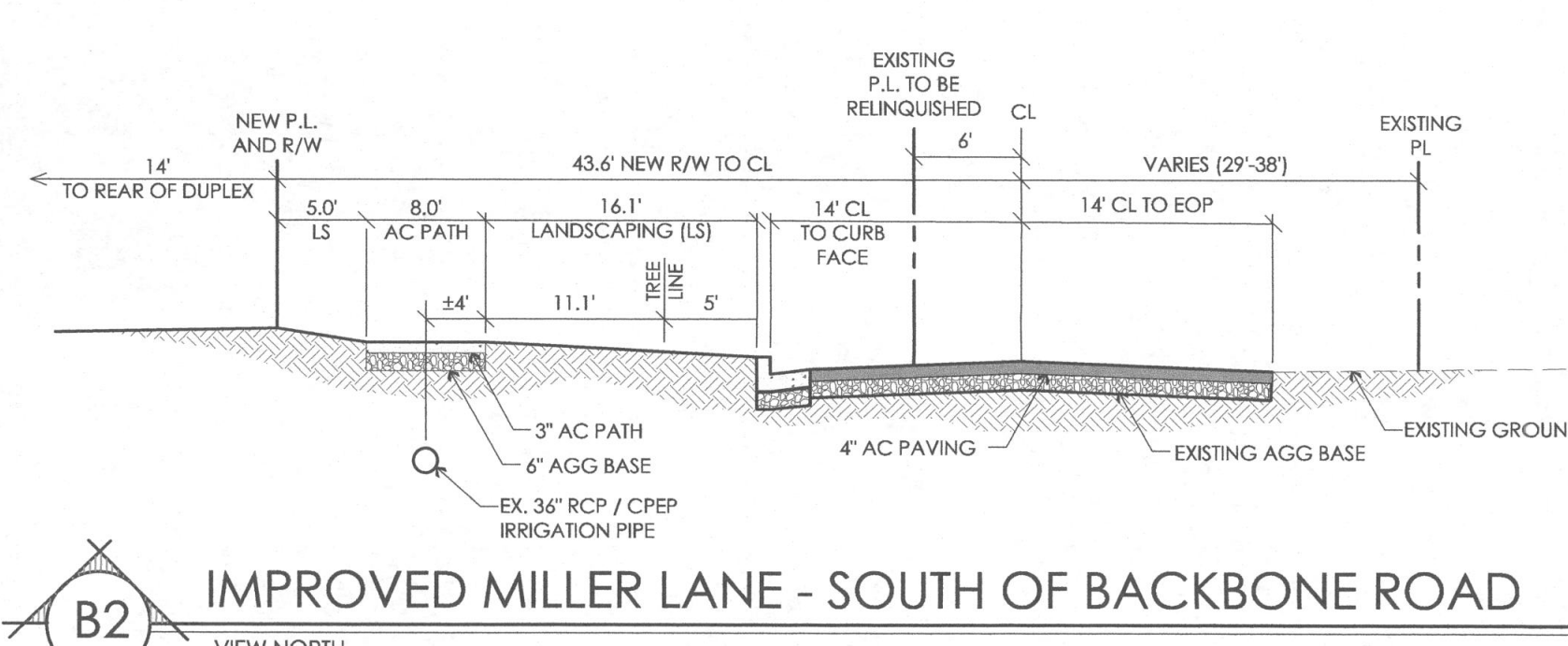
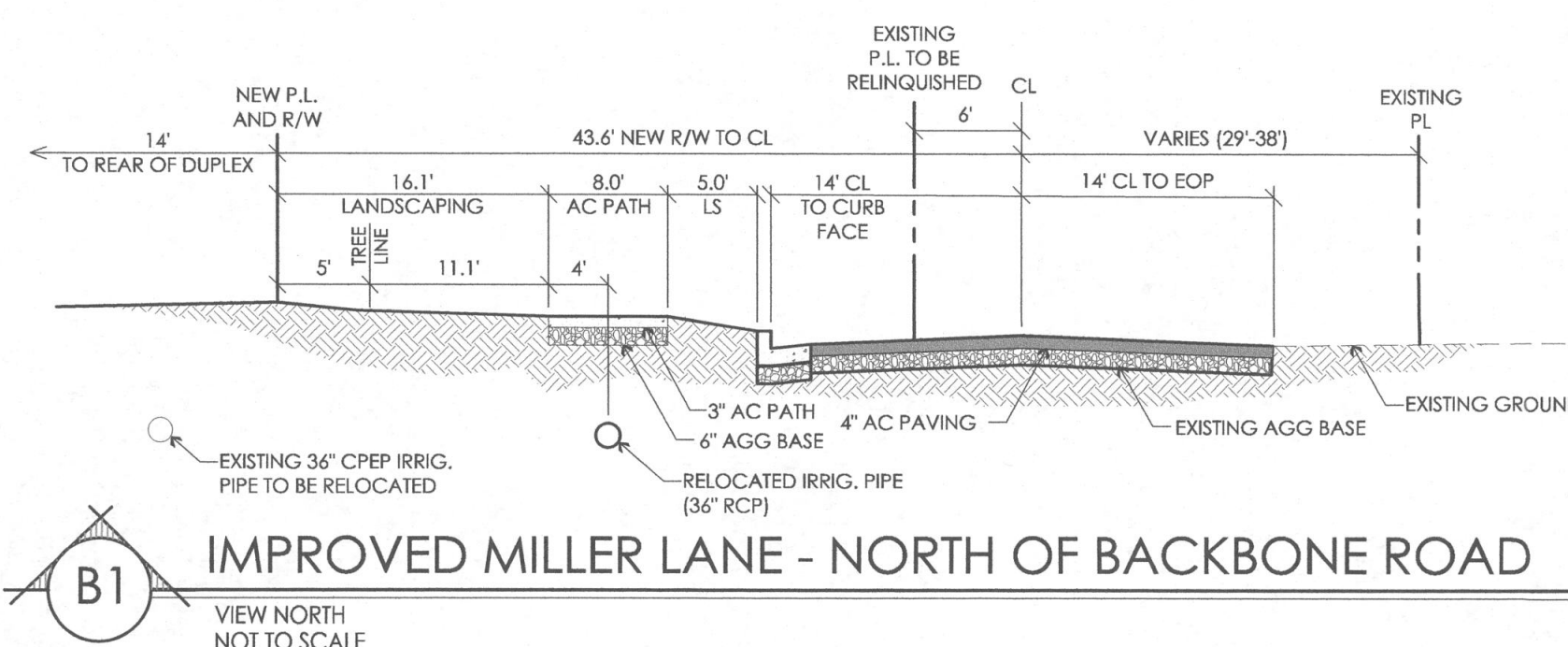
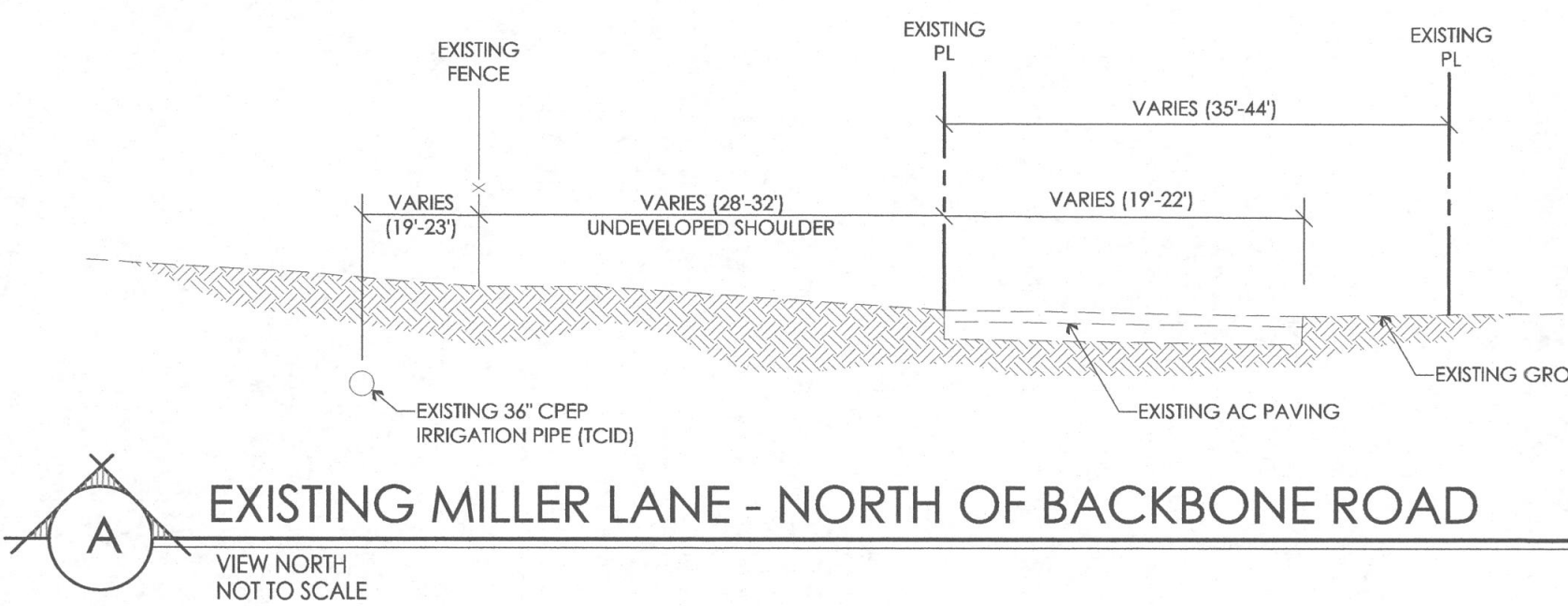


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JOB NO. 1557.019 AUGUST, 2022
SHEET DM-10F 9



DUETS AT
RED HAWK RANCH
TENTATIVE MAP
PRELIMINARY LOT AND BLOCK PLAN



020-031-08
SEATTLE CITY
FAMILY LIMITED
PARTNERSHIP

020-031-07
MARILYN
PAULSON
JOHNSON TR

020-031-06
DOUGLAS C.
LARNED ET AL

RUBY STREET

020-035-01
PAUL L. AND
PEGGY S. KING

020-051-06
GARRETT AND
LISA ANNE
KIBBE

020-051-05
SHARLENE
COSENS

020-051-06
CHESTER
CLEVELAND SR.

WEST CEDAR
STREET

020-055-01
BOBBIE JO
SHOCK



DUETS AT RED HAWK RANCH
PRELIMINARY LOT AND BLOCK PLAN



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JOB NO. 1557.019 AUGUST, 2022
SHEET LB-1 OF 9

DUETS AT
RED HAWK RANCH
TENTATIVE MAP
PRELIMINARY LOT AND BLOCK PLAN

021-041-08
RED HAWK
RANCH LLC

021-041-10
RED HAWK
RANCH LLC

020-055-17
JOHN
CAREY
HIGGINBOTHAM

McCART
STREET

020-058-01
EUGENE
HENRY
ROGERS ET AL

021-132-16
ROBERT C.
RHYNO AND
KAE LYNNE
WARD

BEVERLY
COURT

021-132-35
REBECCA ANN
HAROLD

021-132-14
DANIEL B AND
CHRISTINE S.
FRANICH

021-132-13
CHERYL
FOGARTY

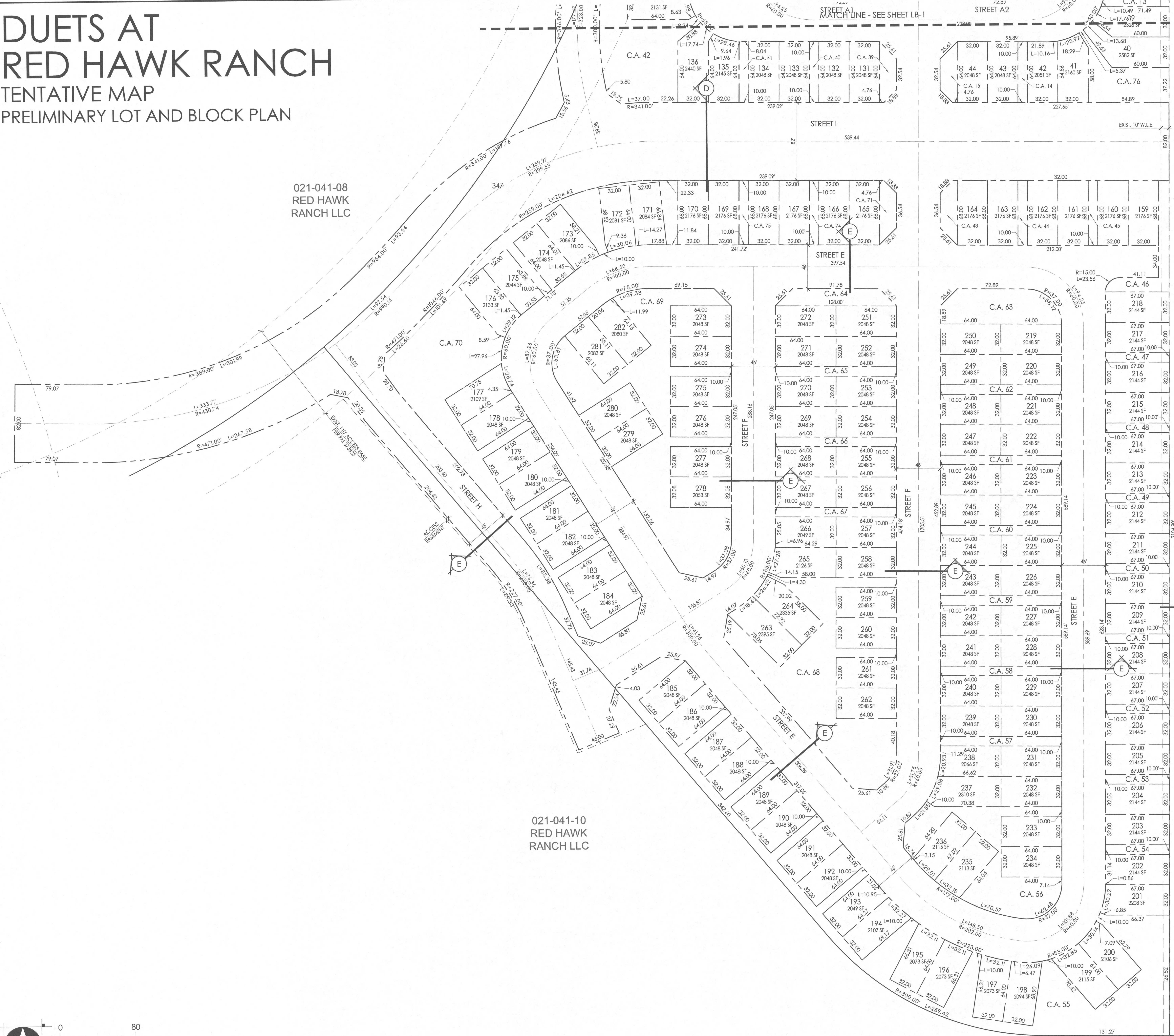
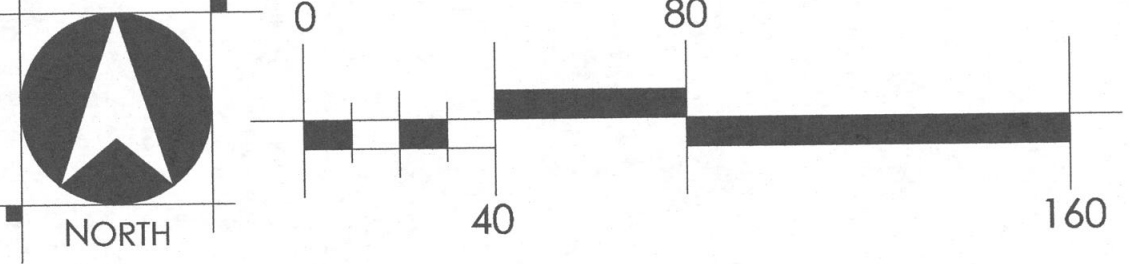
021-132-12
THOMAS J.
MILLER



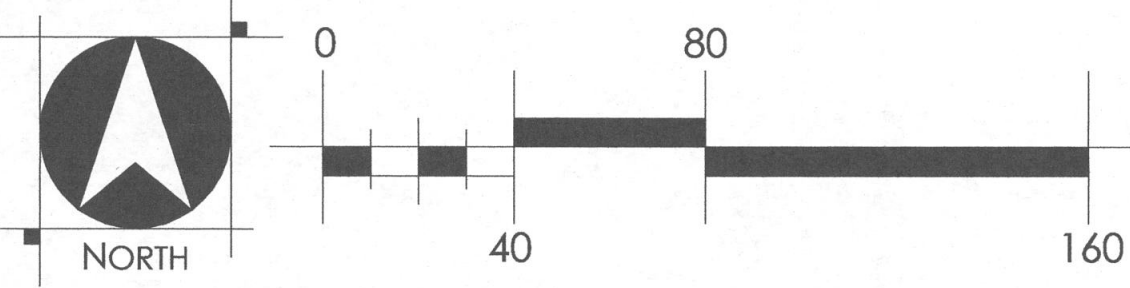
DUETS AT RED HAWK RANCH
PRELIMINARY LOT AND BLOCK PLAN

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JOB NO. 1557.019 AUGUST, 2022
SHEET LB-2 OF 9



DUETS AT
RED HAWK RANCH
TENTATIVE MAP
PRELIMINARY GRADING PLAN



020-031-08
SEATTLE CITY
FAMILY LIMITED
PARTNERSHIP

020-031-07
MARILYN
PAULSON
JOHNSON TR

020-031-06
DOUGLAS C.
LARNED ET AL

RUBY STREET

020-035-01
PAUL L. AND
PEGGY S. KING

020-051-06
GARRETT AND
LISA ANNE
KIBBE

020-051-05
SHARLENE
COSENS

020-051-06
CHESTER
CLEVELAND SR.

WEST CEDAR
STREET

020-055-01
BOBBIE JO
SHOCK

- NOTES:
1. ADD 4100' TO ALL PROPOSED ELEVATIONS.
 2. REFER TO SHEET D-1 FOR TYPICAL STREET SECTIONS.
 3. REFER TO SHEET U-1 FOR EASEMENT NOTES.



DUETS AT RED HAWK RANCH
GRADING PLAN



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JOB NO. 1557.019 AUGUST, 2022
SHEET G-1 OF 9

DUETS AT
RED HAWK RANCH
TENTATIVE MAP
PRELIMINARY GRADING PLAN

021-041-08
RED HAWK
RANCH LLC

021-041-10
RED HAWK
RANCH LLC

020-055-17
JOHN
CAREY
HIGGINBOTHAM

020-058-01
EUGENE
HENRY
ROGERS ET AL

021-132-16
ROBERT C.
RHYNO AND
KAE LYNNE
WARD

BEVERLY
COURT

021-132-35
REBECCA ANN
HAROLD

021-132-14
DANIEL B AND
CHRISTINE S.
FRANICH

021-132-13
CHERYL
FOGARTY

021-132-12
THOMAS J.
MILLER

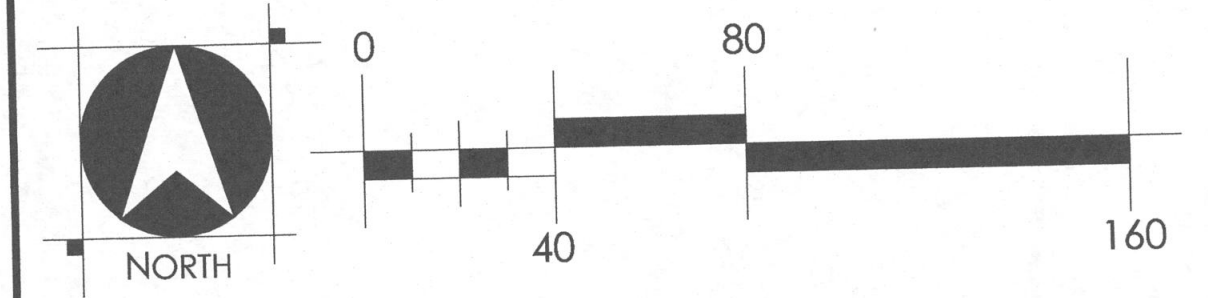
DUETS AT RED HAWK RANCH
PRELIMINARY GRADING PLAN



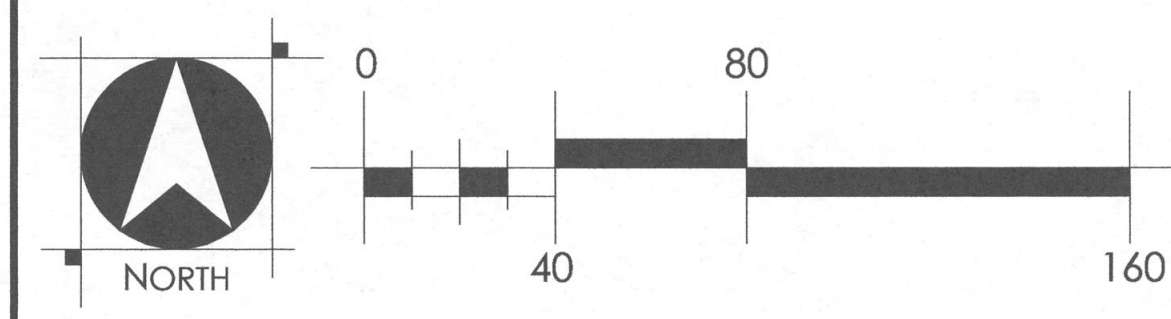
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Fax 775.823.4066

JOB NO. 1557.019
AUGUST, 2022
SHEET G-2 OF 9

- NOTES:
1. ADD 4100 TO ALL PROPOSED ELEVATIONS.
 2. REFER TO SHEET D-1 FOR TYPICAL STREET SECTIONS.
 3. REFER TO SHEET U-1 FOR EASEMENT NOTES.



DUETS AT
RED HAWK RANCH
TENTATIVE MAP
PRELIMINARY UTILITY PLAN



DUETS AT RED HAWK RANCH
PRELIMINARY UTILITY PLAN

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard Tel 775.823.4068
Reno, NV 89502 Fax 775.823.4066

JOB NO. 1557.019 AUGUST, 2022
SHEET U-1 OF 9



020-031-08
SEATTLE CITY
FAMILY LIMITED
PARTNERSHIP

020-031-07
MARILYN
PAULSON
JOHNSON TR

020-031-06
DOUGLAS C.
LARNED ET AL

RUBY STREET

020-035-01
PAUL L. AND
PEGGY S. KING

020-051-06
GARRETT AND
LISA ANNE
KIBBE

020-051-05
SHARLENE
COSENS

020-051-06
CHESTER
CLEVELAND SR.

WEST CEDAR
STREET

020-055-01
BOBBIE JO
SHOCK

021-041-08
RED HAWK
RANCH LLC

PROJECT BOUNDARY (TYP.)

MATCH LINE - SEE SHEET U-2

DUETS AT
RED HAWK RANCH
TENTATIVE MAP
PRELIMINARY UTILITY PLAN

021-041-08
RED HAWK
RANCH LLC

021-041-10
RED HAWK
RANCH LLC

020-055-17
JOHN
CAREY
HIGGINBOTHAM

McCART
STREET

020-058-01
EUGENE
HENRY
ROGERS ET AL

021-132-16
ROBERT C.
RHYNO AND
KAE LYNNE
WARD

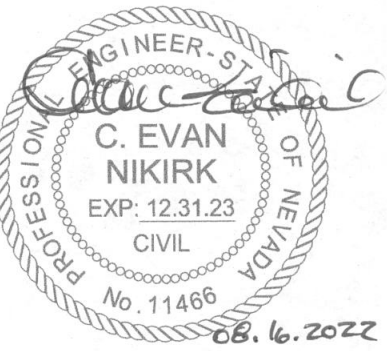
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COURT

021-132-35
REBECCA ANN
HAROLD

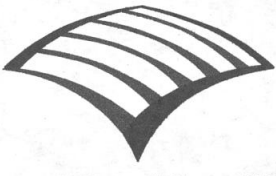
021-132-14
DANIEL B AND
CHRISTINE S.
FRANICH

021-132-13
CHERYL
FOGARTY

021-132-12
THOMAS J.
MILLER

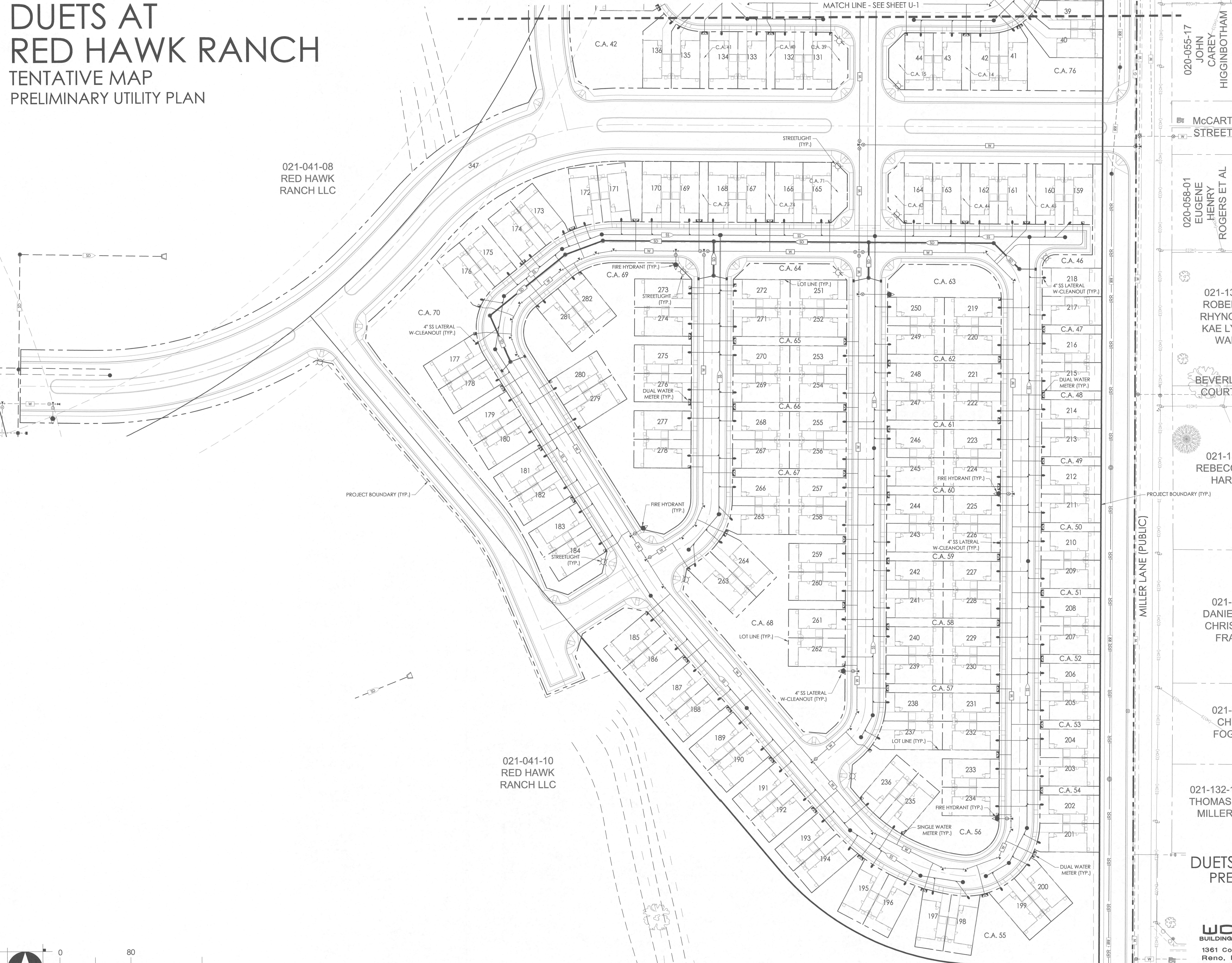
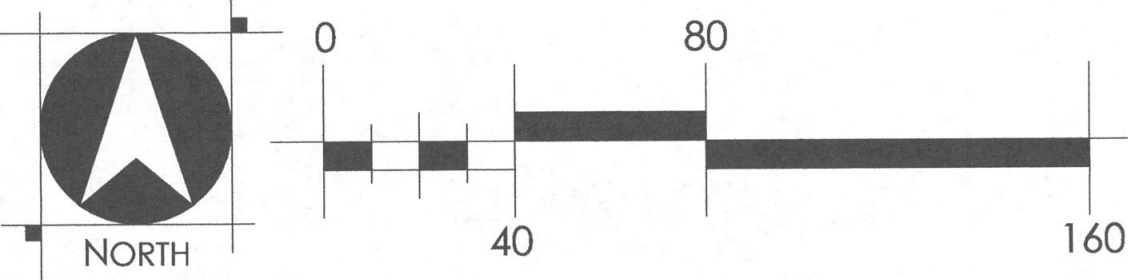


DUETS AT RED HAWK RANCH
PRELIMINARY UTILITY PLAN



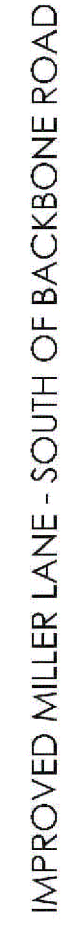
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Reno, NV 89502 Fax 775.823.4066

JOB NO. 1557.019 AUGUST, 2022
SHEET U-2 OF 9



NEVADA

SYMBOL	DESCRIPTION	QTY	DETAIL
1	LANDSCAPE MEDIAN		
2	ENHANCED WOOD FENCE		
3	PATHWAY		



PROJECT SUMMARY

Project Name:	Duets at Red Hawk Ranch Tentative Map
Site Location:	The subject parcel is ±31.15 acres in size located at 0 W Main Street in Fernley, Nevada
APN Numbers:	021-041-09
Applicant:	Paradiso Communities, Attn: John Foley
Applicant's Representative:	Wood Rodgers, Inc., Attn: Derek Kirkland, AICP
Owner:	DB-BB Investments I LLC
Proposed Action:	This is a request for a Tentative Map for a 282-lot subdivision on APN 021-041-09 for development of single-family attached residences.
Land Use Classification:	Mixed Residential (MR)
Zoning:	MDR14 (pending ZMA22006)
Flood Zone Designation:	Zone X
Gross Site Area	±31.15 acres

PROJECT ANALYSIS

Background and Existing Conditions

The ±31.15-acre subject parcel is located at the corner of Main Street and Miller Lane in the western gateway to downtown Fernley. The property is in an area of Fernley which has been targeted for redevelopment since the original Jackson Ranch Planned Development approvals over twenty years ago. The City of Fernley 2018 Master Plan update identified the subject parcel as Mixed Residential (MR) encouraging a density of 7-14 dwelling units per acre. On February 3, 2021, the City of Fernley Council approved a zoning map amendment (Case #ZMA20001/Bill #293) on the adjacent parcel to the west (APN 021-041-08) to Medium Density Residential 14 dwelling units per acre (MDR14), which is consistent with the adopted Master Plan. An application to amend the zoning designation of the site from split zoning (SF6, SF12, and C1) to Medium Density Residential - 14 dwelling units per acre (MDR14) was submitted to the City of Fernley on May 17, 2022 and will be voted on at a City Council meeting scheduled for September 7, 2022. Upon approval of the zoning map amendment, which is consistent with the zoning of the adjacent parcel, the proposed tentative map would be consistent with the allowed uses and density within the MDR-14 zoning district.

Comprehensive Master Plan and Zoning Designations

The subject parcel has a Comprehensive Master Plan (Master Plan) designation of Mixed Residential (MR) and a zoning designation of Medium Density Residential 14 dwelling units per acre (MDR14). The Master Plan designation of MR allows a maximum density of 14 dwelling units per acre and would allow for the development of the ±31.15-acre parcel with up to 436 lots. The proposed tentative map would result in 282 lots and a gross density of approximately 9 units per acre, which is compatible with surrounding properties (refer to Master Plan and Zoning Map in Section 2 of this submittal packet).

Surrounding properties and uses	Current Zoning District	Comprehensive Plan Land Use Designation
North Commercial buildings, Munzinich RV Park, Fernley RV Park	C1, C2 Split Zoning- C1/MF30	SMU
West Vacant land (Red Hawk Ranch)	MDR14	MR & SFR
East Existing single-family residences, Commercial buildings	C1, MF30, SF6, SF20	SMU & MR
South Vacant Land (Red Hawk Ranch)	SF6	SFR

TENTATIVE SUBDIVISION MAP ANALYSIS

Overview

The current request is to develop a 282-lot (141 Duets) single family attached residential development on the project site. The pending regulatory zoning within the project site is Medium Density Residential – 14 units per acre (MDR14), which would allow the proposed Duet single family attached product type. The Duets are attached at the garage and will include a minimum of three (3) plan types including a single story and three different two-story plans. Units will range from 900 square feet to 1500 square feet with a mix of 2- and 3-bedroom options. Each unit will have a 1-car garage and a full driveway as well as on-street parking. Interior roadways are planned to be full width 50-foot right of way public streets. Architectural renderings and floor plans are included in Section 4 of this application packet.

The developer and applicant, Paradiso Communities, is proposing to place the entire development within a Home Owners Association (HOA) who will be responsible for maintaining the front yards, the exteriors of the homes, common area landscape, and all fencing along the common areas and backbone roadways. Back yards will be the home owners responsibility; however, they are designed as low maintenance with paver patios.

Tentative Map Design Standards

The tentative subdivision map has been designed to comply with the standards of the MDR14 zoning district. As outlined in the City of Fernley Development Code the exterior site area has been set from the standards in table 32.06.080-1. Interior lot standards are more flexible to accommodate the various attached product types that are encouraged within this zoning district. Proposed interior lot standards for the Duets are outlined below and within the tentative map included with this application:

Minimum Lot Size: ±2,048 square feet

Minimum Lot Width: ±30 feet

Minimum Interior Lot Setbacks:

Front Yard Setback = 10 feet (20 feet to garage)

Side Yard Setback = 0 feet where Duets are attached with 10' common area between Duets
(Lot lines will be placed along the sides of each Duet)

Rear Yard Setback = 10 feet

Given the smaller lot single family attached product type, there are other typical City of Fernley design standards that will need to be modified to allow the proposed project. These additional interior design exceptions necessary to accommodate the proposed project are requested below:

1. Minimum front-sideyard distance from curb return to driveway

City of Fernley Typical Standard: 30 feet

Proposed Project Standard: 25 feet

Locations: Most curb returns on interior streets

2. Minimum distance from property line to driveway

City of Fernley Typical Standard: 5 feet

Proposed Project Standard: 3.5 feet

Location: Lot 40 at the southeast corner in Phase 1 development

Reason: Lot frontage narrows around the curve to maintain common area between duplexes

3. Minimum lot frontage

City of Fernley Standard: 35 feet

Proposed Project Standard: 13-18 feet

Location: Around street curves

Phase 1: NE corner (Lots 13,14), SE corner (Lots 39,40), and SW corner (Lots 135-137)

Phase 2: NW corner (Lots 173, 176), SE corner (Lot 237), and SW corner (Lot 264)

Reason: Standard lots are 32 feet wide, but frontage narrows around curve and a radial lot line is added to maintain street-front access to common area between duets.

Development Statistics Summary

The following is a summary of the development statistics of the site:

Total Site Area:.....±31.15 acres
 Total Dwelling Units:.....282 single-family residences
 Gross Density:±9.1 dwelling units/acre
 Net Density:±10.6 dwelling units/acre
 Total Lot Area:.....±13.42 acres (43%)
 Average Lot Size: ±2,073 square feet
 Maximum Lot Size: ±3,454 square feet
 Minimum Lot Size:..... ±2,040 square feet
 Total Right of Way Area:.....±12.29 acres (40%)
 Total Common Area:.....±5.44 acres (17%)

Adjacency - Buffering

The proposed project is adjacent to existing commercial and smaller residential homes along Miller Lane, which have a mix of zoning ranging from C-1, MF-30, SF-6 to RR-1. The existing homes that front Miller Lane are smaller in size ranging from 1,000 square feet to 1,500 square feet with many of them having either a single car garage or no garage. The design of the proposed units are consistent with these existing homes. The proposed development also provides a large buffer area along Miller Lane including expanding Miller Lane to a collector street and adding approximately $\pm 27'$ of buffering that will include landscaping and an 8-foot-wide paved shared use path. The project has also been designed to have rear yards along Miller Lane with a decorative fence. The proposed improvements to the Miller Lane corridor will be a huge improvement for the existing residential area and also provide new, safer pedestrian amenities. These improvements comply with the City of Fernley Development Code section 32.09.030 (d) (2) b. Below is a conceptual rendering of the proposed improved Miller Lane improvements and buffering of the existing residents. The rendering is looking north on Miller Lane.



Conceptual Rendering looking north from Miller Lane

Traffic and Circulation

The proposed 282 lots are anticipated to generate 2,030 daily, 135 AM peak hour, and 161 PM peak hour trips (*Traffic Impact Study, Headway Transportation, August 2022*). Traffic generated will be mitigated through specific roadway improvements. See the traffic report prepared by Headway Transportation included in Section 4 of this submittal.

The proposed access to the project is via Miller Lane on the eastern property boundary. Additional access will connect the development to the adjacent Red Hawk Ranch subdivision to the west via the backbone roadway. Miller Lane will be expanded to a full width collector pavement section with curb and gutter, landscaping, and an 8-foot paved shared use path added to the west side of the street along the development frontage. The eastern edge of Miller Lane will remain as existing condition. The applicant is proposing to repave the full width of Miller Lane along the project frontage. Appropriate turn pockets and pedestrian crossings will be added at the intersection with Main Street and where the backbone roadway connects to Miller Lane as outlined in the traffic analysis (included in section 4 of this application package). Full right of way for Miller Lane will be dedicated to the City of Fernley.

Main Street is proposed to be expanded to three-lanes as part of the previously approved Red Hawk Ranch Phase 1 project along with an 8-foot paved shared use path. This proposed project would add the turn lane onto Miller Lane, curb and gutter along the project frontage, as well as landscaping and streetlights. As outlined in the traffic analysis (included in section 4 of this application package) a traffic signal is not warranted at Miller and Main Street as there is already a proposed traffic signal at Truckee Lane and Main Street. Adding another signal at Miller Lane would create issues as the signal would be too close to the proposed Truckee Lane signal and existing 95 signal. Proposed street sections for Miller Lane, Main Street, and the proposed Backbone roadways are included in the tentative map and landscape plan set (attached to this application package). All interior roadways are proposed to be public typical 50-foot City of Fernley local roadway sections with on-street parking.

Pedestrian infrastructure will include sidewalks on both sides of all internal roadways connected to sidewalks along the backbone roadways, which will also connect to the shared use path network around Red Hawk Ranch and Main Street. Proper safe pedestrian crossings including pavement markings and signage will be placed at all crossings.

Landscaping

The project includes landscaping in the center median of the backbone roadway, along common areas, and along the exterior of the site bordering Main Street and Miller Lane. These landscape areas will be maintained by the proposed HOA. All front and side yard common areas will be landscaped in accordance with City of Fernley Code requirements and will include zero scaping with drought tolerant plants and street trees to encourage water-efficient irrigation. 1-inch drain rock will be applied on cut and fill slopes. The proposed HOA will maintain all front yard, sideyard common area, and common area landscaping. Rear yards will include paver patios and will be the responsibility of the future homeowners.

Fencing

Fencing will be proposed on side and rear property boundaries and will be a 6-foot-tall wood good neighbor fencing to create privacy and visual screening. Exterior perimeter fencing along backbone

roadways, Miller Lane, and Main Street is proposed to be a 6-foot wooden fence with a stone façade pilaster. Exterior common area fences will be maintained by the HOA. Fencing details are included on the landscape plan.

Signage

Entry monuments are proposed for the development and will be placed at the main entry points to the proposed development. The formal entry monument signage will be included with the final building permit plans. A conceptual signage design is included below.



Grading

The site is relatively flat and the existing ground generally slopes from south to north at an average slope of approximately 0.66 percent. The entire site has existing and designed slopes flatter than 10%, therefore Section 32.09.130 does not apply. See attached Slope Map in Section 2. Site grading will direct sheet flow and lot line swales toward the adjacent streets with curb and gutter, which will collect and routes runoff to a retention pond in each phase of the project. A grading plan is provided in the Tentative Map Plan Set in Section 4 and Map Pocket of this submittal packet.

Drainage

The existing topography of the site generally slopes from south to north, directing flows toward Main Street, which is situated above the property. Site grading and drainage controls will consist of lot line swales and curb and gutter to collect and convey runoff produced from roofs, driveways, yards, and subdivision streets. Depending on the timing of the proposed project and the adjacent development, site runoff will be conveyed to either temporary or permanent storm water retention ponds. Permanent storage ponds will be installed as a series of retention ponds below the base of the proposed flood control channel in the adjacent development. If construction of the Duets at Red Hawk Ranch project precedes Phase 1 of the Red Hawk Ranch subdivision, two temporary retention ponds will be constructed to manage the north and south phases of the project until the storm drain system can be

extended to the proposed flood control channel. The retention ponds will be dedicated to the City of Fernley either as drainage easements or separate parcels.

Water, Sewer, and Utilities

Utilities are in close proximity to the subject parcels. The City of Fernley is also in the process of upgrading the nearby sewer lift station in advance of the planned growth in this area. It is anticipated a future project on the subject parcel would utilize and improve existing infrastructure in this area to serve the development, which will also provide benefits to the surrounding area. Community wide benefits associated with redevelopment of this project are anticipated to include reconstructing adjacent roadways, new bike and pedestrian facilities connecting to adjacent businesses and Main Street, redevelopment of a major corner within the City's western gateway, and appropriate density to help support long-term sustainability of the City's infrastructure. The proposed project is anticipated to generate an average of approximately 97,300 gallons per day. A preliminary sanitary sewer report letter is provided in Section 4 of this Submittal Packet.

Southwest Gas will provide gas and electrical service to the new units. Telephone service will be provided by AT&T while cable service will be from Spectrum Communications.

Schools

The closest schools to the subject parcels are Fernley Elementary School and Fernley Intermediate School, both located less than a mile east of the site. Fernley High School is located approximately 2.0 miles south. According to the Lyon County School District's 2016 Facilities Plan, all the Fernley schools are currently under capacity and are planned to be within adequate utilization through 2025, with the exception of one elementary school. The School District's 10-year capital program identifies a new elementary school that is planned to be built in the next 4 to 6 years, which would address elementary school capacity. The proposed 282 lots will generate approximately \$451,200 in construction tax (\$1,600 per lot) that goes to the Lyon County School District.

Police and Fire Service

Police protection is provided by the Lyon County Sheriff's office. Fire protection is provided by the North Lyon County Fire Protection District. The subject site is located in a developed area near existing development that is already served by these agencies. The closest fully staffed fire station is Station 61 which is located less than 1 mile (approximately 0.5 miles) to the east on Main Street. Four points of access are provided, with the main entrance directly off of Miller Lane and internal access points from the backbone roadway on the eastern boundary of the Red Hawk Ranch development.

Parks

Several recreational amenities are available in this area. A future park site is proposed as part of the Red Hawk Ranch Subdivision to the west and will be located immediately south of the subject property and east of the constructed drainage channel. It is planned that the proposed project would contribute Residential Construction Tax (RCT) to the proposed Red Hawk Ranch Park that will also serve the proposed project. The proposed project extends the shared use path network proposed in Red Hawk Ranch which connects to the future park. Additionally, In Town Park is located approximately one-quarter mile east of the project site at the intersection of Center Street and Cedar Street.

Tentative Map Findings

- 1) Compliance with environmental and health laws and regulations concerning water and air pollution, solid waste disposal, water supply facilities, community or public sewage disposal, and where applicable, individual systems for sewage disposal.

Response:

This project has been designed to meet all environmental and health laws/regulations, as required by local, state and federal regulations. Water and sewer will be provided and treated by the City of Fernley municipal water and wastewater systems. A utility plan is included in the Map Pocket of this submittal packet. Solid waste disposal will be provided by Waste Management. This is a residential project and this use is not anticipated to contribute significantly to air pollution.

- 2) Availability of water that meets applicable health standards and is sufficient for the reasonably foreseeable needs of the subdivision.

Response:

Water meeting applicable health standards is available for the future needs of this subdivision and will be dedicated by the Applicant at time of final map. Units are single family attached, therefore water will be calculated based on fixture counts. Actual demand will be calculated with the site improvement plans prior to recordation of the final subdivision map. A utility plan is included in the Map Pocket of this submittal packet indicating the location of existing City of Fernley services to serve the project.

- 3) Availability and accessibility of utilities.

Response:

All utilities necessary to serve the proposed subdivision currently exist in Main Street, and near the project area. Sewer will be extended along Main Street under the proposed shared use path and water lines are planned to be extended to the site via the proposed roadway and in the backbone roadway bordering the Red Hawk Ranch subdivision. The proposed water and sewer systems will be operated by the City of Fernley. A preliminary sewer study is included in Section 4 of this submittal packet indicating the City of Fernley has sufficient system capacity to serve the project. Gas will be operated by Southwest Gas and overhead power and communications services will also be extended to the site.

- 4) Availability and accessibility of public services such as schools, police and fire protection, transportation, recreation facilities, and parks.

Response:

Schools

The closest schools to the subject parcels are Fernley Elementary School and Fernley Intermediate School, both located less than a mile east of the site. Fernley High School is located approximately 2.0 miles south. According to the Lyon County School District's 2016 Facilities

Plan, all the Fernley schools are currently under capacity and are planned to be within adequate utilization through 2025, with the exception of one elementary school. The School District's 10-year capital program identifies a new elementary school that is planned to be built in the next 4 to 6 years, which would address elementary school capacity. The proposed 282 lots will generate approximately \$451,200 in construction tax (\$1,600 per lot) that goes to the Lyon County School District.

Police and Fire Service

Police protection is provided by the Lyon County Sheriff's office. Fire protection is provided by the North Lyon County Fire Protection District. The subject site is located in a developed area near existing development that is already served by these agencies. The closest fully staffed fire station is Station 61 which is located less than 1 mile (approximately 0.5 miles) to the east on Main Street. Four points of access are provided, with the main entrance directly off Miller Lane and internal access points from the backbone roadway on the eastern boundary of the Red Hawk Ranch development.

Parks

A future park site is proposed as part of the Red Hawk Ranch Subdivision to the west and will be located immediately south of the subject property. It is planned that the proposed project would contribute Residential Construction Tax (RCT) to the proposed Red Hawk Ranch Park that will also serve the proposed project. The proposed project extends the shared use path network proposed in Red Hawk Ranch which connects to the future park. Additionally, In Town Park is located approximately one-quarter mile east of the project site at the intersection of Center Street and Cedar Street.

- 5) Consistency with the zoning district regulations.

Response:

The project site has a land use designation of Mixed Residential (MR) and a pending zoning designation of Medium Density Residential 14 dwelling units per acre (MDR14). This zoning district allows for single-family residential lots that are a minimum of 6,000 square feet. This tentative subdivision map request seeks to create 282 single family lots, ranging from 2,048 to 3,545 square feet. The proposed project is entirely consistent with all minimum standards of the zoning district regulations.

- 6) Conformity with the Master Streets and Highways Plan.

Response:

The request conforms with the Master Streets and Highways Plan. The proposed project includes significant improvements to Miller Lane, will add improvements along the project frontage adjacent to Main Street per the Main Street plan, and will provide necessary project area intersection improvements and make a contribution to adjacent intersections as outlined in the Traffic Analysis (Section 4 of this application).

- 7) Effect of the proposed subdivision on existing public streets and the need for new streets or highways to serve the subdivision.

Response:

The Traffic Impact Study prepared by Headway Transportation indicated that the proposed project, which includes 282 lots, will generate approximately 2,030 daily trips, 135 AM peak hour trips, and 161 PM peak hour trips. Specific improvements will be included in the project which will mitigate for potential impacts to surrounding roadways as a result of this development.

- 8) Physical land characteristics, such as floodplain, slope, soil and elevation differentials with abutting properties.

Response:

This project area is not within a floodplain. Approved by the Fernley City Council on January 19, 2022, the Red Hawk Ranch Tentative Subdivision Map incorporates the relocation of an existing flood zone via a Conditional Letter of Map Revision (CLOMR) with FEMA. The CLOMR includes the construction of a large drainage channel along the southern boundary and the east side of the Red Hawk Ranch project area. This action diverts the small portion of Flood Zone AE which currently exists in the western portion of the subject parcel. All future flows on the subject property will utilize the constructed channel and will not impact the proposed development.

A grading plan is included in the Map Pocket of this submittal packet completed in compliance with all applicable grading, slope, soil and elevation differential standards of the City of Fernley.

- 9) Recommendations and comments of review bodies.

Response:

Any recommendations and comments of review bodies will be considered in the project design and engineering processes.

- 10) Conformity to the Master Sewer and Water Utility Plan.

Response:

A preliminary sewer report is included within Section 4 of this submittal packet. The reports consulted with the Master Sewer and Water Utility Plans and include discussion of how the City of Fernley sewer and water infrastructure and supply has sufficient capacity to meet the projected demand of this project.

This project also conforms to the following Water/Wastewater Goals of the City of Fernley Comprehensive Master Plan:

- *PSF.1.1.4 - Areas planned for urban or suburban development (residential densities of one or more dwelling units per acre or comparable non-residential development will be served by a community water supply system consistent with adopted policies in the Land Use Chapter of the Fernley Comprehensive Master Plan.*

- **Comment:** *This project will connect to the municipal water system. A utility plan is included within Section 4 of this submittal packet and modeling for demand will be done at final map.*
- *PSF.1.4 - Reduce water demand through xeriscape project landscaping, reclamation and reuse of treated wastewater for golf courses, medians, parkways and other appropriate application uses.*
 - **Comment:** *Although there is minimal landscaping required with this plan xeriscaping will be utilized where feasible with this project to reduce water demand. Section 4 of this submittal packet includes a landscape plan.*
- *PSF.2.1.1 - All new development within the City limits with lot sizes equal to or smaller than 1.0 acre shall be required to connect to the municipal sewer system. New development with residential densities lower than one dwelling unit per acre shall be allowed to utilize individual septic systems with acceptable sub-surface disposal if sewer is not available.*
 - **Comment:** *This project will connect to the municipal sewer system. A utility plan and a preliminary sewer report are included within Section 4 of this submittal packet.*

11) Compliance with the Code and all other applicable regulations.

Response:

Pursuant to Section 32.09.030(d)(2)b, buffering will be provided between the proposed development and existing residential lots to the east. The Miller Lane right-of-way and approximately ±27' wide landscape buffer will provide adequate buffer to provide division between existing and new development. Interior lot standards and interior design exceptions are allowed as long as the larger buildable area meets the overall standards. These have been identified with this tentative map. All other applicable regulations and Code sections will be adhered to.

TRAFFIC IMPACT STUDY FOR Duets at Red Hawk Ranch

August 9, 2022

**PREPARED FOR:
Wood Rogers, Inc**

PREPARED BY:



DRAFT

YOUR QUESTIONS ANSWERED QUICKLY

Why did you perform this study?

This Traffic Impact Study evaluates the potential traffic impacts associated with the proposed Duets at Red Hawk Ranch residential project in Fernley, Nevada. This study of potential transportation impacts was undertaken for planning purposes and to assist in determining what traffic controls or mitigations may be needed to reduce potential impacts, if any are found. The study is comprehensive and evaluates the collective impacts of several planned projects in the area.

What does the project consist of?

The project consists of 282 single family attached housing units (duplexes) in the southwest quadrant of the Main Street/Miller Lane intersection in Fernley, NV. The site is located within an area near several other planned projects and developments, which are accounted for in the study. The project location is shown in **Figure 1** and the preliminary site plan is shown in **Figure 2**.

How much traffic will the project generate?

The project is anticipated to generate approximately 2,030 Daily, 135 AM peak hour, and 161 PM peak hour trips to the external roadway network.

How will project traffic affect the roadway network?

Under Baseline Plus Project and Future Year Plus Project conditions, the study intersections are expected to operate within policy level of service thresholds, with the following exceptions:

- ▶ The Main Street/US 95A intersection operates near the LOS D/E threshold in Baseline conditions, and at LOS E in the Future Conditions without the project. The addition of project traffic does not have any significant impact on the study area intersection operations.
- ▶ The Main Street/Miller Lane intersection is expected to operate within policy level of service provided that the planned two-way left-turn lane (TWLTL) on Main Street is constructed, allowing for a two-stage left turn from Miller Lane. Without the provision for the two-stage left turn, the northbound left turn movement will operate with LOS F in the Baseline Conditions and excessive delay in subsequent study scenarios.

Are any improvements recommended?

- ▶ The Duets at Red Hawk Ranch project should construct the planned TWLTL on Main Street if they move forward to construction before Red Hawk Ranch.



- ▶ The project should stripe/construct an exclusive northbound left turn lane on the Miller Lane approach to Main Street.
- ▶ The project should construct an eastbound right turn lane on Main Street at Miller Lane.
- ▶ The project will contribute 5 percent of the estimated cost for improvements at the Main Street/US 95A intersection (estimated at \$500,000 consistent with the Downtown Fernley Revitalization Planning Study) for a pro-rata share contribution amount of \$25,000.
- ▶ The project will construct sidewalk along the project frontage of Miller Lane consistent with City of Fernley development code.
- ▶ It is recommended that the project construct a marked crosswalk across Miller Lane at Main Street.
- ▶ **Figure 9** shows a summary of the recommendations.



LIST OF FIGURES

1. Project Location
2. Preliminary Site Plan
3. Baseline Traffic Volumes
4. Baseline Lane Configurations and Controls
5. Project Trip Distribution and Assignment
6. Baseline Plus Project Traffic Volumes
7. Future Year Traffic Volumes
8. Future Year Plus Project Traffic Volumes
9. Recommended Lane Configurations and Controls

LIST OF APPENDICES

- A. NDOT Crash Data History
- B. Baseline Conditions LOS Calculations
- C. Baseline Plus Project Conditions LOS Calculations
- D. Future Year Conditions LOS Calculations
- E. Future Year Plus Project Conditions LOS Calculations



INTRODUCTION

This Traffic Impact Study evaluates the potential traffic impacts associated with the proposed Duets at Red Hawk Ranch residential project in Fernley, Nevada. This study of potential transportation impacts was undertaken for planning purposes and to assist in determining what traffic controls or mitigations may be needed to reduce potential impacts, if any are found. The study is comprehensive and evaluates the collective impacts of several planned projects in the area. The location of the project is shown on **Figure 1** and the preliminary project site plan is shown on **Figure 2**.

Study Area and Evaluated Scenarios

The project consists of 282 single family attached housing units (duplexes) in the southwest quadrant of the Main Street and Miller Lane intersection in Fernley, NV. The following intersections, shown on **Figure 1**, are included in this study:

1. Main Street (SR 427) / I-80 Westbound Off-Ramp
2. Main Street (SR 427) / I-80 Westbound On-Ramp
3. Main Street (SR 427) / I-80 Eastbound Off-Ramp
4. Main Street (SR 427) / I-80 Eastbound On-Ramp
5. Main Street / Pilot Road
6. Main Street / Red Hawk Ranch Backbone Road (current Truckee Lane intersection)
7. Main Street / Miller Lane
8. Main Street / US 95A
9. Miller Lane / Project Access Rd / McCart Street

This study includes analysis of both the weekday AM and PM peak hours as these are the periods of time in which peak traffic is anticipated to occur. The evaluated development scenarios are:

- ▶ Baseline Conditions (Existing Conditions plus planned development in the area)
- ▶ Baseline Plus Project Conditions
- ▶ Future Year Conditions (20-year horizon)
- ▶ Future Year Plus Project Conditions

ANALYSIS METHODOLOGY

Level of service (LOS) is a term commonly used by transportation practitioners to measure and describe the operational characteristics of intersections, roadway segments, and other facilities. This term equates seconds of delay per vehicle at intersections to letter grades “A” through “F”, with “A” representing optimum conditions and “F” representing breakdown or over capacity flows.



Intersections

The complete methodology for intersection level of service analysis is established in *the Highway Capacity Manual (HCM), 6th Edition* published by the Transportation Research Board (TRB). **Table 1** presents the delay thresholds for each level of service grade at signalized and unsignalized intersections.

Table 1: Level of Service Definition for Intersections

Level of Service	Brief Description	Average Delay (seconds per vehicle)	
		Signalized Intersections	Unsignalized Intersections
A	Free flow conditions.	< 10	< 10
B	Stable conditions with some affect from other vehicles.	10 to 20	10 to 15
C	Stable conditions with significant affect from other vehicles.	20 to 35	15 to 25
D	High density traffic conditions still with stable flow.	35 to 55	25 to 35
E	At or near capacity flows.	55 to 80	35 to 50
F	Over capacity conditions.	> 80	> 50

Source: *Highway Capacity Manual, 6th Edition*

Level of service calculations were performed for the study intersections using the Synchro 11 software package with analysis and results reported in accordance with *HCM* methodology.

Level of Service Policy

The *City of Fernley Comprehensive Master Plan* indicates that “the minimum Level of Service on all city-maintained roadways shall be LOS D.” This is consistent with Nevada Department of Transportation (NDOT) policies, which indicate that “*Level of Service “C” will be the design objective for capacity and under no circumstances will less than Level of Service “D” be accepted for site and non-site traffic.*”

Therefore, LOS D was used as the threshold for evaluating this project. Where intersections are currently experiencing LOS beyond the thresholds, conditions should not be exacerbated.

The level of service policies are not specific to minor side street approaches, but rather focus on maintaining quality operations on the mainline corridors. LOS “E” or “F” on a side street approach does not constitute an exceedance of the level of service policy as this is understood to be a common and manageable condition in the urban environment, particularly during peak hours. Overall intersection operation is the measure to which the level of service policy applies.



BASELINE CONDITIONS

Roadway Facilities

A brief description of the key roadways in the study area is provided below:

Main Street (SR 427) is classified by NDOT as a Minor Arterial in the project vicinity. The roadway has two lanes west of Miller Lane, and three lanes (one lane in each direction with a two-way left-turn lane) east of Miller Lane. The posted speed limit is 35 mph.

The *I-80 interchange ramps* (both eastbound and westbound) are offset so that the on and off ramps are not aligned, but separate intersections.

Pilot Road is an east-west private road that provides access to Main Street. Pilot Road currently does not have a posted speed limit, but has a *prima-facie* speed of 25 mph. Logan Lane extends east from Main Street opposite Pilot Road.

US 95A is classified by NDOT as a Minor Arterial in the project vicinity. The roadway has a posted speed limit of 25 mph and two lanes in the project area.

Truckee Lane is an east-west minor collector, with a 25-mph posted speed limit. This roadway will be realigned to the Red Hawk Ranch Backbone Roadway.

Miller Lane is a north-south minor collector, with a 25-mph posted speed limit, that runs along the east side of the project and intersects with Main Street.

McCart Street is an east-west local street connecting Miller Lane to US 95A.

Bicycle & Pedestrian Facilities

No bicycle lanes or sidewalks exist on Miller Lane. Bicycle lanes and sidewalks are present on Main Street to the east of Miller Lane. Pedestrian crossings are present on Main Street at Miller Lane (east leg) and at intersections along Main Street east of Miller Lane.

Transit Facilities

Transit services in Lyon County are offered to and from senior centers with advanced scheduling. Park-and-ride transit facilities are planned in the future.



Crash History

Vehicle crash data was provided by NDOT and includes information for the five-year period between 2016 and 2020 (the most current data available). The data indicated that:

- ▶ Four (4) crashes occurred on Miller Lane: three were property damage only, one resulted in an injury.
- ▶ No crashes occurred at the Main Street/ Truckee Lane Intersection

The crash data is provided in **Appendix A**.

Traffic Volumes

Baseline AM and PM peak hour traffic volumes were determined by stacking all known approved and planned development projects in the Main Street corridor on top of existing traffic volumes (2021 volumes increased by 15%). This method presents a conservative and comprehensive approach, and notably higher traffic levels than would be shown by existing traffic counts.

Planned Projects

Numerous other development projects have been recently approved or proposed within the project vicinity. Project traffic generated by each known project (approved or still under City review process) was added to existing traffic volumes to develop a “Baseline” scenario for a comprehensive analysis of the study area.

The projects included in Baseline Conditions are the following:

- ▶ *Red Hawk Ranch (Phase 1)* – 287 Single Family dwelling units (Headway, November 2021)
- ▶ *Commerce Center Industrial* - 1,365,760 sq. ft. of Industrial Development (Headway, September 2021)
- ▶ *Pilot Road Industrial* – 485,000 sq. ft. of Industrial Development (Headway, January 2022)
- ▶ *American Battery Metals Corp* – Battery Recycling plant on 12.44 acre site (Headway, December 2020)
- ▶ *600 West Main Street* (Solaegui Engineers, May 2021)
 - » 201 Multifamily dwelling units
 - » 100 room hotel
 - » 15,000 sq. ft. pharmacy
 - » 8,000 sq. ft. restaurant
 - » 47,000 sq. ft. retail



Baseline Conditions Volumes

The Baseline Conditions traffic volumes are shown on **Figure 3** and represent a comprehensive near-term horizon scenario including all the known nearby developments.

Roadway Modifications and Intersection Controls

Two roadway projects are anticipated to be completed prior to this project and are included in the Baseline conditions:

- ▶ The Red Hawk Ranch Backbone Road is planned to be connected to Main Street at the current Truckee Lane intersection and Truckee Lane will be realigned to the Red Hawk Ranch backbone roadway. This planned roadway will connect east through Red Hawk Ranch Phase 2 and the Duets at Red Hawk Ranch project to Miller Lane. The 600 Main project to the north of Main Street will connect to Main Street opposite the Red Hawk Ranch backbone roadway.,
- ▶ Main Street between Red Hawk Ranch Backbone Road (current Truckee Lane intersection) and Miller Lane will be widened to a three-lane section, one lane in each direction and a TWLTL (two-way left-turn lane) as a condition of the Red Hawk Ranch Phase 1 project. *It is noted that the Duets at Red Hawk Ranch project may be completed prior to Red Hawk Ranch and this possibility is addressed later in this report.*

Two intersections that are currently side-street stop controlled are planned to be signalized in the near future with other developments and are analyzed with signal control in the Baseline conditions since the development traffic volumes associated with those signalizations have been included:

- ▶ Main Street/Pilot Road is planned to be signalized as described in the *Pilot Road Industrial TIS* (Headway, January 2022)
- ▶ Main Street/Red Hawk Ranch Backbone Road (current Truckee Lane) is planned to be signalized with Red Hawk Ranch Phase 2 or potentially earlier by Phase 1, 600 Main, and/or other projects. Initial stages of the signal construction are a condition of approval on Red Hawk Ranch Phase 1.

The Baseline Condition lane configurations and controls are shown on **Figure 4**.

Intersection Level of Service Analysis

Baseline AM and PM peak hour intersection level of service analysis was performed for the study intersections using Synchro 11 analysis software. The signal timing parameters for Main Street/ US95A were derived from the data collection video of the intersection in the AM and PM periods. Signal timing parameters for the soon to be constructed signals for Main Street/ Pilot Road/ Logan Lane and Main



Street/ Red Hawk Ranch Backbone Road were estimated. **Table 2** shows the baseline conditions level of service results, and the technical calculations are provided in **Appendix B**.

Table 2: Baseline Intersection Level of Service

ID	Intersection	Intersection Control	AM Peak		PM Peak	
			LOS	Delay ¹	LOS	Delay ¹
1	Main St & WB I-80 Off-Ramp	Side Street STOP				
	Overall		A	3.0	A	3.4
	Westbound Left		B	13.7	B	14.6
	Westbound Right		B	10.4	A	9.7
2	Main St & WB I-80 On-Ramp	Side Street STOP				
	Overall		A	3.6	A	3.0
	Northbound Left		B	10.3	B	10.9
3	Main St & EB I-80 Off-Ramp	Side Street STOP				
	Overall		A	2.8	A	1.1
	Eastbound Left		C	23.8	C	20.2
4	Main St & EB I-80 On-Ramp	Side Street STOP				
	Overall		A	0.5	A	0.7
	Southbound Left		B	10.1	A	9.7
5	Main St & Pilot Rd / Logan Ln	Signalized ²				
	Overall		C	22.5	C	27.6
6	Main St & Red Hawk Ranch Backbone Rd	Signalized ²				
	Overall		B	13.7	B	15.6
7	Main St & Miller Lane	Side Street STOP				
	Overall		A	1.4	A	0.9
	Westbound Left		A	8.9	B	10.3
	Northbound Approach		C	19.4	C	22.2
8	Main St & US 95A	Signalized				
	Overall		C	32.5	D	51.8
9	Miller Lane & Project Access Rd/ McCart Street	Side Street STOP				
	Overall		A	0.7	A	1.1
	Northbound Left		N/A			
	Southbound Left		A	7.3	A	7.3
	Eastbound Approach		N/A			
	Westbound Approach		A	8.5	A	9.1

Notes: 1. Delay is reported in seconds per vehicle for the overall intersection for signalized and all way stop controlled intersections, and for the worst approach/movement for side street stop-controlled intersections.

2. Intersection is currently side street stop controlled but is planned to be signalized with the development projects included in this scenario

Source: Headway Transportation, 2022



As shown in the table, the study intersections operate within policy level of service thresholds for the baseline conditions during the AM and PM peak hours. It is noted that:

- ▶ The northbound approach of the Main Street/Miller Lane intersection is anticipated to operate at LOS C in the Baseline Condition, assuming that the TWLTL on Main Street is constructed, allowing for a two-stage northbound left turns. Without the TWLTL, the northbound left turn movement will operate at a LOS F.
- ▶ The Main Street/US 95A intersection will operate at LOS D in the PM peak hour (within policy) but is near the LOS D/E threshold of 55 seconds of delay.

PROJECT CONDITIONS

Trip Generation

Trip generation rates from the *Trip Generation Manual, 11th Edition* published by the Institute of Transportation Engineers (ITE) were used to develop trip generation estimates for the proposed project based on the Single Family Attached Housing rates (ITE Code 215) for 282 dwelling units (duplex type housing product). **Table 3** shows the Daily, AM peak hour, and PM peak hour trip generation estimates.

Table 3: Trip Generation Estimates

Land Use (ITE Code)	Size ¹	Trips				
		Daily	AM	AM In/Out	PM	PM In/Out
Single Family Attached Housing (215)	282 du	2,030	135	42 / 93	161	92 / 69

Notes: 1. du = dwelling units

Source: Headway Transportation, 2022

As shown in the table, the project is expected to generate 2,030 Daily, 135 AM peak hour, and 161 PM peak hour trips to the external roadway network.

Trip Distribution

Project trips were distributed to the adjacent roadway network based on existing traffic volumes, the locations of complimentary land uses, and anticipated travel patterns. Project trips were distributed based on the following:

- ▶ 40% to/from east via Main Street
- ▶ 15% to/from the south via US 95A
- ▶ 30% to/from the west via I-80



- ▶ 15% to/from the east via I-80

Figure 4 shows the project trip distribution and assignment.

Project Access

Primary project access is proposed to Miller Lane opposite McCart Street as shown on **Figures 2** and **5**. Secondary access is proposed to Main Street via the Red Hawk Ranch Backbone Road.

To be conservative regarding potential impacts on Miller Lane and address the possibility that Duets at Red Hawk Ranch could potentially be constructed prior to Red Hawk Ranch, 100% of the project traffic was assigned to Miller Lane in this analysis.

BASELINE PLUS PROJECT CONDITIONS

Traffic Volumes

Project trips (**Figure 5**) were added to the baseline traffic volumes (**Figure 3**) to develop the Baseline Plus Project conditions traffic volumes, shown on **Figure 6**.

Intersection Level of Service

AM and PM peak hour intersection level of service analysis was performed for the study intersections based on the Baseline Plus Project traffic volumes, and the lane configurations and controls shown on **Figure 4**. **Table 4** shows the level of service results, and the technical calculations are provided in **Appendix C**.



Table 4: Baseline Plus Project Intersection Level of Service

ID	Intersection Name	Intersection Control	Baseline				Baseline Plus Project			
			AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	Delay ¹	LOS	Delay ¹	LOS	Delay ¹	LOS	Delay ¹
1	Main St & WB I-80 Off-Ramp	Side Street STOP								
	Overall		A	3.0	A	3.4	A	3.1	A	3.7
	Westbound Left		B	13.7	B	14.6	B	13.8	C	15.0
	Westbound Right		B	10.4	A	9.7	B	10.4	A	9.7
2	Main St & WB I-80 On-Ramp	Side Street STOP								
	Overall		A	3.6	A	3.0	A	3.9	A	3.2
	Northbound Left		B	10.3	B	10.9	B	10.6	B	11.3
3	Main St & EB I-80 Off-Ramp	Side Street STOP								
	Overall		A	2.8	A	1.1	A	2.9	A	1.1
	Eastbound Left		C	23.8	C	20.2	D	25.5	C	21.2
4	Main St & EB I-80 On-Ramp	Side Street STOP								
	Overall		A	0.5	A	0.7	A	0.5	A	0.7
	Southbound Left		B	10.1	A	9.7	B	10.4	A	9.9
5	Main St & Pilot Rd / Logan Ln	Signalized ²								
	Overall		C	22.5	C	27.6	C	24.5	C	27.9
6	Main St & Red Hawk Ranch Backbone Road	Signalized ²								
	Overall		B	13.7	B	15.6	B	14.0	B	16.5
7	Main St & Miller Lane	Side Street STOP								
	Overall		A	1.4	A	0.9	A	3.9	A	2.7
	Westbound Left		A	8.9	B	10.3	A	9.1	B	11.0
	Northbound Approach		C	19.4	C	22.2	D	27.7	D	32.7
8	Main St & US 95A	Signalized								
	Overall		C	32.5	D	51.8	D	37.9	E	57.8
9	Miller Lane & Project Access Rd/ McCart Street	Side Street STOP								
	Overall		A	0.7	A	1.1	A	4.5	A	2.9
	Northbound Left		N/A				A	0	A	0
	Southbound Left		A	7.3	A	7.3	A	7.3	A	7.3
	Eastbound Approach		N/A				A	9.7	B	10.3
	Westbound Approach		A	8.5	A	9.1	A	8.5	A	9.3

Notes: 1. Delay is reported in seconds per vehicle for the overall intersection for signalized and all way stop controlled intersections, and for the worst approach/movement for side street stop-controlled intersections.

2. Intersection is currently side street stop controlled but is planned to be signalized with the development projects included in this scenario

Source: Headway Transportation, 2022

As shown in the table, the addition of project traffic had the following impacts:



- ▶ The operation of the northbound left turn movement at the Main Street/Miller Lane intersection is marginally impacted but remains within LOS D with a TWLTL on Main Street. Without a TWLTL, the northbound left turn delay would be excessive. Exiting traffic could alternatively use the Red Hawk Ranch Backbone Road to reach Main Street if the Red Hawk Ranch backbone roadway is constructed prior to Duets at Red Hawk Ranch.
- ▶ The Main Street/US 95A intersection is on the LOS D/E threshold of 55 seconds in the PM peak hour; however, the delay is similar with and without the project.
- ▶ All other intersections experienced insignificant change in delay and are within LOS policy.

FUTURE YEAR CONDITIONS

Roadway Facilities

The *City of Fernley Transportation Master Plan* (July 2020) includes the following planned improvements in the study area:

- ▶ Main Street improvements from Marie Drive to Hardie Lane including bicycle lanes, updated crosswalks, and evaluating pedestrian crossing signals (5-year Planning Horizon)
- ▶ Railroad Underpass improvements to widen the railroad underpass on Main Street between Pilot Road and Miller Lane including multi-modal improvements (10-year Planning Horizon)
- ▶ Improve Main Street/SR 427 to provide bicycle facilities from Fernley to the Washoe County line (10-year Planning Horizon)
- ▶ Potential future roadway on the west side of the city between I-80 and US 95A (20-year horizon)

However, to be conservative, none of the above improvements are assumed in this impact analysis since there is no funding source identified for the above projects at this time.

Traffic Volume Forecasts

The Future Year analysis estimates operating conditions for the 20-year horizon. As stated previously, the Baseline Conditions scenario is comprehensive, and includes known anticipated and approved projects within the project vicinity. The addition of project trips was equivalent to a 2-3 percent per year growth rate at the study intersections, consistent with previous studies and regional planning.

To account for other background growth not included by known specific developments, the existing traffic volumes were factored higher by 1 percent per year for 20 years (1.2 growth factor). The approved/anticipated development projects were then added to the factored existing volumes.



Intersection Level of Service

AM and PM peak hour intersection level of service analysis was performed for the study intersections using Synchro 11 analysis software and the lane configurations and controls shown on **Figure 4. Table 5** shows the Future Year conditions level of service results, and the technical calculations are provided in **Appendix D**.

Table 5: Future Year Intersection Level of Service

ID	Intersection Name	Intersection Control	AM Peak		PM Peak	
			LOS	Delay ¹	LOS	Delay ¹
1	Main St & WB I-80 Off-Ramp	Side Street STOP				
	Overall		A	3.1	A	3.7
	Westbound Left		B	14.6	C	16.2
	Westbound Right		B	10.8	B	10.0
2	Main St & WB I-80 On-Ramp	Side Street STOP				
	Overall		A	4.0	A	3.4
	Northbound Left		B	11.2	B	12.0
3	Main St & EB I-80 Off-Ramp	Side Street STOP				
	Overall		A	3.5	A	1.3
	Eastbound Left		D	30.7	C	24.0
4	Main St & EB I-80 On-Ramp	Side Street STOP				
	Overall		A	0.6	A	0.8
	Southbound Left		B	10.9	B	10.4
5	Main St & Pilot Rd / Logan Ln	Signalized ²				
	Overall		C	24.6	C	34.9
6	Main St & Red Hawk Ranch Backbone Rd	Signalized ²				
	Overall		B	14.6	B	19.6
7	Main St & Miller Lane	Side Street STOP				
	Overall		A	1.8	A	1.1
	Westbound Left		A	9.1	B	11.1
	Northbound Approach		C	23.4	D	27.5
8	Main St & US 95A	Signalized				
	Overall		D	47.8	E	78.3
9	Miller Lane & Project Access Rd/ McCart Street	Side Street STOP				
	Overall		A	0.7	A	1.2
	Northbound Left		N/A			
	Southbound Left		A	7.3	A	7.3
	Eastbound Approach		N/A			
	Westbound Approach		A	8.6	A	9.2

Notes: 1. Delay is reported in seconds per vehicle for the overall intersection for signalized and all way stop controlled intersections, and for the worst approach/movement for side street stop-controlled intersections.

2. Intersection is currently side street stop controlled but is planned to be signalized with the development projects included in this scenario

Source: Headway Transportation, 2022



As shown in the table, the Main Street/US 95A intersection is expected to operate at LOS E in the PM peak hour in the 20-year horizon. All other intersections are expected to operate within level of service policy in the Future Year conditions.

FUTURE YEAR PLUS PROJECT CONDITIONS

Traffic Volumes

Project trips (**Figure 5**) were added to the Future Year traffic volumes (**Figure 7**) to develop the Future Year Plus Project conditions traffic volumes, shown on **Figure 8**.

Intersection Level of Service

AM and PM peak hour intersection level of service analysis was performed for the study intersections based on the Future Year Plus Project traffic volumes and the lane configurations and controls shown on **Figure 4**. **Table 6** shows the level of service results, and the technical calculations are provided in **Appendix E**.



Table 6: Future Year Plus Project Intersection Level of Service

ID	Intersection Name	Intersection Control	Future				Future Plus Project			
			AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	Delay ¹	LOS	Delay ¹	LOS	Delay ¹	LOS	Delay ¹
1	Main St & WB I-80 Off-Ramp	Side Street STOP								
	Overall		A	3.1	A	3.7	A	3.2	A	4.0
	Westbound Left		B	14.6	C	16.2	B	14.8	C	16.7
	Westbound Right		B	10.8	B	10	B	10.8	A	10.0
2	Main St & WB I-80 On-Ramp	Side Street STOP								
	Overall		A	4.0	A	3.4	A	4.3	A	3.6
	Northbound Left		B	11.2	B	12	B	11.6	B	12.5
3	Main St & EB I-80 Off-Ramp	Side Street STOP								
	Overall		A	3.5	A	1.3	A	3.6	A	1.3
	Eastbound Left		D	30.7	C	24	D	33.2	D	25.3
4	Main St & EB I-80 On-Ramp	Side Street STOP								
	Overall		A	0.6	A	0.8	A	0.6	A	0.8
	Southbound Left		B	10.9	B	10.4	B	11.3	B	10.6
5	Main St & Pilot Rd / Logan Ln	Signalized ²								
	Overall		C	24.6	C	34.9	C	26.8	C	37.2
6	Main St & Red Hawk Ranch Backbone Rd (former Truckee Lane)	Signalized ²								
	Overall		B	14.6	B	19.6	B	15.5	C	21.8
7	Main St & Miller Lane	Side Street STOP								
	Overall		A	1.8	A	1.1	A	5.3	A	3.7
	Westbound Left		A	9.1	B	11.1	A	9.3	B	12.0
	Northbound Approach		C	23.4	D	27.5	E	39.4	E	48.2
8	Main St & US 95A	Signalized								
	Overall		D	47.8	E	78.3	D	54.4	F	85.6
9	Miller Lane & Project Access Rd/ McCart Street	Side Street STOP								
	Overall		A	0.7	A	1.2	A	4.3	A	2.8
	Northbound Left		N/A				A	0	A	0
	Southbound Left		A	7.3	A	7.3	A	7.3	A	7.3
	Eastbound Approach		N/A				A	9.8	B	10.6
	Westbound Approach		A	8.6	A	9.2	A	8.6	A	9.4

Notes: 1. Delay is reported in seconds per vehicle for the overall intersection for signalized and all way stop controlled intersections, and for the worst approach/movement for side street stop-controlled intersections.

2. Intersection is currently side street stop controlled but is planned to be signalized with the development projects included in this scenario

Source: Headway Transportation, 2022



The addition of project traffic is expected to have the following impacts:

- ▶ Delay for the northbound left turn movement at the Main Street/Miller Lane intersection would be moderately impacted, and the operations would be manageable (side street LOS E) with the TWLTL on Main Street. Without the TWLTL, the northbound left turn delay would be excessive. Exiting traffic could alternatively use the Red Hawk Ranch Backbone Road (which should be in place in the 20-year horizon) to reach Main Street.
- ▶ The Main Street/US 95A intersection is on the threshold of LOS E/F (80 seconds) in the PM peak hour; the delay is similar with and without the project.
- ▶ All other intersections are expected to experience minor increases in delay but are projected to operate within LOS policy.

MILLER LANE/MAIN STREET INTERSECTION RECOMMENDATIONS

A traffic signal is not recommended at the Main Street/Miller Lane intersection given the spacing to adjacent signals at Main Street/Red Hawk Ranch Backbone Road and Main Street/US 95A.

A TWLTL on Main Street between Red Hawk Ranch Backbone Road and Miller Lane is a condition of approval on Red Hawk Ranch Phase 1. This will allow for a two-stage left turn from Miller Lane, which will significantly benefit the operations and reduce the delay for left turners to a manageable condition, particularly since drivers have an alternate route out of the site via the planned signal at the Red Hawk Ranch Backbone Road/Main Street intersection (current Truckee Lane intersection). This TWLTL should be constructed by Duets at Red Hawk Ranch if it moves forward to construction prior to Red Hawk Ranch.

A northbound left turn lane on the Miller Lane approach to Main Street would further improve operations and is a practical improvement to complement the TWLTL. An eastbound right turn lane into the site is warranted based on *NDOT Access Management System and Standards* in all scenarios, including the Baseline Conditions. **Table 7** shows the level of service results with the proposed improvements – an eastbound right turn lane, and a northbound left-turn lane - and the technical calculations are provided in **Appendix E**.



Table 7: Main Street/ Miller Lane Improvements Level of Service

ID	Intersection Name	Intersection Control	Future Plus Project				Future Plus Project Improvements: Northbound Left Turn Lane			
			AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	Delay ¹	LOS	Delay ¹	LOS	Delay ¹	LOS	Delay ¹
7	Main St & Miller Lane	Side Street STOP								
	Overall		A	5.3	A	3.7	A	3.5	A	2.4
	Westbound Left		A	9.3	B	12.0	A	9.3	B	12.0
	Northbound Approach		E	39.4	E	48.2	N/A			
	Northbound Left		N/A				D	31.4	E	35.8
	Northbound Right		N/A				B	14.2	C	18.9

Notes: 1. Delay is reported in seconds per vehicle for the overall intersection for signalized and all way stop controlled intersections, and for the worst approach/movement for side street stop-controlled intersections.

Source: Headway Transportation, 2022

It is recommended that the project stripe/construct a northbound left turn lane on Miller. Side-street delay of 36 seconds is an acceptable and manageable condition in an urban environment during peak hours. The proposed 100' turn lane length provides adequate storage. It is recommended that the project construct an eastbound right turn lane on Main Street into the site. A deceleration length of 215' (including the taper) is required based on the 35-mph speed limit.

Prohibiting northbound left turns from Miller Lane and rerouting this traffic to the Red Hawk Ranch backbone roadway was considered as an alternative improvement but is not preferred. This configuration would require a raised median and may encourage drivers to turn right and then u-turn on Main Street. Additionally, it is not necessary because drivers will have the option of using the Red Hawk Ranch Backbone Road to access a traffic signal on Main Street. **Table 8** demonstrates that the Main Street/ Red Hawk Ranch Backbone Road intersection has adequate capacity to accommodate additional traffic turning left onto Main Street.

Table 8: Main Street/Red Hawk Ranch Backbone Road Level of Service Comparison

ID	Intersection Name	Intersection Control	Future Year Plus Project				Future Year Plus Project with Additional Lefts from Miller Lane			
			AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	Delay ¹	LOS	Delay ¹	LOS	Delay ¹	LOS	Delay ¹
6	Main St & Red Hawk Ranch Backbone Rd	Signalized ²								
	Overall		B	15.5	C	21.8	C	21.2	C	24.3

Notes: 1. Delay is reported in seconds per vehicle for the overall intersection for signalized and all way stop controlled intersections, and for the worst approach/movement for side street stop-controlled intersections.

2. Intersection is currently side street stop controlled but planned to be signalized with development projects included in this scenario



Source: Headway Transportation, 2022

As shown in **Table 8**, even if all left turns from Miller Lane were rerouted to the Red Hawk Ranch Backbone Road, the intersection is still anticipated to operate within level of service policy.

Figure 9 provides a graphical summary of the recommended roadway and intersection configurations in the project vicinity.

PRO-RATA SHARE CONTRIBUTIONS

The project has a minor impact at the Main Street/US 95A intersection, which is anticipated to operate below the City's policy level of service threshold in the PM peak hour. The project proposes to mitigate this impact by the payment of a pro-rata share contribution to future improvements at the intersection consistent with the methodology utilized for prior projects.

The project will contribute \$25,000, which is 5% of the estimated cost for improvements at the Main Street/US 95A intersection (estimated at \$500,000 consistent with the Downtown Fernley Revitalization Planning Study and calculations for prior contributing development projects).

CONCLUSIONS

The following is a list of our key findings and recommendations:

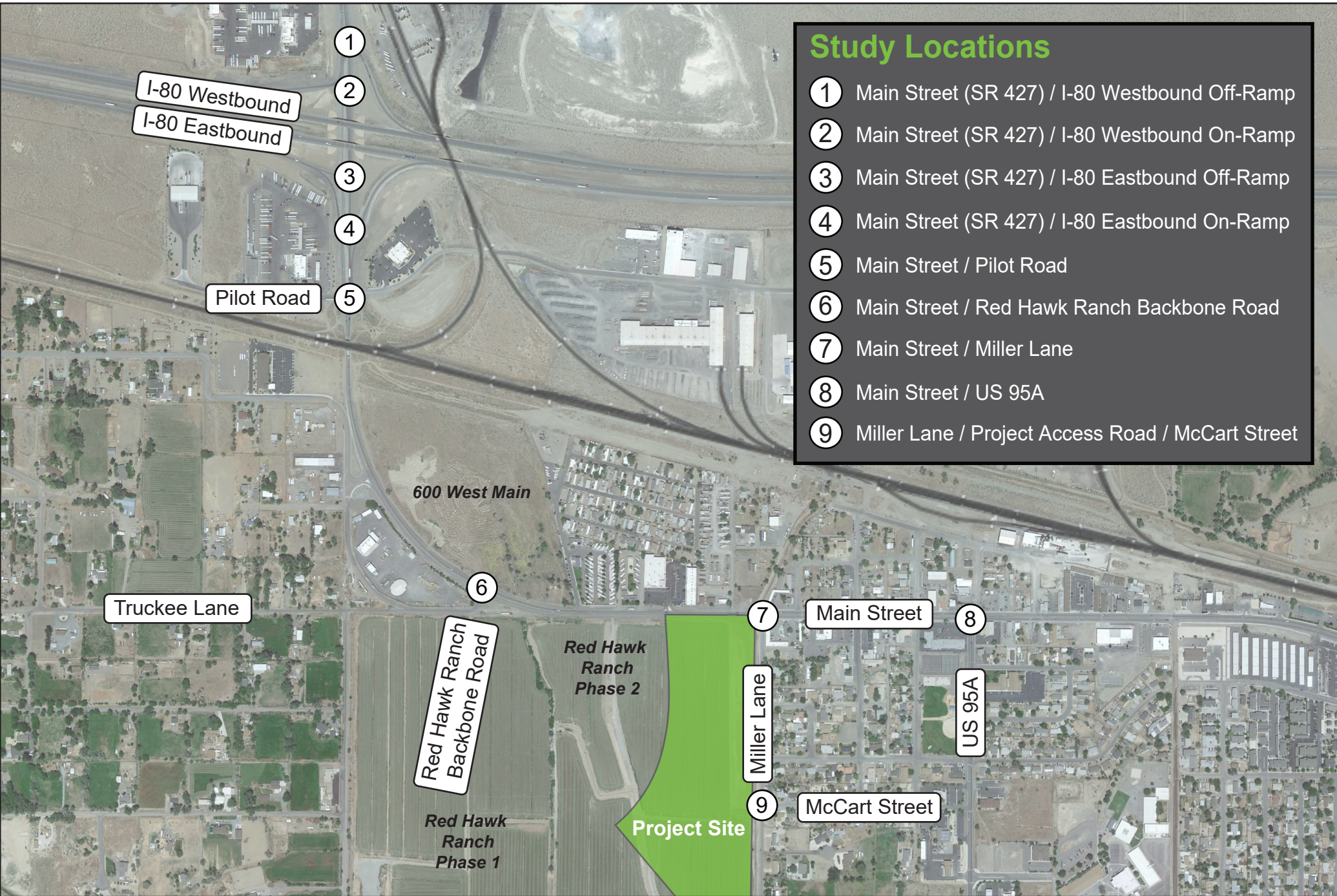
- ▶ The proposed project consists of a 282 single family attached housing units (duplexes) and is anticipated to generate approximately 2,030 Daily, 135 AM peak hour, and 161 PM peak hour trips to the external roadway network.
- ▶ The Baseline Conditions include:
 - » Planned, but unbuilt development in the area
 - » Construction of the Red Hawk Ranch Backbone Road providing an additional access route to the site
 - » Roadway widening on Main Street to include a TWLTL between the Red Hawk Ranch Backbone Road and Miller Lane
 - » Planned signalization of two currently stop-controlled intersections (Main Street/Pilot Road and Main Street/Red Hawk Ranch Backbone Road (currently Truckee Lane).
- ▶ Under Baseline Plus Project and Future Year Plus Project conditions, the study intersections are expected to operate within policy level of service thresholds, except Main Street/US 95A. This intersection operates near the LOS D/E threshold in Baseline conditions, and at LOS E in the Future Conditions without the project. The addition of project traffic has a minor impact on the Main



Street/US 95A intersection, which is projected to function below policy level of service. No notable impacts were identified at the other study intersections.

- ▶ The Main Street/Miller Lane intersection is expected to operate within policy level of service provided that the planned two-way left-turn lane (TWLTL) on Main Street is constructed and striped to allow for two-stage left turn movements from Miller Lane. This TWLTL is a condition of approval on the Red Hawk Ranch Phase 1 project.
- ▶ The Duets at Red Hawk Ranch project should construct the planned TWLTL on Main Street if Duets at Red Hawk Ranch moves forward to construction before Red Hawk Ranch.
- ▶ The project should stripe/construct an exclusive northbound left turn lane on the Miller Lane approach to Main Street.
- ▶ The project should construct an eastbound right turn lane on Main Street at Miller Lane.
- ▶ The project will contribute 5 percent of the estimated cost for improvements at the Main Street/US 95A intersection (estimated at \$500,000 consistent with the Downtown Fernley Revitalization Planning Study) for a pro-rata share contribution amount of \$25,000.
- ▶ The project will construct sidewalk along the project frontage of Miller Lane consistent with City of Fernley development code.
- ▶ It is recommended that the project construct a marked crosswalk across Miller Lane at Main Street.



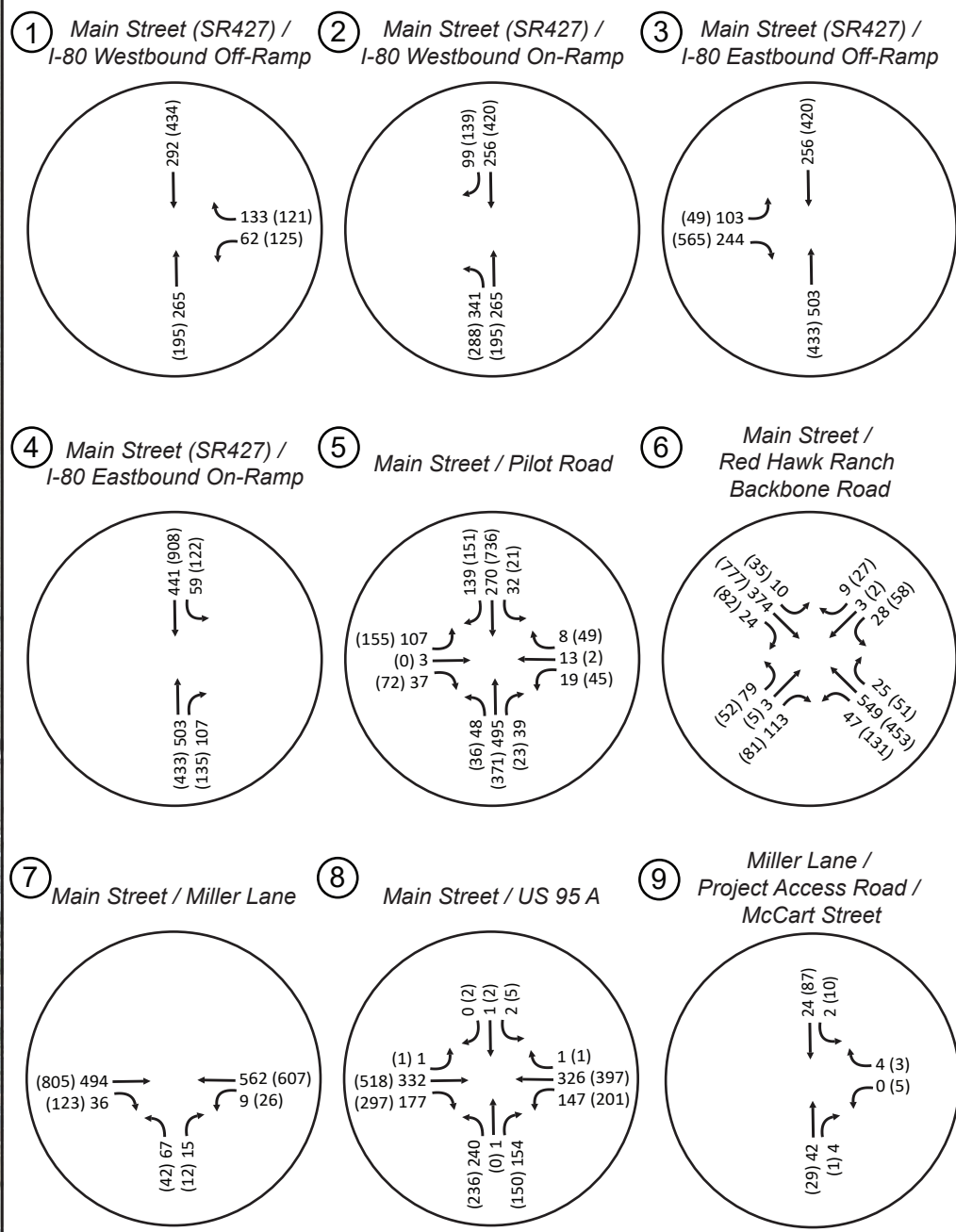


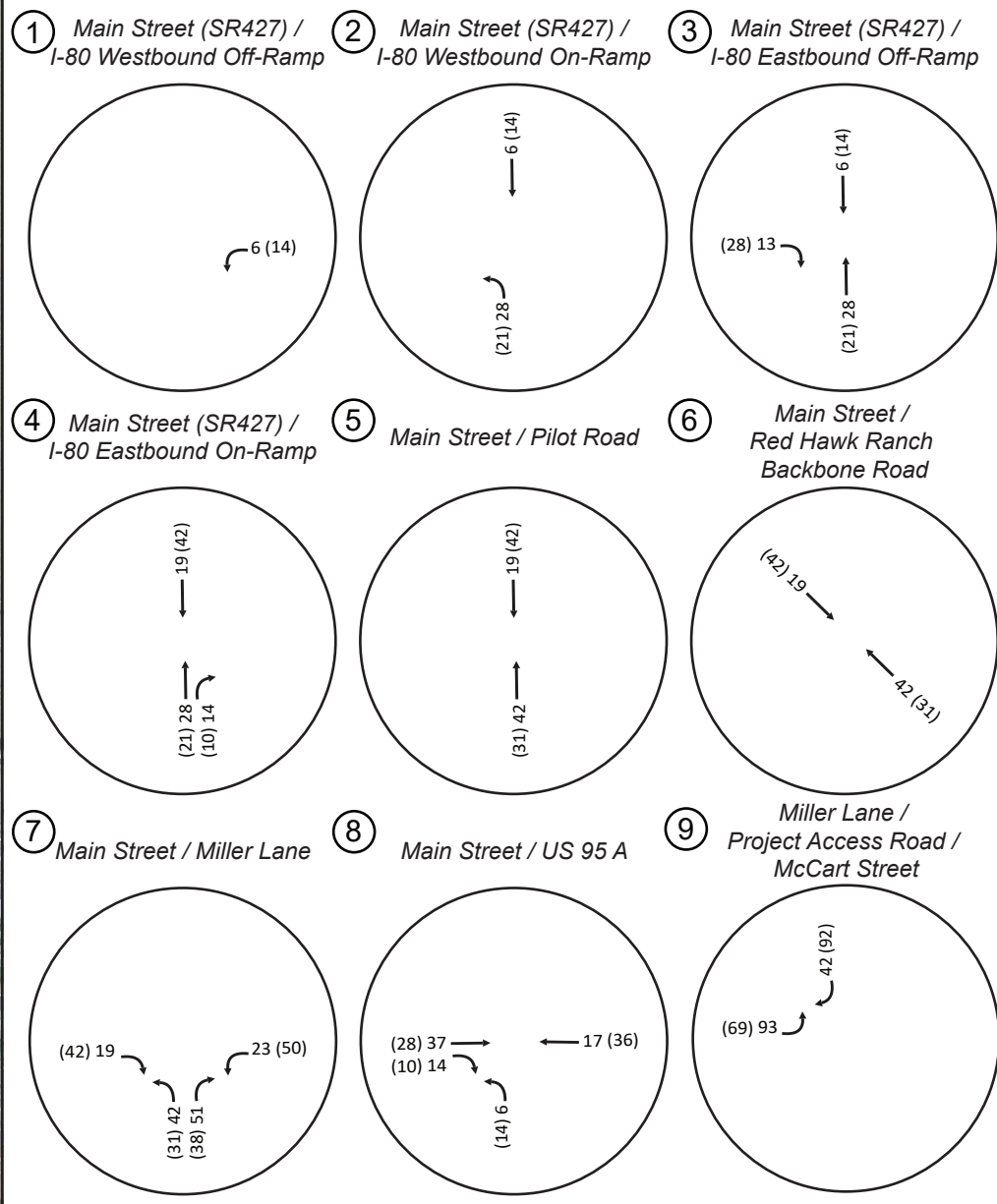
AUGUST 2022

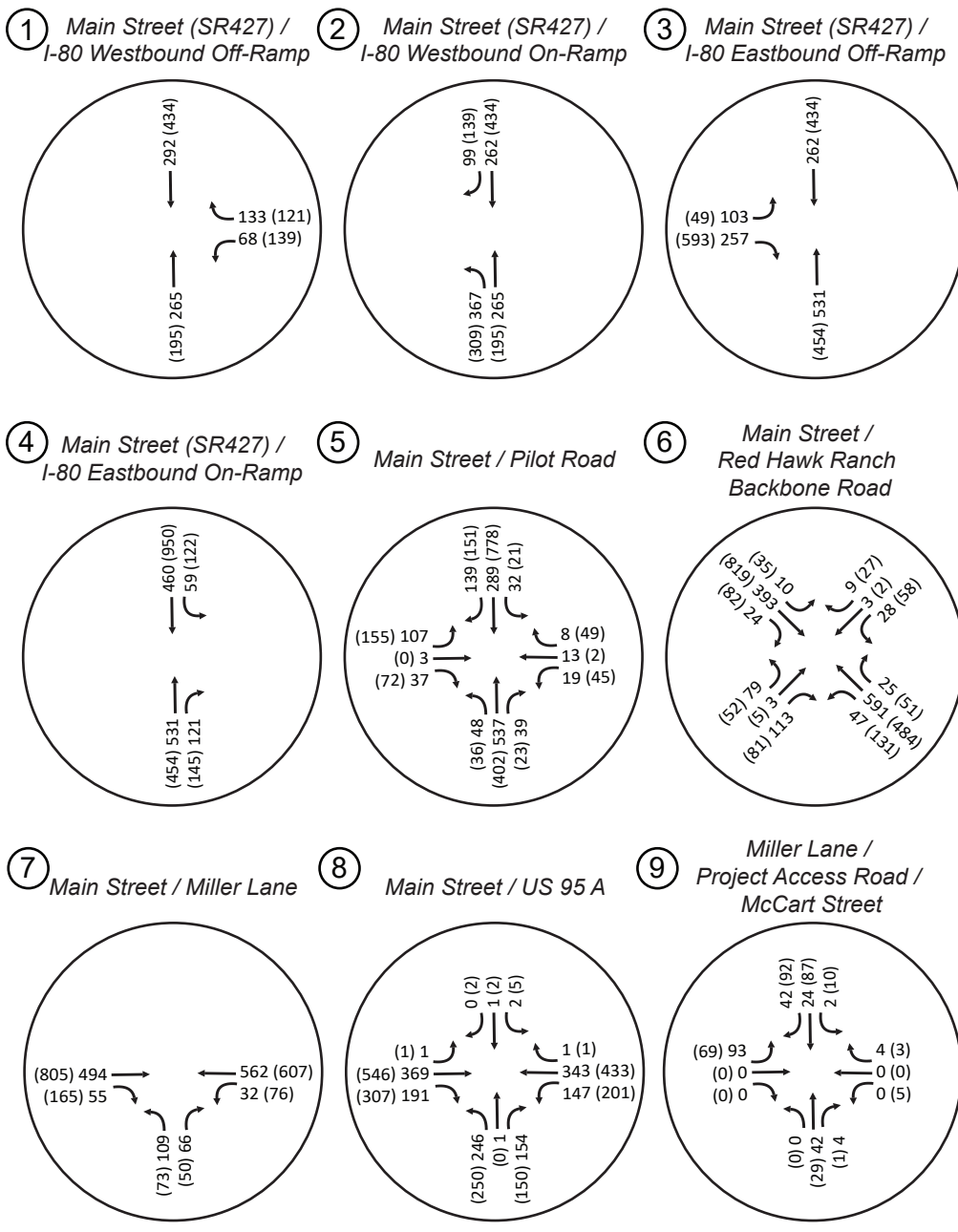


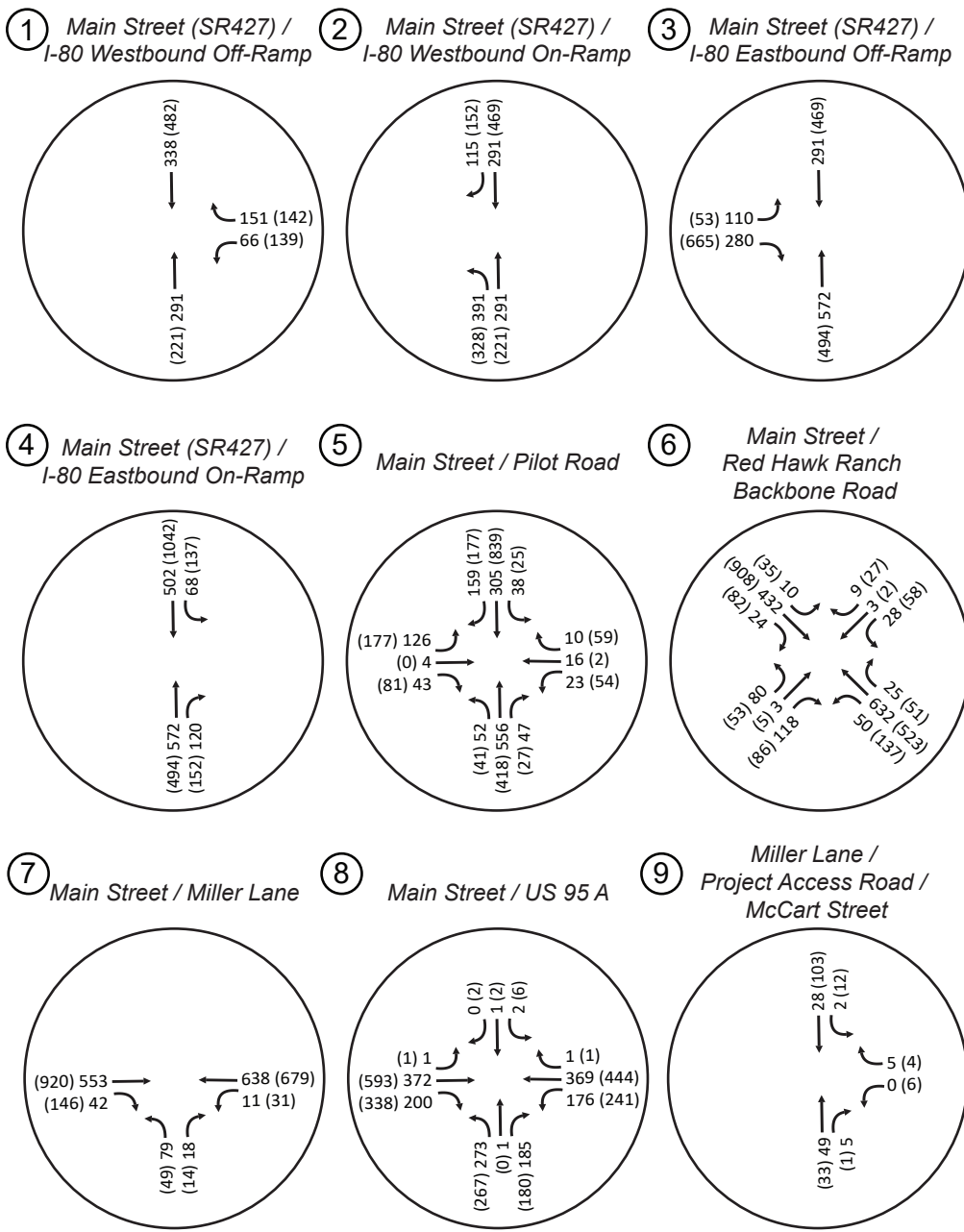
OVERALL SITE: ± 29.4 AC
TOTAL UNITS: ± 282 UNITS (141 DUETS)
(GROSS: ± 9.6 DU/AC, NET: ± 10.2 DU/AC)
PHASE 1: 158 UNITS (79 DUETS)
PHASE 2: 124 UNITS (62 DUETS)

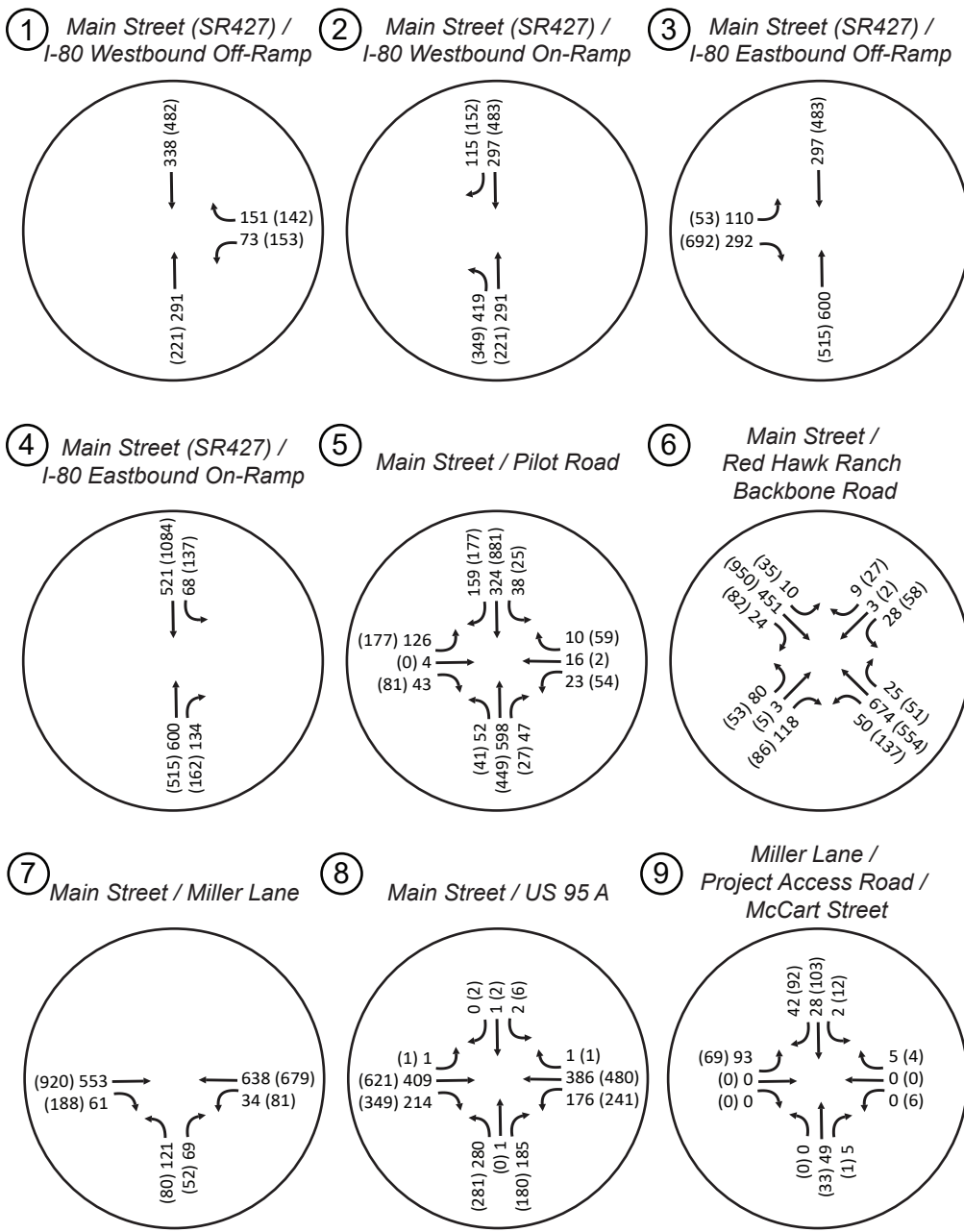


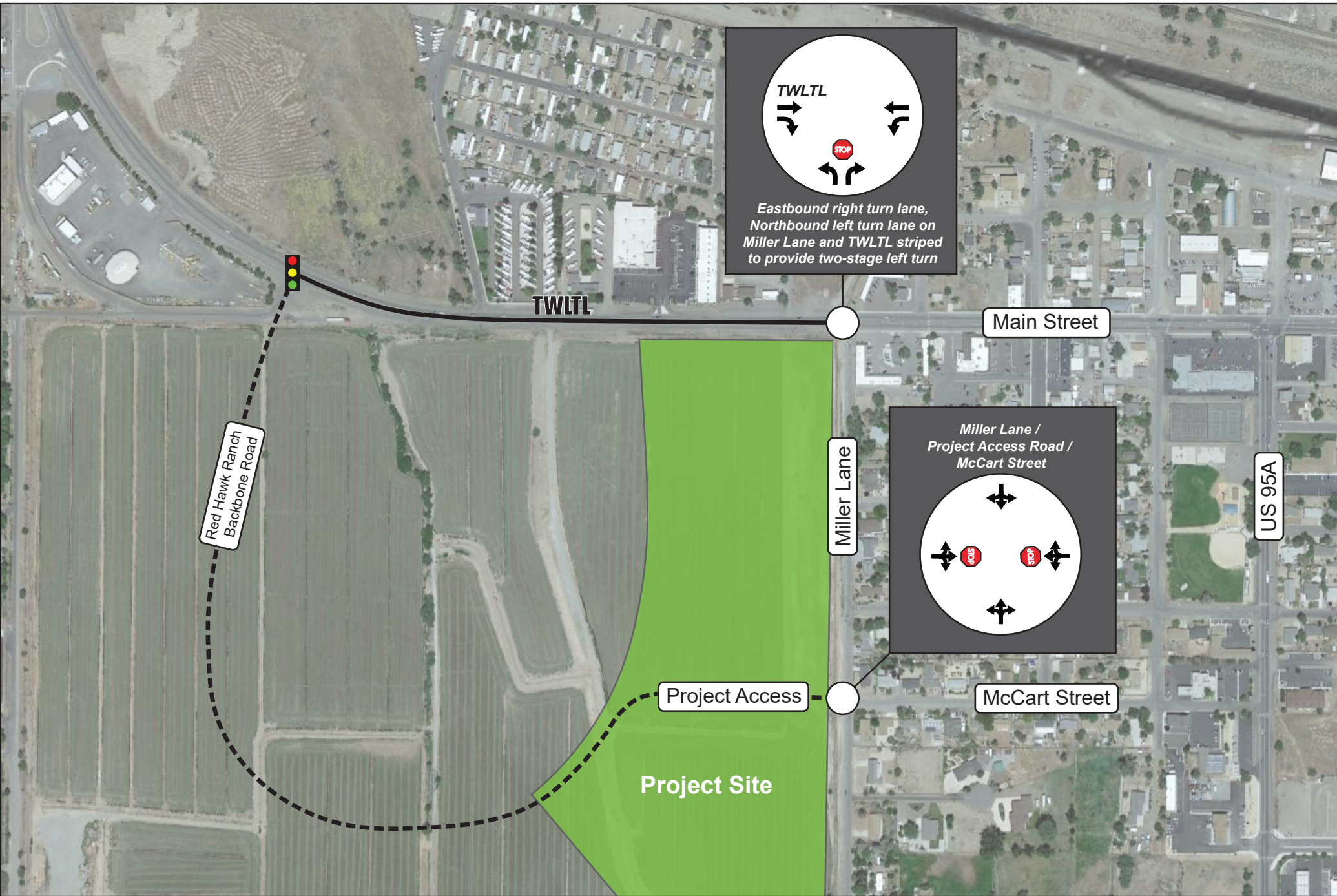












Appendix A

NDOT Crash Data History



ROAD SEGMENT

MILLER LN SEGMENT MAIN
ST TO SHADOW LN
01 JAN 16 - 01 JAN 21

COUNTY: LYON

Crash Severity	Crash Date	Crash Year	Primary Street	Distance	Dir	Secondary Street	Adj. Mile Marker	Fatalities	Injured	Property Damage Only	Injury Type	Crash Type
PROPERTY DAMAGE ONLY	13-Jul-2017	2017	MILLER LN	500	N	HEATHER LN	0.19			PDO		UNKNOWN
PROPERTY DAMAGE ONLY	23-Dec-2018	2018	MILLER LN	50	S	McCART ST	0.27			PDO		BACKING
INJURY ACCIDENT	16-Sep-2016	2016	MILLER LN		AT INT	CEDAR ST	0.33		1		B	ANGLE
PROPERTY DAMAGE ONLY	25-Jun-2018	2018	MILLER LN		AT INT	RUBY ST	0.39			PDO		ANGLE
								Sum: 0	Sum: 1	Count: 3		
								Count: 0	Count: 1			
								Total:	4			

Appendix B

Baseline Conditions LOS Calculations



HCM 6th TWSC
1: Main St & WB I-80 Off-Ramp

08/08/2022

Intersection						
Int Delay, s/veh	3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	62	133	265	0	0	292
Future Vol, veh/h	62	133	265	0	0	292
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	150	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	26	26	26	26	26	26
Mvmt Flow	67	145	288	0	0	317
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	447	144	0	-	-	-
Stage 1	288	-	-	-	-	-
Stage 2	159	-	-	-	-	-
Critical Hdwy	7.32	7.42	-	-	-	-
Critical Hdwy Stg 1	6.32	-	-	-	-	-
Critical Hdwy Stg 2	6.32	-	-	-	-	-
Follow-up Hdwy	3.76	3.56	-	-	-	-
Pot Cap-1 Maneuver	483	806	-	0	0	-
Stage 1	669	-	-	0	0	-
Stage 2	786	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	483	806	-	-	-	-
Mov Cap-2 Maneuver	483	-	-	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11.4	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBTWBLn1WBLn2		SBT			
Capacity (veh/h)	-	483	806	-	-	-
HCM Lane V/C Ratio	-	0.14	0.179	-	-	-
HCM Control Delay (s)	-	13.7	10.4	-	-	-
HCM Lane LOS	-	B	B	-	-	-
HCM 95th %tile Q(veh)	-	0.5	0.7	-	-	-

HCM Unsignalized Intersection Capacity Analysis

2: Main St & WB I-80 On-Ramp

08/08/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	341	265	256	99
Future Volume (Veh/h)	0	0	341	265	256	99
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	371	288	278	108
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				1319		
pX, platoon unblocked						
vC, conflicting volume	1308	278	386			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1308	278	386			
tC, single (s)	6.7	6.5	4.4			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	100	100	65			
cM capacity (veh/h)	101	707	1053			
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	371	288	278	108		
Volume Left	371	0	0	0		
Volume Right	0	0	0	108		
cSH	1053	1700	1700	1700		
Volume to Capacity	0.35	0.17	0.16	0.06		
Queue Length 95th (ft)	40	0	0	0		
Control Delay (s)	10.3	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	5.8		0.0			
Approach LOS						
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			39.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM 6th TWSC
3: Main St & EB I-80 Off Ramp

08/08/2022

Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	103	244	0	503	256	0
Future Vol, veh/h	103	244	0	503	256	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	255	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	30	30	30	30	30	30
Mvmt Flow	113	268	0	553	281	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	834	-	-	0	-	0
Stage 1	281	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Critical Hdwy	6.7	-	-	-	-	-
Critical Hdwy Stg 1	5.7	-	-	-	-	-
Critical Hdwy Stg 2	5.7	-	-	-	-	-
Follow-up Hdwy	3.77	-	-	-	-	-
Pot Cap-1 Maneuver	303	0	0	-	-	0
Stage 1	706	0	0	-	-	0
Stage 2	524	0	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	303	-	-	-	-	-
Mov Cap-2 Maneuver	303	-	-	-	-	-
Stage 1	706	-	-	-	-	-
Stage 2	524	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	23.8	0		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT		
Capacity (veh/h)	-	303	-	-		
HCM Lane V/C Ratio	-	0.374	-	-		
HCM Control Delay (s)	-	23.8	0	-		
HCM Lane LOS	-	C	A	-		
HCM 95th %tile Q(veh)	-	1.7	-	-		

HCM Unsignalized Intersection Capacity Analysis

4: I-80 EB On-Ramp & Main St

08/08/2022

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	503	107	59	441
Future Volume (Veh/h)	0	0	503	107	59	441
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	553	118	65	485
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)			421			
pX, platoon unblocked	0.77	0.77			0.77	
vC, conflicting volume	1168	553			671	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1068	267			421	
tC, single (s)	6.7	6.5			4.4	
tC, 2 stage (s)						
tF (s)	3.8	3.6			2.5	
p0 queue free %	100	100			92	
cM capacity (veh/h)	153	544			771	
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	553	118	65	485		
Volume Left	0	0	65	0		
Volume Right	0	118	0	0		
cSH	1700	1700	771	1700		
Volume to Capacity	0.33	0.07	0.08	0.29		
Queue Length 95th (ft)	0	0	7	0		
Control Delay (s)	0.0	0.0	10.1	0.0		
Lane LOS			B			
Approach Delay (s)	0.0		1.2			
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			36.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM 6th Signalized Intersection Summary

5: Main St & Pilot Rd/Logan Ln

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖	↗		↖	↗		↖	↗	↖
Traffic Volume (veh/h)	107	3	37	19	13	8	48	495	39	32	270	139
Future Volume (veh/h)	107	3	37	19	13	8	48	495	39	32	270	139
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604
Adj Flow Rate, veh/h	114	3	39	20	14	0	51	527	41	34	287	148
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	20	20	20	20	20	20	20	20	20	20	20	20
Cap, veh/h	161	4	147	55	58		74	598	47	55	634	537
Arrive On Green	0.11	0.11	0.11	0.04	0.04	0.00	0.05	0.41	0.41	0.04	0.40	0.40
Sat Flow, veh/h	1490	39	1359	1527	1604	0	1527	1469	114	1527	1604	1359
Grp Volume(v), veh/h	117	0	39	20	14	0	51	0	568	34	287	148
Grp Sat Flow(s), veh/h/ln	1529	0	1359	1527	1604	0	1527	0	1583	1527	1604	1359
Q Serve(g_s), s	4.3	0.0	1.5	0.7	0.5	0.0	1.9	0.0	19.3	1.3	7.7	4.3
Cycle Q Clear(g_c), s	4.3	0.0	1.5	0.7	0.5	0.0	1.9	0.0	19.3	1.3	7.7	4.3
Prop In Lane	0.97		1.00	1.00		0.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	165	0	147	55	58		74	0	645	55	634	537
V/C Ratio(X)	0.71	0.00	0.27	0.36	0.24		0.69	0.00	0.88	0.61	0.45	0.28
Avail Cap(c_a), veh/h	473	0	420	472	496		184	0	815	131	771	653
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.1	0.0	23.9	27.4	27.3	0.0	27.3	0.0	15.9	27.7	13.0	11.9
Incr Delay (d2), s/veh	5.5	0.0	1.0	3.9	2.1	0.0	11.0	0.0	9.2	10.5	0.5	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	1.7	0.0	0.5	0.3	0.2	0.0	0.9	0.0	7.4	0.6	2.4	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	30.6	0.0	24.8	31.3	29.4	0.0	38.3	0.0	25.2	38.1	13.5	12.2
LnGrp LOS	C	A	C	C	C		D	A	C	D	B	B
Approach Vol, veh/h		156			34			619			469	
Approach Delay, s/veh		29.2			30.5			26.2			14.9	
Approach LOS		C			C			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.1	29.7		12.3	8.8	29.0		8.1				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	30.0		18.0	7.0	28.0		18.0				
Max Q Clear Time (g_c+I), s	13.3	21.3		6.3	3.9	9.7		2.7				
Green Ext Time (p_c), s	0.0	2.4		0.5	0.0	2.0		0.1				

Intersection Summary

HCM 6th Ctrl Delay	22.5
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

6: Red Hawk Ranch Backbone/ Truckee Ln & Main St

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	374	24	47	549	25	79	3	113	28	3	9
Future Volume (veh/h)	10	374	24	47	549	25	79	3	113	28	3	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1752	1752	1752	1752	1870	1752	1870	1752	1870	1870	1870
Adj Flow Rate, veh/h	11	440	28	55	646	27	93	3	133	30	3	10
Peak Hour Factor	0.92	0.85	0.85	0.85	0.85	0.92	0.85	0.92	0.85	0.92	0.92	0.92
Percent Heavy Veh, %	2	10	10	10	10	2	10	2	10	2	2	2
Cap, veh/h	282	763	647	449	793	33	328	5	225	228	55	183
Arrive On Green	0.01	0.44	0.44	0.05	0.48	0.48	0.14	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	1781	1752	1485	1668	1669	70	1312	35	1555	1253	379	1264
Grp Volume(v), veh/h	11	440	28	55	0	673	93	0	136	30	0	13
Grp Sat Flow(s),veh/h/ln	1781	1752	1485	1668	0	1739	1312	0	1590	1253	0	1643
Q Serve(g_s), s	0.2	9.3	0.5	0.9	0.0	16.3	3.2	0.0	3.9	1.1	0.0	0.3
Cycle Q Clear(g_c), s	0.2	9.3	0.5	0.9	0.0	16.3	3.6	0.0	3.9	5.1	0.0	0.3
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.98	1.00		0.77
Lane Grp Cap(c), veh/h	282	763	647	449	0	826	328	0	230	228	0	238
V/C Ratio(X)	0.04	0.58	0.04	0.12	0.00	0.81	0.28	0.00	0.59	0.13	0.00	0.05
Avail Cap(c_a), veh/h	437	1709	1449	529	0	1697	644	0	614	530	0	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.6	10.5	8.0	7.6	0.0	11.1	19.7	0.0	19.7	22.0	0.0	18.1
Incr Delay (d2), s/veh	0.1	0.7	0.0	0.1	0.0	2.0	0.5	0.0	2.4	0.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.8	0.1	0.2	0.0	4.9	0.9	0.0	1.5	0.3	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.7	11.2	8.0	7.7	0.0	13.1	20.1	0.0	22.1	22.3	0.0	18.2
LnGrp LOS	A	B	A	A	A	B	C	A	C	C	A	B
Approach Vol, veh/h	479		728			229			43			
Approach Delay, s/veh	10.9		12.7			21.3			21.1			
Approach LOS	B		B			C			C			
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	13.1		8.6	27.4		13.1		6.7	29.4			
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0		6.0	6.0			
Max Green Setting (Gmax), s	19.0		5.0	48.0		19.0		5.0	48.0			
Max Q Clear Time (g_c+I1), s	5.9		2.9	11.3		7.1		2.2	18.3			
Green Ext Time (p_c), s	0.9		0.0	3.0		0.1		0.0	5.1			
Intersection Summary												
HCM 6th Ctrl Delay	13.7											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	494	36	9	562	67	15
Future Vol, veh/h	494	36	9	562	67	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	561	41	10	639	76	17
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	602	0	1241	582
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	659	-
Critical Hdwy	-	-	4.19	-	6.49	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	-	-	2.281	-	3.581	3.381
Pot Cap-1 Maneuver	-	-	942	-	187	500
Stage 1	-	-	-	-	545	-
Stage 2	-	-	-	-	502	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	942	-	185	500
Mov Cap-2 Maneuver	-	-	-	-	321	-
Stage 1	-	-	-	-	545	-
Stage 2	-	-	-	-	496	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		19.4	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	343	-	-	942	-	
HCM Lane V/C Ratio	0.272	-	-	0.011	-	
HCM Control Delay (s)	19.4	-	-	8.9	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	1.1	-	-	0	-	

HCM 6th Signalized Intersection Summary 8: US95A & Main St

08/08/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	332	177	147	326	1	240	1	154	2	1	0
Future Volume (veh/h)	1	332	177	147	326	1	240	1	154	2	1	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	1	391	208	173	384	1	282	1	181	2	1	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	69	453	241	206	878	2	400	2	361	189	80	0
Arrive On Green	0.04	0.42	0.42	0.12	0.50	0.50	0.24	0.24	0.24	0.24	0.24	0.00
Sat Flow, veh/h	1668	1075	572	1668	1746	5	1325	8	1475	484	326	0
Grp Volume(v), veh/h	1	0	599	173	0	385	282	0	182	3	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1647	1668	0	1751	1325	0	1483	810	0	0
Q Serve(g_s), s	0.0	0.0	28.3	8.7	0.0	12.0	9.1	0.0	9.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	28.3	8.7	0.0	12.0	18.1	0.0	9.0	9.1	0.0	0.0
Prop In Lane	1.00		0.35	1.00		0.00	1.00		0.99	0.67		0.00
Lane Grp Cap(c), veh/h	69	0	694	206	0	881	400	0	363	269	0	0
V/C Ratio(X)	0.01	0.00	0.86	0.84	0.00	0.44	0.70	0.00	0.50	0.01	0.00	0.00
Avail Cap(c_a), veh/h	98	0	694	234	0	881	448	0	416	314	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	39.3	0.0	22.5	36.6	0.0	13.5	31.4	0.0	27.8	24.8	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	13.5	21.0	0.0	1.6	4.3	0.0	1.1	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	12.6	4.6	0.0	4.7	5.9	0.0	3.2	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.4	0.0	36.0	57.6	0.0	15.1	35.7	0.0	28.8	24.8	0.0	0.0
LnGrp LOS	D	A	D	E	A	B	D	A	C	C	A	A
Approach Vol, veh/h		600			558			464			3	
Approach Delay, s/veh		36.0			28.3			33.0			24.8	
Approach LOS		D			C			C			C	
Timer - Assigned Phs		2		3		4		6		7		8
Phs Duration (G+Y+Rc), s		26.9		16.6		42.0		26.9		9.6		49.0
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0		6.0		
Max Green Setting (Gmax), s		24.0		12.0		36.0		24.0		5.0		43.0
Max Q Clear Time (g_c+I1), s		20.1		10.7		30.3		11.1		2.0		14.0
Green Ext Time (p_c), s		0.8		0.1		1.9		0.0		0.0		2.4
Intersection Summary												
HCM 6th Ctrl Delay			32.5									
HCM 6th LOS			C									

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	0	0	4	0	42	4	2	24	0
Future Vol, veh/h	0	0	0	0	0	4	0	42	4	2	24	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	4	0	46	4	2	26	0
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	80	80	26	78	78	48	26	0	0	50	0	0
Stage 1	30	30	-	48	48	-	-	-	-	-	-	-
Stage 2	50	50	-	30	30	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	908	810	1050	911	812	1021	1588	-	-	1557	-	-
Stage 1	987	870	-	965	855	-	-	-	-	-	-	-
Stage 2	963	853	-	987	870	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	903	809	1050	910	811	1021	1588	-	-	1557	-	-
Mov Cap-2 Maneuver	903	809	-	910	811	-	-	-	-	-	-	-
Stage 1	987	869	-	965	855	-	-	-	-	-	-	-
Stage 2	959	853	-	986	869	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0		8.5			0			0.6			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1588	-	-	-	1021	1557	-	-				
HCM Lane V/C Ratio	-	-	-	-	0.004	0.001	-	-				
HCM Control Delay (s)	0	-	-	0	8.5	7.3	0	-				
HCM Lane LOS	A	-	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-				

Intersection						
Int Delay, s/veh	3.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	125	121	195	0	0	434
Future Vol, veh/h	125	121	195	0	0	434
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	150	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	15	15	15	15	15	15
Mvmt Flow	134	130	210	0	0	467
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	444	105	0	-	-	-
Stage 1	210	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	7.1	7.2	-	-	-	-
Critical Hdwy Stg 1	6.1	-	-	-	-	-
Critical Hdwy Stg 2	6.1	-	-	-	-	-
Follow-up Hdwy	3.65	3.45	-	-	-	-
Pot Cap-1 Maneuver	510	889	-	0	0	-
Stage 1	767	-	-	0	0	-
Stage 2	745	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	510	889	-	-	-	-
Mov Cap-2 Maneuver	510	-	-	-	-	-
Stage 1	767	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.2	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBTWBLn1WBLn2		SBT			
Capacity (veh/h)	-	510	889	-	-	-
HCM Lane V/C Ratio	-	0.264	0.146	-	-	-
HCM Control Delay (s)	-	14.6	9.7	-	-	-
HCM Lane LOS	-	B	A	-	-	-
HCM 95th %tile Q(veh)	-	1.1	0.5	-	-	-

HCM Unsignalized Intersection Capacity Analysis

2: Main St & WB I-80 On-Ramp

08/08/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	288	195	420	139
Future Volume (Veh/h)	0	0	288	195	420	139
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	310	210	452	149
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				1319		
pX, platoon unblocked						
vC, conflicting volume	1282	452	601			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1282	452	601			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	100	66			
cM capacity (veh/h)	113	581	916			
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	310	210	452	149		
Volume Left	310	0	0	0		
Volume Right	0	0	0	149		
cSH	916	1700	1700	1700		
Volume to Capacity	0.34	0.12	0.27	0.09		
Queue Length 95th (ft)	38	0	0	0		
Control Delay (s)	10.9	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	6.5		0.0			
Approach LOS						
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			63.8%	ICU Level of Service		B
Analysis Period (min)			15			

HCM 6th TWSC
3: Main St & EB I-80 Off Ramp

08/08/2022

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	49	565	0	433	420	0
Future Vol, veh/h	49	565	0	433	420	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	255	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	16	16	16	16	16	16
Mvmt Flow	52	601	0	461	447	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	908	-	-	0	-	0
Stage 1	447	-	-	-	-	-
Stage 2	461	-	-	-	-	-
Critical Hdwy	6.56	-	-	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	-	-	-	-	-
Pot Cap-1 Maneuver	289	0	0	-	-	0
Stage 1	616	0	0	-	-	0
Stage 2	607	0	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	289	-	-	-	-	-
Mov Cap-2 Maneuver	289	-	-	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	607	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	20.2	0		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT		
Capacity (veh/h)	-	289	-	-		
HCM Lane V/C Ratio	-	0.18	-	-		
HCM Control Delay (s)	-	20.2	0	-		
HCM Lane LOS	-	C	A	-		
HCM 95th %tile Q(veh)	-	0.6	-	-		

HCM Unsignalized Intersection Capacity Analysis

4: I-80 EB On-Ramp & Main St

08/08/2022

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	433	135	122	908
Future Volume (Veh/h)	0	0	433	135	122	908
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	461	144	130	966
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			421			
pX, platoon unblocked	0.89	0.89			0.89	
vC, conflicting volume	1687	461			605	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1709	339			500	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	100	100			85	
cM capacity (veh/h)	70	602			891	
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	461	144	130	966		
Volume Left	0	0	130	0		
Volume Right	0	144	0	0		
cSH	1700	1700	891	1700		
Volume to Capacity	0.27	0.08	0.15	0.57		
Queue Length 95th (ft)	0	0	13	0		
Control Delay (s)	0.0	0.0	9.7	0.0		
Lane LOS			A			
Approach Delay (s)	0.0		1.2			
Approach LOS						
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			51.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM 6th Signalized Intersection Summary

5: Main St & Pilot Rd/Logan Ln

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕	↗	↖	↕	↗	↖	↕	↗
Traffic Volume (veh/h)	155	0	72	45	2	49	36	371	23	21	736	151
Future Volume (veh/h)	155	0	72	45	2	49	36	371	23	21	736	151
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678
Adj Flow Rate, veh/h	165	0	77	48	2	0	38	395	24	22	783	161
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	15	15	15	15	15	15	15	15	15	15	15	15
Cap, veh/h	210	0	187	65	69		56	814	49	38	854	724
Arrive On Green	0.13	0.00	0.13	0.04	0.04	0.00	0.03	0.52	0.52	0.02	0.51	0.51
Sat Flow, veh/h	1598	0	1422	1598	1678	0	1598	1565	95	1598	1678	1422
Grp Volume(v), veh/h	165	0	77	48	2	0	38	0	419	22	783	161
Grp Sat Flow(s),veh/h/ln	1598	0	1422	1598	1678	0	1598	0	1661	1598	1678	1422
Q Serve(g_s), s	8.5	0.0	4.2	2.5	0.1	0.0	2.0	0.0	13.7	1.2	36.3	5.3
Cycle Q Clear(g_c), s	8.5	0.0	4.2	2.5	0.1	0.0	2.0	0.0	13.7	1.2	36.3	5.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	210	0	187	65	69		56	0	864	38	854	724
V/C Ratio(X)	0.79	0.00	0.41	0.74	0.03		0.68	0.00	0.49	0.58	0.92	0.22
Avail Cap(c_a), veh/h	340	0	303	340	357		94	0	962	113	992	841
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.6	0.0	33.7	40.1	38.9	0.0	40.3	0.0	13.0	40.8	19.1	11.5
Incr Delay (d2), s/veh	6.4	0.0	1.5	14.7	0.2	0.0	13.6	0.0	0.4	13.0	11.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.6	0.0	1.5	1.2	0.0	0.0	1.0	0.0	4.7	0.6	15.2	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.0	0.0	35.2	54.8	39.1	0.0	53.9	0.0	13.4	53.9	30.9	11.6
LnGrp LOS	D	A	D	D	D		D	A	B	D	C	B
Approach Vol, veh/h	242		50			457			966			
Approach Delay, s/veh	39.8		54.2			16.8			28.2			
Approach LOS	D		D			B			C			
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	8.0	50.0	17.1		9.0	49.1	9.5					
Change Period (Y+Rc), s	6.0	6.0	6.0		6.0	6.0	6.0					
Max Green Setting (Gmax), s	49.0	49.0	18.0		5.0	50.0	18.0					
Max Q Clear Time (g_c+I), s	13.2	15.7	10.5		4.0	38.3	4.5					
Green Ext Time (p_c), s	0.0	2.8	0.7		0.0	4.7	0.1					

Intersection Summary

HCM 6th Ctrl Delay 27.6

HCM 6th LOS C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

6: Red Hawk Ranch Backbone/ Truckee Ln & Main St

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	777	82	131	453	51	52	5	81	58	2	27
Future Volume (veh/h)	35	777	82	131	453	51	52	5	81	58	2	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	36	809	85	136	472	53	54	5	84	60	2	28
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	487	939	796	315	885	99	268	12	195	215	14	193
Arrive On Green	0.04	0.51	0.51	0.07	0.55	0.55	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1739	1826	1547	1739	1612	181	1347	88	1473	1277	104	1459
Grp Volume(v), veh/h	36	809	85	136	0	525	54	0	89	60	0	30
Grp Sat Flow(s),veh/h/ln	1739	1826	1547	1739	0	1793	1347	0	1561	1277	0	1563
Q Serve(g_s), s	0.6	24.6	1.8	2.2	0.0	11.9	2.4	0.0	3.3	2.9	0.0	1.1
Cycle Q Clear(g_c), s	0.6	24.6	1.8	2.2	0.0	11.9	3.4	0.0	3.3	6.2	0.0	1.1
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.94	1.00		0.93
Lane Grp Cap(c), veh/h	487	939	796	315	0	984	268	0	206	215	0	207
V/C Ratio(X)	0.07	0.86	0.11	0.43	0.00	0.53	0.20	0.00	0.43	0.28	0.00	0.15
Avail Cap(c_a), veh/h	559	1345	1140	354	0	1350	491	0	465	426	0	466
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.3	13.5	8.0	12.1	0.0	9.2	26.0	0.0	25.5	28.3	0.0	24.5
Incr Delay (d2), s/veh	0.1	4.2	0.1	0.9	0.0	0.5	0.4	0.0	1.4	0.7	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	9.1	0.5	0.7	0.0	3.7	0.7	0.0	1.3	0.9	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.4	17.7	8.0	13.0	0.0	9.6	26.4	0.0	26.9	29.0	0.0	24.8
LnGrp LOS	A	B	A	B	A	A	C	A	C	C	A	C
Approach Vol, veh/h	930					661		143		90		
Approach Delay, s/veh	16.4					10.3		26.7		27.6		
Approach LOS	B					B		C		C		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	14.4		10.6	38.8		14.4		8.4	41.0			
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0		6.0	6.0			
Max Green Setting (Gmax), s	19.0		6.0	47.0		19.0		5.0	48.0			
Max Q Clear Time (g_c+I1), s	5.4		4.2	26.6		8.2		2.6	13.9			
Green Ext Time (p_c), s	0.5		0.1	6.2		0.2		0.0	3.7			
Intersection Summary												
HCM 6th Ctrl Delay			15.6									
HCM 6th LOS			B									

Intersection

Int Delay, s/veh 0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	805	123	26	607	42	12
Future Vol, veh/h	805	123	26	607	42	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	830	127	27	626	43	12

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	957
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.15
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.245
Pot Cap-1 Maneuver	-	-	707
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	707
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	22.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	264	-	-	707	-
HCM Lane V/C Ratio	0.211	-	-	0.038	-
HCM Control Delay (s)	22.2	-	-	10.3	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

HCM 6th Signalized Intersection Summary 8: US95A & Main St

08/08/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	518	297	201	397	1	236	0	150	5	2	2
Future Volume (veh/h)	1	518	297	201	397	1	236	0	150	5	2	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	1	545	313	212	418	1	248	0	158	5	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	86	529	304	224	1029	2	325	0	306	138	54	39
Arrive On Green	0.05	0.49	0.49	0.13	0.57	0.57	0.20	0.00	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1725	1079	619	1725	1806	4	1366	0	1531	408	271	194
Grp Volume(v), veh/h	1	0	858	212	0	419	248	0	158	9	0	0
Grp Sat Flow(s),veh/h/ln	1725	0	1698	1725	0	1810	1366	0	1531	873	0	0
Q Serve(g_s), s	0.1	0.0	49.0	12.2	0.0	12.9	10.3	0.0	9.2	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	49.0	12.2	0.0	12.9	19.6	0.0	9.2	9.3	0.0	0.0
Prop In Lane	1.00		0.36	1.00		0.00	1.00		1.00	0.56		0.22
Lane Grp Cap(c), veh/h	86	0	832	224	0	1032	325	0	306	231	0	0
V/C Ratio(X)	0.01	0.00	1.03	0.95	0.00	0.41	0.76	0.00	0.52	0.04	0.00	0.00
Avail Cap(c_a), veh/h	86	0	832	224	0	1032	325	0	306	231	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	45.2	0.0	25.5	43.1	0.0	12.0	40.2	0.0	35.7	32.5	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	39.5	44.9	0.0	1.2	10.2	0.0	1.5	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	27.1	7.9	0.0	5.1	6.9	0.0	3.5	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.2	0.0	65.0	88.1	0.0	13.2	50.5	0.0	37.2	32.5	0.0	0.0
LnGrp LOS	D	A	F	F	A	B	D	A	D	C	A	A
Approach Vol, veh/h	859			631			406			9		
Approach Delay, s/veh	64.9			38.4			45.3			32.5		
Approach LOS	E			D			D			C		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	26.0		19.0	55.0		26.0		11.0	63.0			
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0		6.0	6.0			
Max Green Setting (Gmax), s	20.0		13.0	49.0		20.0		5.0	57.0			
Max Q Clear Time (g_c+I1), s	21.6		14.2	51.0		11.3		2.1	14.9			
Green Ext Time (p_c), s	0.0		0.0	0.0		0.0		0.0	2.8			
Intersection Summary												
HCM 6th Ctrl Delay	51.8											
HCM 6th LOS	D											

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	5	0	3	0	29	1	10	87	0
Future Vol, veh/h	0	0	0	5	0	3	0	29	1	10	87	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	5	0	3	0	32	1	11	95	0
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	151	150	95	150	150	33	95	0	0	33	0	0
Stage 1	117	117	-	33	33	-	-	-	-	-	-	-
Stage 2	34	33	-	117	117	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	816	742	962	818	742	1041	1499	-	-	1579	-	-
Stage 1	888	799	-	983	868	-	-	-	-	-	-	-
Stage 2	982	868	-	888	799	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	809	737	962	814	737	1041	1499	-	-	1579	-	-
Mov Cap-2 Maneuver	809	737	-	814	737	-	-	-	-	-	-	-
Stage 1	888	793	-	983	868	-	-	-	-	-	-	-
Stage 2	979	868	-	882	793	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0		9.1			0			0.8			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1499	-	-	-	886	1579	-	-				
HCM Lane V/C Ratio	-	-	-	-	0.01	0.007	-	-				
HCM Control Delay (s)	0	-	-	0	9.1	7.3	0	-				
HCM Lane LOS	A	-	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-				

Appendix C

Baseline Plus Project Conditions LOS Calculations



Intersection						
Int Delay, s/veh	3.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	68	133	265	0	0	292
Future Vol, veh/h	68	133	265	0	0	292
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	150	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	26	26	26	26	26	26
Mvmt Flow	74	145	288	0	0	317
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	447	144	0	-	-	-
Stage 1	288	-	-	-	-	-
Stage 2	159	-	-	-	-	-
Critical Hdwy	7.32	7.42	-	-	-	-
Critical Hdwy Stg 1	6.32	-	-	-	-	-
Critical Hdwy Stg 2	6.32	-	-	-	-	-
Follow-up Hdwy	3.76	3.56	-	-	-	-
Pot Cap-1 Maneuver	483	806	-	0	0	-
Stage 1	669	-	-	0	0	-
Stage 2	786	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	483	806	-	-	-	-
Mov Cap-2 Maneuver	483	-	-	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11.6	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBTWBLn1WBLn2		SBT			
Capacity (veh/h)	-	483	806	-	-	-
HCM Lane V/C Ratio	-	0.153	0.179	-	-	-
HCM Control Delay (s)	-	13.8	10.4	-	-	-
HCM Lane LOS	-	B	B	-	-	-
HCM 95th %tile Q(veh)	-	0.5	0.7	-	-	-

HCM Unsignalized Intersection Capacity Analysis

2: Main St & WB I-80 On-Ramp

08/08/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	369	265	262	99
Future Volume (Veh/h)	0	0	369	265	262	99
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	401	288	285	108
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				1319		
pX, platoon unblocked						
vC, conflicting volume	1375	285	393			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1375	285	393			
tC, single (s)	6.7	6.5	4.4			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	100	100	62			
cM capacity (veh/h)	88	700	1046			
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	401	288	285	108		
Volume Left	401	0	0	0		
Volume Right	0	0	0	108		
cSH	1046	1700	1700	1700		
Volume to Capacity	0.38	0.17	0.17	0.06		
Queue Length 95th (ft)	46	0	0	0		
Control Delay (s)	10.6	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	6.1		0.0			
Approach LOS						
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			40.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM 6th TWSC
3: Main St & EB I-80 Off Ramp

08/08/2022

Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	103	257	0	531	262	0
Future Vol, veh/h	103	257	0	531	262	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	255	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	30	30	30	30	30	30
Mvmt Flow	113	282	0	584	288	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	872	-	-	0	-	0
Stage 1	288	-	-	-	-	-
Stage 2	584	-	-	-	-	-
Critical Hdwy	6.7	-	-	-	-	-
Critical Hdwy Stg 1	5.7	-	-	-	-	-
Critical Hdwy Stg 2	5.7	-	-	-	-	-
Follow-up Hdwy	3.77	-	-	-	-	-
Pot Cap-1 Maneuver	287	0	0	-	-	0
Stage 1	701	0	0	-	-	0
Stage 2	506	0	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	287	-	-	-	-	-
Mov Cap-2 Maneuver	287	-	-	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	25.5	0		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT		
Capacity (veh/h)	-	287	-	-		
HCM Lane V/C Ratio	-	0.394	-	-		
HCM Control Delay (s)	-	25.5	0	-		
HCM Lane LOS	-	D	A	-		
HCM 95th %tile Q(veh)	-	1.8	-	-		

HCM Unsignalized Intersection Capacity Analysis

4: I-80 EB On-Ramp & Main St

08/08/2022

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	531	121	59	460
Future Volume (Veh/h)	0	0	531	121	59	460
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	584	133	65	505
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			421			
pX, platoon unblocked	0.73	0.73			0.73	
vC, conflicting volume	1219	584			717	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1116	249			430	
tC, single (s)	6.7	6.5			4.4	
tC, 2 stage (s)						
tF (s)	3.8	3.6			2.5	
p0 queue free %	100	100			91	
cM capacity (veh/h)	135	532			728	
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	584	133	65	505		
Volume Left	0	0	65	0		
Volume Right	0	133	0	0		
cSH	1700	1700	728	1700		
Volume to Capacity	0.34	0.08	0.09	0.30		
Queue Length 95th (ft)	0	0	7	0		
Control Delay (s)	0.0	0.0	10.4	0.0		
Lane LOS			B			
Approach Delay (s)	0.0		1.2			
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			37.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM 6th Signalized Intersection Summary

5: Main St & Pilot Rd/Logan Ln

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	3	37	19	13	8	48	537	39	32	289	139
Future Volume (veh/h)	107	3	37	19	13	8	48	537	39	32	289	139
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No				No			
Adj Sat Flow, veh/h/ln	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604
Adj Flow Rate, veh/h	114	3	39	20	14	0	51	571	41	34	307	148
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	20	20	20	20	20	20	20	20	20	20	20	20
Cap, veh/h	160	4	146	55	58		72	631	45	55	666	565
Arrive On Green	0.11	0.11	0.11	0.04	0.04	0.00	0.05	0.43	0.43	0.04	0.42	0.42
Sat Flow, veh/h	1490	39	1359	1527	1604	0	1527	1478	106	1527	1604	1359
Grp Volume(v), veh/h	117	0	39	20	14	0	51	0	612	34	307	148
Grp Sat Flow(s),veh/h/ln	1529	0	1359	1527	1604	0	1527	0	1584	1527	1604	1359
Q Serve(g_s), s	4.5	0.0	1.6	0.8	0.5	0.0	2.0	0.0	22.0	1.3	8.4	4.4
Cycle Q Clear(g_c), s	4.5	0.0	1.6	0.8	0.5	0.0	2.0	0.0	22.0	1.3	8.4	4.4
Prop In Lane	0.97		1.00	1.00		0.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	164	0	146	55	58		72	0	677	55	666	565
V/C Ratio(X)	0.71	0.00	0.27	0.36	0.24		0.70	0.00	0.90	0.62	0.46	0.26
Avail Cap(c_a), veh/h	452	0	402	451	474		176	0	780	125	737	625
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	25.0	28.7	28.6	0.0	28.6	0.0	16.3	28.9	12.9	11.7
Incr Delay (d2), s/veh	5.7	0.0	1.0	4.0	2.2	0.0	11.7	0.0	12.8	10.9	0.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.5	0.3	0.2	0.0	0.9	0.0	9.0	0.6	2.7	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.0	0.0	26.0	32.7	30.7	0.0	40.3	0.0	29.1	39.8	13.4	11.9
LnGrp LOS	C	A	C	C	C		D	A	C	D	B	B
Approach Vol, veh/h	156				34		663				489	
Approach Delay, s/veh	30.5				31.9		30.0				14.8	
Approach LOS	C				C		C				B	
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	8.2	32.0	12.5		8.9	31.3	8.2					
Change Period (Y+Rc), s	6.0	6.0	6.0		6.0	6.0	6.0					
Max Green Setting (Gmax), s	5.0	30.0	18.0		7.0	28.0	18.0					
Max Q Clear Time (g_c+I), s	13.3	24.0	6.5		4.0	10.4	2.8					
Green Ext Time (p_c), s	0.0	2.0	0.5		0.0	2.1	0.1					

Intersection Summary

HCM 6th Ctrl Delay	24.5
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary 6: Red Hawk Ranch Backbone/ Truckee Ln & Main St

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	393	24	47	591	25	79	3	113	28	3	9
Future Volume (veh/h)	10	393	24	47	591	25	79	3	113	28	3	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1752	1752	1752	1752	1870	1752	1870	1752	1870	1870	1870
Adj Flow Rate, veh/h	11	462	28	55	695	27	93	3	133	30	3	10
Peak Hour Factor	0.92	0.85	0.85	0.85	0.85	0.92	0.85	0.92	0.85	0.92	0.92	0.92
Percent Heavy Veh, %	2	10	10	10	10	2	10	2	10	2	2	2
Cap, veh/h	268	808	684	453	837	33	316	5	222	216	54	180
Arrive On Green	0.01	0.46	0.46	0.05	0.50	0.50	0.14	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	1781	1752	1485	1668	1675	65	1312	35	1555	1253	379	1264
Grp Volume(v), veh/h	11	462	28	55	0	722	93	0	136	30	0	13
Grp Sat Flow(s),veh/h/ln	1781	1752	1485	1668	0	1740	1312	0	1590	1253	0	1643
Q Serve(g_s), s	0.2	10.1	0.5	0.9	0.0	18.6	3.5	0.0	4.2	1.2	0.0	0.4
Cycle Q Clear(g_c), s	0.2	10.1	0.5	0.9	0.0	18.6	3.8	0.0	4.2	5.4	0.0	0.4
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.98	1.00		0.77
Lane Grp Cap(c), veh/h	268	808	684	453	0	869	316	0	227	216	0	234
V/C Ratio(X)	0.04	0.57	0.04	0.12	0.00	0.83	0.29	0.00	0.60	0.14	0.00	0.06
Avail Cap(c_a), veh/h	413	1640	1390	524	0	1629	580	0	547	468	0	565
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.9	10.3	7.7	7.4	0.0	11.2	21.0	0.0	21.0	23.6	0.0	19.4
Incr Delay (d2), s/veh	0.1	0.6	0.0	0.1	0.0	2.1	0.5	0.0	2.5	0.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	3.1	0.1	0.2	0.0	5.6	1.0	0.0	1.6	0.3	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.0	11.0	7.8	7.6	0.0	13.3	21.6	0.0	23.6	23.9	0.0	19.5
LnGrp LOS	A	B	A	A	A	B	C	A	C	C	A	B
Approach Vol, veh/h	501		777			229			43			
Approach Delay, s/veh	10.8		12.9			22.8			22.5			
Approach LOS	B		B			C			C			
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	13.5		8.8	30.1		13.5		6.7	32.1			
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0		6.0	6.0			
Max Green Setting (Gmax), s	18.0		5.0	49.0		18.0		5.0	49.0			
Max Q Clear Time (g_c+I1), s	6.2		2.9	12.1		7.4		2.2	20.6			
Green Ext Time (p_c), s	0.8		0.0	3.2		0.1		0.0	5.6			
Intersection Summary												
HCM 6th Ctrl Delay			14.0									
HCM 6th LOS			B									

Intersection						
Int Delay, s/veh	3.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	494	55	32	562	109	66
Future Vol, veh/h	494	55	32	562	109	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	561	63	36	639	124	75
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	624	0	1304	593
Stage 1	-	-	-	-	593	-
Stage 2	-	-	-	-	711	-
Critical Hdwy	-	-	4.19	-	6.49	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	-	-	2.281	-	3.581	3.381
Pot Cap-1 Maneuver	-	-	924	-	171	493
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	474	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	924	-	164	493
Mov Cap-2 Maneuver	-	-	-	-	300	-
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	456	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.5		27.7	
HCM LOS	D					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	352	-	-	924	-	
HCM Lane V/C Ratio	0.565	-	-	0.039	-	
HCM Control Delay (s)	27.7	-	-	9.1	-	
HCM Lane LOS	D	-	-	A	-	
HCM 95th %tile Q(veh)	3.3	-	-	0.1	-	

HCM 6th Signalized Intersection Summary

8: US95A & Main St

08/08/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	369	191	147	343	1	246	1	154	2	1	0
Future Volume (veh/h)	1	369	191	147	343	1	246	1	154	2	1	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	1	434	225	173	404	1	289	1	181	2	1	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	90	459	238	205	859	2	403	2	366	191	81	0
Arrive On Green	0.05	0.42	0.42	0.12	0.49	0.49	0.25	0.25	0.25	0.25	0.25	0.00
Sat Flow, veh/h	1668	1086	563	1668	1747	4	1325	8	1475	491	326	0
Grp Volume(v), veh/h	1	0	659	173	0	405	289	0	182	3	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1649	1668	0	1751	1325	0	1483	817	0	0
Q Serve(g_s), s	0.0	0.0	33.6	8.9	0.0	13.4	9.9	0.0	9.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	33.6	8.9	0.0	13.4	19.1	0.0	9.2	9.2	0.0	0.0
Prop In Lane	1.00		0.34	1.00		0.00	1.00		0.99	0.67		0.00
Lane Grp Cap(c), veh/h	90	0	698	205	0	861	403	0	368	272	0	0
V/C Ratio(X)	0.01	0.00	0.94	0.85	0.00	0.47	0.72	0.00	0.49	0.01	0.00	0.00
Avail Cap(c_a), veh/h	95	0	698	210	0	861	437	0	407	305	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	39.2	0.0	24.2	37.6	0.0	14.7	32.0	0.0	28.2	25.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	22.9	25.6	0.0	1.8	5.1	0.0	1.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	16.4	5.0	0.0	5.3	6.3	0.0	3.3	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.2	0.0	47.1	63.1	0.0	16.5	37.1	0.0	29.2	25.1	0.0	0.0
LnGrp LOS	D	A	D	E	A	B	D	A	C	C	A	A
Approach Vol, veh/h	660			578			471			3		
Approach Delay, s/veh	47.1			30.5			34.1			25.1		
Approach LOS	D			C			C			C		
Timer - Assigned Phs	2		3	4	6		7	8				
Phs Duration (G+Y+Rc), s	27.7		16.7	43.0	27.7		10.7	49.0				
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0		6.0	6.0				
Max Green Setting (Gmax), s	24.0		11.0	37.0	24.0		5.0	43.0				
Max Q Clear Time (g_c+I1), s	21.1		10.9	35.6	11.2		2.0	15.4				
Green Ext Time (p_c), s	0.7		0.0	0.6	0.0		0.0	2.5				
Intersection Summary												
HCM 6th Ctrl Delay	37.9											
HCM 6th LOS	D											

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	93	0	0	0	0	4	0	42	4	2	24	42
Future Vol, veh/h	93	0	0	0	0	4	0	42	4	2	24	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	101	0	0	0	0	4	0	46	4	2	26	46
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	103	103	49	101	124	48	72	0	0	50	0	0
Stage 1	53	53	-	48	48	-	-	-	-	-	-	-
Stage 2	50	50	-	53	76	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	877	787	1020	880	766	1021	1528	-	-	1557	-	-
Stage 1	960	851	-	965	855	-	-	-	-	-	-	-
Stage 2	963	853	-	960	832	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	873	786	1020	879	765	1021	1528	-	-	1557	-	-
Mov Cap-2 Maneuver	873	786	-	879	765	-	-	-	-	-	-	-
Stage 1	960	850	-	965	855	-	-	-	-	-	-	-
Stage 2	959	853	-	959	831	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	9.7		8.5		0		0.2					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1528	-	-	873	1021	1557	-	-				
HCM Lane V/C Ratio	-	-	-	0.116	0.004	0.001	-	-				
HCM Control Delay (s)	0	-	-	9.7	8.5	7.3	0	-				
HCM Lane LOS	A	-	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.4	0	0	-	-				

Intersection						
Int Delay, s/veh	3.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	139	121	195	0	0	434
Future Vol, veh/h	139	121	195	0	0	434
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	150	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	15	15	15	15	15	15
Mvmt Flow	149	130	210	0	0	467
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	444	105	0	-	-	-
Stage 1	210	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	7.1	7.2	-	-	-	-
Critical Hdwy Stg 1	6.1	-	-	-	-	-
Critical Hdwy Stg 2	6.1	-	-	-	-	-
Follow-up Hdwy	3.65	3.45	-	-	-	-
Pot Cap-1 Maneuver	510	889	-	0	0	-
Stage 1	767	-	-	0	0	-
Stage 2	745	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	510	889	-	-	-	-
Mov Cap-2 Maneuver	510	-	-	-	-	-
Stage 1	767	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.5	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBTWBLn1WBLn2		SBT			
Capacity (veh/h)	-	510	889	-	-	-
HCM Lane V/C Ratio	-	0.293	0.146	-	-	-
HCM Control Delay (s)	-	15	9.7	-	-	-
HCM Lane LOS	-	C	A	-	-	-
HCM 95th %tile Q(veh)	-	1.2	0.5	-	-	-

HCM Unsignalized Intersection Capacity Analysis

2: Main St & WB I-80 On-Ramp

08/08/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	309	195	434	139
Future Volume (Veh/h)	0	0	309	195	434	139
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	332	210	467	149
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				1319		
pX, platoon unblocked						
vC, conflicting volume	1341	467	616			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1341	467	616			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	100	63			
cM capacity (veh/h)	100	570	904			
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	332	210	467	149		
Volume Left	332	0	0	0		
Volume Right	0	0	0	149		
cSH	904	1700	1700	1700		
Volume to Capacity	0.37	0.12	0.27	0.09		
Queue Length 95th (ft)	43	0	0	0		
Control Delay (s)	11.3	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	6.9		0.0			
Approach LOS						
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			66.2%	ICU Level of Service		C
Analysis Period (min)			15			

HCM 6th TWSC
3: Main St & EB I-80 Off Ramp

08/08/2022

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	49	593	0	454	434	0
Future Vol, veh/h	49	593	0	454	434	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	255	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	16	16	16	16	16	16
Mvmt Flow	52	631	0	483	462	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	945	-	-	0	-	0
Stage 1	462	-	-	-	-	-
Stage 2	483	-	-	-	-	-
Critical Hdwy	6.56	-	-	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	-	-	-	-	-
Pot Cap-1 Maneuver	274	0	0	-	-	0
Stage 1	606	0	0	-	-	0
Stage 2	592	0	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	274	-	-	-	-	-
Mov Cap-2 Maneuver	274	-	-	-	-	-
Stage 1	606	-	-	-	-	-
Stage 2	592	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	21.2	0		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT		
Capacity (veh/h)	-	274	-	-		
HCM Lane V/C Ratio	-	0.19	-	-		
HCM Control Delay (s)	-	21.2	0	-		
HCM Lane LOS	-	C	A	-		
HCM 95th %tile Q(veh)	-	0.7	-	-		

HCM Unsignalized Intersection Capacity Analysis

4: I-80 EB On-Ramp & Main St

08/08/2022

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	454	145	122	950
Future Volume (Veh/h)	0	0	454	145	122	950
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	483	154	130	1011
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			421			
pX, platoon unblocked	0.89	0.89			0.89	
vC, conflicting volume	1754	483			637	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1786	354			527	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	100	100			85	
cM capacity (veh/h)	62	585			863	
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	483	154	130	1011		
Volume Left	0	0	130	0		
Volume Right	0	154	0	0		
cSH	1700	1700	863	1700		
Volume to Capacity	0.28	0.09	0.15	0.59		
Queue Length 95th (ft)	0	0	13	0		
Control Delay (s)	0.0	0.0	9.9	0.0		
Lane LOS			A			
Approach Delay (s)	0.0		1.1			
Approach LOS						
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			53.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM 6th Signalized Intersection Summary

5: Main St & Pilot Rd/Logan Ln

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱	↰	↰	↱		↰	↱	↰
Traffic Volume (veh/h)	155	0	72	45	2	49	36	402	23	21	778	151
Future Volume (veh/h)	155	0	72	45	2	49	36	402	23	21	778	151
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678
Adj Flow Rate, veh/h	165	0	77	48	2	0	38	428	24	22	828	161
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	15	15	15	15	15	15	15	15	15	15	15	15
Cap, veh/h	205	0	183	63	66		54	863	48	37	903	765
Arrive On Green	0.13	0.00	0.13	0.04	0.04	0.00	0.03	0.55	0.55	0.02	0.54	0.54
Sat Flow, veh/h	1598	0	1422	1598	1678	0	1598	1574	88	1598	1678	1422
Grp Volume(v), veh/h	165	0	77	48	2	0	38	0	452	22	828	161
Grp Sat Flow(s), veh/h/ln	1598	0	1422	1598	1678	0	1598	0	1662	1598	1678	1422
Q Serve(g_s), s	9.3	0.0	4.6	2.7	0.1	0.0	2.2	0.0	15.5	1.3	41.5	5.4
Cycle Q Clear(g_c), s	9.3	0.0	4.6	2.7	0.1	0.0	2.2	0.0	15.5	1.3	41.5	5.4
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	205	0	183	63	66		54	0	912	37	903	765
V/C Ratio(X)	0.80	0.00	0.42	0.77	0.03		0.70	0.00	0.50	0.59	0.92	0.21
Avail Cap(c_a), veh/h	312	0	278	312	328		87	0	1064	104	1092	925
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.0	0.0	37.0	43.9	42.6	0.0	44.1	0.0	12.9	44.6	19.4	11.1
Incr Delay (d2), s/veh	8.5	0.0	1.5	17.5	0.2	0.0	15.4	0.0	0.4	13.9	10.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	1.7	1.4	0.0	0.0	1.1	0.0	5.4	0.6	16.9	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.6	0.0	38.5	61.4	42.8	0.0	59.5	0.0	13.3	58.5	30.0	11.2
LnGrp LOS	D	A	D	E	D		E	A	B	E	C	B
Approach Vol, veh/h	242			50			490			1011		
Approach Delay, s/veh	44.7			60.7			16.9			27.7		
Approach LOS	D			E			B			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	56.6		17.8	9.1	55.6		9.6				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	60.0	59.0		18.0	5.0	60.0		18.0				
Max Q Clear Time (g_c+I), s	13.3	17.5		11.3	4.2	43.5		4.7				
Green Ext Time (p_c), s	0.0	3.1		0.6	0.0	6.1		0.1				

Intersection Summary

HCM 6th Ctrl Delay	27.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary 6: Red Hawk Ranch Backbone/ Truckee Ln & Main St

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	819	82	131	484	51	52	5	81	58	2	27
Future Volume (veh/h)	35	819	82	131	484	51	52	5	81	58	2	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	36	853	85	136	504	53	54	5	84	60	2	28
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	478	974	826	299	919	97	260	11	192	206	14	190
Arrive On Green	0.04	0.53	0.53	0.07	0.57	0.57	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1739	1826	1547	1739	1624	171	1347	88	1473	1277	104	1459
Grp Volume(v), veh/h	36	853	85	136	0	557	54	0	89	60	0	30
Grp Sat Flow(s), veh/h/ln	1739	1826	1547	1739	0	1795	1347	0	1561	1277	0	1563
Q Serve(g_s), s	0.6	27.5	1.8	2.3	0.0	13.1	2.5	0.0	3.5	3.1	0.0	1.1
Cycle Q Clear(g_c), s	0.6	27.5	1.8	2.3	0.0	13.1	3.6	0.0	3.5	6.6	0.0	1.1
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.94	1.00		0.93
Lane Grp Cap(c), veh/h	478	974	826	299	0	1015	260	0	203	206	0	204
V/C Ratio(X)	0.08	0.88	0.10	0.46	0.00	0.55	0.21	0.00	0.44	0.29	0.00	0.15
Avail Cap(c_a), veh/h	544	1303	1105	335	0	1308	445	0	418	382	0	418
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.3	13.7	7.7	13.1	0.0	9.2	27.5	0.0	27.0	30.0	0.0	25.9
Incr Delay (d2), s/veh	0.1	5.4	0.1	1.1	0.0	0.5	0.4	0.0	1.5	0.8	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	10.5	0.5	0.9	0.0	4.2	0.8	0.0	1.3	0.9	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.4	19.2	7.8	14.2	0.0	9.7	27.9	0.0	28.4	30.8	0.0	26.3
LnGrp LOS	A	B	A	B	A	A	C	A	C	C	A	C
Approach Vol, veh/h	974			693			143			90		
Approach Delay, s/veh	17.7			10.6			28.3			29.3		
Approach LOS	B			B			C			C		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	14.8		10.6	41.9		14.8		8.4	44.0			
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0		6.0	6.0			
Max Green Setting (Gmax), s	18.0		6.0	48.0		18.0		5.0	49.0			
Max Q Clear Time (g_c+I1), s	5.6		4.3	29.5		8.6		2.6	15.1			
Green Ext Time (p_c), s	0.5		0.1	6.4		0.2		0.0	4.0			

Intersection Summary

HCM 6th Ctrl Delay	16.5
HCM 6th LOS	B

Intersection

Int Delay, s/veh 2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	805	165	76	607	73	50
Future Vol, veh/h	805	165	76	607	73	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	830	170	78	626	75	52

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1000
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.15
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.245
Pot Cap-1 Maneuver	-	-	681
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	681
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	32.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	253	-	-	681	-
HCM Lane V/C Ratio	0.501	-	-	0.115	-
HCM Control Delay (s)	32.7	-	-	11	-
HCM Lane LOS	D	-	-	B	-
HCM 95th %tile Q(veh)	2.6	-	-	0.4	-

HCM 6th Signalized Intersection Summary

8: US95A & Main St

08/08/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	546	307	201	433	1	250	0	150	5	2	2
Future Volume (veh/h)	1	546	307	201	433	1	250	0	150	5	2	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	1	575	323	212	456	1	263	0	158	5	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	86	544	306	207	1030	2	325	0	306	138	54	39
Arrive On Green	0.05	0.50	0.50	0.12	0.57	0.57	0.20	0.00	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1725	1088	611	1725	1806	4	1366	0	1531	408	271	194
Grp Volume(v), veh/h	1	0	898	212	0	457	263	0	158	9	0	0
Grp Sat Flow(s),veh/h/ln	1725	0	1700	1725	0	1810	1366	0	1531	873	0	0
Q Serve(g_s), s	0.1	0.0	50.0	12.0	0.0	14.5	10.7	0.0	9.2	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	50.0	12.0	0.0	14.5	20.0	0.0	9.2	9.3	0.0	0.0
Prop In Lane	1.00		0.36	1.00		0.00	1.00		1.00	0.56		0.22
Lane Grp Cap(c), veh/h	86	0	850	207	0	1032	325	0	306	231	0	0
V/C Ratio(X)	0.01	0.00	1.06	1.02	0.00	0.44	0.81	0.00	0.52	0.04	0.00	0.00
Avail Cap(c_a), veh/h	86	0	850	207	0	1032	325	0	306	231	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	45.2	0.0	25.0	44.0	0.0	12.4	40.8	0.0	35.7	32.5	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	47.0	69.0	0.0	1.4	14.1	0.0	1.5	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	29.4	9.0	0.0	5.8	7.7	0.0	3.5	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.2	0.0	72.0	113.0	0.0	13.7	54.9	0.0	37.2	32.5	0.0	0.0
LnGrp LOS	D	A	F	F	A	B	D	A	D	C	A	A
Approach Vol, veh/h	899			669			421			9		
Approach Delay, s/veh	71.9			45.2			48.3			32.5		
Approach LOS	E			D			D			C		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	26.0		18.0	56.0		26.0		11.0	63.0			
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0		6.0	6.0			
Max Green Setting (Gmax), s	20.0		12.0	50.0		20.0		5.0	57.0			
Max Q Clear Time (g_c+I1), s	22.0		14.0	52.0		11.3		2.1	16.5			
Green Ext Time (p_c), s	0.0		0.0	0.0		0.0		0.0	3.1			
Intersection Summary												
HCM 6th Ctrl Delay	57.8											
HCM 6th LOS	E											

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	69	0	0	5	0	3	0	29	1	10	87	92
Future Vol, veh/h	69	0	0	5	0	3	0	29	1	10	87	92
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	75	0	0	5	0	3	0	32	1	11	95	100
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	201	200	145	200	250	33	195	0	0	33	0	0
Stage 1	167	167	-	33	33	-	-	-	-	-	-	-
Stage 2	34	33	-	167	217	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	757	696	902	759	653	1041	1378	-	-	1579	-	-
Stage 1	835	760	-	983	868	-	-	-	-	-	-	-
Stage 2	982	868	-	835	723	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	750	690	902	754	648	1041	1378	-	-	1579	-	-
Mov Cap-2 Maneuver	750	690	-	754	648	-	-	-	-	-	-	-
Stage 1	835	754	-	983	868	-	-	-	-	-	-	-
Stage 2	979	868	-	828	717	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.3		9.3		0		0.4					
HCM LOS	B		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1378	-	-	750	841	1579	-	-				
HCM Lane V/C Ratio	-	-	-	0.1	0.01	0.007	-	-				
HCM Control Delay (s)	0	-	-	10.3	9.3	7.3	0	-				
HCM Lane LOS	A	-	-	B	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-				

Appendix D

Future Conditions LOS Calculations



HCM 6th TWSC
1: Main St & WB I-80 Off-Ramp

08/08/2022

Intersection						
Int Delay, s/veh	3.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	66	151	291	0	0	338
Future Vol, veh/h	66	151	291	0	0	338
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	150	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	26	26	26	26	26	26
Mvmt Flow	72	164	316	0	0	367
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	500	158	0	-	-	-
Stage 1	316	-	-	-	-	-
Stage 2	184	-	-	-	-	-
Critical Hdwy	7.32	7.42	-	-	-	-
Critical Hdwy Stg 1	6.32	-	-	-	-	-
Critical Hdwy Stg 2	6.32	-	-	-	-	-
Follow-up Hdwy	3.76	3.56	-	-	-	-
Pot Cap-1 Maneuver	445	789	-	0	0	-
Stage 1	645	-	-	0	0	-
Stage 2	762	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	445	789	-	-	-	-
Mov Cap-2 Maneuver	445	-	-	-	-	-
Stage 1	645	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBTWBLn1WBLn2		SBT			
Capacity (veh/h)	-	445	789	-	-	-
HCM Lane V/C Ratio	-	0.161	0.208	-	-	-
HCM Control Delay (s)	-	14.6	10.8	-	-	-
HCM Lane LOS	-	B	B	-	-	-
HCM 95th %tile Q(veh)	-	0.6	0.8	-	-	-

Future Year AM

Synchro 11 Light Report

HCM Unsignalized Intersection Capacity Analysis

2: Main St & WB I-80 On-Ramp

08/08/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	391	291	291	115
Future Volume (Veh/h)	0	0	391	291	291	115
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	425	316	316	125
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				1319		
pX, platoon unblocked						
vC, conflicting volume	1482	316	441			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1482	316	441			
tC, single (s)	6.7	6.5	4.4			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	100	100	58			
cM capacity (veh/h)	70	672	1003			
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	425	316	316	125		
Volume Left	425	0	0	0		
Volume Right	0	0	0	125		
cSH	1003	1700	1700	1700		
Volume to Capacity	0.42	0.19	0.19	0.07		
Queue Length 95th (ft)	54	0	0	0		
Control Delay (s)	11.2	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	6.4		0.0			
Approach LOS						
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			43.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM 6th TWSC
3: Main St & EB I-80 Off Ramp

08/08/2022

Intersection						
Int Delay, s/veh	3.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	110	280	0	572	291	0
Future Vol, veh/h	110	280	0	572	291	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	255	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	30	30	30	30	30	30
Mvmt Flow	121	308	0	629	320	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	949	-	-	0	-	0
Stage 1	320	-	-	-	-	-
Stage 2	629	-	-	-	-	-
Critical Hdwy	6.7	-	-	-	-	-
Critical Hdwy Stg 1	5.7	-	-	-	-	-
Critical Hdwy Stg 2	5.7	-	-	-	-	-
Follow-up Hdwy	3.77	-	-	-	-	-
Pot Cap-1 Maneuver	258	0	0	-	-	0
Stage 1	677	0	0	-	-	0
Stage 2	482	0	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	258	-	-	-	-	-
Mov Cap-2 Maneuver	258	-	-	-	-	-
Stage 1	677	-	-	-	-	-
Stage 2	482	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	30.7	0		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT		
Capacity (veh/h)	-	258	-	-		
HCM Lane V/C Ratio	-	0.469	-	-		
HCM Control Delay (s)	-	30.7	0	-		
HCM Lane LOS	-	D	A	-		
HCM 95th %tile Q(veh)	-	2.3	-	-		

HCM Unsignalized Intersection Capacity Analysis

4: I-80 EB On-Ramp & Main St

08/08/2022

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	572	120	68	502
Future Volume (Veh/h)	0	0	572	120	68	502
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	629	132	75	552
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			421			
pX, platoon unblocked	0.71	0.71			0.71	
vC, conflicting volume	1331	629			761	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1262	276			461	
tC, single (s)	6.7	6.5			4.4	
tC, 2 stage (s)						
tF (s)	3.8	3.6			2.5	
p0 queue free %	100	100			89	
cM capacity (veh/h)	104	498			688	
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	629	132	75	552		
Volume Left	0	0	75	0		
Volume Right	0	132	0	0		
cSH	1700	1700	688	1700		
Volume to Capacity	0.37	0.08	0.11	0.32		
Queue Length 95th (ft)	0	0	9	0		
Control Delay (s)	0.0	0.0	10.9	0.0		
Lane LOS			B			
Approach Delay (s)	0.0		1.3			
Approach LOS						
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			40.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM 6th Signalized Intersection Summary

5: Main St & Pilot Rd/Logan Ln

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔		↔	↔		↔	↔	↔
Traffic Volume (veh/h)	126	4	43	23	16	10	52	556	47	38	305	159
Future Volume (veh/h)	126	4	43	23	16	10	52	556	47	38	305	159
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604
Adj Flow Rate, veh/h	134	4	46	24	17	0	55	591	50	40	324	169
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	20	20	20	20	20	20	20	20	20	20	20	20
Cap, veh/h	180	5	165	60	63		72	660	56	59	712	603
Arrive On Green	0.12	0.12	0.12	0.04	0.04	0.00	0.05	0.45	0.45	0.04	0.44	0.44
Sat Flow, veh/h	1485	44	1359	1527	1604	0	1527	1458	123	1527	1604	1359
Grp Volume(v), veh/h	138	0	46	24	17	0	55	0	641	40	324	169
Grp Sat Flow(s), veh/h/ln	1529	0	1359	1527	1604	0	1527	0	1581	1527	1604	1359
Q Serve(g_s), s	6.0	0.0	2.1	1.1	0.7	0.0	2.5	0.0	25.7	1.8	9.7	5.4
Cycle Q Clear(g_c), s	6.0	0.0	2.1	1.1	0.7	0.0	2.5	0.0	25.7	1.8	9.7	5.4
Prop In Lane	0.97		1.00	1.00		0.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	185	0	165	60	63		72	0	716	59	712	603
V/C Ratio(X)	0.75	0.00	0.28	0.40	0.27		0.76	0.00	0.90	0.67	0.46	0.28
Avail Cap(c_a), veh/h	399	0	355	399	419		222	0	918	111	814	690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	0.0	27.6	32.3	32.1	0.0	32.5	0.0	17.4	32.7	13.3	12.2
Incr Delay (d2), s/veh	5.9	0.0	0.9	4.2	2.2	0.0	15.2	0.0	9.5	12.5	0.5	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.7	0.4	0.3	0.0	1.2	0.0	9.8	0.8	3.2	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.1	0.0	28.5	36.5	34.4	0.0	47.6	0.0	26.9	45.2	13.8	12.4
LnGrp LOS	D	A	C	D	C		D	A	C	D	B	B
Approach Vol, veh/h		184			41			696			533	
Approach Delay, s/veh		33.5			35.6			28.5			15.7	
Approach LOS		C			D			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.7	37.2		14.3	9.3	36.6		8.7				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	40.0		18.0	10.0	35.0		18.0				
Max Q Clear Time (g_c+I), s	13.8	27.7		8.0	4.5	11.7		3.1				
Green Ext Time (p_c), s	0.0	3.5		0.6	0.0	2.5		0.1				

Intersection Summary

HCM 6th Ctrl Delay	24.6
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

6: Red Hawk Ranch Backbone/ Truckee Ln & Main St

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	432	24	50	632	25	80	3	118	28	3	9
Future Volume (veh/h)	10	432	24	50	632	25	80	3	118	28	3	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1752	1752	1752	1752	1870	1752	1870	1752	1870	1870	1870
Adj Flow Rate, veh/h	11	508	28	59	744	27	94	3	139	30	3	10
Peak Hour Factor	0.92	0.85	0.85	0.85	0.85	0.92	0.85	0.92	0.85	0.92	0.92	0.92
Percent Heavy Veh, %	2	10	10	10	10	2	10	2	10	2	2	2
Cap, veh/h	252	845	716	438	877	32	308	5	224	203	54	182
Arrive On Green	0.01	0.48	0.48	0.05	0.52	0.52	0.14	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	1781	1752	1485	1668	1680	61	1312	34	1557	1246	379	1264
Grp Volume(v), veh/h	11	508	28	59	0	771	94	0	142	30	0	13
Grp Sat Flow(s), veh/h/ln	1781	1752	1485	1668	0	1741	1312	0	1590	1246	0	1643
Q Serve(g_s), s	0.2	11.9	0.6	1.0	0.0	21.4	3.7	0.0	4.7	1.3	0.0	0.4
Cycle Q Clear(g_c), s	0.2	11.9	0.6	1.0	0.0	21.4	4.1	0.0	4.7	6.0	0.0	0.4
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.98	1.00		0.77
Lane Grp Cap(c), veh/h	252	845	716	438	0	909	308	0	229	203	0	236
V/C Ratio(X)	0.04	0.60	0.04	0.13	0.00	0.85	0.31	0.00	0.62	0.15	0.00	0.06
Avail Cap(c_a), veh/h	386	1527	1294	497	0	1518	539	0	509	423	0	526
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.5	10.6	7.7	7.6	0.0	11.5	22.6	0.0	22.6	25.5	0.0	20.8
Incr Delay (d2), s/veh	0.1	0.7	0.0	0.1	0.0	2.4	0.6	0.0	2.7	0.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	3.7	0.1	0.3	0.0	6.6	1.1	0.0	1.8	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.5	11.3	7.7	7.8	0.0	14.0	23.1	0.0	25.4	25.8	0.0	20.9
LnGrp LOS	B	B	A	A	A	B	C	A	C	C	A	C
Approach Vol, veh/h	547			830			236			43		
Approach Delay, s/veh	11.1			13.5			24.5			24.3		
Approach LOS	B			B			C			C		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	14.1		9.0	33.1		14.1		6.8	35.3			
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0		6.0	6.0			
Max Green Setting (Gmax), s	18.0		5.0	49.0		18.0		5.0	49.0			
Max Q Clear Time (g_c+I1), s	6.7		3.0	13.9		8.0		2.2	23.4			
Green Ext Time (p_c), s	0.8		0.0	3.6		0.1		0.0	6.0			

Intersection Summary

HCM 6th Ctrl Delay	14.6
HCM 6th LOS	B

Intersection						
Int Delay, s/veh	1.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	553	42	11	638	79	18
Future Vol, veh/h	553	42	11	638	79	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	628	48	13	725	90	20
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	676	0	1403	652
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	751	-
Critical Hdwy	-	-	4.19	-	6.49	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	-	-	2.281	-	3.581	3.381
Pot Cap-1 Maneuver	-	-	883	-	149	456
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	454	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	883	-	147	456
Mov Cap-2 Maneuver	-	-	-	-	283	-
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	447	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		23.4	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	304	-	-	883	-	
HCM Lane V/C Ratio	0.363	-	-	0.014	-	
HCM Control Delay (s)	23.4	-	-	9.1	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	1.6	-	-	0	-	

HCM 6th Signalized Intersection Summary

8: US95A & Main St

08/08/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	372	200	176	369	1	273	1	185	2	1	0
Future Volume (veh/h)	1	372	200	176	369	1	273	1	185	2	1	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	1	438	235	207	434	1	321	1	218	2	1	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	29	493	264	229	1013	2	397	2	407	167	75	0
Arrive On Green	0.02	0.46	0.46	0.14	0.58	0.58	0.28	0.28	0.28	0.28	0.28	0.00
Sat Flow, veh/h	1668	1072	575	1668	1747	4	1326	7	1476	453	271	0
Grp Volume(v), veh/h	1	0	673	207	0	435	321	0	219	3	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1647	1668	0	1751	1326	0	1483	724	0	0
Q Serve(g_s), s	0.1	0.0	52.8	17.3	0.0	19.6	17.6	0.0	17.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	52.8	17.3	0.0	19.6	35.4	0.0	17.7	17.8	0.0	0.0
Prop In Lane	1.00		0.35	1.00		0.00	1.00		1.00	0.67		0.00
Lane Grp Cap(c), veh/h	29	0	757	229	0	1015	397	0	409	242	0	0
V/C Ratio(X)	0.03	0.00	0.89	0.90	0.00	0.43	0.81	0.00	0.54	0.01	0.00	0.00
Avail Cap(c_a), veh/h	59	0	757	260	0	1015	454	0	472	295	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	68.3	0.0	34.9	60.1	0.0	16.6	50.4	0.0	43.5	38.2	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	14.7	29.8	0.0	1.3	9.3	0.0	1.1	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	23.7	9.2	0.0	8.1	12.1	0.0	6.7	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.8	0.0	49.6	89.8	0.0	17.9	59.8	0.0	44.6	38.2	0.0	0.0
LnGrp LOS	E	A	D	F	A	B	E	A	D	D	A	A
Approach Vol, veh/h	674			642			540			3		
Approach Delay, s/veh	49.7			41.1			53.6			38.2		
Approach LOS	D			D			D			D		
Timer - Assigned Phs	2		3	4	6		7	8				
Phs Duration (G+Y+Rc), s	45.0		25.4	71.0	45.0		8.4	88.0				
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0		6.0	6.0				
Max Green Setting (Gmax), s	45.0		22.0	65.0	45.0		5.0	82.0				
Max Q Clear Time (g_c+I1), s	37.4		19.3	54.8	19.8		2.1	21.6				
Green Ext Time (p_c), s	1.6		0.1	3.4	0.0		0.0	3.0				
Intersection Summary												
HCM 6th Ctrl Delay	47.8											
HCM 6th LOS	D											

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	5	0	49	5	2	28	0
Future Vol, veh/h	0	0	0	0	0	5	0	49	5	2	28	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	5	0	53	5	2	30	0
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	92	92	30	90	90	56	30	0	0	58	0	0
Stage 1	34	34	-	56	56	-	-	-	-	-	-	-
Stage 2	58	58	-	34	34	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	892	798	1044	895	800	1011	1583	-	-	1546	-	-
Stage 1	982	867	-	956	848	-	-	-	-	-	-	-
Stage 2	954	847	-	982	867	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	887	797	1044	894	799	1011	1583	-	-	1546	-	-
Mov Cap-2 Maneuver	887	797	-	894	799	-	-	-	-	-	-	-
Stage 1	982	866	-	956	848	-	-	-	-	-	-	-
Stage 2	949	847	-	981	866	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0		8.6			0			0.5			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1583	-	-	-	1011	1546	-	-				
HCM Lane V/C Ratio	-	-	-	-	0.005	0.001	-	-				
HCM Control Delay (s)	0	-	-	0	8.6	7.3	0	-				
HCM Lane LOS	A	-	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-				

Intersection						
Int Delay, s/veh	3.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	139	142	221	0	0	482
Future Vol, veh/h	139	142	221	0	0	482
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	150	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	15	15	15	15	15	15
Mvmt Flow	149	153	238	0	0	518
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	497	119	0	-	-	-
Stage 1	238	-	-	-	-	-
Stage 2	259	-	-	-	-	-
Critical Hdwy	7.1	7.2	-	-	-	-
Critical Hdwy Stg 1	6.1	-	-	-	-	-
Critical Hdwy Stg 2	6.1	-	-	-	-	-
Follow-up Hdwy	3.65	3.45	-	-	-	-
Pot Cap-1 Maneuver	471	870	-	0	0	-
Stage 1	742	-	-	0	0	-
Stage 2	723	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	471	870	-	-	-	-
Mov Cap-2 Maneuver	471	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	13.1	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBTWBLn1WBLn2		SBT			
Capacity (veh/h)	-	471	870	-	-	-
HCM Lane V/C Ratio	-	0.317	0.176	-	-	-
HCM Control Delay (s)	-	16.2	10	-	-	-
HCM Lane LOS	-	C	B	-	-	-
HCM 95th %tile Q(veh)	-	1.3	0.6	-	-	-

HCM Unsignalized Intersection Capacity Analysis

2: Main St & WB I-80 On-Ramp

08/08/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	328	221	469	152
Future Volume (Veh/h)	0	0	328	221	469	152
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	353	238	504	163
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				1319		
pX, platoon unblocked						
vC, conflicting volume	1448	504	667			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1448	504	667			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	100	59			
cM capacity (veh/h)	80	543	864			
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	353	238	504	163		
Volume Left	353	0	0	0		
Volume Right	0	0	0	163		
cSH	864	1700	1700	1700		
Volume to Capacity	0.41	0.14	0.30	0.10		
Queue Length 95th (ft)	50	0	0	0		
Control Delay (s)	12.0	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	7.2		0.0			
Approach LOS						
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			72.5%		ICU Level of Service	C
Analysis Period (min)			15			

HCM 6th TWSC
3: Main St & EB I-80 Off Ramp

08/08/2022

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	53	665	0	494	469	0
Future Vol, veh/h	53	665	0	494	469	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	255	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	16	16	16	16	16	16
Mvmt Flow	56	707	0	526	499	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1025	-	-	0	-	0
Stage 1	499	-	-	-	-	-
Stage 2	526	-	-	-	-	-
Critical Hdwy	6.56	-	-	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	-	-	-	-	-
Pot Cap-1 Maneuver	245	0	0	-	-	0
Stage 1	582	0	0	-	-	0
Stage 2	565	0	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	245	-	-	-	-	-
Mov Cap-2 Maneuver	245	-	-	-	-	-
Stage 1	582	-	-	-	-	-
Stage 2	565	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	24	0		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT		
Capacity (veh/h)	-	245	-	-		
HCM Lane V/C Ratio	-	0.23	-	-		
HCM Control Delay (s)	-	24	0	-		
HCM Lane LOS	-	C	A	-		
HCM 95th %tile Q(veh)	-	0.9	-	-		

Future Year PM

Synchro 11 Light Report

HCM Unsignalized Intersection Capacity Analysis

4: I-80 EB On-Ramp & Main St

08/08/2022

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	494	152	137	1042
Future Volume (Veh/h)	0	0	494	152	137	1042
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	526	162	146	1109
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			421			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	1927	526			688	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1990	383			569	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	100	100			82	
cM capacity (veh/h)	44	553			817	
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	526	162	146	1109		
Volume Left	0	0	146	0		
Volume Right	0	162	0	0		
cSH	1700	1700	817	1700		
Volume to Capacity	0.31	0.10	0.18	0.65		
Queue Length 95th (ft)	0	0	16	0		
Control Delay (s)	0.0	0.0	10.4	0.0		
Lane LOS			B			
Approach Delay (s)	0.0		1.2			
Approach LOS						
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			58.2%		ICU Level of Service	B
Analysis Period (min)			15			

HCM 6th Signalized Intersection Summary

5: Main St & Pilot Rd/Logan Ln

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩	↩	↩		↩	↩		↩	↩	↩
Traffic Volume (veh/h)	177	0	81	54	2	59	41	418	27	25	839	177
Future Volume (veh/h)	177	0	81	54	2	59	41	418	27	25	839	177
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678
Adj Flow Rate, veh/h	188	0	86	57	2	0	44	445	29	27	893	188
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	15	15	15	15	15	15	15	15	15	15	15	15
Cap, veh/h	219	0	195	72	76		54	896	58	41	951	806
Arrive On Green	0.14	0.00	0.14	0.05	0.05	0.00	0.03	0.57	0.57	0.03	0.57	0.57
Sat Flow, veh/h	1598	0	1422	1598	1678	0	1598	1558	102	1598	1678	1422
Grp Volume(v), veh/h	188	0	86	57	2	0	44	0	474	27	893	188
Grp Sat Flow(s), veh/h/ln	1598	0	1422	1598	1678	0	1598	0	1659	1598	1678	1422
Q Serve(g_s), s	12.7	0.0	6.1	3.9	0.1	0.0	3.0	0.0	18.8	1.8	54.4	7.3
Cycle Q Clear(g_c), s	12.7	0.0	6.1	3.9	0.1	0.0	3.0	0.0	18.8	1.8	54.4	7.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	219	0	195	72	76		54	0	954	41	951	806
V/C Ratio(X)	0.86	0.00	0.44	0.79	0.03		0.82	0.00	0.50	0.66	0.94	0.23
Avail Cap(c_a), veh/h	260	0	232	260	274		72	0	1022	101	1064	901
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.6	0.0	43.8	52.2	50.4	0.0	53.0	0.0	14.0	53.3	22.2	11.9
Incr Delay (d2), s/veh	21.2	0.0	1.6	16.9	0.1	0.0	39.1	0.0	0.4	16.9	14.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	0.0	2.2	1.9	0.1	0.0	1.8	0.0	6.7	0.9	23.2	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.8	0.0	45.3	69.1	50.5	0.0	92.1	0.0	14.4	70.2	36.5	12.1
LnGrp LOS	E	A	D	E	D		F	A	B	E	D	B
Approach Vol, veh/h	274			59			518			1108		
Approach Delay, s/veh	60.8			68.5			21.0			33.2		
Approach LOS	E			E			C			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.8	69.5		21.1	9.7	68.6		11.0				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	68.0			18.0	5.0	70.0		18.0				
Max Q Clear Time (g_c+I), s	20.8			14.7	5.0	56.4		5.9				
Green Ext Time (p_c), s	0.0	3.3		0.4	0.0	6.1		0.1				

Intersection Summary

HCM 6th Ctrl Delay 34.9

HCM 6th LOS C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

6: Red Hawk Ranch Backbone/ Truckee Ln & Main St

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	908	82	131	523	51	53	5	86	58	2	27
Future Volume (veh/h)	35	908	82	131	523	51	53	5	86	58	2	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	36	946	85	136	545	53	55	5	90	60	2	28
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	471	1037	878	259	975	95	249	11	193	190	14	191
Arrive On Green	0.04	0.57	0.57	0.06	0.60	0.60	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1739	1826	1547	1739	1638	159	1347	82	1478	1270	104	1459
Grp Volume(v), veh/h	36	946	85	136	0	598	55	0	95	60	0	30
Grp Sat Flow(s),veh/h/ln	1739	1826	1547	1739	0	1797	1347	0	1560	1270	0	1563
Q Serve(g_s), s	0.6	35.0	1.9	2.4	0.0	15.2	2.8	0.0	4.2	3.5	0.0	1.3
Cycle Q Clear(g_c), s	0.6	35.0	1.9	2.4	0.0	15.2	4.1	0.0	4.2	7.7	0.0	1.3
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.95	1.00		0.93
Lane Grp Cap(c), veh/h	471	1037	878	259	0	1070	249	0	204	190	0	205
V/C Ratio(X)	0.08	0.91	0.10	0.52	0.00	0.56	0.22	0.00	0.47	0.32	0.00	0.15
Avail Cap(c_a), veh/h	526	1188	1006	266	0	1169	394	0	373	327	0	374
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.3	14.6	7.4	16.2	0.0	9.3	30.8	0.0	30.3	33.9	0.0	29.0
Incr Delay (d2), s/veh	0.1	9.9	0.0	1.8	0.0	0.5	0.4	0.0	1.6	0.9	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	14.5	0.5	1.3	0.0	5.0	0.9	0.0	1.6	1.1	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.3	24.5	7.5	17.9	0.0	9.8	31.3	0.0	31.9	34.8	0.0	29.3
LnGrp LOS	A	C	A	B	A	A	C	A	C	C	A	C
Approach Vol, veh/h												
1067												
Approach Delay, s/veh												
22.6												
Approach LOS												
C												
Timer - Assigned Phs												
234678												
Phs Duration (G+Y+Rc), s												
15.910.748.815.98.650.8												
Change Period (Y+Rc), s												
6.06.06.06.06.06.0												
Max Green Setting (Gmax), s												
18.05.049.018.05.049.0												
Max Q Clear Time (g_c+I1), s												
6.24.437.09.72.617.2												
Green Ext Time (p_c), s												
0.50.05.80.20.04.3												
Intersection Summary												
HCM 6th Ctrl Delay												
19.6												
HCM 6th LOS												
B												

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	920	146	31	679	49	14
Future Vol, veh/h	920	146	31	679	49	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	948	151	32	700	51	14
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1099	0	1788	1024
Stage 1	-	-	-	-	1024	-
Stage 2	-	-	-	-	764	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	624	-	88	282
Stage 1	-	-	-	-	342	-
Stage 2	-	-	-	-	455	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	624	-	84	282
Mov Cap-2 Maneuver	-	-	-	-	212	-
Stage 1	-	-	-	-	342	-
Stage 2	-	-	-	-	432	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.5		27.5	
HCM LOS	D					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	224	-	-	624	-	
HCM Lane V/C Ratio	0.29	-	-	0.051	-	
HCM Control Delay (s)	27.5	-	-	11.1	-	
HCM Lane LOS	D	-	-	B	-	
HCM 95th %tile Q(veh)	1.2	-	-	0.2	-	

HCM 6th Signalized Intersection Summary

8: US95A & Main St

08/08/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	593	338	241	444	1	267	0	180	6	2	2
Future Volume (veh/h)	1	593	338	241	444	1	267	0	180	6	2	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	1	624	356	254	467	1	281	0	189	6	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	57	570	325	241	1144	2	310	0	327	119	39	30
Arrive On Green	0.03	0.53	0.53	0.14	0.63	0.63	0.21	0.00	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1725	1082	617	1725	1807	4	1368	0	1531	380	185	141
Grp Volume(v), veh/h	1	0	980	254	0	468	281	0	189	10	0	0
Grp Sat Flow(s),veh/h/ln	1725	0	1699	1725	0	1810	1368	0	1531	706	0	0
Q Serve(g_s), s	0.1	0.0	79.0	21.0	0.0	19.2	15.3	0.0	16.6	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	79.0	21.0	0.0	19.2	32.0	0.0	16.6	16.7	0.0	0.0
Prop In Lane	1.00		0.36	1.00		0.00	1.00		1.00	0.60		0.20
Lane Grp Cap(c), veh/h	57	0	895	241	0	1147	310	0	327	189	0	0
V/C Ratio(X)	0.02	0.00	1.10	1.05	0.00	0.41	0.91	0.00	0.58	0.05	0.00	0.00
Avail Cap(c_a), veh/h	57	0	895	241	0	1147	310	0	327	189	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	70.1	0.0	35.5	64.5	0.0	13.6	60.9	0.0	52.9	47.5	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	59.6	72.2	0.0	1.1	28.5	0.0	2.5	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	46.2	14.0	0.0	8.0	13.3	0.0	6.7	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.2	0.0	95.1	136.7	0.0	14.7	89.4	0.0	55.5	47.6	0.0	0.0
LnGrp LOS	E	A	F	F	A	B	F	A	E	D	A	A
Approach Vol, veh/h	981			722			470			10		
Approach Delay, s/veh	95.1			57.6			75.8			47.6		
Approach LOS	F			E			E			D		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	38.0		27.0	85.0		38.0	11.0	101.0				
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0	6.0	6.0				
Max Green Setting (Gmax), s	32.0		21.0	79.0		32.0	5.0	95.0				
Max Q Clear Time (g_c+I1), s	34.0		23.0	81.0		18.7	2.1	21.2				
Green Ext Time (p_c), s	0.0		0.0	0.0		0.0	0.0	3.2				
Intersection Summary												
HCM 6th Ctrl Delay	78.3											
HCM 6th LOS	E											

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	6	0	4	0	33	1	12	103	0
Future Vol, veh/h	0	0	0	6	0	4	0	33	1	12	103	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	7	0	4	0	36	1	13	112	0
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	177	175	112	175	175	37	112	0	0	37	0	0
Stage 1	138	138	-	37	37	-	-	-	-	-	-	-
Stage 2	39	37	-	138	138	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	785	718	941	788	718	1035	1478	-	-	1574	-	-
Stage 1	865	782	-	978	864	-	-	-	-	-	-	-
Stage 2	976	864	-	865	782	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	776	712	941	782	712	1035	1478	-	-	1574	-	-
Mov Cap-2 Maneuver	776	712	-	782	712	-	-	-	-	-	-	-
Stage 1	865	775	-	978	864	-	-	-	-	-	-	-
Stage 2	972	864	-	857	775	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0		9.2			0			0.8			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1478	-	-	-	867	1574	-	-				
HCM Lane V/C Ratio	-	-	-	-	0.013	0.008	-	-				
HCM Control Delay (s)	0	-	-	0	9.2	7.3	0	-				
HCM Lane LOS	A	-	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-				

Appendix E

Future Plus Project Conditions LOS Calculations



Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	73	151	291	0	0	338
Future Vol, veh/h	73	151	291	0	0	338
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	150	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	26	26	26	26	26	26
Mvmt Flow	79	164	316	0	0	367
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	500	158	0	-	-	-
Stage 1	316	-	-	-	-	-
Stage 2	184	-	-	-	-	-
Critical Hdwy	7.32	7.42	-	-	-	-
Critical Hdwy Stg 1	6.32	-	-	-	-	-
Critical Hdwy Stg 2	6.32	-	-	-	-	-
Follow-up Hdwy	3.76	3.56	-	-	-	-
Pot Cap-1 Maneuver	445	789	-	0	0	-
Stage 1	645	-	-	0	0	-
Stage 2	762	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	445	789	-	-	-	-
Mov Cap-2 Maneuver	445	-	-	-	-	-
Stage 1	645	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.1	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBTWBLn1WBLn2		SBT			
Capacity (veh/h)	-	445	789	-	-	-
HCM Lane V/C Ratio	-	0.178	0.208	-	-	-
HCM Control Delay (s)	-	14.8	10.8	-	-	-
HCM Lane LOS	-	B	B	-	-	-
HCM 95th %tile Q(veh)	-	0.6	0.8	-	-	-

HCM Unsignalized Intersection Capacity Analysis

2: Main St & WB I-80 On-Ramp

08/08/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	419	291	297	115
Future Volume (Veh/h)	0	0	419	291	297	115
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	455	316	323	125
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				1319		
pX, platoon unblocked						
vC, conflicting volume	1549	323	448			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1549	323	448			
tC, single (s)	6.7	6.5	4.4			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	100	100	54			
cM capacity (veh/h)	60	666	996			
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	455	316	323	125		
Volume Left	455	0	0	0		
Volume Right	0	0	0	125		
cSH	996	1700	1700	1700		
Volume to Capacity	0.46	0.19	0.19	0.07		
Queue Length 95th (ft)	61	0	0	0		
Control Delay (s)	11.6	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	6.9		0.0			
Approach LOS						
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization			45.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM 6th TWSC
3: Main St & EB I-80 Off Ramp

08/08/2022

Intersection						
Int Delay, s/veh	3.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	110	292	0	600	297	0
Future Vol, veh/h	110	292	0	600	297	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	255	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	30	30	30	30	30	30
Mvmt Flow	121	321	0	659	326	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	985	-	-	0	-	0
Stage 1	326	-	-	-	-	-
Stage 2	659	-	-	-	-	-
Critical Hdwy	6.7	-	-	-	-	-
Critical Hdwy Stg 1	5.7	-	-	-	-	-
Critical Hdwy Stg 2	5.7	-	-	-	-	-
Follow-up Hdwy	3.77	-	-	-	-	-
Pot Cap-1 Maneuver	245	0	0	-	-	0
Stage 1	673	0	0	-	-	0
Stage 2	466	0	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	245	-	-	-	-	-
Mov Cap-2 Maneuver	245	-	-	-	-	-
Stage 1	673	-	-	-	-	-
Stage 2	466	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	33.2	0		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT		
Capacity (veh/h)	-	245	-	-		
HCM Lane V/C Ratio	-	0.493	-	-		
HCM Control Delay (s)	-	33.2	0	-		
HCM Lane LOS	-	D	A	-		
HCM 95th %tile Q(veh)	-	2.5	-	-		

HCM Unsignalized Intersection Capacity Analysis

4: I-80 EB On-Ramp & Main St

08/08/2022

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	600	134	68	521
Future Volume (Veh/h)	0	0	600	134	68	521
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	659	147	75	573
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			421			
pX, platoon unblocked	0.67	0.67			0.67	
vC, conflicting volume	1382	659			806	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1324	244			464	
tC, single (s)	6.7	6.5			4.4	
tC, 2 stage (s)						
tF (s)	3.8	3.6			2.5	
p0 queue free %	100	100			88	
cM capacity (veh/h)	89	489			647	
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	659	147	75	573		
Volume Left	0	0	75	0		
Volume Right	0	147	0	0		
cSH	1700	1700	647	1700		
Volume to Capacity	0.39	0.09	0.12	0.34		
Queue Length 95th (ft)	0	0	10	0		
Control Delay (s)	0.0	0.0	11.3	0.0		
Lane LOS			B			
Approach Delay (s)	0.0		1.3			
Approach LOS						
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			42.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM 6th Signalized Intersection Summary

5: Main St & Pilot Rd/Logan Ln

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱		↰	↱		↰	↱	↱
Traffic Volume (veh/h)	126	4	43	23	16	10	52	598	47	38	324	159
Future Volume (veh/h)	126	4	43	23	16	10	52	598	47	38	324	159
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604	1604
Adj Flow Rate, veh/h	134	4	46	24	17	0	55	636	50	40	345	169
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	20	20	20	20	20	20	20	20	20	20	20	20
Cap, veh/h	178	5	163	59	62		70	694	55	58	745	632
Arrive On Green	0.12	0.12	0.12	0.04	0.04	0.00	0.05	0.47	0.47	0.04	0.46	0.46
Sat Flow, veh/h	1485	44	1359	1527	1604	0	1527	1467	115	1527	1604	1359
Grp Volume(v), veh/h	138	0	46	24	17	0	55	0	686	40	345	169
Grp Sat Flow(s), veh/h/ln	1529	0	1359	1527	1604	0	1527	0	1583	1527	1604	1359
Q Serve(g_s), s	6.3	0.0	2.2	1.1	0.7	0.0	2.6	0.0	29.3	1.9	10.7	5.5
Cycle Q Clear(g_c), s	6.3	0.0	2.2	1.1	0.7	0.0	2.6	0.0	29.3	1.9	10.7	5.5
Prop In Lane	0.97		1.00	1.00		0.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	183	0	163	59	62		70	0	748	58	745	632
V/C Ratio(X)	0.75	0.00	0.28	0.41	0.27		0.78	0.00	0.92	0.69	0.46	0.27
Avail Cap(c_a), veh/h	379	0	337	379	397		189	0	872	105	795	674
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.9	0.0	29.1	34.1	33.9	0.0	34.3	0.0	17.8	34.5	13.2	11.9
Incr Delay (d2), s/veh	6.1	0.0	0.9	4.4	2.3	0.0	16.8	0.0	13.1	13.4	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	0.7	0.5	0.3	0.0	1.2	0.0	11.8	0.9	3.5	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.1	0.0	30.1	38.5	36.3	0.0	51.0	0.0	30.9	47.9	13.7	12.1
LnGrp LOS	D	A	C	D	D		D	A	C	D	B	B
Approach Vol, veh/h		184			41			741			554	
Approach Delay, s/veh		35.3			37.6			32.4			15.7	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.8	40.3		14.7	9.4	39.8		8.8				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	5.0	40.0		18.0	9.0	36.0		18.0				
Max Q Clear Time (g_c+I), s	13.9	31.3		8.3	4.6	12.7		3.1				
Green Ext Time (p_c), s	0.0	3.1		0.6	0.0	2.7		0.1				

Intersection Summary

HCM 6th Ctrl Delay	26.8
HCM 6th LOS	C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

6: Red Hawk Ranch Backbone/ Truckee Ln & Main St

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	451	24	50	674	25	80	3	118	28	3	9
Future Volume (veh/h)	10	451	24	50	674	25	80	3	118	28	3	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1752	1752	1752	1752	1870	1752	1870	1752	1870	1870	1870
Adj Flow Rate, veh/h	11	531	28	59	793	27	94	3	139	30	3	10
Peak Hour Factor	0.92	0.85	0.85	0.85	0.85	0.92	0.85	0.92	0.85	0.92	0.92	0.92
Percent Heavy Veh, %	2	10	10	10	10	2	10	2	10	2	2	2
Cap, veh/h	237	886	751	439	916	31	297	5	221	192	54	179
Arrive On Green	0.01	0.51	0.51	0.05	0.54	0.54	0.14	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	1781	1752	1485	1668	1684	57	1312	34	1557	1246	379	1264
Grp Volume(v), veh/h	11	531	28	59	0	820	94	0	142	30	0	13
Grp Sat Flow(s), veh/h/ln	1781	1752	1485	1668	0	1741	1312	0	1590	1246	0	1643
Q Serve(g_s), s	0.2	12.9	0.6	1.0	0.0	24.3	4.0	0.0	5.0	1.4	0.0	0.4
Cycle Q Clear(g_c), s	0.2	12.9	0.6	1.0	0.0	24.3	4.4	0.0	5.0	6.4	0.0	0.4
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.98	1.00		0.77
Lane Grp Cap(c), veh/h	237	886	751	439	0	948	297	0	225	192	0	233
V/C Ratio(X)	0.05	0.60	0.04	0.13	0.00	0.87	0.32	0.00	0.63	0.16	0.00	0.06
Avail Cap(c_a), veh/h	361	1432	1213	491	0	1423	505	0	477	389	0	493
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.1	10.5	7.5	7.6	0.0	11.8	24.2	0.0	24.3	27.3	0.0	22.3
Incr Delay (d2), s/veh	0.1	0.7	0.0	0.1	0.0	3.8	0.6	0.0	2.9	0.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	4.1	0.2	0.3	0.0	8.0	1.2	0.0	2.0	0.4	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.1	11.2	7.5	7.7	0.0	15.6	24.8	0.0	27.1	27.7	0.0	22.4
LnGrp LOS	B	B	A	A	A	B	C	A	C	C	A	C
Approach Vol, veh/h	570			879			236			43		
Approach Delay, s/veh	11.0			15.1			26.2			26.1		
Approach LOS	B			B			C			C		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	14.5		9.1	36.3		14.5		6.8	38.6			
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0		6.0	6.0			
Max Green Setting (Gmax), s	18.0		5.0	49.0		18.0		5.0	49.0			
Max Q Clear Time (g_c+I1), s	7.0		3.0	14.9		8.4		2.2	26.3			
Green Ext Time (p_c), s	0.8		0.0	3.8		0.1		0.0	6.3			

Intersection Summary

HCM 6th Ctrl Delay	15.5
HCM 6th LOS	B

Intersection						
Int Delay, s/veh	5.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	553	61	34	638	121	69
Future Vol, veh/h	553	61	34	638	121	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	628	69	39	725	138	78
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	697	0	1466	663
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	803	-
Critical Hdwy	-	-	4.19	-	6.49	6.29
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	-	-	2.281	-	3.581	3.381
Pot Cap-1 Maneuver	-	-	867	-	~ 136	449
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	429	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	867	-	~ 130	449
Mov Cap-2 Maneuver	-	-	-	-	264	-
Stage 1	-	-	-	-	500	-
Stage 2	-	-	-	-	410	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.5		39.4		
HCM LOS	E					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	310	-	-	867	-	
HCM Lane V/C Ratio	0.696	-	-	0.045	-	
HCM Control Delay (s)	39.4	-	-	9.3	-	
HCM Lane LOS	E	-	-	A	-	
HCM 95th %tile Q(veh)	4.9	-	-	0.1	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th Signalized Intersection Summary 8: US95A & Main St

08/08/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	409	214	176	386	1	280	1	185	2	1	0
Future Volume (veh/h)	1	409	214	176	386	1	280	1	185	2	1	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	1	481	252	207	454	1	329	1	218	2	1	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	45	502	263	228	1001	2	397	2	409	167	75	0
Arrive On Green	0.03	0.46	0.46	0.14	0.57	0.57	0.28	0.28	0.28	0.28	0.28	0.00
Sat Flow, veh/h	1668	1082	567	1668	1747	4	1326	7	1476	455	271	0
Grp Volume(v), veh/h	1	0	733	207	0	455	329	0	219	3	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	1648	1668	0	1751	1326	0	1483	726	0	0
Q Serve(g_s), s	0.1	0.0	63.0	17.9	0.0	22.0	19.4	0.0	18.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	63.0	17.9	0.0	22.0	37.8	0.0	18.4	18.4	0.0	0.0
Prop In Lane	1.00		0.34	1.00		0.00	1.00		1.00	0.67		0.00
Lane Grp Cap(c), veh/h	45	0	764	228	0	1003	397	0	411	242	0	0
V/C Ratio(X)	0.02	0.00	0.96	0.91	0.00	0.45	0.83	0.00	0.53	0.01	0.00	0.00
Avail Cap(c_a), veh/h	57	0	764	239	0	1003	419	0	435	262	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	69.4	0.0	38.0	62.4	0.0	18.1	52.5	0.0	44.9	39.4	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	24.0	34.2	0.0	1.5	12.5	0.0	1.1	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	29.8	9.7	0.0	9.2	13.2	0.0	6.9	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.6	0.0	62.0	96.7	0.0	19.6	65.0	0.0	46.0	39.4	0.0	0.0
LnGrp LOS	E	A	E	F	A	B	E	A	D	D	A	A
Approach Vol, veh/h	734			662			548			3		
Approach Delay, s/veh	62.0			43.7			57.4			39.4		
Approach LOS	E			D			E			D		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	46.7		26.0	74.0		46.7	10.0	90.0				
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0	6.0	6.0				
Max Green Setting (Gmax), s	43.0		21.0	68.0		43.0	5.0	84.0				
Max Q Clear Time (g_c+I1), s	39.8		19.9	65.0		20.4	2.1	24.0				
Green Ext Time (p_c), s	0.8		0.1	1.4		0.0	0.0	3.1				
Intersection Summary												
HCM 6th Ctrl Delay	54.4											
HCM 6th LOS	D											

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	93	0	0	0	0	5	1	49	5	2	28	42
Future Vol, veh/h	93	0	0	0	0	5	1	49	5	2	28	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	101	0	0	0	0	5	1	53	5	2	30	46
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	117	117	53	115	138	56	76	0	0	58	0	0
Stage 1	57	57	-	58	58	-	-	-	-	-	-	-
Stage 2	60	60	-	57	80	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	859	773	1014	862	753	1011	1523	-	-	1546	-	-
Stage 1	955	847	-	954	847	-	-	-	-	-	-	-
Stage 2	951	845	-	955	828	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	853	771	1014	860	751	1011	1523	-	-	1546	-	-
Mov Cap-2 Maneuver	853	771	-	860	751	-	-	-	-	-	-	-
Stage 1	954	846	-	953	846	-	-	-	-	-	-	-
Stage 2	945	844	-	954	827	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	9.8		8.6		0.1		0.2					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1523	-	-	853	1011	1546	-	-				
HCM Lane V/C Ratio	0.001	-	-	0.119	0.005	0.001	-	-				
HCM Control Delay (s)	7.4	0	-	9.8	8.6	7.3	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.4	0	0	-	-				

Intersection						
Int Delay, s/veh	4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	153	142	221	0	0	482
Future Vol, veh/h	153	142	221	0	0	482
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	None	-	None
Storage Length	0	150	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	15	15	15	15	15	15
Mvmt Flow	165	153	238	0	0	518
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	497	119	0	-	-	-
Stage 1	238	-	-	-	-	-
Stage 2	259	-	-	-	-	-
Critical Hdwy	7.1	7.2	-	-	-	-
Critical Hdwy Stg 1	6.1	-	-	-	-	-
Critical Hdwy Stg 2	6.1	-	-	-	-	-
Follow-up Hdwy	3.65	3.45	-	-	-	-
Pot Cap-1 Maneuver	471	870	-	0	0	-
Stage 1	742	-	-	0	0	-
Stage 2	723	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	471	870	-	-	-	-
Mov Cap-2 Maneuver	471	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	13.5	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBTWBLn1WBLn2		SBT			
Capacity (veh/h)	-	471	870	-	-	-
HCM Lane V/C Ratio	-	0.349	0.176	-	-	-
HCM Control Delay (s)	-	16.7	10	-	-	-
HCM Lane LOS	-	C	B	-	-	-
HCM 95th %tile Q(veh)	-	1.5	0.6	-	-	-

HCM Unsignalized Intersection Capacity Analysis

2: Main St & WB I-80 On-Ramp

08/08/2022

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	349	221	483	152
Future Volume (Veh/h)	0	0	349	221	483	152
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	375	238	519	163
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				1319		
pX, platoon unblocked						
vC, conflicting volume	1507	519	682			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1507	519	682			
tC, single (s)	6.5	6.4	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	100	56			
cM capacity (veh/h)	70	532	853			
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	375	238	519	163		
Volume Left	375	0	0	0		
Volume Right	0	0	0	163		
cSH	853	1700	1700	1700		
Volume to Capacity	0.44	0.14	0.31	0.10		
Queue Length 95th (ft)	57	0	0	0		
Control Delay (s)	12.5	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	7.6		0.0			
Approach LOS						
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			74.9%	ICU Level of Service		D
Analysis Period (min)			15			

HCM 6th TWSC
3: Main St & EB I-80 Off Ramp

08/08/2022

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	53	692	0	515	483	0
Future Vol, veh/h	53	692	0	515	483	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	0	255	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	16	16	16	16	16	16
Mvmt Flow	56	736	0	548	514	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1062	-	-	0	-	0
Stage 1	514	-	-	-	-	-
Stage 2	548	-	-	-	-	-
Critical Hdwy	6.56	-	-	-	-	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	-	-	-	-	-
Pot Cap-1 Maneuver	233	0	0	-	-	0
Stage 1	573	0	0	-	-	0
Stage 2	552	0	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	233	-	-	-	-	-
Mov Cap-2 Maneuver	233	-	-	-	-	-
Stage 1	573	-	-	-	-	-
Stage 2	552	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	25.3	0		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT		
Capacity (veh/h)	-	233	-	-		
HCM Lane V/C Ratio	-	0.242	-	-		
HCM Control Delay (s)	-	25.3	0	-		
HCM Lane LOS	-	D	A	-		
HCM 95th %tile Q(veh)	-	0.9	-	-		

HCM Unsignalized Intersection Capacity Analysis

4: I-80 EB On-Ramp & Main St

08/08/2022

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	515	162	137	1084
Future Volume (Veh/h)	0	0	515	162	137	1084
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	0	548	172	146	1153
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			421			
pX, platoon unblocked	0.86	0.86			0.86	
vC, conflicting volume	1993	548			720	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2075	390			590	
tC, single (s)	6.6	6.4			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.3	
p0 queue free %	100	100			81	
cM capacity (veh/h)	38	539			789	
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	548	172	146	1153		
Volume Left	0	0	146	0		
Volume Right	0	172	0	0		
cSH	1700	1700	789	1700		
Volume to Capacity	0.32	0.10	0.19	0.68		
Queue Length 95th (ft)	0	0	17	0		
Control Delay (s)	0.0	0.0	10.6	0.0		
Lane LOS			B			
Approach Delay (s)	0.0		1.2			
Approach LOS						
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			60.4%	ICU Level of Service		B
Analysis Period (min)			15			

HCM 6th Signalized Intersection Summary

5: Main St & Pilot Rd/Logan Ln

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩	↩	↩		↩	↩		↩	↩	↩
Traffic Volume (veh/h)	177	0	81	54	2	59	41	449	27	25	881	177
Future Volume (veh/h)	177	0	81	54	2	59	41	449	27	25	881	177
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678	1678
Adj Flow Rate, veh/h	188	0	86	57	2	0	44	478	29	27	937	188
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	15	15	15	15	15	15	15	15	15	15	15	15
Cap, veh/h	214	0	190	72	76		54	939	57	39	991	839
Arrive On Green	0.13	0.00	0.13	0.05	0.05	0.00	0.03	0.60	0.60	0.02	0.59	0.59
Sat Flow, veh/h	1598	0	1422	1598	1678	0	1598	1566	95	1598	1678	1422
Grp Volume(v), veh/h	188	0	86	57	2	0	44	0	507	27	937	188
Grp Sat Flow(s), veh/h/ln	1598	0	1422	1598	1678	0	1598	0	1661	1598	1678	1422
Q Serve(g_s), s	14.1	0.0	6.8	4.3	0.1	0.0	3.3	0.0	21.5	2.0	63.3	7.6
Cycle Q Clear(g_c), s	14.1	0.0	6.8	4.3	0.1	0.0	3.3	0.0	21.5	2.0	63.3	7.6
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	214	0	190	72	76		54	0	996	39	991	839
V/C Ratio(X)	0.88	0.00	0.45	0.79	0.03		0.81	0.00	0.51	0.69	0.95	0.22
Avail Cap(c_a), veh/h	235	0	210	235	247		65	0	1060	92	1099	931
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	0.0	48.8	57.7	55.7	0.0	58.6	0.0	14.1	59.1	23.2	11.8
Incr Delay (d2), s/veh	27.6	0.0	1.7	17.0	0.1	0.0	45.5	0.0	0.4	19.2	15.1	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	7.3	0.0	2.5	2.1	0.1	0.0	2.0	0.0	7.7	1.0	27.1	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	79.6	0.0	50.4	74.7	55.9	0.0	104.1	0.0	14.5	78.3	38.3	11.9
LnGrp LOS	E	A	D	E	E		F	A	B	E	D	B
Approach Vol, veh/h	274			59			551			1152		
Approach Delay, s/veh	70.4			74.1			21.6			34.9		
Approach LOS	E			E			C			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	79.3		22.4	10.1	78.1		11.5				
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	78.0			18.0	5.0	80.0		18.0				
Max Q Clear Time (g_c+I), s	23.5			16.1	5.3	65.3		6.3				
Green Ext Time (p_c), s	0.0	3.7		0.3	0.0	6.8		0.1				

Intersection Summary

HCM 6th Ctrl Delay 37.2

HCM 6th LOS D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

6: Red Hawk Ranch Backbone/ Truckee Ln & Main St

08/08/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	950	82	131	554	51	53	5	86	58	2	27
Future Volume (veh/h)	35	950	82	131	554	51	53	5	86	58	2	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	36	990	85	136	577	53	55	5	90	60	2	28
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	458	1060	898	240	999	92	244	11	192	185	14	189
Arrive On Green	0.03	0.58	0.58	0.06	0.61	0.61	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1739	1826	1547	1739	1647	151	1347	82	1478	1270	104	1459
Grp Volume(v), veh/h	36	990	85	136	0	630	55	0	95	60	0	30
Grp Sat Flow(s),veh/h/ln	1739	1826	1547	1739	0	1799	1347	0	1560	1270	0	1563
Q Serve(g_s), s	0.6	39.0	1.9	2.4	0.0	16.7	3.0	0.0	4.4	3.6	0.0	1.3
Cycle Q Clear(g_c), s	0.6	39.0	1.9	2.4	0.0	16.7	4.3	0.0	4.4	8.0	0.0	1.3
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.95	1.00		0.93
Lane Grp Cap(c), veh/h	458	1060	898	240	0	1090	244	0	202	185	0	203
V/C Ratio(X)	0.08	0.93	0.09	0.57	0.00	0.58	0.23	0.00	0.47	0.32	0.00	0.15
Avail Cap(c_a), veh/h	509	1140	966	245	0	1123	378	0	358	311	0	359
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.4	15.1	7.3	17.7	0.0	9.4	32.2	0.0	31.6	35.4	0.0	30.3
Incr Delay (d2), s/veh	0.1	13.2	0.0	2.9	0.0	0.7	0.5	0.0	1.7	1.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	17.0	0.6	1.5	0.0	5.5	1.0	0.0	1.7	1.1	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.4	28.3	7.4	20.6	0.0	10.1	32.7	0.0	33.3	36.4	0.0	30.6
LnGrp LOS	A	C	A	C	A	B	C	A	C	D	A	C
Approach Vol, veh/h	1111					766		150		90		
Approach Delay, s/veh	26.0					11.9		33.1		34.5		
Approach LOS	C					B		C		C		
Timer - Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	16.2		10.7		51.6		16.2		8.7		53.6	
Change Period (Y+Rc), s	6.0		6.0		6.0		6.0		6.0		6.0	
Max Green Setting (Gmax), s	18.0		5.0		49.0		18.0		5.0		49.0	
Max Q Clear Time (g_c+I1), s	6.4		4.4		41.0		10.0		2.6		18.7	
Green Ext Time (p_c), s	0.5		0.0		4.6		0.1		0.0		4.6	
Intersection Summary												
HCM 6th Ctrl Delay			21.8									
HCM 6th LOS			C									

Intersection						
Int Delay, s/veh	3.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	920	188	81	679	80	52
Future Vol, veh/h	920	188	81	679	80	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	948	194	84	700	82	54
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	1142	0	1913	1045
Stage 1	-	-	-	-	1045	-
Stage 2	-	-	-	-	868	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	601	-	~ 73	274
Stage 1	-	-	-	-	334	-
Stage 2	-	-	-	-	406	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	601	-	~ 63	274
Mov Cap-2 Maneuver	-	-	-	-	185	-
Stage 1	-	-	-	-	334	-
Stage 2	-	-	-	-	349	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	1.3		48.2		
HCM LOS	E					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	212	-	-	601	-	
HCM Lane V/C Ratio	0.642	-	-	0.139	-	
HCM Control Delay (s)	48.2	-	-	12	-	
HCM Lane LOS	E	-	-	B	-	
HCM 95th %tile Q(veh)	3.8	-	-	0.5	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th Signalized Intersection Summary 8: US95A & Main St

08/08/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	621	349	241	480	1	281	0	180	6	2	2
Future Volume (veh/h)	1	621	349	241	480	1	281	0	180	6	2	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	1	654	367	254	505	1	296	0	189	6	2	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	62	575	323	234	1136	2	305	0	317	117	38	28
Arrive On Green	0.04	0.53	0.53	0.14	0.63	0.63	0.21	0.00	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1725	1089	611	1725	1807	4	1367	0	1531	364	186	137
Grp Volume(v), veh/h	1	0	1021	254	0	506	296	0	189	10	0	0
Grp Sat Flow(s),veh/h/ln	1725	0	1700	1725	0	1810	1367	0	1531	687	0	0
Q Serve(g_s), s	0.1	0.0	74.0	19.0	0.0	20.2	13.3	0.0	15.6	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	74.0	19.0	0.0	20.2	29.0	0.0	15.6	15.7	0.0	0.0
Prop In Lane	1.00		0.36	1.00		0.00	1.00		1.00	0.60		0.20
Lane Grp Cap(c), veh/h	62	0	898	234	0	1138	305	0	317	183	0	0
V/C Ratio(X)	0.02	0.00	1.14	1.09	0.00	0.44	0.97	0.00	0.60	0.05	0.00	0.00
Avail Cap(c_a), veh/h	62	0	898	234	0	1138	305	0	317	183	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	65.1	0.0	33.0	60.5	0.0	13.4	58.2	0.0	50.2	45.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	75.0	83.3	0.0	1.3	43.1	0.0	3.0	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	47.7	13.7	0.0	8.4	14.3	0.0	6.3	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.2	0.0	108.0	143.8	0.0	14.7	101.3	0.0	53.2	45.1	0.0	0.0
LnGrp LOS	E	A	F	F	A	B	F	A	D	D	A	A
Approach Vol, veh/h		1022			760			485			10	
Approach Delay, s/veh		108.0			57.8			82.6			45.1	
Approach LOS		F			E			F			D	
Timer - Assigned Phs		2	3	4	6		7	8				
Phs Duration (G+Y+Rc), s		35.0	25.0	80.0	35.0		11.0	94.0				
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0		6.0	6.0				
Max Green Setting (Gmax), s		29.0	19.0	74.0	29.0		5.0	88.0				
Max Q Clear Time (g_c+I1), s		31.0	21.0	76.0	17.7		2.1	22.2				
Green Ext Time (p_c), s		0.0	0.0	0.0	0.0		0.0	3.6				
Intersection Summary												
HCM 6th Ctrl Delay			85.6									
HCM 6th LOS			F									

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	69	0	0	6	0	4	0	33	1	12	103	92
Future Vol, veh/h	69	0	0	6	0	4	0	33	1	12	103	92
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	75	0	0	7	0	4	0	36	1	13	112	100
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	227	225	162	225	275	37	212	0	0	37	0	0
Stage 1	188	188	-	37	37	-	-	-	-	-	-	-
Stage 2	39	37	-	188	238	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	728	674	883	730	632	1035	1358	-	-	1574	-	-
Stage 1	814	745	-	978	864	-	-	-	-	-	-	-
Stage 2	976	864	-	814	708	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	720	668	883	725	626	1035	1358	-	-	1574	-	-
Mov Cap-2 Maneuver	720	668	-	725	626	-	-	-	-	-	-	-
Stage 1	814	738	-	978	864	-	-	-	-	-	-	-
Stage 2	972	864	-	807	702	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	10.6		9.4			0			0.4			
HCM LOS	B		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1358	-	-	720	824	1574	-	-				
HCM Lane V/C Ratio	-	-	-	0.104	0.013	0.008	-	-				
HCM Control Delay (s)	0	-	-	10.6	9.4	7.3	0	-				
HCM Lane LOS	A	-	-	B	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-				

Intersection

Int Delay, s/veh 3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	553	61	34	638	121	69
Future Vol, veh/h	553	61	34	638	121	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	225	0	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	628	69	39	725	138	78

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	697
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.19
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.281
Pot Cap-1 Maneuver	-	-	867
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	867
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	25.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	270	470	-	-	867	-
HCM Lane V/C Ratio	0.509	0.167	-	-	0.045	-
HCM Control Delay (s)	31.4	14.2	-	-	9.3	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	2.7	0.6	-	-	0.1	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	2.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Vol, veh/h	920	188	81	679	80	52
Future Vol, veh/h	920	188	81	679	80	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	225	0	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	948	194	84	700	82	54
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1142	0	1816	948
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	868	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	601	-	84	312
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	406	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	601	-	~ 72	312
Mov Cap-2 Maneuver	-	-	-	-	197	-
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	349	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		1.3		29.1	
HCM LOS	D					
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	197	312	-	-	601	-
HCM Lane V/C Ratio	0.419	0.172	-	-	0.139	-
HCM Control Delay (s)	35.8	18.9	-	-	12	-
HCM Lane LOS	E	C	-	-	B	-
HCM 95th %tile Q(veh)	1.9	0.6	-	-	0.5	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th Signalized Intersection Summary 6: Red Hawk Ranch Backbone/ Truckee Ln & Main St

08/08/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	451	24	50	674	25	201	3	118	28	3	9
Future Volume (veh/h)	10	451	24	50	674	25	201	3	118	28	3	9
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1752	1752	1752	1752	1870	1752	1870	1752	1870	1870	1870
Adj Flow Rate, veh/h	11	531	28	59	793	27	236	3	139	30	3	10
Peak Hour Factor	0.92	0.85	0.85	0.85	0.85	0.92	0.85	0.92	0.85	0.92	0.92	0.92
Percent Heavy Veh, %	2	10	10	10	10	2	10	2	10	2	2	2
Cap, veh/h	192	860	729	393	884	30	372	7	333	270	81	271
Arrive On Green	0.01	0.49	0.49	0.05	0.53	0.53	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1781	1752	1485	1668	1684	57	1312	34	1557	1246	379	1264
Grp Volume(v), veh/h	11	531	28	59	0	820	236	0	142	30	0	13
Grp Sat Flow(s),veh/h/ln	1781	1752	1485	1668	0	1741	1312	0	1590	1246	0	1643
Q Serve(g_s), s	0.2	16.1	0.7	1.2	0.0	30.8	12.7	0.0	5.6	1.6	0.0	0.5
Cycle Q Clear(g_c), s	0.2	16.1	0.7	1.2	0.0	30.8	13.1	0.0	5.6	7.2	0.0	0.5
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.98	1.00		0.77
Lane Grp Cap(c), veh/h	192	860	729	393	0	914	372	0	341	270	0	352
V/C Ratio(X)	0.06	0.62	0.04	0.15	0.00	0.90	0.64	0.00	0.42	0.11	0.00	0.04
Avail Cap(c_a), veh/h	289	1178	999	428	0	1171	415	0	393	311	0	406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.6	13.5	9.6	10.0	0.0	15.5	27.9	0.0	24.7	27.8	0.0	22.7
Incr Delay (d2), s/veh	0.1	0.7	0.0	0.2	0.0	7.8	2.7	0.0	0.8	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	5.6	0.2	0.4	0.0	12.0	4.1	0.0	2.1	0.5	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.7	14.3	9.6	10.1	0.0	23.3	30.6	0.0	25.5	28.0	0.0	22.7
LnGrp LOS	B	B	A	B	A	C	C	A	C	C	A	C
Approach Vol, veh/h	570			879			378			43		
Approach Delay, s/veh	14.1			22.4			28.7			26.4		
Approach LOS	B			C			C			C		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	21.6		9.5	41.8		21.6	7.0	44.2				
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0	6.0	6.0				
Max Green Setting (Gmax), s	18.0		5.0	49.0		18.0	5.0	49.0				
Max Q Clear Time (g_c+I1), s	15.1		3.2	18.1		9.2	2.2	32.8				
Green Ext Time (p_c), s	0.5		0.0	3.8		0.1	0.0	5.5				
Intersection Summary												
HCM 6th Ctrl Delay			21.2									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary

6: Red Hawk Ranch Backbone/ Truckee Ln & Main St

08/08/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	950	82	131	554	51	133	5	86	58	2	27
Future Volume (veh/h)	35	950	82	131	554	51	133	5	86	58	2	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	36	990	85	136	577	53	139	5	90	60	2	28
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	444	1047	887	225	984	90	264	12	218	205	15	215
Arrive On Green	0.03	0.57	0.57	0.06	0.60	0.60	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	1739	1826	1547	1739	1647	151	1347	82	1478	1270	104	1459
Grp Volume(v), veh/h	36	990	85	136	0	630	139	0	95	60	0	30
Grp Sat Flow(s),veh/h/ln	1739	1826	1547	1739	0	1799	1347	0	1560	1270	0	1563
Q Serve(g_s), s	0.7	41.2	2.0	2.5	0.0	17.7	8.2	0.0	4.5	3.7	0.0	1.4
Cycle Q Clear(g_c), s	0.7	41.2	2.0	2.5	0.0	17.7	9.5	0.0	4.5	8.2	0.0	1.4
Prop In Lane	1.00		1.00	1.00		0.08	1.00		0.95	1.00		0.93
Lane Grp Cap(c), veh/h	444	1047	887	225	0	1075	264	0	230	205	0	230
V/C Ratio(X)	0.08	0.95	0.10	0.60	0.00	0.59	0.53	0.00	0.41	0.29	0.00	0.13
Avail Cap(c_a), veh/h	491	1098	930	230	0	1082	363	0	345	299	0	345
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.0	16.2	7.9	18.7	0.0	10.2	34.3	0.0	31.5	35.3	0.0	30.2
Incr Delay (d2), s/veh	0.1	15.5	0.0	4.3	0.0	0.8	1.6	0.0	1.2	0.8	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	18.7	0.6	1.6	0.0	6.1	2.7	0.0	1.7	1.2	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.1	31.7	7.9	23.0	0.0	11.0	36.0	0.0	32.7	36.0	0.0	30.5
LnGrp LOS	A	C	A	C	A	B	D	A	C	D	A	C
Approach Vol, veh/h	1111				766				234			
Approach Delay, s/veh	29.1				13.1				34.7			
Approach LOS	C				B				C			
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	18.0		10.8	52.7		18.0		8.8	54.7			
Change Period (Y+Rc), s	6.0		6.0	6.0		6.0		6.0	6.0			
Max Green Setting (Gmax), s	18.0		5.0	49.0		18.0		5.0	49.0			
Max Q Clear Time (g_c+I1), s	11.5		4.5	43.2		10.2		2.7	19.7			
Green Ext Time (p_c), s	0.5		0.0	3.5		0.1		0.0	4.6			
Intersection Summary												
HCM 6th Ctrl Delay	24.3											
HCM 6th LOS	C											

PRELIMINARY DRAINAGE REPORT

FOR THE

DUETS AT RED HAWK RANCH TENTATIVE SUBDIVISION MAP

FERNLEY, NEVADA

Prepared for:

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WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME

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APPENDICES

APPENDIX A – EXHIBITS

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APPENDIX C – PRELIMINARY SITE SOILS DATA

APPENDIX D – HYDROLOGIC & HYDRAULIC CALCULATIONS



1 INTRODUCTION

This report describes existing drainage conditions and provides preliminary estimates of storm water runoff and facility sizing for the conceptual design of the infrastructure at the Duets at Red Hawk Ranch subdivision in Fernley, Nevada. The report has been prepared in support of the tentative subdivision map for the project, which will consist of 282 single-family attached residences (i.e., 141 duplexes) with associated streets, curb, gutter, sidewalk, and utilities.

The preliminary analyses presented in this report will provide the foundation for subsequent detailed analyses pursuant to Chapter 10 of the *City of Fernley Department of Public Works Design Standards*, dated May 2008 (*Design Standards*). The following sections summarize the design criteria, flow analysis, and preliminary design of facilities proposed to manage runoff generated within the project boundary. Supporting exhibits, data, and calculations are included in the appendices to this report.

The project site is not currently served by a City storm drain system, so storm water runoff from the project will be collected by lot-line swales, curb and gutter, and catch basins for routing to either temporary retention ponds or to permanent ponds within the adjacent flood control channel, depending on the timing of construction for the proposed Duets development and the adjacent Red Hawk Ranch subdivision. Ultimately, with development of the adjacent Red Hawk Ranch subdivision and granting of easements by the adjacent developer, storm water from the Duets at Red Hawk Ranch will be discharged into retention ponds constructed within the flood control channel. The ponds will set below the base of the channel and sized to provide storage capacity for the entire volume of anticipated post-development runoff from both developments for the 100-year, 24-hour storm event.

1.1 PROJECT LOCATION

The site is located at the former Jackson Ranch on West Main Street and is identified as Parcel 2 of Parcel Map 373825; a street address has not been assigned to the property. The site is bounded by West Main Street to the north, Miller Lane to the east, undeveloped former agricultural land and Stock Lane to the west, and Quail Run Road and the Miller Estates subdivision to the south. The undeveloped ranch area adjoining the project's western boundary are planned to be residential and commercial properties, and the area adjoining the southwest project boundary is proposed to be developed into a local park. According to the Public Land Survey System, the site is situated within the east half of the northwest quarter of Section 14, Township 20 North, Range 24 East, Mount Diablo Meridian (E1/2, NW1/4, Sec. 14, T.20 N., R.24 E., M.D.M.). The centroid of the site is approximately located at latitude 39.6043°N and longitude -119.2572°W.

1.2 PROJECT DESCRIPTION

The Duets at Red Hawk Ranch subdivision will be located on an undeveloped parcel off Miller Lane in northwest Fernley, Nevada, as shown on the Vicinity Map enclosed in Appendix A. The parcel, identified by Lyon County as Assessor Parcel Number (APN) 021-041-09 comprises of 31.15 acres of former crop land. The overall site layout with streets and lots overlaid on a current aerial photograph is shown on the



exhibit, "Aerial Map / Site Plan Map," enclosed in Appendix A. A request to re-zone the property accompanies the tentative subdivision map application to accommodate the proposed development; a copy of the proposed zoning map of the project parcel and surrounding area is included in Appendix A.

1.3 SITE TOPOGRAPHY AND VEGETATION

The 31.15-acre project area is currently undeveloped with remnants of a former agricultural operation, including irrigation head gates, delivery ditches, and dirt roads throughout the property and its perimeter. The irrigation ditches, head gates, and culverts are overgrown and in disrepair and do not currently provide irrigation water to the site. The site is relatively flat and the existing ground generally slopes from south to north at an average slope of approximately 0.66 percent. The maximum elevation at the southern boundary is approximately 4167 feet and the minimum elevation at the northern boundary, sitting below Main Street, is 4153.5 feet.

Native vegetation includes sparse desert grasses and a few scattered small trees, with grass the predominant vegetation.

1.4 SITE SOILS

A preliminary evaluation of site soils was completed using the on-line Web Soil Survey tool through the USDA's Natural Resources Conservation Service, which draws site-specific information from federal databases, including the Lyon County Soil Survey, for the area delineated. A copy of the soils map and a summary table of engineering properties are provided in Appendix C. Site soils are comprised of the Apian, Fernley, and Juva units, which are classified primarily as a sandy loam near surface underlain by coarse to gravelly sands. In general, site soils are well-draining, have a low plasticity index ($PI < 5$), and are suitable for residential and local street construction. Bedrock and ground water are not expected to be encountered during construction. These properties and conditions will be evaluated by a geotechnical field investigation and laboratory testing during the final design phase of the project.

A geotechnical site investigation was performed in July 2005 by Black Eagle Consulting for the prior Jackson Ranch final subdivision map (Black Eagle, 2005), which covered the four parcels into which the former ranch was split. The investigation evaluated soil, bedrock, and ground water conditions and provided design recommendations for site development. Field work included exploration of subsurface conditions with 10 test pits extended to approximately 11 feet below ground surface (bgs) to evaluate the soil horizon and ground water conditions. Soils were classified in the field and representative bulk samples were obtained for laboratory index testing. Laboratory testing included in-situ moisture content, soil classification, grain size distribution, Atterberg Limits, R-values, and chemical testing for corrosion potential. In general, near-surface soils consist of granular soils, primarily comprised of poorly-graded sands with gravel contents of less than 20 percent. Ground water was not encountered in any test pit. A copy of the final report is not available.

A Holocene fault trace traverses the adjacent parcels in a north-south direction. Presence of the fault was confirmed by Black Eagle with trenching, and its location was established by field survey. The proposed flood control channel will be located over the fault, as a minimum 50-foot separation from the fault to structures is required. The fault and flood channel do not impact the proposed Duets at Red Hawk Ranch subdivision.

Because retention ponds are proposed for storm water management and infiltration, percolation tests will be performed at depth in the proposed pond locations during detailed design to verify adequate soil infiltration rates. Percolation tests were not performed with the previous geotechnical investigation, but will be provided at the time of final design for both developments.

1.5 FLOOD HAZARD INFORMATION

According to Flood Insurance Rate Map (FIRM) Panel 32019C0082E, effective January 16, 2009, prepared by the Federal Emergency Management Agency (FEMA, 2009), the project parcel is located within an “Unshaded X” Flood Zone, which indicates an area of minimal flood hazard. Large portions of the adjacent parcels are within a “Shaded AE” Flood Zone, which indicates a one percent annual chance of flooding. The neighboring developer intends to collect, channelize, and route flood flows through its Red Hawk Ranch subdivision within a flood control channel. An excerpt of the FIRM panel (“FIRMette”) for the area is included in Appendix A.

1.6 PRIOR DRAINAGE STUDIES

The project parcels were previously considered for development in 2005 as the Jackson Ranch subdivision, which was proposed as a 681-lot residential subdivision for which final design was largely completed but not permitted or constructed. A full preliminary drainage analysis of the project parcels was performed at that time to determine the estimated flows in the post-development condition. A water surface profile for flood conditions was modeled using WSPRO software to determine minimum dimensions for the proposed on-site flood control channel. Because the lot and street configurations are substantially different in the current designs for both the proposed Duets at Red Hawk Ranch and the adjacent tentative subdivision map, the prior report is not referenced herein for facility design.

A preliminary drainage study was prepared by Wood Rodgers, Inc. (Wood Rodgers, 2021) for Phase 1 of the Red Hawk Ranch subdivision and it includes preliminary estimates of post-development storm volumes to be managed by its drainage facilities and retention ponds.

1.7 REGULATORY PERSPECTIVE

The project site is located within the City of Fernley jurisdiction. The drainage facilities will be dedicated to the City of Fernley and, once constructed to City standards and adopted into the City’s system, the on-site drainage facilities will be publicly owned and maintained.

2 HYDROLOGIC METHODOLOGY, CRITERIA, AND DESIGN

The preliminary hydrologic analysis for the Duets at Red Hawk Ranch subdivision consists of peak runoff flow and volumetric computations for proposed conditions in accordance with City of Fernley Municipal Code and the City of Fernley Department of Public Works Design Standards (May 2008).

For this preliminary analysis peak flows were developed for storm drain design using the 5-, 25-, and 100-year, 6-hour design storms, and the 100-year, 24-hour storm event was used to approximate the minimum storage volume required for each pond.

The Rational Method was used to compute peak runoff flow rates for proposed site conditions for the 25-year, 6-hour design storm. The Rational Method requires only the area of the basin or watershed, the rainfall intensity corresponding to the time of concentration, and the Rational Runoff Coefficient correlating to the anticipated land use. Peak runoff flows are determined using the following equation:

$$Q = ciA$$

Where:

Q = peak runoff in cubic feet per second (cfs).

c = Rational runoff coefficient (dimensionless)

i = rainfall intensity for design storm (inches/hr)

A = area of the basin (acres)

Rational Method runoff coefficients were taken from Table 701, Runoff Coefficient Table in the Truckee Meadows Regional Drainage Manual (TMRDM) for post-development conditions. Table 701 was used rather than the table in Chapter 10 of the Design Standards because it gives coefficients for the 5- and 100-year storm events and a value for the 25-year storm event can be approximated by linear interpolation. The runoff coefficient for multi-unit residential areas with 1/8-acre lots or smaller is 0.60 for the 5-year storm event, 0.78 for the 100-year event, and interpolated at 0.64 for the 25-year event. A copy of the Rational Runoff Coefficient Table is included in Appendix B.

The time of concentration (t_c) is defined as the time required for water to flow from the hydraulically most distant part of the drainage area to the point of consideration. Usually, the point of consideration is the discharge point of the hydrologic basin or sub-basin. Time of concentration is used in the Rational Method to determine the corresponding rainfall intensity for calculation of the peak runoff rate of a given storm event for the basin or sub-basin. The final time of concentration is the greater of the calculated t_c (equations not shown) or 10 minutes, per Section 10.3.2.1 of Chapter 10 in the Design Standards. Because the subdivision is small, swale and curb lengths are relatively short, and a shorter time of concentration results in higher intensity and higher flow rates, for a conservative preliminary analysis the time of concentration and, therefore, time to peak storm intensity is assumed to be 10 minutes.

For the design of retention ponds, the Natural Resources Conservation Service (formerly SCS) unit hydrograph method was used to determine total runoff volumes for proposed conditions. The SCS method requires a curve number (CN) and accumulated rainfall depth for each basin. The equations for the SCS method are:

$$V = A \cdot (q_d / (12 \text{ in. / ft.}))$$

$$q_d = (P - 0.2S)^2 / (P - 0.8S)$$

$$S = \left(\frac{1000}{CN} \right) - 10$$

Where:

V = Storm volume (cubic feet)

A = Area of the basin (square feet)

q_d = Excess rainfall depth (inches)

P = Accumulated rainfall depth (inches)

S = Currently-available soil moisture storage deficit (inches)

CN = Curve number (dimensionless)

For preliminary storm drain design, the analysis used the prescribed 25-year storm return frequency with a 6-hour duration. The minimum storage volume for on-site retention basins was estimated from the 100-year, 24-hour storm event using the SCS method (above).

3 HYDROLOGIC ANALYSIS

The hydrologic analyses for post-development conditions consist of peak discharge computations using the Rational Method and volumetric runoff calculations using the SCS unit hydrograph method, as described above.

3.1 DESIGN RAINFALL DATA

Precipitation intensity and depth estimates were taken from the Point Precipitation Frequency Data Server website for Atlas 14, Volume 1, Version 5, which is maintained by the National Oceanic and Atmospheric Administration (NOAA). The Point Precipitation Frequency Data Server provides site-specific rainfall data based on latitude and longitude. The latitude and longitude used to obtain storm intensities and depths for the design storms were 39.6043° North and -119.2572° West, respectively. The resulting tables with precipitation intensities and depths for various storm durations and return intervals are included in Appendix B of this report.

3.2 CURVE NUMBER

The Runoff Curve Number (CN) for each hydrologic sub-basin is determined by overlaying land use information, vegetation type and coverage or surface material, and soil data available for the basin. Soil types are rated from A to D with correspondingly higher curve number values for higher runoff potential. Based on the preliminary soils data included in Appendix C, the hydrologic soil group is estimated to be

“B” for a sandy loam. The resulting curve numbers are 85 for 1/8-acre or smaller residential lots and 98 for paved areas. The SCS table for runoff curve numbers in urban areas is included in Appendix B.

4 EXISTING HYDROLOGIC CONDITIONS

Historically, the site drains from south to north in a sheet flow manner, consistent with flood irrigation of crops. Drainage ultimately ponds in a low point below West Main Street, which sits higher than the project parcel. A small residential subdivision to the south between the site and the Truckee Canal drains to the site as shallow sheet flow in regular storm events.

5 PROPOSED DRAINAGE SYSTEM

The proposed drainage system will consist of lot line swales and curb and gutter to collect and convey runoff produced from roofs, driveways, yards, and subdivision streets. A layout of the proposed storm drain is depicted in the exhibit, “Preliminary Storm Drain System,” enclosed in Appendix A.

Depending on the timing of the proposed project and the adjacent development, site runoff will be conveyed to either temporary or permanent storm water retention ponds. Permanent storage ponds will be installed as a series of retention ponds below the base of the proposed flood control channel in the adjacent development. If construction of the Duets at Red Hawk Ranch project precedes Phase 1 of the Red Hawk Ranch subdivision, two temporary retention ponds will be constructed to manage the north and south phases of the project until the storm drain system can be extended to the proposed flood control channel.

5.1 PROPOSED HYDROLOGIC BASINS

The proposed development was divided into three hydrologic basins based on discharge location; these were further subdivided into a total of 28 sub-basins for future analysis of gutter spread and catch basin inlet design. The total runoff volume for the 25-year, 6-hour, 100-year, 6-hour, and the 100-year, 24-hour storm events and the peak discharge for the 5-, 25-, and 100-year, 6-hour storms were calculated. A brief description of each hydrologic basin is provided below. The boundaries of the post-development hydrologic basins are depicted in the “Hydrologic Basins / Land Use” exhibit included in Appendix A.

- Basins 1-A through 1-M drain the entirety of north half (Phase 1) of the project, which consists of streets and lots north of the central east-west backbone road. Runoff from these areas is collected by catch basins installed at intersections with the north street, and routed to the temporary northwest retention pond or, ultimately, to pond(s) located in the base of the future flood control channel.
- Basins 2-A through 2-N drain the south half (Phase 2) of the project, which consists of streets and lots south of the central east-west backbone road. Runoff from these areas is collected by catch basins installed at intersections of the east-west street along the north boundary of Phase 2, and routed to the temporary retention pond adjacent to the backbone road or, ultimately, to pond(s) located in the base of the future flood control channel.



- Basin 3-A drains the southwest portion of the backbone road to a catch basin at the intersection with the park access road, which routes flows to the pond(s) managing Phase 2 runoff. Other areas of the backbone road will be managed by drainage facilities installed for the adjacent Red Hawk Ranch development.

The post-development grading around the project perimeter shows the site is lower than the surrounding properties, which allows for all on-site drainage to be collected by the proposed drainage system and retained on-site. The potential for storm water run-on and run-off along Miller Lane will be evaluated in depth during detailed design.

5.2 PROPOSED STORM DRAIN SYSTEM

The proposed storm drain system will consist of drainage channels and ditches, lot line swales, curb and gutter, catch basins, drop inlets, and yard drains to collect and convey runoff to the retention ponds. Catch basin laterals will be 10-inch-diameter PVC SDR35 pipe and storm drain mains will be a minimum 12-inch-diameter PVC SDR35 pipe. Runoff from house and garage roofs will be collected by roof gutters and discharged via downspouts to lot line swales, which will discharge into the gutter pan fronting the lot.

If permitting and construction of the Storm water retention for the Duets project will be provided by a temporary pond at the north boundary of the site (Phase 1) and a temporary pond south of the backbone road at the north limits of Phase 2.

The largest storm water retention pond (north) will be 6.0 feet deep and provide a storage capacity of 475,330 cubic feet. It will be constructed with 3:1 (horizontal to vertical) sideslopes and a 10-foot wide access road along either side of the proposed flood control channel and retention ponds. Ramps will be designed to provide maintenance access into the channel and storage ponds. Portions of the proposed channel will sit above the existing ground elevations, therefore berms will be utilized to provide adequate depth and freeboard for the channel.

5.3 WATER QUALITY CONTROLS

The retention basins will settle sediment or pollutants transported by storm water runoff. Water quality controls that will be utilized during construction of subdivision improvements will include fiber rolls on the exterior boundary of the grading, construction entrances, and any additional best management practices presented in the approved Erosion Control Plan during final design.

5.4 RESULTS OF DRAINAGE ANALYSES

Peak flow rates calculated for each hydrologic sub-area in post-development conditions are summarized in the table presented in Appendix D. The estimated peak discharge collected and routed to the retention pond for each overall hydrologic basin in the 25-year, 6-hour storm event is as follows:

$$Q_1 = (0.64)(0.208 \text{ in/hr})(14.78 \text{ ac}) = 1.96 \text{ cfs}$$

$$Q_2 = (0.64)(0.208 \text{ in/hr})(12.53 \text{ ac}) = 1.66 \text{ cfs}$$

$$Q_3 = (0.64)(0.208 \text{ in/hr})(0.68 \text{ ac}) = 0.09 \text{ cfs}$$



The largest combined peak flow occurs in hydrologic basin 1. Though the time to peak for the hydrograph in each sub-basin will not coincide, we can conservatively estimate the peak discharge to be 1.96 cfs for the design storm. Hydraulic calculations were performed using the computer software FlowMaster® V8i by Bentley Systems (Watertown, CT) to determine flow characteristics for this discharge. Assuming a 0.5 percent flowline slope for a 12-inch diameter PVC SDR35 storm drain, the flow depth will be 7.5 inches (0.62 feet) and velocity 3.8 feet per second (fps). The detailed calculations are provided in Appendix D.

The results of post-development volumetric analyses by the SCS method as described above are presented in a summary table enclosed in Appendix D. The analyses indicate a 25-year, 6-hour storm event will generate approximately 16,730 cubic feet of runoff in Phase 1 (basin 1) and 14,690 cubic feet of runoff in Phase 2 (basin 2), whereas an estimated 58,940 cubic feet will be generated for the 100-year, 24-hour design storm in Phase 1 and 50,680 cubic feet of runoff will be generated in Phase 2 for the same storm event.

5.5 RETENTION REQUIREMENTS

The adjacent Red Hawk Ranch development proposes to utilize a stepped retention pond system located within the proposed flood control channel to temporarily store runoff until it percolates into the underlying soil. The ponds will be constructed in series, with downstream ponds providing storage for runoff volume exceeding upstream ponds. The overall system will be sized to cumulatively store the full runoff volume of the 100-year, 24-hour storm event in both projects. Agreements have been made in principal and are being negotiated to provide easements and allowing the storm drain system from the Duets at Red Hawk Ranch to be extended. Preliminary volume calculations for the Duets project are provided in Appendix D; if necessary to provide temporary storage before the adjacent Red Hawk Ranch is developed, the temporary ponds will be sized to store the anticipated volume from each phase.

During detailed design of all phases of both projects, the storm drains discharging into the retention pond system will be analyzed to ensure the storage capacity exceeds the estimated runoff volumes. Detailed design will also analyze storm drain pipes to ensure they will not back up into the street and will continue to flow under pressure.

6 SPECIAL FLOOD HAZARDS

As noted above, the project parcel is located within an “Unshaded X” Flood Zone, which indicates an area of minimal flood hazard.

6.1 IMPACTS OF PROPOSED DEVELOPMENT ON FLOOD HAZARD AREA

On a broad scale, the project is within a closed hydrologic basin and, theoretically, storm water runoff discharged from site will ultimately drain to the Fernley Reservoir Number 1 / Fernley Wildlife Management Area. The proposed retention pond system incorporated within the adjacent flood control channel will be constructed below the channel bottom so flow capacity of the channel is not impacted.

6.2 FEMA AND LOCAL CODE COMPLIANCE

Development of the Duets at Red Hawk Ranch subdivision will be compliant with all federal and local code requirements.

7 CONCLUSIONS

The proposed Duets at Red Hawk Ranch subdivision will be designed to collect, convey, and retain storm flows generated on-site. Increases in runoff from relatively impervious surfaces following site development will be temporarily stored in the proposed retention ponds, where it will infiltrate into the underlying soil. Storm water quality measures will be installed during construction to reduce probability of sediment being carried off-site by storm runoff. No negative downstream impacts are anticipated from the development of the project.

8 REFERENCES

Black Eagle Consulting, July 2005. Geotechnical Investigation Jackson Ranch Development. July 2005.

Fernley, 2008a. *City of Fernley Department of Public Works Design Standards and Review Guidelines for Streets, Potable Water, Sewer, Storm Drains & Alternative Water*, published by the City of Fernley Department of Public Works, Fernley, Nevada, May 2008. <http://www.cityoffernley.org/DocumentCenter/Index/279>.

Wood Rodgers, 2021. *Preliminary Drainage Report for the Red Hawk Ranch, Phase 1 Tentative Subdivision Map*, unpublished report prepared for Relief Springs LLC Series C by Wood Rodgers, Inc., Reno, Nevada, November 4, 2021.



APPENDIX A

EXHIBITS







0 0.375 0.75
MILES

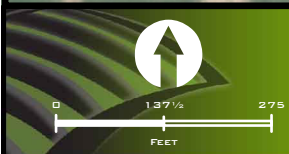
Vicinity Map

Duets at Red Hawk Ranch Tentative Map

August 2022



WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard
Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066



Aerial Map/Site Plan Map

Duets at Red Hawk Ranch Tentative Map

August 2022

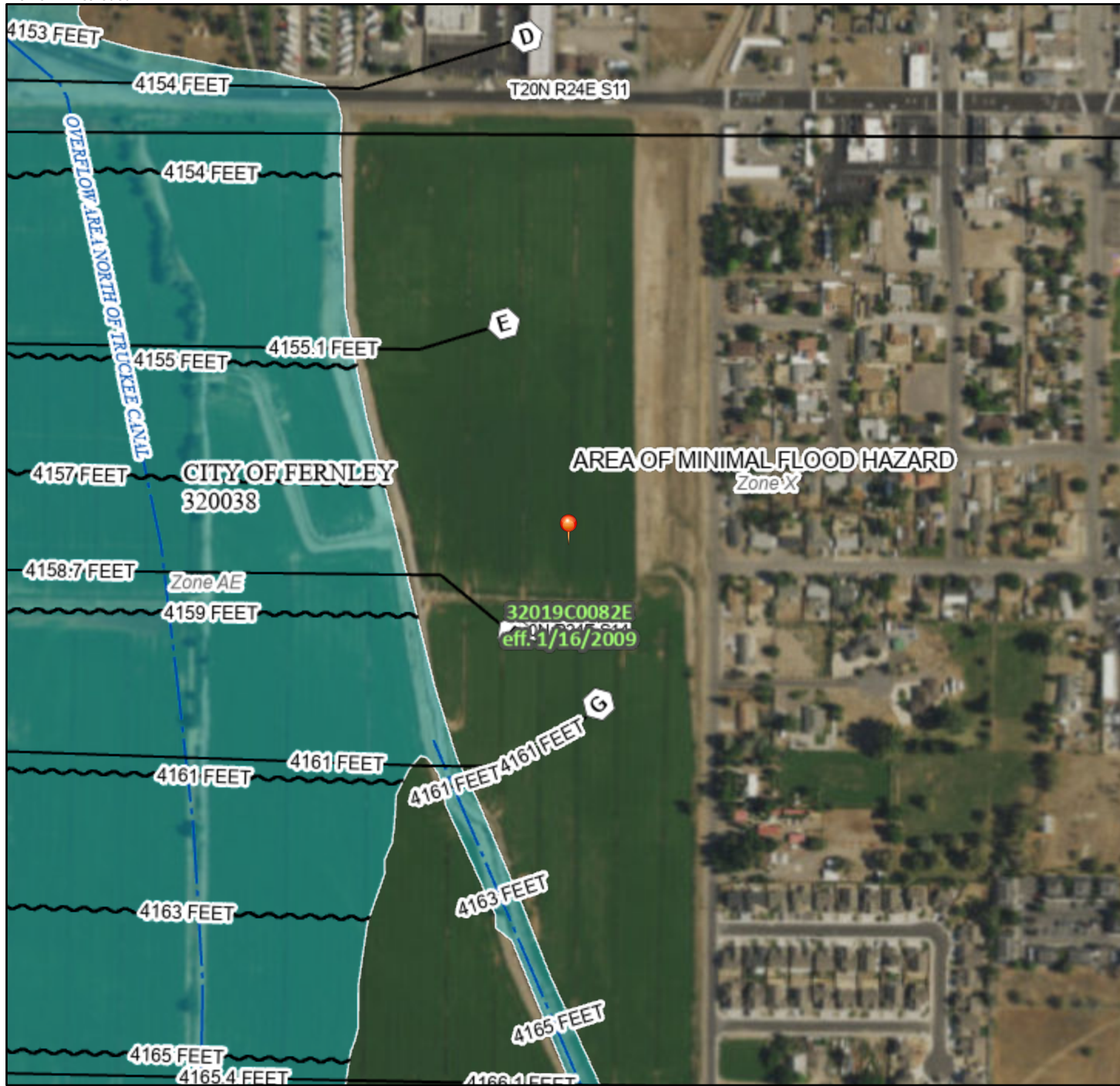


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Reno, NV 89502 Fax: 775.823.4066

National Flood Hazard Layer FIRMMette



119°15'44"W 39°36'30"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
MAP PANELS		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Digital Data Available
		No Digital Data Available
		Unmapped

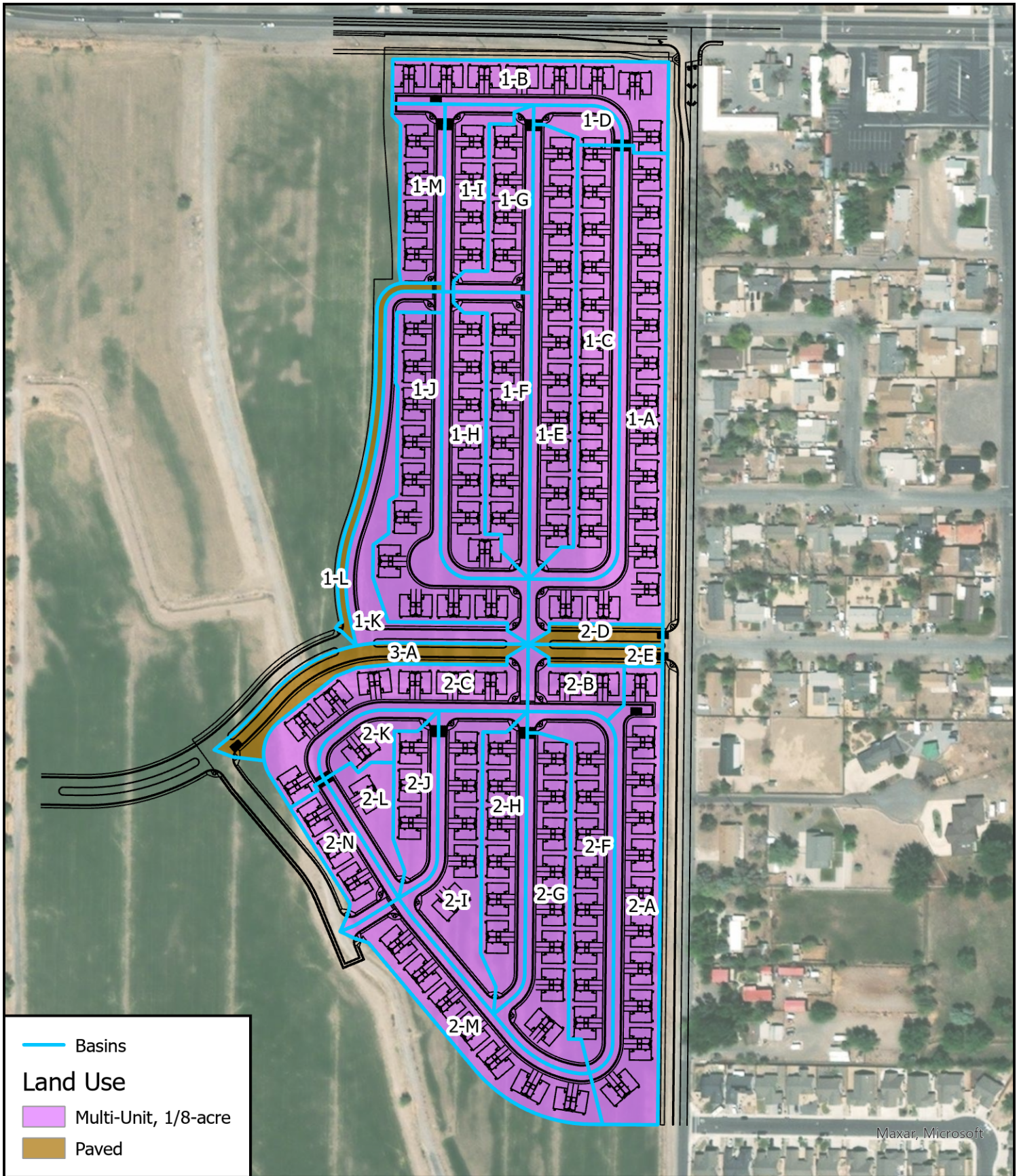


The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/15/2022 at 8:21 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



HYDROLOGIC BASINS / LAND USE

DUETS AT RED HAWK RANCH

FERNLEY, NV

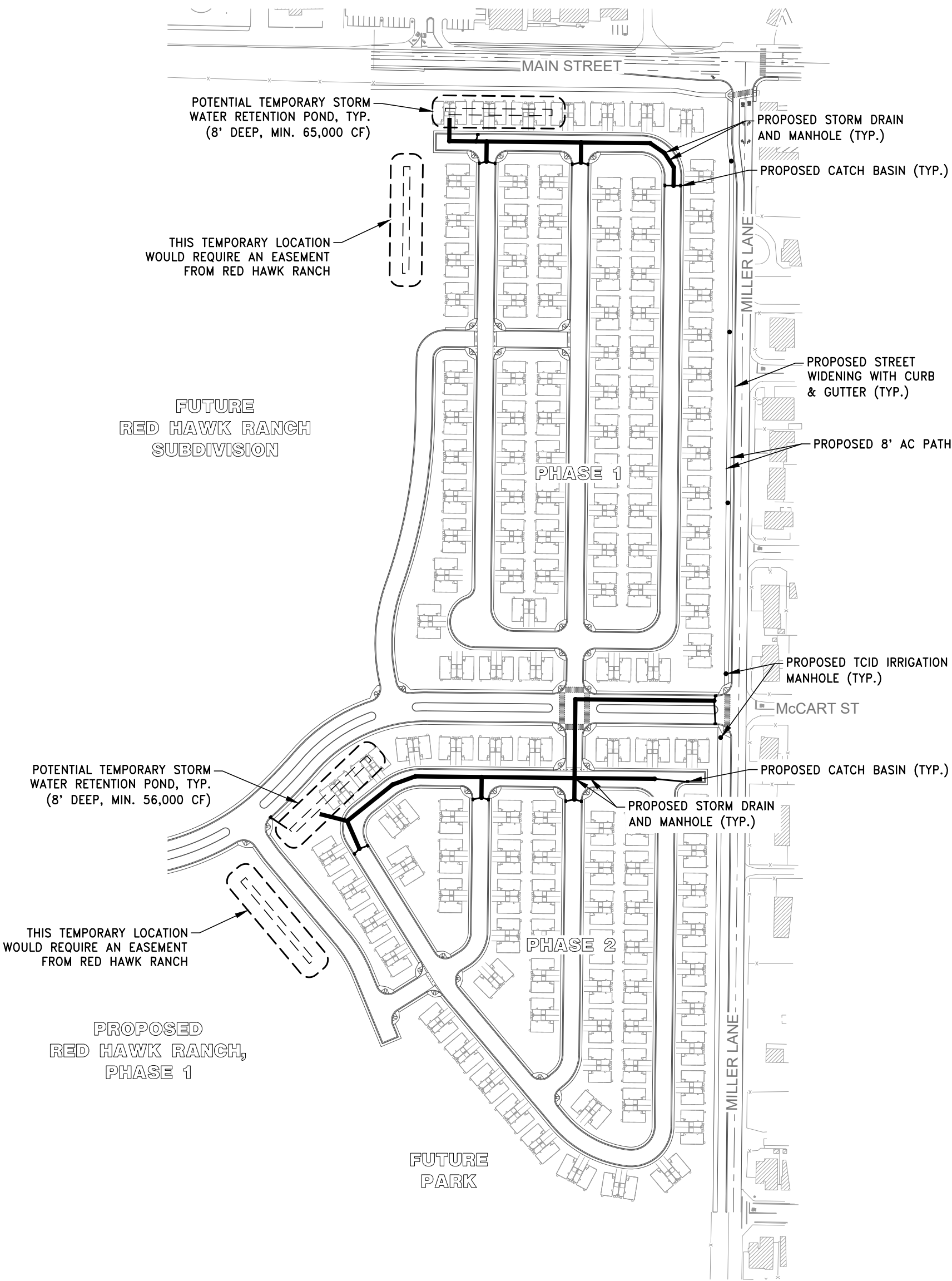
AUGUST 2022

PRELIMINARY STORM DRAIN SYSTEM

DUETS AT RED HAWK RANCH

FERNLEY, NEVADA

AUGUST 2022



APPENDIX B

PRECIPITATION AND HYDROLOGIC DATA





NOAA Atlas 14, Volume 1, Version 5
Location name: Fernley, Nevada, USA*
Latitude: 39.6043°, Longitude: -119.257°
Elevation: 4180.1 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 & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.22 (0.996-1.48)	1.54 (1.25-1.87)	2.05 (1.68-2.52)	2.53 (2.05-3.11)	3.30 (2.60-4.10)	4.02 (3.08-5.03)	4.84 (3.61-6.13)	5.83 (4.19-7.56)	7.39 (5.05-9.97)	8.82 (5.74-12.2)
10-min	0.930 (0.756-1.12)	1.16 (0.948-1.42)	1.57 (1.28-1.91)	1.93 (1.56-2.36)	2.51 (1.99-3.13)	3.05 (2.35-3.83)	3.68 (2.75-4.66)	4.44 (3.19-5.75)	5.63 (3.84-7.60)	6.71 (4.37-9.26)
15-min	0.772 (0.628-0.928)	0.964 (0.784-1.18)	1.29 (1.06-1.58)	1.59 (1.29-1.95)	2.08 (1.64-2.58)	2.52 (1.94-3.16)	3.04 (2.27-3.86)	3.67 (2.64-4.75)	4.65 (3.18-6.28)	5.55 (3.61-7.65)
30-min	0.518 (0.422-0.626)	0.648 (0.528-0.790)	0.872 (0.712-1.07)	1.07 (0.870-1.31)	1.40 (1.10-1.74)	1.70 (1.31-2.13)	2.05 (1.53-2.60)	2.47 (1.78-3.20)	3.13 (2.14-4.23)	3.73 (2.43-5.15)
60-min	0.321 (0.261-0.387)	0.401 (0.327-0.489)	0.539 (0.440-0.660)	0.663 (0.538-0.813)	0.866 (0.683-1.08)	1.05 (0.809-1.32)	1.27 (0.947-1.61)	1.53 (1.10-1.98)	1.94 (1.32-2.62)	2.31 (1.51-3.19)
2-hr	0.200 (0.168-0.246)	0.251 (0.210-0.306)	0.325 (0.269-0.399)	0.388 (0.318-0.476)	0.482 (0.384-0.597)	0.564 (0.440-0.707)	0.668 (0.506-0.846)	0.794 (0.585-1.02)	1.00 (0.705-1.32)	1.19 (0.810-1.61)
3-hr	0.153 (0.128-0.184)	0.191 (0.162-0.232)	0.241 (0.202-0.293)	0.282 (0.235-0.345)	0.340 (0.279-0.415)	0.392 (0.315-0.483)	0.458 (0.361-0.570)	0.540 (0.416-0.682)	0.675 (0.505-0.890)	0.797 (0.581-1.08)
6-hr	0.096 (0.081-0.114)	0.120 (0.101-0.144)	0.151 (0.127-0.183)	0.175 (0.147-0.211)	0.208 (0.172-0.252)	0.232 (0.188-0.282)	0.258 (0.207-0.316)	0.296 (0.233-0.369)	0.358 (0.276-0.453)	0.414 (0.311-0.549)
12-hr	0.056 (0.048-0.065)	0.070 (0.060-0.083)	0.090 (0.077-0.106)	0.105 (0.090-0.124)	0.125 (0.106-0.148)	0.141 (0.118-0.169)	0.157 (0.129-0.190)	0.173 (0.140-0.212)	0.195 (0.153-0.243)	0.219 (0.168-0.277)
24-hr	0.034 (0.029-0.038)	0.042 (0.037-0.048)	0.054 (0.048-0.062)	0.064 (0.056-0.072)	0.077 (0.067-0.087)	0.088 (0.076-0.100)	0.099 (0.085-0.113)	0.110 (0.094-0.126)	0.126 (0.106-0.145)	0.139 (0.116-0.161)
2-day	0.019 (0.016-0.021)	0.023 (0.020-0.027)	0.030 (0.026-0.035)	0.036 (0.031-0.040)	0.043 (0.037-0.049)	0.049 (0.042-0.056)	0.056 (0.048-0.063)	0.062 (0.053-0.071)	0.072 (0.060-0.082)	0.079 (0.065-0.091)
3-day	0.013 (0.012-0.015)	0.017 (0.015-0.019)	0.022 (0.019-0.025)	0.026 (0.022-0.029)	0.031 (0.027-0.036)	0.036 (0.031-0.041)	0.041 (0.035-0.046)	0.045 (0.038-0.052)	0.052 (0.044-0.060)	0.058 (0.047-0.067)
4-day	0.011 (0.009-0.012)	0.014 (0.012-0.015)	0.018 (0.015-0.020)	0.021 (0.018-0.024)	0.025 (0.022-0.029)	0.029 (0.025-0.033)	0.033 (0.028-0.037)	0.037 (0.031-0.042)	0.043 (0.035-0.049)	0.047 (0.039-0.055)
7-day	0.007 (0.006-0.008)	0.009 (0.008-0.010)	0.012 (0.010-0.013)	0.014 (0.012-0.016)	0.017 (0.014-0.019)	0.019 (0.016-0.022)	0.022 (0.018-0.025)	0.024 (0.020-0.028)	0.028 (0.023-0.033)	0.031 (0.025-0.037)
10-day	0.005 (0.005-0.006)	0.007 (0.006-0.008)	0.009 (0.008-0.011)	0.011 (0.009-0.013)	0.013 (0.011-0.015)	0.015 (0.012-0.017)	0.017 (0.014-0.019)	0.018 (0.015-0.022)	0.021 (0.017-0.025)	0.023 (0.019-0.028)
20-day	0.003 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.005-0.006)	0.006 (0.006-0.007)	0.008 (0.007-0.009)	0.009 (0.007-0.010)	0.010 (0.008-0.011)	0.011 (0.009-0.012)	0.012 (0.010-0.014)	0.013 (0.011-0.015)
30-day	0.002 (0.002-0.003)	0.003 (0.003-0.004)	0.004 (0.003-0.005)	0.005 (0.004-0.005)	0.006 (0.005-0.006)	0.006 (0.005-0.007)	0.007 (0.006-0.008)	0.008 (0.006-0.009)	0.009 (0.007-0.010)	0.009 (0.008-0.011)
45-day	0.002 (0.002-0.002)	0.002 (0.002-0.003)	0.003 (0.003-0.004)	0.004 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.004-0.006)	0.005 (0.005-0.006)	0.006 (0.005-0.007)	0.006 (0.005-0.008)	0.007 (0.006-0.008)
60-day	0.002 (0.001-0.002)	0.002 (0.002-0.002)	0.003 (0.002-0.003)	0.003 (0.003-0.003)	0.004 (0.003-0.004)	0.004 (0.003-0.005)	0.004 (0.004-0.005)	0.005 (0.004-0.005)	0.005 (0.004-0.006)	0.005 (0.005-0.006)

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.

[Back to Top](#)



NOAA Atlas 14, Volume 1, Version 5
Location name: Fernley, Nevada, USA*
Latitude: 39.6043°, Longitude: -119.257°
Elevation: 4180.1 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 & aeries](#)

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	0.102 (0.083-0.123)	0.128 (0.104-0.156)	0.171 (0.140-0.210)	0.211 (0.171-0.259)	0.275 (0.217-0.342)	0.335 (0.257-0.419)	0.403 (0.301-0.511)	0.486 (0.349-0.630)	0.616 (0.421-0.831)	0.735 (0.478-1.01)
10-min	0.155 (0.126-0.187)	0.194 (0.158-0.237)	0.261 (0.213-0.319)	0.321 (0.260-0.394)	0.419 (0.331-0.521)	0.509 (0.392-0.638)	0.614 (0.458-0.777)	0.740 (0.532-0.959)	0.938 (0.640-1.27)	1.12 (0.728-1.54)
15-min	0.193 (0.157-0.232)	0.241 (0.196-0.294)	0.323 (0.264-0.396)	0.398 (0.323-0.488)	0.520 (0.410-0.646)	0.631 (0.485-0.791)	0.761 (0.568-0.964)	0.917 (0.659-1.19)	1.16 (0.794-1.57)	1.39 (0.903-1.91)
30-min	0.259 (0.211-0.313)	0.324 (0.264-0.395)	0.436 (0.356-0.533)	0.536 (0.435-0.657)	0.700 (0.552-0.869)	0.850 (0.654-1.07)	1.02 (0.765-1.30)	1.24 (0.888-1.60)	1.57 (1.07-2.11)	1.87 (1.22-2.58)
60-min	0.321 (0.261-0.387)	0.401 (0.327-0.489)	0.539 (0.440-0.660)	0.663 (0.538-0.813)	0.866 (0.683-1.08)	1.05 (0.809-1.32)	1.27 (0.947-1.61)	1.53 (1.10-1.98)	1.94 (1.32-2.62)	2.31 (1.51-3.19)
2-hr	0.401 (0.336-0.493)	0.502 (0.421-0.613)	0.650 (0.538-0.798)	0.775 (0.635-0.953)	0.964 (0.767-1.19)	1.13 (0.880-1.41)	1.34 (1.01-1.69)	1.59 (1.17-2.04)	2.00 (1.41-2.65)	2.38 (1.62-3.22)
3-hr	0.458 (0.385-0.553)	0.574 (0.486-0.696)	0.724 (0.607-0.879)	0.847 (0.705-1.03)	1.02 (0.837-1.25)	1.18 (0.947-1.45)	1.38 (1.09-1.71)	1.62 (1.25-2.05)	2.03 (1.52-2.67)	2.39 (1.75-3.26)
6-hr	0.572 (0.484-0.683)	0.716 (0.607-0.862)	0.904 (0.762-1.10)	1.05 (0.878-1.27)	1.24 (1.03-1.51)	1.39 (1.13-1.69)	1.54 (1.24-1.90)	1.77 (1.40-2.21)	2.15 (1.65-2.71)	2.48 (1.87-3.29)
12-hr	0.670 (0.577-0.783)	0.848 (0.728-0.995)	1.09 (0.930-1.28)	1.27 (1.08-1.49)	1.51 (1.27-1.79)	1.70 (1.42-2.03)	1.89 (1.56-2.28)	2.09 (1.68-2.55)	2.35 (1.85-2.92)	2.64 (2.03-3.34)
24-hr	0.804 (0.705-0.912)	1.02 (0.894-1.16)	1.30 (1.15-1.48)	1.53 (1.34-1.74)	1.85 (1.61-2.10)	2.11 (1.82-2.40)	2.37 (2.04-2.70)	2.65 (2.25-3.02)	3.03 (2.55-3.48)	3.34 (2.78-3.85)
2-day	0.894 (0.779-1.02)	1.13 (0.981-1.28)	1.46 (1.27-1.66)	1.71 (1.48-1.94)	2.08 (1.79-2.36)	2.37 (2.04-2.69)	2.68 (2.29-3.04)	2.99 (2.53-3.42)	3.43 (2.86-3.96)	3.78 (3.12-4.39)
3-day	0.961 (0.842-1.10)	1.21 (1.06-1.39)	1.57 (1.38-1.79)	1.86 (1.62-2.11)	2.26 (1.96-2.56)	2.58 (2.22-2.93)	2.92 (2.49-3.32)	3.27 (2.77-3.73)	3.76 (3.13-4.33)	4.15 (3.42-4.82)
4-day	1.03 (0.905-1.17)	1.30 (1.15-1.49)	1.69 (1.49-1.93)	2.00 (1.75-2.28)	2.44 (2.12-2.77)	2.78 (2.40-3.16)	3.16 (2.70-3.60)	3.54 (3.01-4.04)	4.08 (3.40-4.70)	4.52 (3.71-5.25)
7-day	1.19 (1.04-1.37)	1.50 (1.30-1.74)	1.95 (1.69-2.25)	2.31 (2.00-2.67)	2.81 (2.41-3.25)	3.21 (2.73-3.71)	3.63 (3.08-4.21)	4.08 (3.42-4.74)	4.70 (3.88-5.51)	5.21 (4.24-6.13)
10-day	1.31 (1.13-1.54)	1.67 (1.44-1.95)	2.17 (1.87-2.54)	2.56 (2.19-3.00)	3.10 (2.64-3.63)	3.53 (2.98-4.12)	3.97 (3.32-4.65)	4.43 (3.68-5.23)	5.06 (4.15-6.02)	5.55 (4.48-6.66)
20-day	1.59 (1.38-1.84)	2.02 (1.76-2.34)	2.61 (2.27-3.02)	3.06 (2.65-3.54)	3.65 (3.14-4.23)	4.11 (3.52-4.77)	4.57 (3.88-5.31)	5.05 (4.26-5.88)	5.68 (4.72-6.67)	6.16 (5.07-7.28)
30-day	1.75 (1.53-2.03)	2.23 (1.95-2.58)	2.87 (2.51-3.34)	3.36 (2.92-3.90)	4.01 (3.46-4.65)	4.51 (3.87-5.24)	5.01 (4.28-5.84)	5.52 (4.68-6.46)	6.19 (5.20-7.29)	6.71 (5.58-7.93)
45-day	2.05 (1.78-2.35)	2.61 (2.26-2.99)	3.35 (2.89-3.83)	3.91 (3.37-4.47)	4.64 (3.98-5.31)	5.20 (4.44-5.96)	5.75 (4.89-6.62)	6.30 (5.32-7.27)	7.00 (5.86-8.14)	7.53 (6.26-8.77)
60-day	2.32 (2.03-2.64)	2.97 (2.58-3.37)	3.81 (3.32-4.33)	4.41 (3.83-5.01)	5.17 (4.48-5.88)	5.73 (4.95-6.54)	6.26 (5.39-7.17)	6.78 (5.81-7.78)	7.42 (6.31-8.52)	7.88 (6.67-9.11)

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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**RATIONAL FORMULA METHOD
RUNOFF COEFFICIENTS**

Land Use or Surface Characteristics	Aver. % Impervious Area	Runoff Coefficients	
		5-Year (C ₅)	100-Year (C ₁₀₀)
<u>Business/Commercial:</u>			
Downtown Areas	85	.82	.85
Neighborhood Areas	70	.65	.80
<u>Residential:</u> (Average Lot Size)			
1/8 Acre or Less (Multi-Unit)	65	.60	.78
1/4 Acre	38	.50	.65
1/8 Acre	30	.45	.60
1/2 Acre	25	.40	.55
1 Acre	20	.35	.50
<u>Industrial:</u>	72	.68	.82
<u>Open Space:</u> (Lawns, Parks, Golf Courses)	5	.05	.30
<u>Undeveloped Areas:</u>			
Range	0	.20	.50
Forest	0	.05	.30
<u>Streets/Roads:</u>			
Paved	100	.88	.93
Gravel	20	.25	.50
<u>Drives/Walks:</u>	95	.87	.90
<u>Roof:</u>	90	.85	.87

Notes:

1. Composite runoff coefficients shown for Residential, Industrial, and Business/Commercial Areas assume irrigated grass landscaping for all pervious areas. For development with landscaping other than irrigated grass, the designer must develop project specific composite runoff coefficients from the surface characteristics presented in this table.

VERSION: April 30, 2009

REFERENCE:

USDCM, DROCOG, 1969
(with modifications)

TABLE
701

WRC ENGINEERING, INC.

RUNOFF CURVE NUMBERS FOR URBAN AREAS¹

Runoff Curve Numbers

Cover Type and Hydrologic Condition	Aver. % Impervious Area²	Soil Comp A	Soil Comp B	Soil Comp C	Soil Comp D
<i>Fully developed urban area (vegetation established)</i>					
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
<i>Developing urban areas</i>					
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)					

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

²The 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).

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

⁴Composite 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.

⁵Composite 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.

VERSION: April 30, 2009

REFERENCE:

210-VI-TR-55, Second Edition, June 1986

TABLE

702

1 of 4

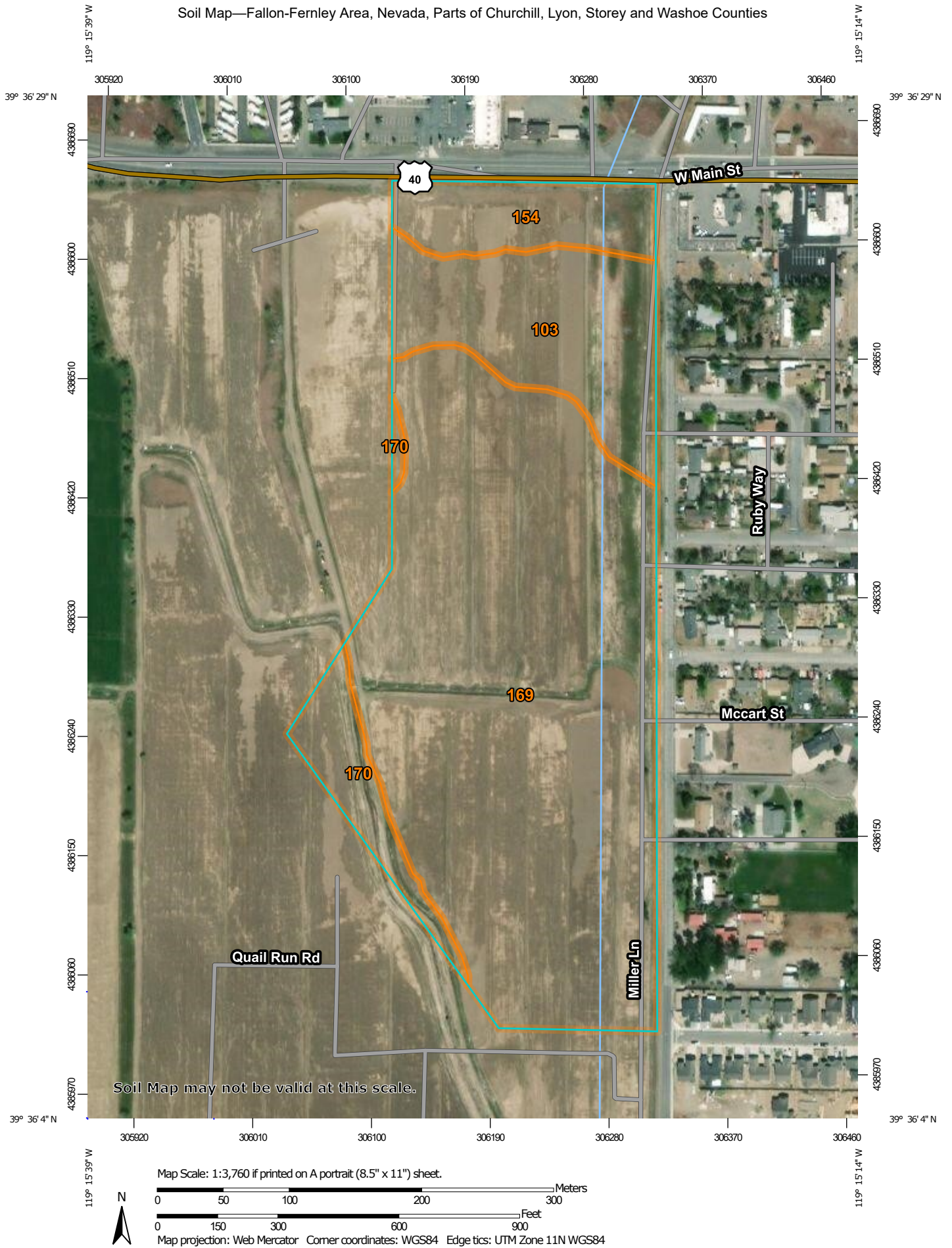
WRC ENGINEERING, INC.

APPENDIX C

PRELIMINARY SITE SOILS DATA



Soil Map—Fallon-Fernley Area, Nevada, Parts of Churchill, Lyon, Storey and Washoe Counties



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

7/15/2022
Page 1 of 3
Page 217 of 311

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Fallon-Fernley Area, Nevada, Parts of Churchill, Lyon, Storey and Washoe Counties

Survey Area Data: Version 17, Sep 9, 2021

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 11, 2017

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
103	Appian fine sandy loam, 0 to 2 percent slopes	5.4	16.3%
154	Fernley sand, 0 to 1 percent slopes	2.6	7.8%
169	Juva sandy loam, 0 to 2 percent slopes	23.2	70.3%
170	Juva sandy loam, 2 to 4 percent slopes	1.9	5.7%
Totals for Area of Interest		32.9	100.0%

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

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.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk "*" denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties—Fallon-Fernley Area, Nevada, Parts of Churchill, Lyon, Storey and Washoe Counties														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
103—Appian fine sandy loam, 0 to 2 percent slopes														
Appian	90	C	0-10	Fine sandy loam	ML	A-4	0- 0- 0	0- 0- 0	90-95-100	90-95-100	78-87-97	37-44-51	16-22-27	2-6 -10
			10-20	Clay loam, sandy clay loam	CL, SC	A-7, A-6	0- 0- 0	0- 0- 0	90-95-100	90-95-100	78-86-95	60-67-75	37-41-46	19-22-25
			20-46	Stratified gravelly coarse sand to fine sand	SP-SM, SM	A-1, A-2, A-3	0- 0- 0	0- 0- 0	76-83-90	75-82-90	68-77-87	7- 9- 12	0-0 -19	NP-0 -2
			46-60	Sand, coarse sand	SP-SM, SP	A-1	0- 0- 0	0- 0- 0	77-84-91	76-83-90	57-64-72	4- 7- 10	0-0 -19	NP-0 -2
154—Fernley sand, 0 to 1 percent slopes														
Fernley	85	A	0-7	Sand	SP-SM, SM	A-2, A-3	0- 0- 0	0- 0- 0	90-95-100	90-95-100	67-73-79	5- 8- 11	0-0 -20	NP-0 -2
			7-60	Stratified coarse sand to fine sand	SW-SM, SM	A-2, A-1, A-3	0- 0- 0	0- 0- 0	86-92-100	86-92-100	64-71-79	5- 7- 11	0-0 -19	NP-0 -2



Engineering Properties—Fallon-Fernley Area, Nevada, Parts of Churchill, Lyon, Storey and Washoe Counties														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
169—Juva sandy loam, 0 to 2 percent slopes														
Juva	90	B	0-6	Sandy loam	ML, SM	A-4	0- 0- 0	0- 0- 0	91-95-100	83-91-100	60-70-81	29-36-43	20-25-30	6-9 -12
			6-60	Stratified very gravelly sand to loam	GM, SM	A-2, A-4	0- 1- 1	0- 4- 8	62-76-92	53-68-87	38-52-70	19-27-37	20-25-30	6-9 -12
170—Juva sandy loam, 2 to 4 percent slopes														
Juva	90	B	0-6	Sandy loam	ML, SM	A-4	0- 0- 0	0- 0- 0	91-95-100	83-91-100	60-70-81	29-36-43	20-25-30	6-9 -12
			6-60	Stratified very gravelly sand to loam	GM, SM	A-2, A-4	0- 1- 1	0- 4- 8	62-76-92	53-68-87	38-52-70	19-27-37	20-25-30	6-9 -12

Data Source Information

Soil Survey Area: Fallon-Fernley Area, Nevada, Parts of Churchill, Lyon, Storey and Washoe Counties

Survey Area Data: Version 17, Sep 9, 2021



APPENDIX D

HYDROLOGIC & HYDRAULIC CALCULATIONS



PEAK DISCHARGE - PROPOSED CONDITIONS

Duets at Red Hawk Ranch (Fernley, NV)

Storm Return, Duration:	5-Yr, 6-hr	25-Yr, 6-Hr	100-Yr, 6-Hr
Runoff Coefficient:	0.60	0.64	0.78
Rainfall Intensity (in/hr):	0.151	0.208	0.258

Hydrologic Sub-Basin	Drainage Area		Peak Discharge by Storm Event (cfs)		
	(ac)	(sf)	5-Year, 6-Hour	25-Year, 6-Hour	100-Year, 6-Hour
HYDROLOGIC BASIN 1 - PHASE 1					
1-A	2.31	100,663	0.209	0.307	0.465
1-B	1.28	55,839	0.116	0.170	0.258
1-C	1.77	76,916	0.160	0.234	0.355
1-D	0.23	10,107	0.021	0.031	0.047
1-E	1.68	73,290	0.152	0.223	0.339
1-F	1.08	47,123	0.098	0.144	0.218
1-G	0.74	32,419	0.067	0.099	0.150
1-H	1.15	49,893	0.104	0.152	0.230
1-I	0.73	31,651	0.066	0.096	0.146
1-J	1.78	77,678	0.162	0.237	0.359
1-K	1.01	43,865	0.091	0.134	0.203
1-L	0.31	13,492	0.028	0.041	0.062
1-M	0.71	31,088	0.065	0.095	0.144
TOTALS:	14.78	644,024	1.34	1.96	2.98
HYDROLOGIC BASIN 2 - PHASE 2					
2-A	1.93	83,919	0.175	0.256	0.388
2-B	0.43	18,645	0.039	0.057	0.086
2-C	1.30	56,736	0.118	0.173	0.262
2-D	0.22	9,675	0.020	0.029	0.045
2-E	0.22	9,676	0.020	0.029	0.045
2-F	1.43	62,136	0.129	0.189	0.287
2-G	1.42	61,671	0.128	0.188	0.285
2-H	1.03	44,791	0.093	0.136	0.207
2-I	1.27	55,112	0.115	0.168	0.255
2-J	0.59	25,719	0.053	0.078	0.119
2-K	0.37	16,004	0.033	0.049	0.074
2-L	0.44	19,371	0.040	0.059	0.089
2-M	1.34	58,490	0.122	0.178	0.270
2-N	0.55	24,046	0.050	0.073	0.111
TOTALS:	12.53	545,991	1.14	1.66	2.52
3-A	0.68	29,567	0.061	0.090	0.137

Runoff coefficients for Residential Development, 1/8-ac Lots from Table 701 of the Truckee Meadows Regional Drainage Manual (interpolated for 25-yr storm).

Combined Hydrologic Basin 1 - 25-Yr, 6-Hr Storm (Duets)

Project Description	
Friction Method	Manning
Solve For	Formula Normal Depth
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.005 ft/ft
Diameter	12.0 in
Discharge	1.96 cfs
Results	
Normal Depth	7.5 in
Flow Area	0.5 ft ²
Wetted Perimeter	1.8 ft
Hydraulic Radius	3.4 in
Top Width	0.97 ft
Critical Depth	7.2 in
Percent Full	62.7 %
Critical Slope	0.006 ft/ft
Velocity	3.78 ft/s
Velocity Head	0.22 ft
Specific Energy	0.85 ft
Froude Number	0.910
Maximum Discharge	2.94 cfs
Discharge Full	2.73 cfs
Slope Full	0.003 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	7.5 in
Critical Depth	7.2 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

RUNOFF VOLUME ESTIMATES - PROPOSED CONDITIONS

Duets at Red Hawk Ranch (Fernley, NV)

25-Yr, 6-Hr Storm Depth (in.) = 1.24

100-Yr, 6-Hr Storm Depth (in.) = 1.54

100-Yr, 24-Hr Storm Depth (in.) = 2.37

Hydrologic Basin Designation	Drainage Area (ac) (sf)		Curve Number	Runoff Volume by Storm Event		
				25-Year, 6-Hour (cu.ft.)	100-Year, 6-Hour (cu.ft.)	100-Year, 24-Hour (cu.ft.)
PHASE 1 Hydrologic Basins Retained On-Site						
1-A	2.31	100,663	85	2,490	4,000	9,020
1-B	1.28	55,839	85	1,380	2,220	5,010
1-C	1.77	76,916	85	1,900	3,060	6,900
1-D	0.23	10,107	85	250	400	910
1-E	1.68	73,290	85	1,810	2,920	6,570
1-F	1.08	47,123	85	1,170	1,870	4,220
1-G	0.74	32,419	85	800	1,290	2,910
1-H	1.15	49,893	85	1,230	1,980	4,470
1-I	0.73	31,651	85	780	1,260	2,840
1-J	1.78	77,678	85	1,920	3,090	6,960
1-K	1.01	43,865	85	1,080	1,750	3,930
1-L	0.31	13,492	98	1,150	1,480	2,410
1-M	0.71	31,088	85	770	1,240	2,790
TOTALS				16,730	26,560	58,940
PHASE 2 Hydrologic Basins Retained On-Site						
2-A	1.93	83,919	85	2,080	3,340	7,520
2-B	0.43	18,645	85	460	740	1,670
2-C	1.30	56,736	85	1,400	2,260	5,090
2-D	0.22	9,675	98	830	1,060	1,730
2-E	0.22	9,676	98	830	1,060	1,730
2-F	1.43	62,136	85	1,540	2,470	5,570
2-G	1.42	61,671	85	1,520	2,450	5,530
2-H	1.03	44,791	85	1,110	1,780	4,020
2-I	1.27	55,112	85	1,360	2,190	4,940
2-J	0.59	25,719	85	640	1,020	2,310
2-K	0.37	16,004	85	400	640	1,430
2-L	0.44	19,371	85	480	770	1,740
2-M	1.34	58,490	85	1,450	2,330	5,240
2-N	0.55	24,046	85	590	960	2,160
TOTALS				14,690	23,070	50,680
Hydrologic Basin Retained OFF-SITE						
3-A	0.68	29,567	98	2,520	3,250	5,280
TOTALS				2,520	3,250	5,280

Runoff volume calculated by SCS method.

PRELIMINARY SANITARY SEWER REPORT

FOR THE
**DUETS AT RED HAWK RANCH
TENTATIVE SUBDIVISION MAP
FERNLEY, NEVADA**

Prepared for:

**DB-BB INVESTMENTS I, LLC
539 Riverside Drive
Reno, Nevada 89503
775.440.1982**

August 16, 2022

Prepared by:

**WOOD RODGERS, INC.
1361 Corporate Boulevard
Reno, Nevada 89502
775.823.4068**

**Evan Nikirk, P.E.
Associate**

Digitally signed by Evan Nikirk, P.E.
Date: 2022.08.16 08:35:21-07'00'



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BUILDING RELATIONSHIPS ONE PROJECT AT A TIME

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1 INTRODUCTION

This report presents the preliminary sewer study for the proposed Duets at Red Hawk Ranch subdivision in Fernley, Nevada. The report describes existing sanitary sewer conditions and provides an estimate of sewage flows anticipated from the proposed project. It has been prepared in support of the tentative subdivision map, which will consist of 282 single-family attached residences (i.e., 141 duplexes) with associated streets, curb, gutter, sidewalk, and utility infrastructure. This report analyzes sewage flows for those final conditions.

The following sections summarize the design criteria, general flow analysis, and preliminary design of a new sanitary sewer network connecting to existing City infrastructure at the north property line of the adjacent development. The proposed sewer system, as described below, is consistent with Chapter 8 of the *City of Fernley Department of Public Works Design Standards and Review Guidelines for Streets, Potable Water, Sewer, Storm Drains & Alternative Water (Design Standards)*, dated May 2008 (Fernley, 2008a).

The project site is not currently served by a City sanitary sewer system, so sewage from the proposed Duets at Red Hawk Ranch subdivision will be managed by newly-constructed sewer laterals and gravity mains under new subdivision streets. This system will connect to a proposed 10-inch-diameter PVC SDR35 sewer main in the adjacent development (APN 021-041-08) at the northwest corner of the project site. The proposed sewer system will collect sewage from new development throughout the former Jackson Ranch (APNs 021-071-07, -08, -09, -10). Sewage will gravity flow across West Main Street and through proposed development at 600 Main Street (APN 021-071-30) to the West Lift Station, which pumps sewage to the East Lift Station and ultimately discharges at the East Wastewater Treatment Plant. See Appendix A for the exhibit, "Preliminary Sanitary Sewer Layout" showing the system proposed to serve the Duets at Red Hawk Ranch subdivision.

2 PROJECT BACKGROUND

The Duets at Red Hawk Ranch subdivision will be located on an undeveloped parcel off Miller Lane in northwest Fernley, Nevada, as shown on the Vicinity Map enclosed in Appendix A. The parcel, identified by Lyon County as Assessor Parcel Number (APN) 021-041-09 comprises of 31.15 acres of former crop land. The overall site layout with streets and lots overlaid on a current aerial photograph is shown on the exhibit, "Aerial Map / Site Plan Map," enclosed in Appendix A. A request to re-zone the property accompanies the tentative subdivision map application to accommodate the proposed development; a copy of the proposed zoning map of the project parcel and surrounding area is included in Appendix A.



2.1 Site Location

The site is located at the former Jackson Ranch on West Main Street and is identified as Parcel 2 of Parcel Map 373825; a street address has not been assigned to the property. The site is bounded by West Main Street to the north, Miller Lane to the east, undeveloped former agricultural land and Stock Lane to the west, and Quail Run Road and the Miller Estates subdivision to the south. The undeveloped ranch area adjoining the project's western boundary are planned to be residential and commercial properties, and the area adjoining the southwest project boundary is proposed to be developed into a local park. According to the Public Land Survey System, the site is situated within the east half of the northwest quarter of Section 14, Township 20 North, Range 24 East, Mount Diablo Meridian (E1/2, NW1/4, Sec. 14, T.20 N., R.24 E., M.D.M.). The centroid of the site is approximately located at latitude 39.6043°N and longitude -119.2572°W.

2.2 Existing Conditions

The 31.15-acre project area is currently undeveloped with remnants of a former agricultural operation, including irrigation head gates, delivery ditches, and dirt roads throughout the property and its perimeter. The irrigation ditches, head gates, and culverts are overgrown and in disrepair and do not currently provide irrigation water to the site. The site is relatively flat and the existing ground generally slopes from south to north at an average slope of approximately 0.66 percent. The maximum elevation at the southern boundary is approximately 4167 feet and the minimum elevation at the northern boundary, sitting below Main Street, is 4153.5 feet.

There are currently no sewer facilities serving the project site or its vicinity. Project development will require a sewer main extension through the adjacent property to the west and across Main Street to the City's West Lift Station. The proposed point of connection will be at the northeast corner of the adjacent parcel (APN 021-071-08) within the Red Hawk Ranch development at a proposed 10-inch-diameter sewer main, which will then route flows to the West Lift Station on APN 020-113-06.

Existing water mains and natural gas mains are located within Main Street and Miller Lane to the north and east, respectively, of the project site. Overhead power and telephone lines also border the north and east boundaries. An existing 36-inch-diameter irrigation pipe on the project's east property line was designed and installed with the previous Jackson Ranch subdivision, but currently no public storm drain infrastructure serves the project site. The water and sewer utilities are owned, operated, and maintained by the City of Fernley. The TC4 Lateral irrigation pipe and easement on the east property line are owned by the U.S. Bureau of Reclamation and operated and maintained under contract to the Truckee-Carson Irrigation District (TCID).



2.3 *Prior Sewer Studies*

The project parcels were previously considered for development in 2005 as the Jackson Ranch subdivision, a 681-lot residential subdivision for which final design was started but never completed, permitted, or constructed and the prior entitlements have expired. Along with a full sewer study, flow monitoring of existing sewer manholes was also performed at that time to determine the existing flows being directed to the West Lift Station. It is assumed the sewer data from 2005 is outdated and not valid for reference with the current Duets at Red Hawk Ranch project.

A preliminary sewer study was prepared by Wood Rodgers, Inc. (Wood Rodgers, 2021) for Phase 1 of the adjacent Red Hawk Ranch subdivision and it includes preliminary estimates of sewage flows from those residences to be managed by the new mains draining to the West Lift Station.

3 PROJECT DESCRIPTION

At full build-out, the project will include single-family attached residential lots, street and utility infrastructure, and an off-site sanitary sewer main with maintenance road(s) to the West Lift Station. The proposed 282 lots (141 duplexes) are expected to be primarily 2,048 square feet (SF) in size, with some corner lots ranging up to 2,400 SF. The general layout of the development is shown on the exhibit, "Preliminary Sanitary Sewer Layout," enclosed in Appendix A. Each duplex will be equipped with a 4-inch-diameter PVC SDR35 sewer lateral, which will connect to an 8-inch-diameter sewer main constructed in each street of the proposed subdivision.

Project infrastructure will include paved public streets with curb, gutter, and sidewalk, paved pedestrian paths, storm drain, sewer and water facilities, and dry utilities (i.e., natural gas, power, telephone, cable television). Water service will connect to the City's network at two locations – one at the northwest corner of the site on the south side of Main Street, and the other at the intersection of the central east-west backbone road with Miller Lane at McCart Street. The new on-site storm drain system will be routed through the adjacent Red Hawk Ranch development to proposed storm water retention ponds incorporated into the flood control channel west of the site. Sanitary sewer mains will be routed to the off-site main through a new sewer main extension. In general, on-site sewage for all areas within the subdivision will gravity flow to a common point at the northwest corner of the project, south of Main Street, where the flows will be combined and sent to the City's West Lift Station. The proposed site layout and sewer system is shown on the exhibit, "Preliminary Sanitary Sewer Layout," enclosed in Appendix A.



4 TRIBUTARY AREAS

The project is located within the West Lift Station Contributory Area. Residential and commercial properties north of the project site sewer to the West Lift Station, which is ultimately processed by the East Wastewater Treatment Plant. The treatment plant also takes wastewater flows from several other interceptors and lift stations throughout the city. There are no tributary areas upstream from the project and the City's sanitary sewer system does not extend to Miller Lane or areas west of the project. The *Red Hawk Ranch Sewer Discovery* prepared by Shaw Engineering for the adjacent development (Shaw, 2021) analyzed the downstream tributary areas to determine adequate sewer pipe and lift station capacities as a result of impacts from that project. The analysis in the Red Hawk Ranch discovery determined that pipe(s) at the West Lift Station had inadequate capacity to manage anticipated flows, and the City subsequently went out to bid for lift station upgrades. A discovery request will be made to analyze the proposed Duets project in the context of adjacent projects.

5 PROPOSED CONDITIONS

On-site sewer facilities will be publicly-owned and maintained by the City of Fernley. Wastewater will drain via 8-inch-diameter sanitary sewer mains under each subdivision street. The sewer mains will gravity drain from south to north towards a common manhole located south of Main Street at the northwest corner of the project site. Because there is no sewer service to the project site, an approximately 1,160 linear foot gravity sewer main will be routed along the south side of Main Street through the adjacent Red Hawk Ranch development, where flows will be combined then cross the highway with an approximate 1,510 linear foot gravity main through the property to the north. The proposed main will then connect to the lift station at a new manhole. The proposed subdivision layout and associated sewer network are shown on the exhibit, "Preliminary Sanitary Sewer Layout," enclosed in Appendix A.

The sanitary sewer system for the Duets at Red Hawk Ranch subdivision will conform with all design standards specified in Chapter 8 of the *City of Fernley Department of Public Works Design Standards and Review Guidelines* (Fernley, 2008a) and are consistent with *City of Fernley Standard Details for Public Works Construction* (Fernley, 2008b). New gravity sewer mains will be a minimum 8-inch-diameter PVC SDR35 sewer pipe installed under subdivision streets. The first 10 lots in each sewershed will connect to a sewer main set at a 1.00 percent slope, which will then flatten to an acceptable minimum slope based on number of connections and size of main consistent with Table 8.1 of the *Design Standards*. Each residence will drain via 4-inch-diameter PVC SDR35 sewer lateral connected to the sewer main fronting each lot. Minimum clearances will be maintained over the sewer mains and over the laterals at the gutter flowline. No non-domestic waste will be introduced into the City's sanitary sewer system from the development.



As specified in Chapter 8 of the *Design Standards*, the on-site sewer system will be designed to satisfy the minimum flow velocity of 2 feet per second (fps) at half-full capacity, and a maximum velocity of 10 fps, with a Manning's roughness coefficient ("n") of 0.012 used for pipe hydraulic calculations. Further, all sanitary sewer mains within the proposed development are designed to carry the calculated peak flow at no more than three-quarters full (0.75D).

5 HYDRAULIC ANALYSIS

This report evaluates the predicted sewage contribution from the proposed subdivision to the City's existing sewer system. The average daily flows expected for the residential portions of the project were calculated using a sewage generation rate of 345 gallons per residence per day for 8-inch mains, as specified by the *Design Standards*.

This results in an average flow rate of 97,290 gallons per day (gpd), or 67.6 gallons per minute (gpm), for the 282 residences (141 duplexes). For the Peak Hourly Flow, a peaking factor of 3.0 is applied, resulting in a peak hour flow rate of 291,870 gpd (203 gpm). The estimated peak flow rate generated by the Duets at Red Hawk Ranch is calculated as:

$$\text{Peak Flow Rate} = (3.0 \text{ peaking factor}) \times (282 \text{ residences}) \times (345 \text{ gal. / residence / day}) = \mathbf{291,870 \text{ gpd (203 gpm)}}$$

The shallowest pipe slope allowable within the on-site network will be 0.40 percent for an 8-inch-diameter PVC SDR35 sewer main. Hydraulic calculations were performed using the computer software FlowMaster® V8i by Bentley Systems (Watertown, CT) to determine flow characteristics at pipe capacity (0.75D) and, by extension, this information was used to evaluate compliance within the on-site sewer system. At three-quarters full an 8-inch pipe set at 0.4 percent slope has a flow rate of 488,200 gpd (339 gpm). Individual pipe sizes will be determined at the time of final design. Hydraulic calculations were also performed for a half-full 8-inch pipe set at 0.4 percent slope and an 8-inch pipe at anticipated peak flow to verify compliance with the minimum velocity of 2.0 fps. The detailed calculations are provided in Appendix B.

The impact of project flows on the City's sewer system will be analyzed in the Technical Sanitary Sewer Study for detailed design. However, based on the Red Hawk Ranch Sewer Discovery (Shaw, 2021), lift station improvements will be required before the Red Hawk Ranch development comes on-line.

6 CONCLUSIONS

The proposed sanitary sewer system described in this report has been designed to meet the City's design criteria and adequately serve the residents of the Duets at Red Hawk Ranch subdivision. An exhibit showing the general site layout and proposed sewer system for the project is included in



Appendix A. Sewerage from the residential properties will be collected via 8-inch sewer mains, which will ultimately discharge into the West Lift Station. Based on data provided in the sewer discovery prepared for the adjacent development, an upgrade to the lift station will be required to accommodate the proposed project. Sewerage from the proposed project will ultimately be treated at the City's East Wastewater Treatment Plant.

7 REFERENCES

Fernley, 2008a. *City of Fernley Department of Public Works Design Standards and Review Guidelines for Streets, Potable Water, Sewer, Storm Drains & Alternative Water*, published by the City of Fernley Department of Public Works, Fernley, Nevada, May 2008. <http://www.cityoffernley.org/DocumentCenter/Index/279>.

Fernley, 2008b. *City of Fernley Standard Details for Public Works Construction*, published by the City of Fernley Department of Public Works, Fernley, Nevada, July 15, 2008. <http://www.cityoffernley.org/DocumentCenter/View/2009>.

Shaw, 2021. *Red Hawk Ranch Sewer Discovery*, unpublished report prepared for the City of Fernley Department of Public Works by Shaw Engineering, Inc., Reno, Nevada, May 28, 2021.

Wood Rodgers, 2021. *Preliminary Master Sanitary Sewer Report for the Red Hawk Ranch Tentative Subdivision Map*, unpublished report prepared for Relief Springs LLC Series C by Wood Rodgers, Inc., Reno, NV, November 2, 2021.



APPENDIX A

EXHIBITS

VICINITY MAP

AERIAL SITE MAP

ZONING MAP

PRELIMINARY SANITARY SEWER LAYOUT



Vicinity Map

Duets at Red Hawk Ranch Tentative Map
August 2022

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Legend

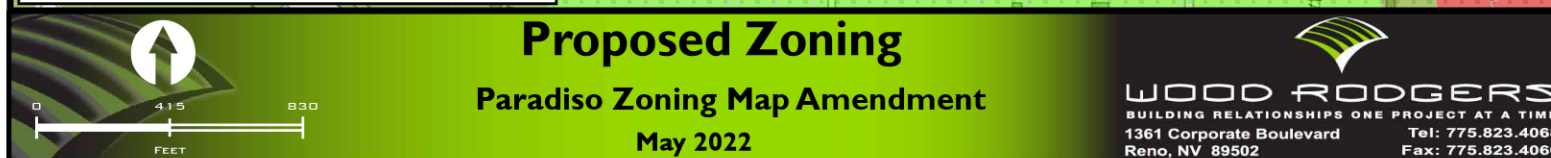
 Project Area



Aerial Map/Site Plan Map
Duets at Red Hawk Ranch Tentative Map
August 2022



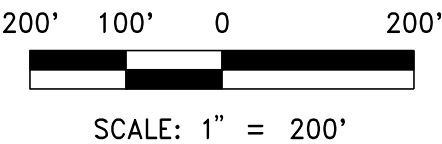
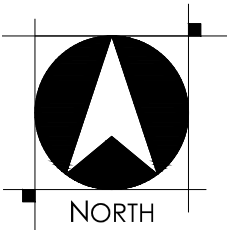
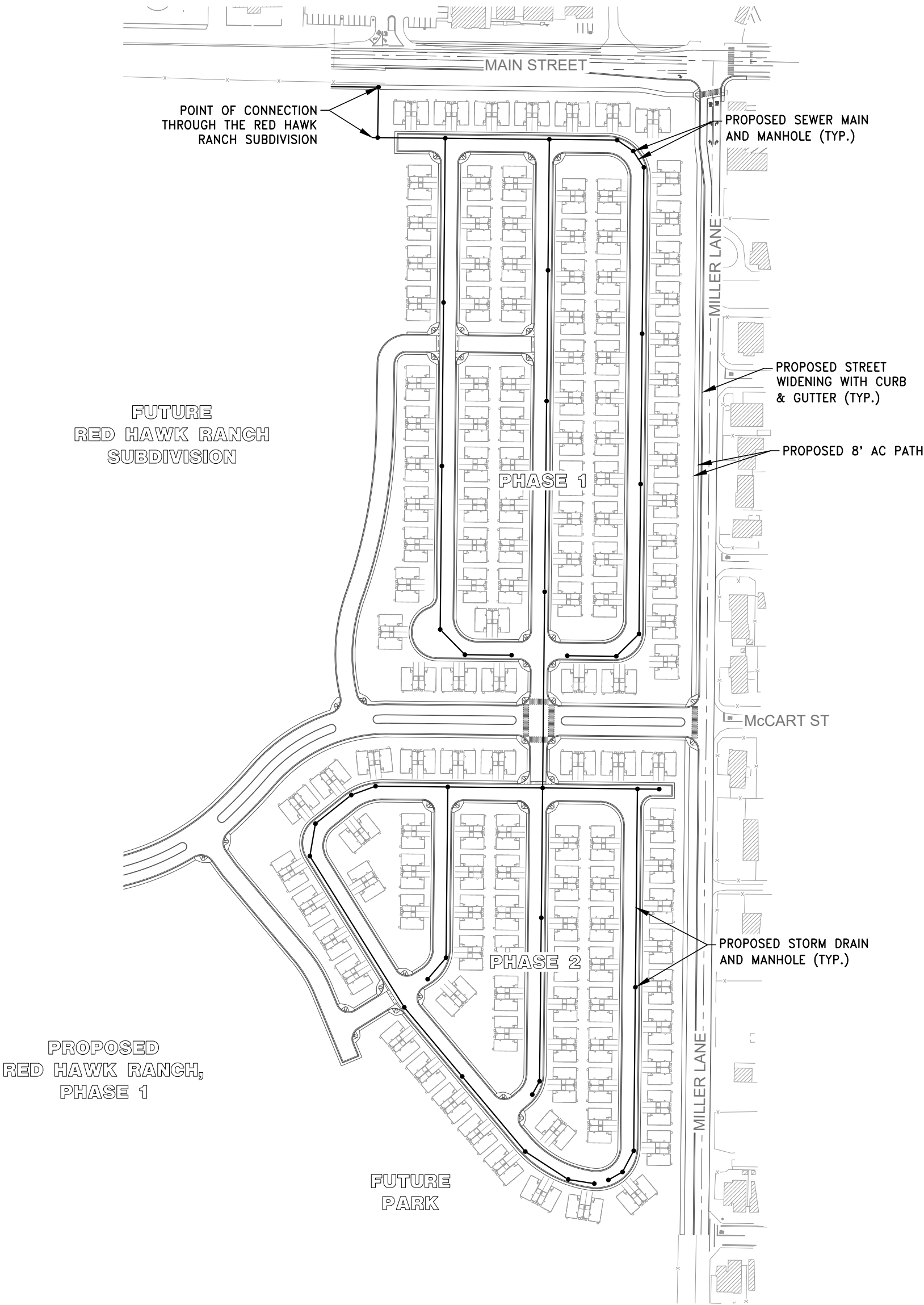
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PRELIMINARY SANITARY SEWER SYSTEM

DUETS AT RED HAWK RANCH

FERNLEY, NEVADA
AUGUST 2022



WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard Tel 775.823.4068
Reno, NV 89502 Fax 775.823.4066

APPENDIX B

HYDRAULIC CALCULATIONS

8 in PVC Sewer Main Capacity (0.75D) at 0.4Pct

Project Description	
Friction Method	Manning
Solve For	Formula Discharge
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.004 ft/ft
Normal Depth	6.0 in
Diameter	8.0 in
Results	
Discharge	338.8 gal/min
Flow Area	0.3 ft ²
Wetted Perimeter	1.4 ft
Hydraulic Radius	2.4 in
Top Width	0.58 ft
Critical Depth	4.9 in
Percent Full	75.0 %
Critical Slope	0.007 ft/ft
Velocity	2.69 ft/s
Velocity Head	0.11 ft
Specific Energy	0.61 ft
Froude Number	0.680
Maximum Discharge	399.7 gal/min
Discharge Full	371.6 gal/min
Slope Full	0.003 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	75.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	6.0 in
Critical Depth	4.9 in
Channel Slope	0.004 ft/ft
Critical Slope	0.007 ft/ft

8 in PVC Sewer Main at 0.4 Pct & 0.5D

Project Description	
Friction Method	Manning
Solve For	Formula Discharge
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.004 ft/ft
Normal Depth	4.0 in
Diameter	8.0 in
Results	
Discharge	185.8 gal/min
Flow Area	0.2 ft ²
Wetted Perimeter	1.0 ft
Hydraulic Radius	2.0 in
Top Width	0.67 ft
Critical Depth	3.6 in
Percent Full	50.0 %
Critical Slope	0.006 ft/ft
Velocity	2.37 ft/s
Velocity Head	0.09 ft
Specific Energy	0.42 ft
Froude Number	0.817
Maximum Discharge	399.7 gal/min
Discharge Full	371.6 gal/min
Slope Full	0.001 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	50.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.0 in
Critical Depth	3.6 in
Channel Slope	0.004 ft/ft
Critical Slope	0.006 ft/ft

8 in PVC Sewer Main at 0.4 Pct & Peak Flow (Duets)

Project Description	
Friction Method	Manning
Solve For	Formula
	Normal Depth
Input Data	
Roughness Coefficient	0.012
Channel Slope	0.004 ft/ft
Diameter	8.0 in
Discharge	202.7 gal/min
Results	
Normal Depth	4.2 in
Flow Area	0.2 ft ²
Wetted Perimeter	1.1 ft
Hydraulic Radius	2.1 in
Top Width	0.67 ft
Critical Depth	3.8 in
Percent Full	52.7 %
Critical Slope	0.006 ft/ft
Velocity	2.42 ft/s
Velocity Head	0.09 ft
Specific Energy	0.44 ft
Froude Number	0.808
Maximum Discharge	399.7 gal/min
Discharge Full	371.6 gal/min
Slope Full	0.001 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	50.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.2 in
Critical Depth	3.8 in
Channel Slope	0.004 ft/ft
Critical Slope	0.006 ft/ft



COTTAGE FRONT ELEVATION

391.008 Legacy Springs
Sparks, NV
December 17, 2021



0 .5' 1' 1.5' 2' 4'

DUET 1 FRONT COTTAGE ELEVATION
A002

SDG Architecture of Nevada
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Brentwood, CA 94513
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COTTAGE REAR ELEVATION



COTTAGE RIGHT ELEVATION

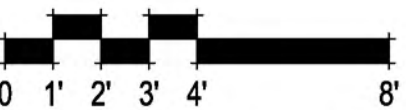


COTTAGE LEFT ELEVATION



COTTAGE FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
CEMENT PLASTER
STUCCO OVER FOAM WINDOW TRIM AT STUCCO

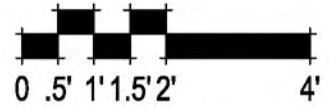


DUET 1 COTTAGE EXTERIOR ELEVATIONS
A003



CRAFTSMAN FRONT ELEVATION

391.008 Legacy Springs
Sparks, NV
December 17, 2021



DUET 1 FRONT CRAFTSMAN ELEVATION
A004

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CRAFTSMAN REAR ELEVATION



CRAFTSMAN RIGHT ELEVATION

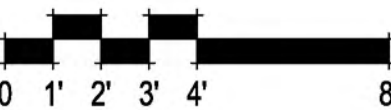


CRAFTSMAN LEFT ELEVATION



CRAFTSMAN FRONT ELEVATION

EXTERIOR MATERIALS
 COMPOSITION SHINGLE ROOFING
 HORIZONTAL SIDING
 CEMENT PLASTER
 WOOD TRIM AT SIDING
 STUCCO OVER FOAM WINDOW TRIM AT STUCCO
 DECORATIVE SHUTTERS



DUET 1 CRAFTSMAN EXTERIOR ELEVATIONS
 A005

391.008 Legacy Springs
 Sparks, NV
 December 17, 2021



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ITALIANATE FRONT ELEVATION

391.008 Legacy Springs
Sparks, NV
December 17, 2021



DUET 1 FRONT ITALIANATE ELEVATION
A006

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ITALIANATE REAR ELEVATION



ITALIANATE RIGHT ELEVATION

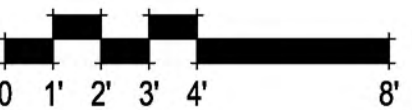


ITALIANATE LEFT ELEVATION



ITALIANATE FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
CEMENT PLASTER
STUCCO OVER FOAM WINDOW TRIM AT STUCCO
STONE VENEER

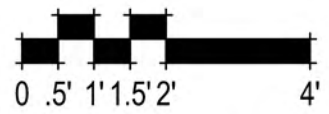


DUET 1 ITALIANATE EXTERIOR ELEVATIONS
A007



COTTAGE FRONT ELEVATION

391.008 Legacy Springs
 Sparks, NV
 December 17, 2021



DUET 2 FRONT COTTAGE ELEVATION
 A008

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COTTAGE REAR ELEVATION



COTTAGE RIGHT ELEVATION

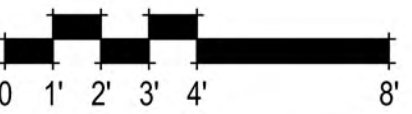


COTTAGE LEFT ELEVATION



COTTAGE FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
CEMENT PLASTER
STUCCO OVER FOAM WINDOW TRIM AT STUCCO



DUET 2 COTTAGE EXTERIOR ELEVATIONS
A009

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CRAFTSMAN FRONT ELEVATION

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DUET 2 FRONT CRAFTSMAN ELEVATION
A010

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CRAFTSMAN REAR ELEVATION



CRAFTSMAN RIGHT ELEVATION



CRAFTSMAN LEFT ELEVATION



CRAFTSMAN FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
HORIZONTAL SIDING
CEMENT PLASTER
WOOD TRIM AT SIDING
STUCCO OVER FOAM WINDOW TRIM AT STUCCO
DECORATIVE SHUTTERS

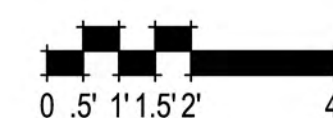


DUET 2 CRAFTSMAN EXTERIOR ELEVATIONS
A011



ITALIANATE FRONT ELEVATION

391.008 Legacy Springs
Sparks, NV
December 17, 2021



DUET 2 FRONT ITALIANATE ELEVATION
A012

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ITALIANATE REAR ELEVATION



ITALIANATE RIGHT ELEVATION

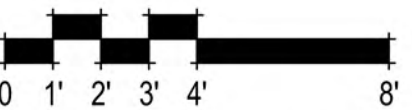


ITALIANATE LEFT ELEVATION



ITALIANATE FRONT ELEVATION

EXTERIOR MATERIALS
 COMPOSITION SHINGLE ROOFING
 CEMENT PLASTER
 STUCCO OVER FOAM WINDOW TRIM AT STUCCO
 STONE VENEER



DUET 2 ITALIANATE EXTERIOR ELEVATIONS
 A013

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COTTAGE REAR ELEVATION



COTTAGE RIGHT ELEVATION

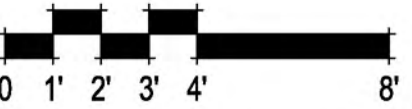


COTTAGE LEFT ELEVATION



COTTAGE FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
CEMENT PLASTER
STUCCO OVER FOAM WINDOW TRIM AT STUCCO



DUET 2 LOFT OPTION COTTAGE EXTERIOR ELEVATIONS
A015



CRAFTSMAN FRONT ELEVATION

391.008 Legacy Springs
Sparks, NV
December 17, 2021



DUET 2 LOFT OPTION FRONT CRAFTSMAN ELEVATION
A016

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CRAFTSMAN REAR ELEVATION



CRAFTSMAN RIGHT ELEVATION

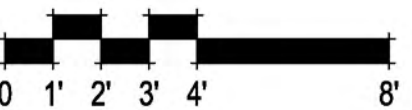


CRAFTSMAN LEFT ELEVATION



CRAFTSMAN FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
HORIZONTAL SIDING
CEMENT PLASTER
WOOD TRIM AT SIDING
STUCCO OVER FOAM WINDOW TRIM AT STUCCO
DECORATIVE SHUTTERS



DUET 2 LOFT OPTION CRAFTSMAN EXTERIOR ELEVATIONS
A017



ITALIANATE FRONT ELEVATION

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Sparks, NV
December 17, 2021



DUET 2 LOFT OPTION FRONT ITALIANATE ELEVATION
A018

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ITALIANATE REAR ELEVATION



ITALIANATE RIGHT ELEVATION

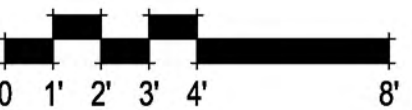


ITALIANATE LEFT ELEVATION



ITALIANATE FRONT ELEVATION

EXTERIOR MATERIALS
 COMPOSITION SHINGLE ROOFING
 CEMENT PLASTER
 STUCCO OVER FOAM WINDOW TRIM AT STUCCO
 STONE VENEER



DUET 2 LOFT OPTION ITALIANATE EXTERIOR ELEVATIONS
 A019



COTTAGE FRONT ELEVATION

391.008 Legacy Springs
Sparks, NV
December 17, 2021



0 .5' 1' 1.5' 2' 4'

DUET 3 FRONT COTTAGE ELEVATION
A020

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COTTAGE REAR ELEVATION



COTTAGE RIGHT ELEVATION

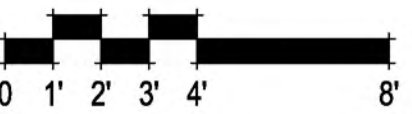


COTTAGE LEFT ELEVATION



COTTAGE FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
CEMENT PLASTER
STUCCO OVER FOAM WINDOW TRIM AT STUCCO



DUET 3 COTTAGE EXTERIOR ELEVATIONS
A021

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CRAFTSMAN FRONT ELEVATION

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DUET 3 FRONT CRAFTSMAN ELEVATION
A022

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CRAFTSMAN REAR ELEVATION



CRAFTSMAN RIGHT ELEVATION



CRAFTSMAN LEFT ELEVATION



CRAFTSMAN FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
HORIZONTAL SIDING
CEMENT PLASTER
WOOD TRIM AT SIDING
STUCCO OVER FOAM WINDOW TRIM AT STUCCO
DECORATIVE SHUTTERS

391.008 Legacy Springs
Sparks, NV
December 17, 2021



0 1' 2' 3' 4' 8'

DUET 3 CRAFTSMAN EXTERIOR ELEVATIONS
A023

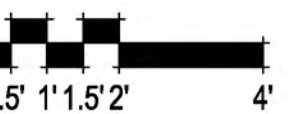
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ITALIANATE FRONT ELEVATION

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December 17, 2021



DUET 3 FRONT ITALIANATE ELEVATION
A024

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ITALIANATE REAR ELEVATION



ITALIANATE RIGHT ELEVATION

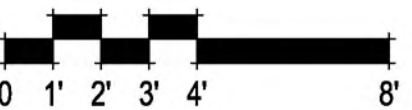


ITALIANATE LEFT ELEVATION



ITALIANATE FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
CEMENT PLASTER
STUCCO OVER FOAM WINDOW TRIM AT STUCCO
STONE VENEER



DUET 3 ITALIANATE EXTERIOR ELEVATIONS
A025

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December 17, 2021



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COTTAGE FRONT ELEVATION

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December 17, 2021



DUET 3 LOFT OPTION FRONT COTTAGE ELEVATION
A026

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COTTAGE REAR ELEVATION



COTTAGE RIGHT ELEVATION

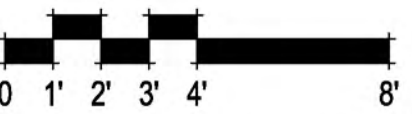


COTTAGE LEFT ELEVATION



COTTAGE FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
CEMENT PLASTER
STUCCO OVER FOAM WINDOW TRIM AT STUCCO



DUET 3 LOFT OPTION COTTAGE EXTERIOR ELEVATIONS
A027



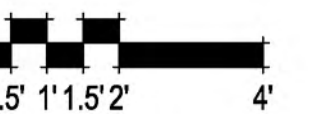
CRAFTSMAN FRONT ELEVATION

391.008 Legacy Springs
Sparks, NV
December 17, 2021



DUET 3 LOFT OPTION FRONT CRAFTSMAN ELEVATION

A028



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CRAFTSMAN REAR ELEVATION



CRAFTSMAN RIGHT ELEVATION



CRAFTSMAN LEFT ELEVATION



CRAFTSMAN FRONT ELEVATION

EXTERIOR MATERIALS

- COMPOSITION SHINGLE ROOFING
- HORIZONTAL SIDING
- CEMENT PLASTER
- WOOD TRIM AT SIDING
- STUCCO OVER FOAM WINDOW TRIM AT STUCCO
- DECORATIVE SHUTTERS

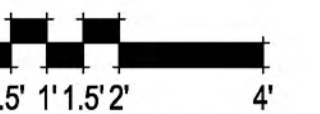


DUET 3 LOFT OPTION CRAFTSMAN EXTERIOR ELEVATIONS
A029



ITALIANATE FRONT ELEVATION

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Sparks, NV
December 17, 2021



DUET 3 LOFT OPTION FRONT ITALIANATE ELEVATION
A030

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ITALIANATE REAR ELEVATION



ITALIANATE RIGHT ELEVATION

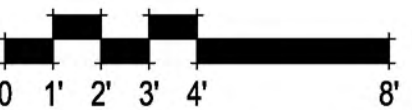


ITALIANATE LEFT ELEVATION



ITALIANATE FRONT ELEVATION

EXTERIOR MATERIALS
 COMPOSITION SHINGLE ROOFING
 CEMENT PLASTER
 STUCCO OVER FOAM WINDOW TRIM AT STUCCO
 STONE VENEER

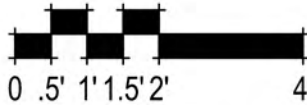


DUET 3 LOFT OPTION ITALIANATE EXTERIOR ELEVATIONS
 A031



COTTAGE FRONT ELEVATION

391.008 Legacy Springs
 Sparks, NV
 December 17, 2021



DUET 4 FRONT COTTAGE ELEVATION
 A032

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COTTAGE REAR ELEVATION



COTTAGE RIGHT ELEVATION



COTTAGE LEFT ELEVATION



COTTAGE FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
CEMENT PLASTER
STUCCO OVER FOAM WINDOW TRIM AT STUCCO



DUET 4 COTTAGE EXTERIOR ELEVATIONS
A033



CRAFTSMAN FRONT ELEVATION

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December 17, 2021



DUET 4 FRONT CRAFTSMAN ELEVATION
A034

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CRAFTSMAN REAR ELEVATION



CRAFTSMAN RIGHT ELEVATION



CRAFTSMAN LEFT ELEVATION



CRAFTSMAN FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
HORIZONTAL SIDING
CEMENT PLASTER
WOOD TRIM AT SIDING
STUCCO OVER FOAM WINDOW TRIM AT STUCCO



DUET 4 CRAFTSMAN EXTERIOR ELEVATIONS
A035

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ITALIANATE FRONT ELEVATION



ITALIANATE REAR ELEVATION



ITALIANATE RIGHT ELEVATION

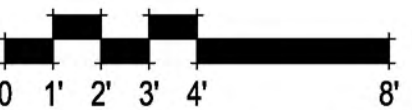


ITALIANATE LEFT ELEVATION



ITALIANATE FRONT ELEVATION

EXTERIOR MATERIALS
COMPOSITION SHINGLE ROOFING
CEMENT PLASTER
STUCCO OVER FOAM WINDOW TRIM AT STUCCO
STONE VENEER



DUET 4 ITALIANATE EXTERIOR ELEVATIONS
A037

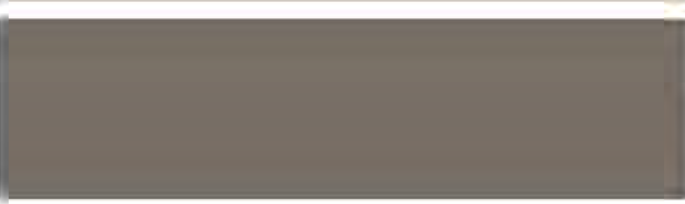
Color Scheme 1



Body
Kelly Moore
304 Stonegate



Trim
Kelly Moore
42 Wise Owl



Accent
Kelly Moore
KM5789 Shadow Cliff

Color Scheme 2



Body
Kelly Moore
KM5771 Apple Hill



Trim
Kelly Moore
14 Frost



Accent
Kelly Moore
159 Sequoia Redwood

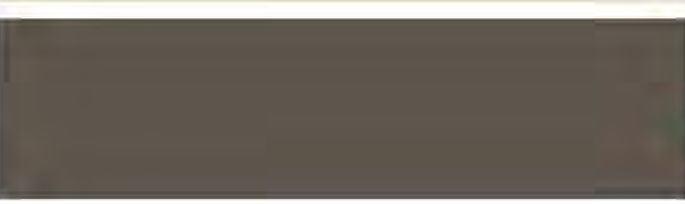
Color Scheme 3



Body
Kelly Moore
KM5788 Tranquil Taupe



Trim
Kelly Moore
27 Bone



Accent
Kelly Moore
KM4582 Beaver Pelt

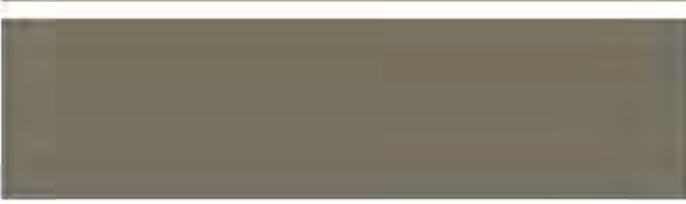
Color Scheme 4



Body
Kelly Moore
27 Bone



Trim
Kelly Moore
KM5771 Apple Hill



Accent
Kelly Moore
KM5772 Palm Lane

Color Scheme 5



Body
Kelly Moore
KM5789 Shadow Cliff



Trim
Kelly Moore
305 Ironwood

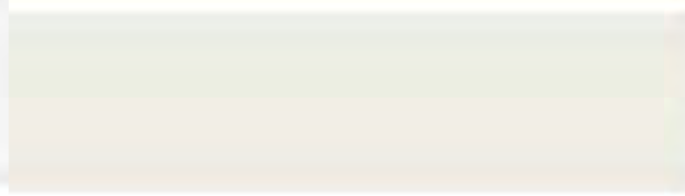


Accent
Kelly Moore
KM4519 Turkish Coffee

Color Scheme 6



Body
Kelly Moore
216 Malibu



Trim
Kelly Moore
23 Swiss Coffee



Accent
Kelly Moore
KM4421 Brickhouse

Color Scheme 7



Body
Kelly Moore
305 Ironwood



Trim
Kelly Moore
216 Malibu Beige



Accent
Kelly Moore
KM5826 Volcanic Rock

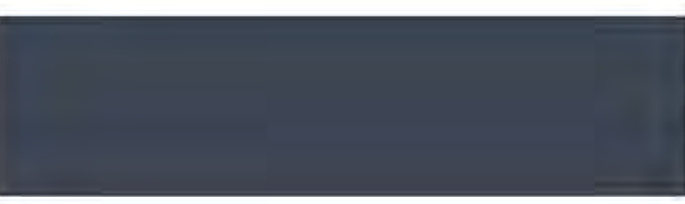
Color Scheme 8



Body
Kelly Moore
KM5817 Pebble Beach



Trim
Kelly Moore
KM5788 Tranquil Taupe



Accent
Kelly Moore
KMA84 Starlit Ever

Color Scheme 9



Body
Kelly Moore
178 Plymouth Grey



Trim
Kelly Moore
27 Bone



Accent
Kelly Moore
KM5800 Sausalito Ridge

Color Scheme 10



Body
Kelly Moore
KM5824 Winter's Park



Trim
Kelly Moore
KM4899 Gray Spell



Accent
Kelly Moore
407 Carbon



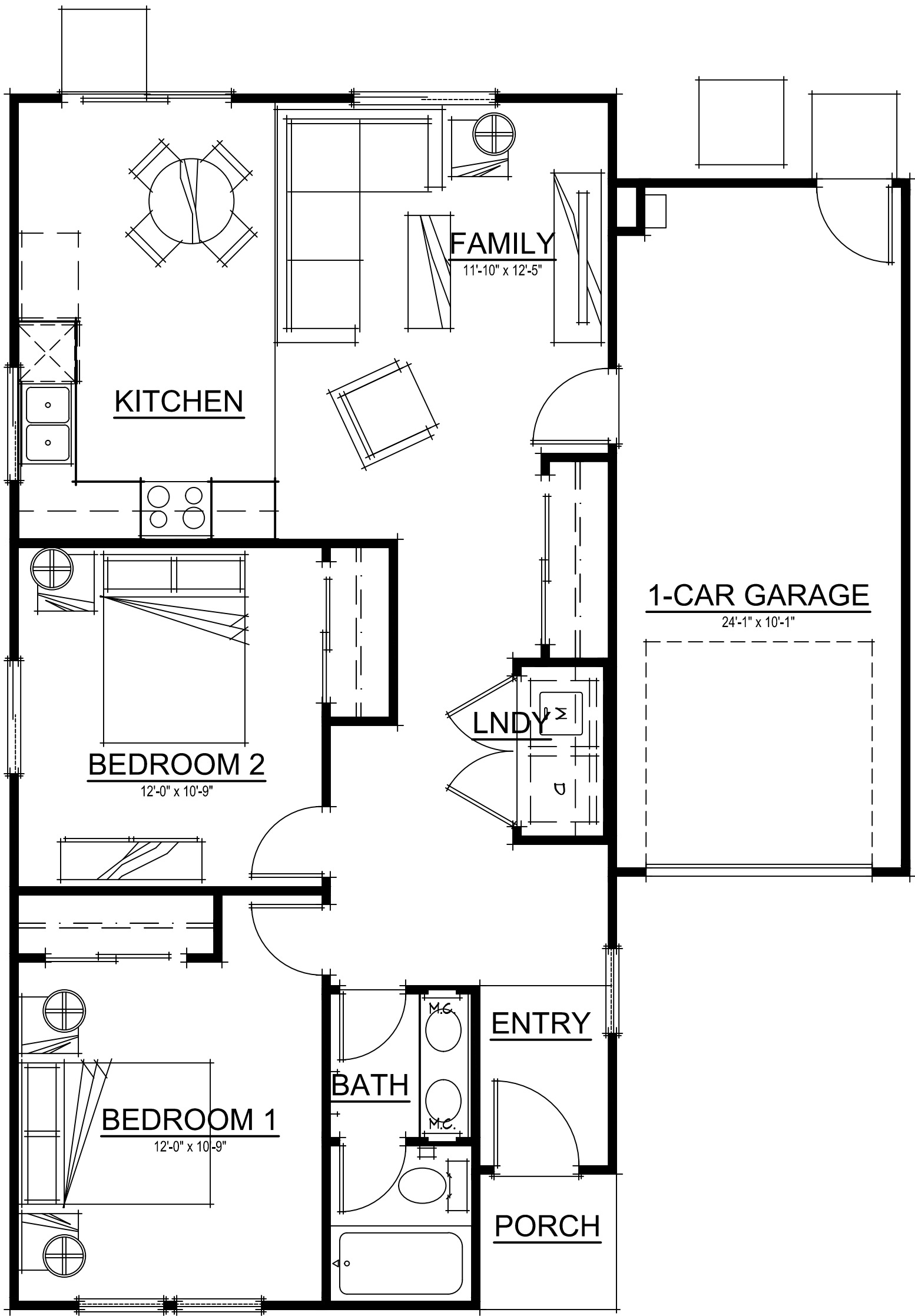
391.008 Legacy Springs
Sparks, NV
June 15, 2021



CONCEPTUAL STREETSCAPE
A002

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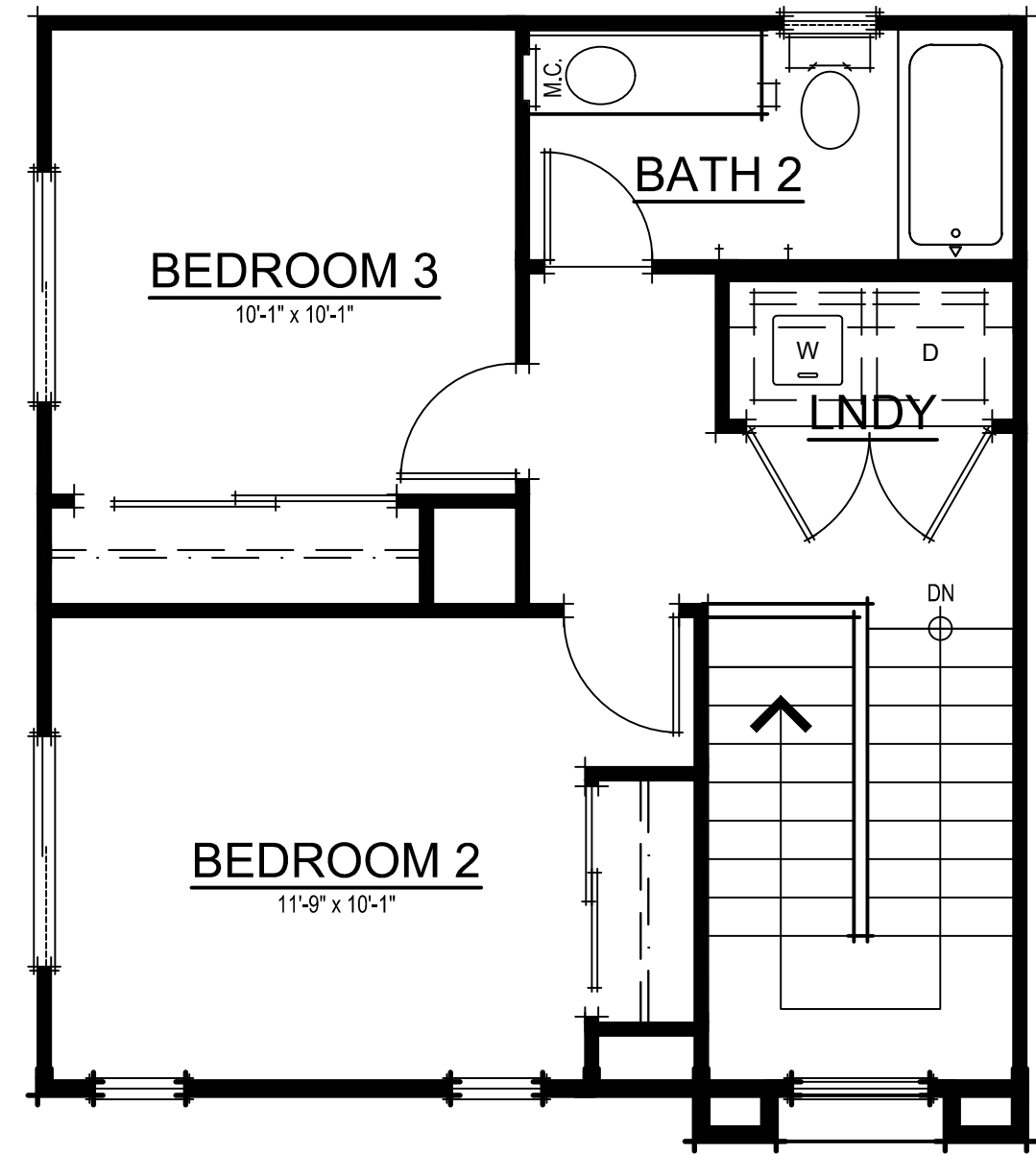




SQUARE FOOTAGES	
TOTAL LIVING	900 SQ. FT.
1-CAR GARAGE	256 SQ. FT.

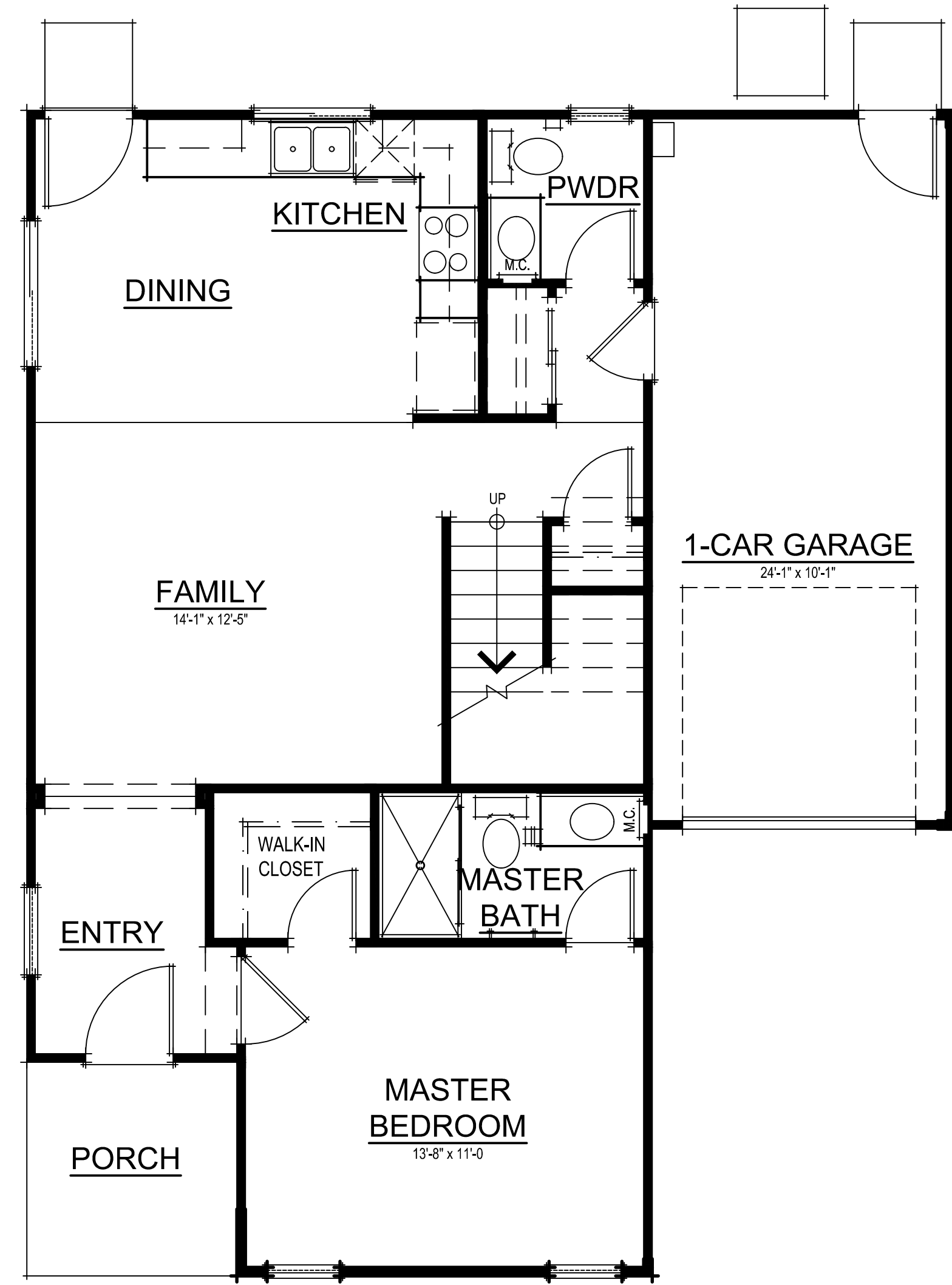
PLAN 1
FLOOR PLAN



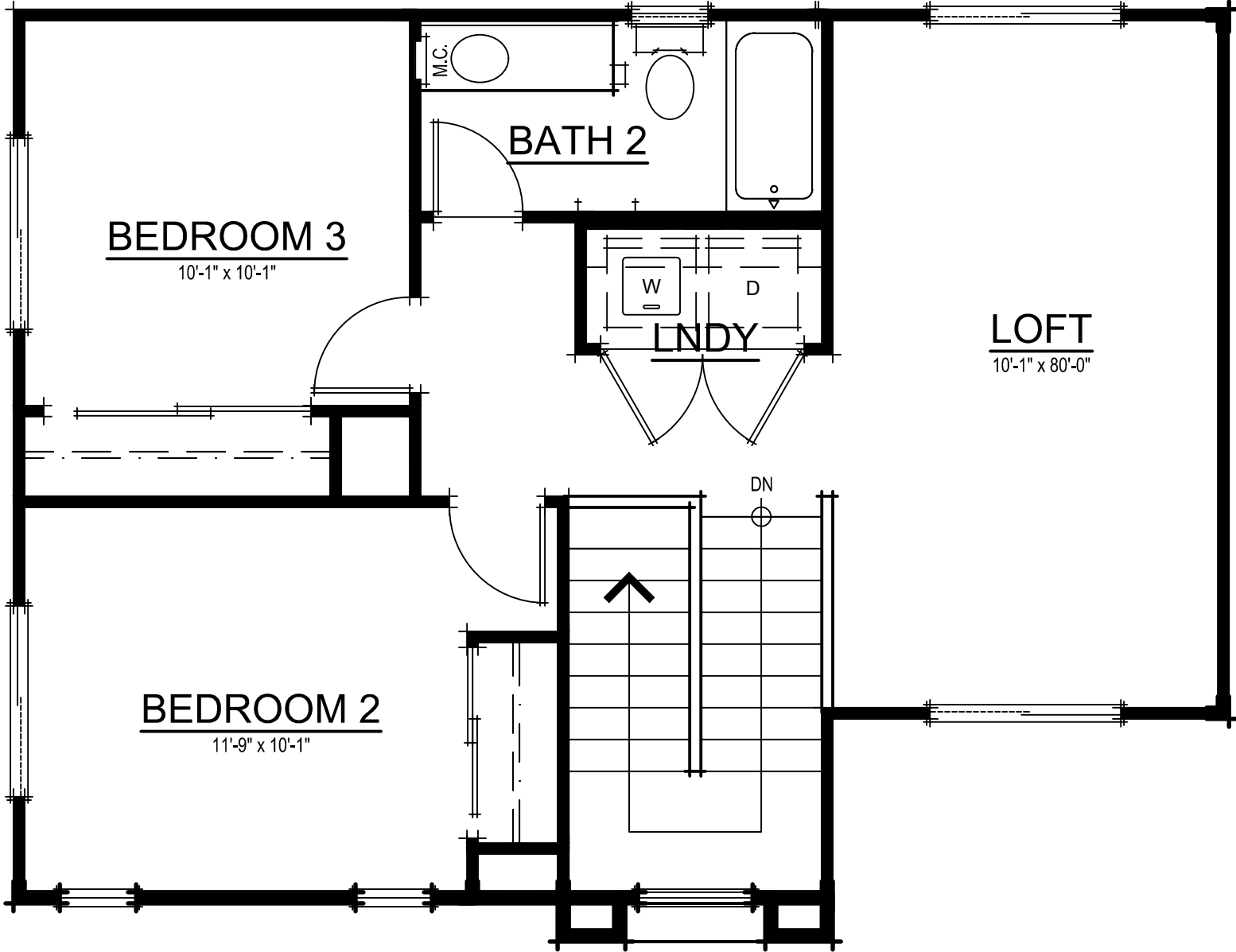


PLAN 2
SECOND FLOOR PLAN

SQUARE FOOTAGES	
FIRST FLOOR	805 SQ. FT.
SECOND FLOOR	458 SQ. FT.
TOTAL LIVING	1263 SQ. FT.
1-CAR GARAGE	256 SQ. FT.

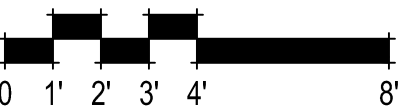


PLAN 2
FIRST FLOOR PLAN

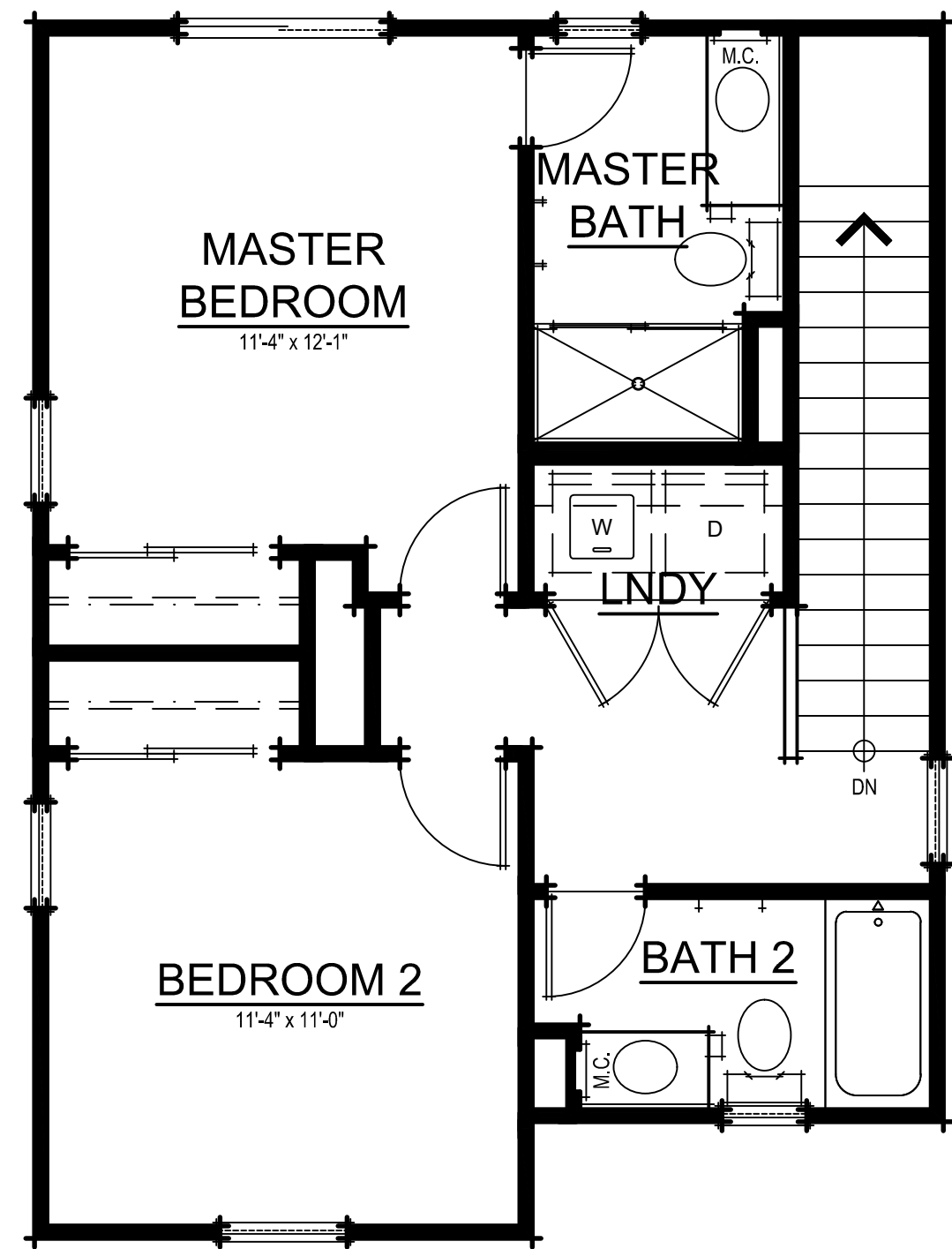


PLAN 2
SECOND FLOOR LOFT OPTION

SQUARE FOOTAGES	
LOFT	193 SQ. FT.
TOTAL LOFT	386 SQ. FT.

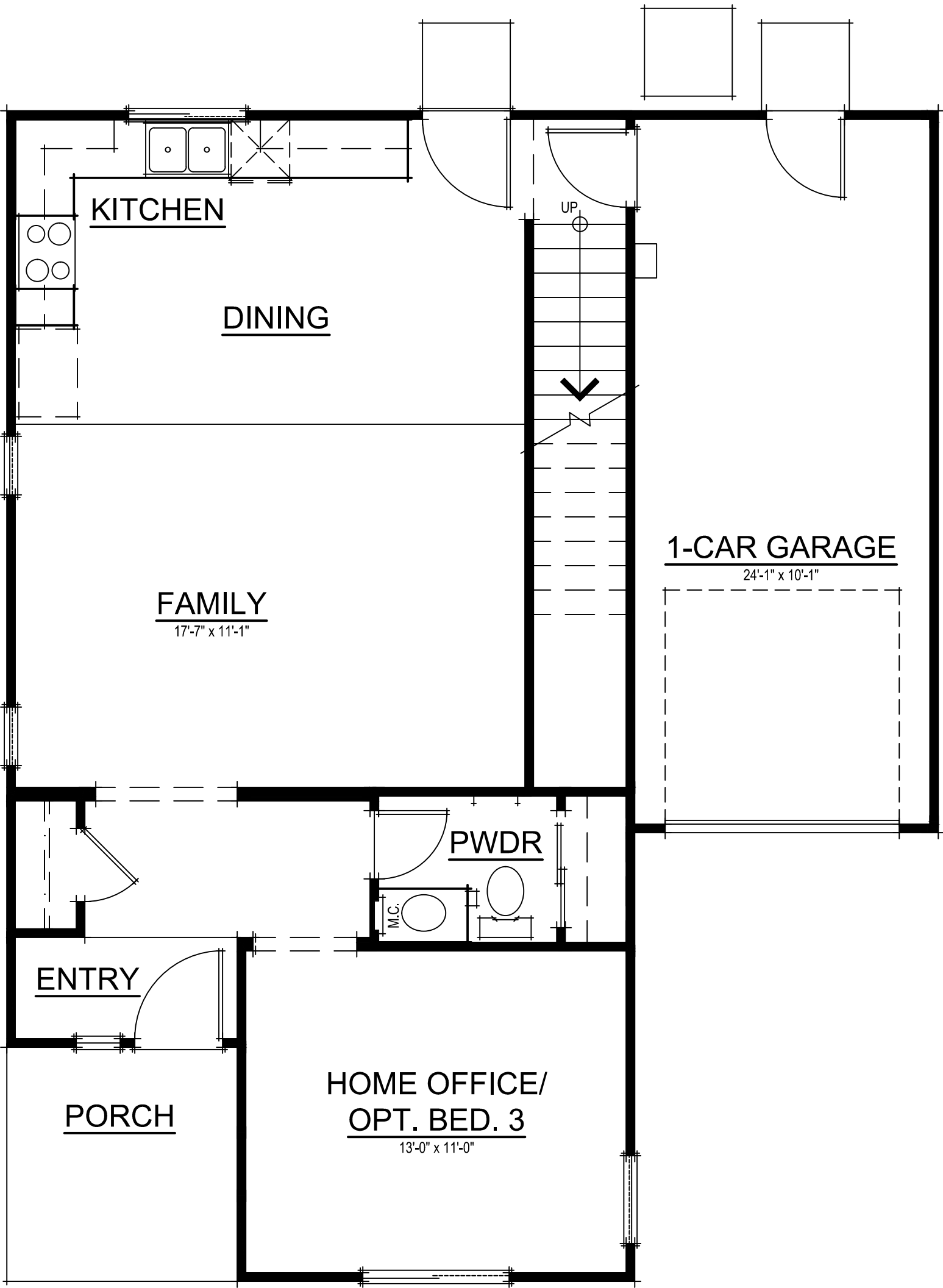


PLAN 2 LOFT OPTION
A005

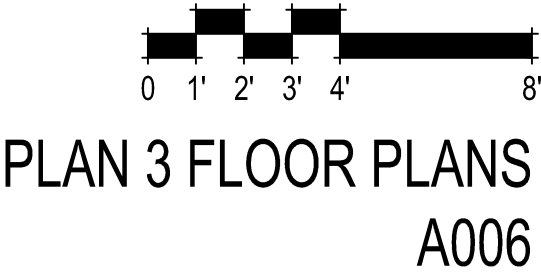


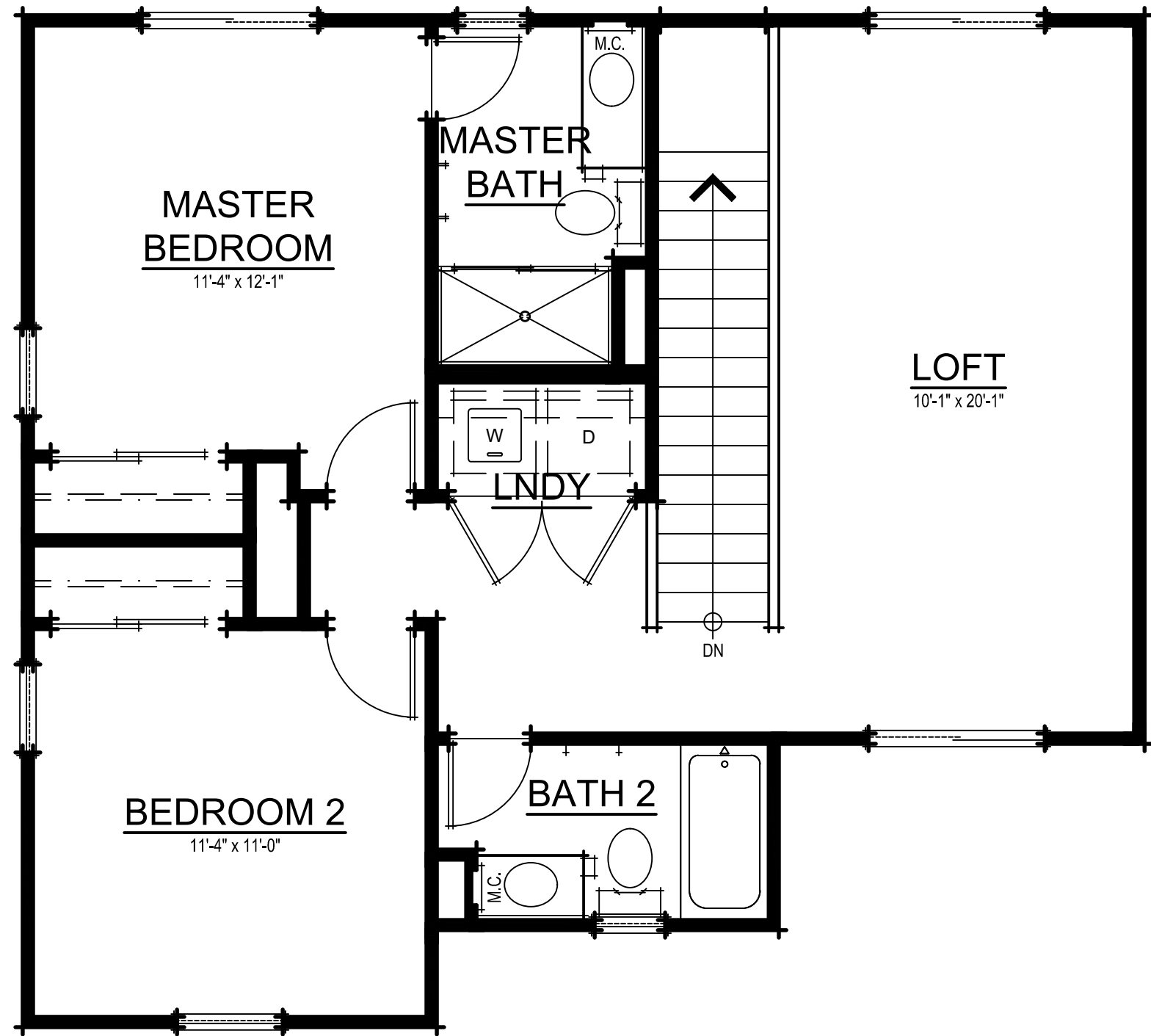
PLAN 3
SECOND FLOOR PLAN

SQUARE FOOTAGES	
FIRST FLOOR	795 SQ. FT.
SECOND FLOOR	530 SQ. FT.
TOTAL LIVING	1325 SQ. FT.
1-CAR GARAGE	256 SQ. FT.



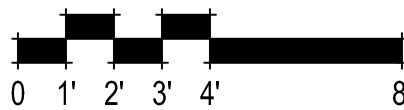
PLAN 3
FIRST FLOOR PLAN





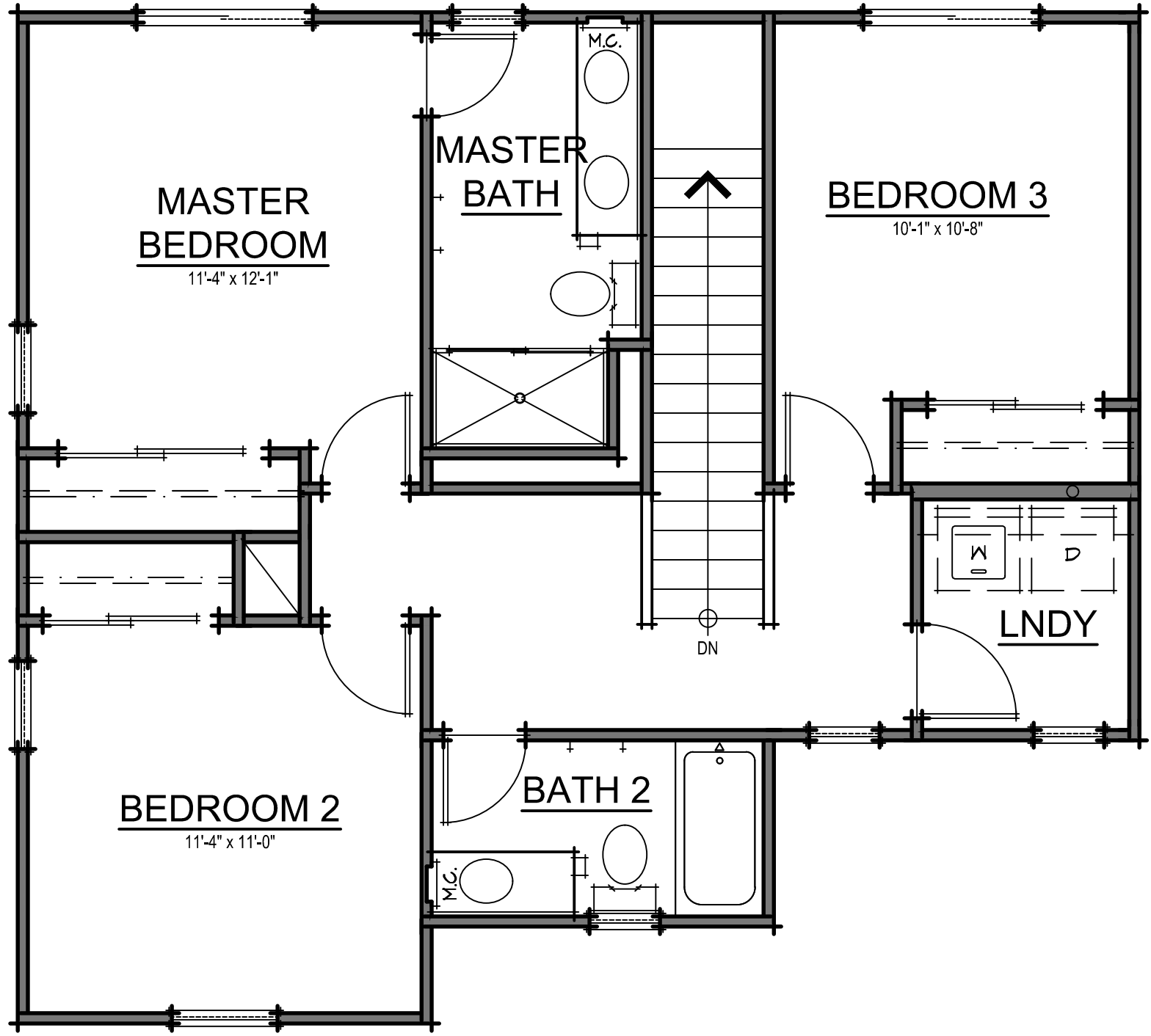
PLAN 3
SECOND FLOOR LOFT OPTION

SQUARE FOOTAGES	
LOFT	214 SQ. FT.
TOTAL LOFT	428 SQ. FT.



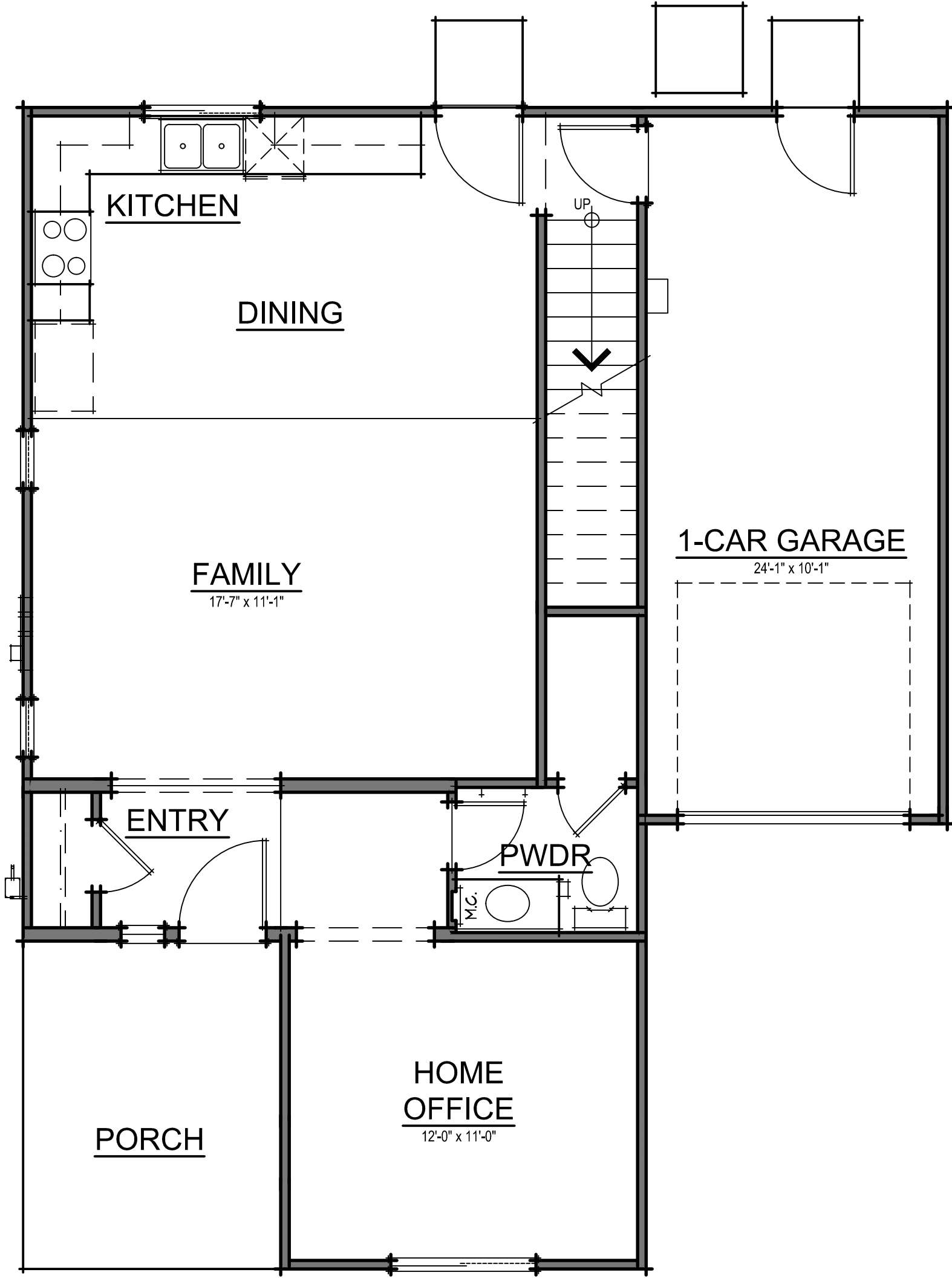
PLAN 3 LOFT OPTION
A007

PLAN 4
SECOND FLOOR PLAN



SQUARE FOOTAGES	
FIRST FLOOR	758 SQ. FT.
SECOND FLOOR	749 SQ. FT.
TOTAL LIVING	1507 SQ. FT.
1-CAR GARAGE	256 SQ. FT.

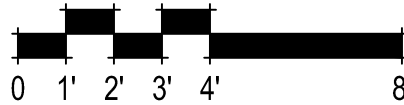
PLAN 4
FIRST FLOOR PLAN





DUET 1 FLOOR PLAN

391.008 Legacy Springs
Sparks, NV
June 15, 2021



DUET 1 FLOOR PLAN
A009

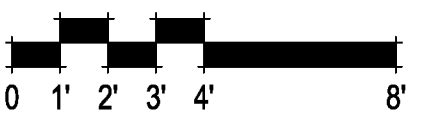
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COTTAGE FRONT ELEVATION

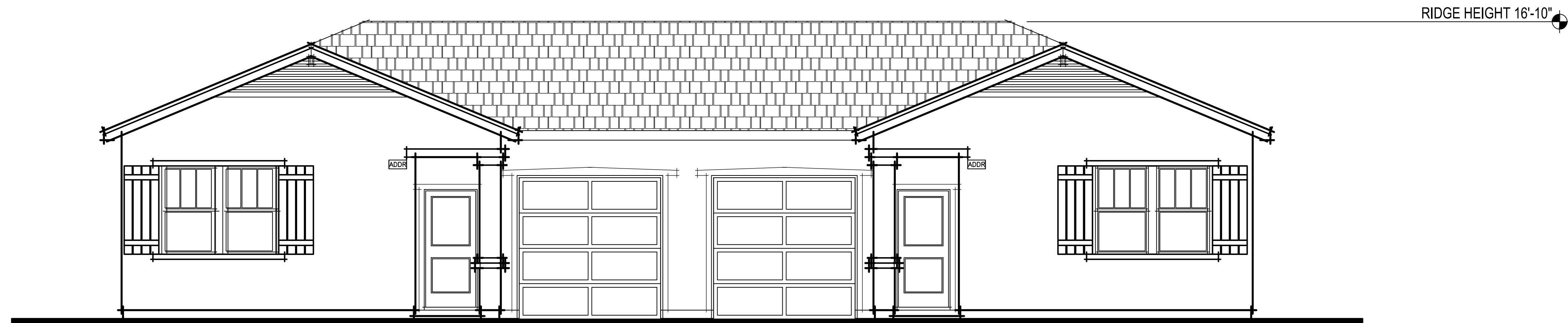
391.008 Legacy Springs
Sparks, NV
June 15, 2021



DUET 1 FRONT COTTAGE ELEVATION
A010

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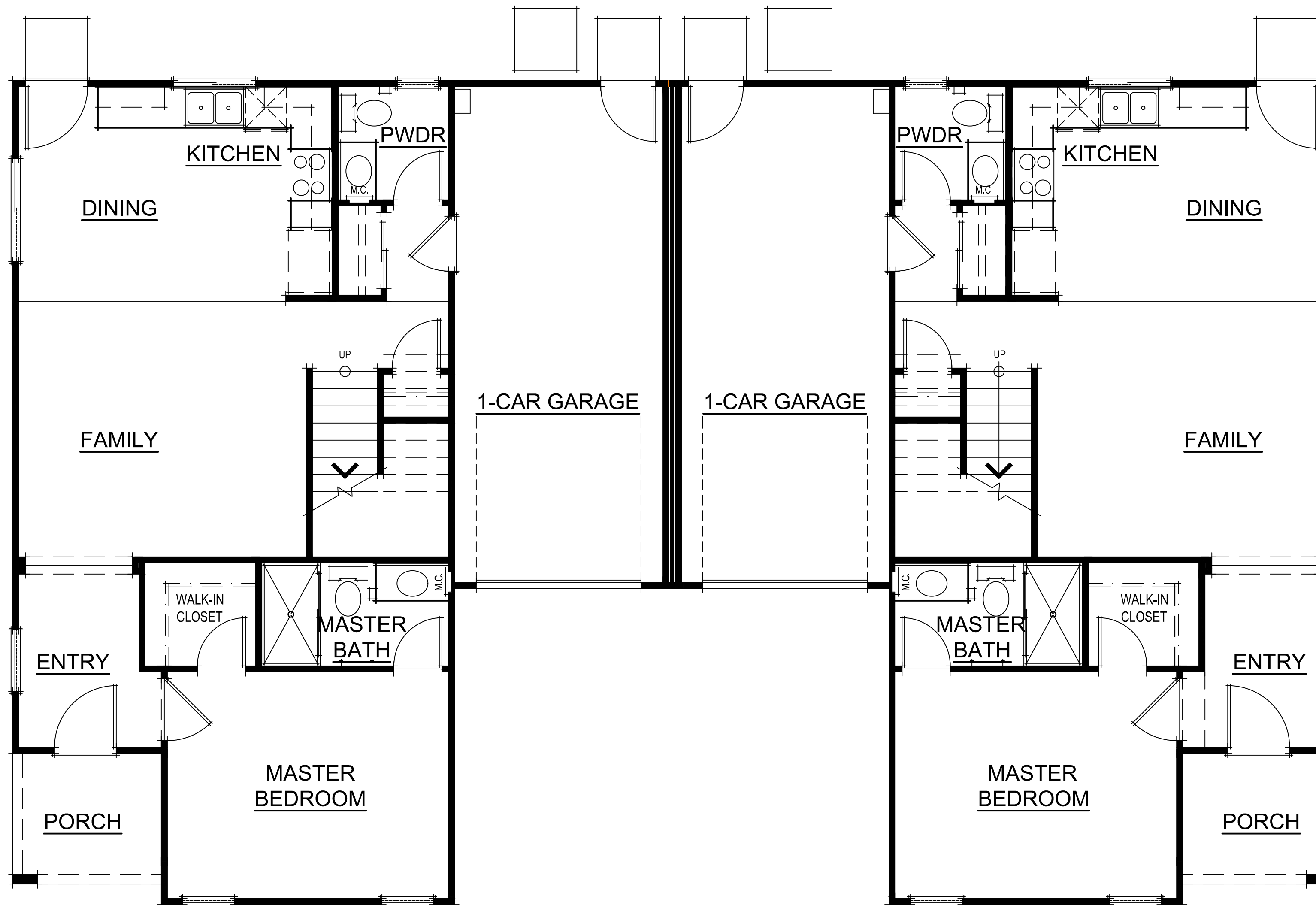




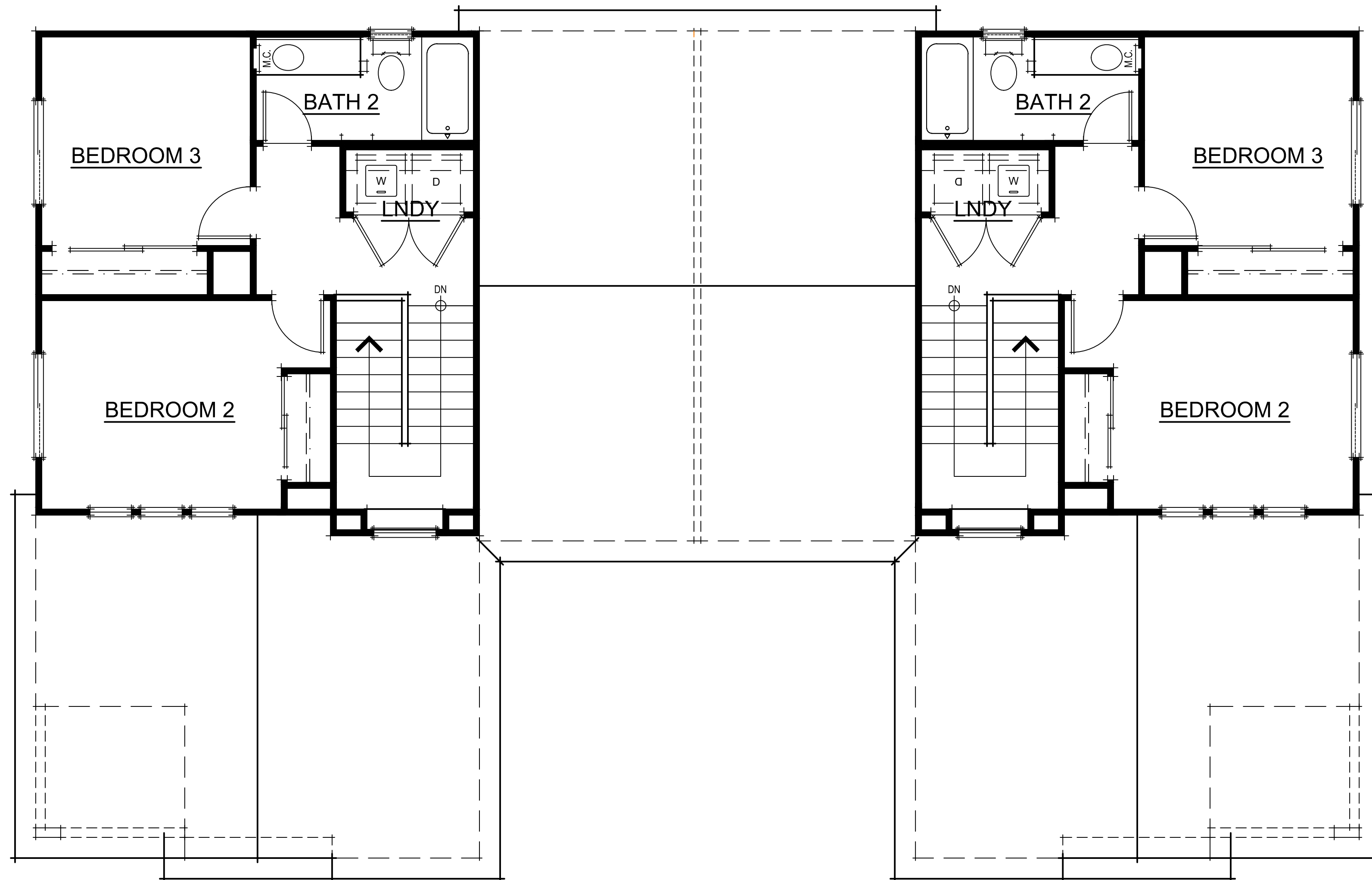
CRAFTSMAN FRONT ELEVATION



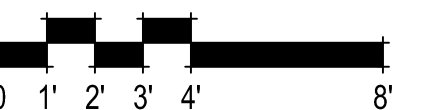
ITALIANATE FRONT ELEVATION



DUET 2 FIRST FLOOR PLAN



DUET 2 SECOND FLOOR PLAN



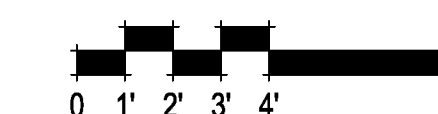
DUET 2 SECOND FLOOR PLAN
A013



RIDGE HEIGHT 25'-1"

CRAFTSMAN FRONT ELEVATION

391.008 Legacy Springs
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DUET 2 FRONT CRAFTSMAN ELEVATION
A014

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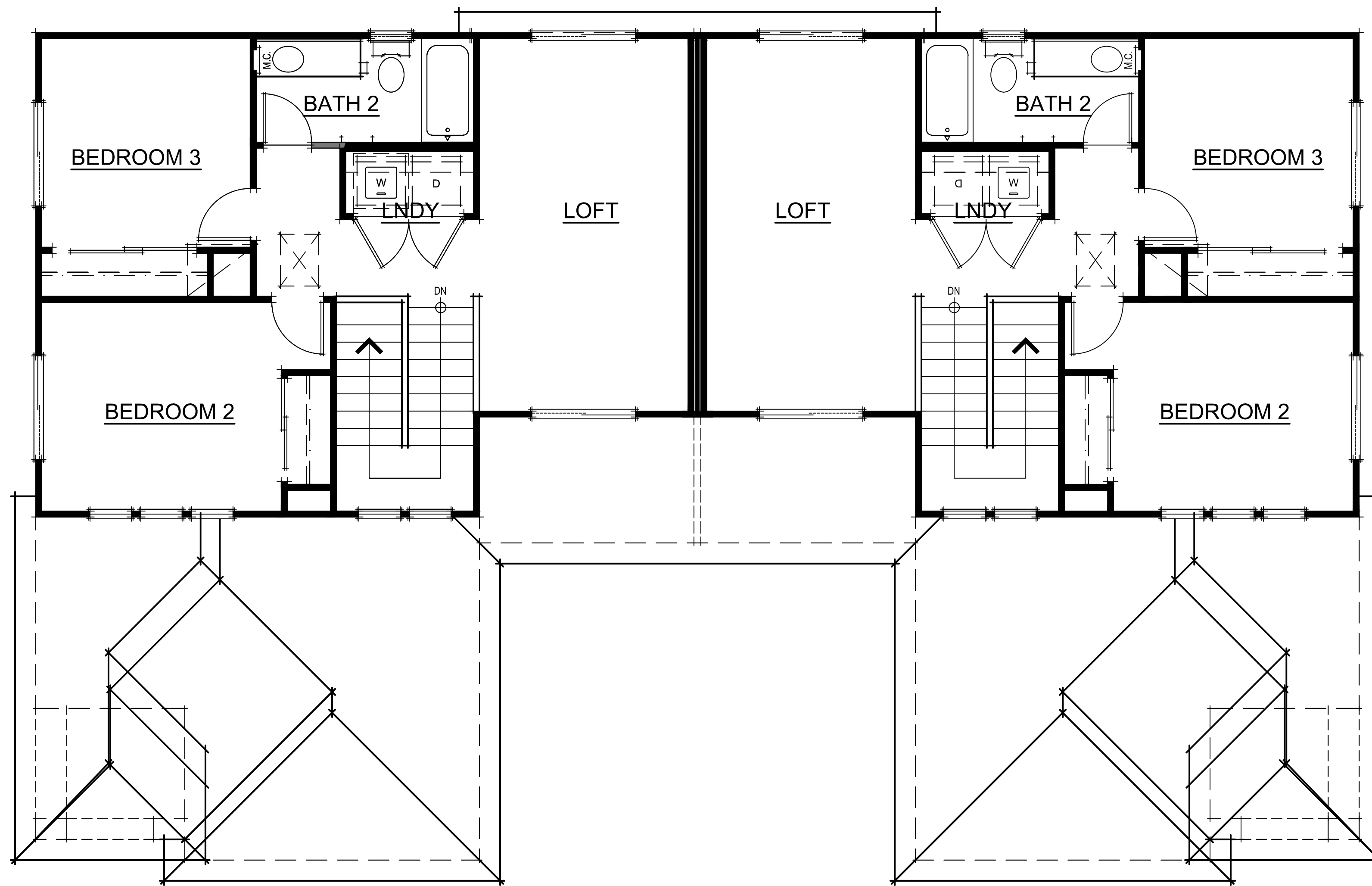




COTTAGE FRONT ELEVATION



ITALIANATE FRONT ELEVATION

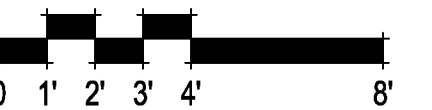


DUET 2 LOFT SECOND FLOOR PLAN



ITALIANATE FRONT ELEVATION

391.008 Legacy Springs
Sparks, NV
June 15, 2021



DUET 2 LOFT FRONT ITALIANATE ELEVATION
A017

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COTTAGE FRONT ELEVATION



CRAFTSMAN FRONT ELEVATION

391.008 Legacy Springs
Sparks, NV
June 15, 2021

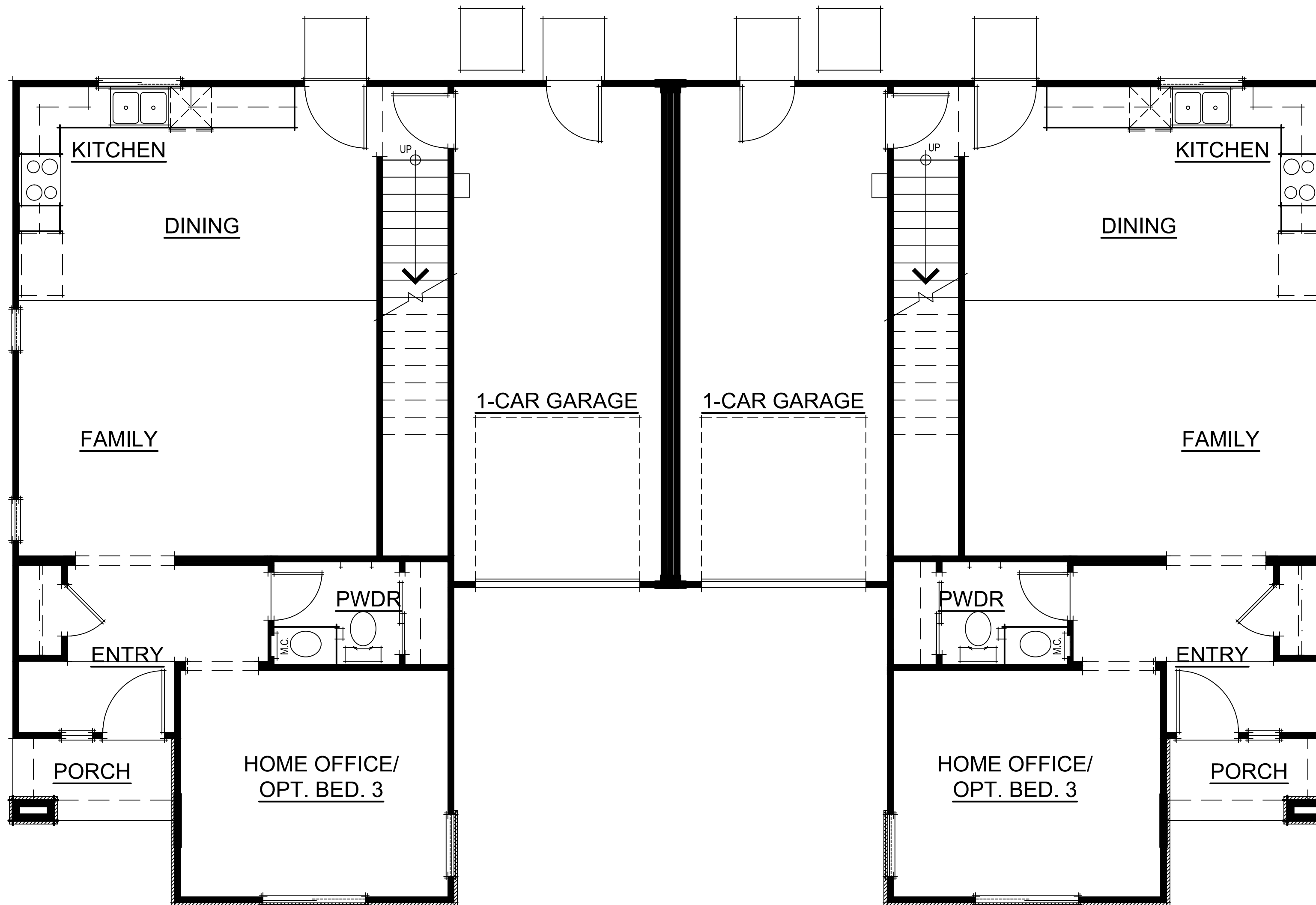


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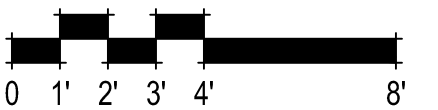
DUET 2 LOFT FRONT ELEVATIONS
A018

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DUET 3 FIRST FLOOR PLAN



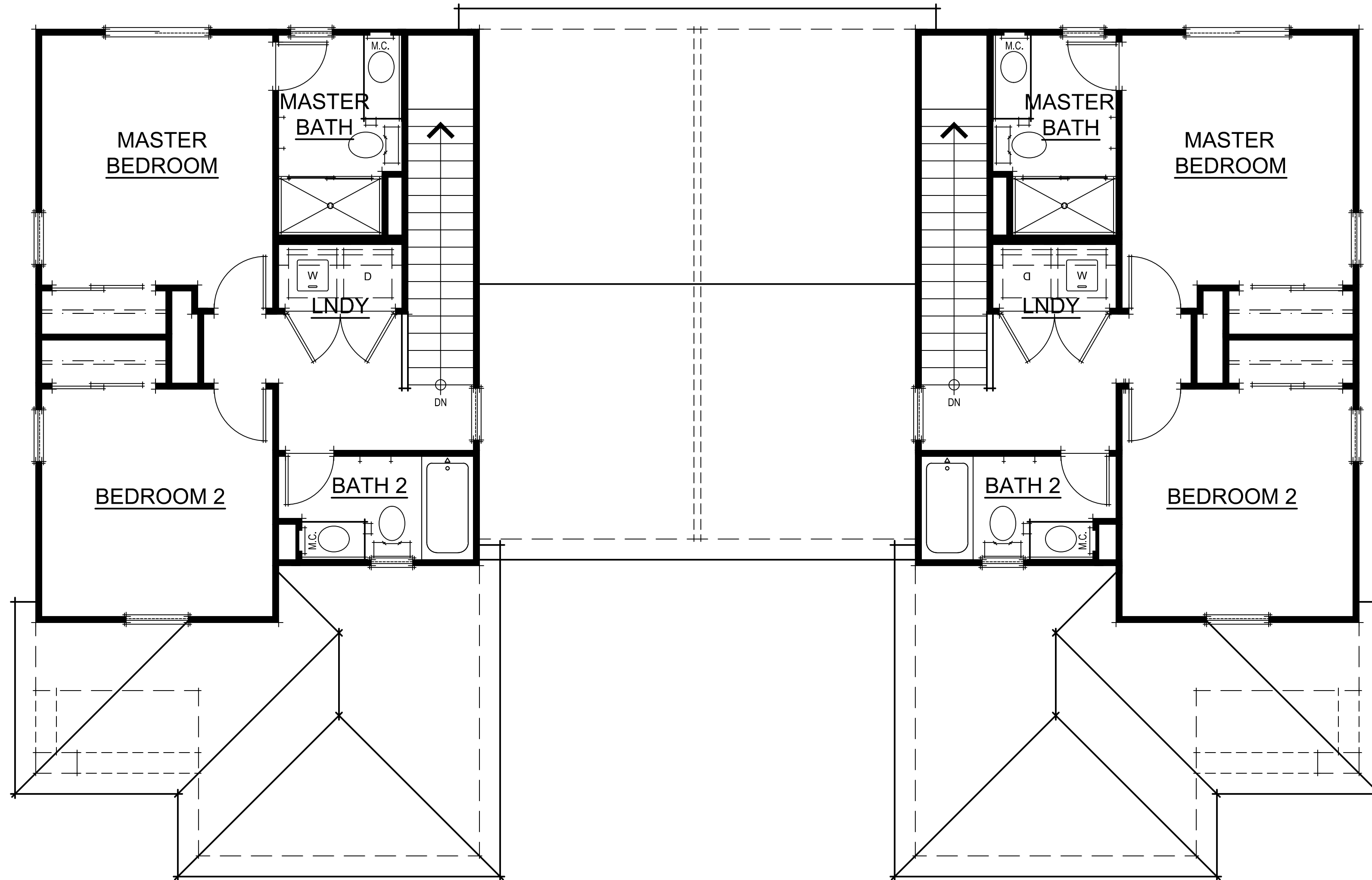
DUET 3 FIRST FLOOR PLAN
A019

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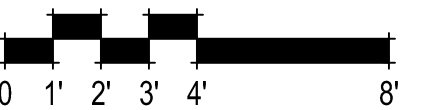


DUET 3 SECOND FLOOR PLAN



ITALIANATE FRONT ELEVATION

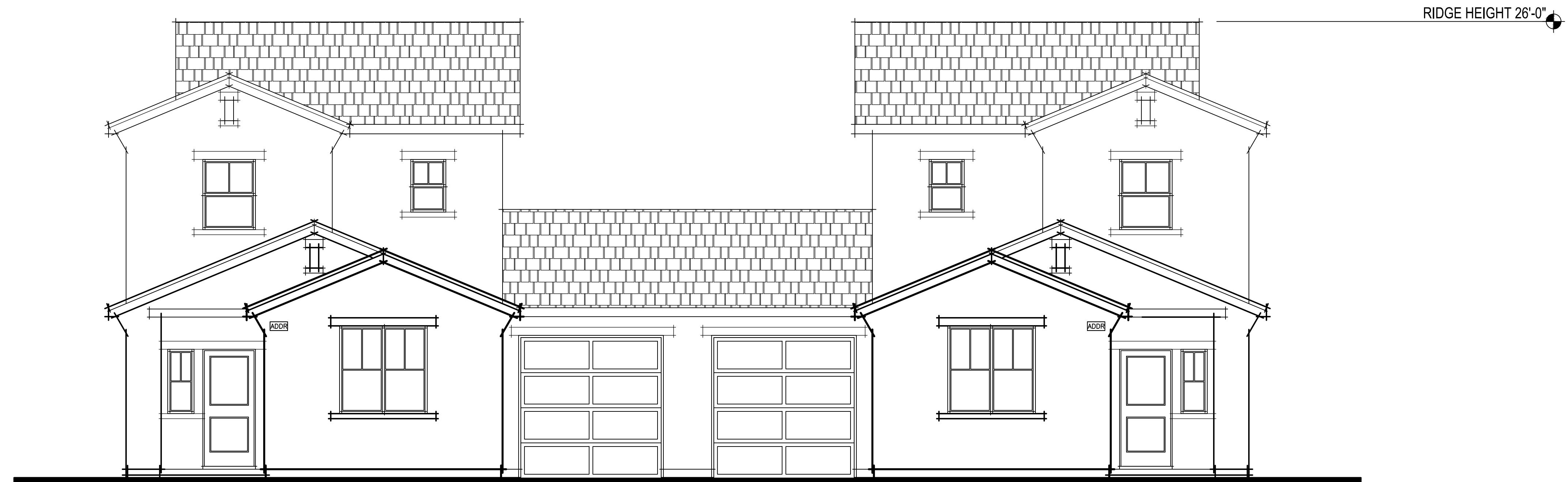
391.008 Legacy Springs
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June 15, 2021



DUET 3 FRONT ITALIANATE ELEVATION
A021

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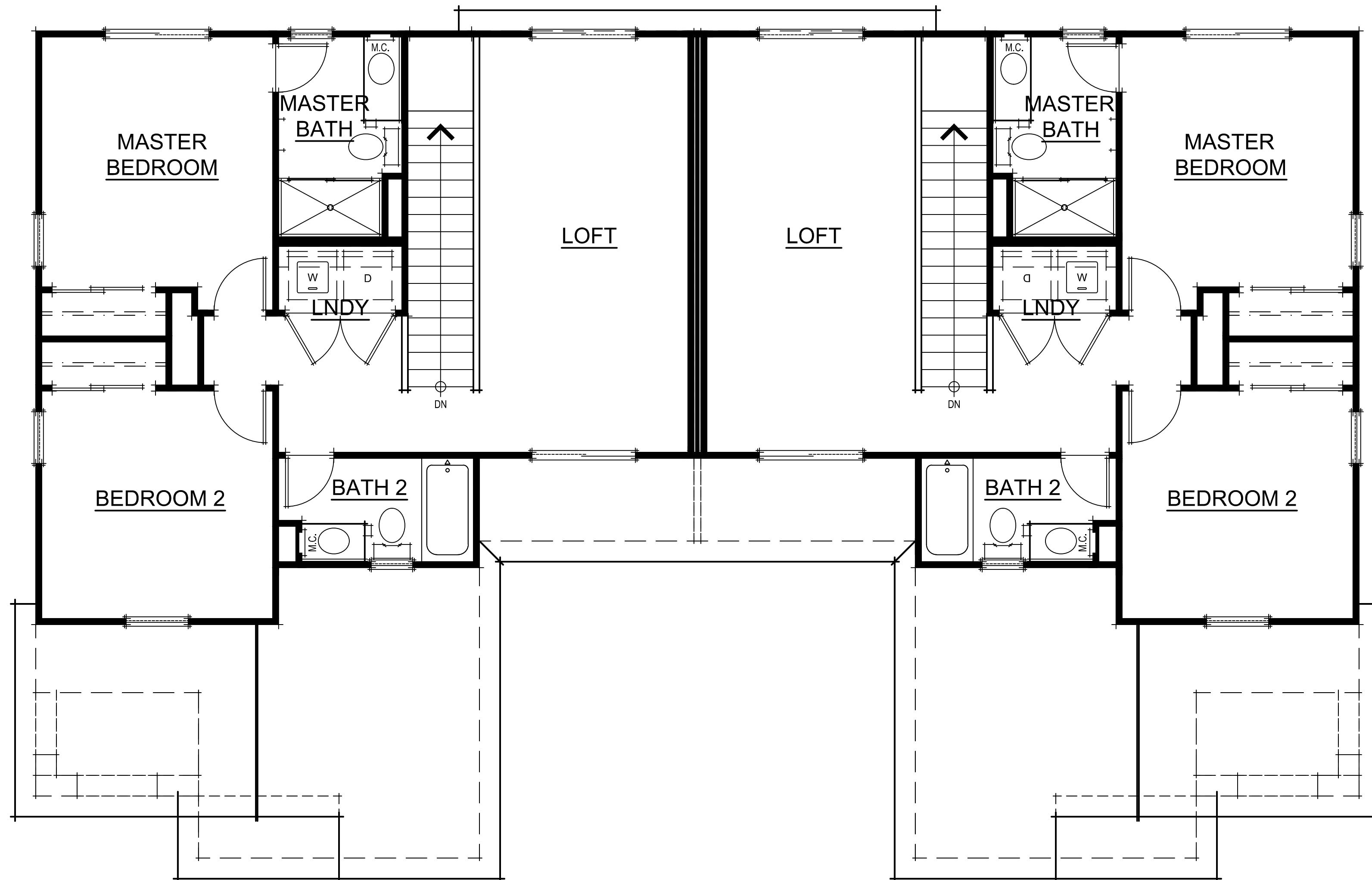




COTTAGE FRONT ELEVATION



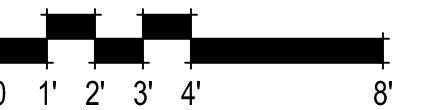
CRAFTSMAN FRONT ELEVATION



DUET 3 SECOND FLOOR PLAN



391.008 Legacy Springs
Sparks, NV
June 15, 2021



DUET 3 LOFT COTTAGE ELEVATION
A024

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RIDGE HEIGHT 25'-1"

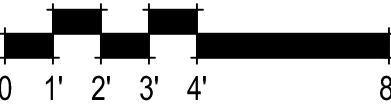


CRAFTSMAN FRONT ELEVATION

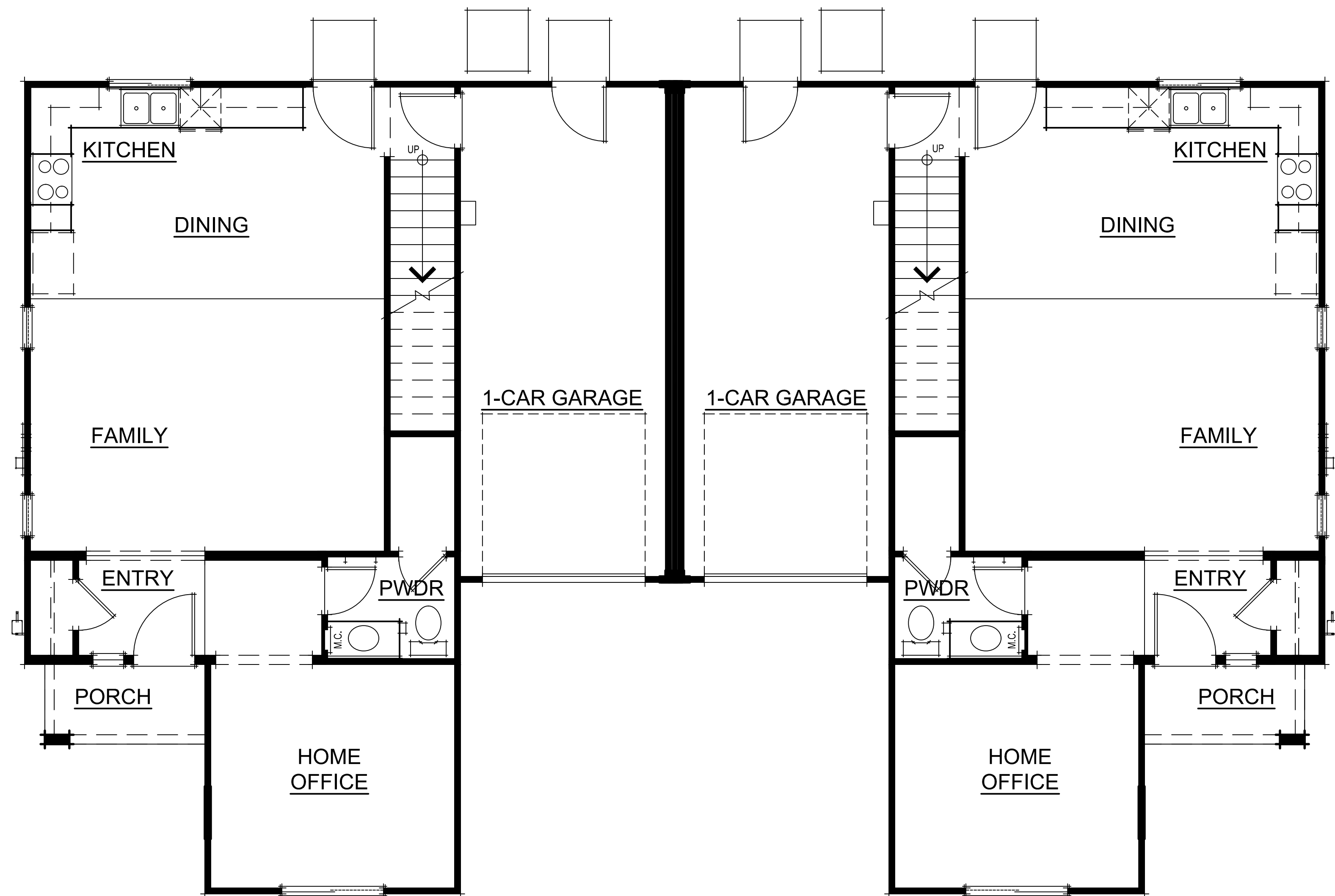
RIDGE HEIGHT 25'-1"



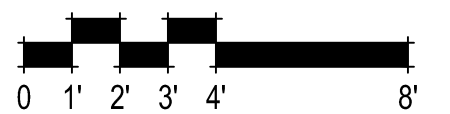
ITALIANATE FRONT ELEVATION



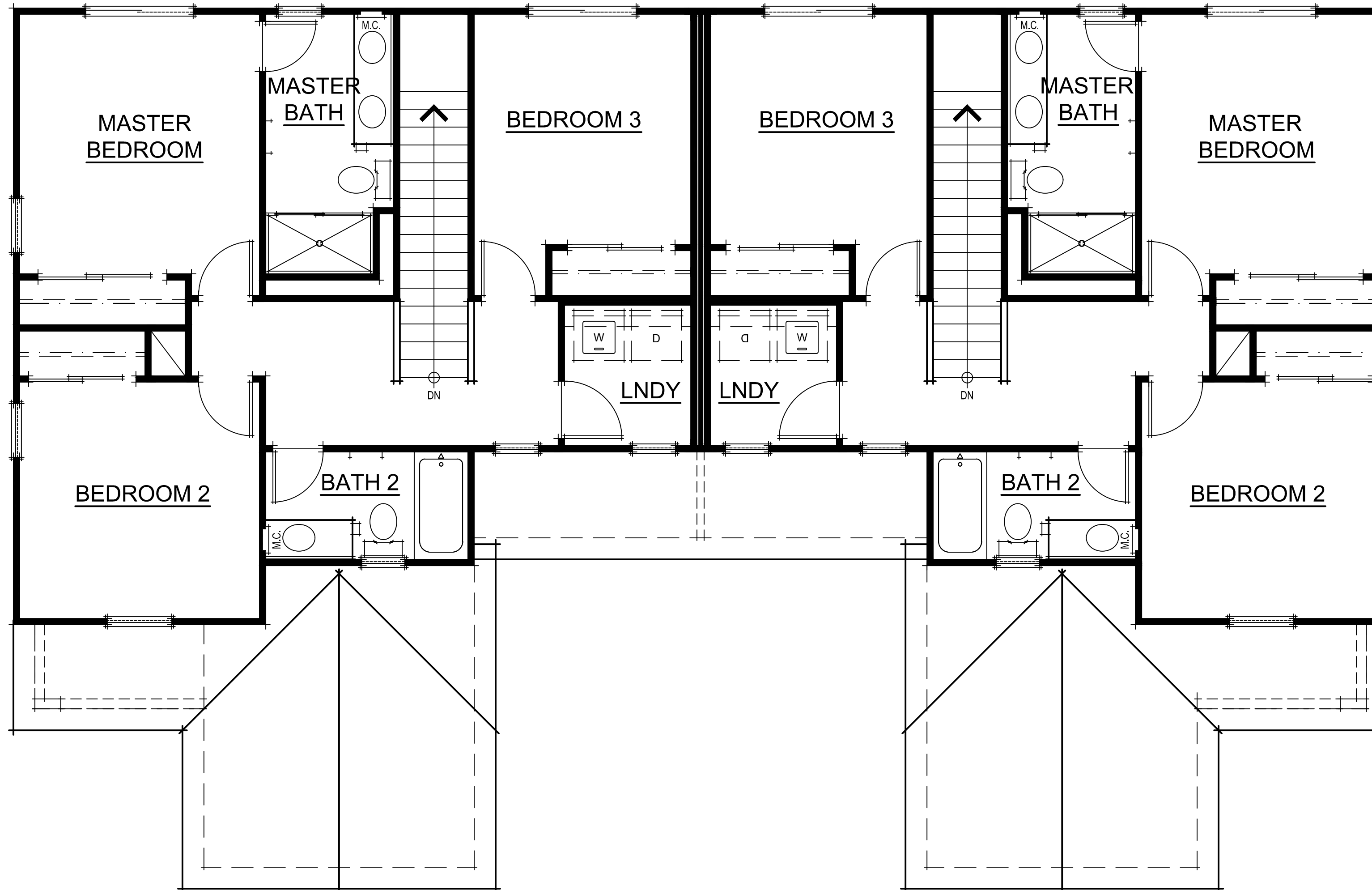
DUET 3 LOFT FRONT ELEVATIONS
A025



DUET 4 FIRST FLOOR PLAN



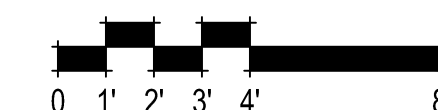
DUET 4 FIRST FLOOR PLAN
A026



DUET 4 SECOND FLOOR PLAN



CRAFTSMAN FRONT ELEVATION



DUET 4 FRONT CRAFTSMAN ELEVATION
A028



COTTAGE FRONT ELEVATION



ITALIANATE FRONT ELEVATION