



PREVENT FRAUD - Please remember to call a member of our closing team when initiating a wire transfer or providing wiring instructions.

Land Title Guarantee Company
Customer Distribution

Our Order Number: ABD25143871-9

Date: 08-12-2020

Property Address: VISTA RIDGE FILING NO. 6 SECOND AMENDMENT - LOT 1

For Closing Assistance

Derek Greenhouse
3033 EAST FIRST AVENUE, SUITE 600
DENVER, CO 80206
303-331-6239 (phone)
303-393-4783 (fax)
dgreenhouse@ltgc.com
Company License: CO44565

Closer's Assistant

Valerie Fertig
3033 EAST FIRST AVENUE, SUITE 600
DENVER, CO 80206
303-331-6217 (phone)
303-393-4739 (fax)
vfertig@ltgc.com

For Title Assistance

David Knapp
5975 GREENWOOD PLAZA BLVD
GREENWOOD VILLAGE, CO 80111
303-850-4174 (phone)
303-393-4842 (fax)
dknapp@ltgc.com

PLEASE CONTACT YOUR CLOSER OR CLOSER'S ASSISTANT FOR WIRE TRANSFER INSTRUCTIONS

AUTOWASH LLLP
2033 CENTRAL PARK BLVD
DENVER, CO 80238
dennisdreeszen@hotmail.com
Delivered via: Linked Commitment Delivery
Copies: 1

COLLIERS INTERNATIONAL
Attention: JAY LANDT
4643 S ULSTER ST #1000
DENVER, CO 80237
303-888-5324 (phone)
303-745-5800 (work)
303-745-5888 (work fax)
jay.landt@colliers.com
Delivered via: Linked Commitment Delivery
Copies: 1

VISTA RIDGE DEVELOPMENT CORPORATION C/O MARATHON LAND COMPANY
Attention: JAMES SPEHALSKI
9750 CAMBRIDGE ST
LITTLETON, CO 80127
303-920-9400 (work)
303-795-2879 (work fax)
jspehalski@marathonlc.com
Delivered via: Linked Commitment Delivery
Copies: 1

CUSHMAN & WAKEFIELD
Attention: TYLER BRAY
1515 ARAPAHOE ST #1200
ARAPAHOE TOWER 1
DENVER, CO 80202
303-292-3700 (work)
303-534-8270 (work fax)
tyler.bray@cushwake.com
Delivered via: Linked Commitment Delivery
Copies: 1

BROWNSTEIN HYATT FARBER & SCHRECK PC
Attention: GREGORY VALLIN, ESQ.
410 17TH ST 22ND FL
DENVER, CO 80202
303-223-1100 (work)
303-223-1111 (work fax)
gvallin@bhfs.com
Delivered via: Undetermined

COLLIERS INTERNATIONAL
Attention: LISA VELA
4643 S ULSTER ST #1000
DENVER, CO 80237
303-745-5800 (work)
303-745-5888 (work fax)
lisa.vela@colliers.com
Delivered via: Linked Commitment Delivery
Copies: 1

BROWNSTEIN HYATT FARBER & SCHRECK PC
Attention: KATHY L OSTER
410 17TH ST 22ND FL
DENVER, CO 80202

SRS REAL ESTATE PARTNERS
Attention: SAM BELL
1875 LAWRENCE ST #850
DENVER, CO 80202

303-223-1323 (work)
303-223-0323 (work fax)
koster@bhfs.com
Delivered via: Linked Commitment Delivery
Copies: 1

VISTA RIDGE DEVELOPMENT CORP
Attention: ANDY CHAIKOVSKY
9750 W CAMBRIDGE PL
HOME ADDRESS
LITTLETON, CO 80127
303-783-9425 (work)
303-783-9427 (work fax)
achaikovsky@comcast.net
Delivered via: Electronic Mail

303-390-5235 (work)
303-390-5228 (work fax)
sam.bell@srsre.com
Delivered via: Electronic Mail

HURST & ASSOCIATES INC
Attention: BO BAIZE
2500 BROADWAY ST #B
BOULDER, CO 80304
bo@hurst-assoc.com
Delivered via: Linked Commitment Delivery



Land Title Guarantee Company

Estimate of Title Fees

Order Number: ABD25143871-9

Date: 08-12-2020

Property Address: VISTA RIDGE FILING NO. 6 SECOND AMENDMENT - LOT 1

Buyer/Borrower: AUTOWASH VISTA RIDGE REAL ESTATE LLC, A COLORADO LIMITED LIABILITY COMPANY

Seller: BONANZA DRIVE DEVELOPMENT CORPORATION, A COLORADO CORPORATION

Visit Land Title's website at www.ltgc.com for directions to any of our offices.

Estimate of Title Insurance Fees	
ALTA Owners Policy 06-17-06	To Be Determined
Deletion of Standard Exception(s)	To Be Determined
Tax Certificate	\$26.00
If Land Title Guarantee Company will be closing this transaction, the fees listed above will be collected at closing.	
Total	To Be Determined
THANK YOU FOR YOUR ORDER!	

ALTA COMMITMENT
Old Republic National Title Insurance Company
Schedule A

Order Number: ABD25143871-9

Customer Ref-Loan No.:

Property Address:

VISTA RIDGE FILING NO. 6 SECOND AMENDMENT - LOT 1

1. Effective Date:

08-06-2020 at 5:00 P.M.

2. Policy to be Issued and Proposed Insured:

"ALTA" Owner's Policy 06-17-06

To Be Determined

Proposed Insured:

AUTOWASH VISTA RIDGE REAL ESTATE LLC, A

COLORADO LIMITED LIABILITY COMPANY

3. The estate or interest in the land described or referred to in this Commitment and covered herein is:

A FEE SIMPLE

4. Title to the estate or interest covered herein is at the effective date hereof vested in:

BONANZA DRIVE DEVELOPMENT CORPORATION, A COLORADO CORPORATION

5. The Land referred to in this Commitment is described as follows:

NOTE: THE FOLLOWING LEGAL DESCRIPTION IS PRELIMINARY AND IS SUBJECT TO CHANGE UPON COMPLIANCE WITH THE REQUIREMENTS UNDER SCHEDULE B-1, HEREIN.

TRACT A1, VISTA RIDGE FILING NO. 6 FIRST AMENDMENT, TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO.

NOTE: UPON THE RECORDING OF THE PROPOSED PLAT THE LAND WILL BE DESCRIBED AS FOLLOWS:

LOT 1, VISTA RIDGE FILING NO. 6 SECOND AMENDMENT, ACCORDING TO THE PLAT THEREOF RECORDED _____, 2017 UNDER RECEPTION NO. _____, COUNTY OF WELD, STATE OF COLORADO.

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ALTA COMMITMENT
Old Republic National Title Insurance Company
Schedule B-1

(Requirements)

Order Number: ABD25143871-9

The following are the requirements to be complied with:

Payment to or for the account of the grantors or mortgagors of the full consideration for the estate or interest to be insured.

Proper instrument(s) creating the estate or interest to be insured must be executed and duly filed for record, to-wit:

1. RECORD DULY EXECUTED AND ACKNOWLEDGED PLAT OF VISTA RIDGE FILING NO. 6 SECOND AMENDMENT.

NOTE: A COPY OF SAID PLAT MUST BE SUBMITTED TO LAND TITLE GUARANTEE COMPANY PRIOR TO RECORDATION. UPON RECEIPT AND REVIEW FURTHER REQUIREMENTS AND/OR EXCEPTIONS MAY BE NECESSARY.

2. PROVIDE LAND TITLE GUARANTEE COMPANY WITH A CURRENT ALTA/NSPS LAND TITLE SURVEY OF SUBJECT PROPERTY. UPON REVIEW, ADDITIONAL REQUIREMENTS AND/OR EXCEPTIONS MAY BE NECESSARY.

LAND TITLE IS NOT RESPONSIBLE FOR ORDERING SAID ALTA/NSPS LAND TITLE SURVEY.

SAID SURVEY MUST BE CERTIFIED TO LAND TITLE GUARANTEE COMPANY AND OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY.

3. A FULL COPY OF THE FULLY EXECUTED OPERATING AGREEMENT AND ANY AND ALL AMENDMENTS THERETO FOR AUTOWASH VISTA RIDGE REAL ESTATE LLC, A COLORADO LIMITED LIABILITY COMPANY MUST BE FURNISHED TO LAND TITLE GUARANTEE COMPANY. SAID AGREEMENT MUST DISCLOSE WHO MAY CONVEY, ACQUIRE, ENCUMBER, LEASE OR OTHERWISE DEAL WITH INTERESTS IN REAL PROPERTY FOR SAID ENTITY.

NOTE: ADDITIONAL REQUIREMENTS MAY BE NECESSARY UPON REVIEW OF THIS DOCUMENTATION.

4. DULY EXECUTED AND ACKNOWLEDGED STATEMENT OF AUTHORITY SETTING FORTH THE NAME OF AUTOWASH VISTA RIDGE REAL ESTATE LLC AS A COLORADO LIMITED LIABILITY COMPANY. THE STATEMENT OF AUTHORITY MUST STATE UNDER WHICH LAWS THE ENTITY WAS CREATED, THE MAILING ADDRESS OF THE ENTITY, AND THE NAME AND POSITION OF THE PERSON(S) AUTHORIZED TO EXECUTE INSTRUMENTS CONVEYING, ENCUMBERING, OR OTHERWISE AFFECTING TITLE TO REAL PROPERTY ON BEHALF OF THE ENTITY AND OTHERWISE COMPLYING WITH THE PROVISIONS OF SECTION 38-30-172, CRS.

NOTE: THE STATEMENT OF AUTHORITY MUST BE RECORDED WITH THE CLERK AND RECORDER.

5. SPECIAL WARRANTY DEED FROM BONANZA DRIVE DEVELOPMENT CORPORATION, A COLORADO CORPORATION TO AUTOWASH VISTA RIDGE REAL ESTATE LLC, A COLORADO LIMITED LIABILITY COMPANY CONVEYING SUBJECT PROPERTY.
6. AN EASEMENT AGREEMENT EXECUTED BY AND BETWEEN BONANZA DRIVE DEVELOPMENT CORPORATION, A COLORADO CORPORATION AND AUTOWASH VISTA RIDGE REAL ESTATE LLC, A COLORADO LIMITED LIABILITY COMPANY IN A FORM ACCEPTABLE TO THIS COMPANY CREATING AN ACCESS EASEMENT FROM THE LAND TO AN OPEN PUBLIC STREET MAINTAINED BY THE TOWN OF

ALTA COMMITMENT
Old Republic National Title Insurance Company
Schedule B-1

(Requirements)

Order Number: ABD25143871-9

The following are the requirements to be complied with:

ERIE.

NOTE: ITEMS 1-3 OF THE STANDARD EXCEPTIONS WILL BE DELETED UPON RECEIPT OF AN APPROVED SURVEY. MATTERS DISCLOSED BY SAID SURVEY MAY BE ADDED TO SCHEDULE B-2 HEREOF.

NOTE: UPON THE APPROVAL OF THE COMPANY AND THE RECEIPT OF A NOTARIZED FINAL LIEN AFFIDAVIT, ITEM NO. 4 OF THE STANDARD EXCEPTIONS ON THE OWNER'S POLICY, WILL BE AMENDED AS FOLLOWS:

ITEM NO. 4 OF THE STANDARD EXCEPTIONS IS DELETED AS TO ANY LIENS OR FUTURE LIENS RESULTING FROM WORK OR MATERIAL FURNISHED AT THE SPECIFIC, DIRECT REQUEST, AND WITH THE ACTUAL KNOWLEDGE OF BONANZA DRIVE DEVELOPMENT CORPORATION, A COLORADO CORPORATION.

OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY SHALL HAVE NO LIABILITY FOR ANY LIENS ARISING FROM WORK OR MATERIAL FURNISHED AT THE SPECIFIC, DIRECT REQUEST, AND WITH THE ACTUAL KNOWLEDGE OF AUTOWASH VISTA RIDGE REAL ESTATE LLC, A COLORADO LIMITED LIABILITY COMPANY.

NOTE: ITEM 5 OF THE STANDARD EXCEPTIONS WILL BE DELETED IF LAND TITLE GUARANTEE COMPANY CONDUCTS THE CLOSING OF THE CONTEMPLATED TRANSACTION(S) AND RECORDS THE DOCUMENTS IN CONNECTION THEREWITH.

NOTE: UPON PROOF OF PAYMENT OF 2019 TAXES, ITEM 6 WILL BE AMENDED TO READ:

TAXES AND ASSESSMENTS FOR THE YEAR 2020 AND SUBSEQUENT YEARS, A LIEN NOT YET DUE OR PAYABLE.

NOTE: ITEMS 7(A) AND 7(B) OF THE STANDARD EXCEPTIONS ARE HEREBY DELETED.

NOTE: ITEM 8 UNDER SCHEDULE B-2 WILL BE DELETED UPON PROOF FROM THE OWNER STATING THERE ARE NO LEASES OR TENANTS ON SUBJECT PROPERTY.

Old Republic National Title Insurance Company
Schedule B-2

(Exceptions)

Order Number: ABD25143871-9

The policy or policies to be issued will contain exceptions to the following unless the same are disposed of to the satisfaction of the Company:

1. Any facts, rights, interests, or claims thereof, not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
2. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
3. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
4. Any lien, or right to a lien, for services, labor or material heretofore or hereafter furnished, imposed by law and not shown by the Public Records.
5. Defects, liens, encumbrances, adverse claims or other matters, if any, created, first appearing in the public records or attaching subsequent to the effective date hereof but prior to the date of the proposed insured acquires of record for value the estate or interest or mortgage thereon covered by this Commitment.
6. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
7. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water.
8. EXISTING LEASES AND TENANCIES, IF ANY.
9. UNDIVIDED 50% INTEREST IN AND TO ALL OIL, GAS AND OTHER MINERALS AS RESERVED IN DEED , RECORDED JUNE 27, 1972, UNDER RECEPTION NO. [1592499](#) IN BOOK 670, AND ANY AND ALL ASSIGNMENTS THEREOF OR INTERESTS THEREIN.
10. OIL AND GAS LEASE RECORDED SEPTEMBER 18, 1981 UNDER RECEPTION NO. [1868894](#) IN BOOK 947 AND ANY AND ALL ASSIGNMENTS THEREOF, OR INTEREST THEREIN.
11. OIL AND GAS LEASE RECORDED NOVEMBER 16, 1981 UNDER RECEPTION NO. [1874598](#) IN BOOK 953 AND ANY AND ALL ASSIGNMENTS THEREOF, OR INTEREST THEREIN.
12. NOTICE CONCERNING UNDERGROUND FACILITIES OF UNITED POWER, INC. RECORDED JANUARY 24, 1991 AT RECEPTION NO. [2239296](#).
13. NOTICE OF UNDERGROUND FACILITIES OF MOUNTAIN BELL RECORDED OCTOBER 01, 1981 AT RECEPTION NO. [1870705](#) IN BOOK 949.
14. GENERAL DESCRIPTION OF UNDERGROUND FACILITIES OF COLORADO INTERSTATE GAS COMPANY RECORDED AUGUST 31, 1984 AT RECEPTION NO. [1979784](#) IN BOOK 1041.
15. NOTICE GAS PIPELINE FACILITIES OF ASSOCIATED NATURAL GAS, INC. RECORDED APRIL 10, 1989 AT RECEPTION NO. [2175917](#) IN BOOK 1229.

Old Republic National Title Insurance Company
Schedule B-2

(Exceptions)

Order Number: ABD25143871-9

The policy or policies to be issued will contain exceptions to the following unless the same are disposed of to the satisfaction of the Company:

16. (ITEM INTENTIONALLY DELETED)
17. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN AND IMPOSED BY ZONING ORDINANCE NO. 696 RECORDED AUGUST 30, 2000 AT RECEPTION NO. [2790549](#).
18. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN AND IMPOSED BY ANNEXATION ORDINANCE NO. 704 RECORDED AUGUST 30, 2000 AT RECEPTION NO. [2790550](#).
ANNEXATION MAP RECORDED SEPTEMBER 15, 2000 AT RECEPTION NO. [2793939](#).
19. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN ANNEXATION AGREEMENT RECORDED SEPTEMBER 15, 2000 AT RECEPTION NO. [2793930](#) AND DECEMBER 8, 2000 AT RECEPTION NO. [2812291](#).
20. ANY TAX, LIEN, FEE, OR ASSESSMENT BY REASON OF INCLUSION OF SUBJECT PROPERTY IN THE VISTA RIDGE METROPOLITAN DISTRICT, AS EVIDENCED BY INSTRUMENT RECORDED JANUARY 08, 2001, UNDER RECEPTION NO. [2817763](#).

NOTICES OF RESOLUTION REGARDING THE IMPOSITION OF SYSTEM DEVELOPMENT FEES AND RESOLUTION REGARDING INCREASE OF SYSTEM DEVELOPMENT FEES RECORDED SEPTEMBER 20, 2010 AT RECEPTION NO. [3719463](#) AND MARCH 16, 2012 AT RECEPTION NO. [3832301](#) AND MAY 21, 2013 AT RECEPTION NO. [3933756](#) AND MARCH 18, 2014 AT RECEPTION NO. [4002991](#) AND AUGUST 20, 2014 AT RECEPTION NO. [4039682](#) AND NOVEMBER 14, 2014 AT RECEPTION NO. [4061805](#) AND JULY 21, 2016 AT RECEPTION NO. [4221172](#).

RESOLUTION OF THE BOARD OF DIRECTORS OF THE VISTA RIDGE METROPOLITAN DISTRICT REGARDING THE INCREASE OF SYSTEM DEVELOPMENT FEES RECORDED FEBRUARY 16, 2017 UNDER RECEPTION NO. [4279108](#) AND RESOLUTION RECORDED OCTOBER 31, 2018 UNDER RECEPTION NO. [4442712](#).

21. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN DEVELOPMENT PLAN RECORDED SEPTEMBER 15, 2000 AT RECEPTION NO. [2793940](#), AND AMENDMENT NO. 4 THERETO RECORDED MARCH 3, 2011 AT RECEPTION NO. [3753956](#), AND AMENDMENT NO. 5 RECORDED NOVEMBER 26, 2012 AT RECEPTION NO. [3890727](#), AND AMENDMENT NO. 6 RECORDED NOVEMBER 25, 2013 UNDER RECEPTION NO. [3980214](#).
22. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN DEVELOPMENT AGREEMENT RECORDED DECEMBER 04, 2001 AT RECEPTION NO. [2905896](#).
23. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN DEVELOPMENT PLAN RECORDED FEBRUARY 27, 2002 AT RECEPTION NO. [2928673](#).
24. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN SURFACE USE AGREEMENT RECORDED AUGUST 21, 2002 AT RECEPTION NO. [2980279](#) AND AMENDMENT THERETO RECORDED JULY 6, 2020 UNDER RECEPTION NO. [4605131](#).
25. RIGHT OF WAY EASEMENT AS GRANTED TO UNITED POWER INC., IN INSTRUMENT RECORDED SEPTEMBER 04, 2002, UNDER RECEPTION NO. [2984584](#).
26. RIGHT OF WAY EASEMENT AS GRANTED TO UNITED POWER INC., IN INSTRUMENT RECORDED

Old Republic National Title Insurance Company
Schedule B-2

(Exceptions)

Order Number: ABD25143871-9

The policy or policies to be issued will contain exceptions to the following unless the same are disposed of to the satisfaction of the Company:

NOVEMBER 06, 2002, UNDER RECEPTION NO. [3002912](#).

27. EASEMENTS, CONDITIONS, COVENANTS, RESTRICTIONS, RESERVATIONS AND NOTES ON THE PLAT OF VISTA RIDGE FILING NO. 6 MINOR SUBDIVISION RECORDED MAY 19, 2008 AT RECEPTION NO. [3555044](#).
28. EASEMENTS, CONDITIONS, COVENANTS, RESTRICTIONS, RESERVATIONS AND NOTES ON THE PLAT OF VISTA RIDGE FILING NO. 6 FIRST AMENDMENT RECORDED FEBRUARY 5, 2014 AT RECEPTION NO. [3994401](#).
29. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN DEVELOPMENT AGREEMENT RECORDED FEBRUARY 05, 2014 AT RECEPTION NO. [3994402](#).
30. RESTRICTIVE COVENANTS, WHICH DO NOT CONTAIN A FORFEITURE OR REVERTER CLAUSE, BUT OMITTING ANY COVENANTS OR RESTRICTIONS, IF ANY, BASED UPON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, FAMILIAL STATUS, MARITAL STATUS, DISABILITY, HANDICAP, NATIONAL ORIGIN, ANCESTRY, OR SOURCE OF INCOME, AS SET FORTH IN APPLICABLE STATE OR FEDERAL LAWS, EXCEPT TO THE EXTENT THAT SAID COVENANT OR RESTRICTION IS PERMITTED BY APPLICABLE LAW, AS CONTAINED IN INSTRUMENT RECORDED FEBRUARY 05, 2014, UNDER RECEPTION NO. [3994461](#).
31. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN DECLARATION OF USE RESTRICTION RECORDED FEBRUARY 05, 2014 AT RECEPTION NO. [3994463](#).
32. EASEMENTS, CONDITIONS, COVENANTS, RESTRICTIONS, RESERVATIONS AND NOTES ON THE PLAT OF VISTA RIDGE FILING NO. 6 SECOND AMENDMENT RECORDED _____, 2017 UNDER RECEPTION NO. _____.
33. NOTWITHSTANDING THE INSURING CLAUSES OF THE POLICY, THE COMPANY DOES NOT INSURE AGAINST LOSS OR DAMAGE BY REASON OF A LACK OF A RIGHT OF ACCESS TO AND FROM THE LAND.

NOTE: THIS EXCEPTION WILL BE DELETED UPON SATISFACTION OF REQUIREMENT 6 HEREIN.



**JOINT NOTICE OF PRIVACY POLICY OF
LAND TITLE GUARANTEE COMPANY
LAND TITLE GUARANTEE COMPANY OF SUMMIT COUNTY
LAND TITLE INSURANCE CORPORATION AND
OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY**

This Statement is provided to you as a customer of Land Title Guarantee Company ,
as agent for Land Title Insurance Corporation and Old Republic National Title Insurance Company.

We want you to know that we recognize and respect your privacy expectations and the requirements of federal and state privacy laws. Information security is one of our highest priorities. We recognize that maintaining your trust and confidence is the bedrock of our business. We maintain and regularly review internal and external safeguards against unauthorized access to non-public personal information ("Personal Information").

In the course of our business, we may collect Personal Information about you from:

- ▶ applications or other forms we receive from you, including communications sent through TMX, our web-based transaction management system;
 - ▶ your transactions with, or from the services being performed by, us, our affiliates, or others;
 - ▶ a consumer reporting agency, if such information is provided to us in connection with your transaction;
- and
- ▶ the public records maintained by governmental entities that we either obtain directly from those entities, or from our affiliates and non-affiliates.

Our policies regarding the protection of the confidentiality and security of your Personal Information are as follows:

- ▶ We restrict access to all Personal Information about you to those employees who need to know that information in order to provide products and services to you.
- ▶ We maintain physical, electronic and procedural safeguards that comply with federal standards to protect your Personal Information from unauthorized access or intrusion.
- ▶ Employees who violate our strict policies and procedures regarding privacy are subject to disciplinary action.
- ▶ We regularly access security standards and procedures to protect against unauthorized access to Personal Information.

WE DO NOT DISCLOSE ANY PERSONAL INFORMATION ABOUT YOU WITH ANYONE FOR ANY PURPOSE THAT IS NOT PERMITTED BY LAW.

Consistent with applicable privacy laws, there are some situations in which Personal Information may be disclosed. We may disclose your Personal Information when you direct or give us permission; when we are required by law to do so, for example, if we are served a subpoena; or when we suspect fraudulent or criminal activities. We also may disclose your Personal Information when otherwise permitted by applicable privacy laws such as, for example, when disclosure is needed to enforce our rights arising out of any agreement, transaction or relationship with you.

Our policy regarding dispute resolution is as follows. Any controversy or claim arising out of or relating to our privacy policy, or the breach thereof, shall be settled by arbitration in accordance with the rules of the American Arbitration Association, and judgment upon the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof.



LAND TITLE GUARANTEE COMPANY

DISCLOSURE STATEMENTS

Note: Pursuant to CRS 10-11-122, notice is hereby given that:

- A) The Subject real property may be located in a special taxing district.
- B) A certificate of taxes due listing each taxing jurisdiction will be obtained from the county treasurer of the county in which the real property is located or that county treasurer's authorized agent unless the proposed insured provides written instructions to the contrary. (for an Owner's Policy of Title Insurance pertaining to a sale of residential real property)
- C) The information regarding special districts and the boundaries of such districts may be obtained from the Board of County Commissioners, the County Clerk and Recorder, or the County Assessor.

Note: Effective September 1, 1997, CRS 30-10-406 requires that all documents received for recording or filing in the clerk and recorder's office shall contain a top margin of at least one inch and a left, right and bottom margin of at least one half of an inch. The clerk and recorder may refuse to record or file any document that does not conform, except that, the requirement for the top margin shall not apply to documents using forms on which space is provided for recording or filing information at the top margin of the document.

Note: Colorado Division of Insurance Regulations 8-1-2 requires that "Every title entity shall be responsible for all matters which appear of record prior to the time of recording whenever the title entity conducts the closing and is responsible for recording or filing of legal documents resulting from the transaction which was closed". Provided that Land Title Guarantee Company conducts the closing of the insured transaction and is responsible for recording the legal documents from the transaction, exception number 5 will not appear on the Owner's Title Policy and the Lenders Policy when issued.

Note: Affirmative mechanic's lien protection for the Owner may be available (typically by deletion of Exception no. 4 of Schedule B-2 of the Commitment from the Owner's Policy to be issued) upon compliance with the following conditions:

- A) The land described in Schedule A of this commitment must be a single family residence which includes a condominium or townhouse unit.
- B) No labor or materials have been furnished by mechanics or material-men for purposes of construction on the land described in Schedule A of this Commitment within the past 6 months.
- C) The Company must receive an appropriate affidavit indemnifying the Company against un-filed mechanic's and material-men's liens.
- D) The Company must receive payment of the appropriate premium.
- E) If there has been construction, improvements or major repairs undertaken on the property to be purchased within six months prior to the Date of the Commitment, the requirements to obtain coverage for unrecorded liens will include: disclosure of certain construction information; financial information as to the seller, the builder and or the contractor; payment of the appropriate premium fully executed Indemnity Agreements satisfactory to the company, and, any additional requirements as may be necessary after an examination of the aforesaid information by the Company.

No coverage will be given under any circumstances for labor or material for which the insured has contracted for or agreed to pay.

Note: Pursuant to CRS 10-11-123, notice is hereby given:

This notice applies to owner's policy commitments disclosing that a mineral estate has been severed from the surface estate, in Schedule B-2.

- A) That there is recorded evidence that a mineral estate has been severed, leased, or otherwise conveyed from the surface estate and that there is a substantial likelihood that a third party holds some or all interest in oil, gas, other minerals, or geothermal energy in the property; and
- B) That such mineral estate may include the right to enter and use the property without the surface owner's permission.

Note: Pursuant to CRS 10-1-128(6)(a), It is unlawful to knowingly provide false, incomplete, or misleading facts or information to an insurance company for the purpose of defrauding or attempting to defraud the company. Penalties may include imprisonment, fines, denial of insurance, and civil damages. Any insurance company or agent of an insurance company who knowingly provides false, incomplete, or misleading facts or information to a policyholder or claimant for the purpose of defrauding or attempting to defraud the policyholder or claimant with regard to a settlement or award payable from insurance proceeds shall be reported to the Colorado Division of Insurance within the Department of Regulatory Agencies.

Note: Pursuant to Colorado Division of Insurance Regulations 8-1-3, notice is hereby given of the availability of a closing protection letter for the lender, purchaser, lessee or seller in connection with this transaction.



Commitment to Insure

ALTA Commitment - 2006 Rev.

OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY, a Minnesota corporation, (Company) for a valuable consideration, commits to issue its policy or policies of title insurance, as identified in Schedule A, in favor of the Proposed Insured named in Schedule A, as owner or mortgagee of the estate or interest in the land described or referred to in Schedule A, upon payment of the premiums and charges and compliance with the requirements; all subject to the provisions of Schedule A and B and to the Conditions of this Commitment.

This Commitment shall be effective only when the identity of the Proposed Insured and the amount of the policy or policies committed for have been inserted in Schedule A by the Company. All liability and obligation under this commitment shall cease and terminate six months after the Effective Date or when the policy or policies committed for shall issue, whichever first occurs, provided that the failure to issue such policy or policies is not the fault of the Company.

CONDITIONS AND STIPULATIONS

1. The term "mortgage", when used herein, shall include deed of trust, trust deed, or other security instrument.
2. If the proposed Insured has or acquires actual knowledge of any defect, lien, encumbrance, adverse claim or other matter affecting the estate or interest or mortgage thereon covered by this Commitment other than those shown in Schedule B hereof, and shall fail to disclose such knowledge to Company in writing, the Company shall be relieved from liability for any loss or damage resulting from any act of reliance hereon to the extent the Company is prejudiced by failure to so disclose such knowledge. If the proposed Insured shall disclose such knowledge to the Company, or if the Company otherwise acquires actual knowledge of any such defect, lien, encumbrance, adverse claim or other matter, the Company at its option may amend Schedule B of this Commitment accordingly, but such amendment shall not relieve the Company from liability previously incurred pursuant to paragraph 3 of these Conditions and Stipulations.
3. Liability of the Company under this Commitment shall be only to the named proposed Insured and such parties included under the definition of Insured in the form of policy or policies committed for and only for actual loss incurred in reliance hereon in undertaking in good faith (a) to comply with the requirements hereof or (b) to eliminate exceptions shown in Schedule B, or (c) to acquire or create the estate or interest or mortgage thereon covered by this Commitment. In no event shall such liability exceed the amount stated in Schedule A for the policy or policies committed for and such liability is subject to the insuring provisions and the Conditions and Stipulations and the Exclusions from Coverage of the form of policy or policies committed for in favor of the proposed Insured which are hereby incorporated by reference and are made a part of this Commitment except as expressly modified herein.
4. This commitment is a contract to issue one or more title insurance policies and is not an abstract of title or a report of the condition of title. Any action or actions or rights of action that the proposed Insured may have or may bring against the Company arising out of the status of the title to the estate or interest or the status of the mortgage thereon covered by this Commitment must be based on and are subject to the provisions of this Commitment.
5. The policy to be issued contains an arbitration clause. All arbitrable matters when the Amount of Insurance is \$2,000,000 or less shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties. You may review a copy of the arbitration rules at www.alta.org.

STANDARD EXCEPTIONS

In addition to the matters contained in the Conditions and Stipulations and Exclusions from Coverage above referred to, this Commitment is also subject to the following:

1. Rights or claims of parties in possession not shown by the Public Records.
2. Easements, or claims of easements, not shown by the Public Records.
3. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, and any facts which a correct survey or inspection of the Land would disclose and which are not shown by the Public Records.
4. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the Public Records.
5. Defects, liens, encumbrances, adverse claims or other matters, if any, created, first appearing in the Public Records or attaching subsequent to the effective date hereof but prior to the date the proposed insured acquires of record for value the estate or interest or mortgage thereon covered by this Commitment.

IN WITNESS WHEREOF, Old Republic National Title Insurance Company has caused its corporate name and seal to be affixed by its duly authorized officers on the date shown in Schedule A to be valid when countersigned by a validating officer or other authorized signatory.

Issued by:
Land Title Guarantee Company
3033 East First Avenue
Suite 600
Denver, Colorado 80206
303-321-1880


John E. Freyer, Jr.
President



Old Republic National Title Insurance Company
a Stock Company
400 Second Avenue South
Minneapolis, Minnesota 55401
(612)371-1111


Mark Bilbrey
President

AMERICAN
LAND TITLE
ASSOCIATION




Rande Yeager
Secretary

After Recording, Return to:
Gregory A. Vallin, Esq.
Brownstein Hyatt Farber Schreck, LLP
410 Seventeenth Street, Suite 2200
Denver, CO 80202

**DECLARATION OF COVENANTS, CONDITIONS,
RESTRICTIONS AND EASEMENTS
FOR VISTA RIDGE FILING NO. 6, FIRST AMENDMENT**

After Recording, Return to:
Gregory A. Vallin, Esq.
Brownstein Hyatt Farber Schreck, LLP
410 Seventeenth Street, Suite 2200
Denver, CO 80202

Recorded Electronically	
ID	3994461
County	Weld
Date	2/5/14
Time	3:52pm
Simplifile.com 800.460.6657	

**DECLARATION OF COVENANTS, CONDITIONS,
RESTRICTIONS AND EASEMENTS
FOR VISTA RIDGE FILING NO. 6, FIRST AMENDMENT**

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- EXHIBIT A - Legal Description of Developer Tract
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- EXHIBIT C-1 - Site Plan depicting Common Access Drive and Common Detention Area
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**DECLARATION OF COVENANTS, CONDITIONS,
RESTRICTIONS AND EASEMENTS
FOR VISTA RIDGE FILING NO. 6, FIRST AMENDMENT**

This Declaration of Covenants, Conditions, Restrictions and Easements for Vista Ridge Filing No. 6, First Amendment (this "**Agreement**") is made as of the 24th day of January, 2014, by COUNTY ROAD 3 INVESTORS, LLC, a Colorado limited liability company ("**Developer**").

WHEREAS:

A. Developer is the owner of the property described on Exhibit A (the "**Developer Tract**") and the property described on Exhibit B (the "**Owner Tract**"), as shown on the site plan attached hereto and incorporated herein as Exhibit C.

B. Developer intends to sell and convey the Owner Tract to KG Store 316, L.L.C., an Iowa limited liability company, and the Owner Tract for the construction and operation of a Kum & Go convenience store.

C. Developer intends for the Developer Tract and the Owner Tract to be developed and operated as integral parts of a Business Park (as defined below) with the Developer conveying portions of the Developer Tract to third parties.

D. In order to effectuate the common use and operation thereof, Developer desires to subject the Business Park to the covenants, restrictions, easements, servitudes, liens and charges, all of which are more particularly hereinafter set forth in this Agreement.

NOW, THEREFORE, Developer declares that all of the Developer Tract and the Owner Tract shall hereafter be known as the "**Business Park**" and shall be subject to the covenants, conditions, restrictions and easements set forth in this Agreement. Developer further declares that the Business Park will be held, conveyed, hypothecated, encumbered, sold, leased, rented, used, occupied and improved subject to the covenants, conditions, restrictions and easements set forth in this Agreement, which are for the purpose of protecting the value and desirability of such real property, and which run with the Business Park and are binding on all parties having any right, title or interest in all or any portion of the Business Park, their heirs, personal representatives, successors, transferees and assigns, and which inure to the benefit of each Owner thereof.

1. DEFINITIONS.

As used herein, the following terms shall have the following meanings:

1.1 Common Area. The Common Access Drive, Access Areas, and Common Detention Area, each as hereafter defined, and all other areas for the common use and enjoyment of the Owners, but specifically excluding all areas on which building improvements are now or may hereafter be constructed.

1.2 Improvements. The Common Access Drive and the Water Detention and Drainage Facilities, each of which shall be constructed or caused to be constructed by Developer.

1.3 Owner or Party. Each person or entity now or hereafter owning a portion of the Business Park.

1.4 Permittees. All Owners and their respective employees, agents, contractors, customers, visitors, invitees, licensees, tenants, subtenants, and concessionaires.

1.5 Tracts. The term "Tract" shall mean each separate tract within the Business Park that is intended for sale or development (including, without limitation, the Owner Tract), whether or not presently subdivided or otherwise constituting a separate legal parcel.

2. EASEMENTS.

2.1 Grant of Reciprocal Easements.

(a) Access Easement. Developer creates, dedicates, grants and establishes, for the benefit of each of the Permittees, a perpetual non-exclusive and reciprocal easement for pedestrian and vehicular cross access, ingress and egress upon, over and across: (i) the common access drives now or hereafter constructed on the thirty-five (35) foot access and utility easement shown on the Plat for Vista Ridge Filing No. 6, First Amendment (the "Plat") and the forty-one (41) foot shared access easement, both as depicted on Exhibit C-1 attached hereto (collectively, the "Common Access Drive"), (ii) the future common access drives to be constructed hereafter, which are generally depicted on Exhibit C-2 attached hereto and which may be relocated at the discretion of the Developer (collectively, the "Future Common Access Drives"), and (iii) all other paved driveways, roadways and walkways as presently or hereafter constructed in the Business Park (collectively, the "Access Areas") for the purpose of providing access, ingress and egress for motor vehicles, bicycles and pedestrians between all portions of the Business Park and to and from all abutting streets or rights-of-way furnishing access to the Business Park. The scope of the aforesaid access easements does not include reciprocal parking rights. No fence or other barrier which would prevent or obstruct the passage of pedestrian or vehicular travel for the purposes herein permitted shall be erected or permitted within or across an Access Areas, except temporary barriers which may be installed during periods of construction or reconstruction of Improvements on such Party's Tract. Any such temporary barriers shall be installed in such a manner so that at least one commercially reasonable alternative access point is open at all times to any other Party's Tract on which Improvements are then being constructed or a business is then open and operating.

(b) Utility Easement. Developer creates, dedicates, grants and establishes, for the use and the benefit of the Permittees, a perpetual non-exclusive and reciprocal easement in, to, under, over and across roadways, driveways and landscaped areas, now or hereafter constructed and those portions of the Business Park that are designated and established as easements by plats or other instruments of record (excluding any area on which building improvements may now or hereafter be located) for the installation, operation, flow and passage, use, maintenance, repair, replacement, relocation, and removal of sanitary sewers, storm drains, water and gas mains, water sprinkler system lines, electrical power lines, telephone lines, cable,

other utility lines and underground appurtenances related thereto (collectively, the "Utilities"). All Utilities shall be underground, except as may be necessary during periods of repair or temporary service and for such parts thereof that cannot and are not intended to be placed below the surface (i.e., transformers and control panels). Any Party installing Utilities pursuant to the provisions of this Section shall pay all costs and expenses with respect thereto and shall cause all work in connection therewith to be completed, including general clean up and surface restoration, as quickly as possible and shall not materially interfere with any business then operating in the Business Park. If any of the Parties elect to install common utility lines or systems, all costs and expenses with respect to the initial installation thereof shall be set forth in a separate agreement between the cooperating Parties. The relocation, if any, of any of the utility easements described in this Section is subject to the prior written approval (not to be unreasonably withheld) of the Party whose portion of the Business Park is to be burdened thereby.

(c) Common Detention Area. Developer hereby creates, dedicates, grants, declares and reserves for itself and for the benefit and burden of each Tract, a perpetual, non-exclusive easement for the purpose of installation, operation, maintenance, repair and replacement of storm water collection, retention, detention and distribution lines, conduits, ponds, pipes and other apparatus under and across Tract B of the Plat, which area is designated on Exhibit C-1 as the "Common Detention Area" (collectively, the "Water Detention and Drainage Facilities"). The easement granted herein shall include the right of reasonable ingress and egress to the Water Detention and Drainage Facilities as may be required to install, operate, maintain, repair and replace the same. The Water Detention and Drainage Facilities shall not be modified, altered, relocated or otherwise changed without the prior written consent of all Owners, provided however, (x) an Owner of a Tract on which the Water Detention and Drainage Facilities are located may alter, relocate and modify the same as such Owner shall determine so long as the same complies with applicable law; and (y) the drainage and detention provided thereby for the other Tracts is not materially or adversely affected or diminished, and the Water Detention and Drainage Facilities, as relocated, continue to meet and satisfy applicable governmental requirements, pertaining to drainage and water detention for the benefit of the other Tracts. Each Owner of a Tract is required to operate and maintain in good order, condition and repair, the Water Detention and Drainage Facilities located upon its Tract and make any repairs and replacements that are necessary from time to time.

2.2 Relocation of Utility Easements.

(a) At any time, the grantor of any utility easement granted pursuant to this Agreement shall have the right to relocate on the land of the grantor any utilities then located thereon; provided, that the relocation shall be performed only after 30 days' written notice of the grantor's intention to so relocate given to the grantee, and the relocations:

(i) shall not interfere materially with or diminish the utility services to the grantee;

(ii) shall not unreasonably reduce or impair the usefulness or function of the Utilities or any other utilities;

(iii) shall be performed without cost or expense to grantee; and

(iv) the materials and design standards used in connection with the relocation shall be equal to or exceed those originally used.

(b) No Party shall relocate or permit to be relocated the Improvements without the prior written consent of the other Parties.

2.3 Reasonable Use of Easements.

(a) The easements established by this Agreement shall be used and enjoyed by each Party and its Permittees in such a manner as not to unreasonably interfere with, obstruct or delay the conduct and operations of the business of any other Party or its Permittees at any time conducted on its Tract, including, without limitation, public access to and from said business, and the receipt or delivery of merchandise in connection therewith.

(b) Once commenced, any construction undertaken in reliance upon an easement granted herein shall be diligently prosecuted to completion, so as to minimize any interference with the business of any other Party and its Permittees. Except in cases of emergency, the right of any Party to enter upon a Tract of another Party for the exercise of any right pursuant to the easements set forth in this Agreement, or to prosecute work on such Party's own Tract if the same interferes with utility or drainage easements or easements of ingress, egress or access to or in favor of another Party's Tract, shall be undertaken only in such a manner so as to minimize any interference with the business of the other Party and its Permittees. In such case, no affirmative monetary obligation shall be imposed upon the other Party, and the Party undertaking such work shall with due diligence repair, at its sole cost and expense, any and all damage caused by such work and restore the affected portion of the Tract upon which such work is performed to a condition which is equal to or better than the condition which existed prior to the commencement of such work. In addition, the Party undertaking such work shall pay all costs and expenses associated therewith (except as otherwise specifically provided herein) and shall indemnify, defend and hold harmless the other Party(s) and its Permittees from all damages, losses, liens or claims attributable to the performance of such work. Notwithstanding the foregoing or anything contained in this Agreement to the contrary, no Party or its Permittees shall in any event undertake any work described in this paragraph (except normal minor repairs in the ordinary course which do not interfere with the business of the other Party and its Permittees) which is not of an emergency nature during the months of November or December of each calendar year unless the other Parties shall consent thereto. For purposes of this Agreement, an emergency is an event which threatens or causes imminent risk of bodily harm or property damage.

3. MAINTENANCE OF TRACTS. The Parties, at their respective sole cost and expense, shall maintain, or cause to be maintained and kept in repair, all buildings, improvements, and Common Area, other than the Improvements that are maintained by the Developer, situated on their respective Tracts (and areas adjacent to their Tracts if required by applicable governmental authorities). The obligation of the Parties hereunder shall, without limiting the generality thereof, include the following:

(a) Maintaining common access surfaces at grades and levels to be used and enjoyed as contiguous and homogeneous common areas, and maintaining the surfaces in a level, smooth and evenly-covered condition with the type of surfacing material originally installed or of similar quality, use and durability; and

(b) Removing all papers, debris, snow, ice, filth and refuse, and thoroughly sweeping the areas to the extent reasonably necessary to keep said areas in a neat, clean and orderly condition; and

(c) Maintaining any sidewalks, storm drains, utility lines and sewers in good condition and state of repair; and

(d) Maintaining all landscaped areas, making replacements of shrubs and other landscaping as is necessary, and keeping said areas at all times adequately mowed, weeded, fertilized and watered; and

(e) Repairing and restoring all buildings and improvements, in the event of a taking in condemnation or under a right of eminent domain or if otherwise damaged or destroyed, within a reasonable period of time and with due diligence, to their condition prior to any damage or destruction, or in the alternative, at the election of the Party on whose Tract the damage occurs, causing a leveling, grading, and paving of the land on which such buildings and improvements were located to ensure that the area shall have an appearance substantially compatible with a first-class business park.

4. MAINTENANCE AND MAINTENANCE EXPENSES FOR THE IMPROVEMENTS.

4.1 From and after the date when construction of the Common Access Drive and the Water Detention and Drainage Facilities are completed, the Developer shall engage a contractor (the "**Manager**") to install, operate, maintain, repair and replace the Improvements. Any Party or any third party professional property manager may be selected as Manager. Such installation, operation, maintenance, repair and replacement shall include cleaning, sweeping, snow removal, repair, striping, patching and resurfacing of asphalt, asphalt overlay, and replacement of asphalt, curb, and gutter of the Common Access Drive and the Future Common Access Drives (when constructed), and the installation, operation, maintenance, repair and replacement of the Water Detention and Drainage Facilities, which may also include a management fee payable to the Manager in an amount not to exceed ten percent (10%) of the total maintenance expenses, exclusive of such fee (all of which are collectively referred to herein as the "**Maintenance Expenses**"). If any of the Improvements are dedicated to the Town of Erie ("**Town**") or other governmental entity, then the dedicated Improvements will no longer be the maintenance obligation of Developer, or its designee, upon acceptance of such maintenance obligation by the Town or such other governmental entity.

4.2 Commencing on the date that a Party is issued a building permit from the applicable governmental authority for the development of its Tract, such Party shall contribute towards Maintenance Expenses by paying to the Developer or its designee, as and when provided herein, an annual maintenance assessment (the "**Maintenance Assessment**") in payment of its share of the Maintenance Expenses. The Maintenance Assessment shall be fixed,

established and collected in accordance with the provisions of this Section 4; provided, however, that the Developer may make whatever arrangements it deems necessary or desirable in order to obtain reimbursement of Maintenance Expenses from any particular Party. Notwithstanding the foregoing to the contrary, in the event that any extraordinary Maintenance Expenses are incurred caused by the acts or omissions of one Party (the "**Responsible Party**") (or persons acting by, through or under the Responsible Party) and not the other Parties, the Responsible Party shall bear the entire cost of such extraordinary Maintenance Expenses.

4.3 The determination of Maintenance Expenses shall be as follows:

(a) The Developer, or its designee, shall develop and adopt a reasonable budget with respect to the Maintenance Expenses at least thirty (30) days prior to the beginning of each calendar year. Developer shall enter into commercially reasonable agreements with third party contractors performing services for the Business Park, and any amounts payable with respect to such contracts shall be limited to commercially reasonable amounts payable pursuant to contracts negotiated as "arms-length" transactions. The Developer may delegate to the Manager the billing and collection of the Maintenance Assessment, Assessments (as defined below), and any other responsibilities of the Developer except approval of the annual budget. Such budget shall include estimated Maintenance Expenses and shall serve as the basis of the Maintenance Assessment against the Tracts. The Developer shall thereafter send to each Owner a copy of the approved annual budget at least fifteen (15) days before the beginning of the calendar year to which the annual budget applies, which sets forth the amount of the Maintenance Expenses payable by each such Owner. The Developer may determine, at its discretion, to round Maintenance Assessments to the nearest whole dollar amount. The annual budget does not require approval from Owners. Each Tract shall be allocated a percentage (the "**Allocated Share**"), which percentage is calculated by dividing the square footage of such Tract by the total square footage of all property within the Business Park (less the square footage of the Common Access Drive, the Common Detention Area, and the Future Common Access Drives when constructed). On or before April 1 of each year, after the first maintenance assessments are made, Developer shall deliver annual reconciliation statements to each of the Owners. Developer shall retain the books and records with respect to Maintenance Expenses and Maintenance Assessments for at least three (3) years after the date the reconciliation statements are delivered to the Owners. Any Owner shall have the right to cause the Maintenance Expense and Maintenance Assessment records to be audited by an independent certified public accountant. A copy of each audit shall be delivered to Developer within thirty (30) days after it is completed. If any overpayment is discovered, Developer shall reimburse the Owner for the amount of the overpayment within thirty (30) days of Developer's receipt of a copy of the audit. If any underpayment is discovered, the Owner shall deliver the amount owed to Developer simultaneously with delivery of a copy of the audit to Developer.

(b) The failure or delay of the Developer, or its designee, to prepare or adopt a budget for any calendar year shall not constitute a waiver or release in any manner of an Owner's obligation to pay the allocable share of the Maintenance Expenses as herein provided whenever the same shall be determined and, in the absence of any annual budget or adjusted budget, each Owner shall continue to pay Maintenance Assessments at the rate established for the previous calendar year until notified of the new payment which is due on the first day of the next payment

period which begins more than thirty (30) days after such new annual or adjusted budget is adopted and the Owner receives notice of it.

(c) Installments of Maintenance Assessments may be levied and collected on a monthly, quarterly, semi-annual or annual basis. Any Owner may prepay one or more installments of any Maintenance Assessment levied by the Developer without premium or penalty.

(d) The Maintenance Assessment against each Tract shall be determined by multiplying the Allocated Share for such Tract by the total amount to be assessed for Maintenance Expenses. The Allocated Share to be allocated to each Tract is set forth on Exhibit D, attached hereto and incorporated herein. Developer shall have the right to file, from time to time, in the Recording Office a revised Exhibit D to reflect revised Allocated Shares, as the Developer's Tract and/or Owner's Tract are further subdivided. No consent by any other Owner or mortgagee shall be required for such modifications to Exhibit D, unless the Owner's Allocated Share will increase as a result.

(e) The Maintenance Assessment shall be collected on the basis of a calendar year. Accordingly, unless a Party's obligation to pay the Maintenance Assessment is in effect on January 1 of any given year, the Maintenance Assessment to be paid by any Party in the year in which the obligation to pay commences shall be prorated on the basis of the number of days remaining in the then-current calendar year.

(f) Special assessments ("**Special Assessments**") may be levied by the Developer from time to time during any calendar year if the Developer reasonably determines that the estimated total amount of funds necessary to defray the Maintenance Expenses for a given calendar year is or will become inadequate to meet expenses due to unexpected repairs, replacements or reconstruction of improvements, or if funds are otherwise required for any activity or purpose of the Developer permitted under this Agreement. The Developer may, in its reasonable discretion, prorate a Special Assessment over the remaining months of the calendar year or levy the Special Assessment immediately against each Tract. Special Assessments against each Tract shall be determined by multiplying the Allocated Share for such Tract by the total amount of the Special Assessment. Special Assessments shall be due and payable within thirty (30) days after a Party receives written notice from the Developer specifying the amount of the Special Assessment, unless the Developer specifies in such notice a later date of payment.

(g) The Term "**Assessments**" as used in this Agreement shall include Maintenance Assessments and Special Assessments.

(h) All Assessments, together with interest thereon (at the rate specified in Section 4.3(i) below) and costs of collection thereof (including reasonable attorneys' fees), shall be charges and may become liens upon each Tract to which the Assessment applies, and binding upon the Party thereof and all successors in title thereto. In the event an Assessment against any Tract is not paid when due, the Developer may give written notice to the delinquent Party, stating the amount due and the rate of interest accruing thereon and, if such Party does not pay the same within 30 days after such notice is given, the Developer may record a notice thereof in the office of the clerk and recorder of the County of Weld (the "**Recording Office**"), and a lien (the

"**Assessment Lien**") shall arise and be perfected upon such recording. An Assessment Lien may be enforced by a judicial proceeding to foreclose such lien or by any other remedy available at law or in equity. Such lien shall continue in full force until such sum of money, any accrued interest thereon, and costs, fees and expenses of collection (including, without limitation, reasonable attorneys' fees) shall have been paid in full. Notwithstanding anything contained herein to the contrary, the Assessment Lien provided for herein shall be subordinate to the lien of any prior or later recorded first mortgage or deed of trust upon each such Tract. Sale or transfer of any such Tract shall not affect the Assessment Lien; provided, however, that after expiration of the period of redemption, if any, following the sale or transfer of any such Tract pursuant to foreclosure (or a transfer in lieu of foreclosure) of any prior or later recorded first deed of trust or mortgage in favor of any bank, savings and loan association, insurance company or other lender holding a first priority lien, the Assessment Lien shall be extinguished (but not the obligation of the Owner who was foreclosed upon to pay the same) as to payments which became due prior to such foreclosure sale. No sale or transfer shall relieve the Party (including, without limitation, any mortgagee in possession) from liability for any payments of Assessments becoming due prior to such sale or transfer or from the lien thereof. The obligation to pay Assessments becoming due prior to the expiration or termination of this Agreement shall survive the expiration or earlier termination of this Agreement. The Assessments against any Tract, together with interest thereon and costs and expenses of collection thereof, including reasonable attorneys' fees, shall also be the personal obligations of the record Owner of such Tract at the time when each such Assessment becomes due. Upon the timely curing by the defaulting Party of any default for which a notice of Assessment Lien was recorded, the Developer shall promptly record an appropriate release of such Assessment Lien.

(i) Liability for Assessments shall be the personal obligation of each Party and its successors and assigns. No Party may waive or otherwise escape liability for the Assessments by reason of non-use of the Improvements or by reason of abandonment of its Tract. If more than one person is the Party, the personal obligation to pay such Assessments respecting such Tract shall be both joint and several. A Party shall have no liability for Assessments that accrue for any period after such Party transfers all of its interest in a Tract. Any Assessment which is not paid when due shall be delinquent and, if not paid within thirty (30) days after the due date, the amount due shall bear interest from the date due at the lesser of (i) that rate of interest that is five percent (5%) above the then-current prime rate for unsecured loans published by the Midwest Edition of the Wall Street Journal, or (ii) the highest rate permitted by applicable law ("**Default Rate**"). By accepting a conveyance of the Tract, each Party agrees that it shall be personally obligated to pay the Assessments, and Developer may bring an action at law or in equity against any Party who does not pay the Assessment when it is due. In each instance all interest, costs, expenses, and reasonable attorneys' fees of the Developer in connection with such action shall be added to the amount due and the amount of the Assessment Lien. Prior to the institution of any action to foreclose the Assessment Lien for any delinquent Assessment, thirty (30) days' written notice of such delinquency (which thirty (30) day period may run concurrently with the thirty (30) day period commencing on the due date) shall be provided to each mortgagee of the subject Tract for whom any Party has provided to the Developer written notice and a contact address; provided, however, that any failure by the Developer to provide such notice shall not invalidate any notice given to the delinquent Party, nor shall such failure invalidate or impact in any way any action taken by the Developer pursuant to this Section 4.3(i).

(j) The Developer shall, within a reasonable time, not to exceed ten (10) business days after receiving written request from any Party or the mortgagee of a Tract, furnish a certificate setting forth the status of the payments of the Assessments on any Tract. The certificates shall be conclusive evidence of the payment of any Assessments stated to have been paid therein.

(k) Notwithstanding anything to the contrary contained in this Agreement, the Developer and any Party shall be excused from performing any non-monetary obligation under this Agreement, if and so long as the performance of the obligation is prevented, delayed or otherwise hindered by fire, earthquake, flood, explosion, actions of the elements which cannot reasonably be anticipated, terrorism, bio-terrorism, war, riots, mob violence, inability to procure or a general shortage of labor, equipment, facilities, materials or supplies in the open market, failure of transportation, strikes, lockouts, actions of labor unions, condemnation, court orders, laws, regulations or orders of governmental or military authorities, actions (or lack of actions) by governmental authorities, or any other cause, whether similar or dissimilar to the foregoing, not within the reasonable control of Developer or such Party.

5. CONSTRUCTION; ALTERATION; SIGNAGE.

5.1 In order to produce an architecturally compatible, unified Business Park, each Party agrees to construct improvements of a design, color treatment and exterior material in accordance with the Vista Ridge Commercial District Design Standards and Guidelines ("**Guidelines**") and all applicable governmental requirements including but not limited to any conditions and regulations established by the plats or other instruments of record on the date of recordation of this Declaration. Every building (including its appurtenant Common Area improvements), now or in the future constructed on a Tract, shall be constructed, operated and maintained so that same is in compliance with the Guidelines and all applicable governmental requirements.

5.2 Any remodeling or reconstruction work undertaken on the exterior of any existing buildings shall at all times be of the first quality construction and architectural design, and shall conform to the Guidelines, so that the exterior of all buildings, including without limitation, the exterior elevations and color thereof shall continue to be architecturally and aesthetically compatible and harmonious with the other buildings in the Business Park.

5.3 Developer hereby creates, dedicates, grants and establishes for the use and benefit of Developer and the Parties temporary licenses over and across each Tract, for construction and maintenance as shall be reasonably necessary to construct and maintain the Common Areas and the Utilities contemplated for the Business Park. Any temporary license shall be in effect only during periods of actual construction or maintenance, and shall not be exercised so as to interfere materially with the use and operation of each Party's respective Tract, including without limitation, the right of the burdened Party to reasonably designate areas within its Tract for access by construction vehicles and equipment and the timing and conduct of construction related activities. Prior to exercising any right under the temporary construction license, the Party wishing to cause work to be performed ("**Requesting Party**") shall provide the Party whose Tract is affected thereby ("**Affected Party**") with a written statement showing need for space and a copy of a certificate of insurance and, if requested by the Affected Party, certified

copies of the policies of insurance, showing that the Requesting Party's contractor has obtained the following minimum insurance coverage:

- (a) Worker's compensation, statutory limit, as required by law;
- (b) Commercial General Liability, to provide combined single limit coverage of not less than \$1,000,000 per occurrence and \$2,000,000 in the aggregate to include the following:
 - (i) Bodily injury (combined single limit);
 - (ii) Property damage (combined single limit);
 - (iii) Contractual Liability;
 - (iv) Products Completed Operations Coverage that will be kept in effect for two years after completion of work; and
 - (v) Independent contractors contingent liability or Owner's Protective Liability.
- (c) Comprehensive automobile liability, including, without limitation, non-ownership liability covering all automobiles, trucks, tractors, trailers, motorcycles or other automotive equipment used in the course of performance of the work for bodily injury and property damage, to provide combined single limit coverage of not less than \$1,000,000 per accident.
- (d) Insurance required by this Section 5 will be maintained with such deductibles of not more than \$10,000.00 and without interruption from the date of commencement of work until completion of work. Each policy of insurance shall be "occurrence-based" shall name the Affected Party as an additional insured and shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least thirty (30) days prior written notice has been given to the Affected Party; provided, however, that the Party providing such insurance shall not be liable in the event the insurance company fails to give such notice of cancellation, but shall be liable for any lapse in coverage.
- (e) Any Party availing itself of a temporary license shall indemnify and hold harmless the other Party from any liability (including reasonable attorneys' fees and costs of suit of the indemnified Party) or obligations arising out of or related to the use of the temporary license, except for claims caused by the negligence or the willful act or omission of the indemnified Party, its licensees, concessionaires, agents, servants or employees, or the agents, servants, or employees of any licensees or concessionaires wherever the same may occur. In addition, such Party shall promptly pay all costs and expenses associated with its work, to diligently complete the work as quickly as possible, and promptly clean the area and restore the affected portion of the Business Park to a condition which is equal to or better than the condition which existed prior to the commencement of the work.

5.4 Nothing contained herein shall authorize a Party, or any person or entity acting through, with, or on behalf of such Party, to subject any other Party's Tract, or any portion thereof, to mechanics' liens. If any such mechanics' lien shall be filed against a Party's respective Tract, and another Party is charged with causing such mechanics' lien, such other Party shall, at its expense, cause the mechanics' lien to be discharged. In the event that such mechanics' lien is not discharged within twenty (20) days after receipt of written notice of the mechanics' lien by the Party charged with causing such mechanics' lien, then the Party whose Tract is subject to the mechanics' lien, at its option, and at the reasonable expense of the other Party, may enter into, defend, prosecute or pursue any effort or action (whether or not litigation is involved) which such Party deems reasonably necessary to defend it and its Tract from and against such mechanics' lien if the Party causing such mechanic's lien fails to take such action within ten (10) days of the affected Party's delivery of written notice of the required action.

5.5 Developer shall have the right, but no obligation to construct for the Business Park a sign or signs (the "**Sign**") to the extent allowed under any applicable governmental authority sign permit that may be obtained by Developer, may include panels on such sign advertising businesses in the Business Park. Developer shall maintain, repair and replace the Sign in a good and attractive operating condition. Any and all work performed in connection with the Sign shall be done in a good and workmanlike manner and, once commenced, shall be promptly and diligently pursued to completion. Any and all such work shall be done in a manner so as not to materially interfere with the operations being conducted on or from the Tracts. In the event Developer elects to construct such sign, Developer shall notify the other Owners, and within forty-five (45) days of receipt of such notification, each Owner shall notify Developer in writing of such Owner's desire to participate in the use and construction of such Sign. If no notice is given by an Owner, such Owner shall be deemed to have elected not to participate in such Sign. If an Owner elects to participate in such Sign, such Owner shall share in the cost to construct, use and maintain such Sign, on a pro rata basis, calculated and based upon the pro rata share of the area of the Sign allocated to such Owner bears to the total area of all signage thereon. Each Party displaying signage on such Sign shall supply its own sign fascia and can and shall maintain such Sign fascia and can at such Party's sole cost and expense. In the event an Owner does not elect to participate in the Sign, such Owner shall have no right to display signage on such Sign and such Party shall have no obligation to contribute to the cost of the construction, maintenance or operation of such Sign. Developer or its designee shall bill the Parties for such costs and receive payment therefore in the same manner as set forth for Assessments in Section 4.3 above.

6. COMPLIANCE WITH LAWS AND REGULATIONS.

6.1 Each Party covenants and agrees, with respect to its Tract, to comply with all laws, rules, regulations and requirements of all public authorities.

7. TRASH AND GARBAGE STORAGE; CONSTRUCTION MATERIALS AND EQUIPMENT.

7.1 Each Party shall store all trash, garbage and construction materials in adequate containers maintained in a neat and clean condition, and shall keep all containers either at the rear of the buildings or at locations which shield the containers in a way that they will not be

readily visible from the parking area or the streets adjacent to the Tracts owned by any Party. Additionally, each Party shall arrange for regular removal of its trash and garbage at its sole cost and expense.

8. USE RESTRICTIONS.

8.1 Each Tract shall be used for lawful purposes in conformance with all restrictions imposed by all applicable governmental laws, ordinances, codes, and regulations, and no use or operation shall be made, conducted or permitted on or with respect to all or any portion of a Tract which is illegal. The Business Park will not be used for any Restricted Use (as defined below in Section 8.2).

8.2 As used above, the term "**Restricted Use**" shall mean any one or more of the following uses: a cocktail lounge, bar, billiard parlor, any other establishment that sells alcoholic beverages for on-premises consumption (other than a restaurant or other business to which such uses are incidental), disco, bowling alley, pool hall, skating rink, roller rink, amusement arcade, a theater of any kind, adult book store, adult theatre, adult amusement facility, any facility selling or displaying pornographic materials or having such displays, second hand store (other than a high end retail outlet such as or similar to Play It Again Sports, EB Games, Game Stop, or second hand fashion store, such as Plato's Closet, but excluding second hand retail outlets, such as Goodwill or ARC), auction house, flea market, educational or training facility (including, without limitation, a beauty school, barber college, school or other facility catering primarily to students or trainees rather than customers), blood bank, massage parlor that is not a part of a spa, funeral home, sleeping quarters or lodging, the outdoor housing or raising of animals, the outside storage of automobiles, boats or other vehicles, any industrial use (including, without limitation, any manufacturing, smelting, rendering, refining, chemical manufacturing or processing, or other manufacturing uses, not including brewing that is incidental to a restaurant use), any mining or mineral exploration or mineral development except by non-surface means, carnival, amusement park or circus, an assembly hall, off track betting establishment, bingo hall, any use involving the use, storage, disposal or handling of hazardous materials or underground storage tanks (other than a gas station), or any use which may materially adversely affect the water and sewer services supplied to the Owner Tract.

9. INSURANCE.

9.1 Each Party shall maintain or caused to be maintained in full force and effect with respect to its Tract and the operations thereon, commercial general liability insurance, with a financially responsible insurance company or companies, to include combined single-limit coverage of bodily injury and property damage of not less than \$1,000,000 per occurrence and \$3,000,000 in the aggregate. Such insurance shall specifically extend to all contractual obligations arising out of indemnifications made hereunder. The Parties agree to review the minimum limits set forth above approximately every 10 years, and further agree to adjust limits if circumstances warrant. Each Party shall carry insurance against all risks of direct physical loss (on a form generally known in the insurance industry as the "Special Causes of Loss" form) with a financially responsible insurance company or companies, in an amount equal to the replacement cost (exclusive of the cost of excavation, foundations and footings) of the buildings on their respective Tracts. Notwithstanding the foregoing to the contrary, any Party (or its tenant

on behalf of such Party) may elect to self-insure and/or carry insurance required hereunder under master or blanket policies of insurance, provided, however, that an insuring Party hereunder may only self-insure on the conditions that the self-insuring Party (individually or together with its parents or affiliated entities) has and maintains net current assets of \$200,000,000.00 or more and, upon request of any other Party provides evidence thereof to the requesting Party. The annual financial statements of any such self-insuring Party that is audited by an independent certified public accountant shall be evidence of the self-insuring Party's net current assets; to the extent a self-insuring Party's financial statements are publicly available (individually or together with its parents or affiliated entities), such statements shall be evidence of such Party's net current assets.

9.2 To the extent damages are covered by insurance as set forth in Paragraph 9.1 above, each Party agrees to waive all rights against each other for damages. Each Party shall include in all insurance policies required under Paragraph 9.1 above a waiver of subrogation. To the extent that such damage or loss is covered by the insurance which the releasing Party is obligated hereunder to carry, or if the releasing Party is not carrying insurance or elects to self-insure, then to the extent such damage or loss would have been covered if the releasing Party were carrying that insurance, each Party hereby releases the other Parties from and against any and all claims, demands, liabilities or obligations whatsoever for damages or losses required by this Agreement to be covered by the insurance to be maintained by each Party, without regard to the amount of insurance coverage or the amount of the deductible under any policy, whether or not such damages or losses shall have been caused by the negligence or the contributory negligence of the Party being released or by any agent, associate or employee of the Party being released.

10. TAX AND ASSESSMENTS. Each Party shall pay all taxes, assessments, or charges of any type levied or made by any governmental body or agency with respect to its Tract.

11. CONDEMNATION.

11.1 In the event of a taking in condemnation or under a right of eminent domain, concerning a portion or all of the Business Park, the award or purchase price paid for the taking shall be paid to the Party owning the land so taken; provided, however, the other Party shall have the right to seek an award or compensation for the loss of its easement rights on the condition that the claim does not reduce or diminish the award or purchase price paid to the Party owning such land.

12. DEFAULT.

12.1 In the event of any failure by a Party to perform, fulfill or observe any agreement herein, to be performed, fulfilled or observed by it, continuing for 30 days following delivery of written notice to a Party of such failure, or if the breach or failure to comply cannot be reasonably cured within the 30 day period, if the defaulting Party does not in good faith commence to cure such breach or failure to comply within the 30 day period and does not diligently proceed therewith to completion the other Party may, at its election and after delivering written notice of exercise of such election ("**Exercise Notice**") to the defaulting Party and the defaulting Party's failure to commence such cure within five (5) business days of receipt

of the Exercise Notice, cure the failure or breach by performing directly or by subcontracting for necessary services, for and on behalf of the defaulting Party; provided, however, that no Party shall have the right to maintain, repair or replace any building or improvement located on a defaulting Party's Tract, whether or not such action is necessitated as a result of an emergency or otherwise. Furthermore, in the event of an emergency [as defined in Section 2.3(b)], any Party shall have the right to take such action as is reasonably necessary under the circumstances to mitigate and/or prevent loss, damage or injury and shall deliver such prior notice, if any, to the Party on whose Tract said emergency situation exists, as is practically capable of being given under the circumstances, and if no prior notice is practical, then written notice shall be given to such Party within two (2) business days after the commencement of the emergency situation. The reasonable costs incurred by the performing Party to address the emergency shall be paid by the other Party within thirty (30) days of delivery of an invoice and supporting documentation evidencing such costs to such other Party.

12.2 Any amount expended by the Party electing to perform an obligation of the other Party hereunder, or which shall otherwise be due by either Party to the other under this Agreement shall be paid to the Party to whom payment is due, within thirty (30) days of receipt of invoice and supporting documentation with respect thereto, together with interest thereon at the Default Rate, from the date of expenditure or the date when the amount became due to the date of payment thereof in full. Any amount not reimbursed shall constitute a lien on the Tract of the defaulting Party, after which the non-defaulting Party may record notice of said lien, and if said lien is not satisfied, it may then be foreclosed as provided by law; provided, however, said liens shall in all respects be subject and subordinate to the lien of any mortgages or deeds of trust at any time or from time to time on the Tract of the defaulting Party and subordinate to the rights of the grantees thereof.

12.3 Each Party shall have the right to prosecute any proceedings at law or in equity against any Party or Permittee violating or attempting to violate or defaulting upon any of the provisions contained in this Agreement. The remedies available shall include, but not be limited to, applications for temporary restraining orders, preliminary and permanent injunctions, and actions for specific performance of a Party's obligations. The remedies specified herein shall be cumulative and in addition to all other remedies permitted at law or in equity.

13. COVENANTS RUN WITH THE LAND. The right to use and exercise the rights, easements and covenants herein contained shall run with the land and inure to the benefit of the Parties, their successors and assigns, tenants, licensees, concessionaires and mortgagees in possession and shall be binding upon the Parties, their successors and assigns, and all Permittees.

14. SALE OF TRACT. In the event any Party shall convey its fee interest in all or a portion of its Tract, said Party shall automatically be freed and relieved from and after the date of transfer or conveyance of all liability as respects the performance of any agreement or obligation on the part of the Party contained in this Agreement thereafter to be performed with respect to the portion of said property conveyed; it being intended hereby that the agreements and obligations contained in this Agreement on the part of each Party shall be binding upon a Party only during its ownership of a Tract, but that the conveying Party shall remain liable for each breach of an obligation hereunder which occurred prior to the date of conveyance. Any grantee

of a fee interest in a Tract shall automatically be deemed to have assumed and agreed to perform the obligations of a Party hereunder from and after the date they acquire the interest.

15. NO PARTNERSHIP. None of the terms or provisions of this Agreement shall be deemed to create a partnership between or among the Parties in their respective businesses or otherwise, nor shall it cause them to be considered joint venturers or members of any joint enterprise. This Agreement is not intended, nor shall it be construed to create any third party beneficiary rights to any person other than Developer, the Parties and the Permittees, unless expressly otherwise provided.

16. SEVERABILITY. If a court of competent jurisdiction finds any provision of this Agreement to be illegal, invalid, or unenforceable as to any person or circumstance, that finding shall not make the offending provision illegal, invalid, or unenforceable as to any other person or circumstance. If feasible, the offending provision shall be considered modified so that it becomes legal, valid and enforceable. If the offending provision cannot be so modified, it shall be considered deleted from this Agreement. Unless otherwise required by law, the illegality, invalidity, or unenforceability of any provision of this Agreement shall not affect the legality, validity or enforceability of any other provision of this Agreement.

17. ENTIRE AGREEMENT. This Agreement and the exhibits hereto contain all of the representations and the entire agreement between the Parties with respect to the subject matter hereof. Any prior correspondence, memoranda or agreements are replaced in total by this Agreement and the exhibits hereto.

18. NOTICE. All notices, statements, demands, requirements, or other communications and documents ("**Communications**") required or permitted to be given, served, or delivered by or to either a Party or any intended recipient under this Agreement shall be in writing and shall be either delivered by hand, sent by a nationally recognized overnight courier service, or prepaid certified or registered mail (airmail in the case of all international communications), return receipt requested, to the Party or intended recipient at its address stated below or the address of record with Weld County Assessor's Office, or sent by facsimile machine to the Party or intended recipient at its facsimile number stated below, or sent by email to the Party or intended recipient at its email stated below. Communications shall be deemed to have been given, served, or delivered:

- (a) if delivered by hand, upon delivery;
- (b) if delivered by overnight courier, on the next business day following the date of delivery to the courier;
- (c) if sent by mail, four days after the date of mailing; or
- (d) if sent by facsimile or electronic transmission upon successful transmission (as proven by evidence of confirmation); provided, however, that any such transmission sent after 5:00 p.m. on a business day or sent on a non-business day shall be deemed to be received on the next business day.

The addresses and facsimile numbers of the Developer are as follows:

To Developer: County Road 3 Investors, LLC
9750 West Cambridge Place
Littleton, Colorado 80127
Attn: James Spehalski
Email: jspehalski@marathonlc.com

with copies to: Brownstein Hyatt Farber Schreck, LLP
410 17th Street, 22nd Floor
Denver, Colorado 80202
Attn: Edward N. Barad, Esq.
Email: ebarad@bhfs.com

19. TERM. The terms, covenants, provisions and conditions of this Agreement shall be effective as of the date hereof and shall continue in full force and effect until December 31, 2094 at 11:59 p.m.; provided, however, the Parties acknowledge and confirm that the permanent and perpetual easements set forth in Section 2 and the maintenance obligations set forth in Sections 3 and 4 shall survive termination of this Agreement.

20. NOT A PUBLIC DEDICATION. Nothing herein contained shall be deemed to be a gift or dedication of any portion of the Business Park to the general public or for the general public for any public purposes whatsoever, it being the intention of the Parties that this Agreement shall be strictly limited to and for the purposes herein expressed; in that regard, and without limiting the foregoing, no easements for parking are granted or implied.

21. BREACH SHALL NOT PERMIT TERMINATION. It is expressly agreed that no breach of this Agreement shall entitle any Party to cancel, rescind or otherwise to terminate this Agreement, and shall not affect in any manner any other rights or remedies which a Party may have hereunder by reason of any breach of this Agreement.

22. AMENDMENT.

22.1 This Agreement and any provision, covenant, condition or restriction contained within it may be terminated, extended, modified or amended as to the whole of the Business Park or any portion thereof, only with the unanimous consent of the Owners of the Business Park, except with respect to modification pursuant to Section 4.3(d), which may occur by Developer, and any termination, extension, modification, or amendment shall be in writing, executed and acknowledged by all Parties (except with respect to a modification pursuant to Section 4.3(d)) and recorded in the Recording Office.

22.2 No amendment, modification, extension or termination will affect the rights of any mortgagee under a mortgage or the trustee or beneficiary under a deed of trust, of record in the Recording Office, constituting a lien on the Business Park at the time, unless the mortgagee, or beneficiary and trustee consent thereto (or with respect to a modification pursuant to Section 4.3(d), receive written notice thereof), nor will any amendment, modification, extension or termination be effective against any mortgagee, trustee, or beneficiary subsequent to its securing title to its encumbered Tract pursuant to foreclosure, or by virtue of deed in lieu of

foreclosure, unless the mortgagee, or trustee and beneficiary have consented thereto in writing, except as otherwise provided in Section 4.3(d).

22.3 No Permittee, lessee, licensee or other person having a possessory interest, other than a Party, will be required to join in the execution of or consent to any act of the Parties taken subject to this Section.

23. PARTIES RIGHT TO ENCUMBER. Each Party shall at all times during the term of this Agreement have the right to mortgage all of its right, title and interest hereunder in favor of and as additional security to the holder of a first lien mortgage or deed of trust encumbering its Tract. Upon encumbrance of a Party's Tract, all consents or approvals to be given by the Party granting a mortgage or deed of trust shall also require consent or approval of the holder of the mortgage or deed of trust and all benefits and protections afforded hereunder to such Party shall extend to the holder of such mortgage or deed of trust. Notwithstanding the above right to encumber, it is understood that any such first mortgage or deed of trust shall be junior and subordinate to this Agreement, and that enforcement or foreclosure of a first mortgage or deed of trust shall be subject to and shall not extinguish this Agreement.

24. ESTOPPEL CERTIFICATE. Any Party may, at any time and from time to time, but not more than three (3) times in any year, in connection with the sale or transfer of its Tract, or in connection with the financing or refinancing of its Tract by mortgage, deed of trust or sale-leaseback made in good faith and for value, deliver written notice to the other Parties or Developer requesting certification in writing that to the knowledge of the certifying Party or Developer, the requesting Party is not in default in the performance of its obligations under this Agreement, or, if in default, to describe therein the nature and amount of any and all defaults. Each Party receiving such request shall execute and return the certificate within thirty (30) days following the receipt thereof. Each request for an estoppel certificate shall include, on the delivery package, the following notation in bold, all capital letters: **DATE SENSITIVE RESPONSE REQUIRED ON OR BEFORE (INSERT DATE WHICH IS THIRTY (30) DAYS FROM DATE OF DELIVERY) OR ADDRESSEE WILL BE IN DEFAULT**. The Parties acknowledge that the certificate may be relied upon by transferees, mortgagees, deed of trust beneficiaries and leaseback-lessees.

25. CONSTRUCTION AND INTERPRETATION.

25.1 Whenever required by context of this Agreement, (i) the singular shall include the plural, and vice versa and the masculine shall include the feminine and neuter genders and vice versa, and (ii) use of the words "including", "such as" or words of similar import, when following any general term, statement or matter shall not be construed to limit any statement, term or matter to specific items, whether or not language of no-limitation, such as "without limitation" or "but not limited to", are used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest scope of any statement, terms or matter.

25.2 The captions preceding the text of each article and section are included only for convenience of reference. Captions shall be disregarded in the construction and interpretation of this Agreement.

26. NO WAIVER. The failure of any Party to insist upon strict performance of any terms, covenants or conditions hereof shall not be deemed a waiver of any rights or remedies which that Party may have hereunder, at law or in equity and shall not be deemed a waiver of any subsequent breach or default in any of terms, covenants or conditions of this Agreement.

27. ATTORNEY FEES. In any action brought to enforce or contest any provision of this Agreement, or to obtain a declaration of the rights or responsibilities of any Party, the prevailing Party shall be entitled to recover all costs and expenses, including, without limitation, reasonable attorney fees, incurred by the prevailing Party in connection with such action.

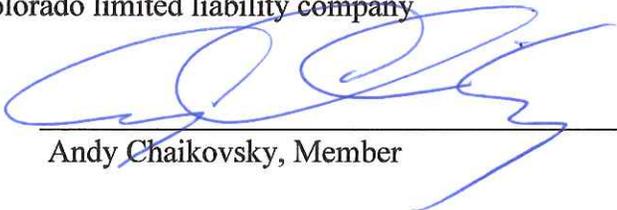
28. DEVELOPER'S DESIGNEE. Developer shall have the right to assign its obligations under this Agreement (the "**Assignment**") to a designee who shall be an owner of a portion of the Business Park and the designee shall agree to fully and promptly perform all of the obligations required to be performed by Developer under this Agreement arising from and after the effective date of the Assignment. If Developer assigns its obligations to a designee, Developer may record a notice thereof in the Recording Office and will no longer be liable or obligated to perform any obligations under this Agreement as of the effective date of the Assignment. In the event that Developer shall become bankrupt, insolvent or shall cease to exist for any reason before the obligations set forth in this Agreement are properly assigned to a designee, then the Owners shall assign the obligations set forth in this Agreement to a designee chosen by a majority vote of the Owners.

IN WITNESS WHEREOF the undersigned does acknowledge their acceptance of this Agreement this 24 day of January, 2014.

DEVELOPER:

COUNTY ROAD 3 INVESTORS, LLC,
a Colorado limited liability company

By:



Andy Chaikovsky, Member

STATE OF COLORADO

)

) SS.

COUNTY OF Denver

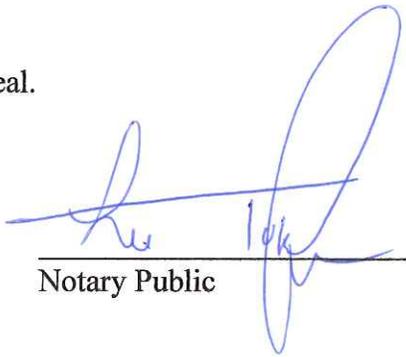
)

The foregoing instrument was acknowledged before me this 23rd day of January, 2014, by Andy Chaikovsky as Member of County Road 3 Investors, LLC, a Colorado limited liability company.

WITNESS my hand and official seal.

My commission expires:

December 28, 2016



Notary Public

ORMAN L TOKO
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20124080298
MY COMMISSION EXPIRES DECEMBER 28, 2016

EXHIBIT A

Legal Description of Developer Tract

Tract A1 and Tract B of Vista Ridge Filing No. 6, First Amendment, County of Weld, State of Colorado.

EXHIBIT B

Legal Description of Owner Tract

Lot 2 of Vista Ridge Filing No. 6, First Amendment, County of Weld, State of Colorado.

EXHIBIT C-2

Site Plan depicting Future Common Access Drives

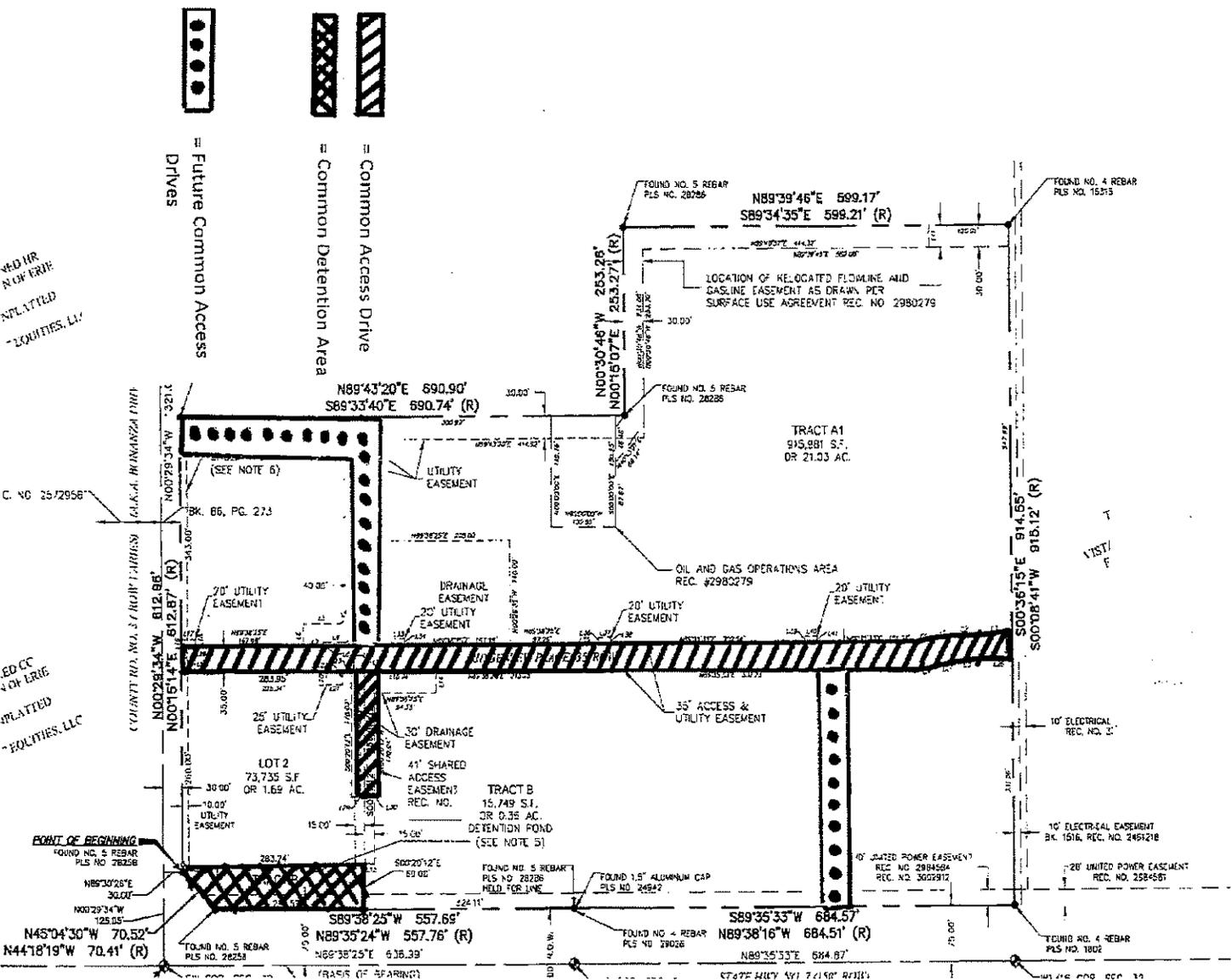


EXHIBIT D

Maintenance Expense Allocation

<u>Tracts</u>	<u>Acreage of Tract</u>	<u>Allocated Share (%)</u>
Developer Tract (net of Common Access Drive and Common Detention Area)	19.23 acres	91.9%
Lot 2 (Owner Tract)	1.69 acres	8.1%
Total	20.92 acres	100%



WORKING INTEREST OWNERSHIP REPORT

REPORT DATE: 8/20/2020
CERTIFIED: 9/14/1981 to 8/17/2020

DESCRIPTION:

Weld County, Colorado
Township 1 North, Range 68 West, 6th P.M.
 Section 32: Tracts A1 and B of Vista Ridge Filing No. 6, 1st Amendment, in the SW/4SW/4

WORKING INTEREST OWNER	WORKING INTEREST %	LEASES
Extraction Oil & Gas, LLC Vesting Docs: 4086521, 4089206	100%	<p>OGL 1868894 Lessor: Lyle J. and Betty L. Picraux, husband and wife Lessee: Petrogulf Energy Company Dated: 8/20/1981 Recorded: 9/14/1981 Covers: <u>Township 1 North, Range 68 West, 6th P.M.</u> Section 32: SW/4SW/4, except the North 330 feet, and the North 495 feet of the NW/4SW/4</p> <p>OGL 1874598 Lessor: Stanley A. Zimmerman and Leone M. Zimmerman, husband and wife Lessee: Petrogulf Energy Company Dated: 10/29/1981 Recorded: 11/16/1981 Covers: <u>Township 1 North, Range 68 West, 6th P.M.</u> Section 32: W/2SW/4</p>
Totals:	100%	

EXAMINER'S NOTES:

Note 1: In Assignment and Bill of Sale 2317283, recorded on 1/7/1993, OGL 1868894 is incorrectly noted as 1868994 on Exhibit, however all other lease information is correct.

Note 2: Wellbore Assignment of Oil and Gas Leases 2508035, Wellbore Assignment of Oil and Gas Leases 2598601, and Agreement for Exercise of Options and Assignment of Oil and Gas Interests 2840695 convey wellbore and production payments on the Hippen #2-32 well. These instrument have not been chained forward and have been included on the Runsheet to be over-inclusive. Also note the Hippen #2-32 well was Plugged and Abandoned as of 11/5/2019.

OTHER:

This report was prepared from a careful examination of the public records and tract indices of Weld County, Colorado found online as indexed against the captioned lands and the online Grantor/Grantee records provided by the Weld County Clerk and Recorder, and is made solely for the benefit of Inked Land Company, LLC for the purpose of assisting in a determination of the apparent ownership of the mineral lands involved. The instruments referred to have not been examined to determine their legal sufficiency. No warranty of title is expressed or implied and the preparer of this report assumes no liability.

Examined By:

Stephanie Harris
 Inked Land Company, LLC
 1009 37th Avenue Ct., Suite 101
 Greeley, CO 80634

PHASE III DRAINAGE REPORT

AUTOWASH AT VISTA RIDGE

Lot 5, Vista Ridge Filing No. 6, 2nd Amendment

PREPARED FOR OWNER/DEVELOPER:

AUTOWASH, LLP

2033 Central Park Boulevard

Denver, CO 80238

Phone: 303-514-0905

Contact: Dennis Dreeszen

Email: dennisdreeszen@hotmail.com

PREPARED BY:

KELLY DEVELOPMENT SERVICES, LLC

9301 Scrub Oak Drive

Lone Tree, Colorado 80124

Phone: 303-888-6338

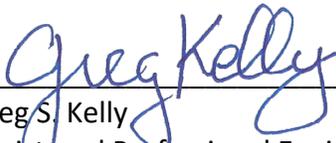
Contact: Greg Kelly, PE

Email: greg@kellydev.com

April 30, 2021

Engineer's Certification

I hereby certify that this Phase III Drainage Report for the design of Autowash at Vista Ridge was prepared by me (or under my direct supervision) in accordance with the provisions of the *Town of Erie Standards and Specifications for Design and Construction* for the owners thereof. I understand that the Town of Erie does not and will not assume liability for drainage facilities designed by others, including the designs presented in this report.



Greg S. Kelly
Registered Professional Engineer
State of Colorado No. 15813

04/30/2021

Date



PREPARED UNDER THE DIRECT SUPERVISION OF
GREGORY S. KELLY, PE COLORADO LIC. #15813
FOR AND ON BEHALF OF KELLY DEVELOPMENT SERVICES, LLC

Town Acceptance

This report has been reviewed and found to be in general compliance with *Town of Erie Standards and Specifications for Design and Construction* and other town requirements.
THE ACCURACY AND VALIDITY OF THE ENGINEERING DESIGN, DETAILS, DIMENSIONS, QUANTITIES, AND CONCEPTS IN THIS REPORT REMAINS THE SOLE RESPONSIBILITY OF THE PROFESSIONSL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.

Accepted by: _____
Town Engineer Date

PHASE III DRAINAGE REPORT AUTOWASH AT VISTA RIDGE

I. GENERAL LOCATION AND DESCRIPTION

Site Location

The Autowash at Vista Ridge site is located just east of the intersection of Bonanza Drive and East Baseline Road (Colorado Highway 7) in the Town of Erie, Colorado. The site is located within the Southwest Quarter of Section 32, Township 1 North, Range 68 West of the 6th P. M., Town of Erie, County of Weld, State of Colorado. The site is located within the Vista Ridge Filing No. 6 2nd Amendment subdivision. It is Lot 1 of that subdivision. Access to the site is from Commons Drive, which is a private drive with a 35' private access easement from Bonanza Drive. The site is adjacent to a Kum-n-Go store.

Property Description

The site is 0.83 acres. The site was used as a staging area for the construction of the Kum-n-Go store, so there is little ground cover and is mostly bare ground.

The ground surface slopes to the southwest at approximately a 4 to 5 percent. NRCS soils data indicates the site is Midway-Shingle complex. The hydrologic soil type is categorized as SCS Hydrologic Soil Group Type D and that the soils are well drained with medium runoff.

There are no major drainageways within the site. There is a proposed detention pond (Pond D) just south of the site located in Tract E of Vista Ridge Filing No. 6, 2nd Amendment subdivision. There is an existing detention pond just north of Commons Drive. A 24" storm sewer outfall from the existing detention pond runs cross the northwest corner of the property, then south along the westerly property line. This storm sewer is within a 30' drainage easement, 15' of which is on the site.

The property is not located within a flood plain as shown on FEMA FIRM Map Number 08013CO443J effective December 18, 2012. The site is located within unshaded Zone X. This zone is described as "Areas determined to be outside the 0.2% annual chance floodplain".

The proposed land use/development is a car wash with a 4,500 square foot building, access drives, parking areas and landscaping. The proposed percent impervious for the site will be 75%.

II. DRAINAGE BASINS AND SUB-BASINS

The site is located within the Coal Creek drainage basin and was a part of the Coal Creek and Rock Creek Major Drainageway Plan (Respec, 2014) and Erie Outfall System Planning Preliminary Design: Town of Erie and Weld County (Love and Associates, 2007 OSP). The OSP was updated by Merrick in 2020. The site is included in the Vista Ridge Filing No. 6, 2nd

Amendment subdivision. A *Phase III Drainage Report for Vista Ridge Filing No. 6, 2nd Amendment* revised January 31, 2020 prepared by Hurst and Associates details the drainage conveyance and storage facilities for the entire subdivision. Sub-regional stormwater detention and water quality is provided for in these facilities. No onsite detention or water quality is required.

The sub-regional detention/water quality ponds will outfall to storm sewers that cross under Bonanza Drive and discharge to a roadside swale along East Baseline Road.

In the updated Town of Erie Outfall Systems Plan (East of Coal Creek) prepared by Merrick dated January 2020, the Autowash site is located within Sub-basin 210. The sub-basin plan shows a future imperviousness of 86% for this sub-basin. The calculated percent imperviousness for the site is 75%, well within the projected imperviousness for this area. There are no impacts, constraints or required drainage patterns, besides generally maintaining existing drainage patterns, in this report for the Autowash site, which is less than 3% of the entire sub-basin.

In the Hurst Phase III Drainage Report, the site for the Autowash development is a portion of Basin B2. This basin did not include the access drive that is included in Basin B1 (3,100 sq. ft. of pavement) and sidewalk and tree lawn that is included in Basin A7 (1,400 sq. ft.) but was included as portion of Basin C of the Autowash site. In the Hurst report, this basin is 0.93 acres with a 100-year runoff coefficient of 0.73. This runoff coefficient was calculated by using 0.73 acres of developed ground at a percent impervious of 73% (Business Suburban Area) and 0.20 acres of undeveloped ground at a percent impervious of 2% (Lawn/Landscaped Area). This calculation is included in the appendix of this report. The calculated runoff rates are 1.62 cfs in the 5-year storm and 6.13 cfs in the 100-year. It should be noted that using a 2% imperviousness for the area of Pond D is not correct since the pond contains a significant amount of riprap, trickle channel and maintenance access pavement.

If those portions of the access drive and sidewalk not included in Basin B2 (4,500 sq. ft. total) are removed from the fully developed Autowash site but the area of Detention Pond D is included, the site will contain 0.93 acres (same as B2), will have a 100-year runoff coefficient of 0.73 and runoff rates of 1.76 cfs in the 5-year storm and 5.90 cfs in the 100-year. Although the 5-year rate is slightly higher than the Hurst rate by 0.14 cfs, the 100-year rate is less than the Hurst calculated rate. The flow difference in the 5-year storm is minimal. The proposed storm sewers are designed with more than adequate capacities and in the 100-year events are flowing at less than 30% full capacity. The minor differences will not negatively impact the stormwater facilities proposed for the Autowash site and adjacent detention pond.

There are two off-site basins that will flow onto the site prior to development of the property to the east. It is assumed that runoff from this property, when fully developed, will flow south to the proposed detention/water quality pond to be constructed by the master developer of the subdivision and no longer flow onto the Autowash site.

III. DRAINAGE DESIGN CRITERIA

Regulations

This drainage report is based upon criteria contained in the *Town of Erie Standards and Specifications for Design and Construction* dated 01/2021 and the UDFCD *Urban Storm Drainage Criteria Manuals, latest editions*.

Hydrology

The Rational Method was used to calculate runoff from this site in accordance with the *Town of Erie Standards and Specifications for Design and Construction, Section 800* dated 01/2021. The 5-year storm event is used to design the initial drainage system. The 100-year storm is used to design the major drainage system. The 1-Hour Design Point Rainfall Values from the Section 813.03 of the Manual used in this report are 1.11 inches for the 5-year storm and 2.68 inches for the 100-year event.

Hydraulics

Calculation methods for private improvements including inlets and storm sewers are based upon the Manning's Equation and the *Town of Erie Standards and Specifications for Design and Construction*. On-site storm drainage improvements are designed for the 5-year and 100-year storm events.

IV. STORMWATER MANAGEMENT FACILITY DESIGN

Stormwater Conveyance Facilities

The general concept for the site drainage will be for storm runoff to surface flow in paved areas to inlets, where it will be captured and conveyed in storm sewers to the off-site detention pond adjacent to the site.

Specifically, the site grading creates four separate basins on-site. These basins are described as follows:

Basin A is 0.25 acres along the northern portion of the site. It consists of pavement and landscaping. It is 65% impervious. Runoff flows southwesterly in this basin in the access drive and parking area to a 5' Type R inlet at Design Point 1. Flow is captured in the inlet and conveyed to the 5' Type R inlet at Design Point 2 in Basin B in an 18" HDPE storm sewer at slopes varying from 0.91% to 1.72%. The 5-year runoff rate from the basin is 0.51 cfs and the 100-year is 1.63 cfs. In the interim condition prior to the site to the east being developed, the runoff rates are less than fully developed due to differing times of concentration. The 100-year flow depth in the pipe ranges from 4.2 inches to 4.9 inches. In the event the inlet is plugged, the emergency overflow path is around the curb to the west to the access drive and into Basin C.

Basin B is along the east side of the site. It is 0.25 acres consisting of pavement and landscaping. It is 84% impervious. Runoff flows southerly to a 5' Type R inlet at Design Point 2 at the southeast corner of the site. Flows then enter an 18" HDPE storm sewer,

combining with the flows from Basin A, at a slope of 3.85% and are conveyed to the off-site pond (Detention Pond D). The basin runoff rates are 0.68 cfs in the 5-year event and 1.88 cfs in the 100-year. In the interim condition with flows entering the site from the property to the east, the 100-year runoff rate is greater than the fully developed rate. The inlet and storm sewer have been designed to the 100-year interim flow rate. The combined flow rate in the storm sewer is 3.88 cfs. The 100-year flow depth in the pipe is 5.3 inches. The emergency overflow for this basin will be over the curb and down the slope to the pond.

Basin C is along the west side of the site. It is 0.26 acres of building roof, pavement and landscaping. It is 92% impervious. Runoff surface flows to a CDOT Type C with close mesh grate inlet at Design Point 3. Flow is then conveyed in an 18" RCP storm sewer at a slope of 1.5% to the off-site pond (Detention Pond D). This storm sewer will connect to an existing 18" RCP stubbed into the site by the master developer of subdivision. Flow rates from this basin are 0.77 cfs in the 5-year and 2.03 cfs for the 100-year event. The 100-year flow depth in the pipe is 4.8 inches. Emergency overflow path is westerly down the east access drive of the Kum-n-Go store to an inlet in the southeast corner of that site, then to the pond adjacent to that site.

Basin D is the landscaped area on the south end of the site. It is 2% impervious. Runoff surface flows directly to the off-site pond. Flow rates are 0.01 cfs in the 5-year and 0.27 cfs for the 100-year.

There are two off-site basins that will flow onto the site prior to development of the property to the east. It is assumed that runoff from this property, when developed, will flow south to the proposed detention/water quality pond to be constructed by the master developer of the subdivision. These interim basins are designated OS-1 and OS-2 on the drainage plan. As noted above, only Basin B's runoff will be greater in the interim condition versus the fully developed condition. The inlet and storm sewer in Basin B has been sized for the greater of the two flows.

As noted above, the outfall (10 LF of 18" RCP @ 5.0% slope) of the storm sewer (Storm Sewer Line B) from Basin C of the site, along with the riprap, forebay and trickle channel have been designed by Hurst and Associates for the master developer of the subdivision. These drainage improvements are included in the Vista Ridge Filing No. 6, 2nd Amendment Construction Plans dated 03/06/2020.

The storm sewer (Storm Sewer Line A) along with the forebay, concrete weir wall and riprap at the east end of Detention Pond D will be constructed as part of the overall Autowash development.

A summary of the Basins' runoff is as follows:

BASIN RUNOFF SUMMARY TABLE							
Basin Designation	Basin Area (ac)	Percent Impervious	C ₅	C ₁₀₀	T _c (min)	Q ₅ (cfs)	Q ₁₀₀ (cfs)
A	0.25	65%	0.56	0.75	5.8	0.51	1.63
B	0.25	84%	0.72	0.83	5.0	0.68	1.88
C	0.26	92%	0.79	0.86	5.0	0.77	2.03
D	0.06	2%	0.05	0.49	5.0	0.01	0.27
OS-1	0.05	0.02	0.05	0.49	13.5	0.01	0.16
OS-2	0.86	0.02	0.05	0.49	25.4	0.08	1.95

A summary of the Design Points' flows is as follows:

DOWNSTREAM OF DESIGN POINT RUNOFF SUMMARY TABLE							
Design Point	Contributing Basins	Contributing Area (acres)	T _c (min)	Q ₅ (cfs)	Q ₁₀₀ (cfs)	Interim Q ₅ (cfs)	Interim Q ₁₀₀ (cfs)
1	A	0.25	5.8	0.51	1.63	0.38	1.35
2	A, B	0.50	5.8	1.16	3.43	0.70	3.88
3	C	0.26	5.0	0.77	2.03	0.77	2.03

Stormwater Storage Facilities

As previously noted, stormwater detention and water quality treatment are provided in the off-site detention/water quality pond (Detention Pond D) adjacent to the south end of the site. This pond will be constructed by the master developer of the Vista Ridge Filing No. 6, 2nd Amendment subdivision drainage improvements. Discharge from the proposed on-site sewers will be into forebays before entering the pond. The east forebay and extensive riprap erosion protection will be constructed as part of the Autowash development. Access to the pond will be from the East Baseline Road right-of-way.

V. CONCLUSIONS

This Phase III Drainage Report and Plan for the Autowash at Vista Ridge is in conformance to acceptable engineering standards and practices and criteria established by the Town of Erie. No variances to any of the regulations and requirements are being requested. No adverse impacts to downstream facilities and/or adjacent properties are expected as a result of the development of the site.

VI. REFERENCES

1. *Town of Erie Standards and Specifications for Design and Construction, Sections 100 and 800* dated 01/2021.
2. *Urban Storm Drainage Criteria Manual Volume 1, updated August 2018; Urban Storm Drainage Criteria Manual Volume 2, updated September 2017; Urban Storm Drainage Criteria Manual Volumes 3, updated October 2019*, Urban Drainage and Flood Control District.
3. FEMA Flood Insurance Rate Map Number 08013CO443J effective December 18, 2012
4. USDA NRCS *Custom Soil Resource Report for Weld County, Colorado, Southern Part*
5. *Phase III Drainage Report for Vista Ridge Filing No. 6, 2nd Amendment* revised January 31, 2020 prepared by Hurst and Associates.
6. Coal Creek and Rock Creek Major Drainageway Plan (Respec, 2014) and Erie Outfall System Planning Preliminary Design: Town of Erie and Weld County (Love and Associates, 2007).
7. Town of Erie Outfall Systems Plan (East of Coal Creek) prepared by Merrick dated January 2020.

VII. APPENDICES

1. Hydrologic Computations
 - a. Land use assumptions, composite "C" and % Impervious calculations
 - b. Initial and major storm runoff computations for developed runoff conditions
2. Hydraulic Computations
 - a. Inlet Capacity Calculations
 - b. Storm Sewer UD_Sewer Results, 5-YR & 100-YR
3. Referenced Information
 - a. FEMA Firmette
 - b. NCRS Soil Report
 - c. Excerpts from Hurst Report
 - d. Excerpts from Town of Erie Outfall Systems Plan (East of Coal Creek)

APPENDIX 1

HYDROLOGIC COMPUTATIONS

COMPOSITE 'C' FACTORS (DEVELOPED)

LOCATION: Autowash at Vista Ridge Erie, CO Soil Type: D Phase 3 Drainage Report BY: GSK DATE: 4/30/2021

SUB-BASIN DESIGNATION	Acreage				PAVEMENT				ROOFS				LAWNS				COMPOSITE C FACTOR				PERCENT IMPERVIOUS		
	PAVED	ROOFS	LAWNS	TOTAL	2YR	5 YR	10 YR	100 YR	2YR	5 YR	10 YR	100 YR	2YR	5 YR	10 YR	100 YR	2YR	5 YR	10 YR	100 YR			
	Imperviousness (%) =				100				90				2										
A	0.16	0.00	0.09	0.25	0.83	0.85	0.87	0.89	0.74	0.77	0.79	0.85	0.01	0.05	0.15	0.49	0.53	0.56	0.61	0.75	64.7%		
B	0.21	0.00	0.04	0.25	0.83	0.85	0.87	0.89	0.74	0.77	0.79	0.85	0.01	0.05	0.15	0.49	0.70	0.72	0.75	0.83	84.3%		
C	0.15	0.10	0.01	0.26	0.83	0.85	0.87	0.89	0.74	0.77	0.79	0.85	0.01	0.05	0.15	0.49	0.76	0.79	0.81	0.86	92.4%		
D	0.00	0.00	0.06	0.06	0.83	0.85	0.87	0.89	0.74	0.77	0.79	0.85	0.01	0.05	0.15	0.49	0.01	0.05	0.15	0.49	2.0%		
Pond D	0.00	0.00	0.20	0.20	0.83	0.85	0.87	0.89	0.74	0.77	0.79	0.85	0.01	0.05	0.15	0.49	0.01	0.05	0.15	0.49	2.0%		
Overall Site	0.52	0.10	0.40	1.02	0.83	0.85	0.87	0.89	0.74	0.77	0.79	0.85	0.01	0.05	0.15	0.49	0.50	0.53	0.58	0.73	60.6%		
Site w/o Drive & Sidewalk	0.46	0.10	0.37	0.93	0.83	0.85	0.87	0.89	0.74	0.77	0.79	0.85	0.01	0.05	0.15	0.49	0.49	0.52	0.57	0.73	59.9%		
OS-1	0.00	0.00	0.05	0.05	0.83	0.85	0.87	0.89	0.74	0.77	0.79	0.85	0.01	0.05	0.15	0.49	0.01	0.05	0.15	0.49	2.0%		
OS-2	0.00	0.00	0.86	0.86	0.83	0.85	0.87	0.89	0.74	0.77	0.79	0.85	0.01	0.05	0.15	0.49	0.01	0.05	0.15	0.49	2.0%		

TIME OF CONCENTRATION (STANDARD FORM SF-2)																REMARKS
LOCATION: Autowash at Vista Ridge			Phase 3 Drainage Report								BY: GSK		DATE: 4/30/2021			FORMULAS: * $T_i = 0.395 (1.1 - C_s)L^{0.5}/S^{1/100}^{1/3}$ ** $V = C_v(S/100)^{0.5}$
SUB-BASIN DATA			INIT./OVERLAND TIME (T _i)			TRAVEL TIME (T _t)					TOTAL	T _c Check (Urbanized Basins)			FINAL T _c	
DESIGNATION	C _s	AREA (AC)	LENGTH (FT)	SLOPE %	T _i (Min.)*	GRASS/PAVED	LENGTH (FT)	SLOPE %	VEL (FPS)**	T _t (Min.)	T _i +T _t (Min.)	LGTH. (FT)	IMPERVIOUS	EQ. 6-5 UDFCD	(minutes)	
A	0.56	0.25	57	2.60	5.42	PAVED	81	3.10	3.52	0.38	5.8	138	0.65	15.4	5.8	Design Point 1
B	0.72	0.25	0	1.00	0.00	PAVED	190	1.80	2.68	1.18	1.2	190	0.84	12.6	5.0	Design Point 2
C	0.79	0.26	0	1.00	0.00	PAVED	172	2.00	2.83	1.01	1.0	172	0.92	11.1	5.0	Design Point 3
D	0.05	0.06	20	20.00	3.17	GRASS	0	1.00	0.70	0.00	3.2	20	0.02	25.7	5.0	Design Point 4
OS-1	0.05	0.05	108	3.24	13.52	GRASS	0	1.00	0.70	0.00	13.5	108	0.02	25.7	13.5	
OS-2	0.05	0.86	300	3.15	22.75	GRASS	113	1.00	0.70	2.69	25.4	413	0.02	28.1	25.4	

Standard Form SF - 3
Storm Drainage System Design
(Rational Method Procedure)

Subdivision Autowash at Vista Ridge
 Designer GSK
 Date 4/30/2021
 Design Storm 5-YR DEVELOPED - INTERIM

$$I = \frac{28.5 \cdot P_1}{(10 + T_C)^{0.786}}$$

Where: $P_1 = 1.11$

Design Point	Direct Runoff							Total Runoff				Comment
	Subbasin Designation	Area	Runoff Coefficient	t_c	C x A	I	Q	t_c	C x A	I	Q	
(1)	(2)	ac. (3)	(4)	min. (5)	ac. (6)	in/hr (7)	cfs (8)	min. (9)	ac. (10)	in/hr (11)	cfs (12)	
	OS-1	0.05	0.05	13.5	0.00	2.64	0.01				0.01	
1	A	0.25	0.56	5.8	0.14	3.61	0.5	13.5	0.14	2.64	0.38	Flow to Inlet 2 & Storm Line A
	OS-2	0.86	0.05	25.4	0.04	1.92	0.1				0.08	
2	B	0.25	0.72	5.0	0.18	3.76	0.7	25.4	0.37	1.92	0.70	Flow to Inlet 1 & Storm Line A
3	C	0.26	0.79	5.0	0.21	3.76	0.8	5.0	0.21	3.76	0.77	Flow to Inlet 3 & Storm Line B
	D	0.06	0.05	5.0	0.00	3.76	0.01				0.01	Flow offsite to pond

Standard Form SF - 3
Storm Drainage System Design
(Rational Method Procedure)

Subdivision Autowash at Vista Ridge
 Designer GSK
 Date 4/30/2021
 Design Storm 100-YR DEVELOPED - INTERIM

$$I = \frac{28.5 \cdot P_1}{(10 + T_C)^{0.786}}$$

Where: $P_1 = 2.68$

Design Point	Direct Runoff							Total Runoff				Comment
	Subbasin Designation	Area	Runoff Coefficient	t_c	C x A	I	Q	t_c	C x A	I	Q	
(1)	(2)	ac. (3)	(4)	min. (5)	ac. (6)	in/hr (7)	cfs (8)	min. (9)	ac. (10)	in/hr (11)	cfs (12)	
	OS-1	0.05	0.49	13.5	0.02	6.38	0.2				0.16	
1	A	0.25	0.75	5.8	0.19	8.73	1.6	13.5	0.21	6.38	1.35	Flow to Inlet 2 & Storm Line A
	OS-2	0.86	0.49	25.4	0.42	4.62	1.9				1.95	
2	B	0.25	0.83	5.0	0.21	9.09	1.9	25.4	0.84	4.62	3.88	Flow to Inlet 1 & Storm Line A
3	C	0.26	0.86	5.0	0.22	9.09	2.0	5.0	0.22	9.09	2.03	Flow to Inlet 3 & Storm Line B
	D	0.06	0.49	5.0	0.03	9.09	0.3				0.27	Flow offsite to pond

BASIN RUNOFF SUMMARY TABLE							
Basin Designation	Basin Area (ac)	Percent Impervious	C ₅	C ₁₀₀	T _c (min)	Q ₅ (cfs)	Q ₁₀₀ (cfs)
A	0.25	65%	0.56	0.75	5.8	0.51	1.63
B	0.25	84%	0.72	0.83	5.0	0.68	1.88
C	0.26	92%	0.79	0.86	5.0	0.77	2.03
D	0.06	2%	0.05	0.49	5.0	0.01	0.27
OS-1	0.05	0.02	0.05	0.49	13.5	0.01	0.16
OS-2	0.86	0.02	0.05	0.49	25.4	0.08	1.95

5.80

DOWNSTREAM OF DESIGN POINT RUNOFF SUMMARY TABLE							
Design Point	Contributing Basins	Contributing Area (acres)	T _c (min)	Q ₅ (cfs)	Q ₁₀₀ (cfs)	Interim Q ₅ (cfs)	Interim Q ₁₀₀ (cfs)
1	A	0.25	5.8	0.51	1.63	0.38	1.35
2	A, B	0.50	5.8	1.16	3.43	0.70	3.88
3	C	0.26	5.0	0.77	2.03	0.77	2.03

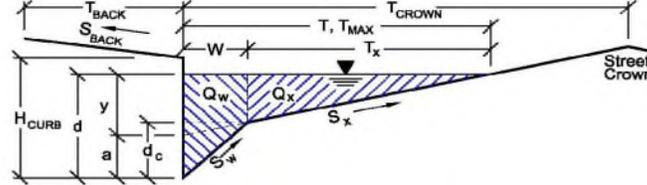
APPENDIX 2

HYDRAULIC COMPUTATIONS

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

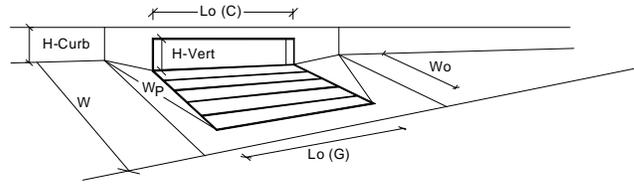
Project: Autowash at Vista Ridge
 Inlet ID: Design Point 1



Gutter Geometry (Enter data in the blue cells)								
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = $ <input style="width: 50px;" type="text" value="0.0"/> ft							
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} = $ <input style="width: 50px;" type="text" value=""/> ft/ft							
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} = $ <input style="width: 50px;" type="text" value="0.015"/>							
Height of Curb at Gutter Flow Line	$H_{CURB} = $ <input style="width: 50px;" type="text" value="6.00"/> inches							
Distance from Curb Face to Street Crown	$T_{CROWN} = $ <input style="width: 50px;" type="text" value="20.0"/> ft							
Gutter Width	$W = $ <input style="width: 50px;" type="text" value="1.00"/> ft							
Street Transverse Slope	$S_x = $ <input style="width: 50px;" type="text" value="0.020"/> ft/ft							
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	$S_w = $ <input style="width: 50px;" type="text" value="0.083"/> ft/ft							
Street Longitudinal Slope - Enter 0 for sump condition	$S_D = $ <input style="width: 50px;" type="text" value="0.000"/> ft/ft							
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = $ <input style="width: 50px;" type="text" value="0.020"/>							
Max. Allowable Spread for Minor & Major Storm	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"></td> <td style="text-align: center; border: none;">Minor Storm Major Storm</td> <td style="width: 5%;"></td> </tr> <tr> <td style="border: none;">$T_{MAX} =$</td> <td style="border: 1px solid blue; width: 50px; text-align: center;">20.0</td> <td style="border: 1px solid blue; width: 50px; text-align: center;">20.0</td> <td style="border: none;">ft</td> </tr> </table>		Minor Storm Major Storm		$T_{MAX} = $	20.0	20.0	ft
	Minor Storm Major Storm							
$T_{MAX} = $	20.0	20.0	ft					
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"></td> <td style="text-align: center; border: none;">Minor Storm Major Storm</td> <td style="width: 5%;"></td> </tr> <tr> <td style="border: none;">$d_{MAX} =$</td> <td style="border: 1px solid blue; width: 50px; text-align: center;">6.0</td> <td style="border: 1px solid blue; width: 50px; text-align: center;">6.0</td> <td style="border: none;">inches</td> </tr> </table>		Minor Storm Major Storm		$d_{MAX} = $	6.0	6.0	inches
	Minor Storm Major Storm							
$d_{MAX} = $	6.0	6.0	inches					
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input type="checkbox"/> check = yes							
MINOR STORM Allowable Capacity is based on Depth Criterion MAJOR STORM Allowable Capacity is based on Depth Criterion								
Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"></td> <td style="text-align: center; border: none;">Minor Storm Major Storm</td> <td style="width: 5%;"></td> </tr> <tr> <td style="border: none;">$Q_{allow} =$</td> <td style="border: 1px solid green; width: 50px; text-align: center;">SUMP</td> <td style="border: 1px solid green; width: 50px; text-align: center;">SUMP</td> <td style="border: none;">cfs</td> </tr> </table>		Minor Storm Major Storm		$Q_{allow} = $	SUMP	SUMP	cfs
	Minor Storm Major Storm							
$Q_{allow} = $	SUMP	SUMP	cfs					
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'								

INLET IN A SUMP OR SAG LOCATION

Project = Autowash at Vista Ridge
 Inlet ID = Design Point 1

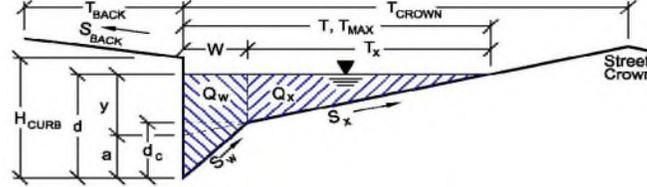


Design Information (Input)		MINOR		MAJOR	
Type of Inlet	Inlet Type =	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches	
Number of Unit Inlets (Grate or Curb Opening)	N_o =	1	1		
Water Depth at Flowline (outside of local depression)	Ponding Depth =	2.1	3.2	inches	<input checked="" type="checkbox"/> Override Depths
Grate Information		MINOR		MAJOR	
Length of a Unit Grate	$L_o (G)$ =	N/A	N/A	feet	
Width of a Unit Grate	W_o =	N/A	N/A	feet	
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_r (G)$ =	N/A	N/A		
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G)$ =	N/A	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G)$ =	N/A	N/A		
Curb Opening Information		MINOR		MAJOR	
Length of a Unit Curb Opening	$L_o (C)$ =	5.00	5.00	feet	
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches	
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches	
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees	
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	1.00	1.00	feet	
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_r (C)$ =	0.10	0.10		
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C)$ =	3.60	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C)$ =	0.67	0.67		
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	0.5	1.7	cfs	
WARNING: Inlet Capacity less than Q Peak for Minor Storm	$Q_{PEAK REQUIRED}$ =	0.5	1.6	cfs	

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Autowash at Vista Ridge
 Inlet ID: Design Point 2



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb
 Side Slope Behind Curb (leave blank for no conveyance credit behind curb)
 Manning's Roughness Behind Curb (typically between 0.012 and 0.020)
 Height of Curb at Gutter Flow Line
 Distance from Curb Face to Street Crown
 Gutter Width
 Street Transverse Slope
 Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)
 Street Longitudinal Slope - Enter 0 for sump condition
 Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} = 0.0$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} = 0.015$
 $H_{CURB} = 6.00$ inches
 $T_{CROWN} = 20.0$ ft
 $W = 1.00$ ft
 $S_x = 0.020$ ft/ft
 $S_w = 0.083$ ft/ft
 $S_D = 0.000$ ft/ft
 $n_{STREET} = 0.020$

Max. Allowable Spread for Minor & Major Storm
 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm
 Allow Flow Depth at Street Crown (leave blank for no)

	Minor Storm	Major Storm	
$T_{MAX} =$	20.0	20.0	ft
$d_{MAX} =$	6.0	6.0	inches
	<input type="checkbox"/>	<input type="checkbox"/>	check = yes

MINOR STORM Allowable Capacity is based on Depth Criterion
MAJOR STORM Allowable Capacity is based on Depth Criterion

$Q_{allow} =$

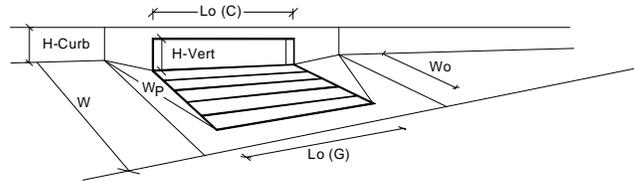
Minor Storm	Major Storm
SUMP	SUMP

 cfs

Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

INLET IN A SUMP OR SAG LOCATION

Project = Autowash at Vista Ridge
 Inlet ID = Design Point 2 - Interim 100-year runoff rate

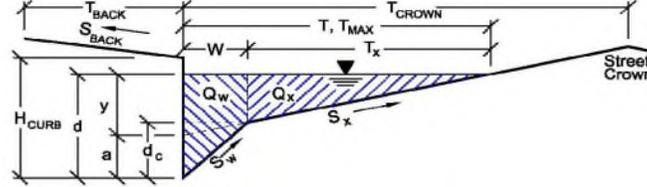


Design Information (Input)	MINOR		MAJOR	
	Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a _{local} = 3.00	3.00	inches	
Number of Unit Inlets (Grate or Curb Opening)	No = 1	1		
Water Depth at Flowline (outside of local depression)	Ponding Depth = 2.8	4.8	inches	
Grate Information	MINOR		MAJOR	
Length of a Unit Grate	L _o (G) = N/A	N/A	feet	
Width of a Unit Grate	W _g = N/A	N/A	feet	
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A _{ratio} = N/A	N/A		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C _r (G) = N/A	N/A		
Grate Weir Coefficient (typical value 2.15 - 3.60)	C _w (G) = N/A	N/A		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C _o (G) = N/A	N/A		
Curb Opening Information	MINOR		MAJOR	
Length of a Unit Curb Opening	L _o (C) = 5.00	5.00	feet	
Height of Vertical Curb Opening in Inches	H _{vert} = 6.00	6.00	inches	
Height of Curb Orifice Throat in Inches	H _{throat} = 6.00	6.00	inches	
Angle of Throat (see USDCM Figure ST-5)	Theta = 63.40	63.40	degrees	
Side Width for Depression Pan (typically the gutter width of 2 feet)	W _p = 1.00	1.00	feet	
Clogging Factor for a Single Curb Opening (typical value 0.10)	C _r (C) = 0.10	0.10		
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C _w (C) = 3.60	3.60		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C _o (C) = 0.67	0.67		
Total Inlet Interception Capacity (assumes clogged condition)	MINOR		MAJOR	
	Q _a = 1.2	3.9	cfs	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	Q _{PEAK REQUIRED} = 1.16	3.88	cfs	

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Autowash at Vista Ridge
 Inlet ID: Design Point 3



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb
 Side Slope Behind Curb (leave blank for no conveyance credit behind curb)
 Manning's Roughness Behind Curb (typically between 0.012 and 0.020)
 Height of Curb at Gutter Flow Line
 Distance from Curb Face to Street Crown
 Gutter Width
 Street Transverse Slope
 Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)
 Street Longitudinal Slope - Enter 0 for sump condition
 Manning's Roughness for Street Section (typically between 0.012 and 0.020)

$T_{BACK} = 0.0$ ft
 $S_{BACK} =$ ft/ft
 $n_{BACK} = 0.015$
 $H_{CURB} = 6.00$ inches
 $T_{CROWN} = 20.0$ ft
 $W = 3.00$ ft
 $S_x = 0.020$ ft/ft
 $S_w = 0.083$ ft/ft
 $S_D = 0.000$ ft/ft
 $n_{STREET} = 0.020$

Max. Allowable Spread for Minor & Major Storm
 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm
 Allow Flow Depth at Street Crown (leave blank for no)

	Minor Storm	Major Storm	
T_{MAX}	20.0	20.0	ft
d_{MAX}	6.0	6.0	inches
	<input type="checkbox"/>	<input type="checkbox"/>	check = yes

MINOR STORM Allowable Capacity is based on Depth Criterion
MAJOR STORM Allowable Capacity is based on Depth Criterion

$Q_{allow} =$

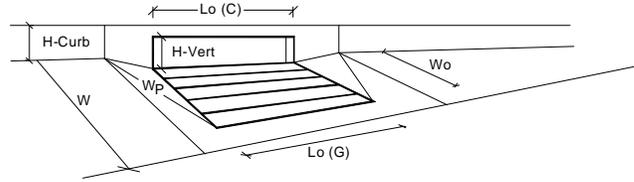
Minor Storm	Major Storm
SUMP	SUMP

 cfs

Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'
Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'

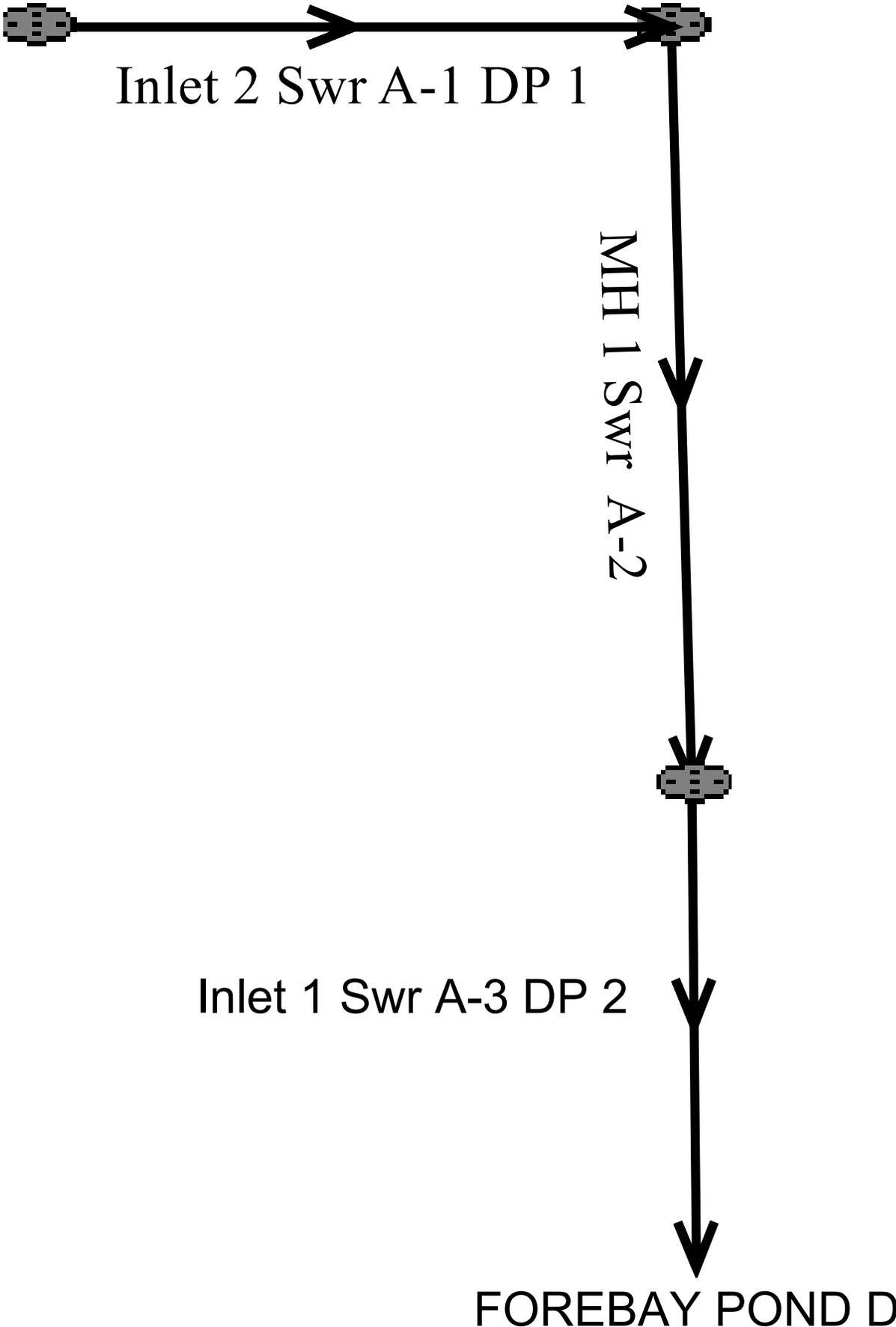
INLET IN A SUMP OR SAG LOCATION

Project = Autowash at Vista Ridge
 Inlet ID = Design Point 3



Design Information (Input)		MINOR		MAJOR	
Type of Inlet	Inlet Type =	CDOT Type C Grate			
Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow')	a_{local} =	3.00	3.00	inches	
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1		
Water Depth at Flowline (outside of local depression)	Ponding Depth =	3.5	5.2	inches	<input checked="" type="checkbox"/> Override Depths
Grate Information		MINOR		MAJOR	
Length of a Unit Grate	$L_o (G)$ =	2.92	2.92	feet	
Width of a Unit Grate	W_g =	2.92	2.92	feet	
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	0.70	0.70		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	$C_r (G)$ =	0.50	0.50		
Grate Weir Coefficient (typical value 2.15 - 3.60)	$C_w (G)$ =	2.41	2.41		
Grate Orifice Coefficient (typical value 0.60 - 0.80)	$C_o (G)$ =	0.67	0.67		
Curb Opening Information		MINOR		MAJOR	
Length of a Unit Curb Opening	$L_o (C)$ =	N/A	N/A	feet	
Height of Vertical Curb Opening in Inches	H_{vert} =	N/A	N/A	inches	
Height of Curb Orifice Throat in Inches	H_{throat} =	N/A	N/A	inches	
Angle of Throat (see USDCM Figure ST-5)	Theta =	N/A	N/A	degrees	
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	N/A	N/A	feet	
Clogging Factor for a Single Curb Opening (typical value 0.10)	$C_r (C)$ =	N/A	N/A		
Curb Opening Weir Coefficient (typical value 2.3-3.7)	$C_w (C)$ =	N/A	N/A		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	$C_o (C)$ =	N/A	N/A		
Total Inlet Interception Capacity (assumes clogged condition)		MINOR		MAJOR	
	Q_a =	0.8	2.1	cfs	
Inlet Capacity IS GOOD for Minor and Major Storms (>Q PEAK)	$Q_{PEAK REQUIRED}$ =	0.77	2.03	cfs	

STORM SEWER LINE A SCHEMATIC

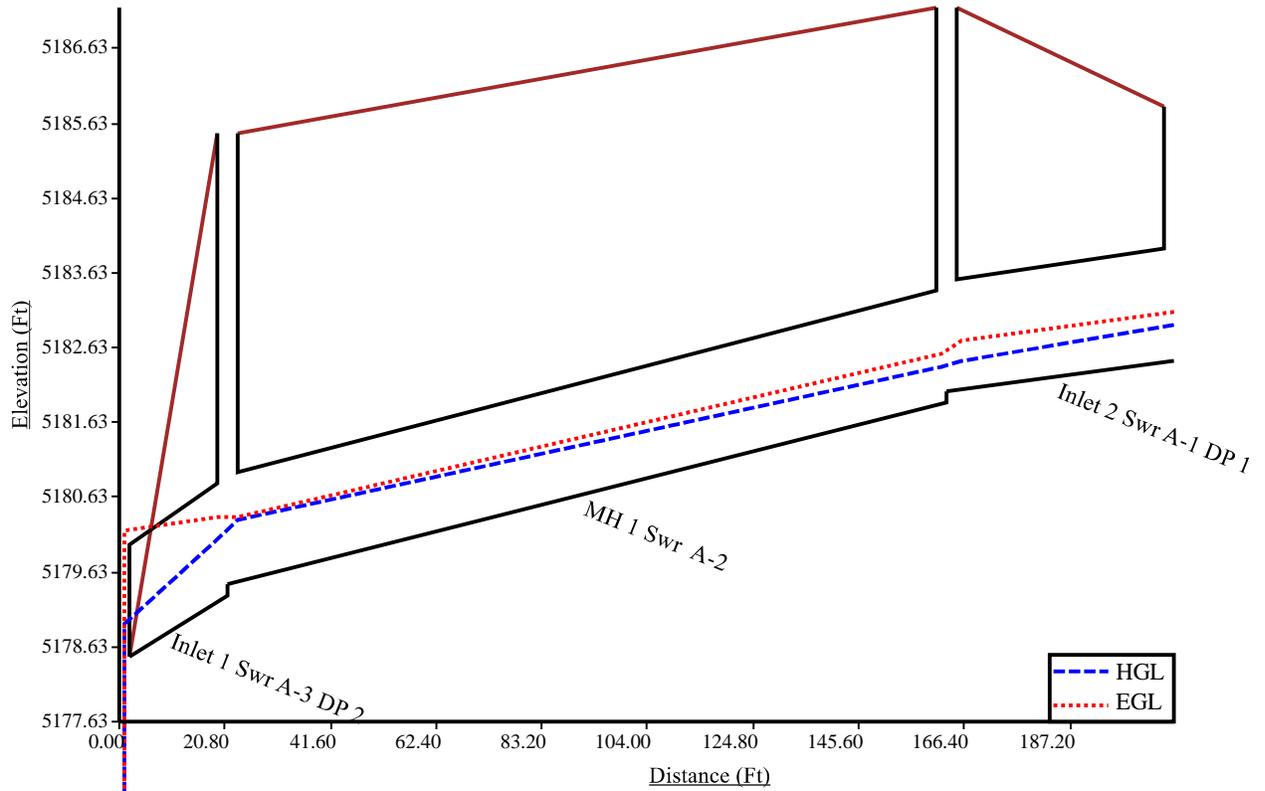


Grade Line Summary:

Tailwater Elevation: 5179.75 = Elevation of Top of Forebay plus 3 inches (estimated flow over forebay wall)

Element Name	Invert Elev.		Downstream Manhole Losses		HGL		EGL		
	Downstream (ft)	Upstream (ft)	Bend Loss (ft)	Lateral Loss (ft)	Downstream (ft)	Upstream (ft)	Downstream (ft)	Friction Loss (ft)	Upstream (ft)
Inlet 1 Swr A-3 DP 2	5178.50	5179.32	0.00	0.00	5179.75	5180.61	5180.70	0.00	5180.70
MH 1 Swr A-2	5179.47	5181.90	0.00	0.00	5180.68	5182.38	5180.70	1.86	5182.55
Inlet 2 Swr A-1 DP 1	5182.05	5182.46	0.00	0.00	5182.42	5182.94	5182.81	0.31	5183.11

STORM SEWER LINE A PROFILE - 100 YEAR

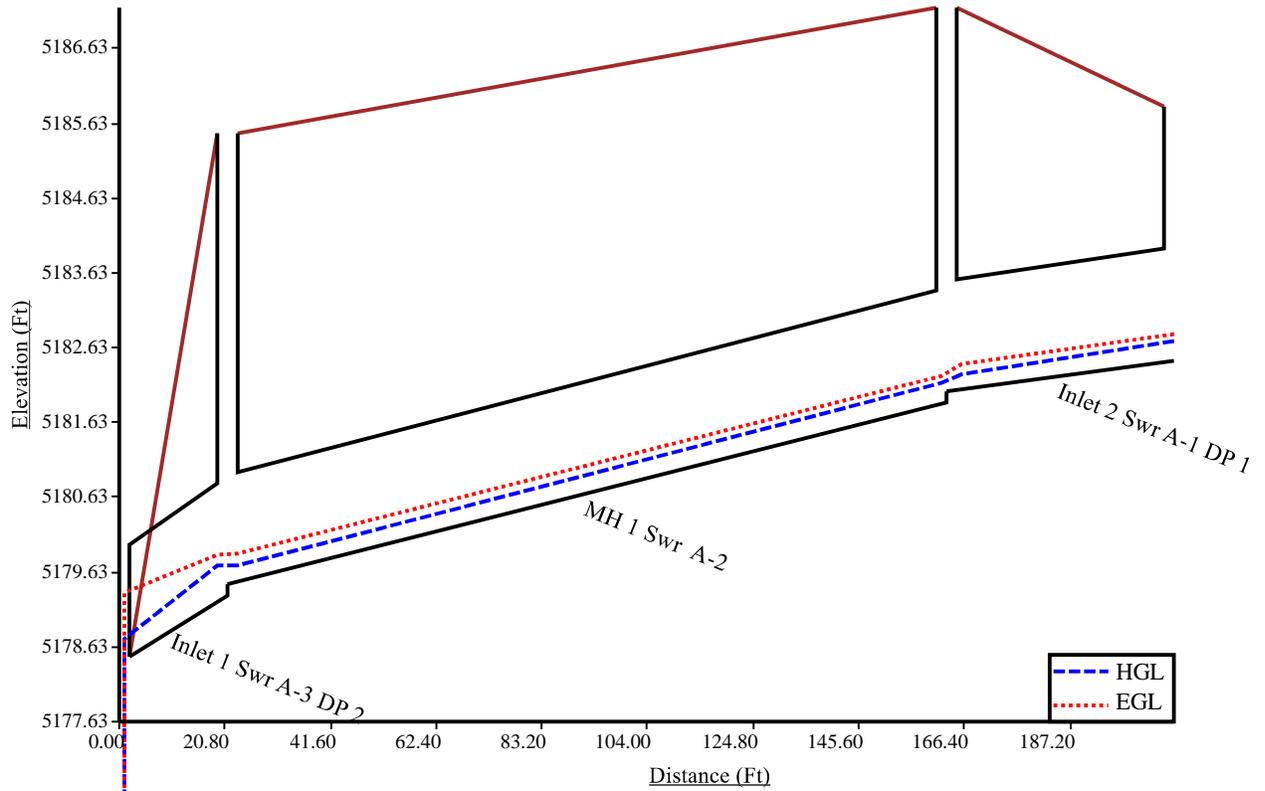


Grade Line Summary:

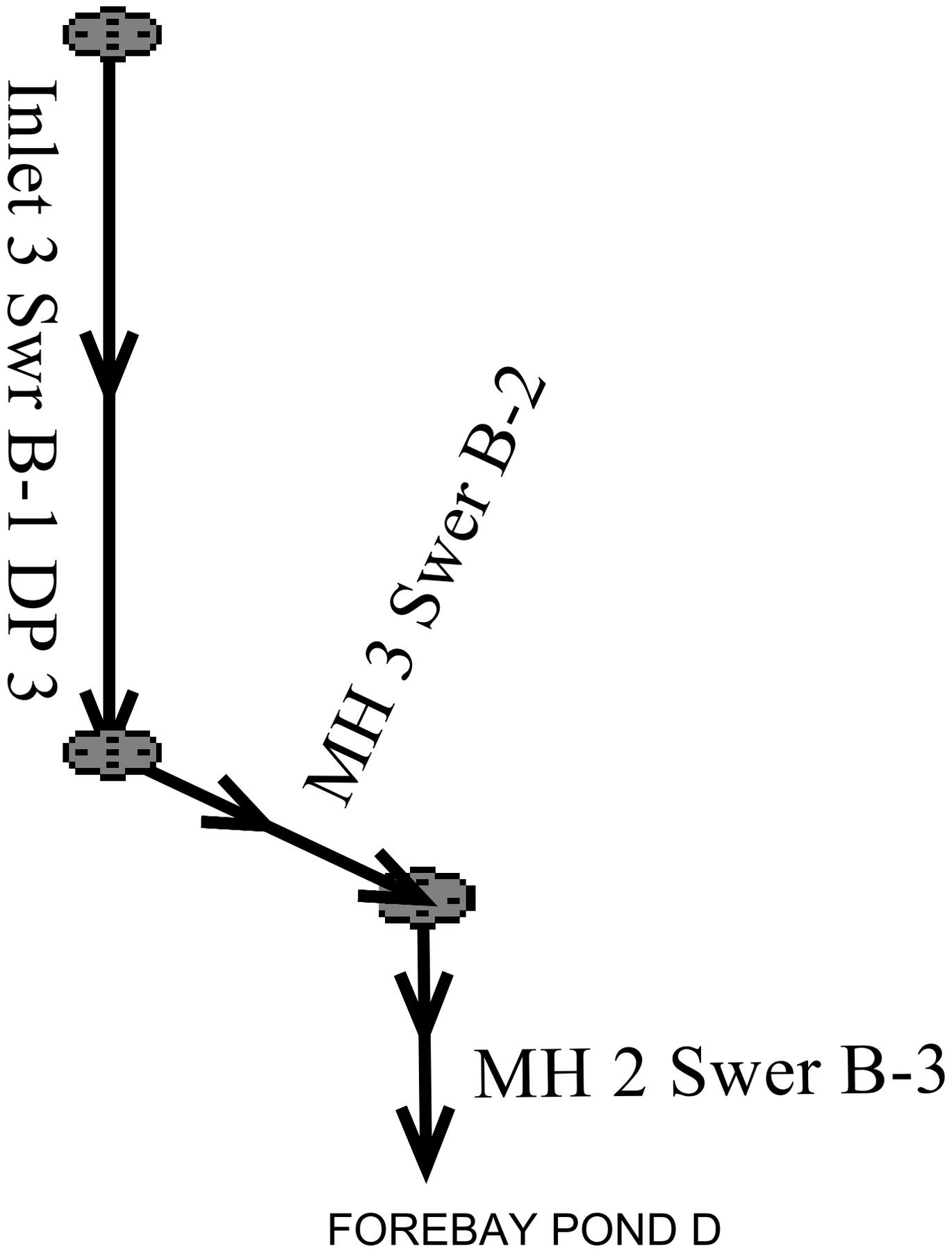
Tailwater Elevation: 5179.75 = Elevation of Top of Forebay (5179.50) plus 3 inches (estimated flow over forebay wall)

Element Name	Invert Elev.		Downstream Manhole Losses		HGL		EGL		
	Downstream (ft)	Upstream (ft)	Bend Loss (ft)	Lateral Loss (ft)	Downstream (ft)	Upstream (ft)	Downstream (ft)	Friction Loss (ft)	Upstream (ft)
Inlet 1 Swr A-3 DP 2	5178.50	5179.32	0.00	0.00	5179.75	5179.75	5179.76	0.11	5179.87
MH 1 Swr A-2	5179.47	5181.90	0.00	0.00	5179.75	5182.16	5179.88	2.28	5182.26
Inlet 2 Swr A-1 DP 1	5182.05	5182.46	0.00	0.00	5182.28	5182.72	5182.46	0.36	5182.82

STORM SEWER A PROFILE - 5 YEAR



STORM SEWER LINE B SCHEMATIC



Sewer Input Summary:

Element Name	Sewer Length (ft)	Elevation			Loss Coefficients			Given Dimensions		
		Downstream Invert (ft)	Slope (%)	Upstream Invert (ft)	Mannings n	Bend Loss	Lateral Loss	Cross Section	Rise (ft or in)	Span (ft or in)
MH 2 Swr B-3	10.00	5179.00	5.0	5179.50	0.010	0.00	0.00	CIRCULAR	18.00 in	18.00 in
MH 3 Swr B-2	27.30	5179.78	1.5	5180.19	0.010	0.05	0.00	CIRCULAR	18.00 in	18.00 in
Inlet 3 Swr B-1 DP 3	62.70	5180.34	1.5	5181.28	0.013	0.05	0.00	CIRCULAR	18.00 in	18.00 in

Sewer Flow Summary:

Element Name	Full Flow Capacity		Critical Flow		Normal Flow				Flow (cfs)	Surcharged Length (ft)	Comment
	Flow (cfs)	Velocity (fps)	Depth (in)	Velocity (fps)	Depth (in)	Velocity (fps)	Froude Number	Flow Condition			
MH 2 Swr B-3	23.55	13.33	6.45	3.57	3.57	8.16	3.15	Supercritical	2.03	0.00	
MH 3 Swr B-2	12.91	7.31	6.45	3.57	4.83	5.33	1.75	Supercritical	2.03	0.00	
Inlet 3 Swr B-1 DP 3	12.90	7.30	6.45	3.57	4.83	5.32	1.75	Supercritical	2.03	0.00	

Sewer Sizing Summary:

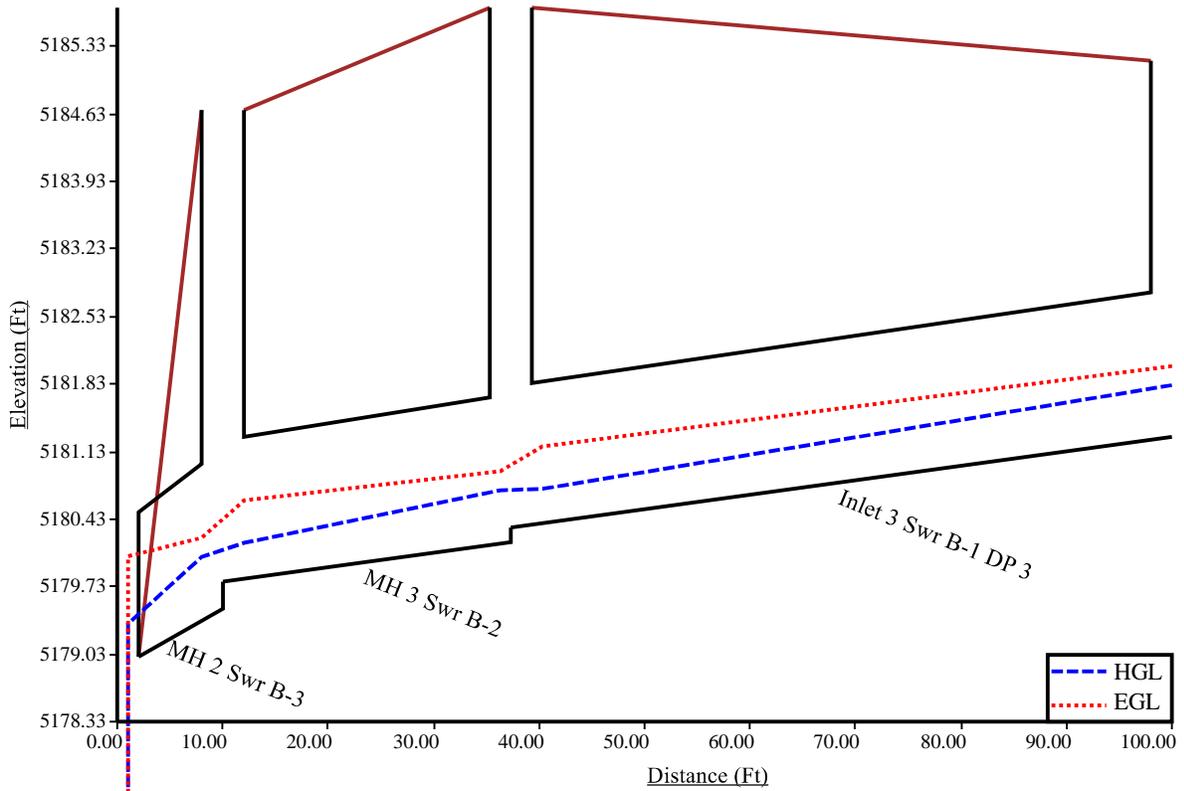
Element Name	Peak Flow (cfs)	Cross Section	Existing		Calculated		Used			Comment
			Rise	Span	Rise	Span	Rise	Span	Area (ft^2)	
MH 2 Swr B-3	2.03	CIRCULAR	18.00 in	18.00 in	15.00 in	15.00 in	18.00 in	18.00 in	1.77	
MH 3 Swr B-2	2.03	CIRCULAR	18.00 in	18.00 in	15.00 in	15.00 in	18.00 in	18.00 in	1.77	
Inlet 3 Swr B-1 DP 3	2.03	CIRCULAR	18.00 in	18.00 in	15.00 in	15.00 in	18.00 in	18.00 in	1.77	

Grade Line Summary:

Tailwater Elevation: 5179.75 = Elevation of Top of Forebay (5179.50) plus 3 inches (estimated flow over forebay wall)

Element Name	Invert Elev.		Downstream Manhole Losses		HGL		EGL		
	Downstream (ft)	Upstream (ft)	Bend Loss (ft)	Lateral Loss (ft)	Downstream (ft)	Upstream (ft)	Downstream (ft)	Friction Loss (ft)	Upstream (ft)
MH 2 Swr B-3	5179.00	5179.50	0.00	0.00	5179.75	5180.25	5180.33	0.00	5180.33
MH 3 Swr B-2	5179.78	5180.19	0.00	0.00	5180.25	5180.73	5180.77	0.15	5180.93
Inlet 3 Swr B-1 DP 3	5180.34	5181.28	0.00	0.00	5180.73	5181.82	5181.33	0.68	5182.02

STORM SEWER LINE B PROFILE - 100 YEAR



Sewer Input Summary:

Element Name	Sewer Length (ft)	Elevation			Loss Coefficients			Given Dimensions		
		Downstream Invert (ft)	Slope (%)	Upstream Invert (ft)	Mannings n	Bend Loss	Lateral Loss	Cross Section	Rise (ft or in)	Span (ft or in)
MH 2 Swr B-3	10.00	5179.00	5.0	5179.50	0.010	0.00	0.00	CIRCULAR	18.00 in	18.00 in
MH 3 Swr B-2	27.30	5179.78	1.5	5180.19	0.010	0.05	0.00	CIRCULAR	18.00 in	18.00 in
Inlet 3 Swr B-1 DP 3	62.70	5180.34	1.5	5181.28	0.013	0.05	0.00	CIRCULAR	18.00 in	18.00 in

Sewer Flow Summary:

Element Name	Full Flow Capacity		Critical Flow		Normal Flow				Flow (cfs)	Surcharged Length (ft)	Comment
	Flow (cfs)	Velocity (fps)	Depth (in)	Velocity (fps)	Depth (in)	Velocity (fps)	Froude Number	Flow Condition			
MH 2 Swr B-3	23.55	13.33	3.91	2.72	2.23	6.12	3.02	Supercritical	0.77	0.00	
MH 3 Swr B-2	12.91	7.31	3.91	2.72	2.98	4.01	1.70	Supercritical	0.77	0.00	
Inlet 3 Swr B-1 DP 3	12.90	7.30	3.91	2.72	2.98	4.01	1.70	Supercritical	0.77	0.00	

Sewer Sizing Summary:

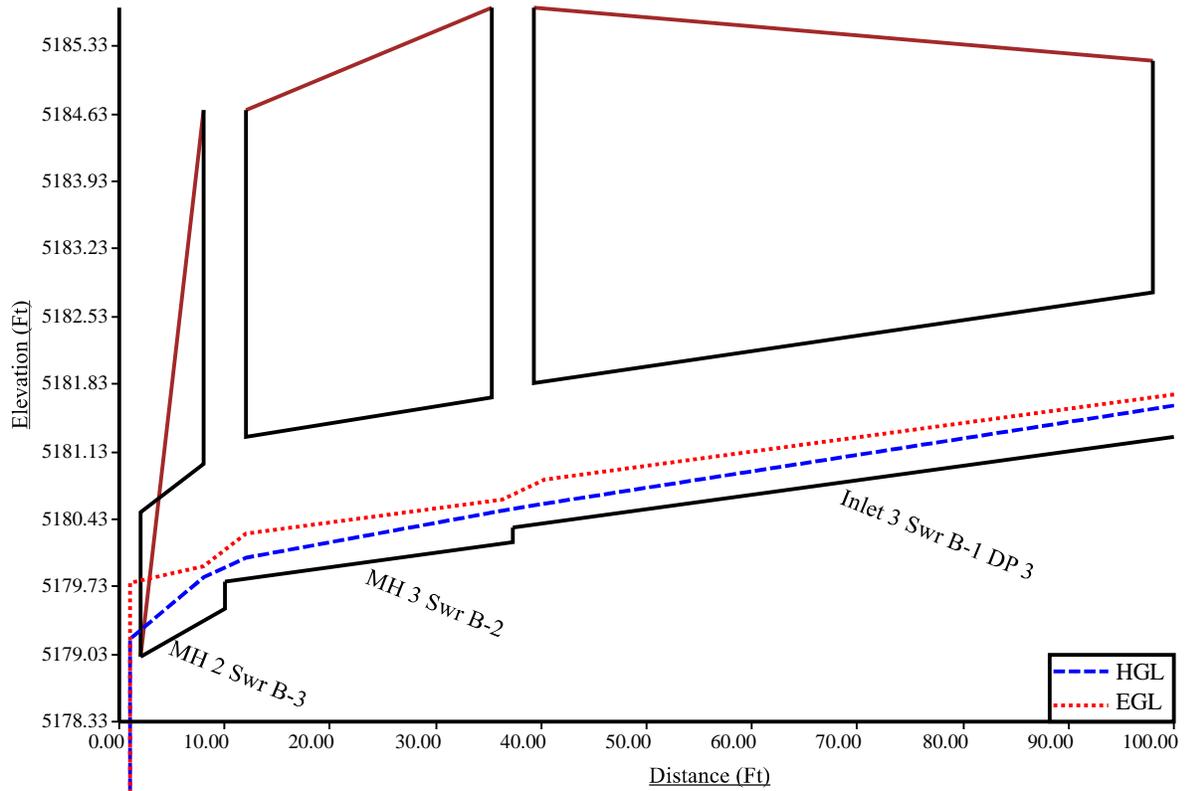
Element Name	Peak Flow (cfs)	Cross Section	Existing		Calculated		Used			Comment
			Rise	Span	Rise	Span	Rise	Span	Area (ft^2)	
MH 2 Swr B-3	0.77	CIRCULAR	18.00 in	18.00 in	15.00 in	15.00 in	18.00 in	18.00 in	1.77	
MH 3 Swr B-2	0.77	CIRCULAR	18.00 in	18.00 in	15.00 in	15.00 in	18.00 in	18.00 in	1.77	
Inlet 3 Swr B-1 DP 3	0.77	CIRCULAR	18.00 in	18.00 in	15.00 in	15.00 in	18.00 in	18.00 in	1.77	

Grade Line Summary:

Tailwater Elevation: 5179.75 = Elevation of Top of Forebay plus 3 inches (estimated flow over forebay wall)

Element Name	Invert Elev.		Downstream Manhole Losses		HGL		EGL		
	Downstream (ft)	Upstream (ft)	Bend Loss (ft)	Lateral Loss (ft)	Downstream (ft)	Upstream (ft)	Downstream (ft)	Friction Loss (ft)	Upstream (ft)
MH 2 Swr B-3	5179.00	5179.50	0.00	0.00	5179.75	5179.83	5179.77	0.17	5179.94
MH 3 Swr B-2	5179.78	5180.19	0.00	0.00	5180.00	5180.52	5180.36	0.27	5180.63
Inlet 3 Swr B-1 DP 3	5180.34	5181.28	0.00	0.00	5180.56	5181.61	5180.92	0.80	5181.72

STORM SEWER LINE B PROFILE - 5 YEAR



Forebay Sizing for Basins A & B

Forebay Statistics

Bottom Elevation = 5178.50
 Top of Weir Elevation 5179.50

Release Rate

2% of 100 year undetained flow rate

Q100= 3.88 cfs
 Release Rate = 0.08 cfs

Rectangular Weir Equation

$$Q = 3.247 \cdot L \cdot H^{1.48} - \frac{0.566L^{1.9}}{1 + 2 \cdot L^{1.87}} \cdot H^{1.9}$$

L = 6 inches
 H = 1.6 inches
 = 0.133 ft
 Q = 0.080 cfs

Forebay Volume

1% of WQCV (min.)

WQCV (watershed inches) = a(0.91*I^3-1.19*I^2+0.78*I)
 I = 0.65
 a = 1.0

WQCV (watershed inches) = 0.23

A = 0.50 acres
 WQCV = 417.5 cubic feet
 1% of WQCV (min.)= 4.17 cubic feet
 Forebay Volume Provided = 153 sq. ft by 1.0 ft deep = 153 cubic feet

Riprap Design

$$VS^{0.17}/(G_s-1)^{0.66} = 3.97$$

Where:

V=Velocity (fps) = 9.0
 S=Slope (ft/ft) = 0.04
 G_s=Specific gravity of stone= 2.5

From USDCM Table MD-10* Use Type 'M' Riprap (d₅₀=12")

TABLE MD-10

Riprap Requirements for Channel Linings¹

$\frac{VS^{0.17}}{(G_s-1)^{0.66}}$ **	Rock Type
< 3.3	VL** (d ₅₀ = 6 inches)
≥ 3.3 to < 4.0	L** (d ₅₀ = 9 inches)
≥ 4.0 to < 4.6	M (d ₅₀ = 12 inches)
≥ 4.6 to < 5.6	H (d ₅₀ = 18 inches)
≥ 5.6 to 6.4	VH (d ₅₀ = 24 inches)

¹ Applicable only for a Froude number of < 0.8 and side slopes no steeper than 2H:1V.

** Use G_s = 2.5 unless the source of rock and its density are known at time of design.

APPENDIX 3

REFERENCED INFORMATION

National Flood Hazard Layer FIRMette



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
		Regulatory Floodway Zone AE, AO, AH, VE, AR
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 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
MAP PANELS		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Digital Data Available
		No Digital Data Available
		Unmapped



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

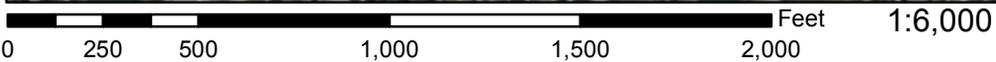
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **6/1/2018 at 10:15:05 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: base map 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.



40°0'17.33"N

105°2'31.95"W



39°59'49.77"N

105°1'54.50"W

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

Custom Soil Resource Report for Weld County, Colorado, Southern Part

AUTOWASH AT VISTA RIDGE



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Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:468 if printed on A portrait (8.5" x 11") sheet.

0 5 10 20 30 Meters

0 20 40 80 120 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

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: Weld County, Colorado, Southern Part
 Survey Area Data: Version 16, Oct 10, 2017

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

Date(s) aerial images were photographed: Aug 30, 2014—Sep 18, 2014

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
36	Midway-Shingle complex, 5 to 20 percent slopes	0.8	100.0%
Totals for Area of Interest		0.8	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Custom Soil Resource Report

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Weld County, Colorado, Southern Part

36—Midway-Shingle complex, 5 to 20 percent slopes

Map Unit Setting

National map unit symbol: 362g
Elevation: 5,050 to 5,250 feet
Mean annual precipitation: 10 to 17 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 100 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Midway and similar soils: 50 percent
Shingle and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Midway

Setting

Landform: Ridges, hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous residuum weathered from shale

Typical profile

H1 - 0 to 7 inches: clay
H2 - 7 to 13 inches: clay
H3 - 13 to 17 inches: weathered bedrock

Properties and qualities

Slope: 5 to 20 percent
Depth to restrictive feature: 6 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 15 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 15.0
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: Shaly Plains (R067BY045CO)
Hydric soil rating: No

Description of Shingle

Setting

Landform: Ridges, hills

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Residuum weathered from calcareous shale

Typical profile

H1 - 0 to 6 inches: loam

H2 - 6 to 18 inches: clay loam

H3 - 18 to 22 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 20 percent

Depth to restrictive feature: 10 to 20 inches to paralithic bedrock

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): 6s

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Ecological site: Shaly Plains (R067BY045CO)

Hydric soil rating: No

Minor Components

Renohill

Percent of map unit: 8 percent

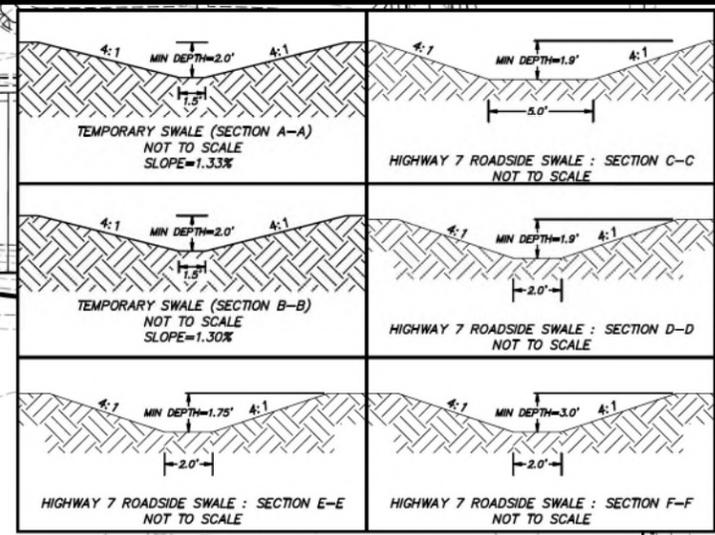
Hydric soil rating: No

Tassel

Percent of map unit: 7 percent

Hydric soil rating: No

Basin	Area (acres)	C5	C100	Tc (mins)	IS (in/hr)	I100 (in/hr)	Q5 (cfs)	Q100 (cfs)
A7	0.43	0.65	0.79	6.7	3.46	8.35	0.98	2.86
B4	1.88	0.64	0.77	5.0	3.76	9.09	4.56	13.91
B2	0.93	0.52	0.73	5.0	3.76	9.09	1.82	6.13
B3A	2.11	0.54	0.74	5.0	3.76	9.09	4.27	14.11
B3B	2.11	0.54	0.74	5.0	3.76	9.09	4.27	14.11
B4	0.17	0.64	0.79	5.0	3.76	9.09	0.41	1.20
B5	0.33	0.65	0.79	5.9	3.60	8.69	0.78	2.29
B6	1.95	0.49	0.71	5.0	3.76	9.09	3.61	12.62
B7	2.44	0.54	0.74	13.4	2.65	6.41	3.50	11.52
B8	1.86	0.45	0.69	9.8	3.03	7.31	2.55	9.44
B9	0.81	0.54	0.74	6.1	3.56	8.60	1.56	5.14
B11	1.13	0.50	0.72	5.3	3.70	8.94	2.10	7.25
B12	0.18	0.48	0.71	5.0	3.76	9.09	0.32	1.15
B13	0.87	0.32	0.63	6.9	3.43	8.27	0.96	4.50
H1	29.74	0.13	0.53	40.4	1.45	3.51	5.50	55.31
H2	6.95	0.13	0.53	14.7	2.55	6.15	2.24	22.63
Undeveloped B2	0.93	0.06	0.50	22.6	2.04	4.94	0.12	2.28
Undeveloped B3A	2.11	0.05	0.49	24.6	1.95	4.71	0.21	4.89
Undeveloped B3B	2.11	0.05	0.49	24.6	1.95	4.71	0.21	4.89
Undeveloped B6	1.95	0.06	0.50	27.0	1.85	4.47	0.21	4.31



SCALE VERIFICATION
 1/8" = 1" ON ORIGINAL DRAWING
 IF NOT ONE INCH ON THIS SHEET
 ADJUST SCALES ACCORDINGLY

DATE: BY: NO. DESCRIPTION: REVISIONS:

NO. DESCRIPTION: REVISIONS:

DATE: BY: NO. DESCRIPTION: REVISIONS:

COLORADO LICENSED PROFESSIONAL ENGINEER
 JOHN W. JORGENSEN
 22730

HURST & ASSOCIATES, INC.
 1265 S. Public Road, Suite 8
 Lafayette, CO 80226
 303.449.9105

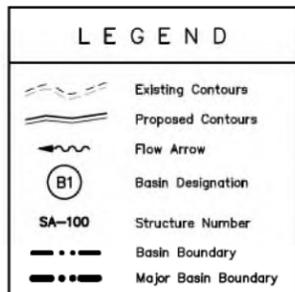
HURST
 CIVIL ENGINEERING
 PLANNING
 SURVEYING

VISTA RIDGE FIL. 6, 2ND AMENDMENT
 CONSTRUCTION PLANS
 DRAINAGE PLAN

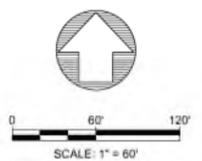
Prepared for: MARATHON LAND COMPANY

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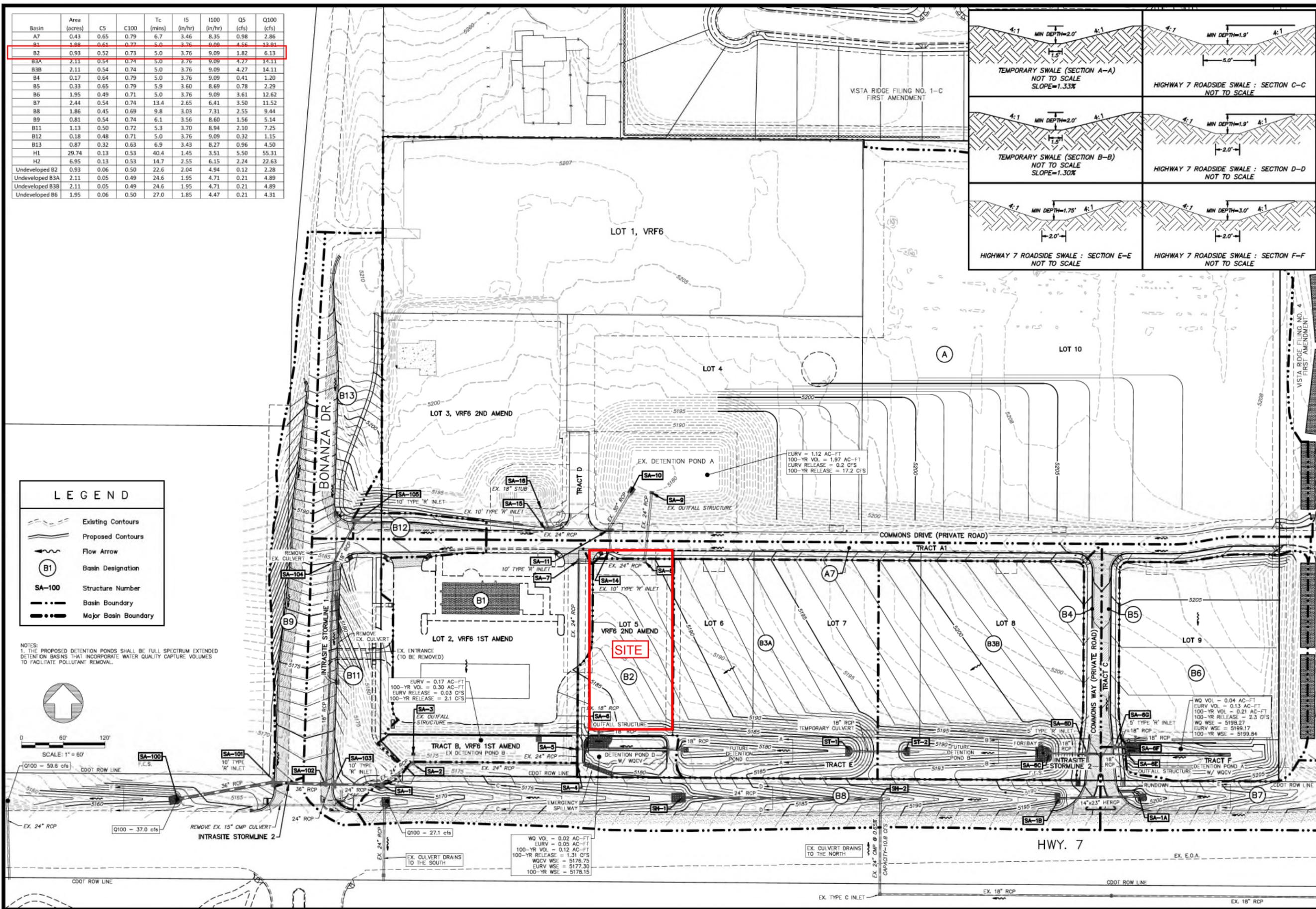
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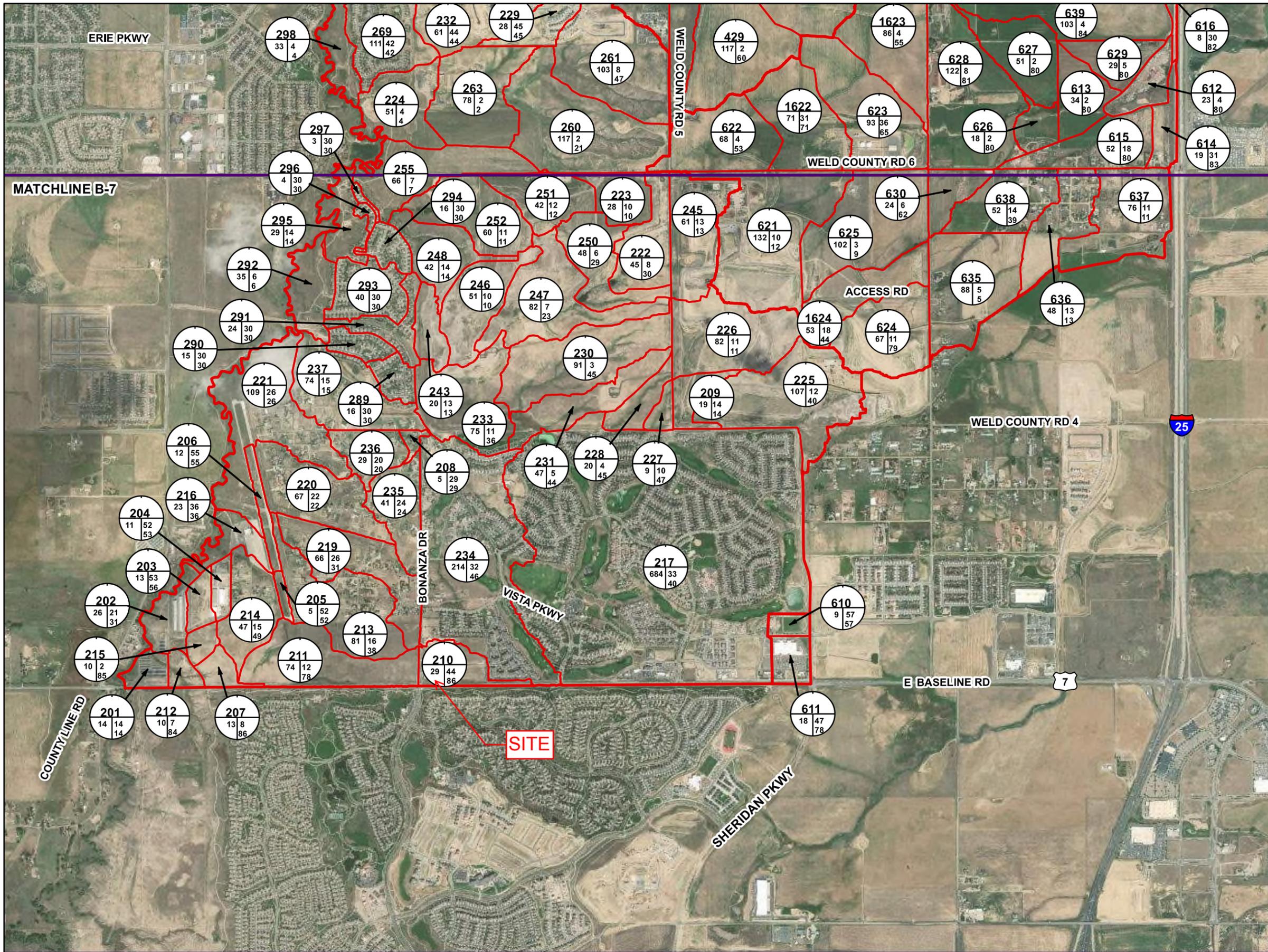


NOTES:
 1. THE PROPOSED DETENTION PONDS SHALL BE FULL SPECTRUM EXTENDED DETENTION BASINS THAT INCORPORATE WATER QUALITY CAPTURE VOLUMES TO FACILITATE POLLUTANT REMOVAL.



C:\21424_2nd Amend\CONSTR\DRG\DRG-PHE-MD.dwg

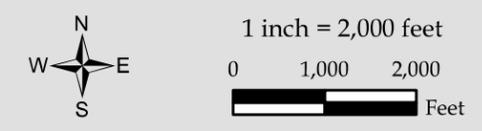
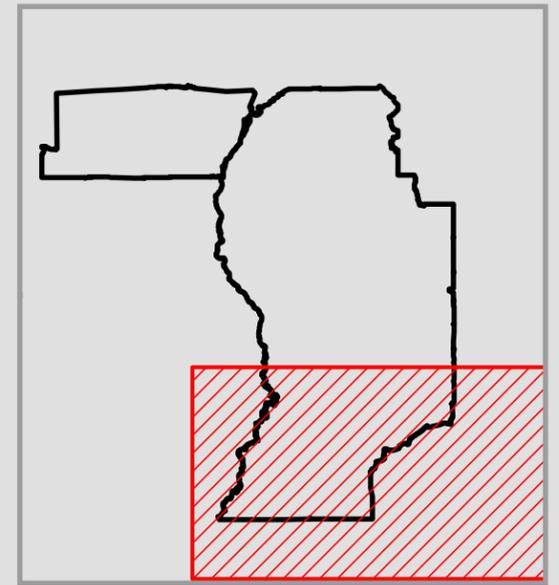




Legend

- Study Area Boundary
- Subbasin Boundary
- XXX - Subbasin ID
- XX | X - % Impervious (Existing Land Use)
- | X - % Impervious (Future Land Use)
- Area (Acres)

KEY MAP



Basin Runoff Rate Calculations

VRF6, 2nd Amendment

Job Number: 2142-4

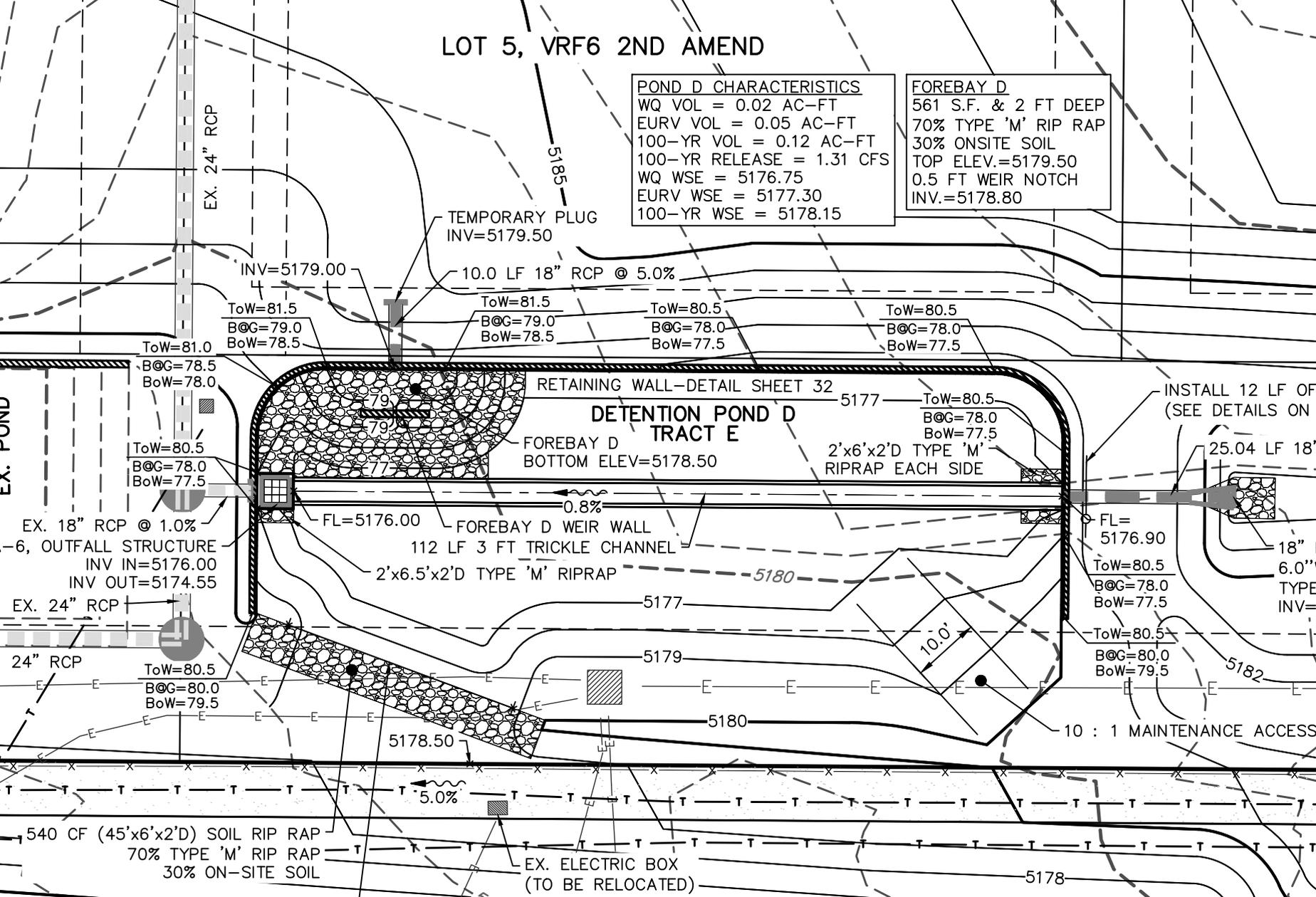
Runoff Coefficients

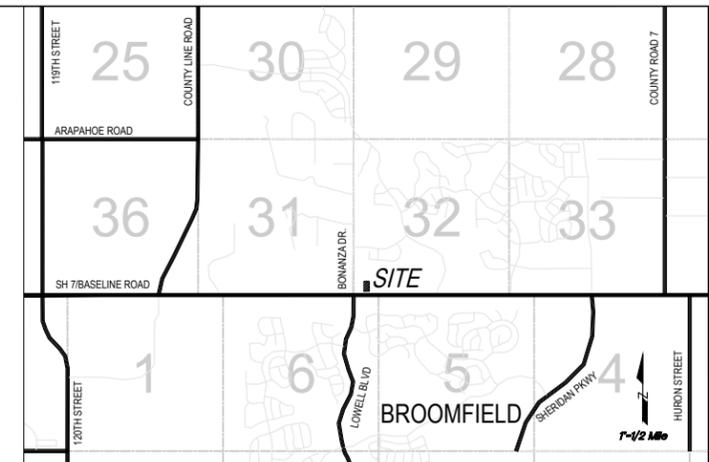
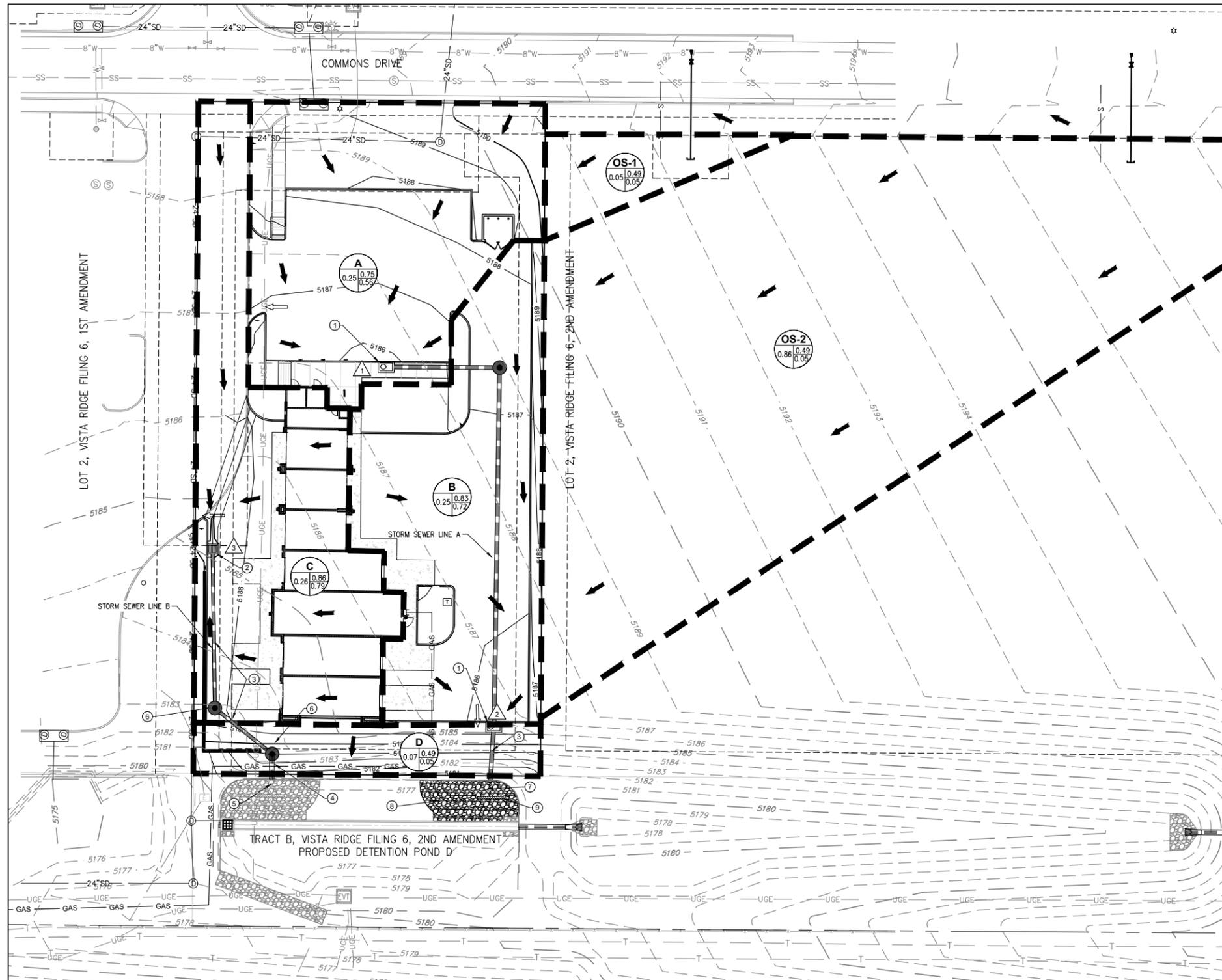
Basin	Area (ac.)	% Imperviousness Calculations						NRCS Soil Groups			2-Yr	2-Yr	2-Yr	5-Yr	5-Yr	5-Yr	10-Yr	10-Yr	10-Yr	100-Yr	100-Yr	100-Yr	Runoff Coefficients			
		Business Suburban Areas (75%) (acres)	Lawns, Landscaping or Undeveloped (2%) (acres)	Streets & Walks (100%) (acres)	Roof (90%) (acres)	Unpaved Roads (40%) (acres)	% Imp.	% A	% B	% C/D	C _A	C _B	C _{C/D}	C _A	C _B	C _{C/D}	C _A	C _B	C _{C/D}	C _A	C _B	C _{C/D}	C ₂	C ₅	C ₁₀	C ₁₀₀
A7	0.43		0.11	0.32			75.5			100	0.58	0.60	0.61	0.60	0.63	0.65	0.62	0.67	0.69	0.70	0.78	0.79	0.64	0.65	0.69	0.70
B1	1.98		0.57	1.12	0.29		70.3			100	0.53	0.56	0.56	0.55	0.59	0.61	0.56	0.63	0.65	0.66	0.76	0.77	0.56	0.61	0.65	0.77
B2	0.93	0.73	0.20				59.4			100	0.43	0.46	0.46	0.44	0.49	0.52	0.46	0.54	0.57	0.57	0.71	0.73	0.46	0.52	0.57	0.73
B3A	2.11	1.71	0.40				61.3			100	0.44	0.47	0.48	0.46	0.51	0.54	0.48	0.55	0.59	0.59	0.71	0.74	0.48	0.54	0.59	0.74
B3B	2.11	1.71	0.40				61.3			100	0.44	0.47	0.48	0.46	0.50	0.54	0.48	0.55	0.59	0.59	0.71	0.74	0.48	0.54	0.59	0.74
B4	0.17		0.04	0.12			74.4			100	0.57	0.59	0.60	0.59	0.62	0.64	0.60	0.66	0.68	0.69	0.78	0.79	0.60	0.64	0.68	0.79
B5	0.33		0.09	0.25			74.6			100	0.57	0.60	0.60	0.59	0.63	0.65	0.61	0.66	0.68	0.69	0.78	0.79	0.60	0.65	0.68	0.79
B6	1.95	1.36	0.53		0.06		55.7			100	0.39	0.42	0.43	0.41	0.46	0.49	0.42	0.51	0.54	0.54	0.69	0.71	0.43	0.49	0.54	0.71
B7	2.44		0.95	1.49			61.7			100	0.45	0.48	0.48	0.46	0.51	0.54	0.48	0.56	0.59	0.59	0.72	0.74	0.48	0.54	0.59	0.74
B8	1.86		0.94	0.93			50.8			100	0.35	0.38	0.39	0.36	0.41	0.45	0.38	0.47	0.51	0.51	0.66	0.69	0.39	0.45	0.51	0.69
B9	0.81		0.32	0.49			61.5			100	0.45	0.48	0.48	0.46	0.51	0.54	0.48	0.56	0.59	0.59	0.72	0.74	0.48	0.54	0.59	0.74
B11	1.13		0.50	0.63			56.9			100	0.40	0.43	0.44	0.42	0.47	0.50	0.43	0.52	0.55	0.55	0.69	0.72	0.44	0.50	0.55	0.72
B12	0.18		0.08	0.10			54.1			100	0.38	0.41	0.42	0.39	0.44	0.48	0.41	0.50	0.53	0.53	0.68	0.71	0.42	0.48	0.53	0.71
B13	0.87		0.57	0.29			35.0			100	0.21	0.25	0.26	0.23	0.27	0.32	0.24	0.34	0.39	0.38	0.59	0.63	0.26	0.32	0.39	0.63
H1	29.74		26.27	2.38		1.10	11.2			100	0.05	0.07	0.07	0.05	0.08	0.13	0.06	0.15	0.22	0.20	0.48	0.53	0.07	0.13	0.22	0.53
H2	6.95		6.29	0.65			11.2			100	0.05	0.06	0.07	0.05	0.08	0.13	0.06	0.15	0.21	0.20	0.48	0.53	0.07	0.13	0.21	0.53
Undeveloped B2	0.93		0.92	0.01			3.2			100	0.01	0.01	0.02	0.01	0.02	0.06	0.01	0.08	0.16	0.13	0.44	0.50	0.02	0.06	0.16	0.50
Undeveloped B3A	2.11		2.11				2.0			100	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.07	0.15	0.13	0.44	0.49	0.01	0.05	0.15	0.49
Undeveloped B3B	2.11		2.11				2.0			100	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.07	0.15	0.13	0.44	0.49	0.01	0.05	0.15	0.49
Undeveloped B6	1.95		1.94	0.01			2.7			100	0.01	0.01	0.01	0.01	0.02	0.06	0.01	0.08	0.15	0.13	0.44	0.50	0.01	0.06	0.15	0.50

LOT 5, VRF6 2ND AMEND

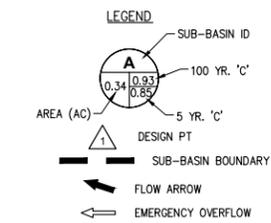
POND D CHARACTERISTICS
WQ VOL = 0.02 AC-FT
EURV VOL = 0.05 AC-FT
100-YR VOL = 0.12 AC-FT
100-YR RELEASE = 1.31 CFS
WQ WSE = 5176.75
EURV WSE = 5177.30
100-YR WSE = 5178.15

FOREBAY D
561 S.F. & 2 FT DEEP
70% TYPE 'M' RIP RAP
30% ONSITE SOIL
TOP ELEV.=5179.50
0.5 FT WEIR NOTCH
INV.=5178.80





VICINITY MAP



DRAINAGE PLAN KEYNOTES

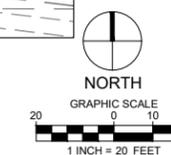
- ① CDOT TYPE R INLET
- ② CDOT TYPE C INLET W/ CLOSE MESH GRATE
- ③ 18" HDPE STORM SEWER
- ④ 18" RCP STORM SEWER (BY OTHERS)
- ⑤ FOREBAY (BY OTHERS)
- ⑥ 5' Ø MANHOLE
- ⑦ FOREBAY
- ⑧ TYPE M RIPRAP
- ⑨ CONCRETE WEIR WALL

Basin Designation	Basin Area (ac)	Percent Impervious	C _s	C ₁₀₀	T _r (min)	Q ₅ (cfs)	Q ₁₀₀ (cfs)
A	0.25	65%	0.56	0.75	5.8	0.51	1.63
B	0.25	84%	0.72	0.83	5.0	0.68	1.88
C	0.26	92%	0.79	0.86	5.0	0.77	2.03
D	0.06	2%	0.05	0.49	5.0	0.01	0.27
OS-1	0.05	0.02	0.05	0.49	13.5	0.01	0.16
OS-2	0.86	0.02	0.05	0.49	25.4	0.08	1.95

Design Point	Contributing Basins	Contributing Area (acres)	T _r (min)	Q ₅ (cfs)	Q ₁₀₀ (cfs)	Interim Q ₅ (cfs)	Interim Q ₁₀₀ (cfs)
1	A	0.25	5.8	0.51	1.63	0.38	1.35
2	A, B	0.50	5.8	1.16	3.43	0.70	3.88
3	C	0.26	5.0	0.77	2.03	0.77	2.03

I HEREBY CERTIFY THAT THIS PHASE III DRAINAGE PLAN FOR THE DESIGN OF AUTOWASH AT VISTA RIDGE WAS PREPARED BY ME (OR UNDER MY DIRECT SUPERVISION) IN ACCORDANCE WITH THE PROVISIONS OF THE TOWN OF ERIE STANDARDS AND SPECIFICATION FOR DESIGN AND CONSTRUCTION FOR THE OWNERS THEREOF. I UNDERSTAND THAT THE TOWN OF ERIE DOES NOT AND WILL NOT ASSUME LIABILITY FOR DRAINAGE FACILITIES DESIGNED BY OTHERS, INCLUDING THE DESIGNS PRESENTED IN THE PLAN.

GREG S. KELLY, P.E.
REGISTERED PROFESSIONAL ENGINEER
STATE OF COLORADO NO. 15813



COLORADO 811
CAUTION NOTICE TO CONTRACTORS
THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL 811 AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF THE UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS.

#	DATE	REVISION DESCRIPTION	BY

PREPARED FOR:
AUTOWASH, LLP

DENNIS DREESZEN
2033 CENTRAL PARK BLVD
DENVER, CO 80238
PH: (303) 514-0905
FAX: (303) 514-0905

project no.	1706	drawn by	
date	07/22/2020	designed by	
dwg.		approved by	

LOT 5, VISTA RIDGE FILING NO. 6, 2ND AMENDMENT
AUTOWASH AT VISTA RIDGE
PHASE III DRAINAGE PLAN

KELLY DEVELOPMENT SERVICES, LLC
9301 SCRUB OAK DR
LONE TREE, CO 80124
303-888-6338
greg@kellydev.com

SHEET NUMBER
PIII DP
SHEET 1 OF 1
PROJECT NUMBER
1706



DB Enterprise, LLC
4771 So. Danube Circle
Aurora, Colorado 80015

Phone: (720) 231-1947
E-Mail: druble.jr@comcast.net

October 1, 2017

Mr. Troy Kirschman
Hover Architecture, PC
8089 So. Lincoln Street, Suite 201
Littleton, CO 80122

Re: Vista Ridge Car Wash Project
Erie, Colorado

Dear Mr. Kirschman:

I have completed the preparation of the traffic compliance letter for the proposed Vista Ridge Car Wash Project. The proposed Vista Ridge Car Wash Project is approximately 0.82 acres in size and is located at the northeast corner of the intersection of East Baseline Road (SH 7) and Bonanza Drive. Figure 1 depicts the location of the proposed commercial development with respect to the surrounding area. The proposed commercial development is bounded by existing commercial development (gas station with convenience store) on the west, Tract A (Commons Drive) on the north, Lot 2 on the east, and East Baseline Road (SH 7) on the south. Figure 2 depicts the preliminary site plan for the proposed Vista Ridge Car Wash Project. This preliminary site plan is currently under review by the Town of Erie and changes may need to be made to the site plan based on comments from the Town of Erie.

A traffic impact study was prepared in December 2016 by LSC Transportation Consultants. This study examined the seven undeveloped lots located within the Vista Ridge – Kraus Parcel. Figure 3 depicts the location of the seven lots. This study considered two options for the development of the seven lots. Only Lot 7 changed for the two options. Option 1 assumed that Lot 7 would have 120 apartments while Option 2 assumed that Lot 7 would have 107,000 square feet of specialty retail space.

The 2016 traffic impact study provided an estimate of the AM peak-hour, PM peak-hour, and daily traffic for each of the seven lots for both options. Attachment No. 1 contains the trip generation table from this study. In total, the full build out of the proposed Vista Ridge – Kraus Parcel (Option 1) project is expected to generate 5,868 daily vehicle trips with 445 vehicle trips occurring in the AM peak-hour (215 vehicles entering and 230 vehicles leaving) and 394 vehicle

trips occurring in the PM peak-hour (202 vehicles entering and 192 vehicles leaving). In total, the full build out of the proposed Vista Ridge – Kraus Parcel (Option 2) project is expected to generate 9,812 daily vehicle trips with 674 vehicle trips occurring in the AM peak-hour (365 vehicles entering and 309 vehicles leaving) and 610 vehicle trips occurring in the PM peak-hour (282 vehicles entering and 328 vehicles leaving).

None of the seven parcels are currently under development. Lot 1 is the first lot to be developed. The proposed Vista Ridge Car Wash Project site is expected to have a building with 4,402 square feet of space with 1,220 square feet for self-service car wash space (3 stalls), 1,908 square feet for automated car wash space, 132 square feet for dog wash space, and 1,142 square feet for equipment. Table 1 depicts the expected trip generation for the proposed Vista Ridge Car Wash Project. This site is expected to generate 850 daily vehicle trips with 42 vehicle trips in the AM peak-hour (21 vehicles entering and 21 vehicles leaving) and 42 vehicle trips in the PM peak-hour (21 vehicles entering and 21 vehicles leaving).

Table 2 shows the trip budget analysis for Option 1 while Table 3 shows the trip budget analysis for Option 2. For Option 1, the proposed Vista Ridge Car Wash Project will leave 14.5 percent of the daily vehicle trip estimated for the entire development and around 10 percent of the AM and PM peak-hour vehicle trips estimated for the entire development. For Option 2, the proposed Vista Ridge Car Wash Project will leave nine percent of the daily vehicle trip estimated for the entire development and around seven percent of the AM and PM peak-hour vehicle trips estimated for the entire development. Based on the analysis of the trip budget for the proposed Vista Ridge – Kraus Parcel project, the trip budget will not be exceeded. No additional analysis is needed.

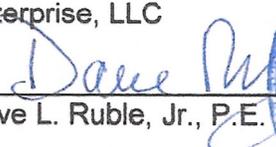
* * *

I trust that this information will assist in the planning for the proposed Vista Ridge Car Wash Project. Please call me if I can be of further assistance.

Respectfully submitted,

DB Enterprise, LLC

By:


Dave L. Ruble, Jr., P.E.



DLR/bar

Enclosures: Figures 1 through 3
Table 1
Attachment No. 1



Approximate Scale
Scale: 1" = 420'



Figure 1
Vicinity Map



Approximate Scale
Scale 1" = 310'

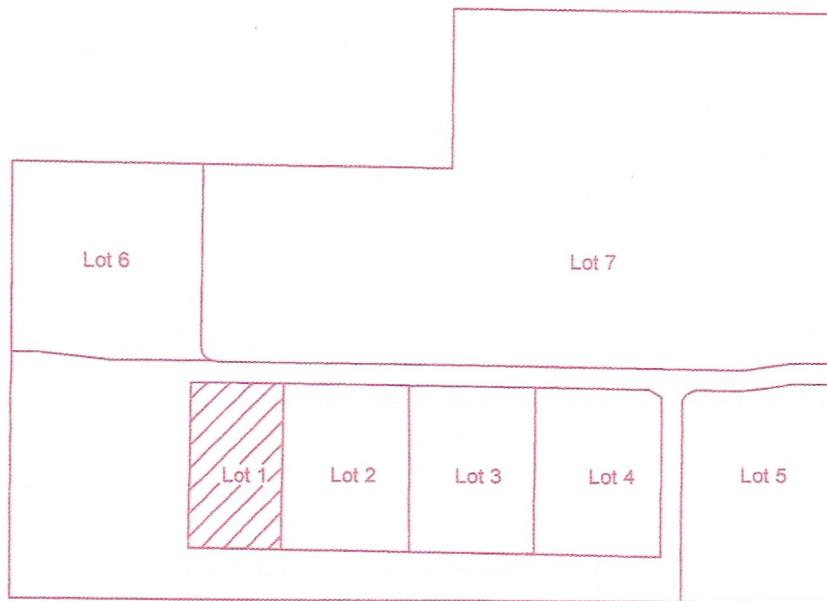


Figure 2
Lot Layout



Approximate Scale
Scale: 1" = 90'

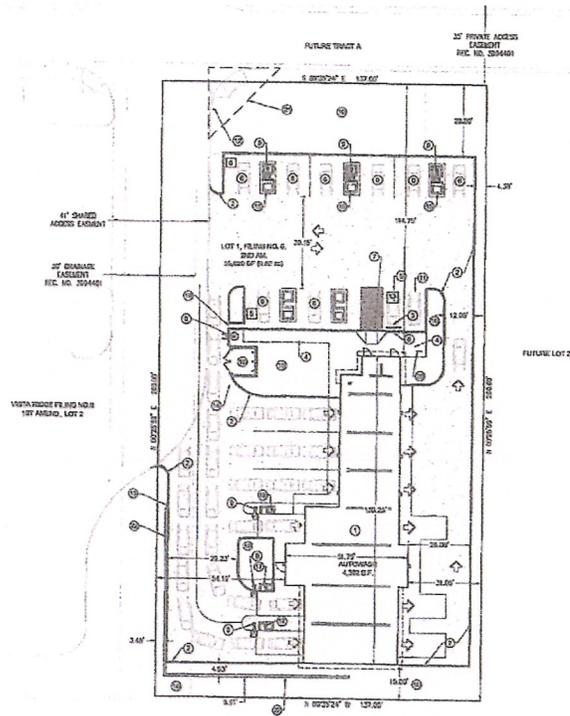


Figure 3
Site Plan

Table 2
 Trip Budget Analysis (Option 1)
 Vista Ridge Car Wash Project
 Erie, Colorado
 (DBE #170200; October, 2017)

ITE Category	Quantity	Trip Generation Rates (1)				Total Vehicle Trips Generated						
		Average Weekday (3)	AM Peak-Hour (4)	PM Peak-Hour	Average Weekday	AM Peak-Hour	PM Peak-Hour	Average Weekday	AM Peak-Hour	PM Peak-Hour		
		In	Out	In	Out	In	Out	In	Out	In	Out	
Approved Trip Generation - Vista Ridge Commercial												
Lot 1												
934	Fast Food Restaurant with Drive Through Window	2.0	KSF (2)	23.16	22.26	16.98	15.67	992	46	45	34	31
Lot 2												
826	Specialty Retail Center	12.8	KSF (2)	1.52	1.19	1.19	1.52	567	19	15	15	19
Lot 3												
826	Specialty Retail Center	12.8	KSF (2)	1.52	1.19	1.19	1.52	567	19	15	15	19
Lot 4												
826	Specialty Retail Center	12.85	KSF (2)	1.52	1.19	1.19	1.52	570	20	15	15	20
Lot 5												
934	Fast Food Restaurant with Drive Through Window	3.0	KSF (2)	23.16	22.26	16.98	15.67	1,488	69	67	51	47
Lot 6												
826	Specialty Retail Center	20.0	KSF (2)	1.52	1.19	1.19	1.52	886	30	24	24	30
Lot 7												
220	Apartments	120	DU (5)	6.65	0.10	0.41	0.22	Total	798	12	49	26
								5,868	215	230	202	192
Approved and Proposed Developments												
Lot 1												
947	Self-Service Car Wash	3	Stalls	108.00	2.83	2.71	2.83	324	8	8	8	8
948	Automated Car Wash	1.9	KSF	277.00	7.06	7.06	7.06	526	13	13	13	13
								Total	850	21	21	21
								Balance	5,018	194	209	171
									88.5%	90.2%	90.9%	89.1%

Notes:
 (1) Source: "Trip Generation", Institute of Transportation Engineers, 9th Edition, 2012.
 (2) KSF = 1,000 Square Feet
 (3) Daily trip generation rate was established by using the self-service car wash information. PM peak-hour trip generation rate for the self-service car wash is 5.1 percent of the daily trip generation rate (See calculations below).
 (4) No AM peak-hour trip generation rate is provided by ITE so the PM peak-hour trip generation rate was used of the AM peak-hour.

5.54 PM Peak-Hour Rate/108 Daily Trip Generation Rate = 5.1 percent
 14.12 PM Peak-Hour Rate/0.051 = 277 Daily Trips for an Automated Car Wash

Table 3
 Trip Budget Analysis (Option 2)
 Vista Ridge Car Wash Project
 Erie, Colorado
 (DBE #170200; October, 2017)

ITE Category	Quantity	Trip Generation Rates (1)				Total Vehicle Trips Generated							
		Average Weekday (3)	AM Peak-Hour (4)	PM Peak-Hour	Average Weekday	AM Peak-Hour	PM Peak-Hour	AM Peak-Hour	PM Peak-Hour				
		In	Out	In	Out	In	Out	In	Out				
Approved Trip Generation - Vista Ridge Commercial													
Lot 1 934	Fast Food Restaurant with Drive Through Window	2.0	KSF (2)	496.12	23.16	22.26	16.98	15.67	992	46	45	34	31
Lot 2 826	Specialty Retail Center	12.8	KSF (2)	44.32	1.52	1.19	1.19	1.52	567	19	15	15	19
Lot 3 826	Specialty Retail Center	12.8	KSF (2)	44.32	1.52	1.19	1.19	1.52	567	19	15	15	19
Lot 4 826	Specialty Retail Center	12.85	KSF (2)	44.32	1.52	1.19	1.19	1.52	570	20	15	15	20
Lot 5 934	Fast Food Restaurant with Drive Through Window	3.0	KSF (2)	496.12	23.16	22.26	16.98	15.67	1,488	69	67	51	47
Lot 6 826	Specialty Retail Center	20.0	KSF (2)	44.32	1.52	1.19	1.19	1.52	886	30	24	24	30
Lot 7 826	Specialty Retail Center	107.0	KSF (2)	44.32	1.52	1.19	1.19	1.52	4,742	163	127	127	163
				Total					9,812	366	308	281	329
Approved and Proposed Developments													
Lot 1 947 948	Self-Service Car Wash Automated Car Wash	3 1.9	Stalls KSF	108.00 277.00	2.83 7.06	2.71 7.06	2.83 7.06	2.71 7.06	324 526	8 13	8 13	8 13	8 13
				Total					850	21	21	21	21
				Balance					8,962	345	287	260	308
									91.3%	94.3%	93.2%	92.5%	93.6%

Notes:
 (1) Source: "Trip Generation", Institute of Transportation Engineers, 9th Edition, 2012.
 (2) KSF = 1,000 Square Feet
 (3) Daily trip generation rate was established by using the self-service car wash information. PM peak-hour trip generation rate for the self-service car wash is 5.1 percent of the daily trip generation rate (See calculations below).
 (4) No AM peak-hour trip generation rate is provided by ITE so the PM peak-hour trip generation rate was used of the AM peak-hour.
 (5) DU = Dwelling Units

5.54 PM Peak-Hour Rate/108 Daily Trip Generation Rate = 5.1 percent
 14.12 PM Peak-Hour Rate/0.051 = 277 Daily Trips for an Automated Car Wash

Attachment No. 1
Vista Ridge – Kraus Parcel Traffic Impact Analysis Report
December 2016



Approximate Scale
Scale: 1"=600'

Figure 1
**Vicinity
Map**



Vista Ridge- Kraus Parcel (LSC #150730)



Approximate Scale
Scale: 1"=200'

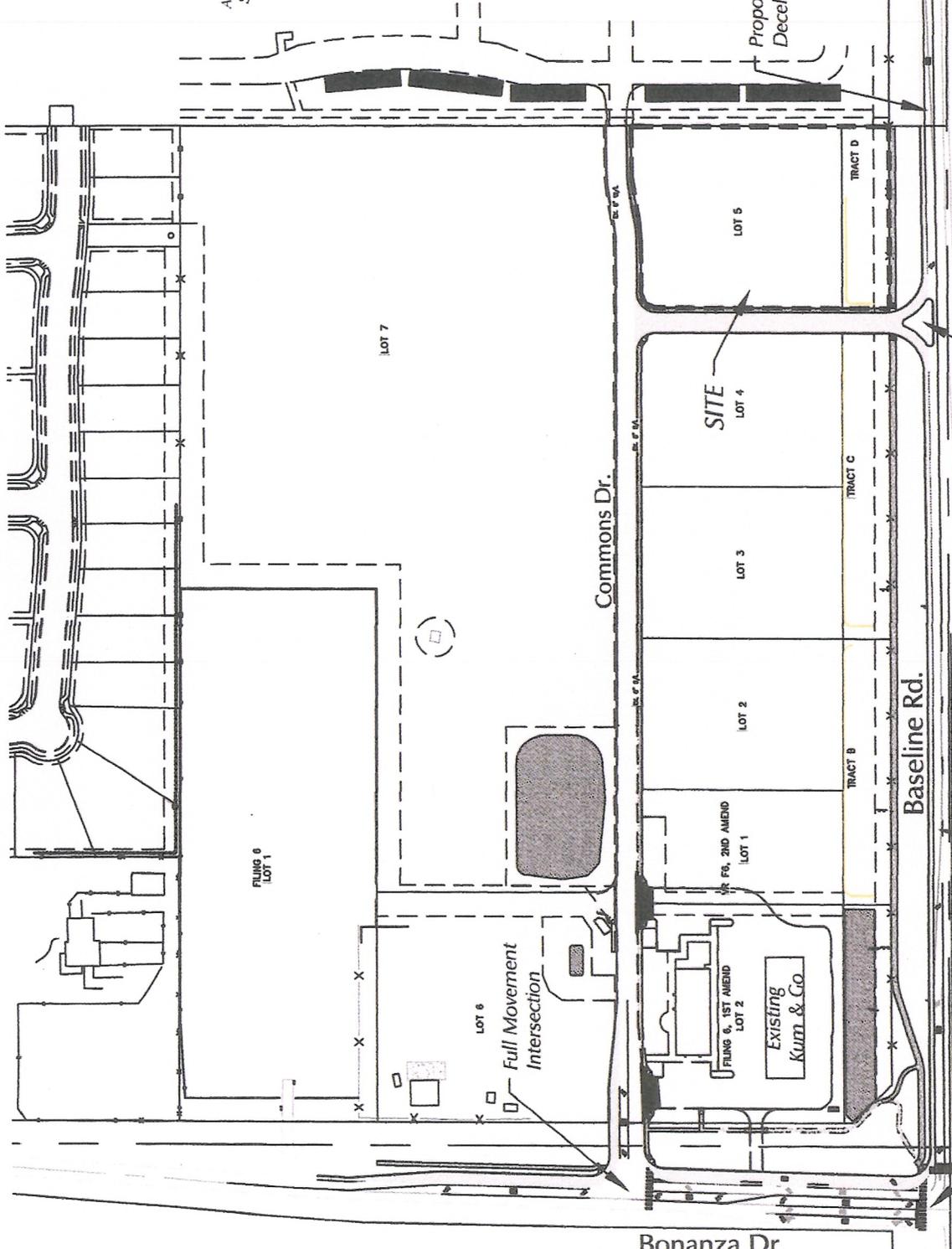


Figure 2

Site Plan

Vista Ridge- Kraus Parcel (LSC #150730)



Table 2
ESTIMATED TRAFFIC GENERATION
Vista Ridge - Kraus Parcel
Erle, CO
LSC #150730; December, 2016

Pad No.	Trip Generating Category	Quantity	Trip Generation Rates ⁽¹⁾						Vehicle-Trips Generated						Pass-By Trips						Net External Vehicle-Trips Generated											
			Average Weekday		AM Peak Hour		PM Peak Hour		Average Weekday		AM Peak Hour		PM Peak Hour		Average Weekday		AM Peak Hour		PM Peak Hour		Average Weekday		AM Peak Hour		PM Peak Hour							
			In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out						
Option 1 - Apartments on Lot 7																																
	1) Existing Kum & Go ⁽²⁾	20.00 FP ⁽³⁾	162.78	5.080	5.080	6.755	6.755	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2) Sonic Restaurant ⁽⁴⁾	2.00 KSF ⁽⁵⁾	496.12	23.164	22.256	16.978	15.672	992	46	34	31	31	496	23	23	16	16	496	23	23	16	16	496	23	23	16	16	496	23	23		
	3) Specialty Retail ⁽⁶⁾	12.80 KSF	44.32	1.518	1.192	1.192	1.518	567	19	15	15	19	170	5	5	5	5	567	19	15	15	19	170	5	5	5	5	397	14	10	14	
	4) Specialty Retail	12.80 KSF	44.32	1.518	1.192	1.192	1.518	567	19	15	15	19	170	5	5	5	5	567	19	15	15	19	170	5	5	5	5	397	14	10	14	
	5) Specialty Retail	12.85 KSF	44.32	1.518	1.192	1.192	1.518	570	20	15	15	20	171	5	5	5	5	570	20	15	15	20	171	5	5	5	399	15	10	10	15	
	6) Fast-Food Restaurant w/ Drive-Through ⁽⁴⁾	3.00 KSF	496.12	23.164	22.256	16.978	15.672	1,488	69	67	51	47	744	34	34	24	24	1,488	69	67	51	47	744	34	34	24	24	744	35	33	27	23
	7) Specialty Retail	20.00 KSF	44.32	1.518	1.192	1.192	1.518	886	30	24	24	30	266	8	8	8	8	886	30	24	24	30	266	8	8	8	8	620	22	16	16	22
	8) Apartments ⁽⁷⁾	120 DU ⁽⁸⁾	6.65	0.102	0.408	0.403	0.217	798	12	49	48	26	0	0	0	0	0	798	12	49	48	26	0	0	0	0	798	12	50	48	26	
		Total =						5,868	215	230	202	192						2,017	80	80	63	63					3,851	135	150	139	129	
Option 2 - Specialty Retail on Lot 7																																
	1) Existing Kum & Go ⁽²⁾	20.00 FP ⁽³⁾	162.78	5.080	5.080	6.755	6.755	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2) Sonic Restaurant ⁽⁴⁾	2.00 KSF ⁽⁵⁾	496.12	23.164	22.256	16.978	15.672	992	46	34	31	31	496	23	23	16	16	496	23	23	16	16	496	23	23	16	16	496	23	23	16	15
	3) Specialty Retail ⁽⁶⁾	12.80 KSF	44.32	1.518	1.192	1.192	1.518	567	19	15	15	19	170	5	5	5	5	567	19	15	15	19	170	5	5	5	5	397	14	10	14	14
	4) Specialty Retail	12.80 KSF	44.32	1.518	1.192	1.192	1.518	567	19	15	15	19	170	5	5	5	5	567	19	15	15	19	170	5	5	5	5	397	14	10	14	14
	5) Specialty Retail	12.85 KSF	44.32	1.518	1.192	1.192	1.518	570	20	15	15	20	171	5	5	5	5	570	20	15	15	20	171	5	5	5	399	15	10	10	15	
	6) Fast-Food Restaurant w/ Drive-Through ⁽⁴⁾	3.00 KSF	496.12	23.164	22.256	16.978	15.672	1,488	69	67	51	47	744	34	34	24	24	1,488	69	67	51	47	744	34	34	24	24	744	35	33	27	23
	7) Specialty Retail	20.00 KSF	44.32	1.518	1.192	1.192	1.518	886	30	24	24	30	266	8	8	8	8	886	30	24	24	30	266	8	8	8	8	620	22	16	16	22
	8) Specialty Retail	107.00 KSF	44.32	1.518	1.192	1.192	1.518	4,742	162	128	128	162	1,423	43	43	43	43	4,742	162	128	128	162	1,423	43	43	43	3,319	119	85	84	119	
		Total =						9,812	365	309	282	328						3,440	123	123	106	106					6,372	242	186	176	222	

Notes:
(1) Source: Trip Generation, Institute of Transportation Engineers, 8th Edition, 2012.
(2) ITE Land Use No. 945 - Gasoline/Service Station with Convenience Market. This use exists and was captured in the recent traffic counts.
(3) FP = Fueling Positions
(4) ITE Land Use No. 934 - Fast-Food Restaurant with Drive-Through
(5) KSF = 1,000 Square Feet
(6) ITE Land Use No. 826 - Specialty Retail Center. No AM peak-hour rates are available, so the PM peak-hour rates were reversed.
(7) ITE Land Use No. 220 - Apartment
(8) DU = Dwelling Units

1889 York Street
Denver, CO 80206
(303) 333-1105
FAX (303) 333-1107
E-mail: lsc@lscdenver.com



December 6, 2016

Mr. James Spehalski
Bonanza Drive Development Corporation
c/o Marathon Land Company
9750 W. Cambridge Place
Littleton, CO 80127

Re: Vista Ridge - Kraus Parcel
Traffic Impact Analysis
Erie, CO
(LSC #150730)

Dear Mr. Spehalski:

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact analysis for the proposed Vista Ridge - Kraus Parcel development. As shown on Figure 1, the site is located north of Baseline Road (State Highway 7) and east of Bonanza Drive in Erie, Colorado.

REPORT CONTENTS

The report contains the following: the existing roadway and traffic conditions in the vicinity of the site including the lane geometries, traffic controls, posted speed limits, etc.; the existing weekday peak-hour traffic volumes; the existing daily traffic volumes in the area; the typical weekday site-generated traffic volume projections for the site for two separate land use options; the assignment of the projected traffic volumes to the area roadways for two separate land use options; an estimate of future background and total traffic; and any recommended roadway improvements to mitigate the site's traffic impacts.

LAND USE AND ACCESS

The site includes an existing Kum & Go gas station/convenience store and the following proposed uses: a 2,000 square-foot Sonic Restaurant with drive-through service, a 3,000 square-foot yet to be named fast-foot restaurant with drive-through service, and Lot 7 with either 58,450 square feet of retail space and 120 apartment units (Scenario 1) or 165,450 square feet of retail space (Scenario 2). Access to Baseline Road (SH 7) is proposed from an existing signalized access via Bonanza Drive and a proposed right-in/right-out access directly to Baseline Road (SH 7) as shown in the conceptual site plan in Figure 2.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

The major roadways in the site's vicinity are shown on Figure 1 and are described below.

- **Baseline Road (SH 7)** is an east-west, two-lane state highway south of the site. There are two eastbound lanes to the east of Bonanza Drive. The intersection with Bonanza Drive is signalized with auxiliary turn lanes. The posted speed limit in the vicinity of the site is 55 mph.
- **Bonanza Drive** is a north-south, two-lane collector roadway west of the site. The intersection with Baseline Road (SH 7) is signalized with auxiliary lanes. The posted speed limit in the vicinity of the site is 35 mph north of Baseline Road (SH 7) and 40 mph south of Baseline Road (SH 7). South of SH 7 this roadway is referred to as Lowell Boulevard in the City/County of Broomfield.

Existing Traffic Conditions

Figure 3 shows the existing lane geometries, traffic controls, posted speed limits, and traffic volumes in the site's vicinity on a typical weekday. The weekday peak-hour traffic volumes and daily traffic counts are from the attached traffic counts conducted by Counter Measures in July, 2015.

2020 and 2035 Background Traffic

Figure 4 shows the estimated 2020 background traffic and Figure 5 shows the estimated 2035 background traffic. The projected background traffic volumes are based on two percent annual growth on Baseline Road (SH 7); the *SH 7 PEL* projected volumes for Lowell Boulevard; the January, 2015 *Sierra Vista TIS* by Aldridge Transportation Consultants, buildout assumptions for Vista Ridge, and no connection of Bonanza Drive to the north.

Existing, 2020, and 2035 Background Levels of Service

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from "A" to "F." LOS A is indicative of little congestion or delay and LOS F is indicative of a high level of congestion or delay. Attached are specific level of service definitions for signalized and unsignalized intersections.

The intersections in Figures 3, 4, and 5 were analyzed as appropriate to determine the existing, 2020 background, and 2035 background levels of service using Synchro. Table 1 shows the level of service analysis results. The level of service reports are attached.

- **Baseline Road (SH 7)/Bonanza Drive:** This signalized intersection currently operates at an overall LOS "D" during both morning and afternoon peak-hours and is expected to do so through 2020. The eastbound through movement operates at LOS "F" during the afternoon peak-hour and is expected to do so until SH 7 is widened to a four-lane section. By

2035, with Baseline Road (SH 7) widened to four lanes, both peak-hours are expected to operate at an overall LOS "C".

- **Bonanza Drive/Commons Drive:** All movements at this unsignalized intersection are expected to operate at LOS "C" or better during both peak-hours through 2035.
- **E. Baseline Road (SH 7)/RIRO Site Access:** All movements at this unsignalized intersection are expected to operate at LOS "C" or better during both peak-hours through 2035.

TRIP GENERATION

Table 1 shows the estimated average weekday, morning peak-hour, and afternoon peak-hour trip generation for the proposed site based on the rates from *Trip Generation, 9th Edition, 2012* by the Institute of Transportation Engineers (ITE) for the proposed land use.

The proposed land use in Scenario 1 is projected to generate about 3,851 net external vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 215 vehicles would enter and about 230 vehicles would exit the site. During the afternoon peak-hour, which generally occurs for one hour between 4:00 and 6:00 p.m., about 202 vehicles would enter and about 192 vehicles would exit.

The proposed land use in Scenario 2 is projected to generate about 6,372 net external vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 365 vehicles would enter and about 309 vehicles would exit the site. During the afternoon peak-hour, which generally occurs for one hour between 4:00 and 6:00 p.m., about 282 vehicles would enter and about 328 vehicles would exit.

TRIP DISTRIBUTION

Figure 6 shows the estimated directional distribution of the primary site-generated traffic volumes on the area roadways. The estimates were based on the location of the site with respect to the regional population, employment, and activity centers; and the site's proposed land use.

TRIP ASSIGNMENT

Figure 7a shows the estimated Scenario 1 pass-by site-generated traffic volumes.

Figure 7b shows the estimated Scenario 1 primary site-generated traffic volumes which are the directional distribution percentages (from Figure 6) applied to the Scenario 1 trip generation estimate (from Table 2).

Figure 7c shows the estimated Scenario 1 total site-generated traffic volumes which are the sum of the volumes in Figures 7a and 7b.

Figure 8a shows the estimated Scenario 2 pass-by site-generated traffic volumes.

Figure 8b shows the estimated Scenario 2 primary site-generated traffic volumes which are the directional distribution percentages (from Figure 6) applied to the Scenario 2 trip generation estimate (from Table 2).

Figure 8c shows the estimated Scenario 2 total site-generated traffic volumes which are the sum of the volumes in Figures 8a and 8b.

2020 AND 2035 TOTAL TRAFFIC

Figure 9 shows the Scenario 1 2020 total traffic which is the sum of the 2020 background traffic volumes (from Figure 4) and the Scenario 1 site-generated traffic volumes (from Figure 7c). Figure 9 also shows the recommended Scenario 1 2020 lane geometry and traffic control.

Figure 10 shows the Scenario 2 2020 total traffic which is the sum of the 2020 background traffic volumes (from Figure 4) and the Scenario 2 site-generated traffic volumes (from Figure 8c). Figure 10 also shows the recommended Scenario 2 2020 lane geometry and traffic control.

Figure 11 shows the Scenario 1 2035 total traffic which is the sum of the 2035 background traffic volumes (from Figure 5) and the Scenario 1 site-generated traffic volumes (from Figure 7c). Figure 11 also shows the Scenario 1 recommended 2035 lane geometry and traffic control.

Figure 12 shows the Scenario 2 2035 total traffic which is the sum of the 2035 background traffic volumes (from Figure 5) and the Scenario 2 site-generated traffic volumes (from Figure 8c). Figure 12 also shows the Scenario 2 recommended 2035 lane geometry and traffic control.

PROJECTED LEVELS OF SERVICE

The intersections in Figures 9 through 12 were analyzed to determine the 2020 and 2035 total levels of service for both Scenario 1 and Scenario 2. Table 1 shows the level of service analysis results. The level of service reports are attached.

- **Baseline Road (SH 7)/Bonanza Drive:** This signalized intersection is expected to operate at an overall LOS “D” during both morning and afternoon peak-hours through 2020 with the recommended improvements to Bonanza Drive for both Scenario 1 and Scenario 2. By 2035, with Baseline Road (SH 7) widened to four lanes, the intersection is expected to operate at LOS “D” during the morning peak-hour and LOS “C” during the afternoon peak-hour for both Scenario 1 and Scenario 2. It is expected the eastbound through movement will operate poorly in the afternoon peak-hour and the westbound through movement will operate poorly in the morning peak-hour as long as there is only one through lane in each direction.
- **Bonanza Drive/Commons Drive:** All movements at this unsignalized intersection are expected to operate at LOS “D” or better during both peak-hours through 2035 for both Scenario 1 and Scenario 2 with the exception of the westbound left-turn movement which could operate at LOS “E” in the 2035 afternoon peak-hour in Scenario 2. Drivers making this movement will have the option to turn right onto Baseline Road (SH 7) at the RIRO site access if they are headed west or south.

- **Baseline Road (SH 7)/RIRO Site Access:** All movements at this unsignalized intersection are expected to operate at LOS “C” or better during both peak-hours through 2035.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

1. The Scenario 1 land use is projected to generate about 3,851 net external vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 215 vehicles would enter and about 230 vehicles would exit the site. During the afternoon peak-hour, about 202 vehicles would enter and about 192 vehicles would exit.
2. The Scenario 2 land use is projected to generate about 6,372 net external vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 365 vehicles would enter and about 309 vehicles would exit the site. During the afternoon peak-hour, about 282 vehicles would enter and about 328 vehicles would exit.

Projected Levels of Service

3. All movements at the unsignalized intersections analyzed are expected to operate at LOS “D” or better during the morning and afternoon peak-hours through 2035 with the following exception: The westbound left-turn movement at the Bonanza Drive/Commons Drive intersection could operate at LOS “E” in the 2035 afternoon peak-hour in Scenario 2. Drivers making this movement will have the option to turn right onto Baseline Road (SH 7) at the RIRO site access if they are headed west or south.
4. The signalized E. Baseline Road (SH 7)/Bonanza Drive intersection is expected to operate at an overall LOS “D” or better during both morning and afternoon peak-hours through 2035 assuming Bonanza Drive is improved as recommended in 2020 and 2035 and Baseline Road (SH 7) is widened to four lanes by 2035. It is expected the eastbound through movement will operate poorly in the afternoon peak-hour and the westbound through movement will operate poorly in the morning peak-hour as long as there is only one through lane in each direction.

Conclusions

5. The impact of the Vista Ridge - Kraus Parcel development site can be accommodated by the existing and proposed roadway network with the recommended buildout Bonanza Drive improvements shown in Figure 13 being made between 2020 and 2035. Only one southbound left-turn lane will be needed at site buildout in 2020. The second southbound left-turn lane will likely be constructed concurrent with development on the west side of Bonanza Drive.

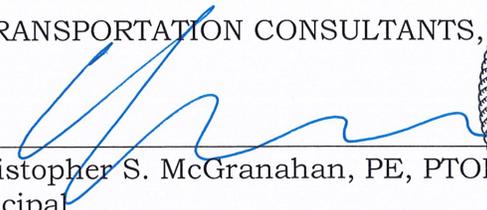
- 6. A continuous westbound right-turn lane should be constructed on Baseline Road (SH 7) between the proposed RIRO site access and Bonanza Drive. The lane should be 12 feet wide with a four-foot wide paved shoulder.
- 7. A westbound right-turn deceleration lane is constructed on Baseline Road (SH 7) approaching the proposed RIRO site access. Based on the 55 mph posted speed limit, this lane would be about 380 feet plus a 220-foot transition taper. The lane should be 12 feet wide with a four-foot wide paved shoulder.

* * * * *

We trust our findings will assist you in gaining approval of the proposed Vista Ridge - Kraus Parcel development. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By 
 Christopher S. McGranahan, PE, PTOE
 Principal



12-6-16

CSM/wc

- Enclosures:
- Tables 1 and 2
 - Figures 1 - 13
 - Traffic Count Reports
 - Level of Service Definitions
 - Level of Service Reports

**Table 1
Intersection Levels of Service Analysis
Vista Ridge - Kraus Parcel
Erie, CO
(LSC #150730; December, 2016)**

Intersection Location	Traffic Control	Existing Traffic		2020 Background Traffic		2020 Total Traffic				2035 Background Traffic		2035 Total Traffic				
		Level of Service	Level of Service	Level of Service	Level of Service	Option 1		Option 2		Level of Service	Level of Service	Option 1		Option 2		
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
<u>Baseline Road (SH 7)/Lowell Blvd./ Bonanza Drive</u>	Signalized															
EB Left		C	B	C	B	D	B	D	C	C	B	C	C	D	C	C
EB Through		C	F	C	F	B	F	B	F	C	C	C	C	C	C	C
EB Right		A	B	A	A	A	A	A	B	B	B	B	B	B	B	B
WB Left		B	C	B	C	B	D	B	D	B	C	B	D	C	D	D
WB Through		D	B	D	B	D	B	F	C	D	B	D	C	D	C	C
WB Right		B	B	B	A	A	A	A	A	B	B	B	B	B	B	B
NB Left		E	D	D	D	D	D	E	D	D	D	D	D	D	D	D
NB Through		C	C	D	D	D	D	D	D	C	D	C	D	C	D	D
NB Right		C	C	C	D	D	D	D	D	C	C	C	C	C	C	C
SB Left		D	D	D	D	D	D	E	E	D	D	D	D	D	D	D
SB Through/Right		E	D	--	--	--	--	--	--	--	--	--	--	--	--	--
SB Through		--	--	D	D	D	D	D	D	D	D	D	D	D	D	D
SB Right		--	--	D	D	D	D	D	D	D	D	D	C	D	D	C
Entire Intersection Delay (sec /veh)		42.9	38.1	41.3	46.3	42.0	47.7	47.7	51.5	34.3	27.3	38.4	29.6	41.8	31.6	
Entire Intersection LOS		D	D	D	D	D	D	D	D	C	C	D	C	D	C	
<u>Bonanza Drive/Commons Drive</u>	TWSC															
NB Left		--	--	--	--	--	--	--	--	A	A	A	A	A	A	A
EB Left		--	--	--	--	--	--	--	--	B	B	B	B	B	B	B
EB Through/Right		--	--	--	--	--	--	--	--	B	A	B	A	B	A	A
WB Left		--	--	B	B	B	B	B	B	B	C	C	D	C	E	E
WB Through/Right		--	--	A	A	A	A	A	A	B	C	B	C	B	C	C
SB Left		--	--	A	A	A	A	A	A	A	A	A	A	A	A	A
Critical Movement Delay (sec/veh)		--	--	10.7	10.4	12.6	11.8	13.8	13.1	13.8	19.7	16.7	27.1	18.8	37.5	
<u>Baseline Road (SH 7)/Site Access</u>	TWSC															
SB Approach		--	--	B	B	C	B	C	B	C	B	C	B	C	C	C
Critical Movement Delay (sec/veh)		--	--	13.5	11.7	15.7	12.6	16.5	13.5	16.3	13.3	20.9	14.8	22.8	16.3	

**Table 2
ESTIMATED TRAFFIC GENERATION
Vista Ridge - Kraus Parcel
Erie, CO
LSC #150730; December, 2016**

Pad No.	Trip Generating Category	Quantity	Trip Generation Rates ⁽¹⁾				Vehicle-Trips Generated					Percent	Pass-By Trips				Net External Vehicle-Trips Generated						
			Average Weekday	AM Peak Hour	PM Peak Hour	In	Out	Average Weekday	AM Peak Hour	PM Peak - Hour	In		Out	Average Weekday	AM Peak Hour	PM Peak - Hour	In	Out	Average Weekday	AM Peak Hour	PM Peak - Hour	In	Out
Option 1 - Apartments on Lot 7																							
1)	Existing Kum & Go ⁽²⁾	20.00 FP ⁽³⁾	162.78	5.080	5.080	6.755	6.755	0	0	0	0	0	0%	0	0	0	0	0	0	0	0	0	0
2)	Sonic Restaurant ⁽⁴⁾	2.00 KSF ⁽⁵⁾	496.12	23.164	22.256	16.978	15.672	992	46	45	34	31	50%	496	23	23	16	16	496	23	22	18	15
3)	Specialty Retail ⁽⁶⁾	12.80 KSF	44.32	1.518	1.192	1.192	1.518	567	19	15	15	19	30%	170	5	5	5	5	397	14	10	10	14
4)	Specialty Retail	12.80 KSF	44.32	1.518	1.192	1.192	1.518	567	19	15	15	19	30%	170	5	5	5	5	397	14	10	10	14
5)	Specialty Retail	12.85 KSF	44.32	1.518	1.192	1.192	1.518	570	20	15	15	20	30%	171	5	5	5	5	399	15	10	10	15
6)	Fast-Food Restaurant w/ Drive-Through ⁽⁴⁾	3.00 KSF	496.12	23.164	22.256	16.978	15.672	1,488	69	67	51	47	50%	744	34	34	24	24	744	35	33	27	23
7)	Specialty Retail	20.00 KSF	44.32	1.518	1.192	1.192	1.518	886	30	24	24	30	30%	266	8	8	8	8	620	22	16	16	22
8)	Apartments ⁽⁷⁾	120 DU ⁽⁸⁾	6.65	0.102	0.408	0.403	0.217	798	12	49	48	26	0%	0	0	0	0	0	798	12	50	48	26
Total =								5,868	215	230	202	192		2,017	80	80	63	63	3,851	135	150	139	129
Option 2 - Specialty Retail on Lot 7																							
1)	Existing Kum & Go ⁽²⁾	20.00 FP ⁽³⁾	162.78	5.080	5.080	6.755	6.755	0	0	0	0	0	0%	0	0	0	0	0	0	0	0	0	0
2)	Sonic Restaurant ⁽⁴⁾	2.00 KSF ⁽⁵⁾	496.12	23.164	22.256	16.978	15.672	992	46	45	34	31	50%	496	23	23	16	16	496	23	22	18	15
3)	Specialty Retail ⁽⁶⁾	12.80 KSF	44.32	1.518	1.192	1.192	1.518	567	19	15	15	19	30%	170	5	5	5	5	397	14	10	10	14
4)	Specialty Retail	12.80 KSF	44.32	1.518	1.192	1.192	1.518	567	19	15	15	19	30%	170	5	5	5	5	397	14	10	10	14
5)	Specialty Retail	12.85 KSF	44.32	1.518	1.192	1.192	1.518	570	20	15	15	20	30%	171	5	5	5	5	399	15	10	10	15
6)	Fast-Food Restaurant w/ Drive-Through ⁽⁴⁾	3.00 KSF	496.12	23.164	22.256	16.978	15.672	1,488	69	67	51	47	50%	744	34	34	24	24	744	35	33	27	23
7)	Specialty Retail	20.00 KSF	44.32	1.518	1.192	1.192	1.518	886	30	24	24	30	30%	266	8	8	8	8	620	22	16	16	22
8)	Specialty Retail	107.00 KSF	44.32	1.518	1.192	1.192	1.518	4,742	162	128	128	162	30%	1,423	43	43	43	43	3,319	119	85	84	119
Total =								9,812	365	309	282	328		3,440	123	123	106	106	6,372	242	186	176	222

- Notes:
- (1) Source: *Trip Generation*, Institute of Transportation Engineers, 9th Edition, 2012.
 - (2) ITE Land Use No. 945 - Gasoline/Service Station with Convenience Market. This use exists and was captured in the recent traffic counts.
 - (3) FP = Fueling Positions
 - (4) ITE Land Use No. 934 - Fast-Food Restaurant with Drive-Through
 - (5) KSF = 1,000 Square Feet
 - (6) ITE Land Use No. 826 - Specialty Retail Center. No AM peak-hour rates are available, so the PM peak-hour rates were reversed.
 - (7) ITE Land Use No. 220 - Apartment
 - (8) DU = Dwelling Units



Approximate Scale
Scale: 1"=600'

Figure 1
**Vicinity
Map**

Vista Ridge- Kraus Parcel (LSC #150730)



Approximate Scale
Scale: 1"=200'

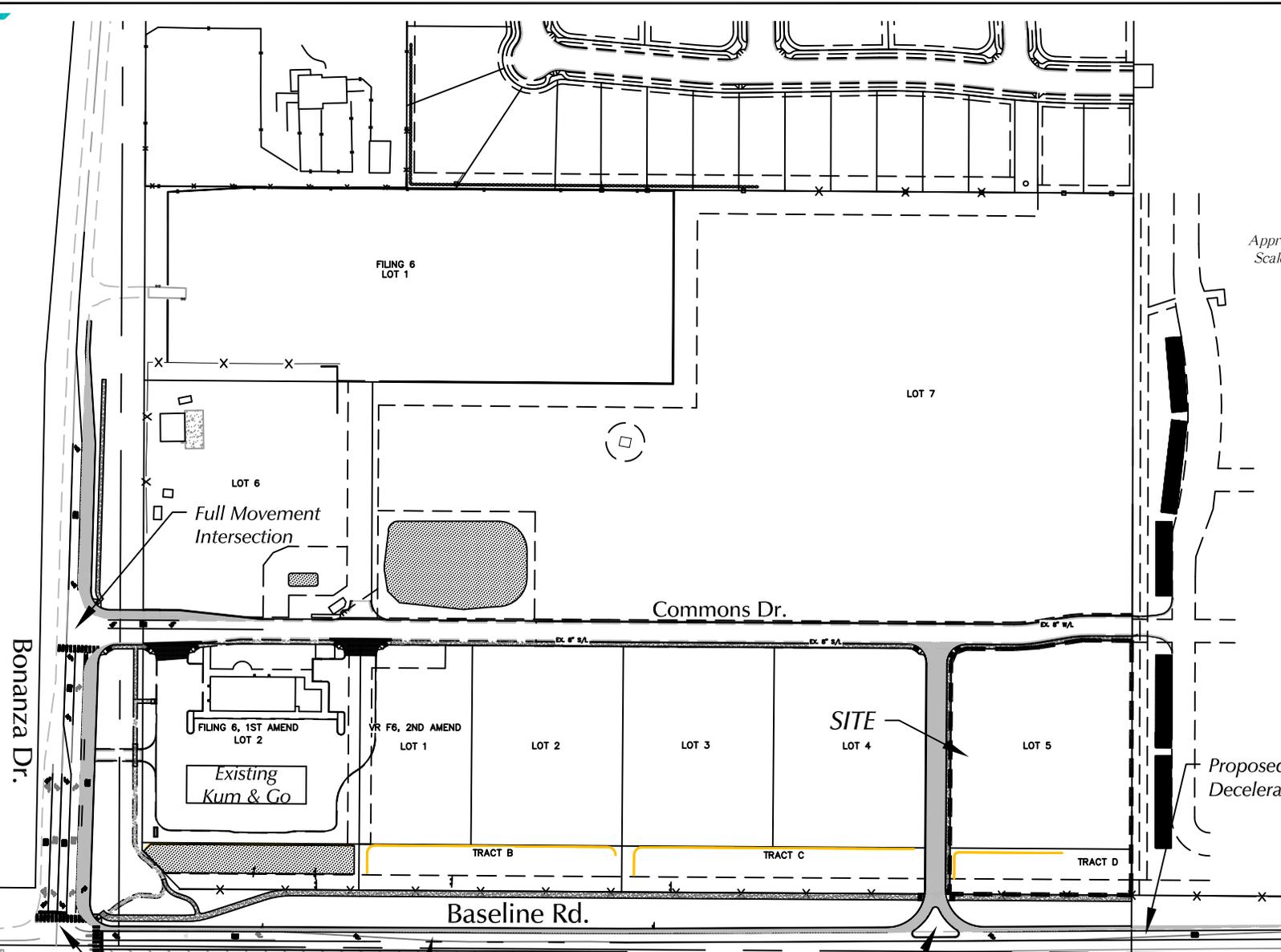
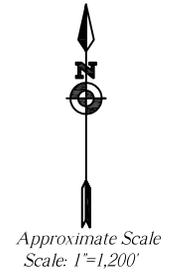
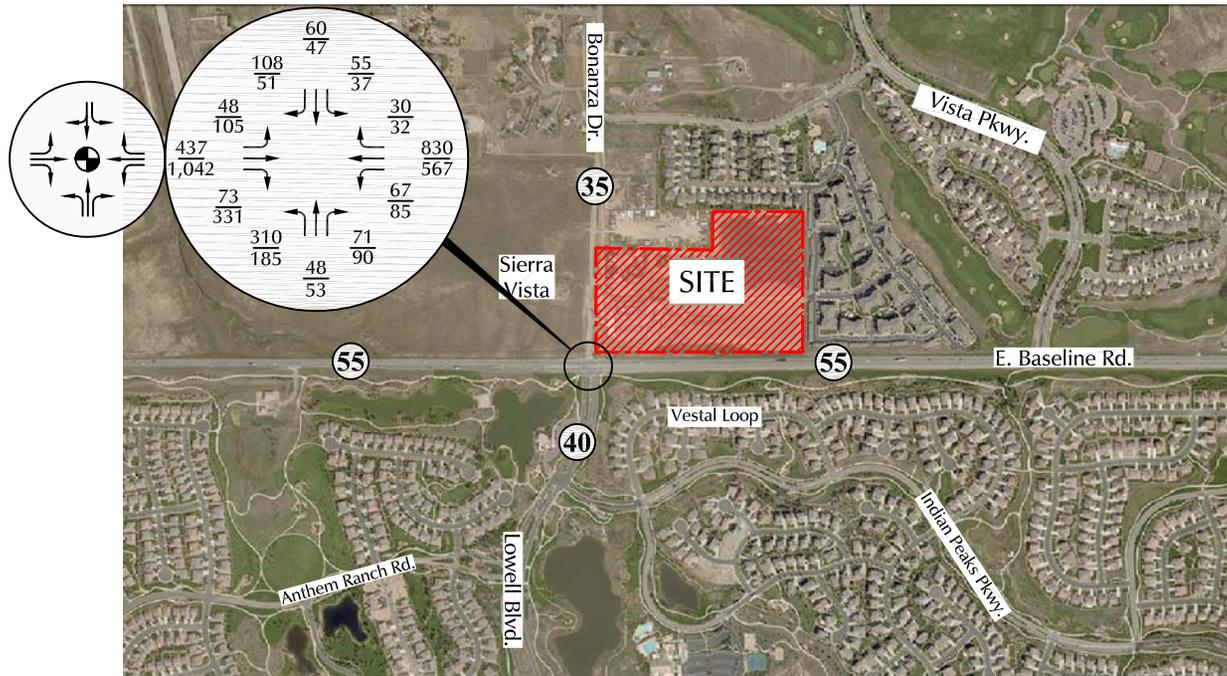


Figure 2

Site Plan

Vista Ridge- Kraus Parcel (LSC #150730)



LEGEND:

-  = Stop Sign
-  = Traffic Signal
-  = Speed Limit
- $\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic
- 2,500 = Average Daily Traffic

Figure 3
**Existing Traffic, Lane
Geometry and Traffic Control**
Vista Ridge- Kraus Parcel (LSC #150730)



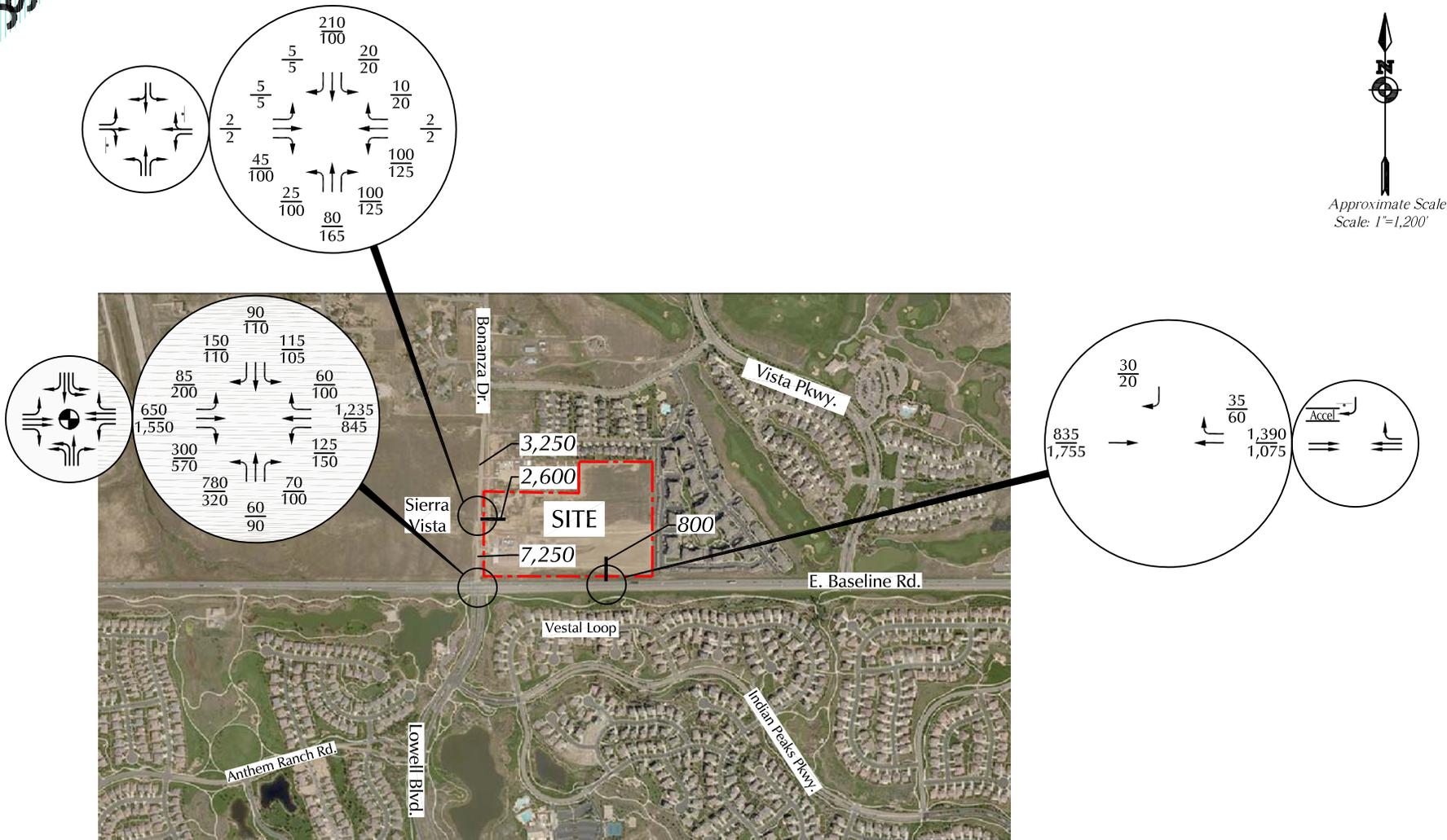
Notes:

1. Two percent annual growth assumed for SH 7 through traffic. Assumes three percent to four percent annual growth for Lowell Boulevard.
2. No connection of Bonanza Drive to the north.

LEGEND:

- = Stop Sign
- = Traffic Signal
- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{26}$ = PM Peak Hour Traffic
- 2,500 = Average Daily Traffic

Figure 4
**Year 2020 Background Traffic,
Lane Geometry and Traffic Control**
Vista Ridge- Kraus Parcel (LSC #150730)



- Notes:
1. Assumes development of adjacent Sierra Vista development based on January, 2015 Sierra Vista TIS by Aldridge Transportation Consultants.
 2. Two percent annual growth assumed for SH 7 through traffic.
 3. Turning volumes to/from Lowell Blvd. from February, 2014 SH 7 PEL Study.
 4. No connection of Bonanza Drive to the north.

LEGEND:

-  = Stop Sign
-  = Traffic Signal
- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{26}$ = PM Peak Hour Traffic
- 2,500 = Average Daily Traffic

Figure 5
**Year 2035 Background Traffic,
 Lane Geometry and Traffic Control**
 Vista Ridge- Kraus Parcel (LSC #150730)



LEGEND:

↔ Percent
50% = Directional Distribution

Figure 6
*Directional Distribution
of Primary Site-Generated Traffic*
Vista Ridge- Kraus Parcel (LSC #150730)



LEGEND:

- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{35}$ = PM Peak Hour Traffic
- 2,500 = Average Daily Traffic

Figure 7a
**Scenario 1 - Assignment of
Passby Site-Generated Traffic**
Vista Ridge- Kraus Parcel (LSC #150730)



Approximate Scale
Scale: 1"=1,200'

LEGEND:

- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{35}$ = PM Peak Hour Traffic
- 2,500 = Average Daily Traffic

Figure 7b
**Scenario 1 - Assignment of
Primary Site-Generated Traffic**

Vista Ridge- Kraus Parcel (LSC #150730)



LEGEND:

- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{35}$ = PM Peak Hour Traffic
- 2,500 = Average Daily Traffic

Figure 7c
**Scenario 1 - Assignment of
Total Site-Generated Traffic**

Vista Ridge- Kraus Parcel (LSC #150730)



Approximate Scale
Scale: 1"=1,200'

LEGEND:

- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{35}$ = PM Peak Hour Traffic
- 2,500 = Average Daily Traffic

Figure 8a
**Scenario 2 - Assignment of
Passby Site-Generated Traffic**

Vista Ridge- Kraus Parcel (LSC #150730)



Approximate Scale
Scale: 1"=1,200'

LEGEND:

- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{26}$ = PM Peak Hour Traffic
- 2,500 = Average Daily Traffic

Figure 8b
**Scenario 2 - Assignment of
Primary Site-Generated Traffic**

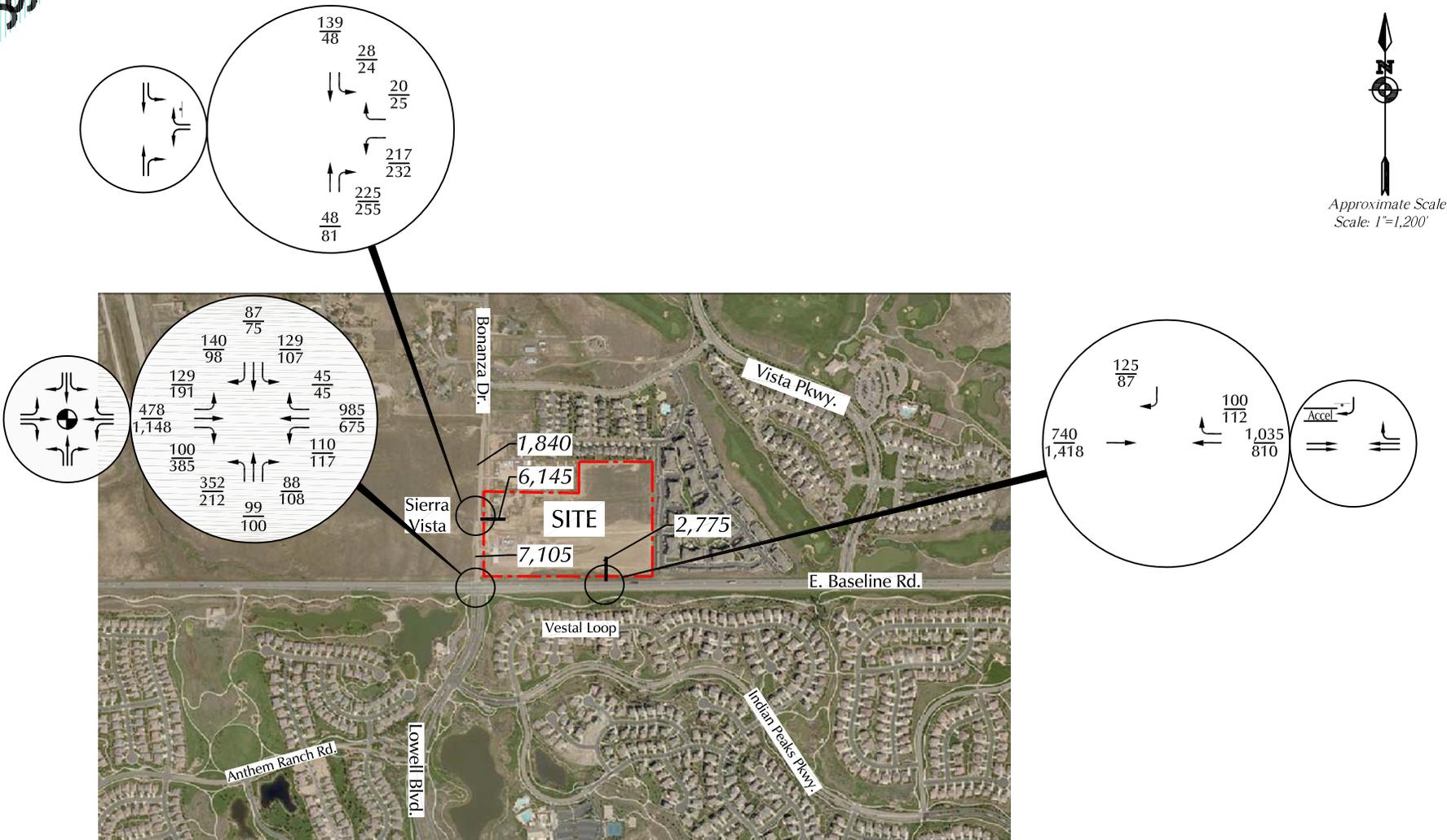
Vista Ridge- Kraus Parcel (LSC #150730)



LEGEND:

- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{26}$ = PM Peak Hour Traffic
- 2,500 = Average Daily Traffic

Figure 8c
**Scenario 2 - Assignment of
Total Site-Generated Traffic**
Vista Ridge- Kraus Parcel (LSC #150730)

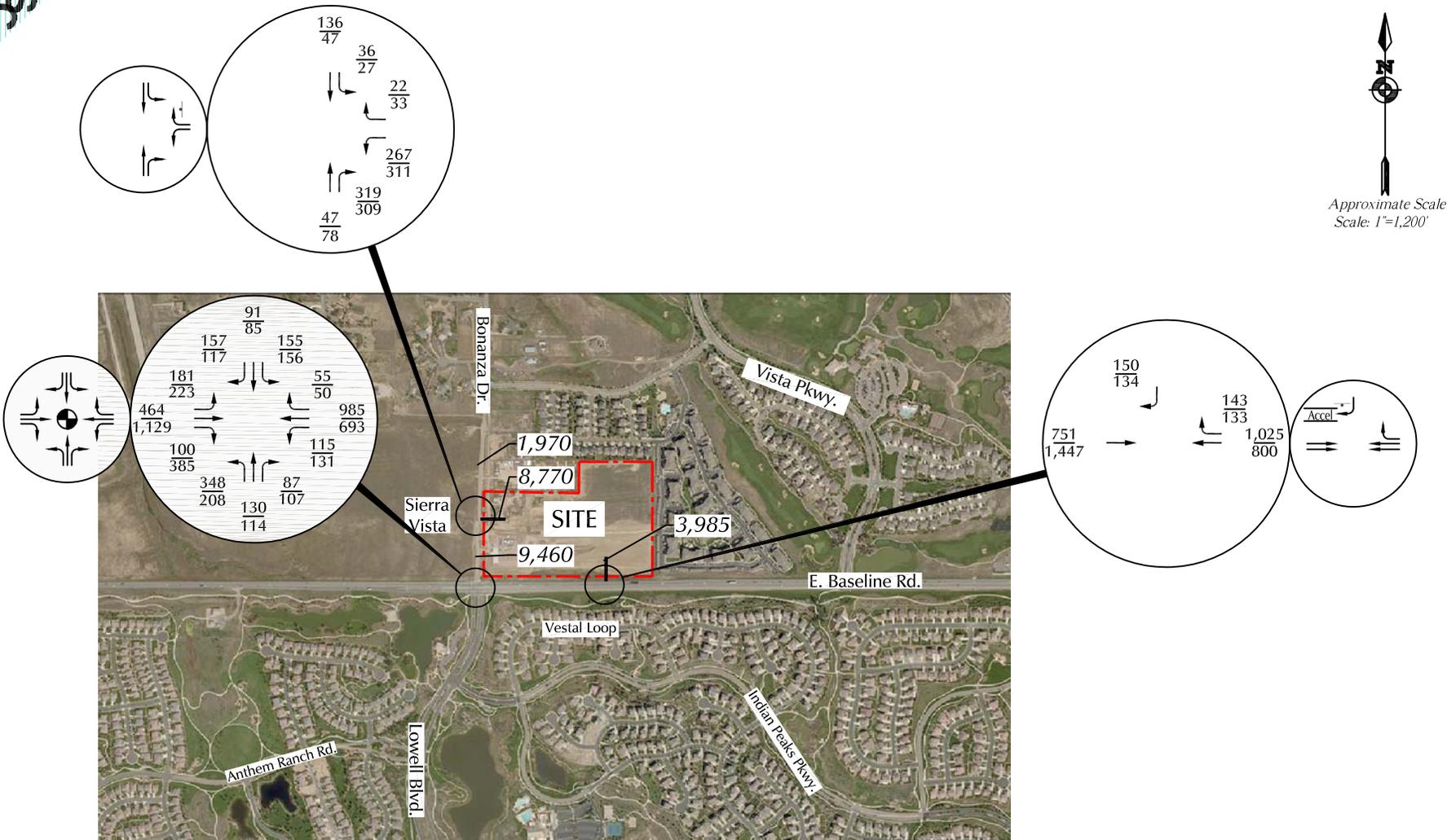


LEGEND:

-  = Stop Sign
-  = Traffic Signal
- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{26}$ = PM Peak Hour Traffic
- 2,500 = Average Daily Traffic

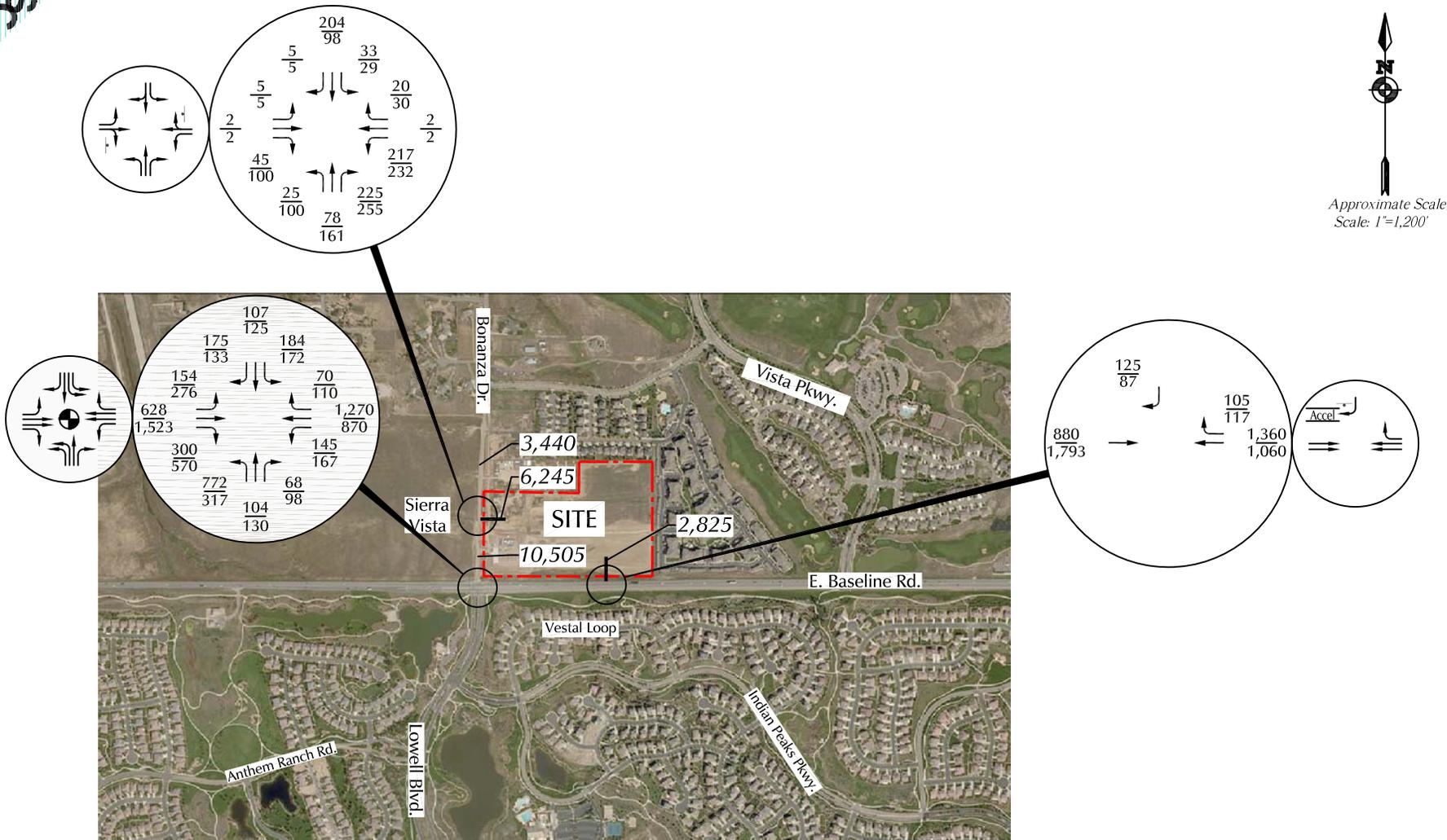
Figure 9
Scenario 1 - Year 2020 Total Traffic,
Lane Geometry and Traffic Control

Vista Ridge- Kraus Parcel (LSC #150730)



- LEGEND:
-  = Stop Sign
 -  = Traffic Signal
 - $\frac{26}{35}$ = AM Peak Hour Traffic
 - $\frac{35}{26}$ = PM Peak Hour Traffic
 - 2,500 = Average Daily Traffic

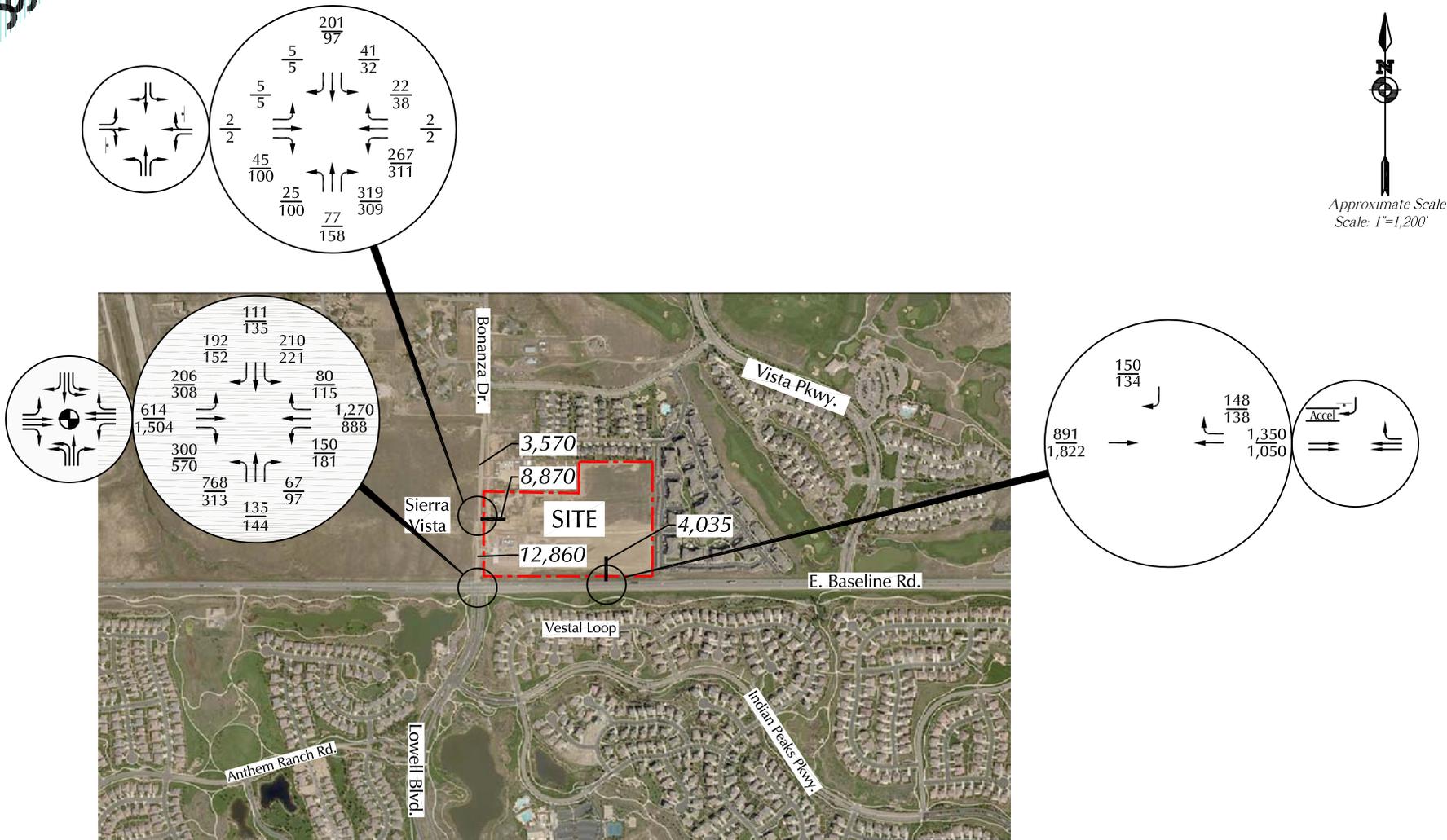
Figure 10
**Scenario 2 - Year 2020 Total Traffic,
 Lane Geometry and Traffic Control**
 Vista Ridge- Kraus Parcel (LSC #150730)



Approximate Scale
Scale: 1"=1,200'

- LEGEND:
- = Stop Sign
 - = Traffic Signal
 - $\frac{26}{35}$ = AM Peak Hour Traffic
 - $\frac{35}{26}$ = PM Peak Hour Traffic
 - 2,500 = Average Daily Traffic

Figure 11
**Scenario 1 - Year 2035 Total Traffic,
Lane Geometry and Traffic Control**
Vista Ridge- Kraus Parcel (LSC #150730)



LEGEND:

-  = Stop Sign
-  = Traffic Signal
- $\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic
- 2,500 = Average Daily Traffic

Figure 12
**Scenario 2 - Year 2035 Total Traffic,
Lane Geometry and Traffic Control**
Vista Ridge- Kraus Parcel (LSC #150730)



Approximate Scale
Scale: 1"=100'

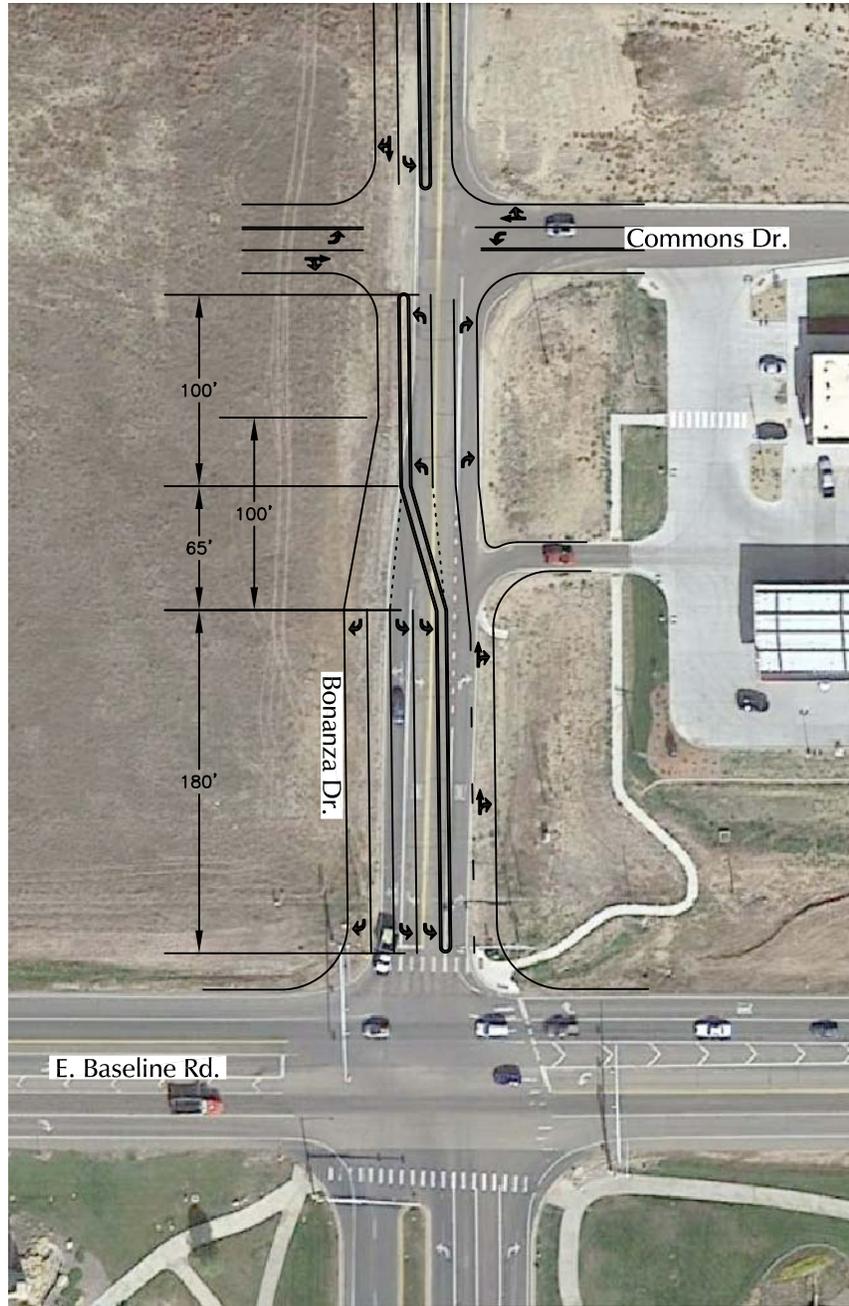


Figure 13

Conceptual Build-Out Lane Geometry for Bonanza Drive

Vista Ridge- Kraus Parcel (LSC #150730)

COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: BONANZA DR / LOWELL BLVD
E/W STREET: SH-7
CITY: ERIE
COUNTY: BOULDER

File Name : BONASH-7
Site Code : 00000011
Start Date : 7/23/2015
Page No : 1

Groups Printed- VEHICLES

Start Time	BONANZA DR Southbound				SH-7 Westbound				LOEWLL BLVD Northbound				SH-7 Eastbound				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	7	13	18	0	10	214	12	1	35	4	9	0	4	92	11	0	430
06:45 AM	10	20	22	0	20	194	8	5	49	6	3	0	7	71	25	0	440
Total	17	33	40	0	30	408	20	6	84	10	12	0	11	163	36	0	870
07:00 AM	10	9	22	0	14	188	8	0	63	3	14	2	7	84	16	0	440
07:15 AM	11	11	28	2	23	228	4	3	63	9	17	1	12	102	11	0	525
07:30 AM	14	18	28	0	13	215	6	2	84	11	20	0	11	123	12	0	557
07:45 AM	15	18	27	0	16	183	15	2	81	13	13	1	13	94	28	0	519
Total	50	56	105	2	66	814	33	7	291	36	64	4	43	403	67	0	2041
08:00 AM	15	13	25	3	15	204	5	0	82	15	21	0	12	118	22	2	552
08:15 AM	8	11	24	1	26	192	5	0	44	3	11	1	9	109	28	0	472
Total	23	24	49	4	41	396	10	0	126	18	32	1	21	227	50	2	1024
04:00 PM	15	9	14	0	17	142	8	0	26	18	18	0	24	211	74	0	576
04:15 PM	14	13	9	0	13	150	9	0	61	12	33	1	35	255	71	0	676
04:30 PM	7	11	18	0	13	146	5	1	40	14	20	0	20	239	82	0	616
04:45 PM	13	9	11	0	16	134	8	0	48	9	26	0	28	262	85	1	650
Total	49	42	52	0	59	572	30	1	175	53	97	1	107	967	312	1	2518
05:00 PM	7	13	7	0	28	147	7	1	49	16	20	0	35	271	71	1	673
05:15 PM	10	14	18	0	20	152	3	0	40	16	21	1	22	288	86	0	691
05:30 PM	7	11	15	0	21	134	14	1	48	12	23	0	20	221	89	2	618
05:45 PM	8	18	9	0	13	129	7	0	52	19	11	4	22	219	70	1	582
Total	32	56	49	0	82	562	31	2	189	63	75	5	99	999	316	4	2564
Grand Total	171	211	295	6	278	2752	124	16	865	180	280	11	281	2759	781	7	9017
Apprch %	25.0	30.9	43.2	0.9	8.8	86.8	3.9	0.5	64.7	13.5	21.0	0.8	7.3	72.1	20.4	0.2	
Total %	1.9	2.3	3.3	0.1	3.1	30.5	1.4	0.2	9.6	2.0	3.1	0.1	3.1	30.6	8.7	0.1	

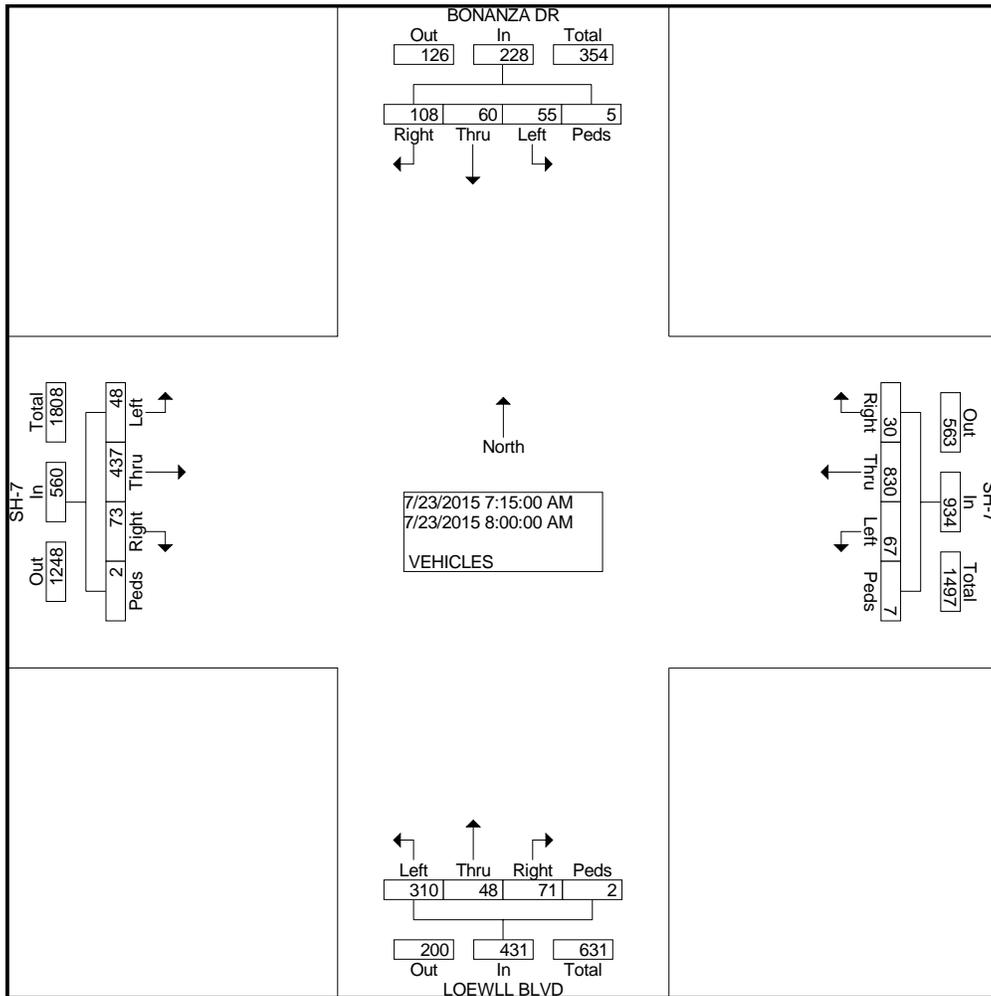
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: BONANZA DR / LOWELL BLVD
E/W STREET: SH-7
CITY: ERIE
COUNTY: BOULDER

File Name : BONASH-7
Site Code : 0000011
Start Date : 7/23/2015
Page No : 2

Start Time	BONANZA DR Southbound					SH-7 Westbound					LOEWLL BLVD Northbound					SH-7 Eastbound					Int. Total
	Left	Thru	Rig ht	Ped s	App. Total	Left	Thru	Rig ht	Ped s	App. Total	Left	Thru	Rig ht	Ped s	App. Total	Left	Thru	Rig ht	Ped s	App. Total	
Intersecti on	07:15 AM																				
Volume	55	60	108	5	228	67	830	30	7	934	310	48	71	2	431	48	437	73	2	560	2153
Percent	24.1	26.3	47.4	2.2		7.2	88.9	3.2	0.7		71.9	11.1	16.5	0.5		8.6	78.0	13.0	0.4		
07:30 Volume	14	18	28	0	60	13	215	6	2	236	84	11	20	0	115	11	123	12	0	146	557
Peak Factor																					
High Int. Volume	07:30 AM					07:15 AM					08:00 AM					08:00 AM					
Peak Factor	14	18	28	0	60	23	228	4	3	258	82	15	21	0	118	12	118	22	2	154	0.966
	0.95					0.90					0.91					0.90					
	0					5					3					9					



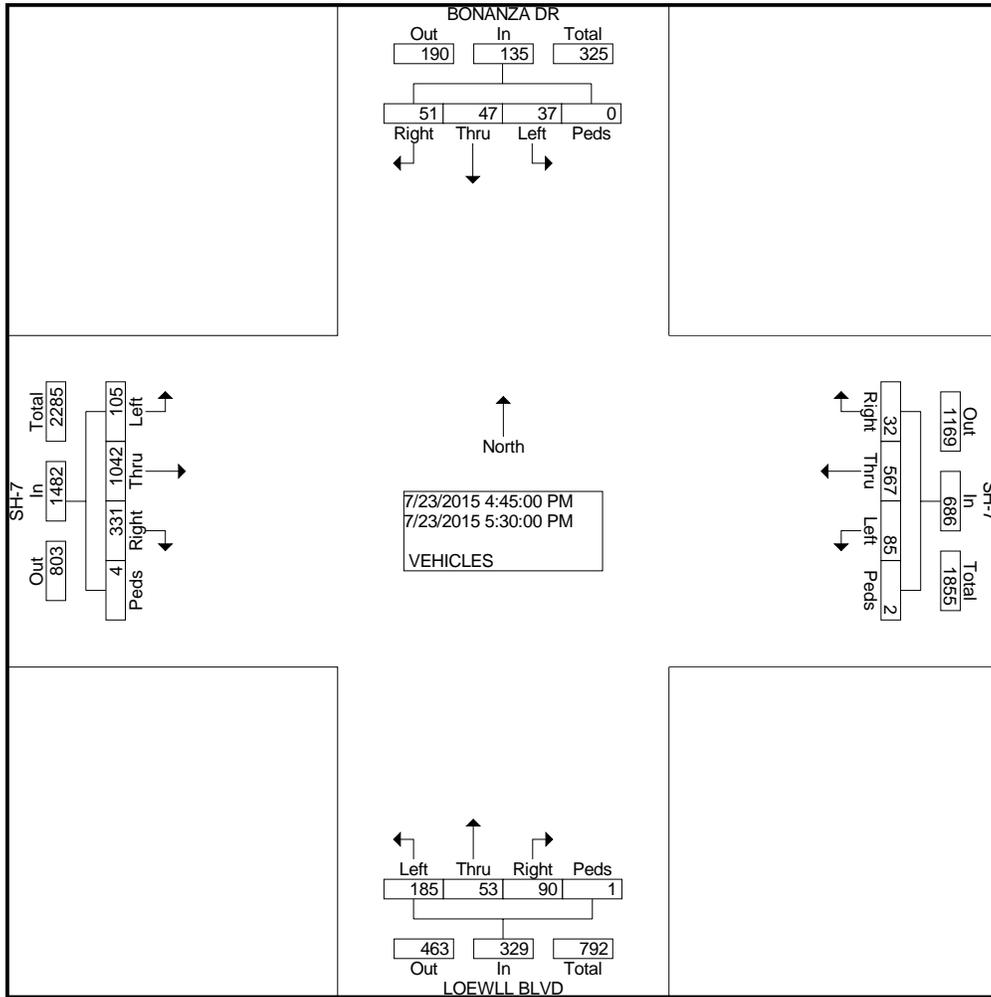
COUNTER MEASURES INC.

1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: BONANZA DR / LOWELL BLVD
E/W STREET: SH-7
CITY: ERIE
COUNTY: BOULDER

File Name : BONASH-7
Site Code : 0000011
Start Date : 7/23/2015
Page No : 2

Start Time	BONANZA DR Southbound					SH-7 Westbound					LOEWLL BLVD Northbound					SH-7 Eastbound					Int. Total
	Left	Thru	Rig ht	Ped s	App. Total	Left	Thru	Rig ht	Ped s	App. Total	Left	Thru	Rig ht	Ped s	App. Total	Left	Thru	Rig ht	Ped s	App. Total	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersecti on	04:45 PM																				
Volume	37	47	51	0	135	85	567	32	2	686	185	53	90	1	329	105	104	331	4	1482	2632
Percent	27.4	34.8	37.8	0.0		12.4	82.7	4.7	0.3		56.2	16.1	27.4	0.3		7.1	70.3	22.3	0.3		
05:15 Volume	10	14	18	0	42	20	152	3	0	175	40	16	21	1	78	22	288	86	0	396	691
Peak Factor																					
High Int. Volume	05:15 PM					05:00 PM					05:00 PM					05:15 PM					
Peak Factor	10	14	18	0	42	28	147	7	1	183	49	16	20	0	85	22	288	86	0	396	0.952
Factor	0.80					0.93					0.96					0.93					6



LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2010

SIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

<u>LOS</u>	<u>Average Vehicle Delay</u> sec/vehicle	<u>Operational Characteristics</u>
A	<10 seconds	Describes operations with low control delay, up to 10 sec/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	10 to 20 seconds	Describes operations with control delay greater than 10 seconds and up to 20 sec/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.
C	20 to 35 seconds	Describes operations with control delay greater than 20 and up to 35 sec/veh. These higher delays may result from only fair progression, longer cycle length, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	35 to 55 seconds	Describes operations with control delay greater than 35 and up to 55 sec/veh. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	55 to 80 seconds	Describes operations with control delay greater than 55 and up to 80 sec/veh. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.
F	>80 seconds	Describes operations with control delay in excess of 80 sec/veh. This level, considered unacceptable to most drivers, often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2010

UNSIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

Applicable to Two-Way Stop Control, All-Way Stop Control, and Roundabouts

LOS	Average Vehicle Control Delay	<u>Operational Characteristics</u>
A	<10 seconds	Normally, vehicles on the stop-controlled approach only have to wait up to 10 seconds before being able to clear the intersection. Left-turning vehicles on the uncontrolled street do not have to wait to make their turn.
B	10 to 15 seconds	Vehicles on the stop-controlled approach will experience delays before being able to clear the intersection. <u>The delay could be up to 15 seconds.</u> Left-turning vehicles on the uncontrolled street may have to wait to make their turn.
C	15 to 25 seconds	Vehicles on the stop-controlled approach can expect delays in the range of 15 to 25 seconds before clearing the intersection. Motorists may begin to take chances due to the long delays, thereby posing a safety risk to through traffic. <u>Left-turning vehicles on the uncontrolled street will now be required to wait to make their turn causing a queue to be created in the turn lane.</u>
D	25 to 35 seconds	<u>This is the point at which a traffic signal may be warranted for this intersection.</u> The delays for the stop-controlled intersection are not considered to be excessive. The length of the queue may begin to block other public and private access points.
E	35 to 50 seconds	The delays for all critical traffic movements are considered to be unacceptable. The length of the queues for the stop-controlled approaches as well as the left-turn movements are extremely long. <u>There is a high probability that this intersection will meet traffic signal warrants.</u> The ability to install a traffic signal is affected by the location of other existing traffic signals. Consideration may be given to restricting the accesses by eliminating the left-turn movements from and to the stop-controlled approach.
F	>50 seconds	The delay for the critical traffic movements are probably in excess of 100 seconds. The length of the queues are extremely long. Motorists are selecting alternative routes due to the long delays. <u>The only remedy for these long delays is installing a traffic signal or restricting the accesses.</u> The potential for accidents at this intersection are extremely high due to motorist taking more risky chances. If the median permits, motorists begin making two-stage left-turns.

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

Existing
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	48	437	73	67	830	30	310	48	71	55	60	108
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	1	1	1	1	1	1	1	1	1	1	0
Cap, veh/h	136	871	740	390	880	748	354	614	522	200	73	130
Arrive On Green	0.03	0.47	0.47	0.03	0.47	0.47	0.16	0.33	0.33	0.12	0.12	0.12
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1264	600	1074
Grp Volume(v), veh/h	49	451	75	69	856	31	320	49	73	57	0	173
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1264	0	1673
Q Serve(g_s), s	1.5	17.6	1.3	2.1	46.5	1.1	14.2	1.9	3.4	4.4	0.0	10.5
Cycle Q Clear(g_c), s	1.5	17.6	1.3	2.1	46.5	1.1	14.2	1.9	3.4	6.3	0.0	10.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.64
Lane Grp Cap(c), veh/h	136	871	740	390	880	748	354	614	522	200	0	203
V/C Ratio(X)	0.36	0.52	0.10	0.18	0.97	0.04	0.90	0.08	0.14	0.29	0.00	0.85
Avail Cap(c_a), veh/h	204	871	740	449	880	748	395	664	565	205	0	210
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.5	19.4	3.4	14.9	26.7	14.7	41.0	23.9	24.4	43.7	0.0	44.7
Incr Delay (d2), s/veh	1.6	2.2	0.3	0.2	24.4	0.1	22.1	0.1	0.1	0.8	0.0	26.7
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 Back of Q (50%), veh/ln	1.3	7.9	1.0	0.8	25.2	0.4	10.5	0.9	1.2	1.5	0.0	5.9
Lane Grp Delay (d), s/veh	26.1	21.6	3.7	15.1	51.1	14.8	63.0	24.0	24.6	44.5	0.0	71.4
Lane Grp LOS	C	C	A	B	D	B	E	C	C	D		E
Approach Vol, veh/h		575			956			442			230	
Approach Delay, s/veh		19.6			47.3			52.3			64.7	
Approach LOS		B			D			D			E	
Timer												
Assigned Phs	7	4		3	8		5	2				6
Phs Duration (G+Y+Rc), s	8.0	56.0		8.5	56.5		21.6	39.2				17.6
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0				5.0
Max Green Setting (Gmax), s	7.0	48.5		7.0	48.5		19.0	37.0				13.0
Max Q Clear Time (g_c+I1), s	3.5	19.6		4.1	48.5		16.2	5.4				12.5
Green Ext Time (p_c), s	0.0	9.7		0.0	0.0		0.5	1.4				0.1
Intersection Summary												
HCM 2010 Ctrl Delay				42.9								
HCM 2010 LOS				D								
Notes												

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

Existing
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	105	1042	331	85	567	32	185	53	90	37	47	51
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	1	1	1	1	1	1	1	1	1	1	0
Cap, veh/h	431	1060	901	145	1049	892	260	413	351	175	69	76
Arrive On Green	0.04	0.57	0.57	0.04	0.56	0.56	0.09	0.22	0.22	0.08	0.08	0.08
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1231	811	894
Grp Volume(v), veh/h	111	1097	348	89	597	34	195	56	95	39	0	103
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1231	0	1705
Q Serve(g_s), s	2.6	58.1	12.4	2.2	21.0	1.0	9.0	2.5	5.1	3.1	0.0	6.0
Cycle Q Clear(g_c), s	2.6	58.1	12.4	2.2	21.0	1.0	9.0	2.5	5.1	3.1	0.0	6.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.52
Lane Grp Cap(c), veh/h	431	1060	901	145	1049	892	260	413	351	175	0	144
V/C Ratio(X)	0.26	1.03	0.39	0.62	0.57	0.04	0.75	0.14	0.27	0.22	0.00	0.71
Avail Cap(c_a), veh/h	475	1060	901	199	1049	892	260	511	434	239	0	234
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.8	22.0	12.1	24.7	14.3	10.0	38.7	31.9	32.9	44.2	0.0	45.5
Incr Delay (d2), s/veh	0.3	36.9	1.3	4.2	2.2	0.1	11.5	0.1	0.4	0.6	0.0	6.4
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 Back of Q (50%), veh/ln	0.9	33.3	4.4	2.4	8.9	0.3	1.4	1.2	1.9	1.0	0.0	2.8
Lane Grp Delay (d), s/veh	11.1	58.9	13.4	28.9	16.6	10.0	50.2	32.0	33.3	44.8	0.0	52.0
Lane Grp LOS	B	F	B	C	B	B	D	C	C	D		D
Approach Vol, veh/h		1556			720			346			142	
Approach Delay, s/veh		45.3			17.8			42.6			50.0	
Approach LOS		D			B			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2				6
Phs Duration (G+Y+Rc), s	9.5	65.6		8.9	65.0		14.0	27.6				13.6
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0				5.0
Max Green Setting (Gmax), s	7.0	57.5		7.0	57.5		9.0	28.0				14.0
Max Q Clear Time (g_c+I1), s	4.6	60.1		4.2	23.0		11.0	7.1				8.0
Green Ext Time (p_c), s	0.0	0.0		0.0	17.7		0.0	1.2				0.6
Intersection Summary												
HCM 2010 Ctrl Delay			38.1									
HCM 2010 LOS			D									
Notes												

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2020 Background
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	500	100	90	950	35	360	55	90	60	70	115
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	133	945	1054	395	980	889	404	385	392	104	156	182
Arrive On Green	0.03	0.51	0.51	0.04	0.53	0.52	0.16	0.21	0.21	0.06	0.08	0.08
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	62	515	103	93	979	36	371	57	93	62	72	119
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	1.8	20.2	2.5	2.6	56.4	1.1	17.0	2.7	5.0	3.7	4.0	7.7
Cycle Q Clear(g_c), s	1.8	20.2	2.5	2.6	56.4	1.1	17.0	2.7	5.0	3.7	4.0	7.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	133	945	1054	395	980	889	404	385	392	104	156	182
V/C Ratio(X)	0.47	0.54	0.10	0.24	1.00	0.04	0.92	0.15	0.24	0.59	0.46	0.65
Avail Cap(c_a), veh/h	193	945	1054	439	980	889	404	385	392	240	156	182
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	18.0	6.4	13.5	25.4	10.6	28.6	34.9	32.3	49.3	46.9	45.4
Incr Delay (d2), s/veh	2.5	2.3	0.2	0.3	28.4	0.1	25.8	0.2	0.3	5.3	2.1	8.0
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 Back of Q (50%), veh/ln	1.7	8.9	0.8	1.0	30.6	0.4	13.0	1.3	0.0	1.8	2.0	3.4
Lane Grp Delay (d), s/veh	28.0	20.2	6.6	13.8	53.8	10.6	54.4	35.0	32.6	54.6	49.0	53.5
Lane Grp LOS	C	C	A	B	D	B	D	D	C	D	D	D
Approach Vol, veh/h		680			1108			521			253	
Approach Delay, s/veh		18.9			49.1			48.4			52.5	
Approach LOS		B			D			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	8.4	62.0		9.4	63.0		22.0	27.2		8.8	14.0	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		4.0	5.0	
Max Green Setting (Gmax), s	7.0	54.5		7.0	54.5		17.0	14.0		13.0	9.0	
Max Q Clear Time (g_c+I1), s	3.8	22.2		4.6	58.4		19.0	7.0		5.7	9.7	
Green Ext Time (p_c), s	0.0	12.7		0.0	0.0		0.0	0.8		0.1	0.0	
Intersection Summary												
HCM 2010 Ctrl Delay			41.3									
HCM 2010 LOS			D									
Notes												

Intersection

Intersection Delay, s/veh 3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	100	10	50	100	15	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	150	-	0	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	11	54	109	16	158

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	244	54	0
Stage 1	54	-	-
Stage 2	190	-	-
Follow-up Headway	3.518	3.318	-
Pot Capacity-1 Maneuver	744	1013	-
Stage 1	969	-	-
Stage 2	842	-	-
Time blocked-Platoon, %			
Mov Capacity-1 Maneuver	736	1013	-
Mov Capacity-2 Maneuver	736	-	-
Stage 1	969	-	-
Stage 2	833	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	0.7
HCM LOS	B		

Minor Lane / Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	736	1013	1551	-
HCM Lane V/C Ratio	-	-	0.148	0.011	0.011	-
HCM Control Delay (s)	-	-	10.7	8.6	7.346	-
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	0.516	0.033	0.032	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	695	1065	30	0	30
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	755	1158	33	0	33

Major/Minor

	Major1	Major2	Minor2
Conflicting Flow All	1158	0	579
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	599	-	458
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	599	-	458
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach

	EB	WB	SB
HCM Control Delay, s	0	0	13.5
HCM LOS			B

Minor Lane / Major Mvmt

	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	599	-	-	-	458
HCM Lane V/C Ratio	-	-	-	-	0.071
HCM Control Delay (s)	0	-	-	-	13.5
HCM Lane LOS	A				B
HCM 95th %tile Q(veh)	0	-	-	-	0.229

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2020 Background
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	1175	385	100	650	35	215	60	110	40	60	75
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	411	1120	1071	147	1109	990	292	231	260	79	126	178
Arrive On Green	0.04	0.60	0.60	0.04	0.60	0.60	0.09	0.12	0.12	0.04	0.07	0.07
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	121	1237	405	105	684	37	226	63	116	42	63	79
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.7	62.7	11.6	2.4	24.5	0.9	9.5	3.2	6.9	2.4	3.4	4.9
Cycle Q Clear(g_c), s	2.7	62.7	11.6	2.4	24.5	0.9	9.5	3.2	6.9	2.4	3.4	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	411	1120	1071	147	1109	990	292	231	260	79	126	178
V/C Ratio(X)	0.29	1.10	0.38	0.72	0.62	0.04	0.77	0.27	0.45	0.53	0.50	0.44
Avail Cap(c_a), veh/h	502	1120	1071	194	1109	990	292	231	260	196	179	223
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.7	20.8	7.3	25.8	13.5	7.5	36.3	41.4	39.3	48.8	46.9	43.2
Incr Delay (d2), s/veh	0.4	60.2	1.0	8.1	2.6	0.1	12.2	0.6	1.2	5.5	3.1	1.7
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 Back of Q (50%), veh/ln	1.0	42.7	3.6	3.0	10.3	0.3	2.2	1.5	2.7	1.2	1.7	2.0
Lane Grp Delay (d), s/veh	11.0	80.9	8.4	33.9	16.1	7.6	48.5	42.1	40.5	54.3	50.0	45.0
Lane Grp LOS	B	F	A	C	B	A	D	D	D	D	D	D
Approach Vol, veh/h		1763			826			405			184	
Approach Delay, s/veh		59.5			18.0			45.2			48.8	
Approach LOS		E			B			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	9.7	70.0		9.2	69.5		13.0	17.9		7.1	12.0	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		4.0	5.0	
Max Green Setting (Gmax), s	10.0	62.5		7.0	59.5		8.0	9.0		10.0	10.0	
Max Q Clear Time (g_c+I1), s	4.7	64.7		4.4	26.5		11.5	8.9		4.4	6.9	
Green Ext Time (p_c), s	0.1	0.0		0.0	21.4		0.0	0.0		0.0	0.2	
Intersection Summary												
HCM 2010 Ctrl Delay			46.3									
HCM 2010 LOS			D									
Notes												

Intersection

Intersection Delay, s/veh 3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	125	15	85	125	15	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	150	-	0	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	136	16	92	136	16	54

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	179	92	0
Stage 1	92	-	-
Stage 2	87	-	-
Follow-up Headway	3.518	3.318	-
Pot Capacity-1 Maneuver	811	965	-
Stage 1	932	-	-
Stage 2	936	-	-
Time blocked-Platoon, %			-
Mov Capacity-1 Maneuver	802	965	-
Mov Capacity-2 Maneuver	802	-	-
Stage 1	932	-	-
Stage 2	926	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	1.7
HCM LOS	B		

Minor Lane / Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	802	965	1503	-
HCM Lane V/C Ratio	-	-	0.169	0.017	0.011	-
HCM Control Delay (s)	-	-	10.4	8.8	7.421	-
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	0.607	0.052	0.033	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	1380	825	55	0	20
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1500	897	60	0	22

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	897	0	448
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	753	-	558
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	753	-	558
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.7
HCM LOS			B

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	753	-	-	-	558
HCM Lane V/C Ratio	-	-	-	-	0.039
HCM Control Delay (s)	0	-	-	-	11.7
HCM Lane LOS	A				B
HCM 95th %tile Q(veh)	0	-	-	-	0.121

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2020 Total - Option 1
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	129	478	100	110	985	45	352	99	88	129	87	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	162	991	1102	459	1016	998	409	273	318	191	152	216
Arrive On Green	0.05	0.53	0.53	0.05	0.55	0.53	0.17	0.15	0.15	0.11	0.08	0.08
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	133	493	103	113	1015	46	363	102	91	133	90	144
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	4.0	18.5	2.3	3.1	59.9	1.2	18.5	5.4	5.4	8.0	5.1	9.0
Cycle Q Clear(g_c), s	4.0	18.5	2.3	3.1	59.9	1.2	18.5	5.4	5.4	8.0	5.1	9.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	162	991	1102	459	1016	998	409	273	318	191	152	216
V/C Ratio(X)	0.82	0.50	0.09	0.25	1.00	0.05	0.89	0.37	0.29	0.70	0.59	0.67
Avail Cap(c_a), veh/h	162	991	1102	492	1016	998	409	273	318	242	152	216
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.7	16.4	5.4	11.9	25.0	7.7	31.8	42.4	37.3	47.3	48.7	45.1
Incr Delay (d2), s/veh	27.1	1.8	0.2	0.3	28.0	0.1	20.3	0.8	0.5	6.0	5.9	7.6
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 Back of Q (50%), veh/ln	4.8	8.0	0.7	1.2	31.9	0.4	11.2	2.6	2.1	3.9	2.7	4.1
Lane Grp Delay (d), s/veh	54.8	18.2	5.6	12.1	53.0	7.8	52.1	43.2	37.7	53.4	54.6	52.7
Lane Grp LOS	D	B	A	B	D	A	D	D	D	D	D	D
Approach Vol, veh/h		729			1174			556			367	
Approach Delay, s/veh		23.1			47.3			48.1			53.4	
Approach LOS		C			D			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	10.0	65.0		10.0	65.0		22.0	20.1		14.9	13.0	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		5.0	5.0	
Max Green Setting (Gmax), s	5.0	55.5		7.0	57.5		17.0	12.0		13.0	8.0	
Max Q Clear Time (g_c+I1), s	6.0	20.5		5.1	61.9		20.5	7.4		10.0	11.0	
Green Ext Time (p_c), s	0.0	13.5		0.0	0.0		0.0	0.8		0.1	0.0	
Intersection Summary												
HCM 2010 Ctrl Delay			42.0									
HCM 2010 LOS			D									
Notes												

Intersection

Intersection Delay, s/veh 4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	217	20	48	225	28	139
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	150	-	0	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	236	22	52	245	30	151

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	264	52	0
Stage 1	52	-	-
Stage 2	212	-	-
Follow-up Headway	3.518	3.318	-
Pot Capacity-1 Maneuver	725	1016	-
Stage 1	970	-	-
Stage 2	823	-	-
Time blocked-Platoon, %			-
Mov Capacity-1 Maneuver	711	1016	-
Mov Capacity-2 Maneuver	711	-	-
Stage 1	970	-	-
Stage 2	807	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.3	0	1.2
HCM LOS	B		

Minor Lane / Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	711	1016	1554	-
HCM Lane V/C Ratio	-	-	0.332	0.021	0.02	-
HCM Control Delay (s)	-	-	12.6	8.6	7.363	-
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	1.454	0.066	0.06	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	740	1035	100	0	125
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	804	1125	109	0	136

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1125	0	563
Stage 1	-	-	1125
Stage 2	-	-	402
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	617	-	470
Stage 1	-	-	272
Stage 2	-	-	644
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	617	-	470
Mov Capacity-2 Maneuver	-	-	108
Stage 1	-	-	272
Stage 2	-	-	644

Approach	EB	WB	SB
HCM Control Delay, s	0	0	15.7
HCM LOS			C

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	617	-	-	-	470
HCM Lane V/C Ratio	-	-	-	-	0.289
HCM Control Delay (s)	0	-	-	-	15.7
HCM Lane LOS	A				C
HCM 95th %tile Q(veh)	0	-	-	-	1.186

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2020 Total - Option 1
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	191	1148	385	117	675	45	212	100	108	107	75	98
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	395	1093	1048	156	1060	1025	290	170	196	164	150	229
Arrive On Green	0.06	0.59	0.59	0.05	0.57	0.57	0.09	0.09	0.08	0.09	0.08	0.08
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	201	1208	405	123	711	47	223	105	114	113	79	103
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	4.7	62.5	12.4	3.1	28.3	1.1	9.5	5.8	7.2	6.6	4.3	6.3
Cycle Q Clear(g_c), s	4.7	62.5	12.4	3.1	28.3	1.1	9.5	5.8	7.2	6.6	4.3	6.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	395	1093	1048	156	1060	1025	290	170	196	164	150	229
V/C Ratio(X)	0.51	1.10	0.39	0.79	0.67	0.05	0.77	0.62	0.58	0.69	0.53	0.45
Avail Cap(c_a), veh/h	431	1093	1048	173	1060	1025	290	170	196	208	192	265
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.3	22.0	8.2	25.7	16.0	6.8	42.2	46.6	44.1	46.9	47.0	41.7
Incr Delay (d2), s/veh	1.0	60.7	1.1	19.5	3.4	0.1	11.8	6.6	4.3	6.6	2.9	1.4
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 Back of Q (50%), veh/ln	1.7	42.4	4.1	4.1	12.1	0.4	2.2	3.0	3.0	3.2	2.1	2.5
Lane Grp Delay (d), s/veh	14.3	82.7	9.2	45.2	19.4	6.9	54.0	53.2	48.4	53.5	49.9	43.1
Lane Grp LOS	B	F	A	D	B	A	D	D	D	D	D	D
Approach Vol, veh/h		1814			881			442			295	
Approach Delay, s/veh		58.7			22.3			52.3			48.9	
Approach LOS		E			C			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	11.8	70.0		9.9	68.1		13.0	13.2		13.3	13.5	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		5.0	5.0	
Max Green Setting (Gmax), s	9.0	62.5		6.0	59.5		8.0	8.0		11.0	11.0	
Max Q Clear Time (g_c+I1), s	6.7	64.5		5.1	30.3		11.5	9.2		8.6	8.3	
Green Ext Time (p_c), s	0.1	0.0		0.0	19.5		0.0	0.0		0.1	0.2	
Intersection Summary												
HCM 2010 Ctrl Delay			47.7									
HCM 2010 LOS			D									
Notes												

Intersection

Intersection Delay, s/veh 4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	232	25	81	255	24	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	150	-	0	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	252	27	88	277	26	52

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	192	88	0
Stage 1	88	-	-
Stage 2	104	-	-
Follow-up Headway	3.518	3.318	-
Pot Capacity-1 Maneuver	797	970	-
Stage 1	935	-	-
Stage 2	920	-	-
Time blocked-Platoon, %			
Mov Capacity-1 Maneuver	783	970	-
Mov Capacity-2 Maneuver	783	-	-
Stage 1	935	-	-
Stage 2	904	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	2.5
HCM LOS	B		

Minor Lane / Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	783	970	1508	-
HCM Lane V/C Ratio	-	-	0.322	0.028	0.017	-
HCM Control Delay (s)	-	-	11.8	8.8	7.429	-
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	1.396	0.086	0.053	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	1418	810	112	0	87
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1541	880	122	0	95

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	880	0	440
Stage 1	-	-	880
Stage 2	-	-	771
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	764	-	565
Stage 1	-	-	366
Stage 2	-	-	417
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	764	-	565
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	366
Stage 2	-	-	417

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.6
HCM LOS			B

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	764	-	-	-	565
HCM Lane V/C Ratio	-	-	-	-	0.167
HCM Control Delay (s)	0	-	-	-	12.6
HCM Lane LOS	A				B
HCM 95th %tile Q(veh)	0	-	-	-	0.597

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2020 Total - Option 2
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	181	464	100	115	985	55	348	130	87	155	91	157
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	243	1002	1096	482	974	979	390	228	285	218	161	288
Arrive On Green	0.10	0.54	0.54	0.06	0.52	0.50	0.16	0.12	0.12	0.12	0.09	0.09
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	187	478	103	119	1015	57	359	134	90	160	94	162
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	7.1	17.6	2.4	3.5	57.5	1.6	17.5	7.5	5.4	9.6	5.3	9.5
Cycle Q Clear(g_c), s	7.1	17.6	2.4	3.5	57.5	1.6	17.5	7.5	5.4	9.6	5.3	9.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	243	1002	1096	482	974	979	390	228	285	218	161	288
V/C Ratio(X)	0.77	0.48	0.09	0.25	1.04	0.06	0.92	0.59	0.32	0.73	0.58	0.56
Avail Cap(c_a), veh/h	243	1002	1096	508	974	979	390	228	285	242	161	288
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.6	15.8	5.6	12.3	26.3	8.3	35.3	45.6	39.2	46.5	48.4	41.0
Incr Delay (d2), s/veh	14.0	1.6	0.2	0.3	40.5	0.1	26.8	3.9	0.6	9.8	5.3	2.5
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 Back of Q (50%), veh/ln	6.0	7.5	0.7	1.3	34.8	0.5	11.2	3.7	2.1	4.9	2.7	4.2
Lane Grp Delay (d), s/veh	47.6	17.4	5.7	12.6	66.7	8.4	62.1	49.5	39.8	56.3	53.7	43.5
Lane Grp LOS	D	B	A	B	F	A	E	D	D	E	D	D
Approach Vol, veh/h		768			1191			583			416	
Approach Delay, s/veh		23.2			58.5			55.8			50.7	
Approach LOS		C			E			E			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	14.0	65.6		10.4	62.0		21.0	17.5		16.5	13.0	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		5.0	5.0	
Max Green Setting (Gmax), s	9.0	56.5		7.0	54.5		16.0	11.0		13.0	8.0	
Max Q Clear Time (g_c+I1), s	9.1	19.6		5.5	59.5		19.5	9.5		11.6	11.5	
Green Ext Time (p_c), s	0.0	13.7		0.0	0.0		0.0	0.4		0.1	0.0	
Intersection Summary												
HCM 2010 Ctrl Delay	47.7											
HCM 2010 LOS	D											
Notes												

Intersection						
Intersection Delay, s/veh	5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	267	22	47	319	36	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	150	-	0	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	290	24	51	347	39	148
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	277	51	0	0	51	0
Stage 1	51	-	-	-	-	-
Stage 2	226	-	-	-	-	-
Follow-up Headway	3.518	3.318	-	-	2.218	-
Pot Capacity-1 Maneuver	713	1017	-	-	1555	-
Stage 1	971	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Time blocked-Platoon, %			-	-		-
Mov Capacity-1 Maneuver	695	1017	-	-	1555	-
Mov Capacity-2 Maneuver	695	-	-	-	-	-
Stage 1	971	-	-	-	-	-
Stage 2	792	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	13.4		0		1.5	
HCM LOS	B					
Minor Lane / Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	695	1017	1555	-
HCM Lane V/C Ratio	-	-	0.418	0.024	0.025	-
HCM Control Delay (s)	-	-	13.8	8.6	7.375	-
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	2.067	0.072	0.077	-
Notes						
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined						

Intersection

Intersection Delay, s/veh 1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	751	1025	143	0	150
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	816	1114	155	0	163

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1114	0	557
Stage 1	-	-	1114
Stage 2	-	-	408
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	623	-	474
Stage 1	-	-	276
Stage 2	-	-	640
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	623	-	474
Mov Capacity-2 Maneuver	-	-	109
Stage 1	-	-	276
Stage 2	-	-	640

Approach	EB	WB	SB
HCM Control Delay, s	0	0	16.5
HCM LOS			C

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	623	-	-	-	474
HCM Lane V/C Ratio	-	-	-	-	0.344
HCM Control Delay (s)	0	-	-	-	16.5
HCM Lane LOS	A				C
HCM 95th %tile Q(veh)	0	-	-	-	1.514

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2020 Total - Option 2
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	223	1129	385	131	693	50	208	114	107	156	85	117
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	364	1060	1001	167	1008	1015	323	188	215	210	203	288
Arrive On Green	0.07	0.57	0.56	0.05	0.54	0.54	0.09	0.10	0.08	0.12	0.11	0.11
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	235	1188	405	138	729	53	219	120	113	164	89	123
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	6.2	62.6	13.9	4.0	32.5	1.4	10.0	6.8	7.3	9.9	4.9	7.6
Cycle Q Clear(g_c), s	6.2	62.6	13.9	4.0	32.5	1.4	10.0	6.8	7.3	9.9	4.9	7.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	364	1060	1001	167	1008	1015	323	188	215	210	203	288
V/C Ratio(X)	0.65	1.12	0.40	0.83	0.72	0.05	0.68	0.64	0.53	0.78	0.44	0.43
Avail Cap(c_a), veh/h	364	1060	1001	184	1008	1015	323	188	215	210	203	288
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.8	23.7	10.0	27.0	19.0	7.3	41.6	47.5	44.2	47.1	45.8	39.9
Incr Delay (d2), s/veh	3.9	67.3	1.2	23.9	4.5	0.1	5.6	7.0	2.4	17.3	1.5	1.0
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 Back of Q (50%), veh/ln	2.7	44.8	4.8	4.9	14.4	0.4	1.3	3.6	3.0	5.4	2.4	3.0
Lane Grp Delay (d), s/veh	20.7	91.0	11.2	51.0	23.6	7.4	47.2	54.5	46.6	64.4	47.3	40.9
Lane Grp LOS	C	F	B	D	C	A	D	D	D	E	D	D
Approach Vol, veh/h		1828			920			452			376	
Approach Delay, s/veh		64.3			26.7			49.0			52.7	
Approach LOS		E			C			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	13.0	69.1		10.9	67.0		13.0	14.0		16.0	17.0	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		5.0	5.0	
Max Green Setting (Gmax), s	8.0	60.5		7.0	59.5		8.0	9.0		11.0	12.0	
Max Q Clear Time (g_c+I1), s	8.2	64.6		6.0	34.5		12.0	9.3		11.9	9.6	
Green Ext Time (p_c), s	0.0	0.0		0.0	17.4		0.0	0.0		0.0	0.5	
Intersection Summary												
HCM 2010 Ctrl Delay			51.5									
HCM 2010 LOS			D									
Notes												

Intersection

Intersection Delay, s/veh 5.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	311	33	78	309	27	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	150	-	0	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	338	36	85	336	29	51

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	195	85	0
Stage 1	85	-	-
Stage 2	110	-	-
Follow-up Headway	3.518	3.318	-
Pot Capacity-1 Maneuver	794	974	-
Stage 1	938	-	-
Stage 2	915	-	-
Time blocked-Platoon, %			-
Mov Capacity-1 Maneuver	779	974	-
Mov Capacity-2 Maneuver	779	-	-
Stage 1	938	-	-
Stage 2	897	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.7	0	2.7
HCM LOS	B		

Minor Lane / Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	779	974	1512	-
HCM Lane V/C Ratio	-	-	0.434	0.037	0.019	-
HCM Control Delay (s)	-	-	13.1	8.8	7.428	-
HCM Lane LOS			B	A	A	
HCM 95th %tile Q(veh)	-	-	2.211	0.115	0.059	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	1447	800	133	0	134
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1573	870	145	0	146

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	870	0	435
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	770	-	569
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	770	-	569
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.5
HCM LOS			B

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	770	-	-	-	569
HCM Lane V/C Ratio	-	-	-	-	0.256
HCM Control Delay (s)	0	-	-	-	13.5
HCM Lane LOS	A				B
HCM 95th %tile Q(veh)	0	-	-	-	1.013

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2035 Background
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	85	650	300	125	1235	60	780	60	70	115	90	150
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	2	1	1	2	1	1
Cap, veh/h	181	1348	944	312	1444	683	877	564	579	184	208	251
Arrive On Green	0.05	0.36	0.36	0.06	0.39	0.38	0.25	0.30	0.30	0.05	0.11	0.11
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	3442	1863	1583	3442	1863	1583
Grp Volume(v), veh/h	88	670	309	129	1273	62	804	62	72	119	93	155
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1721	1863	1583	1721	1863	1583
Q Serve(g_s), s	3.0	13.7	9.6	4.3	31.2	2.3	22.3	2.4	3.0	3.3	4.6	9.0
Cycle Q Clear(g_c), s	3.0	13.7	9.6	4.3	31.2	2.3	22.3	2.4	3.0	3.3	4.6	9.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	181	1348	944	312	1444	683	877	564	579	184	208	251
V/C Ratio(X)	0.49	0.50	0.33	0.41	0.88	0.09	0.92	0.11	0.12	0.65	0.45	0.62
Avail Cap(c_a), veh/h	260	1348	944	345	1444	683	877	564	579	386	209	252
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.7	24.4	9.9	18.1	27.9	16.5	35.6	24.7	20.7	45.5	40.7	38.5
Incr Delay (d2), s/veh	2.0	1.3	0.9	0.9	8.0	0.3	14.3	0.1	0.1	3.8	1.5	4.4
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 Back of Q (50%), veh/ln	1.5	6.1	3.2	1.7	14.9	0.8	11.1	1.1	1.1	1.5	2.2	3.7
Lane Grp Delay (d), s/veh	25.7	25.7	10.9	19.0	36.0	16.8	49.8	24.8	20.8	49.3	42.2	42.9
Lane Grp LOS	C	C	B	B	D	B	D	C	C	D	D	D
Approach Vol, veh/h		1067			1464			938			367	
Approach Delay, s/veh		21.4			33.7			45.9			44.8	
Approach LOS		C			C			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	9.6	43.0		11.2	44.5		28.0	34.7		9.3	16.0	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		4.0	5.0	
Max Green Setting (Gmax), s	9.0	35.5		8.0	34.5		23.0	24.0		11.0	11.0	
Max Q Clear Time (g_c+I1), s	5.0	15.7		6.3	33.2		24.3	5.0		5.3	11.0	
Green Ext Time (p_c), s	0.1	13.4		0.0	1.2		0.0	1.4		0.1	0.0	
Intersection Summary												
HCM 2010 Ctrl Delay			34.3									
HCM 2010 LOS			C									
Notes												

Intersection

Intersection Delay, s/veh 3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	2	45	100	2	10	25	80	100	20	210	5
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									
Storage Length	0	-	-	0	-	-	100	-	0	150	-	-
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	5	2	49	109	2	11	27	87	109	22	228	5

Major/Minor	Minor2			Minor1			Major1			Major2		
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Conflicting Flow All	422	415	231	441	418	87	234	0	0	87	0	0
Stage 1	274	274	-	141	141	-	-	-	-	-	-	-
Stage 2	148	141	-	300	277	-	-	-	-	-	-	-
Follow-up Headway	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Capacity-1 Maneuver	542	528	808	527	526	971	1333	-	-	1509	-	-
Stage 1	732	683	-	862	780	-	-	-	-	-	-	-
Stage 2	855	780	-	709	681	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-	-	-	-
Mov Capacity-1 Maneuver	520	510	808	480	508	971	1333	-	-	1509	-	-
Mov Capacity-2 Maneuver	520	510	-	480	508	-	-	-	-	-	-	-
Stage 1	717	673	-	845	764	-	-	-	-	-	-	-
Stage 2	826	764	-	654	671	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
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HCM Control Delay, s	10.1			13.2			0.9			0.6		
HCM LOS	B			B								

Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
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Capacity (veh/h)	1333	-	-	520	775	480	542	1509	-	-
HCM Lane V/C Ratio	0.02	-	-	0.007	0.068	0.151	0.091	0.014	-	-
HCM Control Delay (s)	7.757	-	-	12	10	13.8	12.3	7.421	-	-
HCM Lane LOS	A			B		B		A		
HCM 95th %tile Q(veh)	0.062	-	-	0.021	0.219	0.528	0.299	0.044	-	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	835	1390	35	0	30
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	908	1511	38	0	33

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1511	0	1965
Stage 1	-	-	1511
Stage 2	-	-	454
Follow-up Headway	2.22	-	3.52
Pot Capacity-1 Maneuver	439	-	55
Stage 1	-	-	169
Stage 2	-	-	606
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	439	-	55
Mov Capacity-2 Maneuver	-	-	55
Stage 1	-	-	169
Stage 2	-	-	606

Approach	EB	WB	SB
HCM Control Delay, s	0	0	16.3
HCM LOS			C

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	439	-	-	-	351
HCM Lane V/C Ratio	-	-	-	-	0.093
HCM Control Delay (s)	0	-	-	-	16.3
HCM Lane LOS	A				C
HCM 95th %tile Q(veh)	0	-	-	-	0.305

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2035 Background
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	200	1550	570	150	845	100	320	90	100	105	110	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	2	1	1	2	1	1
Cap, veh/h	392	1805	957	208	1749	825	412	294	355	178	168	271
Arrive On Green	0.08	0.48	0.48	0.07	0.47	0.47	0.12	0.16	0.16	0.05	0.09	0.09
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	3442	1863	1583	3442	1863	1583
Grp Volume(v), veh/h	211	1632	600	158	889	105	337	95	105	111	116	116
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1721	1863	1583	1721	1863	1583
Q Serve(g_s), s	5.5	37.7	22.7	4.3	15.6	3.2	9.0	4.2	5.2	3.0	5.7	6.2
Cycle Q Clear(g_c), s	5.5	37.7	22.7	4.3	15.6	3.2	9.0	4.2	5.2	3.0	5.7	6.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	392	1805	957	208	1749	825	412	294	355	178	168	271
V/C Ratio(X)	0.54	0.90	0.63	0.76	0.51	0.13	0.82	0.32	0.30	0.62	0.69	0.43
Avail Cap(c_a), veh/h	456	1805	957	242	1749	825	477	294	355	477	218	314
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.5	22.2	11.8	21.1	17.4	11.5	40.3	35.1	30.3	43.6	41.5	34.8
Incr Delay (d2), s/veh	1.1	7.9	3.1	11.2	1.1	0.3	9.6	0.6	0.5	3.6	6.2	1.1
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 Back of Q (50%), veh/ln	2.1	17.2	7.7	4.2	6.6	1.1	4.4	2.0	0.0	1.4	2.9	2.4
Lane Grp Delay (d), s/veh	13.7	30.1	15.0	32.3	18.4	11.8	49.9	35.7	30.7	47.2	47.6	35.8
Lane Grp LOS	B	C	B	C	B	B	D	D	C	D	D	D
Approach Vol, veh/h		2443			1152			537			343	
Approach Delay, s/veh		25.0			19.7			43.7			43.5	
Approach LOS		C			B			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	12.6	53.0		11.2	51.6		16.2	19.8		9.9	13.4	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		5.0	5.0	
Max Green Setting (Gmax), s	11.0	45.5		8.0	42.5		13.0	11.0		13.0	11.0	
Max Q Clear Time (g_c+I1), s	7.5	39.7		6.3	17.6		11.0	7.2		5.0	8.2	
Green Ext Time (p_c), s	0.2	5.4		0.1	20.7		0.3	0.7		0.2	0.3	
Intersection Summary												
HCM 2010 Ctrl Delay			27.3									
HCM 2010 LOS			C									
Notes												

Intersection

Intersection Delay, s/veh 6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	2	100	125	2	20	100	165	125	20	100	5
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									
Storage Length	0	-	-	0	-	-	100	-	0	150	-	-
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	5	2	109	136	2	22	109	179	136	22	109	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	564	552	111	607	555	179	114	0	0	179	0	0
Stage 1	155	155	-	397	397	-	-	-	-	-	-	-
Stage 2	409	397	-	210	158	-	-	-	-	-	-	-
Follow-up Headway	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Capacity-1 Maneuver	436	442	942	408	440	864	1475	-	-	1397	-	-
Stage 1	847	769	-	629	603	-	-	-	-	-	-	-
Stage 2	619	603	-	792	767	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-	-	-	-
Mov Capacity-1 Maneuver	395	403	942	335	401	864	1475	-	-	1397	-	-
Mov Capacity-2 Maneuver	395	403	-	335	401	-	-	-	-	-	-	-
Stage 1	784	757	-	583	558	-	-	-	-	-	-	-
Stage 2	557	558	-	688	755	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	9.7			17.8			2			1.2		
HCM LOS	A			C								

Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1475	-	-	395	899	335	417	1397	-	-		
HCM Lane V/C Ratio	0.074	-	-	0.009	0.125	0.27	0.166	0.016	-	-		
HCM Control Delay (s)	7.635	-	-	14.2	9.6	19.7	15.3	7.618	-	-		
HCM Lane LOS	A			B			A			C		
HCM 95th %tile Q(veh)	0.238	-	-	0.028	0.428	1.074	0.589	0.047	-	-		

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	1755	1075	60	0	20
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1908	1168	65	0	22

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1168	0	584
Stage 1	-	-	1168
Stage 2	-	-	954
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	594	-	455
Stage 1	-	-	258
Stage 2	-	-	335
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	594	-	455
Mov Capacity-2 Maneuver	-	-	43
Stage 1	-	-	258
Stage 2	-	-	335

Approach	EB	WB	SB
HCM Control Delay, s	0	0	13.3
HCM LOS			B

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	594	-	-	-	455
HCM Lane V/C Ratio	-	-	-	-	0.048
HCM Control Delay (s)	0	-	-	-	13.3
HCM Lane LOS	A				B
HCM 95th %tile Q(veh)	0	-	-	-	0.15

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2035 Total - Option 1
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	154	628	300	145	1270	70	772	104	68	184	107	175
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	2	1	1	2	1	1
Cap, veh/h	230	1334	935	330	1364	683	868	499	538	259	207	293
Arrive On Green	0.08	0.36	0.36	0.07	0.37	0.36	0.25	0.27	0.27	0.08	0.11	0.11
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	3442	1863	1583	3442	1863	1583
Grp Volume(v), veh/h	159	647	309	149	1309	72	796	107	70	190	110	180
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1721	1863	1583	1721	1863	1583
Q Serve(g_s), s	5.3	13.4	9.8	5.2	34.0	2.7	22.3	4.4	3.0	5.4	5.5	10.4
Cycle Q Clear(g_c), s	5.3	13.4	9.8	5.2	34.0	2.7	22.3	4.4	3.0	5.4	5.5	10.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	230	1334	935	330	1364	683	868	499	538	259	207	293
V/C Ratio(X)	0.69	0.48	0.33	0.45	0.96	0.11	0.92	0.21	0.13	0.73	0.53	0.62
Avail Cap(c_a), veh/h	261	1334	935	346	1364	683	868	499	538	347	207	293
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	24.7	10.3	18.9	30.7	16.8	36.0	28.2	22.6	44.8	41.6	37.2
Incr Delay (d2), s/veh	6.5	1.3	0.9	1.0	16.4	0.3	14.4	0.2	0.1	5.3	2.6	3.8
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 Back of Q (50%), veh/ln	4.3	6.0	3.4	2.1	17.7	1.0	11.1	2.0	1.1	2.5	2.7	4.2
Lane Grp Delay (d), s/veh	29.5	26.0	11.3	19.8	47.1	17.1	50.4	28.4	22.7	50.2	44.2	41.0
Lane Grp LOS	C	C	B	B	D	B	D	C	C	D	D	D
Approach Vol, veh/h		1115			1530			973			480	
Approach Delay, s/veh		22.4			43.0			46.0			45.4	
Approach LOS		C			D			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	12.3	43.0		12.1	42.8		28.0	31.5		12.5	16.0	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		5.0	5.0	
Max Green Setting (Gmax), s	9.0	35.5		8.0	34.5		23.0	24.0		10.0	11.0	
Max Q Clear Time (g_c+I1), s	7.3	15.4		7.2	36.0		24.3	6.4		7.4	12.4	
Green Ext Time (p_c), s	0.1	13.7		0.0	0.0		0.0	1.8		0.1	0.0	
Intersection Summary												
HCM 2010 Ctrl Delay			38.4									
HCM 2010 LOS			D									
Notes												

Intersection												
Intersection Delay, s/veh	5.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	2	45	217	2	20	25	78	225	33	204	5
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	0	-	-	0	-	-	100	-	0	150	-	-
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	5	2	49	236	2	22	27	85	245	36	222	5
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	447	435	224	461	438	85	227	0	0	85	0	0
Stage 1	296	296	-	139	139	-	-	-	-	-	-	-
Stage 2	151	139	-	322	299	-	-	-	-	-	-	-
Follow-up Headway	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Capacity-1 Maneuver	522	514	815	511	512	974	1341	-	-	1512	-	-
Stage 1	712	668	-	864	782	-	-	-	-	-	-	-
Stage 2	851	782	-	690	666	-	-	-	-	-	-	-
Time blocked-Platoon, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	492	492	815	463	490	974	1341	-	-	1512	-	-
Mov Capacity-2 Maneuver	492	492	-	463	490	-	-	-	-	-	-	-
Stage 1	698	652	-	847	766	-	-	-	-	-	-	-
Stage 2	813	766	-	631	650	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	10.2		15.5			0.6			1			
HCM LOS	B		C									
Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1341	-	-	492	777	463	522	1512	-	-		
HCM Lane V/C Ratio	0.02	-	-	0.007	0.068	0.34	0.196	0.024	-	-		
HCM Control Delay (s)	7.74	-	-	12.4	10	16.7	13.6	7.439	-	-		
HCM Lane LOS	A		B			B		C		A		
HCM 95th %tile Q(veh)	0.062	-	-	0.022	0.219	1.485	0.723	0.073	-	-		
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Intersection

Intersection Delay, s/veh 1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	880	1360	105	0	125
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	957	1478	114	0	136

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1478	0	739
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	452	-	360
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	452	-	360
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	20.9
HCM LOS			C

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	452	-	-	-	360
HCM Lane V/C Ratio	-	-	-	-	0.377
HCM Control Delay (s)	0	-	-	-	20.9
HCM Lane LOS	A				C
HCM 95th %tile Q(veh)	0	-	-	-	1.714

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2035 Total - Option 1
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	276	1523	570	167	870	110	317	130	98	172	125	133
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	2	1	1	2	1	1
Cap, veh/h	403	1765	937	219	1650	819	406	268	345	256	187	324
Arrive On Green	0.10	0.47	0.47	0.07	0.44	0.44	0.12	0.14	0.14	0.07	0.10	0.10
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	3442	1863	1583	3442	1863	1583
Grp Volume(v), veh/h	291	1603	600	176	916	116	334	137	103	181	132	140
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1721	1863	1583	1721	1863	1583
Q Serve(g_s), s	7.9	38.2	23.9	5.1	17.4	3.7	9.1	6.5	5.2	4.9	6.6	7.4
Cycle Q Clear(g_c), s	7.9	38.2	23.9	5.1	17.4	3.7	9.1	6.5	5.2	4.9	6.6	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	403	1765	937	219	1650	819	406	268	345	256	187	324
V/C Ratio(X)	0.72	0.91	0.64	0.80	0.56	0.14	0.82	0.51	0.30	0.71	0.71	0.43
Avail Cap(c_a), veh/h	420	1765	937	236	1650	819	466	268	345	466	213	347
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.9	23.3	12.9	21.6	19.8	12.1	41.4	38.0	31.4	43.4	41.8	33.3
Incr Delay (d2), s/veh	5.8	8.4	3.4	16.9	1.4	0.4	10.1	1.6	0.5	3.6	8.8	0.9
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 Back of Q (50%), veh/ln	3.5	17.6	8.4	5.1	7.6	1.3	4.5	3.1	2.0	2.2	3.5	2.9
Lane Grp Delay (d), s/veh	20.6	31.7	16.2	38.5	21.1	12.4	51.5	39.6	31.9	47.0	50.6	34.2
Lane Grp LOS	C	C	B	D	C	B	D	D	C	D	D	C
Approach Vol, veh/h		2494			1208			574			453	
Approach Delay, s/veh		26.7			22.8			45.1			44.1	
Approach LOS		C			C			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	15.0	53.0		12.1	50.0		16.3	18.8		12.1	14.6	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		5.0	5.0	
Max Green Setting (Gmax), s	11.0	45.5		8.0	42.5		13.0	11.0		13.0	11.0	
Max Q Clear Time (g_c+I1), s	9.9	40.2		7.1	19.4		11.1	8.5		6.9	9.4	
Green Ext Time (p_c), s	0.1	5.0		0.0	19.4		0.2	0.6		0.3	0.2	
Intersection Summary												
HCM 2010 Ctrl Delay			29.6									
HCM 2010 LOS			C									
Notes												

Intersection

Intersection Delay, s/veh 8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	2	100	232	2	30	100	161	255	29	98	5
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									
Storage Length	0	-	-	0	-	-	100	-	0	150	-	-
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	5	2	109	252	2	33	109	175	277	32	107	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	582	564	109	620	567	175	112	0	0	175	0	0
Stage 1	172	172	-	392	392	-	-	-	-	-	-	-
Stage 2	410	392	-	228	175	-	-	-	-	-	-	-
Follow-up Headway	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Capacity-1 Maneuver	424	435	945	400	433	868	1478	-	-	1401	-	-
Stage 1	830	756	-	633	606	-	-	-	-	-	-	-
Stage 2	619	606	-	775	754	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-	-	-	-
Mov Capacity-1 Maneuver	377	394	945	327	392	868	1478	-	-	1401	-	-
Mov Capacity-2 Maneuver	377	394	-	327	392	-	-	-	-	-	-	-
Stage 1	769	739	-	586	561	-	-	-	-	-	-	-
Stage 2	550	561	-	668	737	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	9.8			23.3			1.5			1.7		
HCM LOS	A			C								

Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR		
Capacity (veh/h)	1478	-	-	377	899	327	396	1401	-	-		
HCM Lane V/C Ratio	0.074	-	-	0.01	0.125	0.514	0.3	0.022	-	-		
HCM Control Delay (s)	7.629	-	-	14.6	9.6	27.1	17.9	7.629	-	-		
HCM Lane LOS	A			B			A			D		
HCM 95th %tile Q(veh)	0.238	-	-	0.029	0.428	2.784	1.242	0.069	-	-		

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	1793	1060	117	0	87
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1949	1152	127	0	95

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1152	0	576
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	602	-	460
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	602	-	460
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	14.8
HCM LOS			B

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	602	-	-	-	460
HCM Lane V/C Ratio	-	-	-	-	0.206
HCM Control Delay (s)	0	-	-	-	14.8
HCM Lane LOS	A				B
HCM 95th %tile Q(veh)	0	-	-	-	0.764

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2035 Total - Option 2
 AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	206	614	300	150	1270	80	768	135	67	210	111	192
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	2	1	1	2	1	1
Cap, veh/h	252	1342	935	340	1323	677	860	480	526	284	205	317
Arrive On Green	0.10	0.36	0.36	0.07	0.35	0.34	0.25	0.26	0.26	0.08	0.11	0.11
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	3442	1863	1583	3442	1863	1583
Grp Volume(v), veh/h	212	633	309	155	1309	82	792	139	69	216	114	198
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1721	1863	1583	1721	1863	1583
Q Serve(g_s), s	7.5	13.1	9.9	5.6	34.9	3.1	22.4	6.0	3.0	6.1	5.8	11.0
Cycle Q Clear(g_c), s	7.5	13.1	9.9	5.6	34.9	3.1	22.4	6.0	3.0	6.1	5.8	11.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	252	1342	935	340	1323	677	860	480	526	284	205	317
V/C Ratio(X)	0.84	0.47	0.33	0.46	0.99	0.12	0.92	0.29	0.13	0.76	0.56	0.63
Avail Cap(c_a), veh/h	252	1342	935	350	1323	677	860	480	526	344	205	317
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.0	24.6	10.4	19.4	32.1	17.3	36.5	29.8	23.3	44.9	42.2	36.6
Incr Delay (d2), s/veh	22.0	1.2	0.9	1.0	22.4	0.4	15.0	0.3	0.1	7.8	3.3	3.8
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 Back of Q (50%), veh/ln	6.7	5.8	3.4	2.3	19.2	1.2	11.1	2.8	1.1	2.9	2.9	4.6
Lane Grp Delay (d), s/veh	46.0	25.8	11.4	20.3	54.5	17.6	51.5	30.1	23.4	52.7	45.5	40.4
Lane Grp LOS	D	C	B	C	D	B	D	C	C	D	D	D
Approach Vol, veh/h		1154			1546			1000			528	
Approach Delay, s/veh		25.7			49.1			46.6			46.5	
Approach LOS		C			D			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	14.0	43.5		12.5	42.0		28.0	30.7		13.3	16.0	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		5.0	5.0	
Max Green Setting (Gmax), s	9.0	35.5		8.0	34.5		23.0	24.0		10.0	11.0	
Max Q Clear Time (g_c+I1), s	9.5	15.1		7.6	36.9		24.4	8.0		8.1	13.0	
Green Ext Time (p_c), s	0.0	13.7		0.0	0.0		0.0	2.0		0.1	0.0	
Intersection Summary												
HCM 2010 Ctrl Delay			41.8									
HCM 2010 LOS			D									
Notes												

Intersection

Intersection Delay, s/veh 5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	2	45	267	2	22	25	77	319	41	201	5
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									
Storage Length	0	-	-	0	-	-	100	-	0	150	-	-
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	5	2	49	290	2	24	27	84	347	45	218	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	461	448	221	474	451	84	224	0	0	84	0	0
Stage 1	310	310	-	138	138	-	-	-	-	-	-	-
Stage 2	151	138	-	336	313	-	-	-	-	-	-	-
Follow-up Headway	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Capacity-1 Maneuver	511	506	819	501	504	975	1345	-	-	1513	-	-
Stage 1	700	659	-	865	782	-	-	-	-	-	-	-
Stage 2	851	782	-	678	657	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-	-	-	-
Mov Capacity-1 Maneuver	478	481	819	452	479	975	1345	-	-	1513	-	-
Mov Capacity-2 Maneuver	478	481	-	452	479	-	-	-	-	-	-	-
Stage 1	686	639	-	848	766	-	-	-	-	-	-	-
Stage 2	811	766	-	616	637	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	10.2			17.1			0.5			1.2		
HCM LOS	B			C								

Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR	
Capacity (veh/h)	1345	-	-	478	778	452	505	1513	-	-	
HCM Lane V/C Ratio	0.02	-	-	0.008	0.068	0.428	0.243	0.029	-	-	
HCM Control Delay (s)	7.732	-	-	12.6	10	18.8	14.4	7.452	-	-	
HCM Lane LOS	A			B		C		B			A
HCM 95th %tile Q(veh)	0.062	-	-	0.023	0.218	2.108	0.945	0.091	-	-	

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	891	1350	148	0	150
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	968	1467	161	0	163

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1467	0	734
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	456	-	363
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	456	-	363
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	22.8
HCM LOS			C

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	456	-	-	-	363
HCM Lane V/C Ratio	-	-	-	-	0.449
HCM Control Delay (s)	0	-	-	-	22.8
HCM Lane LOS	A				C
HCM 95th %tile Q(veh)	0	-	-	-	2.245

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
 3: Lowell Blvd./Bonanza Drive & E. Baseline Road

2035 Total - Option 2
 PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	308	1504	570	181	888	115	313	144	97	221	135	152
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	2	1	1	2	1	1
Cap, veh/h	402	1739	923	226	1615	828	400	252	339	308	202	350
Arrive On Green	0.11	0.47	0.47	0.08	0.43	0.43	0.12	0.14	0.14	0.09	0.11	0.11
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	3442	1863	1583	3442	1863	1583
Grp Volume(v), veh/h	324	1583	600	191	935	121	329	152	102	233	142	160
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1721	1863	1583	1721	1863	1583
Q Serve(g_s), s	9.2	38.6	25.0	5.8	18.6	3.9	9.2	7.5	5.3	6.5	7.2	8.6
Cycle Q Clear(g_c), s	9.2	38.6	25.0	5.8	18.6	3.9	9.2	7.5	5.3	6.5	7.2	8.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	402	1739	923	226	1615	828	400	252	339	308	202	350
V/C Ratio(X)	0.81	0.91	0.65	0.84	0.58	0.15	0.82	0.60	0.30	0.76	0.70	0.46
Avail Cap(c_a), veh/h	402	1739	923	231	1615	828	456	252	339	456	209	355
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	24.2	13.7	22.0	21.0	12.1	42.3	39.9	32.4	43.6	42.2	33.1
Incr Delay (d2), s/veh	11.4	8.6	3.5	23.4	1.5	0.4	10.4	4.0	0.5	4.1	9.7	0.9
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 Back of Q (50%), veh/ln	5.3	18.1	8.9	6.0	8.1	1.3	4.5	3.7	2.0	3.0	3.9	3.3
Lane Grp Delay (d), s/veh	27.9	32.9	17.3	45.4	22.5	12.4	52.8	43.9	32.8	47.7	51.9	34.0
Lane Grp LOS	C	C	B	D	C	B	D	D	C	D	D	C
Approach Vol, veh/h		2507			1247			583			535	
Approach Delay, s/veh		28.5			25.0			47.0			44.7	
Approach LOS		C			C			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	16.0	53.3		12.7	50.0		16.4	18.3		13.8	15.7	
Change Period (Y+Rc), s	5.0	7.5		5.0	7.5		5.0	5.0		5.0	5.0	
Max Green Setting (Gmax), s	11.0	45.5		8.0	42.5		13.0	11.0		13.0	11.0	
Max Q Clear Time (g_c+I1), s	11.2	40.6		7.8	20.6		11.2	9.5		8.5	10.6	
Green Ext Time (p_c), s	0.0	4.6		0.0	18.5		0.2	0.4		0.3	0.1	
Intersection Summary												
HCM 2010 Ctrl Delay			31.6									
HCM 2010 LOS			C									
Notes												

Intersection

Intersection Delay, s/veh 11

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	2	100	311	2	38	100	158	309	32	97	5
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									
Storage Length	0	-	-	0	-	-	100	-	0	150	-	-
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	5	2	109	338	2	41	109	172	336	35	105	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	589	567	108	622	569	172	111	0	0	172	0	0
Stage 1	178	178	-	389	389	-	-	-	-	-	-	-
Stage 2	411	389	-	233	180	-	-	-	-	-	-	-
Follow-up Headway	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Capacity-1 Maneuver	420	433	946	399	432	872	1479	-	-	1405	-	-
Stage 1	824	752	-	635	608	-	-	-	-	-	-	-
Stage 2	618	608	-	770	750	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-	-	-	-
Mov Capacity-1 Maneuver	369	391	946	# 326	390	872	1479	-	-	1405	-	-
Mov Capacity-2 Maneuver	369	391	-	# 326	390	-	-	-	-	-	-	-
Stage 1	763	733	-	588	563	-	-	-	-	-	-	-
Stage 2	543	563	-	663	731	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	9.8			30.4			1.3			1.8		
HCM LOS	A			D								

Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR	
Capacity (veh/h)	1479	-	-	369	899	326	392	1405	-	-	
HCM Lane V/C Ratio	0.073	-	-	0.01	0.125	0.691	0.398	0.025	-	-	
HCM Control Delay (s)	7.627	-	-	14.9	9.6	37.5	20.1	7.627	-	-	
HCM Lane LOS	A			B		A		E		C	
HCM 95th %tile Q(veh)	0.238	-	-	0.03	0.428	4.849	1.868	0.076	-	-	

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	1822	1050	138	0	134
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1980	1141	150	0	146

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1141	0	571
Stage 1	-	-	1141
Stage 2	-	-	990
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	608	-	464
Stage 1	-	-	267
Stage 2	-	-	320
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	608	-	464
Mov Capacity-2 Maneuver	-	-	42
Stage 1	-	-	267
Stage 2	-	-	320

Approach	EB	WB	SB
HCM Control Delay, s	0	0	16.3
HCM LOS			C

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	608	-	-	-	464
HCM Lane V/C Ratio	-	-	-	-	0.314
HCM Control Delay (s)	0	-	-	-	16.3
HCM Lane LOS	A				C
HCM 95th %tile Q(veh)	0	-	-	-	1.328

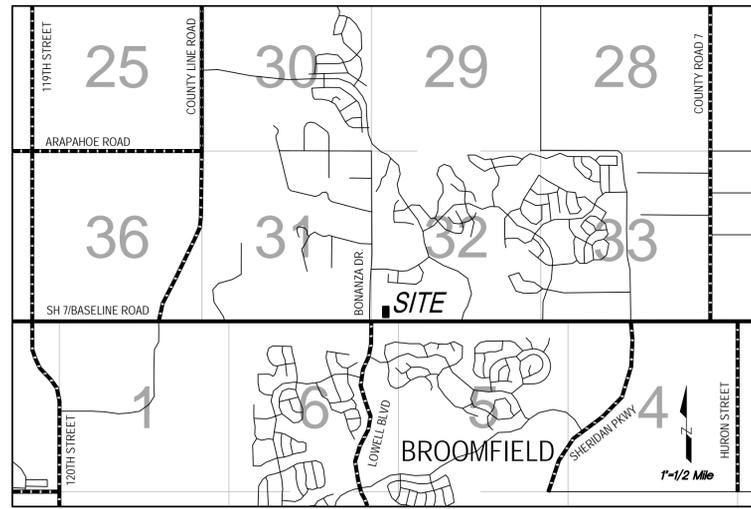
Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

ALTA/NSPS LAND TITLE SURVEY

LOT 5, "VISTA RIDGE FILING NO. 6 2ND AMENDMENT"

LOCATED IN THE SOUTHWEST QUARTER OF SECTION 32,
TOWNSHIP 1 NORTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN,
TOWN OF ERIE, COUNTY OF WELD, STATE OF COLORADO



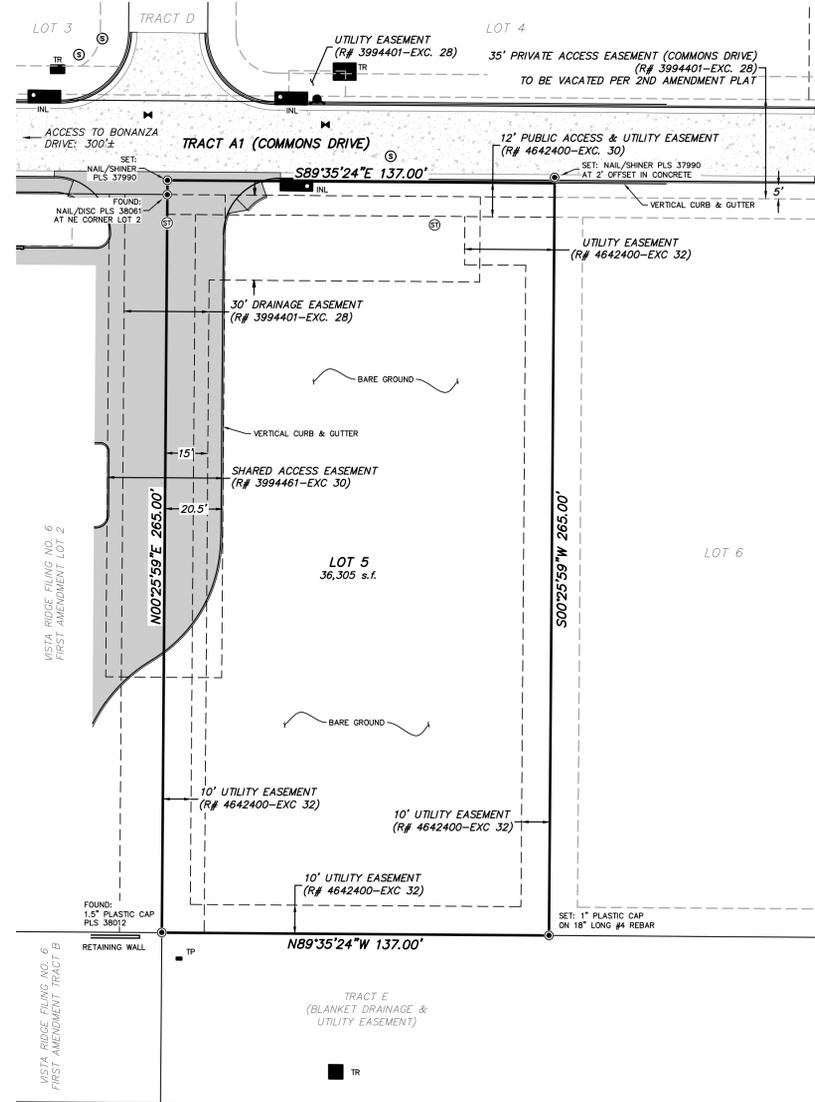
VICINITY MAP

COMMITMENT NOTES:

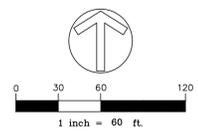
THIS SURVEY IS BASED UPON TITLE COMMITMENT NO. AB025143871-12, PREPARED BY LAND TITLE GUARANTEE COMPANY, WITH AN EFFECTIVE DATE OF 10/28/20. THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH OR EASEMENT RESEARCH BY HURST & ASSOCIATES. RATHER, ALL INFORMATION REGARDING TITLE AND EASEMENT MATTERS SHOULD BE OBTAINED FROM THE TITLE COMMITMENT. UNLESS OTHERWISE NOTED, ALL EXCEPTIONS LISTED AFFECT THE SUBJECT BY BEING INCLUDED IN DESCRIPTIONS CONTAINED IN DOCUMENT.

(EXCEPTIONS 1 THROUGH 8 ARE STANDARD EXCEPTIONS AND CANNOT BE SHOWN)
(EXCEPTIONS 16, 25, 26 AND 33 ARE INTENTIONALLY DELETED)

SCHEDULE B SECTION 2 EXCEPTIONS				
EXC. NO.	DOCUMENT	DATE	RECEPTION NO.	NOTES
9	DEED	06/27/1972	1592499	NOTHING TO SHOW
10	OIL AND GAS LEASE	09/18/1981	1868894	NOTHING TO SHOW
11	OIL AND GAS LEASE	11/16/1981	1874598	NOTHING TO SHOW
12	NOTICE	01/24/1991	2239296	NOTHING TO SHOW
13	NOTICE	10/01/1981	1870705	NOTHING TO SHOW
14	GENERAL DESCRIPTION	08/31/1984	1979784	NOTHING TO SHOW
15	NOTICE	04/10/1989	2145917	NOTHING TO SHOW
17	ORDINANCE NO. 696	08/30/2000	2790549	NOTHING TO SHOW; ZONES PROPERTY TO "PD" (PLANNED DEVELOPMENT)
18	ORDINANCE NO. 704 ANNEXATION MAP	08/30/2000 09/15/2000	2790550 2793939	NOTHING TO SHOW
19	ANNEXATION AGMT	09/15/2000 12/08/2000	2793930 2812291	NOTHING TO SHOW
20	ORDER AND DECREE NOTICE NOTICE NOTICE NOTICE NOTICE NOTICE NOTICE NOTICE RESOLUTION RESOLUTION	01/08/2001 09/20/2010 03/16/2012 05/21/2013 03/18/2014 08/20/2014 07/21/2016 02/16/2017 10/31/2018	2817763 3719463 3832301 3933756 4002991 4039882 4061805 42211721 4279108 4442712	NOTHING TO SHOW
21	DEVELOPMENT PLAN AMENDMENT NO. 4 AMENDMENT NO. 5 AMENDMENT NO. 6	09/15/2000 03/03/2011 11/26/2012 11/25/2013	2793940 3753956 3890727 3980214	NOTHING TO SHOW
22	DEVELOPMENT AGMT	12/04/2001	2905896	NOTHING TO SHOW
23	DEVELOPMENT PLAN AMENDMENT NO. 1	02/27/2002	2928673	NOTHING TO SHOW
24	SURFACE USE AGMT AMENDMENT	08/21/2002 07/06/2020	2980279 4605131	NOTHING TO SHOW
27	VISTA RIDGE FILING NO. 6 PLAT	05/19/2008	3555044	NOTHING TO SHOW, NO EASEMENTS CREATED BY PLAT
28	VISTA RIDGE FILING NO. 6 FIRST AMEND. PLAT	02/05/2014	3994401	EASEMENTS SHOWN
29	DEVELOPMENT AGMT	02/05/2014	3994402	NOTHING TO SHOW
30	DECLARATION OF COVENANTS	02/05/2014	3994461	NOTHING TO SHOW, SEE GENERAL NOTE 8
31	DECLARATION OF USE RESTRICTION	02/05/2014	3994463	NOTHING TO SHOW
32	VISTA RIDGE FILING NO. 6 2ND AMENDMENT PLAT	10/21/2020	4642400	EASEMENTS SHOWN
34	DEVELOPMENT AGMT	10/21/2020	4642394	NOTHING TO SHOW



LEGEND	
⊙	Sanitary Sewer Manhole
⊕	Storm Sewer Manhole
⚡	Fire Hydrant
⊕	Water Valve
INL	Inlet
TP	Telephone Pedestal
TR	Transformer
▨	Asphalt
■	Concrete



PARCEL DESCRIPTION:

LOT 5, VISTA RIDGE FILING NO. 6, 2ND AMENDMENT, ACCORDING TO THE PLAT THEREOF RECORDED OCTOBER 21, 2020 UNDER RECEPTION NO. 4642400, COUNTY OF WELD, STATE OF COLORADO

GENERAL NOTES:

- NOTICE: ACCORDING TO COLORADO LAW, YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.
- BASIS OF BEARINGS: BEARINGS ARE BASED ON THE EASTERLY LINE OF LOT 2 OF VISTA RIDGE FILING NO. 6 FIRST AMENDMENT, ASSUMED N00°25'59"E BETWEEN THE SOUTHEAST CORNER (1.5" PLASTIC CAP, PLS 38012) AND THE NORTHEAST CORNER (NAIL/DISC PLS 38061 SET IN CONCRETE).
- PROPERTY CORNERS ARE MONUMENTED AS SHOWN.
- NO BUILDINGS EXISTING ON THE SURVEYED PROPERTY.
- ACCESS TO PUBLIC RIGHT OF WAY IS VIA PRIVATE DRIVES: TRACTS A1 (COMMONS DRIVE) AND TRACT C (COMMONS WAY) AS DEDICATED BY VISTA RIDGE FILING NO. 6 2ND AMENDMENT. THERE ARE CURRENTLY NO CURB CUTS IN EXISTING VERTICAL CURB & GUTTER.
- THERE IS NO POSTED ADDRESS FOR SURVEYED PROPERTY.
- PER THE VISTA RIDGE FILING NO. 6 FIRST AMENDMENT: DUE TO THE PROXIMITY OF THE PROPERTY TO THE ERIE MUNICIPAL AIRPORT, THERE WILL BE AIRCRAFT PASSING OVER THE PROPERTY. AIRCRAFT PASSAGE MAY RESULT IN NOISE AND OTHER IMPACTS ON THE PROPERTY. AIRCRAFT MAY CROSS PROPERTY AT LOW ALTITUDE IN ACCORDANCE WITH FAA REGULATIONS. THE FREQUENCY OF AIRCRAFT PASSING OVER THE PROPERTY MAY INCREASE IN THE FUTURE. THE OWNERS, THEIR HEIRS, SUCCESSORS AND ASSIGNS, SPECIFICALLY ACKNOWLEDGE THE RIGHT OF PASSAGE OVER THE PROPERTY FOR AIRCRAFT AND AGREE TO HOLD HARMLESS THE TOWN OF ERIE FOR AIRCRAFT OPERATIONS.
- THE DECLARATION OF COVENANTS RECORDED 02/05/2014 AT RECEPTION NO. 3994461 (EXCEPTION NO. 30) GRANTS RECIPROCAL ACCESS & UTILITY EASEMENTS ACROSS FUTURE PAVED AREAS AND WALKWAYS. TRACT A1 (COMMONS DRIVE) CREATED BY THE 2ND AMENDMENT PLAT HAS A BLANKET PUBLIC ACCESS AND UTILITY EASEMENT.
- ABOVE GROUND UTILITIES ARE SHOWN. BURIED UTILITIES SHOULD BE LOCATED PRIOR TO ANY EXCAVATION.
- ALL LINEAR DISTANCES ARE IN U.S. SURVEY FEET.

SURVEY CERTIFICATION:

CERTIFIED TO:
BONANZA DRIVE DEVELOPMENT CORPORATION, A COLORADO CORPORATION
AUTOWASH VISTA RIDGE REAL ESTATE LLC, A COLORADO LIMITED LIABILITY COMPANY
LAND TITLE GUARANTEE COMPANY
OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 4, 8 & 14 OF TABLE A THEREOF. THE FIELDWORK WAS COMPLETED 11/05/20.

DATE OF PLAT OR MAP: 11/06/20



FOR AND ON BEHALF OF HURST AND ASSOCIATES:
BO BAIZE, COLORADO PLS NO. 37990
EMAIL ADDRESS: bo@hurst-assoc.com

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

NO.	DESCRIPTION	DATE	BY

HURST
CIVIL ENGINEERING
PLANNING
SURVEYING

HURST & ASSOCIATES, INC.
2500 Broadway, Suite B
Boulder, CO 80304
303.449.9105

ALTA/NSPS LAND TITLE SURVEY
LOT 5, "VISTA RIDGE FILING NO. 6 2ND AMENDMENT"
ERIE, COLORADO

DRAWN BY:	BO
DESIGNED BY:	BO
APPROVED BY:	BO
JOB NUMBER:	2142-04
DATE:	11/06/20
SCALE:	1"=30'
SHEET NO.:	1 OF 1

Autowash

Project and Company Summary

2033 Central Park Blvd., Denver, CO 80238

October 2016



The information in this plan is confidential and proprietary. This information is not for public use and may not be shared without prior consent of Autowash. This information may not be used to establish a competing wash within 200 miles of an existing Autowash location.

Executive Summary

The Company

Autowash began operations in 2013 with the first location in Stapleton. Autowash's expertise in operations and marketing has proven to be successful for startups and take overs projects as well.

Autowash builds and operates car wash facilities in the Denver Metro Area that include the latest technology in automobile cleaning and dog grooming. Autowash facilities are designed to provide the community with an amenity that is necessary and provides value to the community.

Managed by the General Partners, Dennis & Erin Dreeszen, Autowash has experienced developers and entrepreneurs with business savvy and strong financial and managerial experience. Autowash currently operates five locations and will be building its 5th and 6th locations in the coming months. All locations are corporate owned and are not franchise locations.

The environmentally friendly design and operating principles of the Stapleton Autowash facilities reflect our community's commitment to sustainability. As a result, Stapleton residents have given this family-owned business their enthusiastic support and approval.

-Tom Gleason, VP of Public Relations, Forest City

The Market

Colorado's weather (snow and sunshine) make it the ideal and necessary environment to operate a car wash. The market for Autowash carwash locations includes the three-mile radius surrounding a given site.

The market for all project sites are underserved. Traditional car washes are older and use low quality equipment, are not well maintained or cleaned. Poor lighting and bland designs cause these facilities to become unsafe and undesirable. Almost all of the older car washes are in disrepair, are extremely dirty and contain poor equipment. Autowash Car Washes provide a cleaner, newer, safer and higher-quality facility for users to clean their vehicles with a more convenient location.

The Product

Autowash car washes are defined by the quality of our product, brand identity, consistency of our service, and optimum locations. The combination of building architecture, site layout and appearance, state-of-the-art equipment, service choices, and chemicals all define the Autowash experience. Customers can expect a predictable service at each location across the city because the same care and attention is applied to each site.

Operations

Staff have been developed to provide daily maintenance of the wash, spending 40 hours weekly (two 20-hour work weeks) following a detailed checklist program to keep the sites clean and in operating order. Phone systems have been created to handle customer calls efficiently across all sites.

Branding/Marketing

Autowash focuses on branding, marketing and community outreach. With years of sales experience, operations and development, Dennis & Erin leverage their knowledge with marketing campaigns to capture the interests of the community near each wash location. The marketing includes using the grocery stores, shopping centers, direct mail and more for advertising and brand management. In addition, guerilla marketing techniques may be used to improve community awareness as needed. A major component of the Autowash is raising money for local schools through fundraisers and direct giving.

Green Initiatives

Each new location that Autowash develops include several green initiatives including at least 10% renewable energy resources (solar); 100% LED lighting; at least 30% reclaimed water; green construction methods and other LEED initiatives, and natural gas conservation methods. In addition, Autowash is developing an educational program to inform communities about the hazards of washing vehicles in driveways and other areas where contaminated runoff enters storm water systems that lead to lakes and streams ultimately damaging our delicate Colorado ecosystems.

Autowash has three distinct advantages that separate us from our competitors.

- Superior products and facilities
- A proven Brand and coveted service level
- Industry-leading site maintenance and repair program

Thank you for taking time to review the opportunity and we Autowash can be a part of your community.

Autowash, LLLP

The Company

Company History

Autowash, LLLP is a venture organized to build and operate state-of-the-art car washes in the Denver Metro Area. Autowash began researching different car wash operations in 2005 and was founded with a commitment to form a first class business and to create a long-term investment opportunity for partners. Our years of research resulted in choosing a consultant who has opened more than 100 car wash facilities to help develop our service and maintenance plans for Autowash.

We successfully planned and developed Autowash @ Stapleton located in Denver on time and on budget. Construction began on September 10, 2012 and was completed March 15, 2013. **We are currently operating the facility ahead of projected performance for the third year in a row.**

Autowash @ Fox Hill in southeast Aurora became our second wash when we acquired the 7-year-old wash and re-branded it to Autowash and applied our model of operations and marketing to the site. **Our first take-over project has proven to be a successful one, increasing revenues by 50% in the first two years.**

Autowash @ Northfield is our 3rd location built in the fast growing neighborhood north of I-70. This location opened in June of 2015.

Company Goals and Objectives

In the coming months the Autowash intends to begin building two carwashes with each open for business in a strong demographically-supported location within 18 months. Autowash will cross-market with all adjacent businesses.

Company Management Structure

Autowash carwashes are managed and operated by Dennis and Erin Dreeszen and employ/outsourced staff to provide both customer service liaison and maintenance services. We have also created a strategic partnership with Comtec Wash Systems, Inc. to provide support and operations assistance/guidance as well as repair and maintenance of the car washes.

Management and Ownership Background

Erin I. Dreeszen, co-founder of Autowash, is currently a manager and operator of Autowash and continues to be an Assistant Principal with Denver Public Schools and Denver School of Science and Tech. Mrs. Dreeszen's administrative experience, organization and leadership ability will provide management support as well as community support initiatives.

Mrs. Dreeszen has her Bachelors in Elementary Education from the University of Nevada Las Vegas. She earned her Master's in Teacher Leaderships and Administration from Regis University in Denver, Colorado and is currently studying for her Ph.D. in Leadership and Educational Equity.

Dennis L. Dreeszen, CPA is the co-founder of Autowash, and is currently a manager and operator of Autowash, which began operations three years ago. Mr. Dreeszen is a CPA and holds a Master's degree in Management Information Systems and a BS in Business Administration from Friends University in Wichita, Kansas. Mr. Dreeszen has 15 years of experience in management, financial, taxation, sales and entrepreneurship. Additionally, Mr. Dreeszen has worked in a variety of positions including three years managing Convenience Stores/Fuel Stations in Wichita, Kansas, He also was self-employed for more than seven years in financial services and sales.

Mr. Dreeszen has also served as a member on the Stapleton Community Advisory Board (CAB) and volunteered as an Assistant Baseball Coach at Manual High School in Denver. He volunteers for the YMCA to coach and teach baseball as well as volunteering for clinics to teach baseball fundamentals.

The Product

The Product

Autowash will provide local high quality car wash facilities for the Greater Denver Area.

The type of carwash will be a combination of Automatic Rollover (Touchless) Bays and Self-Serve Wand Bays. The wash will have **three** automatic bays and **three** self-serve bays.

The design of the car wash is intended to blend-in to the current architecture of each area; a mix of modern and traditional styles. By creating projects that are open, stylish, accessible and well lighted, we create an atmosphere of professionalism and comfort for customers and emphasize a higher quality product and service.



Types of Washes

There are several types of wash systems. The equipment for this business will house three (3) Automatic Kärcher machines and three (3) Self Service stalls, all with credit card acceptance and state of the art technology.

Touchless Automatics

Kärcher is the gold standard of modern car washes worldwide; the pinnacle of design, engineering and cleaning. A Kärcher automatic car wash is designed to clean first and foremost. Kärcher engineering has built the type of wash that keeps the most demanding customers coming back. Kärcher's emphasis on cleaning guarantees the best touch free cleaning when compared to any other touchless car wash system on the market today. Kärcher's technology allows the machine to get closer to the vehicle surface than ever



thought possible. Hotter water and more water pressure means better cleaning and more highly-satisfied customers.

Autowash	
Superior Plus	\$15.00
All the benefits of the Superior wash with the premium upgrade Premium grade foam wash Premium Undercarriage Spray & Pressure Protection Premium Pre-Dryer Complete Wax Application Complete Final Rinse	
Superior	\$12.00
Undercarriage Spray - Double Pre-Dry - Wheel Doctor Control High Pressure Rinse - Clear Coat Shine - Spot-Free Rinse Control Dry	
Complete	\$10.00
Undercarriage Spray - Double Pre-Dry - Wheel Doctor High Pressure Rinse - Clear Coat Shine - Spot-Free Rinse Control Dry	
Essential	\$8.00
Undercarriage Spray - Double Pre-Dry - Wheel Doctor High Pressure Rinse - Clear Coat Shine - Spot-Free Rinse	

Proper Maintenance and upkeep are necessary on the automated equipment. As with any machine, a good indicator as to the longevity of the equipment is in the amount of care and Preventative Maintenance (PM) performed over time. Provided with the Kärcher equipment are manuals for all aspects of the Kärcher Machines, as well as a "PM Checklist" by day, week, month, and year, designed to help Autowash stay in front of the curve. Furthermore, Autowash also has access to a fully-trained technical team that offers phone support around the clock to keep our machines running smoothly. There are many automatics almost a decade old that are operating at the same high level that they did at install.

Self Service

The Self Service Bays will utilize credit card payment systems, tri-colored foam washes, high power pumps for maximum water flow and hot water to maintain the effectiveness of the wash.

Autowash self-serve bays offer all of the following:



- 1) High pressure wash (at least 1200 psi).
- 2) High pressure rinse.
- 3) Presoak option.
- 4) Tri-color Foamy Brush option.
- 5) Tri-color Foam Clear Coat Conditioner (low pressure)
- 6) Tire & Engine option.
- 7) Wax option.
- 8) Mag Chloride Remover (low pressure foam)
- 9) Bug Remover (low pressure foam)
- 10) Spot Free Rinse option.
- 11) Air Shammee® Blow Dryer

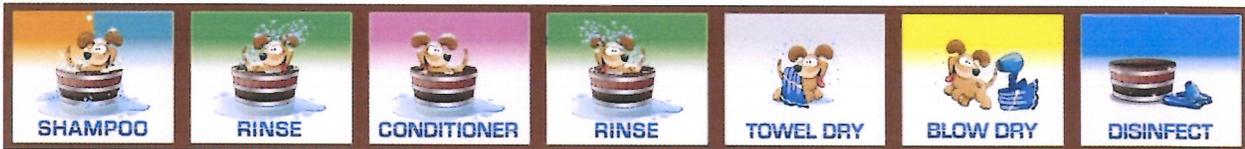
Autowash stresses the importance of ``consistency`` with wash performance. Each wash will be built with equipment designed to perform during all seasons of the year and will use effective chemistry for both hot and cold seasons. Each bay is equipped with four (4) devices to help customers clean their vehicles, including the high pressure wand, low pressure applicator, foaming brush, and blow dryer. Multiple items keep the customer in the bay longer increasing revenues per customer and increasing loyalty.

Dog Wash

In addition to washing cars, pets are a big part of our success model. Autowash will have two dog wash bays to provide Self-Serve Dog Washing Facilities. The K9000/Evolution units have a similar system to the Self-Serve bays and allows use of credit card or cash to pay for the washes.

The K9000 unit is the best unit available in the industry, providing the best filter system and overall construction compared to its competitors.

The dog wash receives glowing reviews from customers after they use the wash for the first time. Our goal is getting customers to use it the first time. The tokens provide great opportunities to let people try it once. Attendants are instructed/coached to hand out tokens to car wash customers they see with their dog, or customers that are curious about the wash.



SWOT Analysis (Strengths/Weaknesses/Opportunities/Threats)

Strengths

Autowash has selected locations that offer quick access, convenience, and safety for our customers. In addition, the quality of the equipment selected for the car wash is the best available. Users will be able to pay with credit card in the hand-wash bays; a feature that is not offered by most competitors. Plus, each bay has twice as many devices per bay keeping customers happily cleaning their cars longer.

The Autowash brand is already recognized in Denver as providing a terrific car wash. The business has been able to pull customers from other washes and also attract customers from farther away due to the superior wash facilities and equipment. Some customers have even dubbed us a "Best Car Wash in Denver".

Autowash equipment maintenance is a primary strength. The equipment has a lot of moving parts that needs to be maintained diligently. To prevent malfunctions and break downs, rigid maintenance and upkeep is necessary. Following scheduled maintenance and reacting immediately is vital to preventing malfunctions and break downs. Each site has fixed maintenance and repair overhead provided by Comtec increasing the up-time for each machine as well as making the costs of repairs predictable and manageable.

- Great location selection is at the heart of the development
- Aesthetic architecture is appealing and adds a level of comfort to customers
- Commitment to community service and involvement
- Management with extensive business education and experience
- The Autowash brand has a reputation for providing top-quality facilities and top-quality customer service.
- Fixed maintenance and part costs with scheduled preventative maintenance.

Opportunities

The Denver area is expected to continue to grow for the next 15 years or more. The daily traffic count of cars in each area is estimated to increase over the next 5 to 7 years. The developing areas will add additional housing, shopping and amenities which will drive increased vehicle traffic by our sites.

The sites are being constructed adjacent high-volume retail centers providing opportunities for cross-marketing and promotions.

Employees of nearby businesses also create an additional market of customers for the wash. Many people will wash their car near their job as a point of convenience. In addition to employees, many businesses need to wash company vehicles and will use the wash for the same reasons.

Uber, Lyft and other new opportunities for provide repeat customers as well. Drivers are using their personal vehicle and are encouraged to keep them clean so they get better reviews to grow their business.

- Strong Demographics
- Lack of competition
- Nearby major employment centers increase volume.
- High likelihood of repeat business.
- Decreasing fixed costs as a percentage of an individual sales with increasing sales volume
- Local industry and businesses can use fleet accounts for volume discounts on car washes for their employees and service vehicles.

Operations

Daily Operations

Autowash operates a 24-hour facility, 7 days a week. Trash and supplies are checked and site maintenance is performed daily (up to 8 hours a day). A normal business-day will include a morning checklist of duties being completed plus an afternoon checklist of duties being completed.

Operational Facilities

Autowash utilizes an approximate 44,000 square foot, pad site for each wash and will construct three manual bays, three automatic bays, and two dog wash bays along with vacuums on each site. Each wash has a capacity of 98,550 cars and 14,000 dogs annually.

Staffing

The General Partners, Dennis and Erin Dreeszen will manage the operations of the wash. Duties will include monitoring the daily duty-checklists as well as performing weekly maintenance and facility upkeep. Two part-time staff persons will be employed to perform the daily duty-checklists and provide customer service on each site. Their job will be to make sure that customers are maximizing their experience at the wash, offering advice for vehicle maintenance, providing change, and greeting the customers. Each site will be staffed for approximately 5 hours each day. 11am to 4 pm is typical however schedules are flexible. Part-time staffing will be outsourced to Comtec Wash Systems for management of time-off, benefits, insurance, etc.



385 INVERNESS PARKWAY, SUITE 190
ENGLEWOOD, CO 80112
(720) 773-2800

10 March, 2021

Town of Erie
Attn: Chris LaRue
645 Holbrook St
PO Box 750
Erie, CO 80516

RESPONSE LETTER

RE: Autowash at Vista Ridge
530 Commons Drive
Erie, CO 80516

PLANNING SUBMITTAL #1

GENERAL

Reviewer: Chris LaRue

1. A Neighborhood meeting is required to be held prior to scheduling of the Site Plan and Special Review Use for Planning Commission and Board of Trustees hearings. Please reference the Town of Erie Unified Development Code (UDC) section 10.7.2.D for neighborhood meeting specifics. You can find this section by following the below link and searching for the noted section:

<https://www.erieco.gov/DocumentCenter/View/351/Unified-Development-Code-UDC?bidId=>

1. Some general information:
 - i. You, as the applicant, are responsible for mailing the notices & posting the property.
 - ii. The Town of Erie will provide the signage.
 - iii. Per the UDC, postings and mailings have occurred a minimum of 15 days prior to the meeting.
 - iv. The notice of the public meeting should be sent out to property owners within 500 feet of the outer boundary of the land subject to the application.
 - v. Meetings should be planned to maximize the potential for attendance.

RESPONSE: Neighborhood meeting has been setup for March 10th at 6pm.

SITE PLAN (PAGES 2-5)

Reviewer: Chris LaRue

2. Refer to planning redlines on the Final Plat for revisions to sheets, please address and incorporate all referral comments.

3. Site Plan Page 1 of 10:

1. General notes: if there are no general notes, remove this heading.

RESPONSE: REMOVED

2. "SITE PLAN APPROVAL CERTIFICATE" -Place a box around this certificate.

RESPONSE: ADDED

3. Add Planning Commission Chair Signature line. Remove Planning Director line.

RESPONSE: REVISED

4. Site Data Table

- i. Update Site address to 530 Commons Drive

RESPONSE: UPDATED

- ii. Building Footprint on site plan shows 4,362 which is inconsistent with page 2 which lists it as 4,392 SF.

RESPONSE: UPDATED

- iii. Hardscape Total 22,120 and planted area (excluding planted interior parking islands) 13,317 SF are both inconsistent with page three.

RESPONSE: SHEET 3 CORRELATED TO TABLE

- iv. Off-Street Parking: narrative should be updated regarding the parking. It states there are 9 vacuum spaces and 2 additional spaces (11 total). There are 6 vacuum spaces, 2 pet wash spaces, and 1 handicap person space (9 total). Also remove the statements about outside storage and loading areas. A loading area is not required because the building is under 7,000 sq. ft, and outdoor storage will not be utilized.

RESPONSE: PARKING CALCULATIONS ADDED TO COVER INSTEAD OF SEPARATE NARRATIVE. LOADING AND OUTDOOR STORAGE LANGUAGE REMOVED.

- v. Regular spaces shows: refer to supplemental parking analysis for required and provided parking spaces. A Supplement parking analysis was not provided with the submittal documents. The Town will need to review this document to determine if the parking is sufficient. Per the UDC, it does not appear the parking requirement is met. UDC states 4 per bay plus stacking.

RESPONSE: THIS PROJECT IS NOT A FULL SERVICE CAR WASH WHEREIN A PERSON WAITS FOR STAFF TO WASH/CLEAN THEIR VEHICLE. ONLY AUTOMATIC/SELF-SERVICE BAYS ARE A PART OF THIS PROJECT, THEREFORE ONLY STACKING WOULD BE NECESSARY AS HAS BEEN ON MANY OTHER INSTALLATIONS OF THIS SAME WASH SYSTEM AND CONFIGURATION. THERE ARE SPACES ADDED FOR THE DOG WASH AND THE EMPLOYEE SPACE HAS BEEN COUNTED IN ADDITION TO THE REQUIRED ACCESIBLE PARKING.

4. Site Plan Page 2 of 10

1. Add a Crosswalk at Commons Drive and Private Drive

RESPONSE: ADDED, TO BE INSTALLED BY MASTER DEVELOPER.

2. 10' is required between parking areas and the building (8.037ft currently shown)

RESPONSE: REVISED

3. (19) Wall diagrams on page 6. Should match Kum & Go wall and/or the wall labeled as #25. Need to show elevations at top & bottom of wall.

RESPONSE: THE WALL DETAIL HAS BEEN NOTED WITH THE SAME MANUFACTURER AS THE DETAIL FOR THE POND WALL PER THE APPROVED FILING NO. 6 AMENDMENT 2 CONSTRUCTION PLANS. BASED ON A SITE VISIT, IT WAS CONFIRMED THAT THE POND WALLS MATCH THE WALL AT KUM-AND-GO. ELEVATIONS ARE PROVIDED ON THE GRADING AND DRAINAGE PLAN.

4. Autowash 4,392 S.F. This square footage is inconsistent with page 1

RESPONSE: SHEET 1 UPDATED.

5. 19.64' should be 20', adjust plan accordingly.

RESPONSE: ADJUSTED

6. Site Plan Keynotes:

- i. (11) Employee parking stall, where is this on the plan? An employee place should be provided.

RESPONSE: IT IS NOTED IN THE NORTHEAST SPACE OF THE SITE.

- ii. (25) Sidewalk (by others) should be #26. What is the timing of the installation of this sidewalk?

RESPONSE: REVISED, TIMING TBD BY MASTER DEVELOPER BUT NEEDS TO BE INSTALLED PRIOR TO LANDSCAPE INSTALLATION ON THE SITE.

5. Site Plan Page 3 of 10

1. Should be 3 trees along the frontage

RESPONSE: There are utilities and their 10' offset for trees plus a street light to contend with in this tree lawn. The only way to fit 3 trees is to make 2 of them columnar form which I've done.

2. Use evergreen plantings around the trash enclosure

RESPONSE: Upright junipers added.

3. Use evergreen plantings around the transformer. Must screen 80% of the equipment.

RESPONSE: Shrub junipers added.

4. Site elements key: (4) Automated pay station. Where is this on the plan?

RESPONSE: These are beside the #7's.

5. Site areas: ensure correct sq ft for building, hardscape and landscape

RESPONSE: These now match the cover sheet.

6. Landscape requirements: Update the landscape requirements table to include the parking lot requirements. 1 tree per 15 spaces and 1 shrub per space are required. See Section 10.6.4.E.8. Parking landscaping requirements are in addition to the other landscaping requirements.

RESPONSE: The table and another tree has been added

6. Site Plan Page 4 of 10
 1. Irrigation Legend: Place symbol from legend on the plan to identify the locations as well.
RESPONSE: The symbols have been added.

7. Site Plan Page 5 of 10
 1. (12) This isn't pointing to anything.
RESPONSE: DELETED.

8. Site Plan Page 6 of 10
 1. Dry-Stack Retaining Wall diagram:
 - i. Remove: "For Information Only – Final Design by Contractor"
RESPONSE: REMOVED.

 - ii. Need to provide the wall specifications regarding type, brand, etc.
RESPONSE: ADDED PER APPROVED FILING NO. 6 AMENDMENT 2 CONSTRUCTION PLANS WALL DETAIL.

9. Site Plan Page 7-8 of 10
 1. Note:
 - i. Add notes from page 8 here (page 7) as well.
RESPONSE: NOTES FROM PAGE 8 ADDED TO PAGE 7.

 - ii. Add a note requiring all light poles to be round
RESPONSE: NOTE ADDED

 - iii. Add another note limiting light pole height to 25'.
RESPONSE: NOTE ADDED

10. Site Plan Page 9 of 10
 1. Smooth face CMU is not used on the main building. The previous site plan had this finished with stone to match the building. Update the plans to depict the stone material on the vacuum and pay stations.
RESPONSE: REVISED TO HAVE STONE USED ON BUILDING.

 2. Front elevation:
 - i. Split face CMU 1 to match building with #4's Vert. at 23" O.C. with bent hooks at bottom.
RESPONSE: REVISED TO HAVE STONE USED ON BUILDING.
 - ii. Smooth face CMU to match building
RESPONSE: REVISED TO HAVE STONE USED ON BUILDING.

 3. Rear elevation:
 - i. Split face CMU 1 to match building
RESPONSE: REVISED TO HAVE STONE USED ON BUILDING.
 - ii. Smooth face CMU to match building
RESPONSE: REVISED TO HAVE STONE USED ON BUILDING.

 4. Trash enclosure:
 - i. Can't exceed 6', currently 7'

RESPONSE: REVISED.

- ii. Faux stone to match building. List the stone material per the architectural plans by item #. Update this on each detail.

RESPONSE: STONE IS TO MATCH BUILDING.

11. Site Plan Page 10 of 10

1. East Elevation Planning:

- i. Rooftop mechanical should be shown dashed in to ensure it is appropriately screened
RESPONSE: WHILE WE RECOGNIZE THIS AS A CONCERN, THERE IS CURRENTLY NO ROOF TOP MECHANICAL EQUIPMENT PROPOSED THAT WOULD REQUIRE SCREENING. A NOTE HAS BEEN ADDED TO THE ELEVATIONS TO CLARIFY THIS.

- ii. Are the pilasters at least 12" in depth? They need to be on this plane to meet section 10.6.8.c.4.b. Add a note requiring the 12" depth.

RESPONSE: A NOTE HAS BEEN ADDED INDICATING THIS REQUIREMENT.

- iii. Ensure the utilities are painted to blend in with the building. Add a note with a reference to a paint color.

RESPONSE: A NOTE HAS BEEN ADDED, AND KEYNOTES MENTION A PAINT COLOR.

- iv. Bring the stone material to the top of the roof of these pilasters.

RESPONSE: STONE PILASTER HAS BEEN EXTENDED TO ROOF LINE.

2. West Elevation Planning:

- i. Are the pilasters at least 12" in depth? They need to be on this place to meet section 10.6.8.c.4.b. Add a note requiring the 12" depth.

RESPONSE: A NOTE HAS BEEN ADDED INDICATING THIS REQUIREMENT.

- ii. Bring the stone materials to the top of the roof of these pilasters.

RESPONSE: STONE PILASTERS HAVE BEEN EXTENDED.

3. North Elevation Planning:

- i. Provide the material for the window in the door. Should be clear for safety reasons.

RESPONSE: NOTE AS BEEN ADDED.

COLORADO GEOLOGICAL STUDY (PAGE 5)

Reviewer: Karen Berry

- 12. The Vista Ridge area is underlain by extremely highly expansive clay soils and claystone bedrock. A lot-specific geotechnical investigation is recommended to characterize soil and bedrock engineering properties such as density, strength, water content, and swell/consolidation potential; make recommendations for mitigating collapsible, expansive, and otherwise problematic soils and bedrock; determine the depth and extent of nay required over-excavation; and make preliminary design recommendations for preparation, foundations, floor systems, subsurface drainage, pavements, etc.

RESPONSE: A lot specific geotechnical report was prepared by Kumar and Associates on June 6, 2018 and was included in the original submittal.

FAA DENVER AIRPORTS DISTRICT OFFICE (PAGE 5)

Reviewer: Mike Matz

13. Please ensure that the Developer or City submits an airspace study through iOE/AAA so that the project may be evaluated for obstructions and hazards to air navigation. Once airspace determination is made, we can follow-up (if needed) to resolve any comments or objections made by the various FAA Lines of Business. There is a 45-day comment period after submittal.

RESPONSE: Request for study was submitted 2/18/21.

DRAINAGE REVIEW (PAGES 6-8)

Reviewers: Jeanne M Boyle and Theresa Ring

14. Please sign and seal the Engineer's Certification with the next submittal.

RESPONSE: STAMPED AND SIGNED

15. The Coal Creek and Rock Creek Major Drainageway Plan by Respec (2014 MDP) and Erie Outfall System Planning Preliminary Design: Town of Erie and Weld County by Love and Associates (2007 OSP) are applicable to the project location and were included in the references, however, the report was not updated to discuss these studies. In addition, the 2007 OSP was updated by Merrick in 2020 and should be referenced. In the report, discuss any impacts, constraints, and/or required drainage patterns per these references.

RESPONSE: REPORT UPDATED PER 2007 OSP AND 2020 OSP

16. There are conflicting statements regarding runoff in the interim condition compared to the fully developed condition. Correct the report to state that the Basin B runoff will be less in the interim condition versus the fully developed condition.

RESPONSE: REVISED

17. Provide a discussion to compare the anticipated conditions per the Phase III Drainage Report for Vista Ridge Filing No. 6, 2nd Amendment, by Hurst and Associates, revised January 31st, 2020 (2020 Vista Ridge Filing No. 6 drainage report) to the proposed conditions tributary to Detention Pond D, such as how much peak runoff from the site was anticipated, the proposed percent imperviousness, and the tributary drainage area. Additionally, discuss any components of the Detention Pond (i.e., east forebay) that are proposed as part of this project.

RESPONSE: ADDED

18. Based on the Basin Runoff Rate Calculations from the 2020 Vista Ridge Filing No. 6 drainage report, the 5-year runoff from the proposed site is greater than what was anticipated. Per comment 7a below, provide an analysis of the proposed storm system, including the existing 18" pipe, to verify the capacity is acceptable for the proposed conditions.

RESPONSE: 5-YR FLOW ONLY 0.3 CFS GREATER. STORM SEWER CAPACITY ADDRESSED AND IS ADEQUATE

19. Provide flows for the 5-year storm event for offsite basins in the Basin Runoff Summary Table.

RESPONSE: PROVIDED

20. Define the published year for the Town of Erie Standards and Specifications that are being used. Note that the most recent 2020 Vista Ridge Filing No. 6 drainage report used the rainfall per the current Erie Standards which is less than the rainfall used by this study.

RESPONSE: DEFINED

DRAINAGE PLAN

21. The existing topography appears to have changed, likely due to overlot grading for the development. Sub-basin OS-2 needs to be re-delineated based on the updated grading.

RESPONSE: REVISED

22. Provide a scale for the drawing.

RESPONSE: ADDED

23. Correct the C-values shown on the basin symbol for Basin C to agree with the values calculated on the "Composite 'C' Factors (Developed)" Worksheet in Appendix 1 of the report.

RESPONSE: REVISED

24. The forebay/riprap on the east side of the Detention Pond D (near Design Point 2) is shown as existing. The Grading and Drainage Plan in the Site Plan Set indicates that this riprap forebay is proposed as part of this project. Additionally, no riprap is shown in that location on Sheet 5 of the Vista Ridge Filing 6, 2nd Amendment Construction Plans (1/31/20) by Hurst. If the riprap forebay is existing, provide highlighted reference documents. If it is proposed, show that it is proposed (i.e., darker hatching) on the Drainage Plan as well as the Grading and Drainage Plan in the Site Plan Set and provide calculations for the riprap and forebay.

RESPONSE: REPORT REVISED FOREBAY/RIPRAP TO BE PROVIDED AS PART OF AUTOWASH PROJECT

25. The report states that all the "outfall storm sewers from the site...have been designed by Hurt and Associates." However, the drainage plan states that the outfall pipe from Design Point 2 (Basin B) is included as part of this design. Clarify which is correct and update as necessary.

RESPONSE: CLARIFIED

APPENDIX 1

26. Calculate the runoff for the 5-year storm even in the interim condition.

RESPONSE: CALCULATED

APPENDIX 2

27. We have the following comments for the storm sewer model:

1. Provide a storm sewer analysis for the 5-year storm event.

RESPONSE: PROVIDED

2. Provide a schematic of the storm systems for the hydraulic analysis. Include manhole and inlet labels.

RESPONSE: PROVIDED

3. A slope of 1.0% for the pipe from Inlet DP 1 is not consistent with the description in the report. The analysis, report and plans must all agree. Correct as needed.

RESPONSE: CORRECTED

4. Correct the flow for Inlet DP 2 to agree with the value calculated in Appendix 1.

RESPONSE: CORRECTED

5. Verify that the pipe lengths for all pipes agree with the construction plans.

RESPONSE: VERIFIED

28. The Circular Conduit Flow worksheets were not reviewed as the information is redundant to the storm system hydraulic analysis referenced in the comment above.

RESPONSE: REMOVED

APPENDIX 3 (No Comments)

DRAINAGE COMPLIANCE LETTER: AUTOWASH AT VISTA RIDGE

29. The discussion regarding the comparison of design flows for the detention pond and the proposed flows from the site, should be included in the Phase III Drainage Report rather than being a separate document.

RESPONSE: FINAL DRAINAGE REPORT SUPERCEDES THE DRAINAGE COMPLIANCE LETTER. FLOW COMPARISON PROVIDED

AUTOWASH SITE PLAN

30. On sheet 5 Utility Plan, we have the following comments:

1. Correct Note 6 to agree with the label shown on the plan for the "15" SD (Private).

RESPONSE: CORRECTED.

2. Clarify if the 18" RCP outfall pipe is existing or not. If it is existing, correct Notes 8 and 9 to indicate that the storm pipe and detention pond are existing. If it is not existing, then clarify who will be required to construct these and when, and how the timing of construction is coordinated with the development of the Autowash site (i.e., the Pond D must be constructed prior to, or consecutively with, the Autowash site).

RESPONSE: THE POND HAS BEEN CONSTRUCTED, THE OUTFALL HAS NOT BUT WILL NEED TO BE INSTALLED BY THE MASTER DEVELOPER PRIOR TO SITE CONSTRUCTION.

3. Note 5 does not indicate that two different inlet types are proposed. Use labels or notes to identify which inlets are Type R inlets and which are Type 13 Combination inlets.

RESPONSE: ADJUSTED AND ADDED.

31. On Sheet 6 Grading and Drainage Plan, we have the following comments:

1. Provide a label to indicate the Type 13 Combination Inlet.

RESPONSE: ADDED.

2. Label the size, length, and material of pipe that exists from Drainage Point 3 (the Type C inlet).

RESPONSE: ADDED.

3. The report indicates that RCP will be used, not HDPE for the 15" pipes. Clarify which is correct and update the appropriate documents, including calculation. Note that RCP must be used within all rights-of-way.

RESPONSE: UPDATED, HDPE WILL BE USED AS IT IS ALL ONSITE AND PRIVATE.

32. Details must be provided for the inlets and forebay(s).

RESPONSE: ADDED.

33. Provide profiles for each of the storm sewer systems according to Section 161.03.05 Storm Drainage Construction Details of the Town Standards and Specifications.

RESPONSE: CONSTRUCTION PLANS HAVE BEEN PROVIDED INCLUDING THE PROFILES.

MOUNTAIN VIEW FIRE RESCUE, FIRE PREVENTION SPECIALIST (PAGE 8)

Reviewer: LuAnn Penfold

34. The building appears to be about 4,400 square foot. In accordance with Appendix B of the International Fire Code, the required fire flow for the building is 1,750 gallons per minute, measured at a residual pressure of 20 pounds per square inch. The Fire District recognizes the required fire flow is available from the existing fire hydrant shown on the plans.

RESPONSE: NOTED.

35. Fire apparatus access to the building appears to be adequate as indicated on the plans. Fire apparatus access roads must be designed and maintained to support the imposed loads of fire apparatus (75,000 pounds).

RESPONSE: NOTED.

36. Building construction plans and the final site plan showing a code analysis which includes, the gross square footage of the building, the building construction type, and occupancy classification(s) must be submitted to the Fire District for review and approval before building permits may be issued.

RESPONSE: Acknowledged, building permits and Fire District Permits will be filed separately.

REGIONAL TRANSPORTATION DISTRICT (PAGE 8)

Reviewer: C. Scott Woodruff

37. The RTD has no comment on this project

RESPONSE: ACKNOWLEDGED

UNITED POWER (PAGE 8-9)

Reviewer: Veronica L. Garcia

38. After review of the information, United Power has existing underground service going south under Commons Drive into the parcel then it veers west and continues south through the parcel then veers east to transformer located just of Hwy 7 (see design picture). Also, according to the Plat there is concrete sidewalk on the northwest side of the parcel where it is denoted a 10' UE on the plat, is this correct? (See copy of plat.) All of this is contingent upon United Power's ability to maintain all existing rights, facilities/equipment, and existing easements. This request should not hinder our ability for future expansion, including all present and any future accommodations for electrical distribution.

RESPONSE: ALL 10' UTILITY EASEMENTS ARE PER THE PLAT. THE SIDEWALK IN THE 10' UE IS ON THE NORTH END OF THE PROPERTY ADJACENT TO COMMONS DRIVE.

39. Please note, the property owner/developer/contractor must submit an application along with CAD data for new electrical service via <https://www.unitedpower.com/construction>. United Power would like to work with these persons early in the construction process on getting an electrical design prepared so that we can request any additional easements needed and hopefully have those easements dedicated on the plat rather than obtaining separate document(s). Obtaining easements via a separate document can be time consuming and could cause delays.

RESPONSE: NOTED

40. As a Reminder: No permanent structures are acceptable within the dry utility easement(s); United Power considers any structure that impedes the access, maintenance, and safety of our facilities a permanent structure. No exceptions will be allowed, and any encroachments could result in penalties.

RESPONSE: ACKNOWLEDGED

ERIE MUNICIPAL AIRPORT (PAGE 9)

Reviewer: Jason Hurd

41. This project, due to the proximity to the runway at the Erie Municipal Airport, **REQUIRES** an Obstruction Evaluation/Airspace Analysis to be performed to confirm that the project, including the height of structures, does not interfere with airspace reserved for the safe operation of aircraft at the airport.

RESPONSE: Request for analysis was submitted the FAA.

42. The FAA states that any person/organization who intends to sponsor any construction or alteration within 20,000ft of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 ft must notify the Administrator of the FAA. Please refer to FAA Form 7460-1 Notice of Proposed Construction or Alteration and Form 7460-2 Supplemental Notice for additional information.

RESPONSE: Form 7460-1 was completed and submitted to FAA.

43. In the event that any construction project requires construction equipment, i.e. cranes, pumps, etc., that exceeds the height of the construction project, the equipment must be flagged during the day and lighted if in place at night. In addition, the Airport Manager requires 48 hours prior notification of the installment of the equipment so that the appropriate NOTAMs (Notice to Airmen) can be put in place.

RESPONSE: Acknowledged

XCEL ENERGY (PAGE 9)

Reviewer: Brittany Schoborg

44. There are no Transmission engineering encroachment concerns from XCEL Energy regarding this project.

RESPONSE: ACKNOWLEDGED

SPECIAL DISTRICT MANAGEMENT SERVICES (PAGES 9-10)

Reviewer: Judy Leyshon

45. I am in receipt of the referral for Autowash Vista Ridge Real Estate LLC., Lot 1 Vista Ridge Flg 6.2nd amendment. This email shall serve as notification that a one-time System Development Fee is due to the District in the amount of \$14,950.39 (at the 2021 rate). For your convenience, attached is the Fee Schedule Summary. Please note that this Fee (if unpaid) may be subject to a 5% increase each year January 1st, plus a \$3,000 per gross acre penalty, plus interest. Payment should be remitted to: Vista Ridge Metropolitan District; 141 Union Blvd., Suite 150, Lakewood, CO 80228.

RESPONSE: Acknowledged, notice has been provided to the owner/Developer.

System Development Fee Schedule / Summary			
Filing No. 6, Second Amendment Final Plat			
	Gross Area	21.04 acres	
	2021 System Development Fee	\$15,987.82 per gross acre	
		\$ 336,383.73	
	Acres	Total %	Fee
Lot 1	0.82	4.4444%	\$14,950.39
Lot 2	1.23	6.6667%	\$22,425.58
Lot 3	1.11	6.0163%	\$20,237.72
Lot 4	1.25	6.7751%	\$22,790.23
Lot 5	1.44	7.8049%	\$26,254.34
Lot 6	1.97	10.6775%	\$35,917.40
Lot 7	10.63	57.6152%	\$193,808.08
	18.45	100.0000%	\$336,383.73
Tract A	1.250		
Tract B	0.470		
Tract C	0.540		
Tract D	0.330		
	2.590		
Total Gross Acreage	21.040		

SOTRMWATER COORDINATOR (PAGES 10-11)

Reviewer: Misty Hall

46. Site will need to apply for a Stormwater Quality permit prior to construction
RESPONSE: NOTED.

47. Site will need CDPHE COR 400000 permit coverage prior to construction
RESPONSE: NOTED.

48. Site will need a Stormwater Management Plan prior to construction
RESPONSE: PLAN PREPARED

49. Site will need a phased Erosion Control Plans
RESPONSE: PLANS PREPARED AND IN CONSTRUCTION SET

50. Complete Post Construction Design Standards form
RESPONSE: Form will be completed after construction is complete.

DEPARTMENT OF PUBLIC WORKS: (PAGES 11-12)

Reviewer: Chad Schroeder

51. Previous Comments for Site Plan:

Show and provide details for a water reclamation system.

RESPONSE 1: No water reclamation is planned for this sight. The equipment scheduled and used on this type of project is not designed to handle reclamation water.

A Water reclamation system is required. The adopted Town of Erie Water Conservation Plan requires the reduction of the average per capita water use in Town through the use of conservation activities that are compatible with the community and are sustainable from an economic, social and environmental perspective. All other similar carwashes in Town have installed water reclamation systems.

RESPONSE 2: Not provided.

Without a water reclamation system installed, the Raw Water Rate will be significantly greater than other car washes in town which incorporate reclamation systems.

RESPONSE: The current design has two (2) - 8000 gallon water buffer tanks that serve as a reclamation system for the car wash. We are able to reclaim approximately 30% of fresh water usage by recapturing the waste water used to make the spot free rinse. Instead of sending this water into the sewer system, we blend it into our water storage tanks and repressurize it back into the system. We basically use the mass amount of original water to dilute the heavy mineral water wasted by the spot free rinse system. This water then passes through the water softener and is used in the rest of the equipment. In addition, we recapture the weep water from the self-serve bays into a holding pit for re-pressurization into the system.

52. Route all runoff collection drains including from the dog washes into the sand oil separator and water reclamation system.

RESPONSE 1: The dog wash drains are non-automotive domestic and not required by code to flow through the SOL.

See Section 8-2-4.B of the Town's Municipal Code regarding sanitary sewer connections. If the dog wash use is continued to be pursued, it will need to connect the SOI.

RESPONSE 2: Not provided.

Previous comment still stands.

RESPONSE: REVISED.

53. Address the attached Drainage Compliance Letter issues for the Autowash outlined in the Merrick referral comments from January 5, 2018.

RESPONSE 1: Comments have been addressed.

See attached Merrick drainage referral comments from August 7, 2018. The review covers both Filing 6, 2nd Amendment and Lot 1 Autowash drainage issue.

RESPONSE 2: New submittal.

Address the attached Drainage Compliance Letter issues for the Autowash outlined in the Merrick referral comments from January 19, 2021.

RESPONSE: COMMENTS ADDRESSED.

54. Provide the necessary construction details as needed such as utility connection standard drawings and details.

RESPONSE 1: Construction documents will be provided once site plan approval is obtained.

Final civil construction plans are to be provided with the Site Plan.

RESPONSE 2: Not provided.

Construction documents needed at this time.

RESPONSE: CONSTRUCTION PLANS PROVIDED.

55. A Grading and Stormwater Quality Permit will need to be issued from the Public Works Department prior to the issuance of the building permit. In addition, this site being over one acre will require a State of Colorado Construction Stormwater Permit.

RESPONSE 1: Noted, however the site is less than 1.0 acre.

Although the site is under one acre, it is part of a larger common plan development and will require a State of Colorado Construction Stormwater Permit.

RESPONSE 2: Not provided.

Construction documents needed at this time. See attached comments from the Town's Stormwater Coordinator.

RESPONSE: CONSTRUCTION PLANS PROVIDED.

56. Provide an engineer review of the lift station, force main, and overflow ponds initial design and capacity to demonstrate that the car wash lot is in compliance with the approved Wastewater Receiving Entity Certification. Additionally, provide an amended approval from the Colorado Department of Public Health for the expanded actual use of the lift station. If modifications are required, provide upgrade plans along with an updated certification and State approval.

RESPONSE: PLEASE REFER THIS COMMENT TO THE OVERALL DEVELOPER AND LIFT STATION DESIGN ENGINEER FOR CAPACITY CALCULATIONS. NEITHER THE APPLICANT NOR APPLICANT'S CONSULTANTS FOR THIS LOT HAVE ACCESS OR DESIGN INFORMATION REGARDING THE LIFT STATION DESIGN OR FUNCTIONALITY.

57. The pipe to the lift station overflow pond is stuck shut and needs maintenance to operate properly.

RESPONSE: THIS ISSUE SHOULD BE REPORTED TO THE OVERALL DEVELOPER AND/OR OPERATIONS PERSONNEL, THIS PROJECT HAS NO ACCESS TO THE LIFT STATION.

Please feel free to contact me with any further questions or concerns regarding these issues.

Sincerely,



Phil Walz
Project Architect
Hover Architecture



385 INVERNESS PARKWAY, SUITE 190
ENGLEWOOD, CO 80112
(720) 773-2800

3 May, 2021

Town of Erie
Attn: Chris LaRue
645 Holbrook St
PO Box 750
Erie, CO 80516

RESPONSE LETTER PLANNING REVIEW 02

RE: Autowash at Vista Ridge
SP-001187-2020, SRU-001186-2020
530 Commons Drive
Erie, CO 80516

Dear Chris LaRue,

Thank you for assembling planning review comment for this second round of planning review. We have consolidated comments from all parties and redlines on the drawings into one list of comments below. We have provided comment responses to each item and where necessary updated drawings. Please forward and review as necessary.

PLANNING SUBMITTAL #2 COMMENTS

GENERAL

Reviewer: Chris LaRue

1. Please ensure the utility easements are appropriately labeled on the site plan.
RESPONSE: Labels added
2. Please note, the Town anticipates greatly shortening next round of review given the limited amount of comments remaining. This will depend upon the current workload at the time of submittal, and amount of comments to be provided by engineering.
RESPONSE: Noted thank you

SITE PLAN (PAGES 2-5)

Reviewer: Chris LaRue

3. Refer to planning redlines on the Site Plan (attached) for revisions to sheets, please address and incorporate all referral comments.
4. Cover Sheet Page 1 of 10:
 1. Site Data Table: Hardscape total different than landscape plan
RESPONSE: Revised to differentiate hardscape and building footprint, please note totals for both building and hardscape did not change
 2. Site Data Table: Provide an actual analysis in a separate exhibit/report. Include within the analysis and justifications for the parking being requested. You should also include the a discussion on the amount of on-site employees reporting to the facility every day as those spaces would not be available to customers. It would be helpful to use other locations as examples. How does what is being proposed compare to those other locations? How many spaces do the locations have and are they needed each day? Talk about how this is not a full-service car wash and the parking needs are different. Please do update the narrative as well. This will be shared with our boards and needs to be consistent with the site plan.
RESPONSE: A separate summary Parking Analysis has been provided to address these concerns with images from other Autowash sites across the Metroplex.
5. Landscape Plan Page 3 of 10
 1. Site Areas: Hardscape different than value on cover sheet
RESPONSE: Both sets of numbers agree, it's just that the Cover Sheet gives a total of Building and Roads/Paving for Hardscape where-as and the Landscape is only noted the Roads/Paving as Hardscape. Notes revised to be consistent.
6. Exterior Elevations Page 10 of 10
 1. Add additional leaders to EE-20 and EE-19 keynotes on Elevations 1-3
RESPONSE: Leaders added

COLORADO GEOLOGICAL SURVEY (PAGE 5)

Reviewer: Jim Carlson

7. Colorado Geological Survey has reviewed the Lot 1, Vista Ridge Filing 6, 2nd Amendment site plan and special review use resubmittal. The resubmittal documents include a Geotechnical Engineering Study, Proposed Vista Ridge Carwash, Bonanza Drive and Highway 7, Erie, Colorado (Kumar & Associates Project No. 18-8-186, June 6, 2018). Kumar's recommendations for mitigating the site's expansive clay soils and shallow, highly expansive claystone bedrock are valid. Specifically, Kumar recommends a drilled or helical pier foundation, and floor slabs should bear on a minimum of four feet of non-expansive structural fill, or structurally-supported floors should be used. Provided Kumar's recommendations are adhered to, CGS has no objection to site plan approval.
RESPONSE: Acknowledged drilled piers are indicated on the structural drawings as submitted for Building Permit.

FAA DENVER AIRPORTS DISTRICT OFFICE (PAGE 5)

Reviewer: Mike Matz

8. As mentioned in the previous round of comments, we do not see any land compatibility issues surrounding the proposed Car Wash project near Highway 7 and Bonanza Dr. However, please provide the case number for the airspace case that was submitted for the construction of the car wash on 2/18/2021.
RESPONSE: Case Number for Aeronautical study is 2021-ANM-981-OE and provided for reference.

DRAINAGE REVIEW (PAGES 6-8)

Reviewers: Jeanne M Boyle and Theresa Ring

9. From the response to comments, we understand that the 5-year storm event is slightly greater in the proposed condition than in the Hurst design. The 18" RCP to the pipe has been analyzed and provides the required capacity which is acceptable.

RESPONSE: Acknowledged

10. The report mentions that the difference in flow rate for the 100-year storm event is "mostly attributed to the acreage of the Hurst B2 basin (0.93 acres) versus the Autowash site (0.83 acres)." From comparing the two drainage maps, it appears that the Autowash analysis did not include the Detention Pond D area in the analysis but did include areas along the north and west boundary that were originally part of Hurst Basin B1. Therefore, the flow originating from the Detention Pond D area has not been considered in the Autowash design. The report also mentions that "many jurisdictions have adopted a percent imperviousness of 100% for detention ponds." This means that there is approximately 0.2 acres (as measured from the Autowash Drainage Plan) of 100% imperviousness that flow into Detention Pond D that was not considered in the analysis. Analyze the pond area as part of the Autowash proposed site. If a highlighted excerpt can be provided showing that Hurst used 2% imperviousness, the analysis for the proposed site may also use 2% imperviousness.

RESPONSE: Revised

DRAINAGE PLAN

11. From the Detailed Grading Plan (Sheet C1.4), the portion of Sub-basin C located north of Design Point 3 will drain offsite to the west and would not be intercepted by the inlet at Design Point 3. Revise the grading as needed to intercept runoff at the Design Point 3 inlet for all of Basin C

RESPONSE: Cross pan added and grading revised, along with Inlet at Design Point 3 to a sump condition.

12. Correct the C-values shown on the basin symbol for Sub-basin B to agree with the values calculated on the "Composite 'C' Factors (Developed)" Worksheet in Appendix 1 of the report.

RESPONSE: Corrected.

13. Remove the errant label for Note 3 in Sub-basin C

RESPONSE: Removed.

14. The Drainage Plan says the Manhole on Storm Sewer Line B is a 4' diameter manhole. The Construction Plans show that manhole as both a 5' diameter MH (on Sheet C1.4) and a 4' diameter MH (on Sheet C1.5). Update the documents to match.

RESPONSE: All MH's are 5' diameter, report and plans coordinated.

APPENDIX 1

15. No comments

APPENDIX 2

16. The inlet at Design Point 3 is not in a sump condition. Runoff that bypasses this inlet would flow offsite. Therefore, revise the grading to make this a sump condition. Also see Comment 3 above.

RESPONSE: Cross pan added and grading revised, along with Inlet at Design Point 3 to a sump condition.

17. For the Inlet Calculations at Design Point 3, the Required Peak Flow for the 5-year event is

lower than the flow calculated in Appendix 1. Update the inlet spreadsheet to match the flow calculated in Appendix 1.

RESPONSE: Updated.

18. We have the following comments for the storm sewer model:

1. Manning's n value shall be 0.010 for HDPE pipe per Town of Erie Standards and Specifications Table 800-5.

RESPONSE: Revised

2. Describe the assumed tailwater condition for the hydraulic analysis.

RESPONSE: Tailwater condition added to UD Sewer analysis and described

19. We have the following comments on the Forebay Sizing for Basin A & B worksheet:

1. The forebay shall be sized for the interim condition, not the final condition due to the higher flows for the interim condition.

RESPONSE: Revised

2. The forebay volume appears to be sized for the flow from Basin A only. Correct the volume to size the forebay for both Basins A and B.

RESPONSE: Revised

3. The resulting WQCV is unreasonably small. Check the calculation and correct as needed. Also, define the final minimum forebay volume and compare to the actual volume provided.

RESPONSE: Revised

APPENDIX 3

20. No comments

SITE CONSTRUCTION PLANS

21. On Sheet C1.4, label the size of riprap for the proposed forebay.

RESPONSE: Labeled (Type M)

22. On Sheet C1.4, in the southwest corner of the site, the top of wall elevations are lower than the proposed adjacent grades on the east side, especially by MH-3. Fix the wall elevations to contain the proposed fill in the southwest corner of the site.

In addition, the bottom of wall elevations are proposed to be lower than the existing grades on the west side of the wall which does not appear to be necessary and creates a swale along the bottom of the wall which is not desired. Revise the bottom of wall elevations to match existing grades. Matching existing grades will also help to maintain cover over the existing 24" storm sewer pipe that runs parallel to the wall.

RESPONSE: Bottom of wall revised on the west. Note the SW corner labels are correct, TW (top of wall) is 84.50 and the bottom of the wall is 80.40 (SW bottom corner).

23. On Sheet C1.5, the length of the pipe between MH-2 and MH-3 on Storm Sewer Profile Line B does not match the length provided in Appendix 2. Fix to match.

RESPONSE: Data in Appendix 2 updated.

SITE PLANS

24. Make revisions as needed to match the revised plans per the above comments.

RESPONSE: Revised to match.

MOUNTAIN VIEW FIRE RESCUE, FIRE PREVENTION SPECIALIST (PAGE 8)

Reviewer: LuAnn Penfold

25. I do not have any additional comments to my letter dated 12-22-2020

RESPONSE: Acknowledged

VECTOR AIR MANAGEMENT

Reviewer: Jason Hurd

1. This project, due to the proximity to the runway at the Erie Municipal Airport, **REQUIRES** an Obstruction Evaluation/Airspace Analysis to be performed to confirm that the project, including the height of structures, does not interfere with airspace reserved for the safe operation of aircraft at the airport.

RESPONSE: Aeronautical Study No 2021-ANM-981-OE has been completed and included for review.

2. The FAA states that any person/organization who intends to sponsor any construction or alteration within 20,000 ft of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200 ft must notify the Administrator of the FAA.

RESPONSE: Notice was submitted to FAA through Form 7460 and Aeronautical Study.

3. Please refer to FAA Form 7460-1 FAA Form 7460-1 Notice of Proposed Construction or Alteration and Form 7460-2 FAA Form 7460-2, SUPPLEMENTAL NOTICE for additional information.

RESPONSE: Forms 7460-1 were submitted to the FAA and determination letter was provided.

4. In the event that any construction project requires construction equipment, i.e. cranes, pumps, etc., that exceeds the height of the construction project, the equipment must be flagged during the day and lighted if in place at night. In addition, the Airport Manager requires 48 hours prior notification of the installation of the equipment so that the appropriate NOTAMs (Notice to Airmen) can be put in place.

RESPONSE: Acknowledged

Please feel free to contact me with any further questions or concerns regarding these issues.

Sincerely,



Phil Walz
Project Architect
Hover Architecture



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ENGLEWOOD, CO 80112
(720) 773-2800

30 July, 2021

Town of Erie
Attn: Chris LaRue
645 Holbrook St
PO Box 750
Erie, CO 80516

RESPONSE LETTER PLANNING REVIEW 03

RE: Autowash at Vista Ridge
SP-001187-2020, SRU-001186-2020
530 Commons Drive
Erie, CO 80516

Dear Chris LaRue,

Thank you for assembling planning review comment for this third round of planning review. We have consolidated comments from all parties and redlines on the drawings into one list of comments below. We have provided comment responses to each item and where necessary updated drawings. Please forward and review as necessary.

PLANNING SUBMITTAL #3 COMMENTS

GENERAL

Reviewer: Chris LaRue

1. There need to be a documents O&M Plan for the permanent control measures.
RESPONSE: Per email on 7/23/21, the O&M should have been completed for the Tract B facility at the time of approval for the pond.
2. Complete Post Construction Design Standards Form.
RESPONSE: Completed and attached

CD's

Reviewer: Chris LaRue

3. Include Flow arrows on C1.11 and C1.12.
RESPONSE: Revised and added.

Please feel free to contact me with any further questions or concerns regarding these issues.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Phil Walz', with a long horizontal flourish extending to the right.

Phil Walz
Project Architect
Hover Architecture