DOUGLAS COUNTY
COLORADO

Preliminary Plan Staff Report

Date: August 28, 2025

To: Douglas County Planning Commission

CC: Eric Pavlinek, Principal Planner EP
Jeanette Bare, AICP, Planning Manager JB
Steven E. Koster, AICP, Assistant Director of Planning Services SK

Subject: **Pinery Meadows Preliminary Plan**

Project File: **SB2025-009**

Planning Commission Hearing:	**September 8, 2025 @ 6:00 p.m.**
Board of County Commissioners Hearing:	**September 23 , 2025 @ 2:30 p.m.**

I. EXECUTIVE SUMMARY

The request is for approval of a preliminary plan for 136 residential lots, 11 tracts, and associated public and private roads on approximately 39.5 acres. The subject property is located northwest of the intersection of State Highway 83 and Scott Avenue and is zoned as part of the Pinery Meadows Planned Development (Pinery Meadows PD). The Pinery Meadows PD is located within the Pinery SUA as designated in the Douglas County Comprehensive Master Plan (CMP). Primary access to the subdivision will take place via the extension of Piney Center Boulevard which will connect N. Pinery Parkway and Scott Avenue.

Water and sewer services will be provided by the Pinery Water & Wastewater District (PWWD). Additionally, the applicant requests approval of an appeal to the water supply standards of Section 18A of the Douglas County Zoning Resolution to defer the timing of inclusion into the PWWD to final plat.

II. APPLICATION INFORMATION

A. Applicant

Integrity Land Ventures
7200 S Alton Way, Suite C400
Centennial, CO 80112

B. Applicant's Representative

Carl Runge
Norris Design
1101 Bannock Street
Denver, CO 80204

C. Request

The request is for two approvals which will require separate consideration and motions by the Planning Commission:

- Approval of an appeal to the water documentation standards of Section 18A of the Douglas County Zoning Resolution (DCZR) which requires that the property be included in a water district at the time of preliminary plan approval.
- Approval of a preliminary plan for 136 residential lots, 11 tracts and associated public and private roads on 39.5 acres.

D. Process

A preliminary plan application is processed pursuant to Article 4 of the Douglas County Subdivision Resolution (DCSR). Article 4 states the intent of the process is "An in-depth analysis of the proposed subdivision, including review of the design considering the ability to obtain water and sanitation, identified geologic hazards, environmentally sensitive areas, wildlife habitat areas, source of required services, vehicular and pedestrian circulation, storm drainage and water quality, relationship to surrounding land uses, and conformance with the Master Plan."

Per Section 405.06 of the DCSR, "The Planning Commission shall evaluate the preliminary plan, staff report, referral comments, applicant responses, public comment and testimony, and make a recommendation to the Board to approve, approve with conditions, continue, table for further study, or deny the preliminary plan. The Planning Commission's decision shall be based on the evidence presented; compliance with adopted County standards, regulations, and policies; and other guidelines."

The appeal to the water documentation standards is processed pursuant to Section 1808A of the DCZR. Per section 1808A.06, "the Planning Commission shall evaluate the application based on the technical data, the water consultants' opinions, site-specific data, the water demand standards, the staff report, and public testimony and shall make a recommendation to the Board to approve, conditionally approve, or deny the appeal. The Planning Commission's comments shall be based on evidence presented.

E. Location

The site is located approximately 850 feet northwest of the intersection of State Highway 83 and Scott Avenue. The Pinery Meadows PD abuts PD zoning on all sides; State Highway 83 also borders the eastern boundary. Vicinity, zoning, and aerial maps are included as an attachment to the staff report to highlight site location and existing conditions.

F. Project Description

The application proposes 136 single family detached and attached residential lots on approximately 9.48 acres of the 39.53-acre site. The proposed lots range in size from

2,378 S.F. to 7,329 S.F. with an average lot size of 3,202 S.F. All lots exceed the minimum lot size for detached (2,200 S.F.) and attached (1,500 S.F.) single family lots as set forth in the Pinery Meadows PD.

Residential lots are allowed within Planning Area 1 of the Pinery Meadows PD. 28 single family detached residential lots are proposed adjacent to State Highway 83 and the Pinery West development directly north of the site. This is consistent with the Pinery Meadows PD requirement that no attached single-family units shall be allowed to abut the existing Pinery West Filing 2 subdivision. 40 attached single-family townhome lots are located in the western portion of the subdivision. 68 detached single family residential lots, laid out in a clustered arrangement, are located in the middle of the development. The attached and clustered residential units will be served by shared private drives to be owned and maintained by the Pinery Meadows Metropolitan District No. 2 (District) or HOA. All other roads within the subdivision will be public and conveyed to Douglas County at the time of final plat.

The applicant proposes approximately 24.92 acres of open space within the 11 tracts. Tract C, on the western edge of the subdivision, is the largest open space tract containing the Cherry Creek floodplain and is consistent with the limits of Planning Area 2 as shown on the PD. An approximate 100-foot wide tract parallels State Highway 83 and provides a noise buffer for homes closest to the highway. Other tracts are shown on the preliminary plan exhibit and provide opportunities for drainage, utilities, open space, and recreational uses.

One detention and water quality pond will be constructed within Tract C to accommodate stormwater detention and water quality. The District will own and maintain the detention facility, with the County accepting back-up access and maintenance easements at the time of final plat.

Pinery Center Boulevard will be extended through the subdivision, completing the connection between Scott Avenue on the south and North Pinery Parkway on the north. Water and sewer service will be provided by the PWWD.

III. CONTEXT

A. Background

The property was zoned Agricultural with the inception of Zoning in Douglas County in 1955. The property has historically been used for residential and agricultural purposes. In May of 2022, the Planning Commission approved a CMP Land Use Map Amendment to include the property in the Pinery SUA from the Northeast Subarea for urban level development. The Pinery Meadows PD was approved by the Board on February 8, 2023, which allows a maximum of 170 residential units. This preliminary plan proposes 136 residential units.

B. Adjacent Land Uses and Zoning

The subdivision is located within the Pinery SUA and has PD zoned land on all sides of the development. Residential developments (The Pinery PD and Cross Creek) border the site on the north and west. The Scott Avenue Planned Development is located directly south of the subdivision which is zoned for residential workforce housing.

Zoning and Land Use

Direction	Zoning	Land Use
North	Pinery Planned Development	Residential
South	Scott Avenue Planned Development	Future Residential Development
East	Pinery Planned Development	Residential
West	Cross Creek Planned Development	Residential

IV. PHYSICAL SITE CHARACTERISTICS

A. Site Characteristics and Constraints

The site generally consists of trees, grassy areas, and drainages which slope east to west towards Cherry Creek. The Cherry Creek Floodplain covers approximately 15 acres, or 38 percent of the site. The creek flows south to north through the western portion of the property. Overall, the site is relatively flat, and the historic use of the property has been for agricultural purposes. There are no structures on the property. The Pinery Meadows PD allows limited development within Planning Area 2 which includes the Cherry Creek floodplain.

In addition to the site containing the Cherry Creek floodplain, the parcel includes frontage along State highway 83. A minimum 100-foot setback is required for all structures. The applicant has included building envelopes for reference to ensure that no residential building will be located within this setback. The preliminary plan exhibit depicts the location of the 65 DNL (Day-Night-Noise Level) which does not impact any of the proposed residential lots.

B. Access

Access to the subdivision is from the extension of Pinery Center Boulevard south to Scott Avenue. There is no access to or from State Highway 83. The applicant submitted a traffic impact analysis which was reviewed by Engineering. Per the Pinery Meadows PD, the applicant will be required to provide a pro-rata share of the required traffic signal improvements to the intersection of Scott Avenue and State Highway 83 and 50 percent of the traffic signal cost for the intersection of Pinery Center Boulevard and Scott Avenue which will be secured via an improvements agreement at the time of final plat.

The extension of Pinery Center Boulevard and internal subdivision roads Brook Bend Circle, Meadow Brush Lane, and Valley Creek Point will be public and dedicated to

Douglas County. Internal private drives associated with the proposed townhome units will be owned and maintained by the District or HOA.

C. Soils and Geology

The 2040 CMP Class 3 Hazards and Environmental Constraints map indicates no constraints on the property. Colorado Geological Survey (CGS) reviewed the request and has no objection to the preliminary plan request provided the applicant's geotechnical study is adhered to. CGS noted that the over lot grading plans should be provided to the applicant's geotechnical consultant prior to commencement of work to evaluate areas needed and to what depth over excavation is required.

The applicant submitted a noxious weed management plan with the preliminary plan application which provides guidelines for managing noxious weeds that represent a threat to the natural and agricultural ecosystem.

D. Drainage and Erosion

Engineering reviewed the Phase II Drainage Report and found it to be acceptable. A detention pond is proposed within proposed Tract C. The District will own and maintain stormwater facilities with the County to accept backup drainage easements via the final plat.

E. Floodplain

Cherry Creek flows through the site from south to north. The Cherry Creek floodplain covers approximately 38 percent of the site, mostly within Planning Area 2 with very limited development proposed in this area. No residential lots are proposed within the floodplain.

F. Wildlife

The CMP Wildlife Resources map identifies the site as having both low and moderate habitat value. The moderate habitat value is located along Cherry Creek. The remainder of the site is of low habitat value. The area with moderate habitat value is preserved within Planning Area PA-2 as open space.

The preliminary plan preserves 24.92 acres as open space and related uses within 11 tracts. Tract C is approximately 19.23 acres which includes all of Planning Area 2, which is mostly floodplain. In their referral response dated April 23, 2025, Colorado Parks and Wildlife expects a variety of wildlife species to utilize the site on a regular basis, including small to mid-sized mammals, songbirds, deer and raptors. CPW noted that the main concern is the disturbance of nesting bald eagles. CPW also provided comments related to prairie dogs and burrowing owls.

G. Historic Preservation

The applicant submitted a cultural resources survey report which was reviewed by Douglas County Historic Preservation staff. The County's curator noted that new sites and artifacts were discovered but none are eligible to be listed on the national

register. No further action is required at this time. Should buried artifacts and features be discovered in future phases, the curator recommends that the applicant complete the appropriate Colorado Office of Archeology and Historic Preservation Data Management and Historic and/or Prehistoric Component forms.

V. PROVISION OF SERVICES

A. Schools

The Douglas County School District (DCSD) stated in its referral letter dated May 15, 2025, that a total of 50 students are expected from this development which would equate to a total land dedication requirement of 1.2 acres. This land dedication requirement is less than DCSD's minimum site requirements and therefore, DCSD requests cash-in-lieu of land dedication. Land for a school site is not proposed to be dedicated within the Pinery Meadows PD. An appraisal will be provided at the time of final plat for the purpose of determining the amount of required cash-in-lieu of school land dedication for the subdivision.

B. Fire Protection

Fire protection is provided by South Metro Fire Rescue (South Metro). South Metro reviewed the request and had no objection to the proposed preliminary plan with 4 conditions as noted in their referral letter dated April 21, 2025. The conditions were related to the completion of Pinery Center Boulevard south to Scott Avenue, coordination of addressing, wayfinding address signage for the clustered lot shared driveways, and the coordination of fire hydrant placement prior to platting. The applicant acknowledged the comments and noted that Pinery Center Boulevard will be completed south of the project to Scott Avenue prior to construction and that the fire hydrant locations will be coordinated and finalized with South Metro prior to recordation of the final plat.

C. Sheriff Services

The Douglas County Sheriff's Office (DCSO) provides police protection to the site. DCSO did not comment on the proposal. The Office of Emergency Management recommends completion of Pinery Center Boulevard prior to residential construction for two egress points in the event of an evacuation.

D. Water and Sanitation

PWWD has indicated its willingness and ability to serve the proposed subdivision, subject to successful inclusion into the district, entering into an inclusion agreement, and executing a developer service agreement for construction, maintenance, and ownership of facilities necessary to serve the proposed subdivision.

The Colorado Division of Water Resources (CDWR) reviewed the application and stated that the proposed water supply is adequate and can be provided without causing injury to decreed water rights. The County's water consultant, RESPEC,

reviewed the application and concluded that there is sufficient water to serve the uses proposed in the preliminary plan.

E. Utilities

Utility service providers include AT&T, Black Hills Energy, Core Electric Cooperative (CORE), Comcast, and Xcel Energy. AT&T indicated they may have conflicts with the proposal as their infrastructure is located along State Highway 83. The applicant has indicated that they will perform utility locates prior to construction to ensure that there is no conflicts with AT&T infrastructure along State Highway 83. Black Hills Energy, CenturyLink, and Comcast did not respond to the referral request. CORE provided referral comments related to electric capacity in the area stating that the applicant will be required to extend electric facilities to the subdivision. CORE provided an updated will-serve letter dated July 1, 2025, confirming their willingness to extend and provide electric service to the subdivision. Xcel Energy reviewed the application and provided comments related to their existing natural gas distribution facilities within the area. Other comments were provided regarding the 30-foot-wide gas easement that will be vacated and realigned at the time of final plat.

F. Dedications

As reflected on the preliminary plan exhibit, the following dedications are anticipated at the time of final plat.

Dedicated Element	Purpose, Ownership, and Maintenance
Road	Brook Bend Circle, Meadow Brush Lane, Valley Creek Point, and extension of Pinery Center Boulevard will be public and dedicated to the County. Private Roads A, D, and E will be owned and maintained by the District or HOA.
Tracts	All 11 Tracts will be owned and maintained by the District or HOA.
Drainage and Blanket Access Easements	Douglas County will require a secondary drainage easement for all drainage facilities in the event that the system owner fails to maintain the improvements.
Utilities	Douglas County will accept general purpose utility easements.

G. Parks, Trails, and Open Space

The preliminary plan includes 11 tracts accounting for approximately 24.92 acres which are intended for open space, parks, and related purposes. These tracts will be owned and maintained by the District or HOA. Tract A is proposed to include a passive park with a covered grill and picnic area.

Trails and sidewalks are proposed to provide a connection within the development and to other areas surrounding the project. The extension of Pinery Center Boulevard

through the property will include sidewalks on both sides of the road which will provide pedestrian connections to existing sidewalks and trails within the area.

Per the PD, the applicant will contribute $500 per unit at the time of final plat recordation which will go towards future park and trail improvements in the area which may include feasibility studies, design, construction, and other regional improvements as determined by the County. This contribution is in addition to the required cash-in-lieu fees for parks required pursuant to Article 10 of the Subdivision Resolution.

VI. PUBLIC NOTICE AND INPUT

In accordance with Section 409 of the Subdivision Resolution and Section 1810A of the Zoning Resolution, public notice is required to be published in the Douglas County News-Press and posted on the site by the applicant for both requests. In addition to the public notice requirements, adjacent landowners were mailed courtesy notices of an application in process at the beginning of the referral period. Public comment was received from a neighbor in the Pinery West subdivision. In general, public comment focused on building orientation, landscape buffering, and existing barbed wire fencing on the property.

Of the HOA's notified during the referral period, High Prairie Farms HOA, Pinewood Townhomes HOA and Pradera Homeowners' Association did not respond to the referral request. The Pinery HOA expressed concerns with the proposed development maintaining community character, enhancing a community separation buffer, and ensuring any new development is compatible with the character of the original Pinery. For details, please reference their response letter, which was received May 6, 2025. The Pinery West HOA provided comments related to density and 2-story homes directly abutting their subdivision to the north.

The applicant provided a written response to the public comment and referral comments which is included as an attachment to this staff report. In summary, the applicant confirmed that the preliminary plan request will provide a 20' wide landscape buffer along the northern property line adjacent to the residential development as required by the Pinery PD. This landscape buffer along with on-site fencing will provide screening and buffering from the existing development. The applicant confirmed that the proposal is for 136 dwelling units and that the density and housing products comply with the Pinery Meadows PD. In response to the comments from the Pinery HOA, the applicant stated that the details surrounding the character of the community will become available at the time of Site Improvement Plan for the attached product and that the proposed subdivision complies with the approved PD and vision of the Pinery SUA.

VII. STAFF ANALYSIS

A preliminary plan may be approved upon finding by the Board that the following standards have been met:

403.01: Conforms with the goals, objectives, and policies of the Master Plan.
Staff Comment: The property is located within the Pinery SUA as identified in Section 2 of the 2040 CMP. Goals, objectives, and policies within Section 2 reflect the diversity of the CMP. Policy 2-6D.5 encourages a mix of residential densities and a diversity of housing types, sizes, and price range. Policy 2-7A.1 encourages a variety of housing that fits different lifestyles and needs.

Goal 2-1 encourages development that supports healthy communities. Consistent with Goals 2-3 and 2-12 and related policies, the applicant is providing pedestrian connections within the development that allow connections to and from the subdivision. A passive park will be provided within Tract A. These amenities promote exercise and recreation opportunities for a healthy community.

Consistent with Goals 2-15C and related policies, the applicant has sited the lots to adequately protect the natural drainage areas on-site. The proposal preserves 15 acres or 38 percent of the site as open space within Planning Area 2. Cherry Creek is preserved within an open space tract in the western portion of the site.

403.02: Addresses the design elements established in Article 4, Section 404.
Staff Comment: The preliminary plan has addressed all applicable subdivision design elements as noted herein.

Per Section 404.01 – Each of the proposed lots conform in size to those allowed within the PD and is capable of meeting applicable setbacks. Building envelopes are shown for reference but will be removed at the time of final plat. Lots nearest the Pinery West subdivision conform with the requirement for detached single family residential use.

Per Section 404.02 – Geotechnical conditions have been reviewed and determined acceptable. Standard soils investigations will occur in conjunction with building permit applications.

Per Section 404.03 – Proposed lots are oriented to minimize conflicts with surrounding land uses. The subdivision is surrounded by existing and planned residential development.

Per Section 404.04 – Grading and drainage designs have been preliminary reviewed and accepted by Engineering.

Per Section 404.05 – The terrain and drainage design are integrated into the subdivision layout.

Per Section 404.06 – The applicant will take all reasonable care to watch for historic resources, paleontological resources, and other cultural history resources and shall immediately notify Douglas County in the event of such discovery.

Per Section 404.07 – Appropriate opportunities for vehicular and pedestrian connections are possible via the proposed road and sidewalk connections.

Per Section 404.08 – Recommendations within technical studies, including the geotechnical report, drainage report, and traffic impact analysis, will be further implemented through the final plat and construction plan processes. A noise study was prepared which verified that lots closest to State Highway 83 will not experience noise levels greater than 65 DNL.

403.03: Conforms with Section 18A Water Supply Overlay District, of the Zoning Resolution.
Staff Comment: DCZR Section 1803A establishes approval standards to be used in the evaluation of land use applications reviewed under Section 18A. CDWR and RESPEC have reviewed the preliminary plan application and required water documentation and have determined that the water supply is adequate. The applicant is appealing the timing of inclusion into the PWWD as discussed below. This appeal would need to be approved to demonstrate full compliance with Section 18A.

The Douglas County Water Commission reviewed the application on April 28, 2025, and individual comments were provided from two commissioners. Commissioner Bernhardt commented that it would be nice to see will serve letters indicate how much ground water is being used compared to renewable water. Commissioner Hudson stated that he had been approached by nearby residents to the project, who have asked him to oppose the project based on the limited groundwater resources in the area and the high density of the project.

> **1803A.01: The applicant has demonstrated that the water rights can be used for the proposed uses.**
> *Staff Comment: The applicant has submitted water documentation that demonstrates PWWD has the necessary water rights to serve the proposed uses and water demands generated by the subdivision. Such water rights can be used for the residential and open space uses within the project. CDWR and the County's water consultant RESPEC reviewed the application and indicated that the amount of water is adequate to annually serve the subdivision without injuring other decreed water rights.*
>
> **1803A.02: The reliability of a renewable right has been analyzed and is deemed sufficient by the County on its priority date within the Colorado System of Water Rights Administration.**
> *Staff Comment: No new renewable water rights are proposed to serve the development.*
>
> **1803A.03: The Water Plan is deemed adequate and feasible by the County to ensure that water supply shortage will not occur due to variations in the hydrologic cycle.**
> *Staff Comment: A Water Plan is not required for review of proposed service by a special district. PWWD notes that it is physically and economically feasible to extend service to the proposed subdivision.*

1803A.04: The Water Plan is sufficient to meet the demand applicable to the project based on the minimum water demand standards in Section 1805A herein.
Staff Comment: A Water Plan is not required for review of proposed water service by a special district. PWWD acknowledges its willingness and ability to serve the proposed subdivision.

403.04: Provides for a public wastewater collection and treatment system and, if other methods of wastewater collection and treatment are proposed, such systems comply with State and local laws and regulations.
Staff Comment: PWWD has committed to provide sanitary sewer collection and treatment facilities for the subdivision.

403.05: Identifies all areas of the proposed subdivision, which may involve soil or topographical conditions presenting hazards or requiring special precautions and the proposed uses of these areas are compatible with such conditions.
Staff Comment: The Pinery Meadows PD restricts residential development within Planning Area 2 which encumbers the floodplain. Site specific geotechnical investigations will be performed at the time of building permit requests to determine appropriate soils mitigations and foundation design.

403.06: Provides adequate drainage improvements.
Staff Comment: A Phase II Drainage Report has been reviewed by Engineering and found to be acceptable. A detention pond is proposed within Tract C to be owned and maintained by the District.

403.07: Provides adequate transportation improvements.
Staff Comment: The applicant's traffic analysis has been reviewed by Engineering. Per the Pinery Meadows PD, the applicant will be responsible to provide a pro-rata share of the required traffic signal improvements to the intersection of Scott Avenue and State Highway 83 and 50 percent of the traffic signal cost for the intersection of Pinery Center Boulevard and Scott Avenue which will be secured via an improvements agreement at the time of final plat.

403.08: Protects significant cultural, archaeological, natural, and historical resources, and unique landforms.
Staff Comment: As reflected in proposed condition #7, the applicant shall take all reasonable care to watch for historic resources, paleontological resources, and other cultural history resources during construction activity, and shall immediately notify Douglas County in the event of such discovery.

403.09: Has available all necessary services, including fire and police protection, recreation facilities, utility services, streets, and open space to serve the proposed subdivision.

Staff Comment: The development is served by South Metro, DCSO, Xcel Energy, CORE, and other utility providers within the area. The roads established with this subdivision will be public and privately owned and maintained and conveyed to the County and District or HOA at the time of final plat.

403.10: Does not interfere with the extraction of any known commercial mining deposit.
Staff Comment: No known commercially viable mining deposits will be interfered with by this application.

Appeal to Water Supply Standards Analysis
Section 18A of the Zoning Resolution establishes approval criteria for appeals to the water supply standards. In this case, the applicant is requesting a deferment of the inclusion requirement of Section 1805A.01.2 of the DCZR until the final plat stage of review and approval. The regulations state that an appeal shall be approved only upon the finding, based upon the evidence presented in each specific case, that:

1. The request will not be detrimental to the health, safety, or welfare of the present or future inhabitants of the County.
Staff Comment: The applicant must demonstrate that the appeal does not negate the provision of an adequate water supply as needed to provide for the health, safety, and welfare of future residents of the community. The applicant's water documentation demonstrates that PWWD has the necessary water rights to serve the proposed subdivision and that the amount of water is adequate to annually serve the development without injuring other decreed water rights. The applicant requests that formal inclusion into the PWWD be deferred to the final plat stage of review and approval. The applicant has indicated in its written request for the appeal that the inclusion process is underway. A complete application for inclusion was submitted to the PWWD on February 4, 2025.

2. For appeals to the minimum water demand standards set forth in Section 1804A or to the water supply standards set forth in Sections 1805A through 1809A, the application provides for a water supply that is sufficient in terms of quantity, quality, and dependability.
Staff Comment: The applicant has not appealed the demand standards related to the proposed water supply. Therefore, this criterion is not applicable.

3. For appeals to the timing of determining the adequacy of the water supply, the application identifies the stage at which the determination of adequacy shall be made.
Staff Comment: The applicant has not appealed the timing for determining the adequacy of water supply. As proposed, the Planning Commission and Board will determine the adequacy of the water supply with this preliminary plan request, but that determination would need to be conditioned upon formal inclusion within the PWWD during the final plat application.

VIII. STAFF ASSESSMENT

Should the Planning Commission find that the approval standards for the appeal are met, the following proposed condition should be considered for inclusion in the recommendation to the Board of County Commissioners.

1. Evidence of PWWD formal approval of inclusion shall be provided prior to the Board meeting on the final plat request.

Should the Planning Commission find that the approval standards for the preliminary plan are met, the following proposed conditions should be considered for inclusion in the recommendation to the Board of County Commissioners. Many of these conditions are intended to track specific requirements and commitments that must be met as part of the subsequent final plat application.

1. Prior to Board action on the preliminary plan, the associated water appeal shall be approved.

2. Prior to recordation of the final plat, the applicant shall pay $500 per unit to Douglas County for future park and trail improvements within the area.

3. Prior to recordation of the final plat, a homeowners' association or Metro District shall be established for ownership and maintenance purposes of the tracts within the proposed subdivision.

4. Prior to recordation of the final plat, required park land dedication shall be provided or cash-in-lieu fees paid in accordance with Article 10 of the Subdivision resolution.

5. Prior to recordation of the final plat, required cash-in-lieu of school land dedication shall be paid in accordance with Article 10 of the Subdivision Resolution.

6. Prior to the Board's action on the final plat request, the subdivision shall be formally included within the Pinery Water and Wastewater District by District Court action.

7. During construction activity within the development, the applicant, its successors and assigns shall take all reasonable care to watch for historic resources, paleontological resources, and other cultural history resources and shall immediately notify Douglas County and complete appropriate Colorado Office of Archaeology and Historic Preservation data management forms in the event of such discovery.

8. Colorado Division of Wildlife literature shall be made available to both prospective homeowners and homebuyers concerning the possible presence of wildlife and shall be available at all times.

9. During construction activity within the development, the applicant, its successors and assigns shall conduct a burrowing owl study if any earth moving will take place between March 15 and October 31.

10. Technical corrections to the record copy of the preliminary plan exhibit shall be made to the satisfaction of Douglas County.

ATTACHMENTS **PAGE**

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LAND USE APPLICATION

Please complete, sign, and date this application. Return it with the required items listed on the Submittal Checklist to planningsubmittals@douglas.co.us. Submittals may also be mailed or submitted in person to Planning Services. *NOTE: The Planning Commission or the Board of County Commissioners should not be contacted regarding an open application.*

OFFICE USE ONLY	
PROJECT TITLE:	**Pinery Meadows Preliminary Plan**
PROJECT NUMBER:	**SB2025-009**

PROJECT TYPE: Mixed product single-family residential development

MARKETING NAME: Pinery Meadows

PRESUBMITTAL REVIEW PROJECT NUMBER: PS2025-004

PROJECT SITE:

Address: North of Scott Ave., west of Parker Rd, south of Pinery West residential subdivision

State Parcel Number(s): 2349-100-00-025

Subdivision/Block#/Lot# *(if platted)*:

PROPERTY OWNER(S):

Name(s): Fuad Abdalla Khalaf & Iyad Khalaf Et Al

Address: 11587 E. Florida Ave., Aurora, CO 80012

Phone:

Email:

AUTHORIZED REPRESENTATIVE: *(Notarized Letter of Authorization is required from the property owner, unless the owner is acting as the representative)*

Name: Jerry Richmond

Address: 7200 S. Alton Way, Suite C400 Centennial, CO 80112

Phone: 303.267.6255

Email:

To the best of my knowledge, the information contained on this application is true and correct. I have received the County's information sheet regarding the *Preble's Meadow Jumping Mouse*.

Jerry B Richmond
Applicant Signature

March 4, 2025
Date

NORRIS DESIGN
PEOPLE + PLACEMAKING
1101 Bannock Street
Denver, Colorado 80204
303.892.1166

April 15, 2025

Eric Pavlinek
Douglas County Department of Community Development
100 Third St,
Castle Rock, CO 80104

RE: Pinery Meadows, Preliminary Plan Submittal 02

Dear Eric Pavlinek,

On behalf of Integrity Land Ventures, we are pleased to submit this Preliminary Plan application for the Pinery Meadows project. The consultants listed below have been assembled to realize this plan and we look forward to working closely with Douglas County to make this project a success.

Owner:
Fuad Abdallah Khalaf & Iyad Khalaf Et Al
11587 E. Florida Ave.
Aurora, CO 80012

Developer:
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7200 S. Alton Way, Suite C400
Centennial, CO 80112
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Contact: Jerry Richmond
jerry@integritylandventures.com

Civil Engineer:
Roth Lang Engineering Group, LLC
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Contact: Kurt Lang, PE
klang@rothlang.com

Planner and Landscape Architect:
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Contact: Carl Runge
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Traffic Engineer:
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1889 York Street
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303.333.1105
Contact: Chris McGranahan, PE
csmcgranahan@lsctrans.com

Noise Study:
LSC Transportation Consultants
1889 York Street
Denver, Colorado 80206
303.333.1105
Contact: Kirstin Ferrin
lsc@lscdenver.com

PROJECT BACKGROUND AND SITE CONTEXT

This proposal is for a Preliminary Plan for Pinery Meadows to allow for the subject property to be developed with a mix of 40 single family attached (duplex) and 96 single family detached residential lots. The subject property is approximately 39.5 acres in total, with development of this preliminary plan occurring on 24.5 acres comprising Planning Area 1 of the approved Pinery Meadows Planned Development (PMPD). The subject property is bordered to the north by the Pinery West residential subdivision, to the east by Parker Rd (HWY 83), to the west by Cherry Creek, and to the south by a multifamily development currently under review by the County.

The allowed land uses for the subject property include single family residential, with an allowed maximum unit count of 170 at a gross density of 6.7 DU/AC . The density proposed with this preliminary plan is 5.5 DU/AC, below the allowed maximum. All development within the subject property shall be subject to the design standards established by the approved PMPD.

The subject parcel is gradually sloped and features no significant natural features including viewsheds, mature vegetation and geological features. The site generally slopes northeast to southwest from Parker Road. The site has been featureless for most of its existence and because of this the site features have little to contribute to the design of the site. Drainage is being handled as discussed in the drainage report included with this submittal and will improve the existing drainage in the area.

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303.892.1166

COMPLIANCE WITH THE DOUGLAS COUNTY COMPREHENSIVE MASTER PLAN (CMP)

The County's Comprehensive Master Plan (CMP) has designated the area the Pinery Meadows site is located in as the Pinery Separated Urban Area (SUA) where urban level development and redevelopment is anticipated. More specifically, this property is located in distinct natural area 2 of the Pinery SUA, the Cherry Creek Valley. With its proximity to Cherry Creek and its floodplain, the entirety of the western portion of the site is intended to be left alone to allow the existing open space and floodplain to continue operating in their natural states. The density proposed by this project is consistent with the goals outlined for SUA's, as well as what was established by the Pinery Meadows Planned Development (PMPD). Some noted goals stated in the CMP for the Pinery SUA, and this project's achievement of them, are as follows:

Goal 2-1 - Improve and enhance existing infrastructure; support healthy living; reduce vehicle miles travelled; maintain air quality standards; and conserve open space.

This development will be installing all necessary infrastructure to complement and build upon what is already existing in the area. The site is being developed in a manner that will promote pedestrian access internally, and is located just south of the planned Pinery Village commercial development where residents will have convenient vehicular and pedestrian access to daily needs. Air quality will not be compromised by this development as it is strictly residential dwelling units. The entirety of the site west of the planned extension of Pinery Center Blvd (called Planning Area 2 in the PMPD), comprising roughly 15.0 acres (38%) of the total site area, is to remain undeveloped open space and floodplain for the Cherry Creek. Additionally, the residential portion within Planning Area 1 will feature a central open space amenity, and periphery open space landscape buffers around residential lots.

Goal 2-9 - Ensure development occurs concurrently with essential services and infrastructure

Development of the Pinery Meadows property will occur concurrently with the construction/installation of all required essential services and infrastructure including but not limited to stormwater facilities, water and electric services, and wastewater services.

Goal 2-15 - Preserve the integrity of the Separated Urban Areas

This development will be entirely within the Pinery SUA, and there is no expanded or new land proposed to be added to this SUA as part of this development. The PMPD will be integrated into and complement the existing framework of adjacent developments to promote pedestrian and vehicular connectivity across the Pinery SUA. This will be urban level development in an existing urban area.

Goal 6-2 - Develop and maintain an efficient and safe road network in harmony with natural features and existing neighborhoods

The road infrastructure for the development is being designed per Douglas County design criteria, and will tie into adjacent existing networks to create a cohesive roadway system within the Pinery SUA. The extension of Pinery Center Blvd collector road from the Pinery Village development to the north to Scott Avenue to the south will occur through the site, connecting two existing roads as previously planned and outlined in the approved PMPD. Residential roads within the development will feed into this collector road in a manner consistent with County requirements and will not generate traffic beyond designed levels.

Goal 8-6 - Maintain appropriate noise levels

As part of this development process, a sound study has been conducted and is included in the application package. All residential structures being proposed will respect the sound line associated with Parker Rd, as defined in the

sound study. As this is a strictly residential development, no substantial noise levels that would adversely affect adjacent properties and wildlife will be generated.

PRELIMINARY PLAN APPROVAL CRITERIA

Per Section 403 of the Douglas County Subdivision Resolution, a preliminary plan may be approved upon the finding by the Board that the preliminary plan:

403.01 Conforms with the goals, objectives, and policies of the Master Plan.
The proposed project conforms to the Master Plan in that it provides more housing to meet the needs of future residents, while adhering to the development standards found in the HRPD Section VI – Low Density, Medium Low Density, and Medium Density One-Family Residential of the HRPD. This will be urban level development in an existing urban area.

403.02 Addresses the design elements established in Article 4, Section 404.
The proposed project adheres to the design elements established in Article 4, Section 404, in that:

1. Lots are designed to be an appropriate size and configuration to meet all minimum requirements of the zone district standards set forth in the approved Pinery Meadows Planned Development
2. All potential site hazards have been considered with mitigation or avoidance in mind
3. Conflicts between site and surrounding land uses are minimized
4. Public facilities such as streets, storm and sewer, along with dry utilities, are taken into account.
5. The site's natural features are integrated into the design of the development
6. Archeological and cultural resources are protected, and other potential conflicts are considered in the design.
7. The site is laid out to accommodate safe connections for vehicles as well as pedestrians

403.03 Conforms with Section 18A, Water Supply - Overlay District, of the Zoning Resolution.
The proposed project conforms to Section 18A in that adequate water supply is provided and meets the minimum demands for future residents. A will serve letter from Pinery Water and Wastewater District is provided with this submittal.

403.04 Provides for a public wastewater collection and treatment system and, if other methods of wastewater collection and treatment are proposed, such systems comply with State and local laws and regulations.
Public wastewater collection and treatment will be provided and will comply with the requirements of Douglas County and Pinery Water and Wastewater District.

403.05 Identifies all areas of the proposed subdivision, which may involve soil or topographical conditions presenting hazards or requiring special precautions and the proposed uses of these areas are compatible with such conditions.
Any soil or topographical conditions presenting hazards that may be discovered throughout the project lifecycle will be mitigated in a manner that is compatible with the conditions presented. At this time, no such conditions have been identified.

403.06 Provides adequate drainage improvements.
Adequate drainage for the proposed project is provided and detailed in the Phase II Drainage Report, which is included in this submittal.

403.07 Provides adequate transportation improvements.
Adequate transportation improvements are provided for this project and detailed in the Traffic Impact Study, which is included in this submittal.

NORRIS DESIGN
PEOPLE + PLACEMAKING
1101 Bannock Street
Denver, Colorado 80204
303.892.1166

403.08 Protects significant cultural, archaeological, natural, and historical resources and unique landforms.
No significant cultural, archaeological, natural or historical resources have been discovered on the project site. A biological assessment and cultural resources record review was completed for this site and has been included with this submittal.

403.09 Has available all necessary services, including fire and police protection, recreation facilities, utility services, streets, and open space to serve the proposed subdivision.
The proposed project has all available services, including fire and police protection, utility services, street maintenance, recreation facilities and open spaces needed to serve future residents. Applicable will serve letters are included in this submittal.

403.10 Does not interfere with the extraction of any known commercial mining deposit.
At this time, no known mining deposits have been identified in the project area. As such, this project does not interfere with any mining extractions.

We appreciate the Douglas County staff's review of this Preliminary Plan, and look forward to receiving your comments soon. Please do not hesitate to contact me at 303.892.1166 or at crunge@norris-design.com with any questions you may have.

Sincerely,

Norris Design



Carl Runge
Senior Associate

PINERY
WATER AND WASTEWATER DISTRICT
Quality Water for Life

October 30, 2024
Integrity Land Ventures, LLC
7200 S. Alton Way, Suite 400
Centennial, CO 80112

RE: Pinery Meadows, State Parcel Number: 2349-100-00-025

Pursuant to Section 1806A.02 of the Douglas County Zoning Resolution, the Pinery Water & Wastewater District (the "District") acknowledges its willingness and ability to serve the proposed subdivision with water and wastewater service, subject to certain conditions listed below.

- Conditions of service:
  - Successful Inclusion into the District
  - Entering into an Inclusion Agreement, the terms of which shall include, without limitation:
    - Dedicate certain water and water rights underlying the proposed subdivision.
    - Payment of Renewable Water Resource Fee prior to recordation of Final Plat, at the then current rate. The current rate at the time of this letter is $11,550 per Single Family Equivalent (SFE), calculated as follows [#of SFE * 0.55 * 0.70 * $30,000]
    - Payment of Wastewater Plant Upgrade Fee prior to recordation of Final Plat at the then current rate. The current rate at the time of this letter is $8,633 per SFE.
  - Entering into a Developer Service Agreement concerning the construction, maintenance, and ownership of facilities necessary to serve the proposed subdivision.

Water Demand

Based on the proposed 170 single family units, two 3/4" irrigation meters, for a total estimated 172 single family equivalents (SFE's) equaling 0.55 acre-feet/year/SFE, the proposed development will require 94.6 acre-feet/year.

Water Supply

Please find enclosed a copy of our District's Present and Future Water Sources report that the District has provided the State Division of Water Resources as required by Section 30-28-136(1)(h)(ii), C.R.S.

Water Quality

The District is in compliance with the Colorado Department of Public Health and Environment testing and quality requirements.

If you have additional questions or concerns, please feel free to call.

Sincerely,

Heather Beasley,
District Manager

Present and Future Water Sources
Denver Southeast Suburban Water & Sanitation District

Prepared by HRS Water Consultants, Inc. in Consultation with Denver Southeast Suburban Water & Sanitation District
May 2014
Updated February 2018

A. General

The Denver Southeast Suburban Water and Sanitation District AKA Pinery Water and Wastewater District (DSSWSD) has three types or sources of water for present and future water supply. These are tributary shallow wells constructed in the Cherry Creek alluvium and deep non-tributary Denver Basin Aquifer wells and the WISE water supply. The shallower alluvial wells have water rights from the senior Harrison and Haley Ditch rights, along with junior water rights which are covered under existing plans for augmentation in Case No. W-6862 and (Case No. 11CW198). The annual appropriation for the deep Denver Basin aquifer wells is derived from: 1) Pre Senate Bill 213 wells; 2) District decrees; 3) Decrees from others that have been included in the District. In total, DSSWSD has water rights for a maximum of 15,037 af/yr. The District is a member of the WISE Authority and has subscribed to 500 af/yr, on average of renewable and reusable water.

B. Water Rights Considerations

The pumping of the shallow wells constructed in the Cherry Creek alluvium is covered by the District's existing plan for augmentation (W-6268) and 11CW198 which adds additional tributary wells and water sources. The augmentation plan, W-6268 allows for tributary pumping using three sources:

1. In-priority pumping based upon the historic use from the senior Harrison and Haley ditch rights totaling 1,220 acre-feet per year;
2. Infrequent in-priority pumping under the junior well water rights;
3. Out-of-priority pumping derived from return flow credit from District use of non-tributary (pre-S.B. 213) wells pursuant to the plan for augmentation.

The augmentation plan, 11CW198, includes additional alluvial wells, nontributary water rights not included in the augmentation plan, and additional water sources. These sources include W-6268:

4. Infrequent in-priority pumping under new alluvial well water rights;
5. Additional nontributary water rights and wells;
6. Water available from the Cherry Creek Project Water Authority;
7. Water available through the WISE project;
8. Out-of-priority alluvial well pumping to be allowed under the new plan for augmentation and derived from return flow credits and/or direct releases and exchanges from the above sources.

The District has acquired a substantial amount of non-tributary ground water through adjudications by the District or Senior Corp., or through inclusions into the District, or by direct purchase. The attached Table 1 provides a summary of the various decreed non-tributary rights and annual appropriations.

The primary source of non-tributary ground water currently in use by the District is from the original set of Pre-Senate Bill 213 (Pre-S.B. 213) wells which are referenced in the augmentation plan in Case No. W-6268 and three associated decrees (W-6265, W-6267 and W-7241). These are the wells designated as A through M. Because part of the original appropriations for wells A, B and J have been reduced, and Well C has been abandoned, the present total availability of non-tributary water for this set of wells is 1,865 acre-feet per year (af/yr).

The District acquired water rights from Senior Corp., initially for property east of Highway 83 and then for property west of the highway. These rights were originally filed together under applications for each of the four Denver basin aquifers, but were then separated into two sets of decrees based on lands east and west of Highway 83. Non-tributary rights acquired from Senior Corp. for the District area east of the highway total 2,261 af/yr, and 3,051 af/yr for the west area.

The District also acquired the non-tributary water rights associated with the Gondolier Farms which was decreed in Case No. 84CW208. These rights total 885 af/yr.

In Case No. 85CW203, the District adjudicated all remaining water underlying District lands east of Highway 83 which had not previously been adjudicated in any of the above-described decrees. This decree also recovered a portion of the water made available by the reduction in appropriations for Pre-S.B. 213 wells A, B, C and J. The total non-tributary ground water made available under this decree is 2,466 af/yr.

The District has also obtained additional decreed ground water rights by inclusion of the Reata South (1,608 af/yr) and Vistancia/Scott Road (184 af/yr) developments. In addition the District purchased decreed ground water rights from the Evans Ranch in the amount of 1,146 af/yr. These additional rights total 2,938 af/yr.

All of the above-described decrees provide additional non-tributary ground water for District use beyond the amount originally included in the District augmentation plan. The total of these additional rights is 11,601 af/yr. When combined with the original Pre-S.B. 213 well appropriations, the District has a total non-tributary ground water supply of about 13,466 af/yr. It should be noted that several of the listed decrees include provisions where the final ground water appropriation may be changed based on site-specific data at the time wells are drilled. Based on past experience, such data is not likely to change the decreed appropriations more than plus or minus 5 percent.

The decree in Case No. W-6268 also includes changes in use for the District's 5/9 interest in the Harrison Ditch, and the 85% interest in the Haley Ditch. The decree made findings of a combined total 1220 af/yr may be pumped through certain District alluvial wells as alternate points of diversion and used directly for municipal purposes. With priorities of May 30, 1874,

and July 1, 1873, respectively, these are some of the most senior rights on Cherry Creek and provide a firm yield of 1,220 af/y.

Under the existing augmentation plan in Case No. W-6268, the District can utilize return flows from municipal use of non-tributary water supplied by the District's Denver Basin aquifer wells as credits against out-of-priority tributary well pumping. Under the augmentation plan, return flow credits for non-tributary pumping are calculated based on the monthly consumptive use percentages included in Paragraph 22 of the decree. Depletions from tributary well pumping are calculated as equal to the monthly consumptive use percentages. The credits for return flows are then applied to offset the calculated depletions on an annual basis. As long as the total non-tributary return flows equal or exceed the total tributary well depletions at the end of the year, the District's augmentation plan is in compliance and no injury to other water rights will occur.

Under the plan for augmentation in Case No. 11CW198, additional nontributary water rights and associated return flow credits are included as augmentation sources to also allow for additional tributary well pumping. Up to eight additional alluvial wells (2 currently in use) can be added under the plan. Depletions from out-of-priority pumping from the alluvial wells will be offset from return flows from nontributary well pumping under the plan, as well as other sources. These other sources include water available to the District through its participation in the Cherry Creek Project Water Authority and the WISE project, a plan by which excess water from Denver and Aurora is made available via pipeline for use by several south metro area water providers. The augmentation plan also includes provisions to maximize use and flexibility for the various water sources via exchanges and storage, including aquifer storage and recovery.

The water listed in Table 1 under the Broe Aug Plan and Rosie Wells decree (Broe) can only be used for future development of the Broe property.

C. Requirements

The water requirements of DSSWSD has varied over the years, depending upon stage of buildout and precipitation. Table 2 shows the recorded use during the past 35 years. As can be noted, the system use has nearly tripled since 1982 to a total of 3,098 af in the water year 2017. Projected build out water use for the District is estimated to be 4,200 af/y.

D. Summary of Uses and Projected Dry Year and Average YearYields

The tabulation below shows water used from 2002 – 2017 within the existing system. The uses within the District should be more than covered by the 15,037 af/yr of water for which the District has water rights.

The yield of the Districts Denver Basin water rights will not be affected by a dry year. Thus the dry year and average year yield will be the same and will be as decreed, with a total of up to 13,800 af/y of decreed rights available.

The District’s Cherry Creek alluvial water rights can be impacted by a dry year in terms of both physical supply and water available through the administration of water rights. The most

senior water rights for the Haley and Harrison ditches have a firm yield of 1,220 af/y. When both the junior and senior alluvial well water rights are combined with Denver Basin water under the District augmentation plans, the actual yield of the alluvial wells is greater. During drought years from 2002 through 2004, total alluvial well pumping was in the range of 1,700 to 2,000 af/y. Based on those years, the dry year yield of the alluvial wells can be considered to be 1,700 af/y. The expected average yield of the alluvial water rights is about 2,150 af/y.

The current and proposed uses of the District's water rights are the same and are for all uses. These uses correspond to the existing decreed water rights of the District.

Year	Tributary (af/yr)	Non-Tributary (af/yr)	Total (af/yr)
2002	2,002	832	2,834
2003	1,730	687	2,417
2004	1,852	360	2,211
2005	2,088	652	2,740
2006	2,704	811	3,514
2007	2,474	613	3,087
2008	2,450	1021	3,470
2009	1,928	608	2,537
2010	2,160	1150	3,310
2011	2,536	769	3,305
2012	2,198	1273	3,471
2013	1,704	1195	2,898
2014	1801	896	2698
2015	2036	741	2777
2016	2015	962	2977
2017	2155	943	3098

TABLE I

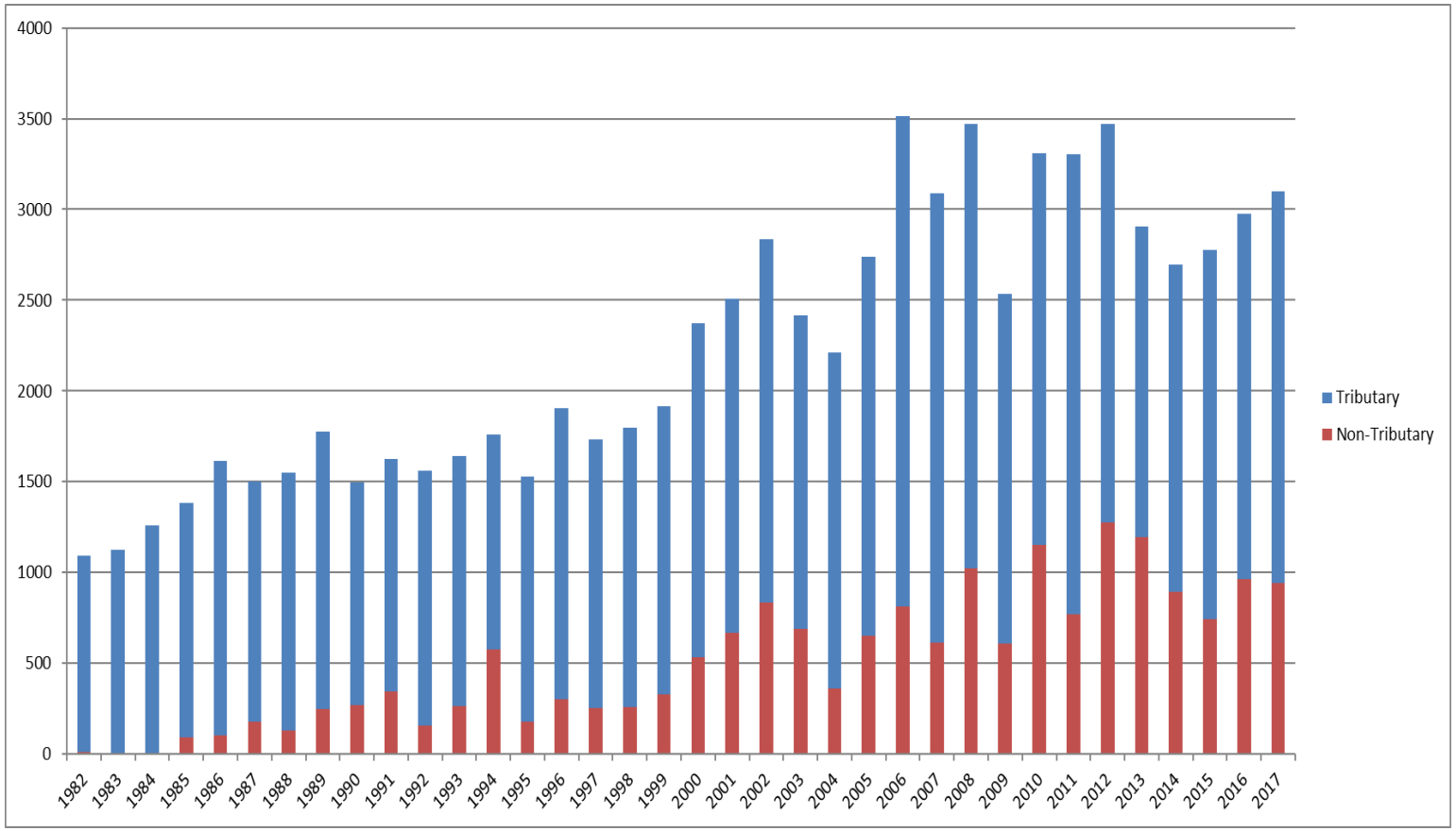
Denver Southeast Suburban Water & Sanitation District

Water Rights Summary

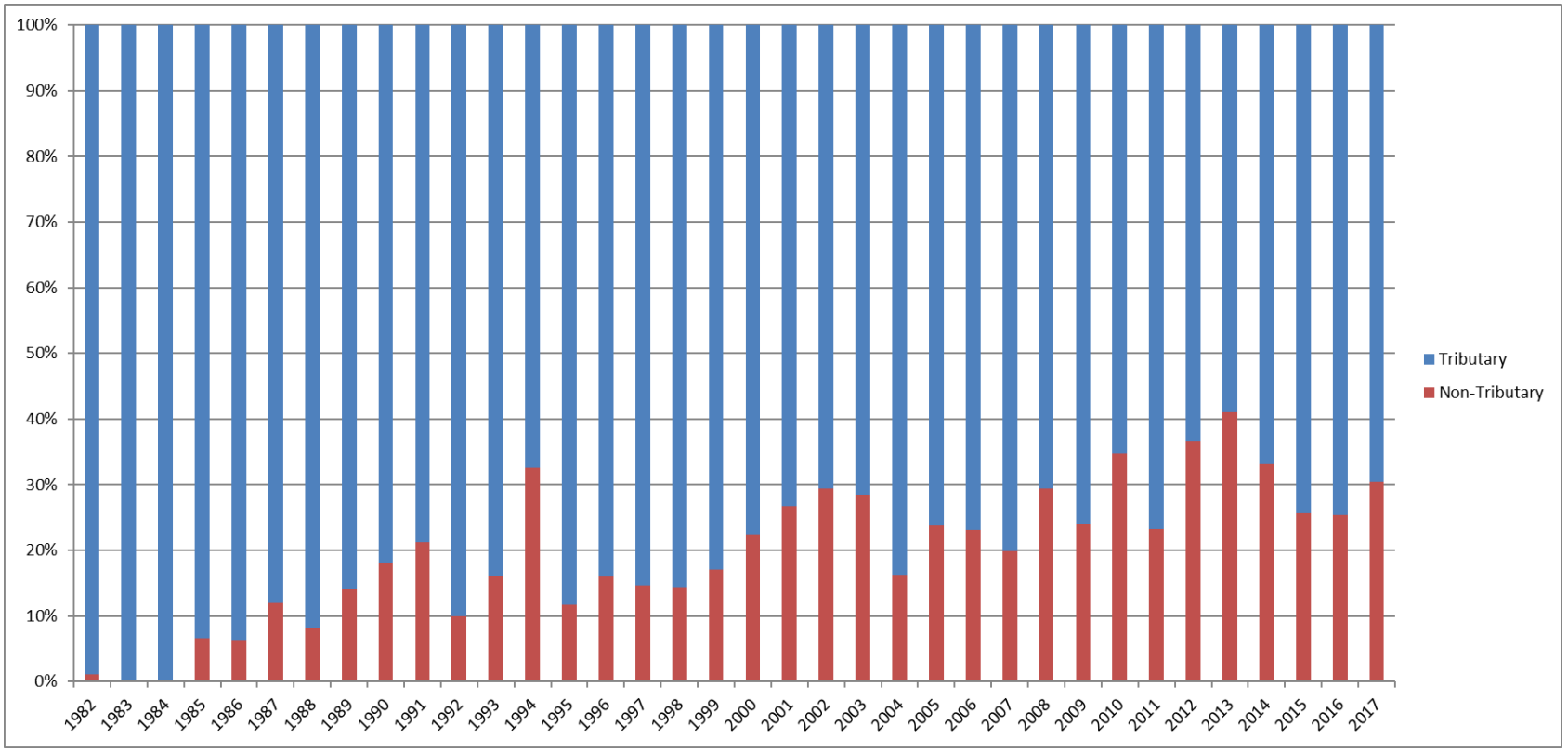
Case No.	Description	Decreed Amount (af/yr)	Subtotals (af/yr)
A. Tributary Water Rights			
W-6268	Harrison & Haley Ditchs	1220	**1220**
W-6268	Junior Water Rights	Variable	
B. Nontributary Water Rights			
W-6265	Wells A, B and C	243	
W-6267	Well J	103	
W-7241	Wells F,G,H,I,K,L and M	1519	
	Pre-S.B. 213 Wells Subtotal:		**1865**
	(amount w/Current Aug Plan in W-6268)		**3085**
83CW087E	Senior Corp. East Side - Arapahoe	1202	
83CW088E	Senior Corp. East Side - Denver	240	
83CW089E	Senior Corp. East Side - Dawson	305	
83CW090E	Senior Corp. East Side - LFH	514	
	Senior Corp East Side Subtotal:		**2261**
82CW087W	Senior Corp. West Side - Arapahoe	1823	
83CW088W	Senior Corp. West Side - Denver	396	
83CW089W	Senior Corp. West Side - Dawson	154	
83CW090W	Senior Corp. West Side - LFH	678	
	Senior Corp West Side Subtotal:		**3051**
84CW208	Gondolier Farms Decree	885	
85CW203	DSSWSD Nontributary Determination	2466	
89CW086, 087, 088, and 089	Reata South	1608	
93CW146 & 2003CW344	Evans Ranch	1146	
85CW139	Wolf/Vistancia/Scott Road	184	
	Additional Nontributary Water Subtotal:		**6289**
	Total Nontributary Water:		**13,466**
Nontributary Water Assigned to Broe Aug Plan (87CW338)			
82CW418	Rosie Wells Decree (Broe)	351	**351**
C. Total Water Sources, including Broe			**15,037**

Pinery Water and Wastewater District
Water Use based on Water Year
Table 2

	(in ac.ft.) Tributary	Non-Tributary	Total
1982	1,080	12	1,091
1983	1,123	0	1,123
1984	1,258	0	1,258
1985	1,292	91	1,384
1986	1,511	103	1,614
1987	1,324	179	1,504
1988	1,422	127	1,549
1989	1,527	250	1,777
1990	1,225	271	1,496
1991	1,282	344	1,626
1992	1,407	156	1,563
1993	1,379	265	1,644
1994	1,184	574	1,758
1995	1,351	178	1,529
1996	1,601	303	1,904
1997	1,477	254	1,731
1998	1,537	257	1,795
1999	1588	326	1,914
2000	1,838	533	2,371
2001	1,839	669	2,508
2002	2,002	832	2,834
2003	1,730	687	2,417
2004	1,852	360	2,211
2005	2,088	652	2,740
2006	2,704	811	3,514
2007	2,474	613	3,087
2008	2,450	1021	3,470
2009	1,928	608	2,537
2010	2,160	1150	3,310
2011	2,536	769	3,305
2012	2,198	1273	3,471
2013	1,709	1195	2,903
2014	1,801	896	2,698
2015	2,036	741	2,777
2016	2,015	962	2,977
2017	2,155	943	3,098



	(in ac.ft.) Tributary	Non-Tributary
1982	98.9%	1.1%
1983	100.0%	0.0%
1984	100.0%	0.0%
1985	93.4%	6.6%
1986	93.6%	6.4%
1987	88.1%	11.9%
1988	91.8%	8.2%
1989	85.9%	14.1%
1990	81.9%	18.1%
1991	78.8%	21.2%
1992	90.0%	10.0%
1993	83.9%	16.1%
1994	67.3%	32.7%
1995	88.3%	11.7%
1996	84.1%	15.9%
1997	85.3%	14.7%
1998	85.7%	14.3%
1999	83.0%	17.0%
2000	77.5%	22.5%
2001	73.3%	26.7%
2002	70.6%	29.4%
2003	71.6%	28.4%
2004	83.7%	16.3%
2005	76.2%	23.8%
2006	76.9%	23.1%
2007	80.1%	19.9%
2008	70.6%	29.4%
2009	76.0%	24.0%
2010	65.3%	34.7%
2011	76.7%	23.3%
2012	63.3%	36.7%
2013	58.9%	41.1%
2014	66.8%	33.2%
2015	73.3%	26.7%
2016	67.7%	32.3%
2017	69.6%	30.4%



May 21, 2025

Douglas County Planning Services
Attn: Eric Pavlinek, Principal Planner
100 Third Street
Castle Rock, CO 80104

RE: Request for Appeal to the Standards of Section 18A – Timing of Inclusion into Water District
Project Name: Pinery Meadows

Dear Mr. Pavlinek,

On behalf of the applicant for the Pinery Meadows project, we respectfully submit this formal Request for Appeal to the Standards of Section 18A of the Douglas County Zoning Resolution (DCZR). Specifically, this appeal pertains to Section 1806A.02.2(c), which requires property to be included in the servicing water district prior to Preliminary Plan approval.

We are requesting that the requirement for inclusion into the Pinery Water and Wastewater District (PWWD) be deferred until the Final Plat stage, and that the Preliminary Plan be considered complete based on the documentation submitted.

This appeal is made in accordance with Section 1808A.07(3) of the DCZR, which provides for appeals related to the timing of the determination of water supply adequacy, as long as the application identifies the stage at which such determination shall occur.

Justification for Appeal

- **Inclusion Application Submitted**
  A complete Inclusion Application for the Pinery Meadows project was submitted to PWWD on February 4, 2025, including legal descriptions, development phasing and density, water rights documentation, maps, ownership details, and financial information as required.
- **District Has Issued a Conditional Will Serve Letter**
  The PWWD Conditional Will Serve Letter, dated October 30, 2024, affirms the District's willingness and ability to serve the proposed development with both water and wastewater services. This commitment is subject to standard conditions including formal inclusion, execution of service agreements, and payment of fees—all of which are structured to occur prior to Final Plat recordation.

- **Consistency with Practice and Feasibility**
  Given that the development has provided the documentation necessary to demonstrate service feasibility and that the remaining conditions are customarily resolved at the Final Plat stage, it is both reasonable and consistent with past practice to defer inclusion until that time.
- **Meets Intent of Section 18A**
  The appeal complies with the intent of Section 18A to ensure that a proposed water supply is sufficient in quantity, quality, and dependability. The District's Will Serve Letter and its publicly available water portfolio demonstrate that this standard is met.

Request

We respectfully request that the Planning Commission and Board of County Commissioners approve this appeal and allow the inclusion requirement to be satisfied at the Final Plat stage rather than at Preliminary Plan approval.

Attachments

1. Exhibit A – Pinery Meadows Preliminary Plan
2. Exhibit B – PWWD Conditional Will Serve Letter dated October 30, 2024
3. Exhibit C – Inclusion Application submitted to PWWD on February 4, 2025

Thank you for your time and consideration. Please feel free to contact us with any questions or requests for further information.

Sincerely,

Jerry B. Richmond

Jerry B. Richmond, III
Integrity Land Ventures, LLC

EXHIBIT A

PINERY MEADOWS

PRELIMINARY PLAN

PLANNING AREAS 1 AND 2

LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO

39.53 ACRES, 136 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

SYMBOLS LEGEND	
1	NOISE RECIEVER LOCATION AND NUMBER (SEE SOUND LEVELS TABLE ON SHEET 1)(RE: NOISE IMPACT ANALYSIS BY LSC, DATED 3/7/25)

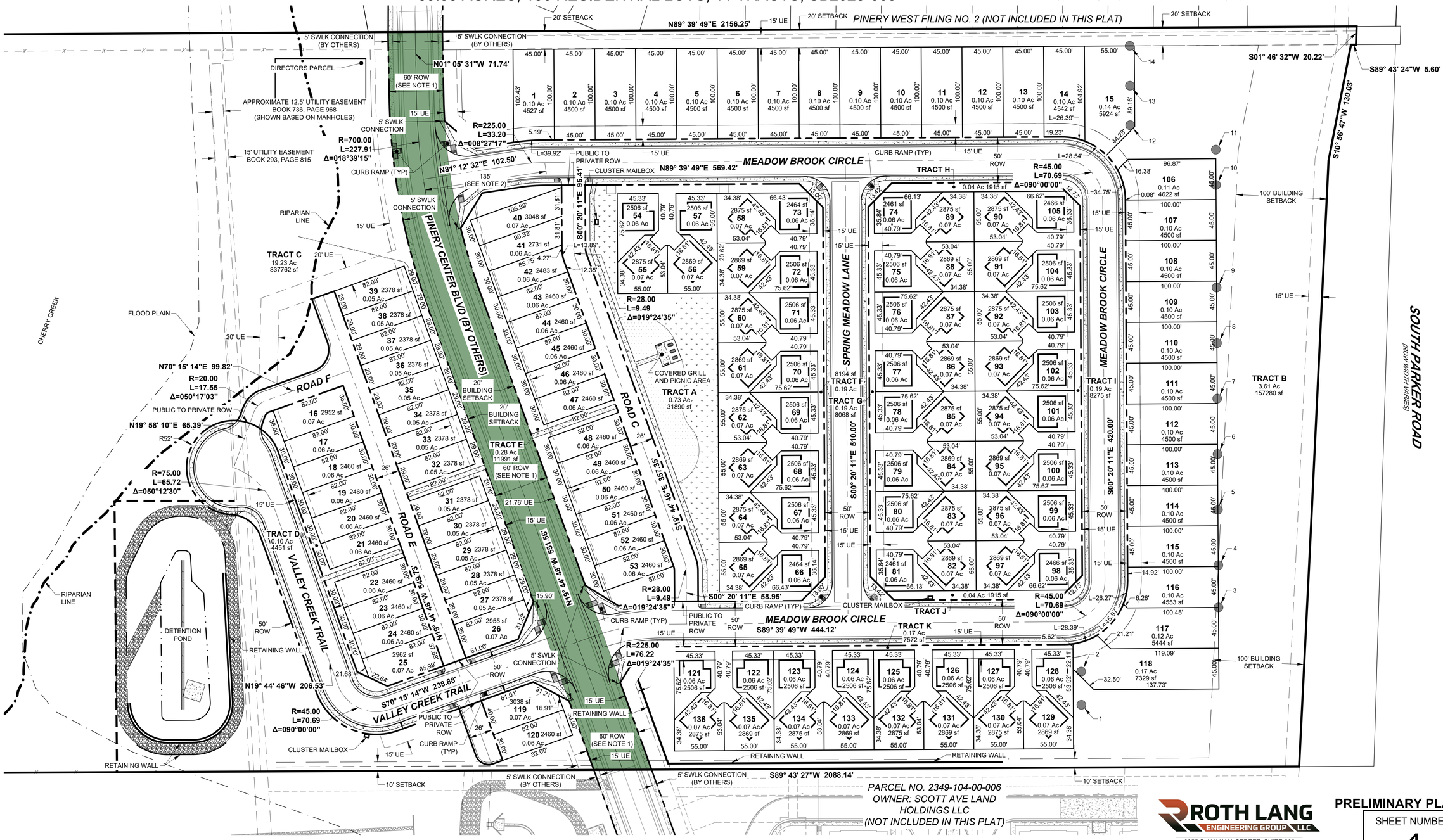
N

50 0 50

HORIZONTAL SCALE: 1" = 50'

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.
2. 135' IS THE DIMENSION FROM THE CENTERLINE OF PINERY CENTER BOULEVARD TO THE CENTERLINE OF THE DRIVEWAY FOR LOT 2.



ROTH LANG ENGINEERING GROUP LLC

6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

5/21/25

PRELIMINARY PLAN

SHEET NUMBER: 4

4 of 10

PINERY
WATER AND WASTEWATER DISTRICT
Quality Water for Life

EXHIBIT B

October 30, 2024
Integrity Land Ventures, LLC
7200 S. Alton Way, Suite 400
Centennial, CO 80112

RE: Pinery Meadows, State Parcel Number: 2349-100-00-025

Pursuant to Section 1806A.02 of the Douglas County Zoning Resolution, the Pinery Water & Wastewater District (the "District") acknowledges its willingness and ability to serve the proposed subdivision with water and wastewater service, subject to certain conditions listed below.

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Based on the proposed 170 single family units, two 3/4" irrigation meters, for a total estimated 172 single family equivalents (SFE's) equaling 0.55 acre-feet/year/SFE, the proposed development will require 94.6 acre-feet/year.

Water Supply

Please find enclosed a copy of our District's Present and Future Water Sources report that the District has provided the State Division of Water Resources as required by Section 30-28-136(1)(h)(ii), C.R.S.

Water Quality

The District is in compliance with the Colorado Department of Public Health and Environment testing and quality requirements.

If you have additional questions or concerns, please feel free to call.

Sincerely,

Heather Beasley,
District Manager

Present and Future Water Sources
Denver Southeast Suburban Water & Sanitation District

Prepared by HRS Water Consultants, Inc. in Consultation with Denver Southeast Suburban Water & Sanitation District
May 2014
Updated February 2018

A. General

The Denver Southeast Suburban Water and Sanitation District AKA Pinery Water and Wastewater District (DSSWSD) has three types or sources of water for present and future water supply. These are tributary shallow wells constructed in the Cherry Creek alluvium and deep non-tributary Denver Basin Aquifer wells and the WISE water supply. The shallower alluvial wells have water rights from the senior Harrison and Haley Ditch rights, along with junior water rights which are covered under existing plans for augmentation in Case No. W-6862 and (Case No. 11CW198). The annual appropriation for the deep Denver Basin aquifer wells is derived from: 1) Pre Senate Bill 213 wells; 2) District decrees; 3) Decrees from others that have been included in the District. In total, DSSWSD has water rights for a maximum of 15,037 af/yr. The District is a member of the WISE Authority and has subscribed to 500 af/yr, on average of renewable and reusable water.

B. Water Rights Considerations

The pumping of the shallow wells constructed in the Cherry Creek alluvium is covered by the District's existing plan for augmentation (W-6268) and 11CW198 which adds additional tributary wells and water sources. The augmentation plan, W-6268 allows for tributary pumping using three sources:

1. In-priority pumping based upon the historic use from the senior Harrison and Haley ditch rights totaling 1,220 acre-feet per year;
2. Infrequent in-priority pumping under the junior well water rights;
3. Out-of-priority pumping derived from return flow credit from District use of non-tributary (pre-S.B. 213) wells pursuant to the plan for augmentation.

The augmentation plan, 11CW198, includes additional alluvial wells, nontributary water rights not included in the augmentation plan, and additional water sources. These sources include W-6268:

4. Infrequent in-priority pumping under new alluvial well water rights;
5. Additional nontributary water rights and wells;
6. Water available from the Cherry Creek Project Water Authority;
7. Water available through the WISE project;
8. Out-of-priority alluvial well pumping to be allowed under the new plan for augmentation and derived from return flow credits and/or direct releases and exchanges from the above sources.

The District has acquired a substantial amount of non-tributary ground water through adjudications by the District or Senior Corp., or through inclusions into the District, or by direct purchase. The attached Table 1 provides a summary of the various decreed non-tributary rights and annual appropriations.

The primary source of non-tributary ground water currently in use by the District is from the original set of Pre-Senate Bill 213 (Pre-S.B. 213) wells which are referenced in the augmentation plan in Case No. W-6268 and three associated decrees (W-6265, W-6267 and W-7241). These are the wells designated as A through M. Because part of the original appropriations for wells A, B and J have been reduced, and Well C has been abandoned, the present total availability of non-tributary water for this set of wells is 1,865 acre-feet per year (af/yr).

The District acquired water rights from Senior Corp., initially for property east of Highway 83 and then for property west of the highway. These rights were originally filed together under applications for each of the four Denver basin aquifers, but were then separated into two sets of decrees based on lands east and west of Highway 83. Non-tributary rights acquired from Senior Corp. for the District area east of the highway total 2,261 af/yr, and 3,051 af/yr for the west area.

The District also acquired the non-tributary water rights associated with the Gondolier Farms which was decreed in Case No. 84CW208. These rights total 885 af/yr.

In Case No. 85CW203, the District adjudicated all remaining water underlying District lands east of Highway 83 which had not previously been adjudicated in any of the above-described decrees. This decree also recovered a portion of the water made available by the reduction in appropriations for Pre-S.B. 213 wells A, B, C and J. The total non-tributary ground water made available under this decree is 2,466 af/yr.

The District has also obtained additional decreed ground water rights by inclusion of the Reata South (1,608 af/yr) and Vistancia/Scott Road (184 af/yr) developments. In addition the District purchased decreed ground water rights from the Evans Ranch in the amount of 1,146 af/yr. These additional rights total 2,938 af/yr.

All of the above-described decrees provide additional non-tributary ground water for District use beyond the amount originally included in the District augmentation plan. The total of these additional rights is 11,601 af/yr. When combined with the original Pre-S.B. 213 well appropriations, the District has a total non-tributary ground water supply of about 13,466 af/yr. It should be noted that several of the listed decrees include provisions where the final ground water appropriation may be changed based on site-specific data at the time wells are drilled. Based on past experience, such data is not likely to change the decreed appropriations more than plus or minus 5 percent.

The decree in Case No. W-6268 also includes changes in use for the District's 5/9 interest in the Harrison Ditch, and the 85% interest in the Haley Ditch. The decree made findings of a combined total 1220 af/yr may be pumped through certain District alluvial wells as alternate points of diversion and used directly for municipal purposes. With priorities of May 30, 1874,

and July 1, 1873, respectively, these are some of the most senior rights on Cherry Creek and provide a firm yield of 1,220 af/y.

Under the existing augmentation plan in Case No. W-6268, the District can utilize return flows from municipal use of non-tributary water supplied by the District's Denver Basin aquifer wells as credits against out-of-priority tributary well pumping. Under the augmentation plan, return flow credits for non-tributary pumping are calculated based on the monthly consumptive use percentages included in Paragraph 22 of the decree. Depletions from tributary well pumping are calculated as equal to the monthly consumptive use percentages. The credits for return flows are then applied to offset the calculated depletions on an annual basis. As long as the total non-tributary return flows equal or exceed the total tributary well depletions at the end of the year, the District's augmentation plan is in compliance and no injury to other water rights will occur.

Under the plan for augmentation in Case No. 11CW198, additional nontributary water rights and associated return flow credits are included as augmentation sources to also allow for additional tributary well pumping. Up to eight additional alluvial wells (2 currently in use) can be added under the plan. Depletions from out-of-priority pumping from the alluvial wells will be offset from return flows from nontributary well pumping under the plan, as well as other sources. These other sources include water available to the District through its participation in the Cherry Creek Project Water Authority and the WISE project, a plan by which excess water from Denver and Aurora is made available via pipeline for use by several south metro area water providers. The augmentation plan also includes provisions to maximize use and flexibility for the various water sources via exchanges and storage, including aquifer storage and recovery.

The water listed in Table 1 under the Broe Aug Plan and Rosie Wells decree (Broe) can only be used for future development of the Broe property.

C. Requirements

The water requirements of DSSWSD has varied over the years, depending upon stage of buildout and precipitation. Table 2 shows the recorded use during the past 35 years. As can be noted, the system use has nearly tripled since 1982 to a total of 3,098 af in the water year 2017. Projected build out water use for the District is estimated to be 4,200 af/y.

D. Summary of Uses and Projected Dry Year and Average YearYields

The tabulation below shows water used from 2002 – 2017 within the existing system. The uses within the District should be more than covered by the 15,037 af/yr of water for which the District has water rights.

The yield of the Districts Denver Basin water rights will not be affected by a dry year. Thus the dry year and average year yield will be the same and will be as decreed, with a total of up to 13,800 af/y of decreed rights available.

The District’s Cherry Creek alluvial water rights can be impacted by a dry year in terms of both physical supply and water available through the administration of water rights. The most

senior water rights for the Haley and Harrison ditches have a firm yield of 1,220 af/y. When both the junior and senior alluvial well water rights are combined with Denver Basin water under the District augmentation plans, the actual yield of the alluvial wells is greater. During drought years from 2002 through 2004, total alluvial well pumping was in the range of 1,700 to 2,000 af/y. Based on those years, the dry year yield of the alluvial wells can be considered to be 1,700 af/y. The expected average yield of the alluvial water rights is about 2,150 af/y.

The current and proposed uses of the District's water rights are the same and are for all uses. These uses correspond to the existing decreed water rights of the District.

Year	Tributary (af/yr)	Non-Tributary (af/yr)	Total (af/yr)
2002	2,002	832	2,834
2003	1,730	687	2,417
2004	1,852	360	2,211
2005	2,088	652	2,740
2006	2,704	811	3,514
2007	2,474	613	3,087
2008	2,450	1021	3,470
2009	1,928	608	2,537
2010	2,160	1150	3,310
2011	2,536	769	3,305
2012	2,198	1273	3,471
2013	1,704	1195	2,898
2014	1801	896	2698
2015	2036	741	2777
2016	2015	962	2977
2017	2155	943	3098

TABLE I

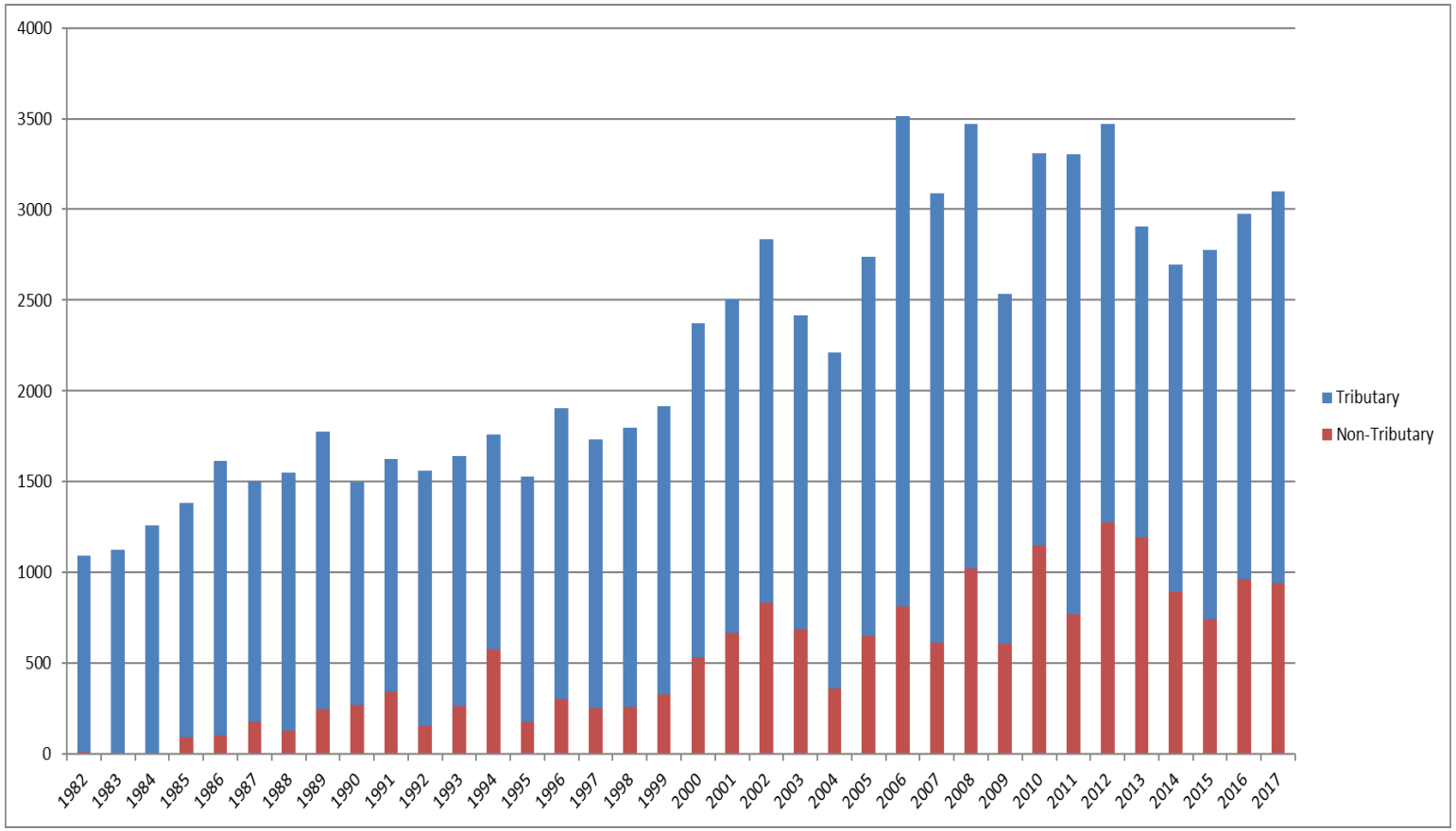
Denver Southeast Suburban Water & Sanitation District

Water Rights Summary

Case No.	Description	Decreed Amount (af/yr)	Subtotals (af/yr)
A. Tributary Water Rights			
W-6268	Harrison & Haley Ditchs	1220	**1220**
W-6268	Junior Water Rights	Variable	
B. Nontributary Water Rights			
W-6265	Wells A, B and C	243	
W-6267	Well J	103	
W-7241	Wells F,G,H,I,K,L and M	1519	
	Pre-S.B. 213 Wells Subtotal:		**1865**
	(amount w/Current Aug Plan in W-6268)		**3085**
83CW087E	Senior Corp. East Side - Arapahoe	1202	
83CW088E	Senior Corp. East Side - Denver	240	
83CW089E	Senior Corp. East Side - Dawson	305	
83CW090E	Senior Corp. East Side - LFH	514	
	Senior Corp East Side Subtotal:		**2261**
82CW087W	Senior Corp. West Side - Arapahoe	1823	
83CW088W	Senior Corp. West Side - Denver	396	
83CW089W	Senior Corp. West Side - Dawson	154	
83CW090W	Senior Corp. West Side - LFH	678	
	Senior Corp West Side Subtotal:		**3051**
84CW208	Gondolier Farms Decree	885	
85CW203	DSSWSD Nontributary Determination	2466	
89CW086, 087, 088, and 089	Reata South	1608	
93CW146 & 2003CW344	Evans Ranch	1146	
85CW139	Wolf/Vistancia/Scott Road	184	
	Additional Nontributary Water Subtotal:		**6289**
	Total Nontributary Water:		**13,466**
Nontributary Water Assigned to Broe Aug Plan (87CW338)			
82CW418	Rosie Wells Decree (Broe)	351	**351**
C. Total Water Sources, including Broe			**15,037**

Pinery Water and Wastewater District
Water Use based on Water Year
Table 2

	(in ac.ft.) Tributary	Non-Tributary	Total
1982	1,080	12	1,091
1983	1,123	0	1,123
1984	1,258	0	1,258
1985	1,292	91	1,384
1986	1,511	103	1,614
1987	1,324	179	1,504
1988	1,422	127	1,549
1989	1,527	250	1,777
1990	1,225	271	1,496
1991	1,282	344	1,626
1992	1,407	156	1,563
1993	1,379	265	1,644
1994	1,184	574	1,758
1995	1,351	178	1,529
1996	1,601	303	1,904
1997	1,477	254	1,731
1998	1,537	257	1,795
1999	1588	326	1,914
2000	1,838	533	2,371
2001	1,839	669	2,508
2002	2,002	832	2,834
2003	1,730	687	2,417
2004	1,852	360	2,211
2005	2,088	652	2,740
2006	2,704	811	3,514
2007	2,474	613	3,087
2008	2,450	1021	3,470
2009	1,928	608	2,537
2010	2,160	1150	3,310
2011	2,536	769	3,305
2012	2,198	1273	3,471
2013	1,709	1195	2,903
2014	1,801	896	2,698
2015	2,036	741	2,777
2016	2,015	962	2,977
2017	2,155	943	3,098



	Tributary	(in ac.ft.) Non-Tributary
1982	98.9%	1.1%
1983	100.0%	0.0%
1984	100.0%	0.0%
1985	93.4%	6.6%
1986	93.6%	6.4%
1987	88.1%	11.9%
1988	91.8%	8.2%
1989	85.9%	14.1%
1990	81.9%	18.1%
1991	78.8%	21.2%
1992	90.0%	10.0%
1993	83.9%	16.1%
1994	67.3%	32.7%
1995	88.3%	11.7%
1996	84.1%	15.9%
1997	85.3%	14.7%
1998	85.7%	14.3%
1999	83.0%	17.0%
2000	77.5%	22.5%
2001	73.3%	26.7%
2002	70.6%	29.4%
2003	71.6%	28.4%
2004	83.7%	16.3%
2005	76.2%	23.8%
2006	76.9%	23.1%
2007	80.1%	19.9%
2008	70.6%	29.4%
2009	76.0%	24.0%
2010	65.3%	34.7%
2011	76.7%	23.3%
2012	63.3%	36.7%
2013	58.9%	41.1%
2014	66.8%	33.2%
2015	73.3%	26.7%
2016	67.7%	32.3%
2017	69.6%	30.4%

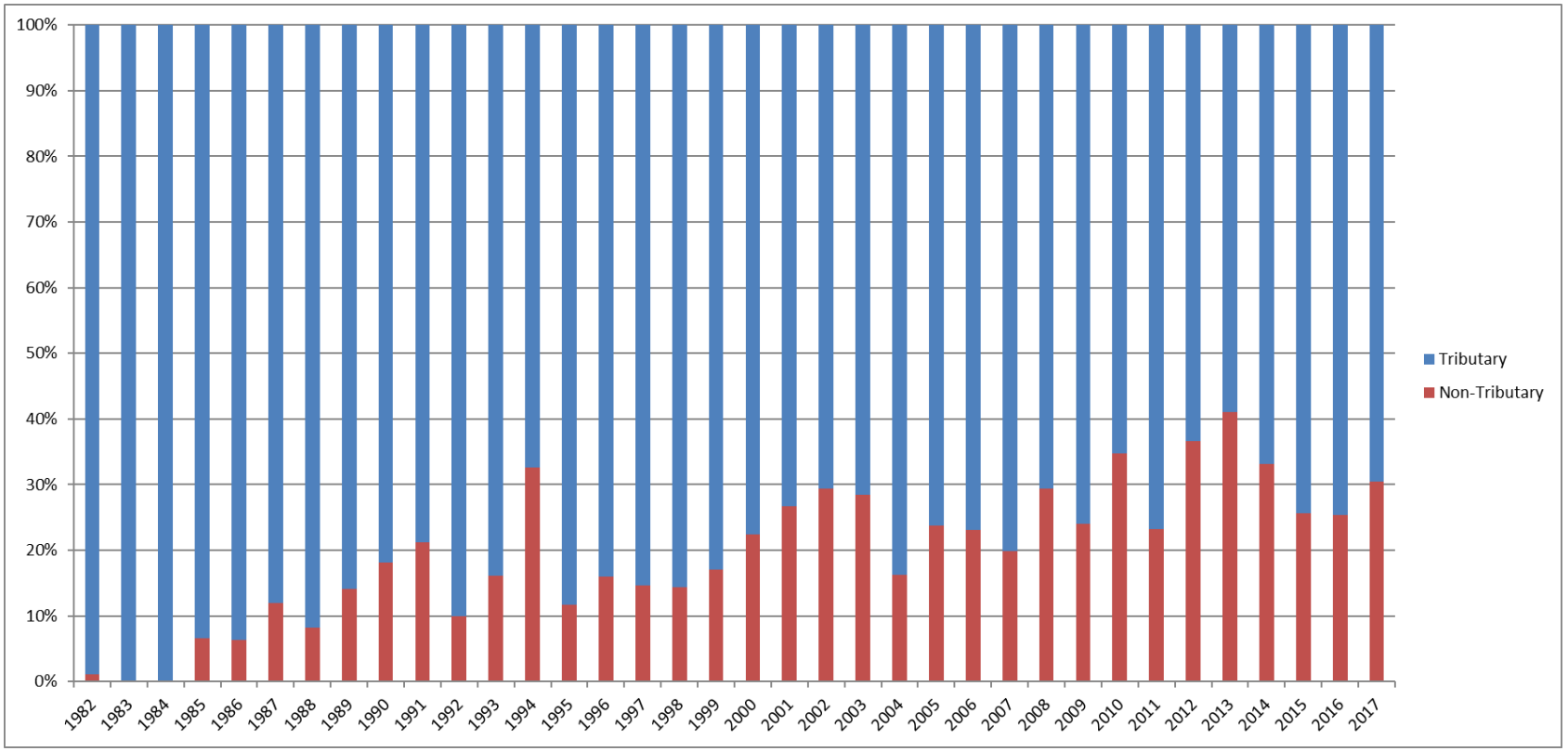


EXHIBIT C

PINERY MEADOWS
(WEST SIDE OF PARKER ROAD, ONE LOT NORTH OF SCOTT AVENUE).

9.3 Information Required for Inclusion: The District will begin evaluating the potential for inclusion of property upon receipt of two paper copies and one electronic copy of all the following information:

(a) Accurate legal description of the property, to surveying standards acceptable to the District, including the total acreage.

Attached please find the most recent survey.

(b) Map of the property showing its location with respect to the current District boundaries.

Attached are maps of the property showing its location within current District boundaries.

(c) Existing and proposed zoning.

Existing Zoning: Planned Development (PD)

(d) A plan showing land uses, lot and tract sizes, proposed densities and other significant information necessary for the District to determine the effects of the development on its water and sewer systems.

The main portion of the project will consist of approximately 143 residential units, public and private streets and typical landscaping. That area is approximately 19.4 acres. The remaining property of approximately 20.2 acres will consist of open space and floodplain for a total land area of approximately 39.6 acres.

Attached please find plan, subject to minor changes.

(e) Proposed development schedule.

Horizontal construction est.	
Start	*Q4, 2025*
Finish	*Q4, 2026*
Vertical construction	*Q1, 2027*
Initial COs	*Q3, 2027*

(f) Complete description of all water rights associated with the property, including copies of court decrees and well permits.

The water rights association with the Property, presented in the table below is nontributary groundwater in the Denver, Arapahoe and Laramie-Fox Hills aquifers underlying the Property. Please fins the water court application in Case No. 22CW3093, Water Division 1, to quantify the nontributary groundwater in the Denver, Arapahoe and Laramie-Fox Hills aquifers attached.

AQUIFER	STATUS	CLAIMED ACREAGE	AVERAGE SATURATED THICKNESS (FEET)	AVERAGE ANNUAL AMOUNT (ACRE FEET/YEAR)	TOTAL APPROPRIATED VOLUME (ACRE FEET)
Denver	Nontributary	39.54	240	16.1	1,610
Arapahoe	Nontributary	39.54	310	20.8	2,080
Laramie-Fox Hills	Nontributary	39.54	210	12.5	1,250

There is also nontributary water in the Lower Dawson Aquifer underlying the Property. However, the entire Property is within the cylinders of appropriation of two Pre-213 wells, Well No. 16008-F-R and Well No. 27296, both of which are physically located outside the boundaries of the Property. Applicant has agreed to convey its interest in the Lower Dawson Aquifer underlying the Property, if any, to the District by means of a bargain and sale deed.

(g) If the water right is used for irrigation, the number of acres presently being irrigated and a legal description and/or map of the acreage irrigated.

Not applicable.

(h) A copy of the documents by which the present owners of each water right appurtenant to the property received title to the water right.

See the following attachments:

i. Deeds vesting title in Khalaf family;
ii. Please note that Alphabet Investments, Inc. has assigned all right, title and interest in its purchase agreement with the current owners, the Khalafs, to Pinetown Investments, LP.
iii. Please note that Pinetown Investment, LP. has assigned all right, title and interest in its purchase agreement with the current owners, the Khalafs, to JEN 8 Land Holdings LLC, or assigns.

(i) A copy of all diversion records for each water right proposed for dedication to the District (unless this requirement is waived by the District).

Not applicable.

(j) A description of the historical use of the water right proposed for dedication to the District, including the amount and time of diversions and, if the use was irrigation, the type of irrigation, the number of acres irrigated, the crops grown, and a description of any other water rights used on the land irrigated.
Not applicable

(k) Complete financial statement of the Developer with balance sheet.

Integrity Land Ventures, LLC, on behalf of JEN 8 Land Holdings LLC is responsible for taking the property through the entitlement process. After the preliminary plat has been approved and prior to final plat recordation, Integrity / JEN will provide the final Developer's financial statements.

(l) Name and address of the property owner(s), including principal stockholders or partners as applicable.

Khalaf family

Fuad Khalaf
Iyad Khalaf
Ziad Khalaf by Iyad Khalaf, Attorney In Fact
Eman Khalaf by Iyad Khalaf, Attorney In Fact
Nihad Khalaf by Iyad Khalaf, Attorney In Fact
Nisreen Khalaf by Iyad Khalaf, Attorney In Fact

2477 Revere Way
Aurora, CO 80014

Alphabet Investments, Inc/ Pinetown Investments, LP
Attention: David Meyerowitz
37 Kodiak Crescent
Suite 300
Toronto, Ontario M3J 3E5
Canada

Integrity Land Ventures, LLC on behalf of JEN 8
Land Holdings LLC
Attention: Jerry B. Richmond III
7200 S. Alton Way, Suite C400
Centennial, CO 80112

ALTA/NSPS LAND TITLE SURVEY

LOCATED IN THE SOUTH 1/2 OF SECTION 10
TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH P.M.
COUNTY OF DOUGLAS, STATE OF COLORADO

LEGAL DESCRIPTION:

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE COUNTY OF DOUGLAS, STATE OF COLORADO, AND IS DESCRIBED AS FOLLOWS:

A TRACT OF LAND SITUATED IN THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHWEST CORNER OF SAID SECTION 10 AND CONSIDERING THE SOUTH LINE OF SAID SECTION 10 TO BEAR N 90°00'00" E WITH ALL BEARINGS CONTAINED HEREIN RELATIVE THERETO; THENCE N 90°00'00" E ALONG SAID SOUTH LINE A DISTANCE OF 1,326.56 FEET TO THE SOUTHWEST CORNER OF THE
EAST 1/2 OF THE SOUTHWEST 1/4 OF SECTION 10; THENCE N 90°00'00" E ALONG SAID SOUTH LINE A DISTANCE OF 805.17 FEET; THENCE N 00°02'42" W, PARALLEL WITH THE WEST LINE OF SAID EAST 1/2 OF THE SOUTHWEST 1/4, A DISTANCE OF 827.04 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N 00°02'42" W ALONG SAID PARALLEL LINE A DISTANCE OF 795.96 FEET;
THENCE N 90°00'00" E, PARALLEL WITH THE SOUTH LINE OF SAID SECTION 10 A DISTANCE OF 2,203.57 FEET TO THE WEST RIGHT OF WAY LINE OF STATE HIGHWAY NO. 83;
THENCE S 02°02'42" W ALONG SAID WEST RIGHT OF WAY A DISTANCE OF 796.47 FEET;
THENCE N 90°00'00" W, PARALLEL WITH THE SOUTH LINE OF SAID SECTION 10, A DISTANCE OF 2,174.52 FEET TO THE POINT OF BEGINNING, COUNTY OF DOUGLAS, STATE OF COLORADO.

EXCEPT THAT PORTION CONVEYED TO THE COLORADO DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS, STATE OF COLORADO BY DEED RECORDED JANUARY 8, 1993 IN BOOK 1106 AT PAGE 903.

PARCEL B:

A PARCEL OF LAND LOCATED IN THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF THE EAST 1/2 OF THE SOUTHWEST 1/4 OF SAID SECTION 10;
THENCE S 89°55'40" E, ALONG THE SOUTH LINE OF SAID SOUTHWEST 1/4, A DISTANCE OF 805.17 FEET;
THENCE N 00°00'53" E, PARALLEL WITH THE WEST LINE OF SAID EAST 1/2, A DISTANCE OF 1,523.00 FEET TO THE NORTHWESTERLY CORNER OF A PARCEL OF LAND AS RECORDED IN BOOK 338 AT PAGE 123 IN THE DOUGLAS COUNTY CLERK AND RECORDER'S OFFICE, SAID POINT BEING THE POINT OF BEGINNING;
THENCE N 00°00'53" E, PARALLEL WITH THE WEST LINE OF SAID EAST 1/2, A DISTANCE OF 18.15 FEET TO A POINT ON THE SOUTHERLY LINE OF A PARCEL OF LAND AS RECORDED IN BOOK 108 AT PAGE 290 AND IN BOOK 228 AT PAGE 582 IN SAID CLERK AND RECORDER'S OFFICE; THENCE N 89°59'25" E, ALONG SAID SOUTHERLY LINE A DISTANCE OF 2,204.91 FEET TO THE WESTERLY RIGHT-OF-WAY OF STATE HIGHWAY NO. 83;
THENCE S 02°05'05" W, ALONG SAID WESTERLY RIGHT-OF-WAY A DISTANCE OF 21.30 FEET TO A POINT ALONG THE NORTHERLY LINE OF SAID PARCEL AS RECORDED IN BOOK 338 AT PAGE 123;
THENCE N 89°55'40" W, ALONG SAID NORTHERLY LINE, A DISTANCE OF 2,204.13 FEET TO THE POINT OF BEGINNING, COUNTY OF DOUGLAS, STATE OF COLORADO.

BEARINGS USED IN THIS LEGAL DESCRIPTION ARE BASED UPON THE SOUTH LINE OF THE SOUTHWEST 1/4 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN TO BEAR NORTH 89°55'40" WEST.

PARCEL C:

AN EASEMENT FOR ACCESS AS SET FORTH IN DEED RECORDED AUGUST 3, 1978 IN BOOK 338 AT PAGE 123, AND SAID EASEMENT BEING 45.00 FEET IN WIDTH WITH THE WEST LINE OF SAID EASEMENT BEING DESCRIBED AS FOLLOWS: BEGINNING AT THE SOUTHWEST CORNER OF THE ABOVE DESCRIBED PARCEL; THENCE S 00°02'42" E, ALONG THE WEST LINE OF SUBJECT EASEMENT, A DISTANCE OF 827.04 FEET TO THE SOUTH LINE OF SAID SECTION 10 AND TO THE CENTER LINE OF COUNTY ROAD NO. 39, AND TO THE POINT OF TERMINUS OF SUBJECT EASEMENT.

TITLE COMMITMENT NOTES:

THIS LAND SURVEY DOES NOT CONSTITUTE A TITLE SEARCH BY JR ENGINEERING, LLC TO DETERMINE OWNERSHIP OF THIS TRACT, VERIFY THE DESCRIPTION SHOWN, VERIFY THE COMPATIBILITY OF THIS DESCRIPTION WITH THAT OF ADJACENT TRACTS, OR VERIFY EASEMENTS OF RECORD. FOR ALL INFORMATION REGARDING EASEMENTS, RIGHT-OF-WAY OR TITLE OF RECORD, JR ENGINEERING, LLC RELIED UPON TITLE COMMITMENT NO. NCS-1235820-CO, PREPARED BY FIRST AMERICAN TITLE INSURANCE COMPANY, DATED DECEMBER 05, 2024 AT 5:00 P.M.

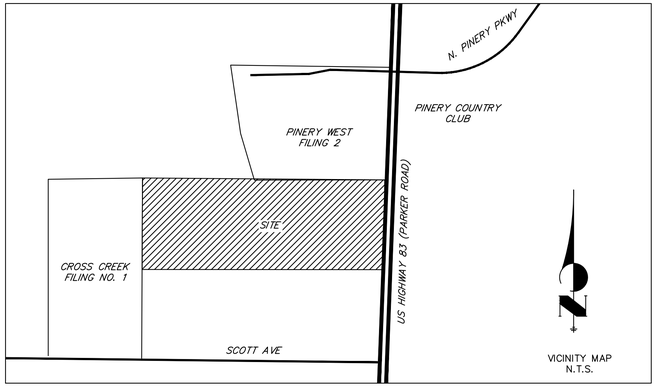
THE FOLLOWING COMMENTS ARE IN REGARDS TO THE ABOVE-REFERENCED TITLE COMMITMENT. THE NUMBERS IN OUR COMMENTS CORRESPOND TO THE NUMBERING SYSTEM USED IN THE TITLE COMMITMENT.

SCHEDULE A

ITEM	COMMENT
1.	NOTED ABOVE.
2., 3., 4.	JR ENGINEERING, LLC DID NOT EXAMINE OR ADDRESS THESE ITEMS.
5.	THE LEGAL DESCRIPTION OF THE LAND SURVEYED IS SHOWN PER THIS COMMITMENT, TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

SCHEDULE B - SECTION 2 (EXCEPTIONS)

ITEM	COMMENT
1.	VISIBLE AND APPARENT EVIDENCE OF RIGHTS OR CLAIMS OF PARTIES IN POSSESSION ARE SHOWN HEREON TO THE BEST OF OUR KNOWLEDGE AND BELIEF.
2.	VISIBLE AND APPARENT EVIDENCE OF EASEMENTS OR CLAIMS OF EASEMENTS ARE SHOWN HEREON TO THE BEST OF OUR KNOWLEDGE AND BELIEF.
3.	VISIBLE AND APPARENT DISCREPANCIES, CONFLICTS IN BOUNDARY LINES, SHORTAGES IN AREA AND ENCROACHMENTS ARE SHOWN HEREON TO THE BEST OF OUR KNOWLEDGE AND BELIEF.
4., 5., 6., 7., 8, 9,	JR ENGINEERING, LLC DID NOT EXAMINE OR ADDRESS THESE ITEMS.
10.	THE BAULDAUF DITCH PLAT RECORDED IN BOOK Q AT PAGE 514 AFFECTS THE SUBJECT PROPERTY. ALL DITCHES ARE SHOWN HEREON.
11.	THE EASEMENT RECORDED IN BOOK 34 AT PAGE 337, AND CONVEYED IN BOOK 39 AT PAGE 547 AFFECTS A PORTION OF THE SUBJECT PROPERTY (W 1/2, SE 1/4, SEC. 10) THIS EASEMENT DOES NOT CONTAIN A SPECIFIC LOCATION.
12.	THE EASEMENT RECORDED IN BOOK 83 AT PAGE 83, WARRANTY DEED RECORDED IN BOOL 83 AT PAGE 213, AND ASSIGNMENT RECORDED IN BOOK 180 AT PAGE 332 AFFECTS A PORTION OF THE SUBJECT PROPERTY (E 1/2, SE 1/4, SEC. 10) THIS EASEMENT DOES NOT CONTAIN A SPECIFIC LOCATION
13.	THE EASEMENT RECORDED IN BOOK 83 AT PAGE 131 AFFECTS THE SUBJECT PROPERTY (W 1/2, SE 1/4 SEC. 10) THIS EASEMENT DOES NOT CONTAIN A SPECIFIC LOCATION.
14.	INTENTIONALLY DELETED.
15.	THE RIGHT-OF-WAY AGREEMENT RECORDED IN BOOK 293 AT PAGE 815 IS SHOWN HEREON.
16.	THE ACCESS EASEMENT RECORD IN BOOK 338 AT PAGE 123 IS SHOWN HEREON, THE RIGHT-OF-WAY GRANT RECORDED UNDER RECEPTION NOS. 2018019426 AND 2019007557 ARE SHOWN HEREON.
17.	THE RIGHT-OF-WAY EASEMENT RECORDED IN BOOK 407 AT PAGE 344 IS SHOWN HEREON.
18.	INCLUSION INTO THE DENVER SOUTHEAST SUBURBAN WATER AND SANITATION DISTRICT RECORDED IN BOOK 409 AT PAGE 287 AFFECTS A PORTION OF THE SUBJECT PROPERTY (PARCEL B) (NOT A SURVEY MATTER).
19.	THE EASEMENT RECORDED IN BOOK 472 AT PAGE 415 IS SHOWN HEREON.
20.	ITEM INTENTIONALLY DELETED.
21.	THE MINUTES OF PUBLIC HEARING RECORDED IN BOOK 686 AT PAGE 630 (AFFECTS PARCEL B ONLY) DOES NOT CONTAIN A SPECIFIC LOCATION. (NOT A SURVEY MATTER)



SCHEDULE B - SECTION 2 (EXCEPTIONS) (CONTINUED)

22.	THE EASEMENT AGREEMENT AND DEED RECORDED IN BOOK 736 AT PAGE 968 IS SHOWN HEREON.
23.	INCLUSION INTO THE CHERRY CREEK BASIN AUTHORITY RECORDED IN BOOK 790 AT PAGE 718 AFFECTS THE SUBJECT PROPERTY. (NOT A SURVEY MATTER)
24.	THE SENIOR CORP. AGREEMENT RECORDED IN BOOK 891 AT PAGE 334 AND CONSENT RECORDED IN BOOK 932 AT PAGE 514 DO NOT CONTAIN A SPECIFIC LOCATION AND DO NOT APPEAR TO AFFECT THE SUBJECT PROPERTY.
25.	INTENTIONALLY DELETED.
26.	THE RIGHT OF ACCESS RESTRICTION RECORDED IN BOOK 1106 AT PAGE 906 IS SHOWN HEREON.
27.	THE PINERY PLAN SIXTEENTH AMENDMENT RECORDED UNDER RECEPTION NO. 2003070760 AND 2004026531 (AFFECTS PARCEL B ONLY) DOES NOT CONTAIN A SPECIFIC LOCATION. (NOT A SURVEY MATTER)
28.	THE REQUEST FOR NOTIFICATION RECORDED UNDER RECEPTION NO. 2008084153 AFFECTS THE SUBJECT PROPERTY. (NOT A SURVEY MATTER)
29.	THE PSCO EASEMENT RECORDED UNDER RECEPTION NO. 2013067976 IS SHOWN HEREON.
30.	THE LANDSCAPE EASEMENT RECORDED UNDER RECEPTION NO. 2015077127 IS SHOWN HEREON.
31.	THE GRANT OF ACCESS EASEMENT RECORDED UNDER RECEPTION NO. 2018056863 IS SHOWN HEREON.
32.	THE EASEMENT AGREEMENT RECORDED UNDER RECEPTION NO. 20018056863 IS SHOWN HEREON.
33.	THE RESOLUTION NO. PC-022-003 RECORDED UNDER RECEPTION NO. 2022035422 AFFECTS THE SUBJECT PROPERTY (NOT A SURVEY MATTER)
34.	THE PINERY MEADOWS DEVELOPMENT PLAN RECORDED UNDER RECEPTION NO. 2023021480 AFFECTS THE SUBJECT PROPERTY. (NOT A SURVEY MATTER)
35.	THE EASEMENT DEED RECORDED UNDER RECEPTION NO. 2023051634 IS SHOWN HEREON.
36.	THE EASEMENT DEED RECORDED UNDER RECEPTION NO. 2024036333 IS SHOWN HEREON.
37.	THIS ITEM HAS BEEN INTENTIONALLY DELETED.
38.	THE MEMORANDUM OF LEASE RECORDED IN BOOK 1392 AT PAGE 724 AFFECTS PARCEL C (NOT A SURVEY MATTER).
39.	THE EASEMENT RECORDED UNDER RECEPTION NO. 2018045867 IS SHOWN HEREON.
40.	THIS ITEM HAS BEEN INTENTIONALLY DELETED.
41.	RESOLUTION NO. R-020-091 RECORDED UNDER RECEPTION NO. 2020095513 IS NOT A SURVEY MATTER.
42.	THE SCOTT AVENUE PLANNED DEVELOPMENT SITE PLAN RECORDED UNDER RECEPTION NO. 2023017612 AFFECTS PARCEL C (NOT A SURVEY MATTER).
43.	THE EASEMENT DEED RECORDED UNDER RECEPTION NO. 202303637 IS SHOWN HEREON.
44.	THE CORE ELECTRIC COOPERATIVE EASEMENT RECORDED UNDER RECEPTION NO. 2023037096 IS SHOWN HEREON.
45.	THE STORM WATER EASEMENT RECORDED UNDER RECEPTION NO. 2023040001 IS SHOWN HEREON.

AREAS OF CONCERN NOTES:

JR ENGINEERING, LLC FOR THE BENEFIT OF THE PARTY REQUESTING THE SURVEY, NOTES THE FOLLOWING MATTERS, WHICH MAY AFFECT THE STATUS OF TITLE TO THE SURVEYED PROPERTY. JR ENGINEERING, LLC AND THE SURVEYOR OF RECORD DO NOT WARRANT OR REPRESENT THAT ALL MATTERS THAT MAY AFFECT TITLE ARE NOTED BELOW. THE NUMBERS IN THE FOLLOWING COMMENTS CORRESPOND TO THE NUMBERS SHOWN ON OUR ALTA/NSPS LAND TITLE SURVEY.

1. THE SUBJECT PROPERTY DESCRIPTION AND THE DESCRIPTION OF PLAT OF CROSS CREEK FILING NO. 1 TOGETHER WITH RECOVERED PROPERTY MONUMENTS CREATE A GAP OF APPROXIMATELY 5' ALONG THE WESTERN BOUNDARY CREATING AN AREA OF CONCERN.
2. EASEMENT RIGHTS RECORDED IN BOOK 283 AT PAGE 815 AND IN BOOK 736 AT PAGE 968 TERMINATE AT THE NORTH LINE OF PARCEL A. THERE WERE NO DOCUMENTS WITHIN THE TITLE RECORDS THAT THESE EASEMENTS ENCUMBER PARCEL B, YET UTILITY LINES INDICATE THE ROUTES CONTINUE INTO PARCEL B, CREATING AN AREA OF CONCERN.
3. XCEL GAS LINES, AS SHOWN HEREON, LIE WITHIN THE RECORD TITLE LINES WITHOUT THE BENEFIT OF AN EASEMENT, CREATING AN AREA OF CONCERN. NOTE: EXCEPTION 13 DOES NOT CONTAIN A SPECIFIC LOCATION AND MAY BE INTENDED FOR THIS LINE,
4. WATER LINES AS SHOWN HEREON, LIE OUTSIDE OF THE EASEMENT RECORDED IN BOOK 283 AT PAGE 815 CREATING AN AREA OF CONCERN.
5. THE ACCESS RESTRICTION DEED RECORDED IN 1106 AT PAGE 906 DOES NOT ALLOW FOR DIRECT ACCESS TO US HIGHWAY 83 RIGHT OF WAY ALONG THE EASTERN LINE OF THE SUBJECT PROPERTY WITH THE EXCEPTION OF A 24' ALLOWANCE IN THE NORTHEAST CORNER. THERE IS CURRENTLY AN ACCESS GATE AT THE SOUTHEAST CORNER OF THE PROPERTY WITHIN THE RESTRICTED AREA CREATING AN AREA OF CONCERN.

GENERAL NOTES:

1. PER THE BYLAWS AND RULES OF THE STATE BOARD OF LICENSURE FOR ARCHITECTS, PROFESSIONAL ENGINEERS AND PROFESSIONAL LAND SURVEYORS, CERTIFICATION IS DEFINED AS A STATEMENT THAT INCLUDES THE FOLLOWING: (A) IS SIGNED AND/OR SEALED BY A PROFESSIONAL LAND SURVEYOR REPRESENTING THAT THE SURVEYING SERVICES ADDRESSED THEREIN HAVE BEEN PERFORMED BY THE PROFESSIONAL LAND SURVEYOR OR UNDER THE PROFESSIONAL LAND SURVEYOR IN RESPONSIBLE. (B) IS BASED UPON THE PROFESSIONAL LAND SURVEYOR'S KNOWLEDGE, INFORMATION AND BELIEF. (C) IS IN ACCORDANCE WITH APPLICABLE STANDARDS OF PRACTICE. (D) IS NOT A GUARANTY OR WARRANTY, EITHER EXPRESSED OR IMPLIED.
2. PER C.R.S. 18-04-508, ANY PERSON WHO KNOWINGLY REMOVES, ALTERS OR DEFACES ANY PUBLIC LAND SURVEY MONUMENT OR LAND MONUMENT OR ACCESSORY, COMMITS A CLASS TWO (2) MISDEMEANOR.
3. PER C.R.S. 38-51-106, "ALL LINEAL UNITS DEPICTED ON THIS LAND SURVEY PLAT ARE U.S. SURVEY FEET. ONE METER EQUALS 39.37/12 U.S. SURVEY FEET, EXACTLY ACCORDING TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY."
4. ALL REFERENCES HEREON TO BOOKS, PAGES, MAPS AND RECEPTION NUMBERS ARE PUBLIC DOCUMENTS FILED IN THE RECORDS OF DOUGLAS COUNTY, COLORADO.
5. EASEMENTS AND PUBLIC DOCUMENTS SHOWN OR NOTED HEREON WERE EXAMINED AS TO LOCATION AND PURPOSE AND WERE NOT EXAMINED AS TO RESERVATIONS, RESTRICTIONS, CONDITIONS, OBLIGATIONS, TERMS, OR AS TO THE RIGHT TO GRANT THE SAME.
6. BURIED UTILITIES AND/OR PIPELINES ARE SHOWN PER VISIBLE AND APPARENT SURFACE EVIDENCE OR RECORD DRAWINGS OF THE CONSTRUCTED UTILITY LINES. IF MORE ACCURATE LOCATIONS OF UNDERGROUND UTILITIES ARE REQUIRED, THE UTILITY WILL HAVE TO BE VERIFIED BY FIELD POTHOLING. JR ENGINEERING, LLC AND THE SURVEYOR OF RECORD SHALL NOT BE LIABLE FOR THE LOCATION OF OR THE FAILURE TO NOTE THE LOCATION OF NON-VISIBLE UTILITIES.
7. THE BASIS OF BEARINGS IS THE EAST LINE OF THE SOUTHEAST 1/4 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH P.M., BEING MONUMENTED BY A 3.25" ALUMINUM CAP STAMPED "LS 13213" AT THE SOUTHEAST CORNER AND A 2.5" ALUMINUM CAP STAMPED "LS 37929" AT THE EAST 1/4 CORNER, SAID LINE BEING ASSUMED TO BEAR N00°33'35"W.
8. THE LAST FIELD INSPECTION OF THIS SITE WAS ON NOVEMBER 13, 2024.
9. PORTIONS OF THIS SITE, AS SHOWN HEREON, ARE WITHIN A SPECIAL FLOOD HAZARD AREA "ZONE AE", AS DETERMINED BY THE FLOOD INSURANCE RATE MAP FOR DOUGLAS COUNTY, COLORADO, MAP NUMBER 08035C0184G, EFFECTIVE DATE MARCH 16TH, 2016. NOTE: SITE ALSO AFFECTED BY LOMR 22-08-0219P WITH AN EFFECTIVE DATE OF 7/28/2023.
10. THERE ARE NO BUILDINGS ON THE SUBJECT PROPERTY.
11. ALL TIES TO RECORD TITLE LINES FROM THE BUILDING CORNERS OR OTHER IMPROVEMENTS SHOWN HEREON ARE PERPENDICULAR TO THE RECORD TITLE LINE.
12. THERE IS NO DESIGNATED PARKING AREAS ON THE SUBJECT PROPERTY.
13. THIS SITE CONTAINS A CALCULATED AREA OF 1,723,318 SQUARE FEET OR 39.5619 ACRES.
14. JR ENGINEERING, LLC DOES NOT WARRANT THAT THE PARCEL, AS DESCRIBED HEREON, COMPLIES WITH C.R.S. 30-28-101.
15. THE BENCHMARK USED FOR THIS SITE IS: DOUGALS COUNTY GIS CONTROL STATION 1.051038 BEING MONUMENTED BY A 3.25" ALUMINUM CAP LOCATED 0.58 MILES NORTH OF THE INTERSECTION N. PINERY PARKWAY AND US HIGHWAY 83, 130 FEET WEST OF THE CENTERLINE OF THE SOUTH LANE OF SAID US HIGHWAY, SAID MONUMENT HAVING A PUBLISHED ELEVATION OF 6053.86 FEET NAVD88.
16. CONTOURS AS SHOWN HEREON WERE ACHIEVED UTILIZING AN AERIAL SURVEY PERFORMED BY JR ENGINEERING.

SURVEYOR'S STATEMENT:

TO JEN 8 LAND HOLDINGS LLC, A DELAWARE LIMITED LIABILITY COMPANY; TO FUAD ABDALLA KHALAF, IYAD KHALAF, NIHAD KHALAF, ZIAD KHALAF, NISREEN KHALAF AND EMAN KHALAF; AND TO FIRST AMERICAN 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 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 3, 4, 5, 8, 11(b), AND 13 TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON NOVEMBER 13, 2024.

DATE OF MAP OR PLAT

FOR INFORMATION ONLY

JARROD ADAMS, PROFESSIONAL LAND SURVEYOR
COLORADO P.L.S. NO. 38252
FOR AND ON BEHALF OF JR ENGINEERING, LLC

NOTICE:

PER C.R.S. 13-80-105, 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.

NO.	REVISION	BY	DATE
4			
3			
2			
1	TITLE UPDATE	JA	12/16/2024

DWN. BY JAA	CHK. BY DV
SCALE N/A	DATE 11/15/2024
JOB NO. 16220.00	SHT. 1 OF 3

ALTA/NSPS LAND TITLE SURVEY
PINERY MEADOWS
SEC. 10, T7S, R.66W

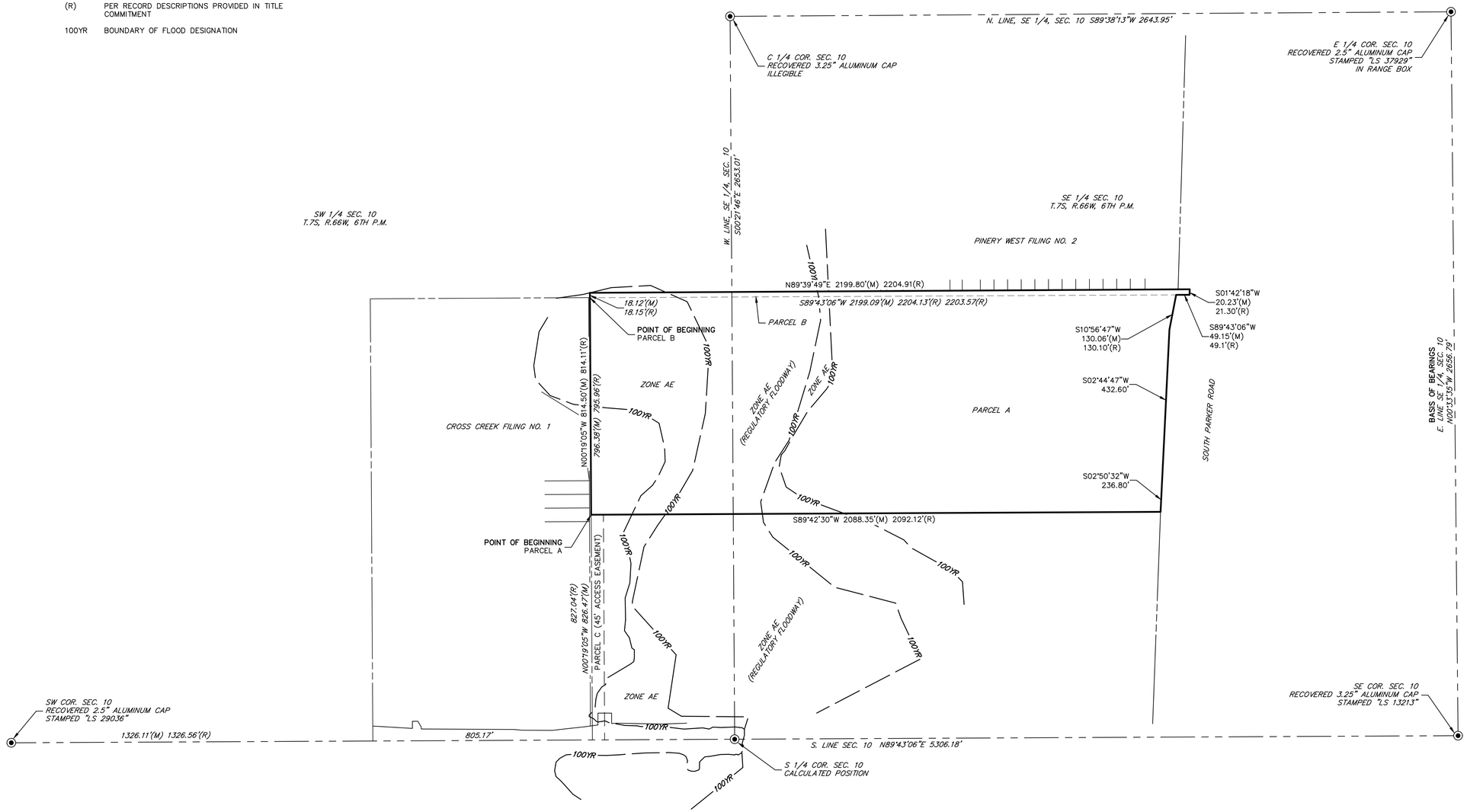
J·R ENGINEERING
A Westrian Company
Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

ALTA/NSPS LAND TITLE SURVEY

LOCATED IN THE SOUTH 1/2 OF SECTION 10
TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH P.M.
COUNTY OF DOUGLAS, STATE OF COLORADO

LEGEND

(M)	AS MEASURED/CALCULATED FOR THIS SURVEY
(R)	PER RECORD DESCRIPTIONS PROVIDED IN TITLE COMMITMENT
100YR	BOUNDARY OF FLOOD DESIGNATION



200 100 0 200
ORIGINAL SCALE: 1" = 200'

NO.	REVISION	BY	DATE
4			
3			
2			
1	TITLE UPDATE	JA	12/16/2024

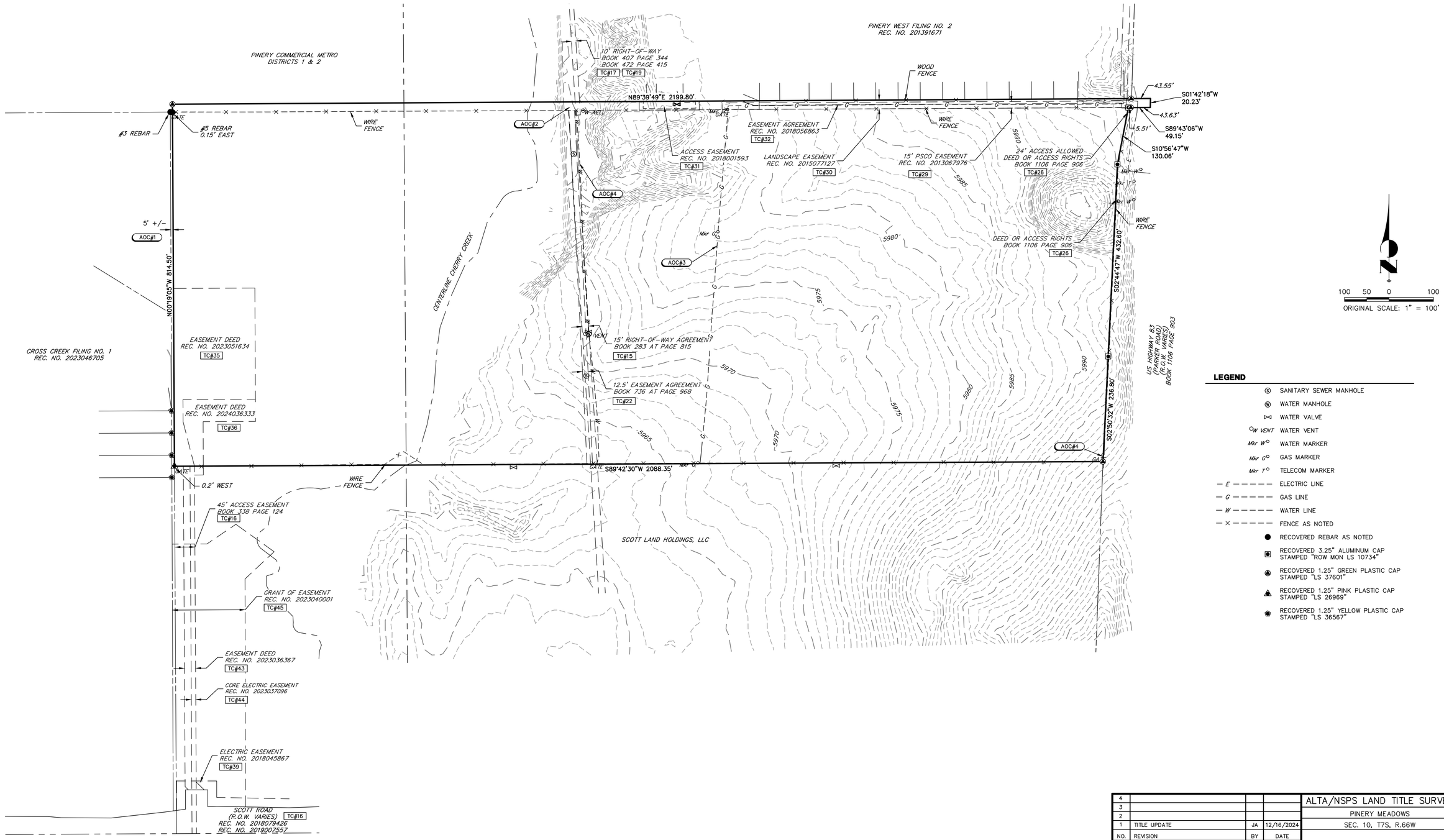
DWN. BY JAA	CHK. BY DV
SCALE 1"=200'	DATE 11/15/2024
JOB NO. 16220.00	SHT. 2 OF 3

ALTA/NSPS LAND TITLE SURVEY
PINERY MEADOWS
SEC. 10, T7S, R.66W

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ALTA/NSPS LAND TITLE SURVEY

LOCATED IN THE SOUTH 1/2 OF SECTION 10
TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH P.M.
COUNTY OF DOUGLAS, STATE OF COLORADO



100 50 0 100

ORIGINAL SCALE: 1" = 100'

LEGEND

- SANITARY SEWER MANHOLE
- WATER MANHOLE
- WATER VALVE
- W VENT WATER VENT
- Mkr W WATER MARKER
- Mkr G GAS MARKER
- Mkr T TELECOM MARKER
- E ELECTRIC LINE
- G GAS LINE
- W WATER LINE
- X FENCE AS NOTED
- RECOVERED REBAR AS NOTED
- RECOVERED 3.25" ALUMINUM CAP STAMPED "ROW MON LS 10734"
- RECOVERED 1.25" GREEN PLASTIC CAP STAMPED "LS 37601"
- RECOVERED 1.25" PINK PLASTIC CAP STAMPED "LS 26969"
- RECOVERED 1.25" YELLOW PLASTIC CAP STAMPED "LS 36567"

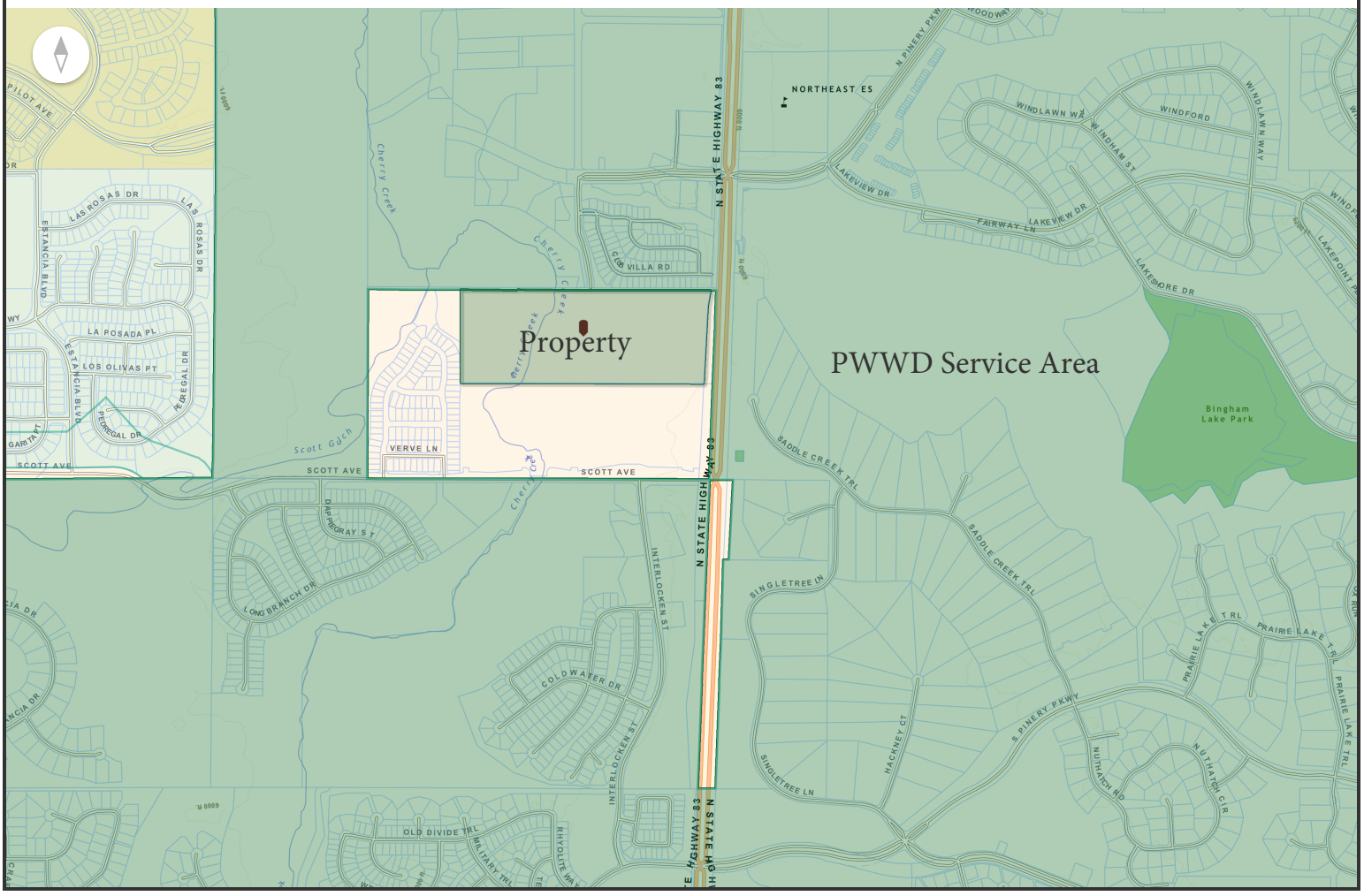
NO.	REVISION	BY	DATE
4			
3			
2			
1	TITLE UPDATE	JA	12/16/2024

DWN. BY JAA	CHK. BY DV
SCALE 1"=100'	DATE 11/15/2024
JOB NO. 16220.00	SHT. 3 OF 3

ALTA/NSPS LAND TITLE SURVEY
PINERY MEADOWS
SEC. 10, T7S, R.66W

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Water Provider Lookup - Click Here for more apps



Water Providers **Parcels**

Selected Parcel

Address: **Address not available**
Owner Name: **FUAD ABDALLA KHALAF & IYAD KHALAF ET AL**
Account Number: **R0366779**
State Parcel Number: **234910000025**
Township and Range: **T7S & R66W**
Section: **10**

Assessment Details

Pinery Meadows - PWWD Service Boundary Map



Real Property

- Parcel

Public Land Survey System

- Township
- Section

General Features

- School
- Private Road
- Railroad

0 0.1 0.2

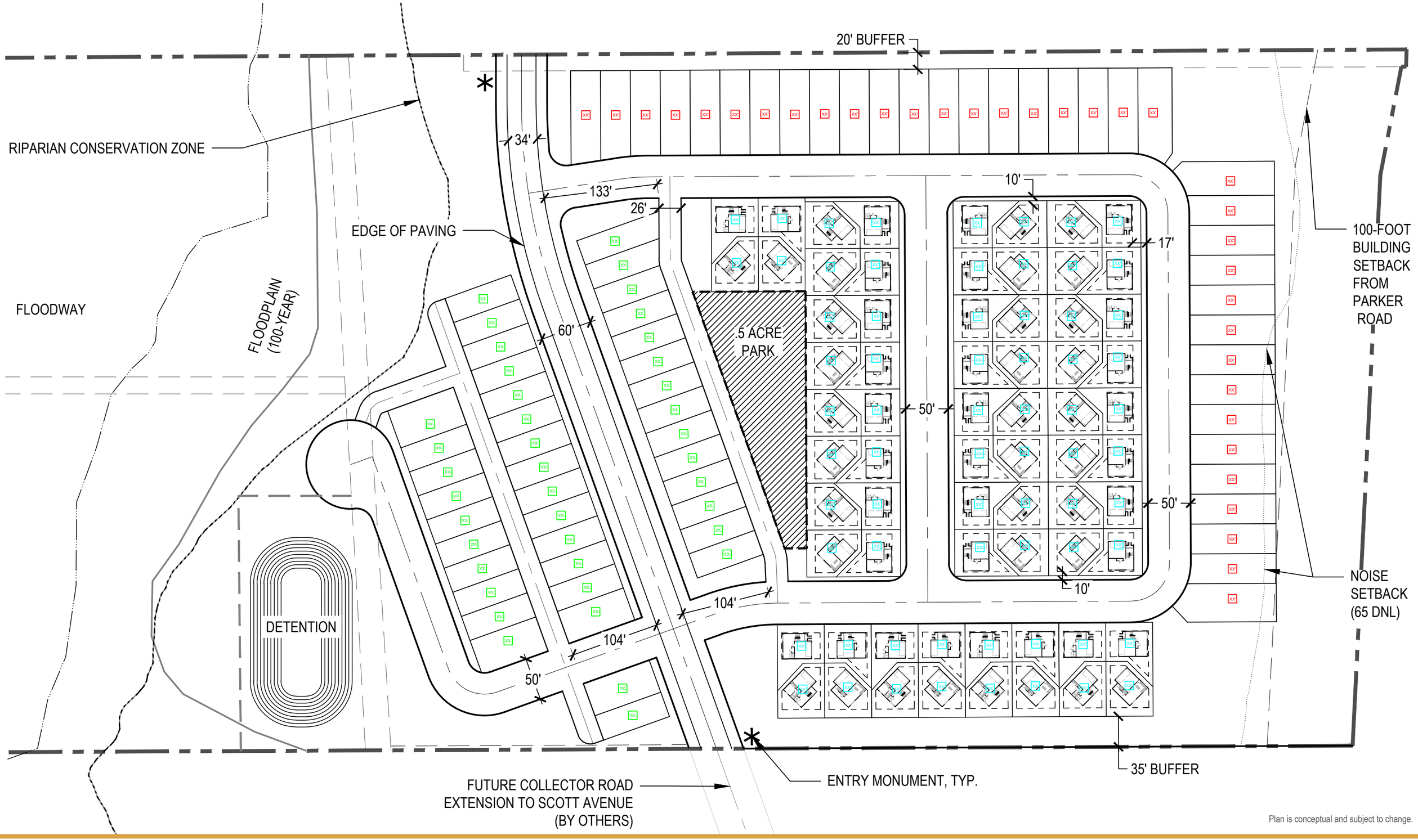
Miles

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Douglas County GIS Division
Philip S. Miller Bldg., 100 Third St.
Castle Rock, Colorado 80104

Pinery Meadows Preliminary Plan
Project File: SB2025-009



Plan is conceptual and subject to change.

PINERY MEADOWS | CONCEPTUAL LOTTING

01/17/2025 Pinery Meadows Preliminary Plan
Project File: SB2025-009
Planning Commission Staff Report -Page 47 of 463

35'x100' Single Family Detached	35 units	Total Units: 143
Cluster Single Family Detached	68 units	
30'x82' Duplex	40 units	

NORTH

0 25 50 100 200

SCALE: 1" = 100'

NORRIS DESIGN
PEOPLE + PLACEMAKING

DISTRICT COURT, WATER DIVISION 1, STATE OF COLORADO

DATE FILED: June 14, 2023 6:28 PM CASE NUMBER: 2022CW3093

Weld County Courthouse 901 – 9th Avenue Greeley, Colorado 80631
Telephone: (970) 475-2400

▲COURT USE ONLY▲

CONCERNING THE APPLICATION FOR GROUNDWATER RIGHTS OF:

Case No. 22CW3093

PINETOWN INVESTMENTS, LP; FUAD KHALAF, IYAD KHALAF, ZIAD KHALAF, EMAN KHALAF, NIHAD KHALAF, and NISREEN KHALAF

IN DOUGLAS COUNTY, COLORADO.

FINDINGS OF FACT, CONCLUSIONS OF LAW, RULING OF THE REFEREE, AND DECREE OF THE WATER COURT

THIS MATTER has come before the Referee with an Application for Groundwater Rights from Nontributary Denver Basin Aquifers filed on July 28, 2022 (the "Application"). The Referee, having considered the Application, the State Engineer's Determinations of Facts, the Division Engineer's Summary of Consultation, and having taken such testimony and reviewed such evidence as is necessary, being fully advised with respect to this matter, does hereby enter the following Findings of Fact, Conclusions of Law, and Ruling of the Referee, and the Water Judge does hereby confirm, approve, and make the following the Judgment and Decree of this Court:

FINDINGS OF FACT

1. **Name, Address, and Telephone Number of Applicants**:

Applicants: Pinetown Investments, LP
37 Kodiak Crescent, Suite 300 Toronto, Ontario M3J 3E5 Canada
(416) 849-3527

Fuad Khalaf Iyad Khalaf Ziad Khalaf Eman Khalaf Nihad Khalaf

Nisreen Khalaf 234 S. Holly Street
Denver, Colorado 80246 United States
(303) 419-1449

(collectively, the "Applicants")

Please send all pleadings and correspondence to:

Counsel: Carolyn F. Burr, Esq.
James M. Noble, Esq. Kyle B. Howe, Esq.
Welborn Sullivan Meck & Tooley, P.C.
Address: 1401 Lawrence Street, Suite 1800
Denver, Colorado 80202 United States
Telephone: (303) 830-2500
Facsimile: (303) 832-2366
E-mail: cburr@wsmtlaw.com jnoble@wsmtlaw.com khowe@wsmtlaw.com

1. **Statements of Opposition**: No statements of opposition were filed and the time for filing statements of opposition has expired.

1. **Subject Matter Jurisdiction**: Timely and adequate notice of the Application was published in the manner required by law, and all persons affected by the Application, whether appearing or not, are parties hereto and are bound by this Ruling of the Referee ("Ruling"). The Property and groundwater are outside any designated groundwater basin created pursuant to the 1965 Colorado Groundwater Management Act, C.R.S. §§ 37-90-101, *et seq.* This Court thus has subject matter jurisdiction over this proceeding. *See* C.R.S.

§§ 37-92-203 and 37-92-302.

1. **Consultations**: In accordance with C.R.S. § 37-92-302(2)(a), the Office of the State Engineer issued Determinations of Facts regarding the Applicants' claims for water rights from the Denver, Arapahoe, and Laramie-Fox Hills aquifers on September 15, 2022. In accordance with C.R.S. § 37-92-302(4), the Division Engineer submitted a Summary of Consultation regarding the Application on October 31, 2022. The Referee has considered the State Engineer's Determinations of Facts and the Division Engineer's Summary of Consultation.

1. **Description of Overlying Land, Ownership, and Source of Groundwater**:

    1. Description of Overlying Land: Applicants' property consists of 39.54 acres

located in Douglas County in the South ½ of Section 10, Township 7 South, Range 66 West, of the 6th P.M., (the "Property"). A legal description of the Property is attached hereto as **Exhibit A**.

    1. Parcel Ownership: The Applicants own and/or have consent to withdraw the water underlying the Property.

    1. Source of Groundwater: Applicants seek a decree for rights to nontributary groundwater, as defined in C.R.S. § 37-90-103(10.5), in the Denver, Arapahoe, and Laramie-Fox Hills aquifers underlying the Property.

1. **Well Locations, Rates of Withdrawal, and Annual Amounts**: The groundwater may be withdrawn at rates of flow necessary to withdraw the amounts decreed herein. Applicants may withdraw the groundwater through any number of wells to be located at any location on the Property. Applicants waive any 600-foot spacing rule as described in for wells located on the Property. The average annual amounts of groundwater available for withdrawal to which the Applicants are entitled, subject to this Court's retained jurisdiction in this matter pursuant to C.R.S. § 37-92-305(11), are as follows:

AQUIFER	STATUS	CLAIMED ACREAGE	AVERAGE SATURATED THICKNESS (FEET)	AVERAGE ANNUAL AMOUNT (ACRE FEET/YEAR)	TOTAL APPROPRIATED VOLUME (ACRE FEET)
Denver	Nontributary	39.54	240	16.1	1,610
Arapahoe	Nontributary	39.54	310	20.8	2,080
Laramie-Fox Hills	Nontributary	39.54	210	12.5	1,250

The water supply availability listed in the table above is based on a 100-year aquifer life in accordance with C.R.S. § 37-90-137(4)(b)(I), and the decreed amounts are based upon the State Engineer's Determinations of Facts.

    1. Decreed Uses: The water will be used, reused, and successively used for domestic, municipal, commercial, irrigation, livestock watering, fire protection, recharge, storage, recreation, exchange, augmentation, and replacement, both on and off the Property. Applicants may reuse and successively use the groundwater to extinction, and may lease, convey, or otherwise transfer the groundwater decreed herein.

    1. Wells, Well Locations, and Well Field: Wells to withdraw the subject groundwater have not yet been constructed, nor have applications for well permits been filed. Prior to constructing any wells to withdraw the subject groundwater, the Applicants will apply to the State Engineer for a permit to construct such wells.

        1. Additional and Replacement Wells: The Applicants have the right to

construct additional and replacement wells, as necessary, to maintain production levels in the aquifers, without publishing additional notice or filing any additional pleading with the Court. As such additional wells are planned, Applicants shall file well permit applications with the State Engineer in accordance with C.R.S. § 37-90-137(10). The location and operation of all such wells shall be subject to the terms and conditions set forth in this Ruling.

1. Well Locations: Applicants are entitled to withdraw groundwater from each of the subject aquifers anywhere on the Property, but wells must be located more than 600 feet from any wells owned by others in the same aquifer, unless the State Engineer authorizes closer spacing.

1. Well Field: Subject to this Ruling, wells constructed in the same aquifer will be operated as the same well field and the total annual amount of withdrawal confirmed by this Decree for the aquifer may be withdrawn from any combination of wells in the well field.

1. **No Injury to Vested Water Rights**: So long as the provisions of this Ruling are complied with, withdrawal of the water underlying the Property from the subject aquifers will not result in material injury to the vested water rights of others.

CONCLUSIONS OF LAW

1. Any of the foregoing Findings of Facts which may be Conclusions of Law are incorporated herein by this reference.

1. This Application is one contemplated by law, and this Court has subject matter jurisdiction over this proceeding. *See* C.R.S. §§ 37-92-302(2), 37-90-137(4) and (6), and 37-92-

305(11).

1. Full and adequate notice of the Application having been given, and this Court having subject matter jurisdiction over this proceeding, this Court has jurisdiction over the Application and over the parties, whether appearing or not. *See* C.R.S. §§ 37-92-203 and 37-92-302.

1. The rights to groundwater determined herein are vested property rights and shall not be administered in accordance with the priority of appropriation. *See* C.R.S. § 37-92-305(11).

1. The quantities of groundwater in the Denver, Arapahoe, and Laramie-Fox Hills aquifers underlying the Subject Property are available for withdrawal in the amounts described above, in accordance with C.R.S. § 37-90-137(4).

1. The Application for a decree confirming Applicants' right to withdraw and use all unappropriated groundwater from the subject aquifers beneath the Property, as described

herein, should be granted pursuant to C.R.S. § 37-90-137(4), subject to the provisions of this Ruling.

RULING OF THE REFEREE

1. The foregoing Findings of Fact and Conclusion of Law are incorporated into this Ruling of the Referee, and the Application is hereby granted, subject to the terms and conditions of this Ruling.

1. **Right to Withdraw Groundwater**: Applicants are hereby decreed the vested right to withdraw their fully decreed entitlement to nontributary groundwater from the Denver, Arapahoe, and Laramie-Fox Hills aquifers through wells on the Property to be permitted by the State Engineer's Office in the average annual amounts specified in paragraph 6, subject to the terms and conditions of this Ruling.

    1. Applicants may not consume more than 98% of the annual quantity of nontributary groundwater withdrawn from the subject aquifers and may reasonably be required to demonstrate periodically to the Division Engineer that no more than 98% of the water being withdrawn from a well in a nontributary source is being consumed. The relinquishment to the stream system of 2% of the annual amount of ground water withdrawn may be satisfied by any method selected by the Applicants, satisfactory to the State Engineer, so long as it can be shown that an amount equal to 2% of such withdrawals (by volume) has been relinquished to the stream system.

    1. Applicants may exceed the average annual amount of withdrawals of groundwater established in this Ruling, so long as the total volume of water withdrawn from the wells does not exceed the product of the number of years since the date(s) of issuance of any well permit or the date of this Ruling, whichever comes first, and the allowed average annual amount of withdrawal from each aquifer.

1. **Retained Jurisdiction**:

    1. This Court retains jurisdiction as necessary to adjust the average annual amount of groundwater available from the subject aquifers underlying the Property to conform to actual local aquifer characteristics as determined from adequate information obtained from well drillings or test holes, pursuant to C.R.S. § 37-92-305(11). Within 60 days of the completion of any well withdrawing groundwater decreed herein or any test hole(s), Applicants or any successor in interest to these water rights shall serve copies of such log(s) upon the State Engineer.

    1. At such time when adequate data is available, any party to this case, including the State Engineer, may invoke this Court's retained jurisdiction to make a final determination of water rights. Within four months of notice that the retained jurisdiction for such purpose has been invoked, the State Engineer shall use the information available to him to make a finding of a final determination of water

    rights. The State Engineer shall submit such finding to the Court and to the parties to this case.

    1. If no protest to such finding is made within 60 days, a final determination of water rights shall be incorporated into the decree by the Court. In the event of a protest, or in the event the State Engineer makes no finding within four months, such final determination shall be made by this Court after notice and a hearing.

1. **Well Permits**: The State Engineer shall issue well permits for the withdrawal of groundwater from the Denver, Arapahoe, and Laramie-Fox Hills aquifers underlying the Property in accordance with this Ruling and pursuant to C.R.S. §37-90-137(4) at such time as the Applicants or successors submit well permit applications to withdraw said groundwater. In issuing such permits, the State Engineer shall be bound by this Ruling.

    1. Conditions: For each well, constructed or approved pursuant to this Ruling, the Applicants shall comply with the following conditions:

1. A site-specific evaluation shall be conducted with each well permit to identify the correct aquifer interval due to the varying elevations and surface topography.

1. Each well, constructed to withdraw groundwater decreed herein, may only withdraw groundwater from a single aquifer.

1. A totalizing flow meter shall be installed on the well prior to withdrawing any water therefrom and maintained thereafter. The Applicants shall keep accurate records of all withdrawals, make any calculations reasonably required by the Division Engineer, and submit such records to the Division Engineer, upon request.

1. The entire length of the open bore hole shall be geophysically surveyed prior to casing and copies of the geophysical log shall be submitted to the Division of Water Resources. The Applicant may provide a geophysical log from a well or test hole meeting the requirements of 2 C.C.R. 402- 7:9(A).

1. Groundwater production shall be limited to the subject aquifer. Plain, unperforated casings must be installed and properly grouted to prevent withdrawal from or intermingling of water from zones other than those for which the well was designed.

1. Each well shall be permanently identified by its permit number, this water court case number, and the name of the producing aquifer on the above- ground portion of the well casing or on the pumphouse.

Dated: May 23, 2023

John S. Cowan Water Referee Water Division One

No protest was filed in this matter. The foregoing Ruling is confirmed, approved, and hereby made the Judgment and Decree of this Court.

Dated: June 14, 2023

Shannon Lyons Alternate Water Judge Water Division One

EXHIBIT A
22CW3093 Decree

The Land referred to herein is situated in the County of Douglas, State of Colorado, and is described as follows:

PARCEL A:
A TRACT OF LAND SITUATED IN THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF SAID SECTION 10 AND CONSIDERING THE SOUTH LINE OF SAID SECTION 10 TO BEAR N 90°00'00" E WITH ALL BEARINGS CONTAINED HEREIN RELATIVE THERETO; THENCE N 90°00'00" E ALONG SAID SOUTH LINE A DISTANCE OF 1,326.56 FEET TO THE SOUTHWEST CORNER OF THE EAST 1/2 OF THE SOUTHWEST 1/4 OF SECTION 10; THENCE N 90°00'00" E ALONG SAID SOUTH LINE A DISTANCE OF 805.17 FEET; THENCE N 0°02'42" W, PARALLEL WITH THE WEST LINE OF SAID EAST 1/2 OF THE SOUTHWEST 1/4, A DISTANCE OF 827.04 TO THE TRUE POINT OF BEGINNING; THENCE N 0°02'42" W ALONG SAID PARALLEL LINE A DISTANCE OF
795.96 FEET;
THENCE N 90°00'00" E, PARALLEL WITH THE SOUTH LINE OF SAID SECTION 10 A DISTANCE OF 2,203.57 FEET TO THE WEST RIGHT OF WAY LINE OF STATE HIGHWAY NO. 83; THENCE S 2°02'42" W ALONG SAID WEST RIGHT OF WAY A DISTANCE OF 796.47 FEET; THENCE N 90°00'00" W, PARALLEL WITH THE SOUTH LINE OF SAID SECTION 10, A DISTANCE OF 2,174.52 FEET TO THE POINT OF BEGINNING,
EXCEPT THAT PORTION CONVEYED BY SPECIAL WARRANTY DEED RECORDED JANUARY 8, 1993 AT RECEPTION NO. 9300923, COUNTY OF DOUGLAS, STATE OF

COLORADO.

PARCEL B:
A PARCEL OF LAND LOCATED IN THE SOUTH ONE-HALF OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF DOUGLAS, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF THE EAST ONE-HALF OF THE SOUTHWEST ONE- QUARTER OF SAID SECTION 10; THENCE SOUTH 89°55'40" EAST, ALONG THE SOUTH LINE OF SAID SOUTHWEST ONE-QUARTER, A DISTANCE OF 805.17 FEET; THENCE NORTH 00°00'53" EAST, PARALLEL WITH THE WEST LINE OF SAID EAST ONEHALF, A DISTANCE OF 1,523.00 FEET TO THE NORTHWESTERLY CORNER OF A PARCEL OF LAND AS RECORDED IN BOOK 338 AT PAGE 123 IN THE DOUGLAS COUNTY CLERK AND RECORDER'S OFFICE, SAID POINT BEING THE POINT OF BEGINNING; THENCE NORTH 00°00'53" EAST, PARALLEL WITH THE WEST LINE OF SAID EAST ONE- HALF, A DISTANCE OF 18.15 FEET TO A POINT ON THE SOUTHERLY LINE OF A PARCEL OF LAND AS RECORDED IN BOOK 108 AT PAGE 290 AND IN BOOK 228 AT PAGE 582 IN SAID CLERK AND RECORDER'S OFFICE; THENCE NORTH 89°59'25" EAST, ALONG SAID SOUTHERLY LINE; A DISTANCE OF 2,204.91 FEET TO THE WESTERLY RIGHT-OF-WAY OF STATE HIGHWAY NO. 83; THENCE SOUTH 02°05'05" WEST, ALONG SAID WESTERLY RIGHT-OF-WAY A DISTANCE OF 21.30 FEET TO A POINT ALONG THE NORTHERLY LINE OF SAID PARCEL AS RECORDED IN BOOK 338, AT PAGE 123; THENCE NORTH 89°55'40" WEST, ALONG SAID NORTHERLY LINE, A DISTANCE OF 2,204.13 FEET TO THE POINT OF BEGINNING, COUNTY OF DOUGLAS, STATE OF COLORADO.

BEARINGS USED IN THIS LEGAL DESCRIPTION ARE BASED UPON THE SOUTH LINE OF THE SOUTHWEST ONEQUARTER OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN TO BEAR NORTH 89°55'40" WEST.

Recorded at 8:00 o'clock M., AUG 03 1978 BOOK 338 PAGE 123

Reception No. 221230 CARROLL HIER Recorder.

FILING STAMP

THIS DEED, Made this 1st day of August

1978, between Percy L. Losey and Edna K. Losey

of the County of Douglas and State of Colorado, of the first part, and

State Documentary Fee
Date AUG 03 1978
$ 11.00

FUAD ABDALLA KHALAF and RIYAD ABDALLA KHALAF
1587 East Florida Avenue, Aurora, Colorado 80012

whose legal address is

of the County of and State of Colorado, of the second part:

Doc
See
$11.00

WITNESSETH, That the said party of the first part, for and in consideration of the sum of ----------
-----One Hundred Ten Thousand and no/100----------DOLLARS,
to the said party of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, has granted, bargained, sold and conveyed, and by these presents does grant, bargain, sell, convey and confirm, unto the said party of the second part, his heirs and assigns forever, all the following described lot or parcel of land, situate, lying and being in the County of DOUGLAS and State of Colorado, to-wit:

(SEE ATTACHMENT)

also known as street and number

TOGETHER with all and singular the hereditaments and appurtenances thereto belonging, or in anywise appertaining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof; and all the estate, right, title, interest, claim and demand whatsoever of the said party of the first part, either in law or equity, of, in and to the above bargained premises, with the hereditaments and appurtenances.

TO HAVE AND TO HOLD the said premises above bargained and described, with the appurtenances, unto the said party of the second part, his heirs and assigns forever. And the said party of the first part, for himself, his heirs, executors, and administrators, does covenant, grant, bargain, and agree to and with the said party of the second part, his heirs and assigns, that at the time of the ensealing and delivery of these presents, he is well seized of the premises above conveyed, as of good, sure, perfect, absolute and indefeasible estate of inheritance, in law, in fee simple, and has good right, full power and lawful authority to grant, bargain, sell and convey the same in manner and form as aforesaid, and that the same are free and clear from all former and other grants, bargains, sales, liens, taxes, assessments and encumbrances of whatever kind or nature soever. Except the general taxes for 1978 and subsequent years; except easements, restrictions, reservations, and rights-of-way of record, if any.

and the aboved bargained premises in the quiet and peaceable possession of the said party of the second part, his heirs and assigns against all and every person or persons lawfully claiming or to claim the whole or any part thereof, the said party of the first part shall and will WARRANT AND FOREVER DEFEND. The singular number shall include the plural, the plural the singular, and the use of any gender shall be applicable to all genders.

IN WITNESS WHEREOF, the said party of the first part has hereunto set his hand and seal the day and year first above written.

Percy L. Losey [SEAL]
PERCY L. LOSEY

Edna K. Losey [SEAL]
EDNA K. LOSEY

[SEAL]

STATE OF COLORADO
County of Douglas } ss.

The foregoing instrument was acknowledged before me this 1st day of August

1978, by PERCY L. LOSEY and EDNA K. LOSEY

My commission expires May 16, 1981. Witness my hand and official seal.

Patricia M. Benefiel
Notary Public.

PATRICIA M. BENEFIEL NOTARY PUBLIC STATE OF COLORADO

No. 932A. WARRANTY DEED—For Recording in Public Record.—Bradford Publishing Co., 1824-46 Stout Street, Denver, Colorado (573-5011)—8-77

PROPERTY DESCRIPTION:

A tract of land situated in the South ½ of Section 10, Township 7 South, Range 66 West of the 6th Principal Meridian, Douglas County, Colorado, more particularly described as follows:

Commencing at the Southwest corner of said Section 10 and considering the South line of said Section 10 to bear N 90°00'00"E with all bearings contained herein relative therto:

Thence N 90°00'00"E along said South line a distance of 1326.56 feet to the Southwest corner of the East ½ of the Southwest ¼ of said Section 10;

Thence N 90°00'00"E along said South line a distance of 805.17 feet;

Thence N 0°02'42"W, parallel with the West line of said East ½ of the Southwest ¼, a distance of 827.04 feet to the true point of beginning;

Thence N 0°02'42"W along said parallel line a distance of 795.96 feet;

Thence N 90°00'00"E, parallel with the South line of said Section 10 a distance of 2203.57 feet to the West Right of Way line of State Highway No. 83;

Thence S 2°02'42"W along said West Right of Way line a distance of 796.47 feet;

Thence N 90°00'00"W, parallel with the South line of said Section 10, a distance of 2174.52 feet to the point of beginning;

Containing 40.000 acres, more or less;

Together with an easement for access, said easement being 45.00 feet in width with the West line of said easement being described as follows;

Beginning at the Southwest corner of the above described 40.000 acre parcel;

Thence S 0°02'42"E, along the West line of subject easement, a distance of 827.04 feet to the South line of said Section 10 and to the center line of County Road No. 39, and to the point of terminus of subject easement.

Together with an undivided 3.88% interests in the Haley Ditch, Priority #78 and an undivided 25% interest in the Harrison Ditch, Priority #83, as decreed in Case No. W-6268, The District Court in and for the Water Division #1, State of Colorado.

#2014019659, 04/21/2014 at 03:30:54 PM, 1 OF 2, Recording Fee $16.00 Doc Fee $0.00 Electronically Recorded Official Records Douglas County, CO Jack Arrowsmith, Clerk & Recorder

PERSONAL REPRESENTATIVE'S DEED

Iyad Khalaf was appointed Personal Representative by Clerk of the District Court of Douglas County, Colorado, on June 12, 2013 and Letters of Personal Representative were issued on June 12, 2013 for Probate Case No. 2013 PR 30015, which Letters are unrevoked and remain in full force and effect; a copy of the Letters is recorded at District Court, Douglas County, Colorado.

Iyad Khalaf, 2354 High Ridge Road, Lima, OH 45805, as the duly appointed, qualified, and acting Personal Representative of the Estate of Riyad Abdallah Khalaf, GRANTOR, sells, conveys, transfers, assigns, and releases to Iyad Khalaf, GRANTEE of 2354 High Ridge Road, Lima, OH 45805; Nihad Khalaf, GRANTEE of 2222 202sd Place S.W. Lynwood, WA 98036; Ziad Khalaf, GRANTEE of 2222 202nd Place S.W. Lynwood, WA 98036; Nisreen Khalaf, GRANTEE of 2558 Chain Bridge Rd, Apt T1, Vienna, VA 22181; and Eman Khalaf, GRANTEE of 2222 202nd Place S.W. Lynwood, WA 98036, all interest of the decedent and the estate of decedent in the following described real estate in Douglas County, Colorado:

(SEE ATTACHMENT)

Also known as

subject to easements and restrictions of record.

The above described property is not being used as a homestead by any person.

Dated 14 APRIL 2014

Iyad Khalaf
Personal Representative of the Estate of Riyad Abdallah Khalaf

Transfer Fee: $0.00

State of Ohio)
)§§
County of Allen)

The foregoing instrument was acknowledged before me this 14 day of April, 2014 by Iyad Khalaf, known to me or satisfactorily proven to be the person described in the Personal Representative's Deed, and acknowledged that he executed the foregoing Personal Representative's Deed as Personal Representative of the Estate of Riyad Abdallah Khalaf and for the purposes therein contained.

Dated 4-14-14

(Seal)

Notary Public, State of Ohio
My commission expires: May 1, 2018

NOTARY PUBLIC STATE OF OHIO

BETHANY GARRETT
Notary Public, State of Ohio
My Commission Expires
May 1, 2018

PROPERTY DESCRIPTION:

A tract of land situated in the South ½ of Section 10, Township 7 South, Range 66 West of the 6th Principal Meridian, Douglas County, Colorado, more particularly described as follows:

Commencing at the Southwest corner of said Section 10 and considering the South line of said Section 10 to bear N 90°00'00"E with all bearings contained herein relative therto:

Thence N 90°00'00"E along said South line a distance of 1326.56 feet to the Southwest corner of the East ½ of the Southwest ¼ of said Section 10;

Thence N 90°00'00"E along said South line a distance of 805.17 feet;

Thence N 0°02'42"W, parallel with the West line of said East ½ of the Southwest ¼, a distance of 827.04 feet to the true point of beginning;

Thence N 0°02'42"W along said parallel line a distance of 795.96 feet;

Thence N 90°00'00"E, parallel with the South line of said Section 10 a distance of 2203.57 feet to the West Right of Way line of State Highway No. 83;

Thence S 2°02'42"W along said West Right of Way line a distance of 796.47 feet;

Thence N 90°00'00"W, parallel with the South line of said Section 10, a distance of 2174.52 feet to the point of beginning;

Containing 40.000 acres, more or less;

Together with an easement for access, said easement being 45.00 feet in width with the West line of said easement being described as follows;

Beginning at the Southwest corner of the above described 40.000 acre parcel;

Thence S 0°02'42"E, along the West line of subject easement, a distance of 827.04 feet to the South line of said Section 10 and to the center line of County Road No. 39, and to the point of terminus of subject easement.

Together with an undivided 3.88% interests in the Haley Ditch, Priority #78 and an undivided 25% interest in the Harrison Ditch, Priority #83, as decreed in Case No. W-6268, The District Court in and for the Water Division #1, State of Colorado.

Ref #2021123854, Date: 11/2/2021 9:50 AM, Pages: 1 of 3 ,RECORDING $23.00
Electronically Recorded Douglas County, CO. Merlin Klotz, Clerk and Recorder

No Documentary Transfer Tax Payable
Consideration under $500
C.R.S. § 39 13 102(2)(a)

QUITCLAIM DEED

[STATUTORY FORM – C.R.S. § 38 30 113(d)]

TF PINERY WEST, L.P., a Delaware limited partnership, whose street address is c/o Starwood Land Advisors, LLC, 6310 Capital Drive, Suite 130, Lakewood Ranch, Florida 34202, for the consideration of Ten and 00/100 Dollars ($10.00) and other good and valuable consideration, in hand paid, hereby sells and quitclaims to (i) FUAD ABDALLA KHALAF, whose street address is 11587 E. Florida Avenue, Aurora, Colorado 80012, a 50% undivided interest, as tenant in common, in the real property legally described in Exhibit A attached hereto and incorporated herein by this reference (the "Land"), with all its appurtenances; (ii) IYAD KHALAF, whose street address is 11587 E. Florida Avenue, Aurora, Colorado 80012, a 10% undivided interest, as tenant in common, in the Land, with all its appurtenances; (iii) NIHAD KHALAF, whose street address is 11587 E. Florida Avenue, Aurora, Colorado 80012, a 10% undivided interest, as tenant in common, in the Land, with all its appurtenances; (iv) EMAN KHALAF, whose street address is 11587 E. Florida Avenue, Aurora, Colorado 80012, a 10% undivided interest, as tenant in common, in the Land, with all its appurtenances; (v) ZIAD KHALAF, whose street address is 11587 E. Florida Avenue, Aurora, Colorado 80012, a 10% undivided interest, as tenant in common, in the Land, with all its appurtenances; and (vi) NISREEN KHALAF, whose street address is 11587 E. Florida Avenue, Aurora, Colorado 80012, a 10% undivided interest, as tenant in common, in the Land, with all its appurtenances.

[signature page follows this page]

Signed the 18th day of October, 2021.

TF PINERY WEST, L.P., a Delaware limited partnership

By: TF Holdings GP, L.L.C., a Delaware limited liability company, its general partner

By: [signature]
Name: CRAIG CAMPBELL
Title: AUTHORIZED SIGNATORY

STATE OF COLORADO)
) ss.
COUNTY OF DOUGLAS)

The foregoing instrument was acknowledged before me this 18th day of October, 2021, by Craig Campbell as Authorized Signatory of TF Holdings GP, L.L.C., a Delaware limited liability company, general partner of TF PINERY WEST, L.P., a Delaware limited partnership.

Witness my hand and official seal.

My commission expires: 04 03 2023

RACHAEL MIDDLEMIST
Notary Public
State of Colorado
Notary ID # 20194017649
My Commission Expires 04-03-2023

[signature]
Notary Public

Exhibit A
to Quitclaim Deed

Legal Description of the Land

A PARCEL OF LAND LOCATED IN THE SOUTH ONE-HALF OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF THE EAST ONE-HALF OF THE SOUTHWEST ONE-QUARTER OF SAID SECTION 10;
THENCE SOUTH 89°55'40" EAST, ALONG THE SOUTH LINE OF SAID SOUTHWEST ONE-QUARTER, A DISTANCE OF 805.17 FEET;
THENCE NORTH 00°00'53" EAST, PARALLEL WITH THE WEST LINE OF SAID EAST ONE-HALF, A DISTANCE OF 1523.00 FEET TO THE NORTHWESTERLY CORNER OF A PARCEL OF LAND AS RECORDED IN BOOK 338 AT PAGE 123 IN THE DOUGLAS COUNTY CLERK AND RECORDER'S OFFICE SAID POINT BEING THE POINT OF BEGINNING;
THENCE NORTH 00°00'53" EAST, PARALLEL WITH THE WEST LINE OF SAID EAST ONE-HALF, A DISTANCE OF 18.15 FEET TO A POINT ON THE SOUTHERLY LINE OF A PARCEL OF LAND AS RECORDED IN BOOK 108 AT PAGE 290 AND IN BOOK 228 AT PAGE 582 IN SAID CLERK AND RECORDER'S OFFICE;
THENCE NORTH 89°59'25" EAST, ALONG SAID SOUTHERLY LINE, A DISTANCE OF 2204.91 FEET TO THE WESTERLY RIGHT-OF-WAY OF STATE HIGHWAY NO. 83;
THENCE SOUTH 02°05'05" WEST, ALONG SAID WESTERLY RIGHT-OF-WAY A DISTANCE OF 21.30 FEET TO A POINT ALONG THE NORTHERLY LINE OF SAID PARCEL AS RECORDED IN BOOK 338 AT PAGE 123;
THENCE NORTH 89°55'40" WEST, ALONG SAID NORTHERLY LINE, A DISTANCE OF 2204.13 FEET TO THE POINT OF BEGINNING,

COUNTY OF DOUGLAS, STATE OF COLORADO.

BEARINGS USED IN THIS LEGAL DESCRIPTION ARE BASED UPON THE SOUTH LINE OF THE SOUTHWEST ONE-QUARTE OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN TO BEAR NORTH 89°55'40" WEST.

Ref #2018062231, Date: 10/10/2018 3:44 PM, Pages: 1 of 3 ,RECORDING $23.00 0
Electronically Recorded Douglas County, CO. Merlin Klotz, Clerk and Recorder

BARGAIN AND SALE DEED

KNOW ALL BY THESE PRESENTS, That **Forestar (USA) Real Estate Group Inc., a Delaware corporation** (whether one, or more than one), the "Grantor," whose legal address is 6300 Bee Cave Road, Building 2, Suite 500, Austin, Texas 78746, of the County of Travis and State of Texas,

for the consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, in hand paid, hereby sells and conveys to **Fuad Abdalla Khalaf and Iyad Khalaf**, as tenants in common, (whether one, or more than one), the "Grantee," whose legal address is 11587 E. Florida Ave., Aurora, Colorado 80012, the following real property situate in the County of Douglas and State of Colorado, to wit:

See Exhibit A attached hereto

NO STATE DOCUMENTARY FEE REQUIRED PURSUANT TO C.R.S. § 39-13-104 (1) (j)

also known by street address as: vacant land
with all its appurtenances.

Signed this 5th day of October, 2018.

FORESTAR (USA) REAL ESTATE GROUP INC.
a Delaware corporation

By: _____
Charles D. Jehl
Its: Chief Financial Officer

STATE OF Texas)
) ss.
COUNTY OF Travis)

The foregoing instrument was acknowledged before me this 5th day of October, 2018, by Charles D. Jehl as Chief Financial Officer of Forestar (USA) Real Estate Group Inc.

Witness my hand and official seal.
My commission expires:

FERN WESTHEAD
MY COMMISSION EXPIRES
May 28, 2019

Fern Westhead
Notary Public

EXHIBIT A

A PARCEL OF LAND LOCATED IN THE SOUTH ONE-HALF OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF DOUGLAS, STATE OF COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

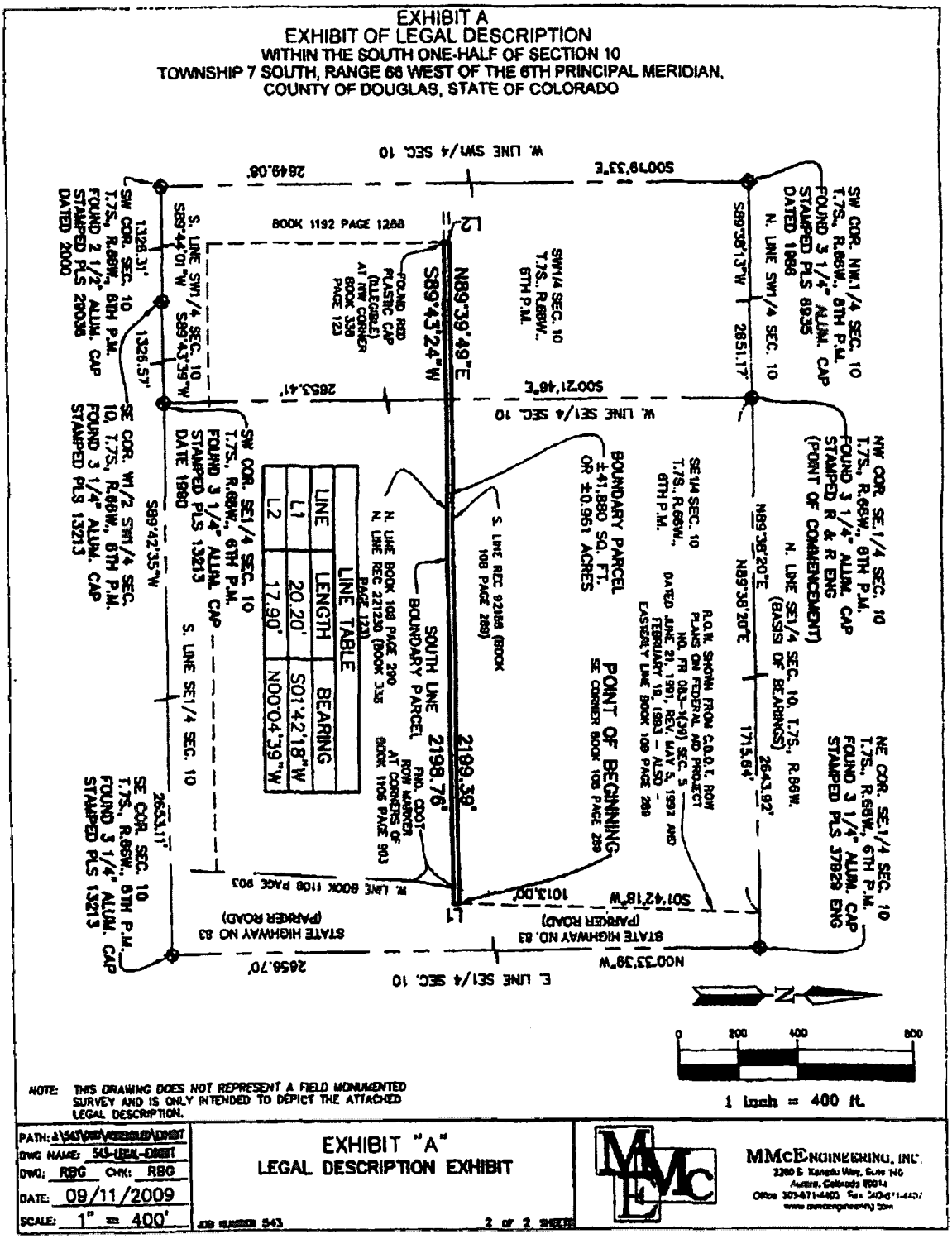
COMMENCING AT THE SOUTHWEST CORNER OF THE EAST ONE-HALF OF THE SOUTHWEST ONE-QUARTER OF SAID SECTION 10; THENCE SOUTH 89°55'40" EAST, ALONG THE SOUTH LINE OF SAID SOUTHWEST ONE-QUARTER, A DISTANCE OF 805.17 FEET; THENCE NORTH 00°00'53" EAST, PARALLEL WITH THE WEST LINE OF SAID EAST ONE-HALF, A DISTANCE OF 1523.00 FEET TO THE NORTHWESTERLY CORNER OF A PARCEL OF LAND AS RECORDED IN BOOK 338 AT PAGE 123 IN THE DOUGLAS COUNTY CLERK AND RECORDER'S OFFICE, SAID POINT BEING THE POINT OF BEGINNING; THENCE NORTH 00°00'53" EAST, PARALLEL WITH THE WEST LINE OF SAID EAST ONE-HALF, A DISTANCE OF 18.15 FEET TO A POINT ON THE SOUTHERLY LINE OF A PARCEL OF LAND AS RECORDED IN BOOK 108 AT PAGE 290 AND IN BOOK 228 AT PAGE 582 IN SAID CLERK AND RECORDER'S OFFICE; THENCE NORTH 89°59'25" EAST, ALONG SAID SOUTHERLY LINE; A DISTANCE OF 2204.91 FEET TO THE WESTERLY RIGHT-OF-WAY OF STATE HIGHWAY NO. 83; THENCE SOUTH 02°05'05" WEST, ALONG SAID WESTERLY RIGHT-OF-WAY A DISTANCE OF 21.30 FEET TO A POINT ALONG THE NORTHERLY LINE OF SAID PARCEL AS RECORDED IN BOOK 338, AT PAGE 123; THENCE NORTH 89°55'40" WEST, ALONG SAID NORTHERLY LINE, A DISTANCE OF 2204.13 FEET TO THE POINT OF BEGINNING,

BEARINGS USED IN THIS LEGAL DESCRIPTION ARE BASED UPON THE SOUTH LINE OF THE SOUTHWEST ONE-QUARTER OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE SIXTH PRINCIPAL MERIDIAN TO BEAR NORTH 89°55'40" WEST.

AS ALSO DEPICTED AND DESCRIBED ON EXHIBIT A – PAGE TWO ATTACHED HERETO.

PAGE ONE

EXHIBIT A
EXHIBIT OF LEGAL DESCRIPTION
WITHIN THE SOUTH ONE-HALF OF SECTION 10
TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN,
COUNTY OF DOUGLAS, STATE OF COLORADO



NOTE: THIS DRAWING DOES NOT REPRESENT A FIELD MONUMENTED SURVEY AND IS ONLY INTENDED TO DEPICT THE ATTACHED LEGAL DESCRIPTION.

PATH: J:\543\DWG\EXHIBITS\EXHIBIT	EXHIBIT "A"
DWG NAME: 543-LEGAL-EXHIBIT	LEGAL DESCRIPTION EXHIBIT
DWG: RBG CHK: RBG	
DATE: 09/11/2009	
SCALE: 1" = 400'	JOB NUMBER 543 2 OF 2 SHEETS

MMcENGINEERING, INC.
2280 S. Xanadu Way, Suite 140
Aurora, Colorado 80014
Office 303-671-4400 Fax 303-671-4401
www.mmcengineering.com

PAGE TWO

Recorded at 8:00 o'clock M., AUG 03 1978 BOOK 338 PAGE 123

Reception No. 221230 CARROLL HIER Recorder.

FILING STAMP

THIS DEED, Made this 1st day of August,

1978, between Percy L. Losey and Edna K. Losey

of the County of Douglas and State of Colorado, of the first part, and

State Documentary Fee
Date AUG 03 1978
$ 11.00

FUAD ABDALLA KHALAF and RIYAD ABDALLA KHALAF
1587 East Florida Avenue, Aurora, Colorado 80012

whose legal address is

of the County of and State of Colorado, of the second part:

Doc See $11.00

WITNESSETH, That the said party of the first part, for and in consideration of the sum of ----------
-----One Hundred Ten Thousand and no/100----------DOLLARS,
to the said party of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, has granted, bargained, sold and conveyed, and by these presents does grant, bargain, sell, convey and confirm, unto the said party of the second part, his heirs and assigns forever, all the following described lot or parcel of land, situate, lying and being in the County of DOUGLAS and State of Colorado, to-wit:

(SEE ATTACHMENT)

also known as street and number

TOGETHER with all and singular the hereditaments and appurtenances thereto belonging, or in anywise appertaining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof; and all the estate, right, title, interest, claim and demand whatsoever of the said party of the first part, either in law or equity, of, in and to the above bargained premises, with the hereditaments and appurtenances.

TO HAVE AND TO HOLD the said premises above bargained and described, with the appurtenances, unto the said party of the second part, his heirs and assigns forever. And the said party of the first part, for himself, his heirs, executors, and administrators, does covenant, grant, bargain, and agree to and with the said party of the second part, his heirs and assigns, that at the time of the ensealing and delivery of these presents, he is well seized of the premises above conveyed, as of good, sure, perfect, absolute and indefeasible estate of inheritance, in law, in fee simple, and has good right, full power and lawful authority to grant, bargain, sell and convey the same in manner and form as aforesaid, and that the same are free and clear from all former and other grants, bargains, sales, liens, taxes, assessments and encumbrances of whatever kind or nature soever. Except the general taxes for 1978 and subsequent years; except easements, restrictions, reservations, and rights-of-way of record, if any.

and the aboved bargained premises in the quiet and peaceable possession of the said party of the second part, his heirs and assigns against all and every person or persons lawfully claiming or to claim the whole or any part thereof, the said party of the first part shall and will WARRANT AND FOREVER DEFEND. The singular number shall include the plural, the plural the singular, and the use of any gender shall be applicable to all genders.

IN WITNESS WHEREOF, the said party of the first part has hereunto set his hand and seal the day and year first above written.

Percy L. Losey [SEAL]
PERCY L. LOSEY

Edna K Losey [SEAL]
EDNA K. LOSEY

[SEAL]

STATE OF COLORADO
County of Douglas } ss.

The foregoing instrument was acknowledged before me this 1st day of August

1978, by PERCY L. LOSEY and EDNA K. LOSEY

My commission expires May 16, 1981. Witness my hand and official seal.

Patricia M. Benefiel
Notary Public.

No. 932A. WARRANTY DEED. For Photographic Record.—Bradford Publishing Co., 1824-46 Stout Street, Denver, Colorado (573-5011)—8-77

PROPERTY DESCRIPTION:

A tract of land situated in the South ½ of Section 10, Township 7 South, Range 66 West of the 6th Principal Meridian, Douglas County, Colorado, more particularly described as follows:

Commencing at the Southwest corner of said Section 10 and considering the South line of said Section 10 to bear N 90°00'00"E with all bearings contained herein relative therto:

Thence N 90°00'00"E along said South line a distance of 1326.56 feet to the Southwest corner of the East ½ of the Southwest ¼ of said Section 10;

Thence N 90°00'00"E along said South line a distance of 805.17 feet;

Thence N 0°02'42"W, parallel with the West line of said East ½ of the Southwest ¼, a distance of 827.04 feet to the true point of beginning;

Thence N 0°02'42"W along said parallel line a distance of 795.96 feet;

Thence N 90°00'00"E, parallel with the South line of said Section 10 a distance of 2203.57 feet to the West Right of Way line of State Highway No. 83;

Thence S 2°02'42"W along said West Right of Way line a distance of 796.47 feet;

Thence N 90°00'00"W, parallel with the South line of said Section 10, a distance of 2174.52 feet to the point of beginning;

Containing 40.000 acres, more or less;

Together with an easement for access, said easement being 45.00 feet in width with the West line of said easement being described as follows;

Beginning at the Southwest corner of the above described 40.000 acre parcel;

Thence S 0°02'42"E, along the West line of subject easement, a distance of 827.04 feet to the South line of said Section 10 and to the center line of County Road No. 39, and to the point of terminus of subject easement.

Together with an undivided 3.88% interests in the Haley Ditch, Priority #78 and an undivided 25% interest in the Harrison Ditch, Priority #83, as decreed in Case No. W-6268, The District Court in and for the Water Division #1, State of Colorado.

#2014019659, 04/21/2014 at 03:30:54 PM, 1 OF 2, Recording Fee $16.00 Doc Fee $0.00 Electronically Recorded Official Records Douglas County, CO Jack Arrowsmith, Clerk & Recorder

PERSONAL REPRESENTATIVE'S DEED

Iyad Khalaf was appointed Personal Representative by Clerk of the District Court of Douglas County, Colorado, on June 12, 2013 and Letters of Personal Representative were issued on June 12, 2013 for Probate Case No. 2013 PR 30015, which Letters are unrevoked and remain in full force and effect; a copy of the Letters is recorded at District Court, Douglas County, Colorado.

Iyad Khalaf, 2354 High Ridge Road, Lima, OH 45805, as the duly appointed, qualified, and acting Personal Representative of the Estate of Riyad Abdallah Khalaf, GRANTOR, sells, conveys, transfers, assigns, and releases to Iyad Khalaf, GRANTEE of 2354 High Ridge Road, Lima, OH 45805; Nihad Khalaf, GRANTEE of 2222 202nd Place S.W. Lynwood, WA 98036; Ziad Khalaf, GRANTEE of 2222 202nd Place S.W. Lynwood, WA 98036; Nisreen Khalaf, GRANTEE of 2558 Chain Bridge Rd, Apt T1, Vienna, VA 22181; and Eman Khalaf, GRANTEE of 2222 202nd Place S.W. Lynwood, WA 98036, all interest of the decedent and the estate of decedent in the following described real estate in Douglas County, Colorado:

(SEE ATTACHMENT)

Also known as

subject to easements and restrictions of record.

The above described property is not being used as a homestead by any person.

Dated 14 APRIL 2014

Iyad Khalaf
Personal Representative of the Estate of Riyad Abdallah Khalaf

Transfer Fee: $0.00

State of Ohio)
)§§
County of Allen)

The foregoing instrument was acknowledged before me this 14 day of April, 2014 by Iyad Khalaf, known to me or satisfactorily proven to be the person described in the Personal Representative's Deed, and acknowledged that he executed the foregoing Personal Representative's Deed as Personal Representative of the Estate of Riyad Abdallah Khalaf and for the purposes therein contained.

Dated 4-14-14

(Seal)

Notary Public, State of Ohio
My commission expires: May 1, 2018

BETHANY GARRETT
Notary Public, State of Ohio
My Commission Expires
May 1, 2018

PROPERTY DESCRIPTION:

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Commencing at the Southwest corner of said Section 10 and considering the South line of said Section 10 to bear N 90°00'00"E with all bearings contained herein relative therto:

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Thence N 90°00'00"E along said South line a distance of 805.17 feet;

Thence N 0°02'42"W, parallel with the West line of said East ½ of the Southwest ¼, a distance of 827.04 feet to the true point of beginning;

Thence N 0°02'42"W along said parallel line a distance of 795.96 feet;

Thence N 90°00'00"E, parallel with the South line of said Section 10 a distance of 2203.57 feet to the West Right of Way line of State Highway No. 83;

Thence S 2°02'42"W along said West Right of Way line a distance of 796.47 feet;

Thence N 90°00'00"W, parallel with the South line of said Section 10, a distance of 2174.52 feet to the point of beginning;

Containing 40.000 acres, more or less;

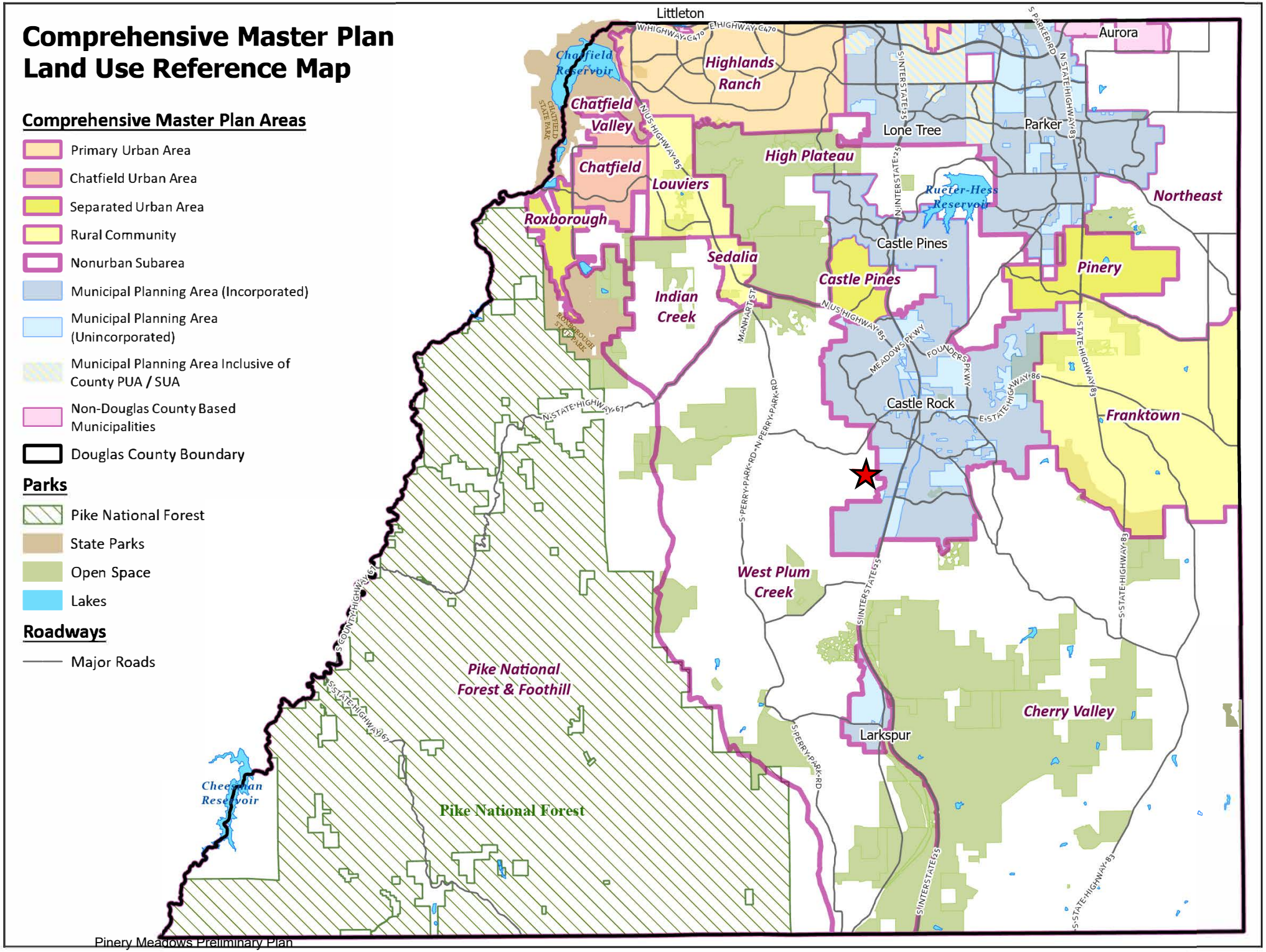
Together with an easement for access, said easement being 45.00 feet in width with the West line of said easement being described as follows;

Beginning at the Southwest corner of the above described 40.000 acre parcel;

Thence S 0°02'42"E, along the West line of subject easement, a distance of 827.04 feet to the South line of said Section 10 and to the center line of County Road No. 39, and to the point of terminus of subject easement.

Together with an undivided 3.88% interests in the Haley Ditch, Priority #78 and an undivided 25% interest in the Harrison Ditch, Priority #83, as decreed in Case No. W-6268, The District Court in and for the Water Division #1, State of Colorado.

Comprehensive Master Plan Land Use Reference Map



Pinery Meadows Preliminary Plan

SB2025-009
Zoning Map

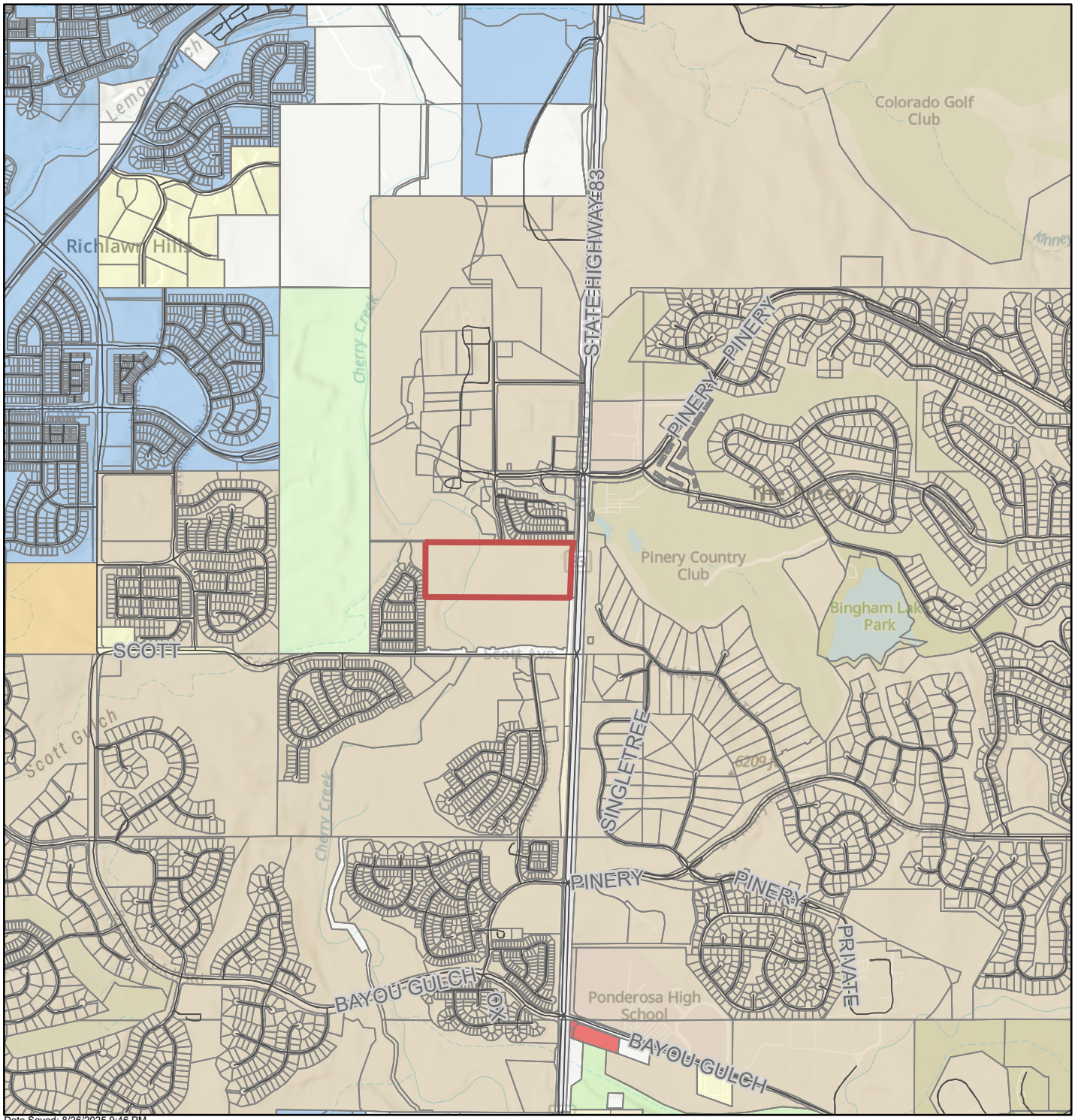
N

LEGEND

- Roads
- Major Roads
- Parcels - PARCELS

ZONE DISTRICT

A1 - AGRICULTURAL ONE	A1 - AGRICULTURAL ONE
LRR - LARGE RURAL RESIDENTIAL	LRR - LARGE RURAL RESIDENTIAL
RR - RURAL RESIDENTIAL	RR - RURAL RESIDENTIAL
ER - ESTATE RESIDENTIAL	ER - ESTATE RESIDENTIAL
C - COMMERCIAL	C - COMMERCIAL
CTY	CTY
PD - PLANNED DEVELOPMENT	PD - PLANNED DEVELOPMENT
OS - OPEN SPACE CONSERVATION	OS - OPEN SPACE CONSERVATION



Date Saved: 8/26/2025 9:46 PM

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Pinery Meadows Preliminary Plan

SB2025-009
Aerial Map

N

LEGEND
- Roads
- Major Roads
- Parcels - PARCELS



Date Saved: 8/26/2025 9:50 PM

Source: https://apps.douglas.co.us/gisportal/apps/webappviewer/index.html?id=9cd173c692b7436891bd0bd025cbcc2c

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
Addressing Analyst	04/17/2025	**Verbatim Response:** Please propose street names to be placed on the final plat. Suffixes are determined by the street alignment: ROAD A - CIRCLE or LOOP ROAD B - ROAD or TRAIL ROAD C - LANE ROAD D - LANE The following private accesses do not require street names and should remain unnamed. ROAD C ROAD E ROAD F Please submit propose street names to Douglas County for evaluation. Pre-check street names online before submitting to Douglas County using the Street Names dataset available on the DougCo Hub. These are street names only and do not include directions or suffixes. All street names in the Douglas County database have already been considered and should not be proposed again. They are existing, reserved, or denied. Use the Filter feature found on the left panel to enter a proposed street. If that name is already in the database, it is unavailable. Proposed street names should be easy to read or pronounce. Street names that are the same as, or similar to, other street names are considered to be duplications and will be denied. Street names that are the same as, or similar to, subdivision names may not be used. Street names existing in areas to which we dispatch emergency services outside of Douglas County may not be used. North, east, south and west should not be part of the name. Special characters may not be used. Abbreviations, acronyms and initials may not be used. Street names must contain no more than 12 letters or character spaces (including the space between words). Please review all guidelines in the Douglas County Addressing and Street Naming Manual. Contact DCAddressing@douglas.co.us or 303.660.7411 with questions.	Street names will be finalized at the time of final plat.

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
Assessor	05/05/2025	**Verbatim Response:** please be aware of the following comments None	No response required.
AT&T Long Distance - ROW	04/22/2025	**Summary of Response:** Provide additional information to verify if a conflict will exist. See email attached for detail.	The applicant has indicated that they will perform utility locates prior to construction to ensure that there is no conflicts with AT&T infrastructure along State Highway 83.
Black Hills Energy		No Response Received.	
Building Services	04/15/2025	**Verbatim Response:** Permits required. Please visit Douglas County's web site for requirements and contact 303-660-7497 if you have any questions.	The applicant will obtain any necessary permits as part of the building permit review.
CenturyLink		No Response Received.	
Cherry Creek Basin Water Quality Authority	04/21/2025	**Verbatim Response:** The Cherry Creek Basin Water Quality Authority (Authority) acknowledges notification from Douglas County that the proposed development plans for SB2025-009, Pinery Meadows Preliminary Plan have been or will be reviewed by Douglas County for compliance with the applicable Regulation 72 construction and post-construction requirements. Based on the Authority's current policy, the Authority will no longer routinely conduct a technical review and instead the Authority will defer to Douglas County's review and ultimate determination that the proposed development plans comply with Regulation 72. If a technical review of the proposed development plan is needed, please contact LandUseReferral@ccbwqa.org. The review may include consultation with the Authority's Technical Manager to address specific questions or to conduct a more detailed Land Use Review, if warranted.	No response required.
Colorado Department of Transportation CDOT-Region # 1	04/30/2025	Comments were provided regarding hydraulics and permits. No negative drainage impacts are expected to State Highway 83 and any permits are required if working within CDOT right-of-way, See letter attached for detail.	The applicant acknowledged the comments.

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
Colorado Division of Water Resources	04/21/2025	The Colorado Division of Water Resources (CDWR) reviewed the application and stated that the proposed water supply is adequate and can be provided without causing injury to decreed water rights. See letter attached for detail.	No response required.
Colorado Geological Survey	05/06/2025	**Verbatim Response:** The characterization of subsurface conditions and recommendations in AGW's Geotechnical Site Development Study, Pinery Meadows, Douglas County, Colorado (AGW Project No. 247051, December 16, 2024) are valid. Provided AGW's recommendations are rigorously adhered to, CGS has no objection to preliminary plan approval. Specifically, this includes the recommendation (page 6) that "The overlot grading plans should be provided to AGW [or the project geotechnical consultant] prior to commencement of work to evaluate which areas and to what depth overexcavation is required."	Standard geotechnical explorations of individual building sites will also be required at the time of construction as part of the building permit process.
Colorado Parks and Wildlife	04/23/2025	**Summary of Response:** In their referral response dated April 23, 2025, Colorado Parks and Wildlife expects a variety of wildlife species to utilize the site on a regular basis, including small to mid-sized mammals, songbirds, deer and raptors. CPW noted that the main concern is the disturbance of nesting bald eagles. CPW also provided comments related to prairie dogs and burrowing owls. See letter attached for detail.	Proposed condition of approval #8 requires that the applicant provide Colorado Division of Wildlife literature to homeowners and homebuyers about the presence of wildlife within the area. Proposed condition of approval #9 requires that the applicant complete a burrowing owl study if any construction is to take place between March 15th and October 31st.
Comcast		No Response Received.	

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
CORE Electric Cooperative	05/04/2025	**Verbatim Response:** CORE Electric Cooperative has reviewed the contents in the above-referenced referral response packet. We reviewed the project for maintaining our existing facilities, utility easements, electric loading, and service requirements. We are advising you of the following concerns and comments: CORE does not have electric capacity in the area; the applicant will be required to extend electric facilities 1.71 miles from CORE's existing substation at Bayou Gulch Road. CORE will require additional utility easements to extend an electric facility to the site. The proposed grading within utility easements may not exceed 15%. CORE will require the additional note added to the preliminary plan and plat.	The preliminary plan has been revised to address CORE comments. CORE provided an updated will-serve letter dated July 1, 2025, confirming their willingness to extend and provide electric service to the subdivision. The applicant will continue to work with CORE during the final plat process.
Douglas County Conservation District		No Response Received.	
Douglas County Health Department	04/25/2025	**Summary of Response:** Comments were provided related to fugitive dust and stormwater impacts. See letter attached for detail.	The applicant acknowledged the comments and stated that construction practices will follow County standards and requirements.
Douglas County Historic Preservation	05/07/2025	**Summary of Response:** The applicant submitted a cultural resources survey report which was reviewed by Douglas County Historic Preservation staff. The County's curator noted that new sites and artifacts were discovered but none are eligible to be listed on the national register. See letter attached for detail.	No further action is required at this time. Should buried artifacts and features be discovered in future phases, the curator recommends that the applicant complete the appropriate Colorado Office of Archeology and Historic Preservation Data Management and Historic and/or Prehistoric Component forms. Proposed Condition #7 reflects this commitment.

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
Douglas County Parks and Trails	05/08/2025	**Verbatim Response:** Applicant will be required to meet park land dedication standards as stated in article 10 of the Douglas County Subdivision Resolution. In addition, a contribution of $500 per dwelling unit will be required for park and recreation improvements.	Per the PD, the applicant will contribute $500 per unit at the time of final plat recordation which will go towards future park and trail improvements in the area which may include feasibility studies, design, construction, and other regional improvements as determined by the County. An appraisal will be provided at the time of final plat for the purpose of determining the amount of required cash-in-lieu of park land dedication for the subdivision as required by Article 10 of the Douglas County Subdivision Resolution.
Douglas County School District RE 1		**Summary of Response:** The Douglas County School District (DCSD) stated in its referral letter dated May 15, 2025, that a total of 50 students are expected from this development which would equate to a total land dedication requirement of 1.2 acres. This land dedication requirement is less than DCSD's minimum site requirements and therefore, DCSD requests cash-in-lieu of land dedication. See letter attached for detail.	An appraisal will be provided at the time of final plat for the purpose of determining the amount of required cash-in-lieu of school land dedication for the subdivision as required by Article 10 of the Douglas County Subdivision Resolution.
Douglas County Water Commission		**Summary of Response:** The Douglas County Water Commission reviewed the application on April 28, 2025, and individual comments were provided from two commissioners. Commissioner Bernhardt commented that it would be nice to see will serve letters indicate how much ground water is being used compared to renewable water. Commissioner Hudson stated that he had been approached by nearby residents to the project, who have asked him to oppose the project based on the limited groundwater resources in the area and the high density of the project.	Comments were provided to the applicant.

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
Engineering Services	05/06/2025	**Summary of Response:** Engineering provided comments related to the preliminary plan exhibit. See letter attached for detail.	The applicant has addressed Engineering's comments regarding the preliminary plan exhibit. Per the Pinery Meadows PD, the applicant will be required to provide a pro-rata share of the required traffic signal improvements to the intersection of Scott Avenue and State Highway 83 and 50 percent of the traffic signal cost for the intersection of Pinery Center Boulevard and Scott Avenue which will be secured via an improvements agreement at the time of final plat.
High Prairie Farms HOA		No Response Received.	
High Prairie Farms Metro District		No Response Received.	
Mile High Flood District		No Response Received.	
Office of Emergency Management	04/24/2025	**Verbatim Response:** OEM recommends completion of Pinery Center Pkwy with North and South ingress/egress points prior to building of dwellings. This will facilitate two egress options in the event of evacuation.	Pinery Center Boulevard will be extended through the subdivision, completing the connection between Scott Avenue on the south and North Pinery Parkway on the north.
Open Space and Natural Resources		No Response Received.	
Pinery Commercial Metro Districts #1 & 2		No Response Received.	

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
Pinery Water and Wastewater District	04/16/2025	**Verbatim Response:** The project applicant has submitted an application for inclusion into the Pinery Water & Wastewater District and is working with the District directly. The District has not other comments at this time.	If the appeal is approved to defer the timing of inclusion to final plat. Proposed Condition #1 will require evidence of PWWD formal approval of inclusion prior to the Board meeting on the final plat request.
Pinery West HOA	05/01/2025	**Verbatim Response:** This project has changed the density of homes 4 times time now. This was originally projected for roughly 196, then adjusted to 170. The project then re-applied for 121 now adjusted to 130. Pinery Residential (Pinery West) is on roughly 31 acres with common areas, 3 private roads and 86 single family "patio" homes with average lot size of 5,500 square feet. Pinery Meadows is planning roughly 51 percent more dwellings on 39.5 acres of which not all will be homes. Will there be 2 story homes abutting the 20-foot setback from the private fences of the Pinery West homes on the South side of our community? If so, this is not acceptable to our community therefore only ranch style should be approved for this location. I believe this project is too high density to be in such close proximity to Pinery West.	The applicant confirmed that the preliminary plan request will provide a 20' wide landscape buffer along the northern property line adjacent to the residential development as required by the Pinery PD. This landscape buffer along with on-site fencing will provide screening and buffering from the existing development. The applicant confirmed that the proposal is for 136 dwelling units and that the density and housing products comply with the Pinery Meadows PD.
Pinewood Townhome HOA		No Response Received.	
Pradera Homeowners' Association		No Response Received.	
Rural Water Authority of Douglas County		No Response Received.	
Sheriff's Office		No Response Received.	
Sheriff's Office E911		No Response Received.	

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
South Metro Fire Rescue	04/21/2025	**Verbatim Response:** South Metro Fire Rescue (SMFR) has reviewed the provided documents and has conditional non-objection to the proposed preliminary plan. See attached letter for comments to be resolved prior to plat.	The applicant acknowledged the comments and noted that Pinery Center Boulevard will be completed south of the project to Scott Avenue prior to construction and that the fire hydrant locations will be coordinated and finalized with South Metro prior to final plat recordation.
Stone Creek Metropolitan District		No Response Received.	
The Pinery HOA	05/06/2025	**Summary of Response:** The Pinery HOA expressed concerns with the proposed development maintaining community character, enhancing a community separation buffer, and ensuring any new development is compatible with the character of the original Pinery. See letter attached for detail.	In response to the comments from the Pinery HOA, the applicant stated that the details surrounding the character of the community will become available at the time of Site Improvement Plan for the attached product and that the proposed subdivision complies with the approved PD and vision of the Pinery SUA.
Town of Castle Rock	04/22/2025	No Comment.	No response required.
Town of Parker Development Review	04/16/2025	No Comment.	No response required.
Town of Parker Public Works	04/15/2025	No Comment.	No response required.
Wildfire Mitigation	05/08/2025	**Verbatim Response:** Wildfire mitigation does not have any comments for this proposal.	No response required.
Xcel Energy-Right of Way & Permits	04/17/2025	**Summary of Response:** Xcel Energy reviewed the application and provided comments related to their existing natural gas distribution facilities within the area. Other comments were provided regarding the 30-foot-wide gas easement that will be vacated and realigned at the time of final plat. See letter attached for detail.	The applicant acknowledged the comments and will continue to work with Xcel Energy during the final plat process. General note #4 on sheet 1 of the preliminary plan exhibit has information related to the gas easements which will be vacated and realigned at the time of final plat.

Eric Pavlinek

From: annb cwc64.com <annb@cwc64.com>
Sent: Tuesday, April 22, 2025 3:27 PM
To: Eric Pavlinek
Cc: Pam Choy (pc2914@att.com); duanew cwc64.com; jt cwc64.com
Subject: Pinery Meadows Parker, Colorado eReferral #SB2025-009
Attachments: Pinery Meadows Parker, Colorado.jpg

Hi Eric,

This is in response to your eReferral for a utility map showing the buried AT&T Long Line Fiber Optics near Pinery Meadows Parker, Colorado. I attached an Earth map showing the project area in red and the buried AT&T Long Line Fiber Optics in yellow. As shown, there is a possibility of conflict along S Parker Rd. Any other information you could provide about the projects would be appreciated in determining if a conflict will exist. Please pass on our contact information as well.

Please feel free to contact us with any questions or concerns.

Ann Barnowski
Clearwater Consulting Group Inc
120 9th Avenue South
Suite 140
Nampa, ID 83651
Annb@cwc64.com

The attached google earth maps are intended to show approximate locations of the buried AT&T long line fiber optic cable. The maps are provided for informational purposes only. In no way should the maps be used for anything other than general guidelines as to where the fiber is or is not and any other use of these maps is strictly prohibited.

-----Original Message-----
From: epavlinek@douglas.co.us <epavlinek@douglas.co.us>
Sent: Tuesday, April 15, 2025 1:14 PM
To: annb cwc64.com <annb@cwc64.com>
Subject: Douglas County eReferral (SB2025-009) Is Ready For Review

There is an eReferral for your review. Please use the following link to log on to your account:
https://apps.douglas.co.us/planning/projects/Login.aspx

Project number: SB2025-009

Project title: Pinery Meadows Preliminary Plan

Project Summary: A preliminary plan application for 136 residential lots, and 11 tracts on approximately 39.5 acres within Pinery Meadows Planned Development. The proposal includes 40 single-family attached (duplex) and 96 single-family detached residential lots.

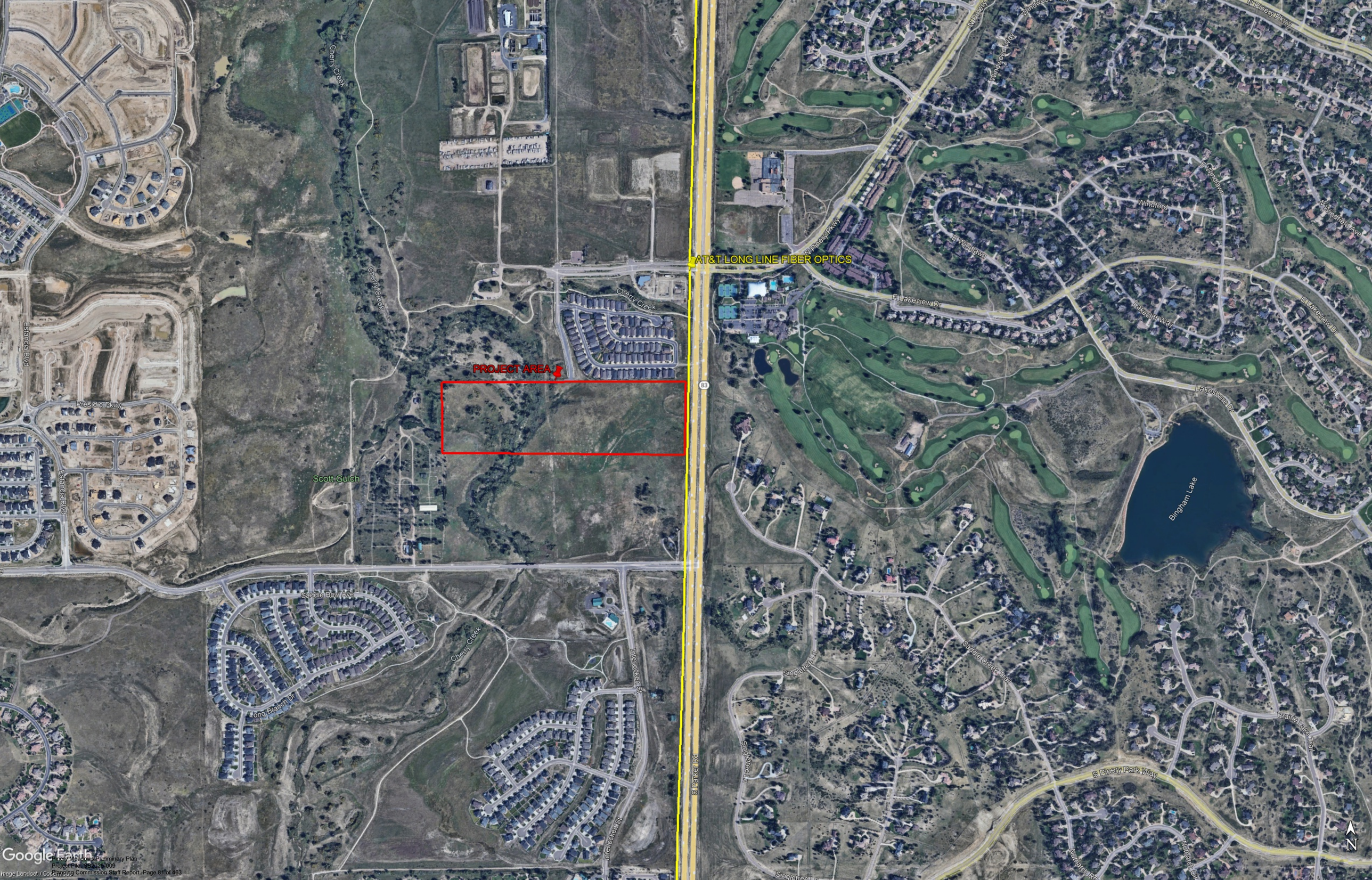
This referral will close on Tuesday, May 6, 2025.

If you have any questions, please contact me.

Sincerely,

Eric Pavlinek

Planning Services
100 Third Street
Castle Rock, CO 80104
303-660-7460 (main)


AT&T LONG LINE FIBER OPTICS
PROJECT AREA
Cherry Creek
Cherry Creek
Cherry Creek
Estancia Blvd
Presidio Pkwy
Scott Gulch
Saddle Bow Ave
Long Branch Dr
Interlocken St
Interlocken St
S Parker Rd
N Pinery Pkwy
Winnipeg Way
N Pinery Pkwy
W Pinery Pkwy
E Windpark
E Windpark
Windford
Winnefield Ave
E Lakeview Dr
Lakeside Way
E Lakeview Dr
Lakeshore Dr
Lakeshore Dr
Bingham Lake
Singletree Ln
Saddle Creek Trail
Singletree Ln
Prairie Lake Trail
S Pinery Park Way
Northglenn Rd
Northglenn Dr
83
N
Google Earth
Image Landsat / Copernicus

Traffic & Safety
Region 1
2829 W Howard Place, 2nd Floor
Denver, Colorado 80204

COLORADO
Department of Transportation
Region 1

Project Name: Pinery Meadows

Print Date: 4/30/2025 **Highway**: 083 **Mile Marker**: 54.835

A comment response letter is REQUIRED along with the next submittal.

Review POC: Varner, Jessica

Hydraulics Comments:

I have reviewed the attached drainage report for the above development, The report was prepared by Roth Lang Engineering. I have concluded that there will be no negative drainage impact to SH83, and that the existing drainage patterns will be maintained and improved Samer 4-28-2025

Permits Comments:

4.29.25

- The signal at Scott Ave has been installed. It doesn't appear that any work will be taking place in CDOT ROW.

- Please keep in mind that working in or form the CDOT ROW will require a utility/special use permit from our office. This includes, but is not limited to survey, landscaping, signal or utility work. Application is made online at the following link: https://cdotpermits.force.com/portal/s/login/?ec=302&startURL=%2Fportal%2Fs%2F -- Aaron Eyl 4.29.25

COLORADO
Division of Water Resources
Department of Natural Resources

April 21, 2025

Eric Pavlinek, Principal Planner
Douglas County Planning Services
Transmission via email: epavlinek@douglas.co.us

Re: Pinery Meadows Planned Development
Project File # SB2025-009 (related to ZR2022-028)
Part of the S ½ of Sec. 10, Twp. 7S, Rng. 66W, 6th P.M.
Water Division 1, Water District 8
CDWR Assigned Referral No. 30422 - 2nd Letter

Dear Eric Pavlinek:

We have reviewed the April 15, 2025 referral concerning the proposal for a preliminary plan for 136 residential lots and 11 tracts on approximately 39.50 acres located in the S ½ of Sec. 10, Twp. 7S, Rng. 66W, 6th P.M. The proposal includes 40 single-family attached (duplex) and 96-single-family detached residential lots.

This is a decrease from the previously proposed 196 single-family residential lots. These comments supersede the comments provided in our August 4, 2022 letter.

Water Supply Demand

According to the letter dated October 30, 2024 ("Letter") from the Pinery Water & Wastewater District ("District"), the estimated water demand is 0.55 acre-feet/year per single-family equivalent (SFE), or 94.6 acre-feet/year for 172 SFEs at full buildout (170 SFE and two ¾" irrigation meters).

Source of Water Supply

The proposed water supply for the subdivision is service provided by the District. According to the Letter, the District is willing and able to serve the proposed subdivision subject to the

conditions set forth in that letter. This office has not received information that the applicant has complied with those conditions.

According to the "Present and Future Water Sources" report dated May 2014 and updated February 2018 prepared by HRS Consultants Inc. ("Report"), the Pinery Water & Wastewater District has a total of 15,037 acre-feet per year of water rights. This amount consists of 13,466 acre-feet of nontributary water rights, 1,220 acre-feet of senior tributary water rights, an additional 351 acre-feet of nontributary water rights that are dedicated to development of the Broe property, and as a member of the WISE Authority the District has subscribed to 500 acre-feet per year on average of renewable and reusable water. In addition, the District has two existing augmentation plans, decreed in Division 1 Water Court Case nos. W-6268 and 11CW198. Under those augmentation plans, return flows from the use of nontributary water, along with other replacement sources, are used to offset out-of-priority depletions from pumping of junior wells.

As of 2017, the District's water requirements from existing commitments totaled 3,098 acre-feet. Projected commitments at full build out are estimated at 4,200 acre-feet.

Typically, this office requires an updated report from a municipal supplier every 5 years. However, since we previously approved the water supply for this development and since the water demands for this development have decreased, we will rely on the May 2014 Report in this letter. **However, please be aware that if water demand for this development increases in the future, and for any other new subdivisions that rely on the District as its water source, an updated report will be required in order for this office to provide a favorable opinion the proposed water supply plan.**

The majority of the Pinery Water & Wastewater Treatment District's water supply is water from bedrock aquifers in the Denver Basin. The State Engineer's Office does not have evidence regarding the length of time for which this source will be a physically and economically viable source of water. According to section 37-90-137(4)(b)(I), C.R.S., "Permits issued pursuant to this subsection (4) shall allow withdrawals on the basis of an aquifer life of one hundred years." Based on this **allocation** approach, the annual amounts of

water decreed are equal to one percent of the total amount, as determined by rules 8.A and 8.B of the Statewide Nontributary Ground Water Rules, 2 CCR 402-7. Therefore, the water may be withdrawn in those annual amounts for a maximum of 100 years.

State Engineer's Office Opinion

Based upon the above and pursuant to section 30-28-136(1)(h)(I) and 30-28-136(1)(h)(II), C.R.S., it is our opinion that the proposed water supply is adequate and can be provided without causing injury to decreed water rights.

Our opinion that the water supply is **adequate** is based on our determination that the amount of water required annually to serve the subdivision is currently physically available, based on current estimated aquifer conditions.

Our opinion that the water supply can be **provided without causing injury** is based on our determination that the amount of water that is legally available on an annual basis, according to the statutory **allocation** approach, for the proposed uses is greater than the annual amount of water required to supply existing water commitments and the demands of the proposed subdivision.

Our opinion is qualified by the following:

The Division 1 Water Court has retained jurisdiction over the final amount of water available pursuant to the above-referenced decree, pending actual geophysical data from the aquifer.

The amounts of water in the Denver Basin aquifer, and identified in this letter, are calculated based on estimated current aquifer conditions. The source of water is from a non-renewable aquifer, the allocations of which are based on a 100-year aquifer life. The county should be aware that the economic life of a water supply based on wells in a given Denver Basin aquifer may be less than the 100 years used for allocation due to anticipated water level declines. We recommend that the county determine whether it is appropriate to require development of renewable water resources for this subdivision to provide for a long-term water supply.

Additional Comments

The application materials indicate that a stormwater detention structure may be a part of this project. The applicant should be aware that unless the structure can meet the requirements of a "storm water detention and infiltration facility" as defined in section 37-92-602(8), C.R.S., the structure may be subject to administration by this office. The applicant should review DWR's Administrative Statement Regarding the Management of Storm Water Detention Facilities and Post-Wildland Fire Facilities in Colorado to ensure that the notification, construction and operation of the proposed structure meets statutory and administrative requirements. The Applicant is encouraged to use the Colorado Stormwater Detention and Infiltration Facility Notification Portal to meet the notification requirements.

Please contact Wenli.Dickinson@state.co.us or (303) 866-3581 x8206 with any questions.

Sincerely,

Ioana Comaniciu, P.E.
Water Resources Engineer

Ec: Pinery Water & Wastewater Treatment District file

COLORADO
Parks and Wildlife
Department of Natural Resources

Northeast Regional Office
6060 Broadway
Denver, CO 80216
P 303.291.7227

April 23, 2025

Eric Pavlinek
Planning Services
Douglas County
100 Third Street
Castle Rock, CO 80104

RE: Pinery Meadows Preliminary Plan, Project # (SB2025-009)

Dear Mr. Pavlinek,

Thank you for the opportunity for Colorado Parks and Wildlife (CPW) to comment on the proposed Pinery Meadows Preliminary Plan. The mission of CPW is to perpetuate the wildlife resources of the state, to provide a quality state parks system, and to provide enjoyable and sustainable outdoor recreation opportunities that educate and inspire current and future generations to serve as active stewards of Colorado's natural resources. CPW has a statutory responsibility to manage all wildlife species in Colorado, and to promote a variety of recreational opportunities throughout Colorado. One way we achieve this goal is by responding to referral comment requests, as is the case for this project.

It is our understanding that this project is for a planned development of 136 residential lots, and 11 tracts on 39.5 acres and is located within the Pinery Meadows Planned Development and is bordered to the north by the Pinery West residential subdivision, by the east Parker Road (Hwy 83, the west by the Cherry Creek and to the south by another development that is under review by Douglas County.

CPW would expect a variety of wildlife species to utilize this site on a regular basis, most notably, small to mid-sized mammals, songbirds and raptors. There is also potential for larger mammals, such as deer to visit the site, as the site is located in the overall range for both mule deer and whitetail deer. The main concern would be the likely disturbance of nesting bald eagles.

<u>Bald Eagles</u>

The proposed site could be within the ¼ mile buffer of an active bald eagle nesting site. Spatial buffers from development and other human activities are a proven management tool to address impacts on breeding activities at raptor nest sites. CPW has established recommended buffer zones and seasonal restrictions for raptors in Colorado, including bald eagles. CPW developed these raptor guidelines to assist with compliance with the Federal

Jeff Davis, Director, Colorado Parks and Wildlife
Parks and Wildlife Commission: Dallas May, Chair · Richard Reading, Vice-Chair · Karen Bailey, Secretary · Jessica Beaulieu
Marie Haskett · Tai Jacober · Jack Murphy · Gabriel Otero · Murphy Robinson · James Jay Tutchton · Eden Vardy

Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. To avoid impacts to nesting bald eagles, CPW recommends:

- No surface occupancy within ¼ mile of an active eagle nest, and no human activities within ½ mile of the nest from December 1st to July 31st.

CPW recommends landscape buffers and observing seasonal restrictions to minimize disturbance. To minimize disturbance for all birds, CPW recommends all security lighting for on-ground structures and equipment during and after construction be motion- sensitive, down shielded, and of a minimum intensity to reduce nighttime bird attraction and eliminate constant nighttime illumination.

Other raptors and migratory birds are protected from take, harassment, and nest disruption at both the state and federal levels. If any other active nest is discovered within the development area, CPW recommends that buffer zones around the nest site be implemented during any period of activity that may interfere with the nesting season. This will prevent the intentional or unintentional destruction of an active nest.

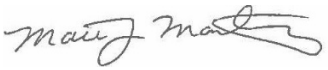
Prairie Dogs and Burrowing Owls

If a prairie dog colony is discovered within the project area, the potential may also exist for the presence of burrowing owls. Burrowing owls live on flat, treeless land with short vegetation, and nest underground in burrows dug by prairie dogs, badgers, and foxes. Burrowing owls are classified as a state threatened species and are protected by both state and federal laws, including the Migratory Bird Treaty Act. These laws prohibit the killing of burrowing owls or disturbance of their nests. Therefore, if any earth-moving will begin between March 15th and August 31st, a burrowing owl survey should be performed. Guidelines for performing a burrowing owl survey can be obtained from your local District Wildlife Manager.

If prairie dog colonies are active, CPW recommends humane euthanasia of live animals before any earth-moving occurs. The possibility of donating carcasses to a raptor rehabilitation facility or the black-footed ferret recovery program may also exist. If interested, please contact the local District Wildlife Manager for more information and any required permits or forms. Please note that a permit from CPW and approval from the Douglas County Board of Commissioners will likely be required for any live relocation of prairie dogs to another site.

Thank you again for the opportunity to comment on the Pinery Meadows Preliminary Plan. Please do not hesitate to contact us about ways to continue managing the property in order to maximize wildlife value while minimizing potential conflicts. If you have any further questions, please contact District Wildlife Manager Katie Doyle at (720)930-8039 or katie.doyle@state.co.us.

Sincerely,



Matt Martinez
Area Wildlife Manager

Cc: M. Leslie, S. Schaller, K. Doyle

CORE COMMENTS

LEGEND

PROPOSED		EXISTING
	AASHTO SIGHT TRIANGLE	
	CENTERLINE OF ROAD	
5280	CONTOUR - MAJOR	5280
5279	CONTOUR - MINOR	5279
	DRAINAGE SWALE	
X X	FENCE - BARBED WIRE	
	FENCE - WOOD POST	
	PROPERTY BOUNDARY	
	RETAINING WALL	
	RIGHT-OF-WAY LINE	
	STORM SEWER	

SYMBOLS LEGEND

2.0%	SLOPE	
80.00	SPOT ELEVATION	(80.00)
	STORM INLET	
	STORM MANHOLE	D

HATCHING LEGEND

	CONCRETE PAVING
	RIPRAP / GRAVEL

LEGAL:

A TRACT OF LAND SITUATED IN THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, COLORADO, DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF SAID SECTION 10 AND CONSIDERING THE SOUTH LINE OF SAID SECTION 10 TO BEAR N89°44'01"E WITH ALL BEARINGS CONTAINED HEREIN RELATIVE THERETO:
THENCE N89°44'01"E, ON SAID SOUTH LINE A DISTANCE OF 1326.31 FEET, TO THE SOUTHWEST CORNER OF THE EAST 1/2 OF THE SOUTHWEST 1/4 OF SAID SECTION 10;
THENCE N89°43'39"E, ON SAID SOUTH LINE, A DISTANCE OF 805.19 FEET;
THENCE N00°19'54"W, A DISTANCE OF 827.39 FEET, TO THE POINT OF BEGINNING;

THENCE CONTINUING N00°19'54"W, A DISTANCE OF 813.92 FEET, TO THE EXTENSION OF THE SOUTH LINE OF PINERY WEST FILING NO. 2;
THENCE N89°39'49"E, ON SAID SOUTH LINE OF PINERY WEST FILING NO. 2, A DISTANCE OF 2156.25 FEET TO THE WEST RIGHT OF WAY LINE OF STATE HIGHWAY NO. 83 PER THAT DEPARTMENT OF TRANSPORTATION RIGHT OF WAY PLAN, FEDERAL AID PROJECT NO. FR 083-1(39);
THENCE SOUTHERLY ON SAID WEST RIGHT OF WAY LINE THE FOLLOWING (5) FIVE COURSES;
1) S01°46'32"W, A DISTANCE OF 20.22 FEET;
2) S89°43'24"W, A DISTANCE OF 5.60 FEET;
3) S10°56'47"W, A DISTANCE OF 130.03 FEET;
4) S02°44'47"W, A DISTANCE OF 432.60 FEET;
5) S02°50'32"W, A DISTANCE OF 236.80 FEET;
THENCE S89°43'27"W, A DISTANCE OF 2088.14 FEET TO THE POINT OF BEGINNING;

CONTAINING 1,721,739+/- SQUARE FEET (39.536+/- ACRES)

TOGETHER WITH AN EASEMENT FOR ACCESS, SAID EASEMENT BEING 45.00 FEET IN WIDTH WITH THE WEST LINE OF SAID EASEMENT BEING DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF THE ABOVE DESCRIBED PARCEL;
THENCE S 0°02'42" E, ALONG THE WEST LINE OF SUBJECT EASEMENT, A DISTANCE OF 827.04 FEET TO THE SOUTH LINE OF SAID SECTION 10 AND TO THE CENTER LINE OF COUNTY ROAD NO. 39, AND TO THE POINT OF TERMINUS OF SUBJECT EASEMENT,

BENCHMARK:

NAVD 1988 BASED ON THE DOUGLAS COUNTY CONTROL MONUMENT 1051038, ELEVATION 6053.87 (NAVD 1988)
CONTOUR INTERVAL = 1.0'

BASIS OF BEARINGS:

THE EAST LINE OF THE SOUTHEAST 1/4 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST, ASSUMED TO BEAR S00°33'39"E, MONUMENTED BY A 3 1/4" ALUMINUM CAP ON THE NORTH AND SOUTH.

DEVELOPER/OWNER:

INTEGRITY LAND VENTURES LLC
7200 S. ALTRON WAY, SUITE C400
CENTENNIAL, CO 80112
PH: 303-842-5311
CONTACT: JACKSON GIVENS
EMAIL: JACKSON@INTEGRITYLANDVENTURES.COM

CIVIL ENGINEER:

ROTH LANG ENGINEERING GROUP LLC
6855 S HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PH: 303-841-9365
CONTACT : KURT LANG, P.E.
EMAIL: KLANG@ROTHLANG.COM

SURVEYOR:

GILLIANS LAND CONSULTANTS
P.O. BOX 375
BENNETT, CO 80102
PH: 303-972-6640
CONTACT: ROBERT HARRIS, PLS
EMAIL: RHARRIS@GILLIANSLC.COM

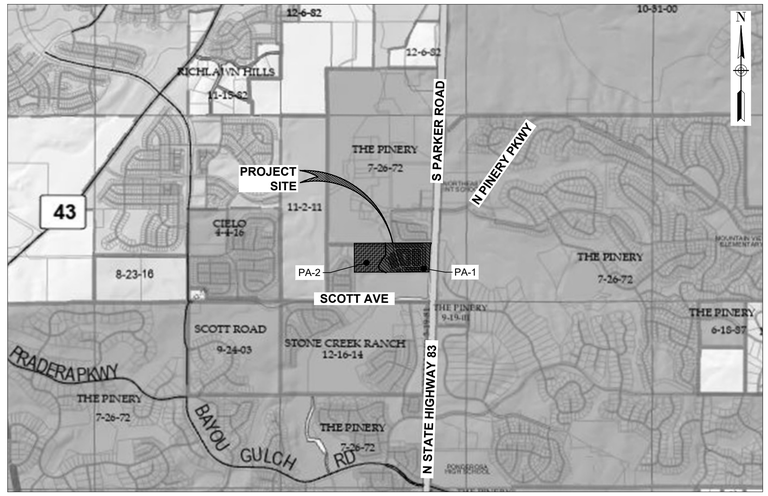
LANDSCAPE ARCHITECT/PLANNER:

NORRIS DESIGN
1101 BANNOCK STREET
DENVER, CO 80204
PH: 303-892-1166
CONTACT: CARL RUNGE
EMAIL: CRUNGE@NORRIS-DESIGN.COM

PINERY MEADOWS

PRELIMINARY PLAN

PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 135 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009



VICINITY MAP
SCALE 1" = 2000'

SHEET INDEX:

1 COVER SHEET
2 EXISTING CONDITIONS
3 OVERALL PRELIMINARY PLAN
4 PRELIMINARY PLAN
5 OVERALL PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
6 PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
7 PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
8 PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
9 PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
10 CROSS SECTIONS AND DETAILS

NOTES:

1. ALL TRACTS WILL BE OWNED AND MAINTAINED BY THE H.O.A. / METRO DISTRICT, ITS SUCCESSORS AND ASSIGNS. THE H.O.A. / METRO DISTRICT WILL OWN AND HOLD THE MAINTENANCE RESPONSIBILITY FOR ALL LANDSCAPING, DETENTION PONDS, RETAINING WALLS, DRIVEWAYS, OPEN SPACE, AND COMMUNITY AMENITIES CONTAINED WITHIN THESE TRACTS.

2. SECONDARY DRAINAGE EASEMENTS WILL BE GRANTED TO DOUGLAS COUNTY AT THE TIME OF FINAL PLAT TO ACCOMMODATE DRAINAGE INFRASTRUCTURE FOR THE PURPOSES OF ACCESSING, MAINTAINING, AND REPAIRING STORM WATER MANAGEMENT IMPROVEMENTS, INCLUDING, BUT NOT LIMITED TO, INLETS, PIPES, CULVERTS, CHANNELS, DITCHES, HYDRAULIC STRUCTURES, RIPRAP, DETENTION BASINS, FOREBAYS, MICROPOOLS, AND WATER QUALITY FACILITIES (COLLECTIVELY, THE "FACILITIES"). THE MAINTENANCE AND REPAIR OF THE FACILITIES LOCATED IN THE SUBDIVISION WILL BE ACCEPTED BY DOUGLAS COUNTY AT THE TIME OF FINAL PLAT AND WILL BE THE RESPONSIBILITY OF THE SYSTEM OWNER. IN THE EVENT SUCH MAINTENANCE AND REPAIRS ARE NOT PERFORMED BY THE SYSTEM OWNER TO THE SATISFACTION OF DOUGLAS COUNTY, THEN DOUGLAS COUNTY WILL HAVE THE RIGHT, BUT NOT THE OBLIGATION, TO ENTER SAID SUBDIVISION AFTER TEN (10) DAYS PRIOR WRITTEN NOTICE TO THE SYSTEM OWNER, UNLESS THERE IS AN EMERGENCY, IN WHICH CASE DOUGLAS COUNTY WILL GIVE NOTICE AS SOON AS PRACTICABLE, TO PERFORM ALL NECESSARY WORK, THE COST OF WHICH WILL BE PAID BY THE SYSTEM OWNER UPON BILLING. IN THE EVENT THE SYSTEM OWNER FAILS TO REIMBURSE DOUGLAS COUNTY WITHIN THIRTY (30) DAYS AFTER SUBMISSION OF THE BILL FOR THE COSTS INCURRED, DOUGLAS COUNTY WILL HAVE THE RIGHT TO ENFORCE SUCH OBLIGATION BY APPROPRIATE LEGAL ACTION. IT IS THE SYSTEM OWNER'S RESPONSIBILITY TO CONSTRUCT, MAINTAIN AND REPAIR THE FACILITIES IN A MANNER CONSISTENT WITH ALL APPLICABLE PLANS APPROVED OR ACCEPTED BY DOUGLAS COUNTY.

ADD NOTE:
No improvements that conflict with or interfere with construction, maintenance or access to utilities shall be placed within the utility easements. Prohibited improvements include, but are not limited to, permanent structures, buildings, counter-forts, decks, attached porches, attached stairs, window wells, air conditioning units, retaining walls/components and other objects that may interfere with the utility facilities or access, use and maintenance thereof. Prohibited improvements may be removed by the entities responsible for providing the utility services. The owners of the property subject to or adjacent to the utility easements shown herein are responsible for the maintenance and operation of such areas, which does not include utility lines and related facilities. When the owner(s) or adjacent owners fail to adequately maintain such utility easements, including the removal of prohibited improvements, the maintenance, operation, reconstruction and removal shall be at the cost of the owner(s).

LAND USE TABLE:

GROSS AREA	39.53 AC	
NET AREA (EXCLUDING PUBLIC AND PRIVATE RIGHT-OF-WAY)	34.29 AC	86.74%
TOTAL NUMBER OF LOTS	136	
AREA OF LOTS	9.48 AC	23.97%
TOTAL NUMBER OF TRACTS	11	
AREA OF TRACTS	24.92 AC	63.04%
AREA OF LOCAL STREET DEDICATION	3.40 AC	8.60%
AREA OF PRIVATE ALLEYS (OWNED AND MAINTAINED BY H.O.A / METRO DISTRICT)	0.66 AC	1.67%
SMALLEST RESIDENTIAL LOT	2,378 SF / 0.05 AC	
LARGEST RESIDENTIAL LOT	5,848 SF / 0.13 AC	
AVERAGE RESIDENTIAL LOT	3,202 / 0.07 AC	
DENSITY (GROSS)	3.44 DU / AC	
ZONING/LAND USE	PLANNED DEVELOPMENT (PD) / SINGLE FAMILY (SF) DETACHED RESIDENTIAL / SINGLE FAMILY (SF) ATTACHED RESIDENTIAL	

TRACT AREA TABLE

TRACT	TRACT USE	OWNERSHIP / MAINTENANCE	SQUARE FEET	ACRES
TRACT A	LANDSCAPE, PARK, AMENITIES, AND CLUSTER DRIVEWAY	H.O.A. / METRO DISTRICT	31,890.14	0.73
TRACT B	RETAINING WALL, LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	164,390.80	3.77
TRACT C	DETENTION POND, RETAINING WALLS, OPEN SPACE, LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	837,698.41	19.23
TRACT D	LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	4,380.64	0.10
TRACT E	LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	11,963.05	0.27
TRACT F	LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	H.O.A. / METRO DISTRICT	8,194.13	0.19
TRACT G	LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	H.O.A. / METRO DISTRICT	8,067.95	0.19
TRACT H	LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	1,915.08	0.04
TRACT I	LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	H.O.A. / METRO DISTRICT	8,275.38	0.19
TRACT J	LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	1,915.08	0.04
TRACT K	LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	H.O.A. / METRO DISTRICT	7,605.18	0.17

RESULTS: SOUND LEVELS — **Pinery Meadows**

LSC — **26 February 2025**
KDF — **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Pinery Meadows
RUN: 2045 Total PM Peak Hour
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH
Receiver

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existing		Type	With Barrier			
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc	Impact	Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
Receiver2	2	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0
Receiver3	3	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
Receiver4	4	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
Receiver5	5	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Receiver6	6	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Receiver7	7	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Receiver8	8	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Receiver9	9	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Receiver10	10	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
Receiver11	11	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
Receiver12	12	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
Receiver13	13	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
Receiver14	14	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min dB	Avg dB	Max dB
All Selected	14	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

4/14/25

COVER SHEET
SHEET NUMBER: **1**
1 of 10

PINERY MEADOWS

PRELIMINARY PLAN

PLANNING AREAS 1 AND 2

LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO

39.53 ACRES, 135 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

SYMBOLS LEGEND	
1	NOISE RECIEVER LOCATION AND NUMBER (SEE SOUND LEVELS TABLE ON SHEET 1)(RE: NOISE IMPACT ANALYSIS BY LSC, DATED 3/7/25)

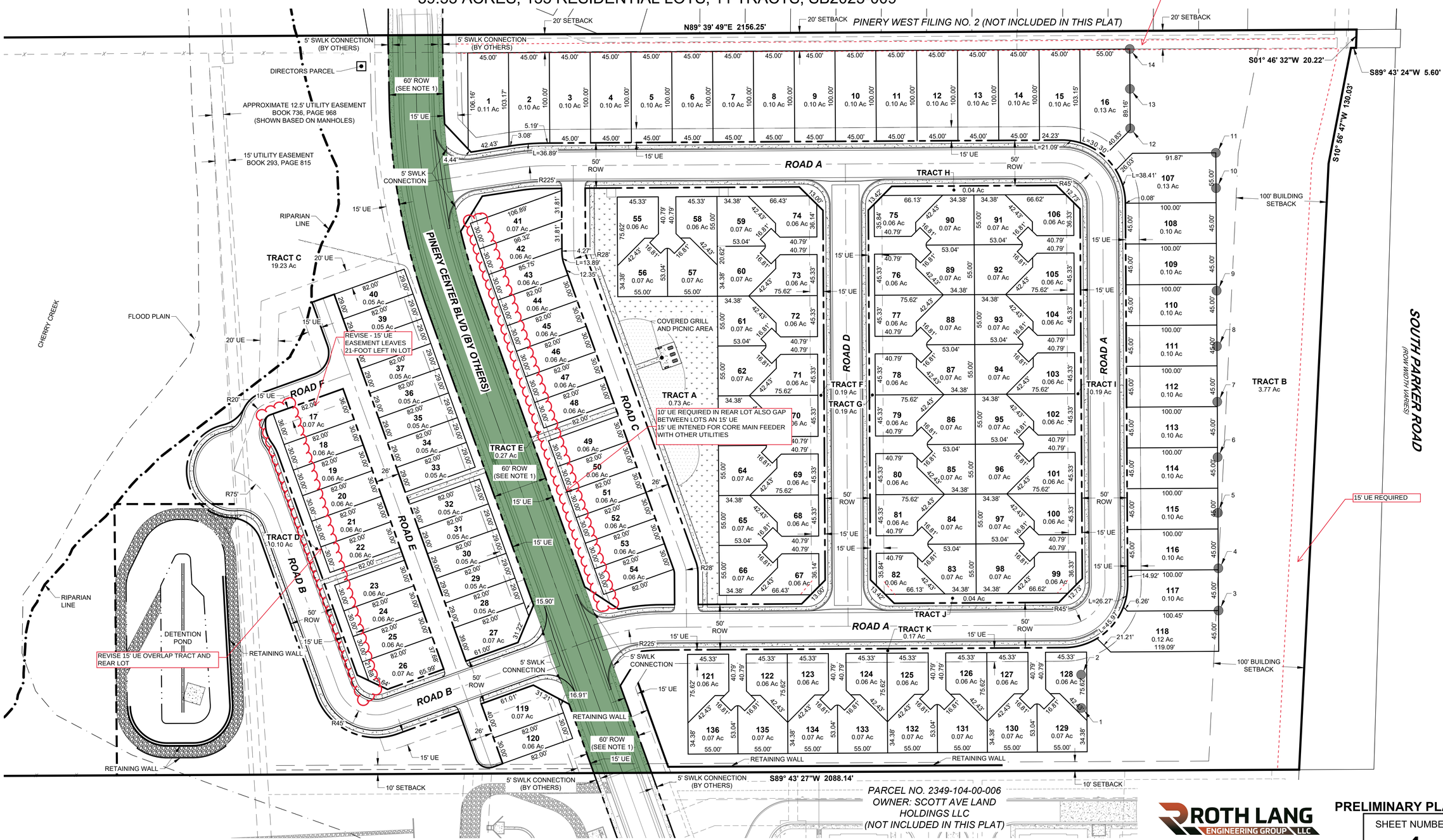
NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.

N

50 0 50

HORIZONTAL SCALE: 1" = 50'



ROTH LANG ENGINEERING GROUP LLC

6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

4/14/25

PRELIMINARY PLAN

SHEET NUMBER: **4**

4 of 10

PINERY MEADOWS

PRELIMINARY PLAN

PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 135 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

SLOPE LEGEND	
	15% - 20%
	GREATER THAN 20%

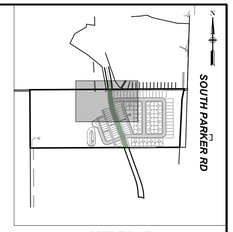
HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

N

30 0 30
HORIZONTAL SCALE: 1" = 30'

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.



KEYMAP
1" = 1000'

PARCEL NO. 2349-103-01-001
OWNER: PINERY COMMERCIAL METRO DISTRICTS 1 & 2
(NOT INCLUDED IN THIS PLAT)

PINERY WEST FILING NO. 2
(NOT INCLUDED IN THIS PLAT)

GRADE MAY NOT EXCEED 15% WITHIN UE

48" FES
48" RCP
6' DIA MH
73.06 FG
69.40 FG/ME
SWALE
5' TYPE R INLET
71.50 FG
5' DIA MH
18" RCP
5' DIA MH
18" RCP

ROAD A
ROAD C
ROAD E
ROAD F

PINERY CENTER BOULEVARD
(60' ROW) (SEE NOTE 1)

MATCHLINE - SEE SHEET 7
MATCHLINE - SEE SHEET 8

PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

4/14/25

SHEET NUMBER:
6
6 of 10

PINERY MEADOWS

PRELIMINARY PLAN

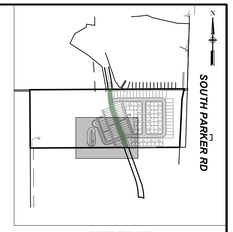
PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 135 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

SLOPE LEGEND	
	15% - 20%
	GREATER THAN 20%

HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

N

30 0 30
HORIZONTAL SCALE: 1" = 30'



KEYMAP
1" = 1000'

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.

MATCHLINE - SEE SHEET 6

PINERY CENTER BOULEVARD (80' ROW) (SEE NOTE 1)

ROAD A

ROAD B

ROAD C

ROAD D

ROAD E

DETENTION POND

GRADE MAY NOT EXCEED 15% WITHIN UE

GRADE MAY NOT EXCEED 15% WITHIN UE

RETAINING WALL (SEE DETAIL A, SHEET 9)

MATCHLINE - SEE SHEET 9

PARCEL NO. 2349-104-00-006
OWNER: SCOTT AVE LAND HOLDINGS LLC
(NOT INCLUDED IN THIS PLAT)

PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

4/14/25

SHEET NUMBER: 8

8 of 10

The Energy to Thrive™

CORE ELECTRIC COOPERATIVE

July 1, 2025

Integrity Land Ventures, LLC
Jerry Richmond
7200 S Alton Way Suite C400
Centennial, CO 80112

Re: Pinery Meadows- State Parcel #2349-100-00-025

We are an electric utility operating under the rules and regulations approved by our Board of Directors. The above-referenced parcels of land in Section 10, Township 7 South, and Range 66 West of the 6th P.M., County of Douglas, State of Colorado, containing 170 single family lots is located within our service area.

We are willing to extend and provide electric to the proposed project in accordance with our extension policies. When you submit for an application for service, the designer assigned will be able to answer any questions concerning the location of electric facilities in relation to the project. Any attempt to identify facilities now may provide inaccurate information due to the phasing of your project and other developments in the vicinity, which may alter the location or type of facilities prior to your request for service.

If you have any further questions, please feel free to contact me.

Sincerely,

Brooks Kaufman
Lands and Rights-of-Way Manager

CORE Electric Cooperative
5496 N. U.S. Highway 85
Sedalia, CO 80135
(800) 332-9540
www.core.coop

DOUGLAS COUNTY
HEALTH DEPARTMENT COLORADO

April 25th, 2025

Eric Pavlinek
100 Third St.
Castle Rock, CO 80104

RE: SB2025-009

Dear Mr. Pavlinek

Thank you for the opportunity to review and comment on the Pinery Meadows Preliminary Plan. Douglas County Health Department (DCHD) staff have reviewed the application for compliance with pertinent environmental and public health regulations. After reviewing the application, DCHD has the following comment(s).

Fugitive Dust - Developments of 25 acres and more than 6 months in duration
Exposure to air pollution is associated with a number of health problems including asthma, lung cancer, and heart disease. The Colorado Department of Public Health and Environment Air Pollution Control Division (APCD) regulates air emissions, including fugitive dust from developments of 25 acres or more that last at least 6 months. The applicant shall contact the APCD, at (303) 692-3100 for more information. Additional information is available at https://cdphe.colorado.gov/apens-and-air-permits.

Stormwater Impacts on Nearby Waterway
Development of the subject parcel will potentially result in an increase of stormwater and snowmelt runoff that may contribute significant pollutant loadings to Cherry Creek. These pollutants include bacteria, nutrients, metals, and oxygen consuming contaminants.

Sincerely,

Caden Thompson
Environmental Health Specialist I
Douglas County Health Department

May 7, 2025

Eric Pavlinek
Planning Services
100 Third Street
Castle Rock, CO 80104

Re: SB2025-009 Pinery Meadows Preliminary Plan

Dear Mr. Pavlinek:

The letter provides comments regarding the request for approval of a preliminary plan application for 136 residential lots, and 11 tracts on approximately 39.5 acres within Pinery Meadows Planned Development. The proposal includes 40 single-family attached (duplex) and 96 single-family detached residential lots. The applicant submitted a cultural resource survey report.

The Curator has reviewed the completed cultural resource survey of the project site. New sites and artifacts were discovered but none are eligible to be listed on the national register. The cultural resource survey satisfies the Curators request.

Should buried artifacts and features be discovered in future phases, we recommend completion of the appropriate Colorado Office of Archaeology and Historic Preservation (OAHP) Data Management and Historic and/or Prehistoric Component forms, following OAHP guidelines, with accompanying sketch maps and photographs. Completed forms are submitted to OAHP to ensure that Douglas County's historic or prehistoric data is included in the Colorado OAHP state-wide database of cultural resources.

Thank you in advance for your attention to the preservation and protection of Douglas County's cultural resources for future generations.

Sincerely,

Brittany Cassell

Brittany Cassell, Curator

Douglas County School District
Learn Today, Lead Tomorrow
620 Wilcox Street
Castle Rock, Colorado 80104

May 15th, 2025

Eric Pavlinek | Principal Planner
Douglas County Department of Community Development
Planning Services Division
Address | 100 Third St., Castle Rock, CO 80104
Direct | 303.814.4377 Main | 303.660.7460
Email epavlinek@douglas.co.us

RE: Pinery Meadows Preliminary Plan-Subdivision - Preliminary Plan (SB2025-009)

Dear Mr. Pavlinek,

Thank you for the opportunity to respond to the above referenced application. It is our understanding that the applicant is requesting approval for 40 attached and 96 detached single-family lots on 39.5 acres within the Pinery Meadows Planned Development. The proposed development is generally located at the northwest corner of Parker Road (Hwy 83) and Scott Avenue.

On behalf of Douglas County School District (DCSD), we have a couple of comments regarding this proposed development that we would like to resolve prior to approval. DCSD has calculated the number of students that are expected from the 136 residential units. A total of 50 students are expected from this development which would equate to a total land dedication requirement of 1.2-acres. Since this amount of land dedication is smaller than DCSD's minimum site standards, DCSD requests cash-in-lieu of dedication.

PROJECT NAME: Pinery Meadows Preliminary Plan-Subdivision - Preliminary Plan (SB2025-009)				
DU/	ACRES		DENSITY	
136	12.88		10.56	
			Generation	Number
STUDENT GENERATION RATES	No. of DU's		Rate	of Students
ELEMENTARY	136	X	0.19	26
MIDDLE SCHOOL	136	X	0.06	8
HIGH SCHOOL	136	X	0.12	16
				Required
			School	Land
	Number		Acreage	Dedication
SCHOOL LAND DEDICATION	of Students		Per Student	Acreage
ELEMENTARY	26	X	0.018	0.465
MIDDLE SCHOOL	8	X	0.030	0.245
HIGH SCHOOL	16	X	0.030	0.490
			TOTAL	1.200

Pursuant to Section 1004.05.3 of the Douglas County Subdivision Resolution, "The cash-in-lieu fee shall be equivalent to the full market value of the acreage required for school land dedication. Value shall be based on anticipated market value after completion of platting. The applicant shall submit a proposal for the cash-in-lieu fee and supply the information necessary for the Board to evaluate the adequacy of the proposal. This information shall include at least one appraisal of the property by a qualified appraiser."

DCSD would ask that the cash-in-lieu fee be paid directly to DCSD, in one lump sum, upon site plan approval. Assuming the applicant agrees with the payment of these fee requirements, DCSD has no objection to approval of this application.

Shavon Caldwell-Planning Manager
Planning and Construction Department, Douglas County School District
shavon.caldwell@dcsdk12.org
303.387.0417

DOUGLAS COUNTY
COLORADO

Memorandum

Date: April 30, 2025

To: Eric Pavlinek, Principal Planner

From: DJ Beckwith, Principal Planner
Lauren Pulver, Planning Supervisor
Kati Carter, AICP, Assistant Director of Planning Resources
Chris Pratt, Managing County Attorney

CC: Terence T. Quinn, AICP, Director of Community Development

Subject: **Water Commission Member Referral Comments**
SB2025-009 – Pinery Meadows Preliminary Plan

The Douglas County Water Commission (Commission) met on April 28, 2025 and provided comment on SB2025-009 – Pinery Meadows Preliminary Plan (Project). There was no consensus comment from the Commission, only individual comments were provided. All other members had no comment. The following is a summary of comments from each Commission member that provided comments on the Project. This Project was pulled from the agenda for discussion by Commission Member Tricia Bernhardt.

Tricia Bernhardt: Member Bernhardt commented that this project, along with Project ZR2024-031, has a cumulative impact of using 200 acre-feet of water per year. The Project includes a will serve letter from a District, but water use from that District includes ground water. The member stated that it would be nice to see the will serve letters indicate how much ground water is being used as compared to renewable water for project like this.

Roger Hudson: Member Hudson commented that he had been approached by nearby residents to the Project, who have asked him to oppose this Project based on the limited groundwater resources in the area and the high density of the planned Project. Member Hudson wanted to recognize the input from nearby residents who were opposed to this Project.

DR 25-121

DOUGLAS COUNTY
COLORADO

Department of Community Development

www.douglas.co.us

Planning Services

REFERRAL RESPONSE REQUEST

Date sent: April 15, 2025 Comments due by: May 6, 2025

Project Name:	Pinery Meadows Preliminary Plan
Project File #:	SB2025-009
Project Summary:	A preliminary plan application for 136 residential lots, and 11 tracts on approximately 39.5 acres within Pinery Meadows Planned Development. The proposal includes 40 single-family attached (duplex) and 96 single-family detached residential lots.

Information on the identified development proposal located in Douglas County is enclosed. Please review and comment in the space provided.

☐ No Comment	
☐ Please be advised of the following concerns:	
☒ See letter attached for detail.	
Agency: ENGINEERING	**Phone #:** 4318
Your Name: AL PETERSON	**Your Signature:** Al Peterson
(please print)	**Date:** 5/6/25

Agencies should be advised that failure to submit written comments prior to the due date, or to obtain the applicant's written approval of an extension, will result in written comments being accepted for informational purposes only.

Sincerely,

Eric Pavlinek

Eric Pavlinek, Principal Planner

Enclosure

DOUGLAS COUNTY
COLORADO

May 6, 2025 DV 25-121

Eric Pavlinek – Principal Planner
Douglas County Planning
100 Third Street
Castle Rock, CO. 80104

RE: Pinery Meadows Preliminary Plan

Dear Eric,

Engineering has reviewed the Preliminary Plan and the following comments have been generated:

1. Please delineate the Public ROW across the private road sections.

2. Please label all roadway centerlines with their bearing and distances and define the cul-de-sac radii.

3. Please show all proposed curb ramps.

4. Will the private alley sections be proposed with valley pans?

5. Will crosspans be proposed at either end of Road C and the southern end of Road E as it intersects both sides Road B?

6. As previously mentioned, County criteria defines that Local Streets must be a minimum of 160' in length (Collector ROW to local street centerline) prior to intersecting with other local roadways and residential fronting lots when accessing from a Collector Roadway. The County has already consented to support a variance of a length less than 160' for Roads A (southern access) and B. This same criteria and variance application would apply to Road A (northern access). As such, Lots 1 and 2 must be eliminated or relocated on this Preliminary Plan.

7. Please submit the variance request for Roads A and B entry portions less than the 160' and label these distances on the Preliminary Plan.

8. Traffic Comments will be forthcoming when they have been received.

Should you have any questions in regard to these comments, I can be reached at 303-660-7490 or apeterso@douglas.co.us.

Respectfully,

Al Peterson
Sr. Development Review Engineer

c: Brad Jackson, P.E., Development Review Supervisor
DV File

SOUTH METRO FIRE RESCUE
FIRE MARSHAL'S OFFICE

Eric Pavlinek, Principal Planner
Douglas County Department of Community Development, Planning Services
100 Third St
Castle Rock Co 80104
303.660.7460
303.660.9550 Fax

Project Name:	Pinery Meadows Preliminary Plan
Project File #:	**SB2025-009**
S Metro Review #	REFSP25-00072
Review date:	April 21, 2025
Plan reviewer:	Aaron Miller 720.989.2246 aaron.miller@southmetro.org
Project Summary:	A preliminary plan application for 136 residential lots, and 11 tracts on approximately 39.5 acres within Pinery Meadows Planned Development. The proposal includes 40 single-family attached (duplex) and 96 single-family detached residential lots.
Code Reference:	Douglas County Fire Code, 2018 International Fire Code, and 2021 International Building Code with amendments as adopted by Douglas County.

South Metro Fire Rescue (SMFR) has reviewed the provided documents and has conditional non-objection to the proposed preliminary plan. See following comments.

COMMENTS:

1. Pinery Center Boulevard is to be completed South connecting to Scott Avenue prior to release of building permits. Without a completed connection, too long of a dead end is created exceeding max allowable dead end.

2. Wayfinding address signage to be placed adjacent to where cluster lot shared driveways meet the road as visibility of address signage on back homes will be limited.

3. Coordinate addressing with Douglas County Addressing analyst and SMFR prior to plat.

4. Coordinate fire hydrant placement with SMFR prior to plat.

Homeowners' Association, Inc.
A COLORADO NON-PROFIT CORPORATION
8170 Hillcrest Way
Parker, Colorado 80134-6360
303.841.8572

May 6, 2025

Eric Pavlinek
Planning Services
100 Third Street
Castle Rock, CO 80104
Re:SB2025-009

The Pinery Homeowners' Association (PHA) appreciates the opportunity to review and comment on the Preliminary Plan application for Pinery Meadows project.

Overall, as we review this preliminary plat, the compliance of the Comprehensive Master Plan, specifically the Pinery Separated Urban Area is our focus. It currently is difficult to comment as to the character of the development is not known. The 40 single family attached and 96 single family residential lots is high density as compared to the original Pinery, seemingly in opposition to the natural rural character of The Pinery. It is a challenge to see how the criteria of the SUA is taken into consideration - maintain community character, enhance community separation buffer, and ensure that new development is compatible with the character of the original Pinery.

The proposed design does not lend to custom homes, rather a tract-home design. Color palette, materials, finishes, structure design, heights will be topics of concern throughout the future approval process. The Pinery Meadows PD has been referred to many times throughout the updated Project Narrative. Access to this document would provide a better understanding of the guidelines set forth for this area.

The Traffic Study completed as part of this planned development, identified safety issues that the PHA has been reporting for years. While not specifically identified as part of the traffic impacts of this proposed development, it is identified as Background Traffic.

> *Recommended Improvements: WB to NB acceleration lane to mitigate poor existing levels of service (by others).* Page 14 Figure 4 Year 2028 Background Traffic, lane geometry and traffic Control (attached)

Traffic studies completed over the years for any development along the SH 83 corridor have failed to recognize the lack of a dedicated northbound auxiliary deacceleration/acceleration lane at the entrance of The Pinery. Regardless of Level of Service ranking, the North Pinery Parkway existing configuration does not meet today's required traffic capacity and sets drivers' up for failure. The addition of a NB acceleration lane in conjunction with a dedicated westbound left turn lane (with modifications to the existing median on N Pinery Parkway) east leg of the intersection, certainly addresses many of our community traffic safety concerns. We are hopeful that this will be considered and taken under advisement for correction.

Sincerely,

Sonia Eyre,

Board President

Pinery Homeowners' Association

Right of Way & Permits

1123 West 3rd Avenue
Denver, Colorado 80223
Telephone: 303.285.6612
violeta.ciocanu@xcelenergy.com

April 17, 2025

Douglas County Planning Services
100 Third Street
Castle Rock, CO 80104

Attn: Eric Pavlinek

Re: Pinery Meadows Preliminary Plan, Case # SB2025-009

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has reviewed the **Pinery Meadows Preliminary Plan.** Please be aware PSCo owns and operates existing natural gas distribution facilities within the area to be developed.

Please note that before the plat approval can be granted, the facilities within the existing 30-foot easement must be relocated to a newly designated easement and the current easement must be legally relinquished through a quitclaim deed. Only after these steps are completed can the plat approval process proceed.

The property owner/developer/contractor must complete the application process for any new natural gas service, or *modification* to existing facilities, including relocation via xcelenergy.com/InstallAndConnect. It is then the responsibility of the developer to contact the Designer assigned to the project for approval of design details.

Additional easements may need to be acquired by separate document – be sure to ask the Designer to contact a Right-of-Way & Permits Agent in this event.

As a safety precaution, PSCo would like to remind the developer to call the Utility Notification Center by dialing 811 for utility locates prior to construction.

Violeta Ciocanu (Chokanu)
Right of Way and Permits
Public Service Company of Colorado dba Xcel Energy
Office: 303-285-6612 – Email: violeta.ciocanu@xcelenergy.com

Eric Pavlinek

From: Paul Thompson <paulbthompson@icloud.com>
Sent: Monday, April 21, 2025 12:22 PM
To: Eric Pavlinek
Subject: Pinery Meadows Plan

Re: Project File #SB2025-009

Thank you for the information and the opportunity to comment on the plan. As we do face the new subdivision, we have a couple of questions.

1. Will the single family detached homes be positioned so we do not have two stories homes looking into our backyards?

2. Will the barbed wire fence be removed?

3. KB planted evergreen trees along our back property line, will the new development have a similar buffer along the easement facing our homes?

Thank you for your consideration, looking forward to your response.

Paul and Audrey Thompson
6718 Club Village Rd

NORRIS DESIGN
PEOPLE + PLACEMAKING

1101 Bannock Street
Denver, Colorado 80204
303.892.1166

July 16, 2025

Eric Pavlinek, Principal Planner
Douglas County Department of Community Development
100 Third Street
Castle Rock, CO 80104

Re: Pinery Meadows Preliminary Plan 01 Response to Comments

Dear Eric,

Thank you for your review of the Pinery Meadows Preliminary Plan package. Valuable feedback was received on June 17, 2025, and responses to comments made can be found in the following pages. If you have any questions, please feel free to contact me at crunge@norris-design.com.

Sincerely,
Norris Design



Carl Runge
Senior Associate

NORRIS DESIGN
PEOPLE + PLACEMAKING
1101 Bannock Street
Denver, Colorado 80204
303.892.1166

1. The updated noise study was sent to our noise consultant for review. Any comments received will be provided and included in the project file. Per the PD, final mitigation requirements will be determined as part of the review of the preliminary plan. If residential structures fall within the 65 DNL, then noise mitigation requirements may be required to protect future residents from traffic noise along State Highway 83. Sheet 4 of the preliminary plan exhibit shall include the 65 DNL line based on the most-recent noise study.
   RESPONSE: A meeting was held with County's noise consultant to review the findings of the noise study and a revised report has been provided in the resubmittal package. No building envelopes are located within the 65 DNL. 65 DNL has been added to preliminary plan exhibit.
2. Once the weed management plan is complete, please provide a copy for review.
   RESPONSE: A copy of the weed management plan has been provided to the County.
3. Thank you for providing an 18A appeal based on the anticipated timing of inclusion within the District. The Board will need to approve the appeal as part of the subdivision request at a public hearing.
   RESPONSE: Noted, the 18A appeal will be reviewed for approval by Planning Commission and BOCC concurrently with the preliminary plan.
4. Provide accurate dimensions for the building envelopes added to the plans. Refer to 407.10.
   RESPONSE: Per conversation with County Staff we do not need to include dimensions for building envelopes given the small sizes of the lots. Building envelopes for single family detached lots are shown on the plan, but will be removed prior to recordation of the plat. Building envelopes will comply with all required setbacks as outlined in the PD.
5. Please meet with CORE to discuss possible options of providing service to the subdivision. Preliminary plan approval standards require that necessary utility services must be available to serve the subdivision. Documentation from CORE must be provided to demonstrate that they can serve the subdivision prior to hearings on this application.
   RESPONSE: An updated will-serve letter from CORE has been provided in the resubmittal package.
6. The updated preliminary plan was provided to our Addressing Specialist to review the proposed street names of the private roads. Comments may be forthcoming which may require revisions to the preliminary plan exhibit.
   RESPONSE: Street names have been coordinated directly with the County's Addressing Specialist and approved for use. Revised plans reflect the approved

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
Addressing Analyst	04/17/2025	**Verbatim Response:** Please propose street names to be placed on the final plat. Suffixes are determined by the street alignment: ROAD A - CIRCLE or LOOP ROAD B - ROAD or TRAIL ROAD C - LANE ROAD D - LANE The following private accesses do not require street names and should remain unnamed. ROAD C ROAD E ROAD F Please submit propose street names to Douglas County for evaluation. Pre-check street names online before submitting to Douglas County using the Street Names dataset available on the DougCo Hub. These are street names only and do not include directions or suffixes. All street names in the Douglas County database have already been considered and should not be proposed again. They are existing, reserved, or denied. Use the Filter feature found on the left panel to enter a proposed street. If that name is already in the database, it is unavailable. Proposed street names should be easy to read or pronounce. Street names that are the same as, or similar to, other street names are considered to be duplications and will be denied. Street names that are the same as, or similar to, subdivision names may not be used. Street names existing in areas to which we dispatch emergency services outside of Douglas County may not be used. North, east, south and west should not be part of the name. Special characters may not be used. Abbreviations, acronyms and initials may not be used. Street names must contain no more than 12 letters or character spaces (including the space between words). Please review all guidelines in the Douglas County Addressing and Street Naming Manual. Contact DCAddressing@douglas.co.us or 303.660.7411 with questions.	Response: Proposed street names have been added to plans.
Assessor	05/05/2025	**Verbatim Response:** please be aware of the following comments None	Response: Noted, thank you.
AT&T Long Distance - ROW	04/22/2025	**Summary of Response:** Provide additional information to verify if a conflict will exist. See email attached for detail.	Response: Response noted on subsequent page.
Black Hills Energy		No Response Received.	

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
Building Services	04/15/2025	**Verbatim Response:** Permits required. Please visit Douglas County's web site for requirements and contact 303-660-7497 if you have any questions.	Response: Noted, thank you.
CenturyLink		No Response Received.	
Cherry Creek Basin Water Quality Authority	04/21/2025	**Verbatim Response:** The Cherry Creek Basin Water Quality Authority (Authority) acknowledges notification from Douglas County that the proposed development plans for SB2025-009, Pinery Meadows Preliminary Plan have been or will be reviewed by Douglas County for compliance with the applicable Regulation 72 construction and post-construction requirements. Based on the Authority's current policy, the Authority will no longer routinely conduct a technical review and instead the Authority will defer to Douglas County's review and ultimate determination that the proposed development plans comply with Regulation 72. If a technical review of the proposed development plan is needed, please contact LandUseReferral@ccbwqa.org. The review may include consultation with the Authority's Technical Manager to address specific questions or to conduct a more detailed Land Use Review, if warranted.	Response: Noted, thank you.
Colorado Department of Transportation CDOT-Region # 1	04/30/2025	See letter attached for detail.	Response: Response noted on subsequent page.
Colorado Division of Water Resources	04/21/2025	See letter attached for detail.	Response: Response noted on subsequent page.
Colorado Geological Survey	05/06/2025	**Verbatim Response:** The characterization of subsurface conditions and recommendations in AGW's Geotechnical Site Development Study, Pinery Meadows, Douglas County, Colorado (AGW Project No. 247051, December 16, 2024) are valid. Provided AGW's recommendations are rigorously adhered to, CGS has no objection to preliminary plan approval. Specifically, this includes the recommendation (page 6) that "The overlot grading plans should be provided to AGW [or the project geotechnical consultant] prior to commencement of work to evaluate which areas and to what depth overexcavation is required."	Response: Noted, thank you.
Colorado Parks and Wildlife (East DC - Dist 549)	04/23/2025	See letter attached for detail.	Response: Response noted on subsequent page.
Comcast		No Response Received.	

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
CORE Electric Cooperative	05/04/2025	**Verbatim Response:** CORE Electric Cooperative has reviewed the contents in the above-referenced referral response packet. We reviewed the project for maintaining our existing facilities, utility easements, electric loading, and service requirements. We are advising you of the following concerns and comments: CORE does not have electric capacity in the area; the applicant will be required to extend electric facilities 1.71 miles from CORE's existing substation at Bayou Gulch Road. CORE will require additional utility easements to extend an electric facility to the site. The proposed grading within utility easements may not exceed 15%. CORE will require the additional note added to the preliminary plan and plat.	Response: Responses noted on subsequent pages. Grading within utility easements has been revised to not exceed 15%.
Douglas County Conservation District		No Response Received.	
Douglas County Health Department	04/25/2025	See letter attached for detail.	Response: Responses noted on subsequent pages.
Douglas County Historic Preservation	05/07/2025	See letter attached for detail.	Response: Responses noted on subsequent pages.
Douglas County Parks and Trails	05/08/2025	**Verbatim Response:** Applicant will be required to meet park land dedication standards as stated in article 10 of the Douglas County Subdivision Resolution. In addition, a contribution of $500 per dwelling unit will be required for park and recreation improvements.	Response: Noted, thank you.
Douglas County School District RE 1		No Response Received.	
Engineering Services	05/06/2025	See letter attached for detail.	Response: Responses noted on subsequent pages.
High Prairie Farms HOA		No Response Received.	
High Prairie Farms Metro District		No Response Received.	
Mile High Flood District		No Response Received.	
Office of Emergency Management	04/24/2025	**Verbatim Response:** OEM recommends completion of Pinery Center Pkwy with North and South ingress/egress points prior to building of dwellings. This will facilitate two egress options in the event of evacuation.	Response: Noted, thank you.
Open Space and Natural Resources		No Response Received.	
Pinery Commercial Metro Districts #1 & 2		No Response Received.	

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
Pinery Water and Wastewater District	04/16/2025	**Verbatim Response:** The project applicant has submitted an application for inclusion into the Pinery Water & Wastewater District and is working with the District directly. The District has not other comments at this time.	Response: Noted, thank you.
Pinery West HOA	05/01/2025	**Verbatim Response:** This project has changed the density of homes 4 times time now. This was originally projected for roughly 196, then adjusted to 170. The project then re-applied for 121 now adjusted to 130. Pinery Residential (Pinery West) is on roughly 31 acres with common areas, 3 private roads and 86 single family "patio" homes with average lot size of 5,500 square feet. Pinery Meadows is planning roughly 51 percent more dwellings on 39.5 acres of which not all will be homes. Will there be 2 story homes abutting the 20-foot setback from the private fences of the Pinery West homes on the South side of our community? If so, this is not acceptable to our community therefore only ranch style should be approved for this location. I believe this project is too high density to be in such close proximity to Pinery West.	Response: This application is proposing 136 dwelling untis. The density and housing products being utilized for this subdivision comply with the approved Pinery Meadows PD. A 20' buffer is provided along the existing adjacent single family homes in Pinery West to provide required separation as outlined in the approved PD.
Pinewood Townhome HOA		No Response Received.	
Pradera Homeowners' Association		No Response Received.	
Rural Water Authority of Douglas County		No Response Received.	
Sheriff's Office		No Response Received.	
Sheriff's Office E911		No Response Received.	
South Metro Fire Rescue	04/21/2025	**Verbatim Response:** South Metro Fire Rescue (SMFR) has reviewed the provided documents and has conditional non-objection to the proposed preliminary plan. See attached letter for comments to be resolved prior to plat.	Response: Responses noted on subsequent pages.
Stone Creek Metropolitan District		No Response Received.	
The Pinery HOA	05/06/2025	**Verbatim Response:** See letter attached for detail.	Response: Responses noted on subsequent pages.
Town of Castle Rock	04/22/2025	No Comment.	
Town of Parker Development Review	04/16/2025	No Comment.	
Town of Parker Public Works	04/15/2025	No Comment.	

Project Name: Pinery Meadows Preliminary Plan
Project File #: SB2025-009
Date Sent: 04/15/2025 **Date Due:** 05/06/2025

Agency	Date Received	Agency Response	Response Resolution
Wildfire Mitigation	05/08/2025	**Verbatim Response:** Wildfire mitigation does not have any comments for this proposal.	Response: Noted, thank you.
Xcel Energy-Right of Way & Permits	04/17/2025	See letter attached for detail.	Response: Responses noted on subsequent pages.

Eric Pavlinek

From: annb cwc64.com <annb@cwc64.com>
Sent: Tuesday, April 22, 2025 3:27 PM
To: Eric Pavlinek
Cc: Pam Choy (pc2914@att.com); duanew cwc64.com; jt cwc64.com
Subject: Pinery Meadows Parker, Colorado eReferral #SB2025-009
Attachments: Pinery Meadows Parker, Colorado.jpg

Hi Eric,

This is in response to your eReferral for a utility map showing the buried AT&T Long Line Fiber Optics near Pinery Meadows Parker, Colorado. I attached an Earth map showing the project area in red and the buried AT&T Long Line Fiber Optics in yellow. As shown, there is a possibility of conflict along S Parker Rd. Any other information you could provide about the projects would be appreciated in determining if a conflict will exist. Please pass on our contact information as well.

RESPONSE: Development team will conduct utility locates prior to beginning construction and ensure lines are coordinated.

Please feel free to contact us with any questions or concerns.

Ann Barnowski
Clearwater Consulting Group Inc
120 9th Avenue South
Suite 140
Nampa, ID 83651
Annb@cwc64.com

The attached google earth maps are intended to show approximate locations of the buried AT&T long line fiber optic cable. The maps are provided for informational purposes only. In no way should the maps be used for anything other than general guidelines as to where the fiber is or is not and any other use of these maps is strictly prohibited.

RESPONSE: Noted, thank you.

-----Original Message-----
From: epavlinek@douglas.co.us <epavlinek@douglas.co.us>
Sent: Tuesday, April 15, 2025 1:14 PM
To: annb cwc64.com <annb@cwc64.com>
Subject: Douglas County eReferral (SB2025-009) Is Ready For Review

There is an eReferral for your review. Please use the following link to log on to your account:
https://apps.douglas.co.us/planning/projects/Login.aspx

Project number: SB2025-009

Project title: Pinery Meadows Preliminary Plan

Project Summary: A preliminary plan application for 136 residential lots, and 11 tracts on approximately 39.5 acres within Pinery Meadows Planned Development. The proposal includes 40 single-family attached (duplex) and 96 single-family detached residential lots.

This referral will close on Tuesday, May 6, 2025.

If you have any questions, please contact me.

Traffic & Safety
Region 1
2829 W Howard Place, 2nd Floor
Denver, Colorado 80204

COLORADO
Department of Transportation
Region 1

Project Name: Pinery Meadows

Print Date: 4/30/2025 **Highway**: 083 **Mile Marker**: 54.835

A comment response letter is REQUIRED along with the next submittal.

Review POC: Varner, Jessica

Hydraulics Comments:

I have reviewed the attached drainage report for the above development, The report was prepared by Roth Lang Engineering. I have concluded that there will be no negative drainage impact to SH83, and that the existing drainage patterns will be maintained and improved Samer 4-28-2025 RESPONSE: Noted, thank you.

Permits Comments:

4.29.25

- The signal at Scott Ave has been installed. It doesn't appear that any work will be taking place in CDOT ROW.

- Please keep in mind that working in or form the CDOT ROW will require a utility/special use permit from our office. This includes, but is not limited to survey, landscaping, signal or utility work. Application is made online at the following link: https://cdotpermits.force.com/portal/s/login/?ec=302&startURL=%2Fportal%2Fs%2F -- Aaron Eyl 4.29.25

RESPONSE: Noted, thank you.

April 21, 2025

Eric Pavlinek, Principal Planner
Douglas County Planning Services
Transmission via email: epavlinek@douglas.co.us

Re: Pinery Meadows Planned Development
Project File # SB2025-009 (related to ZR2022-028)
Part of the S ½ of Sec. 10, Twp. 7S, Rng. 66W, 6th P.M.
Water Division 1, Water District 8
CDWR Assigned Referral No. 30422 - 2nd Letter

Dear Eric Pavlinek:

We have reviewed the April 15, 2025 referral concerning the proposal for a preliminary plan for 136 residential lots and 11 tracts on approximately 39.50 acres located in the S ½ of Sec. 10, Twp. 7S, Rng. 66W, 6th P.M. The proposal includes 40 single-family attached (duplex) and 96-single-family detached residential lots.

This is a decrease from the previously proposed 196 single-family residential lots. These comments supersede the comments provided in our August 4, 2022 letter.

Water Supply Demand

According to the letter dated October 30, 2024 ("Letter") from the Pinery Water & Wastewater District ("District"), the estimated water demand is 0.55 acre-feet/year per single-family equivalent (SFE), or 94.6 acre-feet/year for 172 SFEs at full buildout (170 SFE and two ¾" irrigation meters).

Source of Water Supply

The proposed water supply for the subdivision is service provided by the District. According to the Letter, the District is willing and able to serve the proposed subdivision subject to the

conditions set forth in that letter. This office has not received information that the applicant has complied with those conditions.

According to the "Present and Future Water Sources" report dated May 2014 and updated February 2018 prepared by HRS Consultants Inc. ("Report"), the Pinery Water & Wastewater District has a total of 15,037 acre-feet per year of water rights. This amount consists of 13,466 acre-feet of nontributary water rights, 1,220 acre-feet of senior tributary water rights, an additional 351 acre-feet of nontributary water rights that are dedicated to development of the Broe property, and as a member of the WISE Authority the District has subscribed to 500 acre-feet per year on average of renewable and reusable water. In addition, the District has two existing augmentation plans, decreed in Division 1 Water Court Case nos. W-6268 and 11CW198. Under those augmentation plans, return flows from the use of nontributary water, along with other replacement sources, are used to offset out-of-priority depletions from pumping of junior wells.

As of 2017, the District's water requirements from existing commitments totaled 3,098 acre-feet. Projected commitments at full build out are estimated at 4,200 acre-feet.

Typically, this office requires an updated report from a municipal supplier every 5 years. However, since we previously approved the water supply for this development and since the water demands for this development have decreased, we will rely on the May 2014 Report in this letter. **However, please be aware that if water demand for this development increases in the future, and for any other new subdivisions that rely on the District as its water source, an updated report will be required in order for this office to provide a favorable opinion the proposed water supply plan.**

The majority of the Pinery Water & Wastewater Treatment District's water supply is water from bedrock aquifers in the Denver Basin. The State Engineer's Office does not have evidence regarding the length of time for which this source will be a physically and economically viable source of water. According to section 37-90-137(4)(b)(I), C.R.S., "Permits issued pursuant to this subsection (4) shall allow withdrawals on the basis of an aquifer life of one hundred years." Based on this **allocation** approach, the annual amounts of

water decreed are equal to one percent of the total amount, as determined by rules 8.A and 8.B of the Statewide Nontributary Ground Water Rules, 2 CCR 402-7. Therefore, the water may be withdrawn in those annual amounts for a maximum of 100 years.

State Engineer's Office Opinion

Based upon the above and pursuant to section 30-28-136(1)(h)(I) and 30-28-136(1)(h)(II), C.R.S., it is our opinion that the proposed water supply is adequate and can be provided without causing injury to decreed water rights.

Our opinion that the water supply is **adequate** is based on our determination that the amount of water required annually to serve the subdivision is currently physically available, based on current estimated aquifer conditions.

Our opinion that the water supply can be **provided without causing injury** is based on our determination that the amount of water that is legally available on an annual basis, according to the statutory **allocation** approach, for the proposed uses is greater than the annual amount of water required to supply existing water commitments and the demands of the proposed subdivision.

Our opinion is qualified by the following:

The Division 1 Water Court has retained jurisdiction over the final amount of water available pursuant to the above-referenced decree, pending actual geophysical data from the aquifer.

The amounts of water in the Denver Basin aquifer, and identified in this letter, are calculated based on estimated current aquifer conditions. The source of water is from a non-renewable aquifer, the allocations of which are based on a 100-year aquifer life. The county should be aware that the economic life of a water supply based on wells in a given Denver Basin aquifer may be less than the 100 years used for allocation due to anticipated water level declines. We recommend that the county determine whether it is appropriate to require development of renewable water resources for this subdivision to provide for a long-term water supply.

Additional Comments

The application materials indicate that a stormwater detention structure may be a part of this project. The applicant should be aware that unless the structure can meet the requirements of a "storm water detention and infiltration facility" as defined in section 37-92-602(8), C.R.S., the structure may be subject to administration by this office. The applicant should review DWR's Administrative Statement Regarding the Management of Storm Water Detention Facilities and Post-Wildland Fire Facilities in Colorado to ensure that the notification, construction and operation of the proposed structure meets statutory and administrative requirements. The Applicant is encouraged to use the Colorado Stormwater Detention and Infiltration Facility Notification Portal to meet the notification requirements.

Please contact Wenli.Dickinson@state.co.us or (303) 866-3581 x8206 with any questions.

Sincerely,

RESPONSE: Noted, thank you.



Ioana Comaniciu, P.E.
Water Resources Engineer

Ec: Pinery Water & Wastewater Treatment District file

COLORADO
Parks and Wildlife
Department of Natural Resources

Northeast Regional Office
6060 Broadway
Denver, CO 80216
P 303.291.7227

April 23, 2025

Eric Pavlinek
Planning Services
Douglas County
100 Third Street
Castle Rock, CO 80104

RE: Pinery Meadows Preliminary Plan, Project # (SB2025-009)

Dear Mr. Pavlinek,

Thank you for the opportunity for Colorado Parks and Wildlife (CPW) to comment on the proposed Pinery Meadows Preliminary Plan. The mission of CPW is to perpetuate the wildlife resources of the state, to provide a quality state parks system, and to provide enjoyable and sustainable outdoor recreation opportunities that educate and inspire current and future generations to serve as active stewards of Colorado's natural resources. CPW has a statutory responsibility to manage all wildlife species in Colorado, and to promote a variety of recreational opportunities throughout Colorado. One way we achieve this goal is by responding to referral comment requests, as is the case for this project.

It is our understanding that this project is for a planned development of 136 residential lots, and 11 tracts on 39.5 acres and is located within the Pinery Meadows Planned Development and is bordered to the north by the Pinery West residential subdivision, by the east Parker Road (Hwy 83, the west by the Cherry Creek and to the south by another development that is under review by Douglas County.

CPW would expect a variety of wildlife species to utilize this site on a regular basis, most notably, small to mid-sized mammals, songbirds and raptors. There is also potential for larger mammals, such as deer to visit the site, as the site is located in the overall range for both mule deer and whitetail deer. The main concern would be the likely disturbance of nesting bald eagles.

Bald Eagles

The proposed site could be within the ¼ mile buffer of an active bald eagle nesting site. Spatial buffers from development and other human activities are a proven management tool to address impacts on breeding activities at raptor nest sites. CPW has established recommended buffer zones and seasonal restrictions for raptors in Colorado, including bald eagles. CPW developed these raptor guidelines to assist with compliance with the Federal

Jeff Davis, Director, Colorado Parks and Wildlife
Parks and Wildlife Commission: Dallas May, Chair · Richard Reading, Vice-Chair · Karen Bailey, Secretary · Jessica Beaulieu
Marie Haskett · Tai Jacober · Jack Murphy · Gabriel Otero · Murphy Robinson · James Jay Tutchton · Eden Vardy

Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. To avoid impacts to nesting bald eagles, CPW recommends:

- No surface occupancy within ¼ mile of an active eagle nest, and no human activities within ½ mile of the nest from December 1st to July 31st.

CPW recommends landscape buffers and observing seasonal restrictions to minimize disturbance. To minimize disturbance for all birds, CPW recommends all security lighting for on-ground structures and equipment during and after construction be motion- sensitive, down shielded, and of a minimum intensity to reduce nighttime bird attraction and eliminate constant nighttime illumination.

Other raptors and migratory birds are protected from take, harassment, and nest disruption at both the state and federal levels. If any other active nest is discovered within the development area, CPW recommends that buffer zones around the nest site be implemented during any period of activity that may interfere with the nesting season. This will prevent the intentional or unintentional destruction of an active nest.

Prairie Dogs and Burrowing Owls

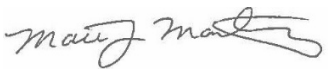
If a prairie dog colony is discovered within the project area, the potential may also exist for the presence of burrowing owls. Burrowing owls live on flat, treeless land with short vegetation, and nest underground in burrows dug by prairie dogs, badgers, and foxes. Burrowing owls are classified as a state threatened species and are protected by both state and federal laws, including the Migratory Bird Treaty Act. These laws prohibit the killing of burrowing owls or disturbance of their nests. Therefore, if any earth-moving will begin between March 15th and August 31st, a burrowing owl survey should be performed. Guidelines for performing a burrowing owl survey can be obtained from your local District Wildlife Manager.

If prairie dog colonies are active, CPW recommends humane euthanasia of live animals before any earth-moving occurs. The possibility of donating carcasses to a raptor rehabilitation facility or the black-footed ferret recovery program may also exist. If interested, please contact the local District Wildlife Manager for more information and any required permits or forms. Please note that a permit from CPW and approval from the Douglas County Board of Commissioners will likely be required for any live relocation of prairie dogs to another site.

Thank you again for the opportunity to comment on the Pinery Meadows Preliminary Plan. Please do not hesitate to contact us about ways to continue managing the property in order to maximize wildlife value while minimizing potential conflicts. If you have any further questions, please contact District Wildlife Manager Katie Doyle at (720)930-8039 or katie.doyle@state.co.us.

Sincerely,

RESPONSE: Noted, thank you.



Matt Martinez
Area Wildlife Manager

Cc: M. Leslie, S. Schaller, K. Doyle

PINERY MEADOWS

PRELIMINARY PLAN

PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 135 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

LINETYPE LEGEND

PROPOSED		EXISTING
	AASHTO SIGHT TRIANGLE	
	CENTERLINE OF ROAD	
5280	CONTOUR - MAJOR	5280
5279	CONTOUR - MINOR	5279
	DRAINAGE SWALE	
X X	FENCE - BARBED WIRE	
	FENCE - WOOD POST	
	PROPERTY BOUNDARY	
	RETAINING WALL	
	RIGHT-OF-WAY LINE	
	STORM SEWER	

SYMBOLS LEGEND

2.0%	SLOPE	
80.00	SPOT ELEVATION	(80.00)
	STORM INLET	
	STORM MANHOLE	D

HATCHING LEGEND

	CONCRETE PAVING
	RIPRAP / GRAVEL

LEGAL:

A TRACT OF LAND SITUATED IN THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, COLORADO, DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF SAID SECTION 10 AND CONSIDERING THE SOUTH LINE OF SAID SECTION 10 TO BEAR N89°44'01"E WITH ALL BEARINGS CONTAINED HEREIN RELATIVE THERETO:
THENCE N89°44'01"E, ON SAID SOUTH LINE A DISTANCE OF 1326.31 FEET, TO THE SOUTHWEST CORNER OF THE EAST 1/2 OF THE SOUTHWEST 1/4 OF SAID SECTION 10;
THENCE N89°43'39"E, ON SAID SOUTH LINE, A DISTANCE OF 805.19 FEET;
THENCE N00°19'54"W, A DISTANCE OF 827.39 FEET, TO THE POINT OF BEGINNING;

THENCE CONTINUING N00°19'54"W, A DISTANCE OF 813.92 FEET, TO THE EXTENSION OF THE SOUTH LINE OF PINERY WEST FILING NO. 2;
THENCE N89°39'49"E, ON SAID SOUTH LINE OF PINERY WEST FILING NO. 2, A DISTANCE OF 2156.25 FEET TO THE WEST RIGHT OF WAY LINE OF STATE HIGHWAY NO. 83 PER THAT DEPARTMENT OF TRANSPORTATION RIGHT OF WAY PLAN, FEDERAL AID PROJECT NO. FR 083-1(39);
THENCE SOUTHERLY ON SAID WEST RIGHT OF WAY LINE THE FOLLOWING (5) FIVE COURSES;
1) S01°46'32"W, A DISTANCE OF 20.22 FEET;
2) S89°43'24"W, A DISTANCE OF 5.60 FEET;
3) S10°56'47"W, A DISTANCE OF 130.03 FEET;
4) S02°44'47"W, A DISTANCE OF 432.60 FEET;
5) S02°50'32"W, A DISTANCE OF 236.80 FEET;
THENCE S89°43'27"W, A DISTANCE OF 2088.14 FEET TO THE POINT OF BEGINNING;

CONTAINING 1,721,739+/- SQUARE FEET (39.536+/- ACRES)

TOGETHER WITH AN EASEMENT FOR ACCESS, SAID EASEMENT BEING 45.00 FEET IN WIDTH WITH THE WEST LINE OF SAID EASEMENT BEING DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF THE ABOVE DESCRIBED PARCEL;
THENCE S 0°02'42" E, ALONG THE WEST LINE OF SUBJECT EASEMENT, A DISTANCE OF 827.04 FEET TO THE SOUTH LINE OF SAID SECTION 10 AND TO THE CENTER LINE OF COUNTY ROAD NO. 39, AND TO THE POINT OF TERMINUS OF SUBJECT EASEMENT,

BENCHMARK:

NAVD 1988 BASED ON THE DOUGLAS COUNTY CONTROL MONUMENT 1051038, ELEVATION 6053.87 (NAVD 1988)
CONTOUR INTERVAL = 1.0'

BASIS OF BEARINGS:

THE EAST LINE OF THE SOUTHEAST 1/4 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST, ASSUMED TO BEAR S00°33'39"E, MONUMENTED BY A 3 1/4" ALUMINUM CAP ON THE NORTH AND SOUTH.

DEVELOPER/OWNER:

INTEGRITY LAND VENTURES LLC
7200 S. ALTRON WAY, SUITE C400
CENTENNIAL, CO 80112
PH: 303-842-5311
CONTACT: JACKSON GIVENS
EMAIL: JACKSON@INTEGRITYLANDVENTURES.COM

CIVIL ENGINEER:

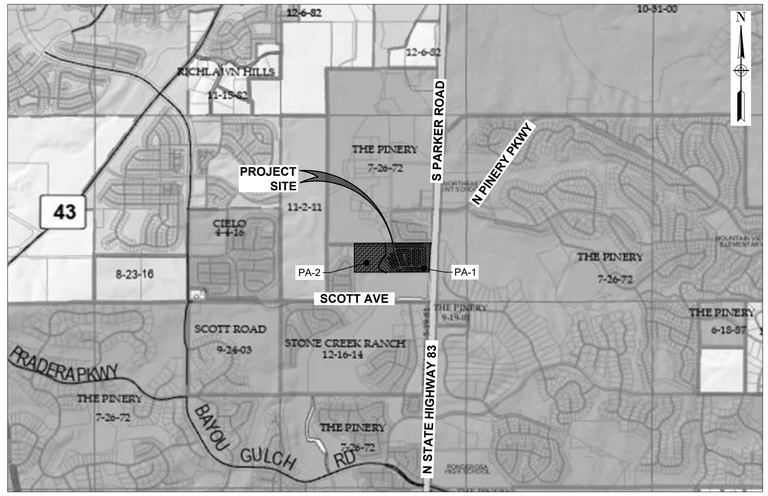
ROTH LANG ENGINEERING GROUP LLC
6855 S HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PH: 303-841-9365
CONTACT : KURT LANG, P.E.
EMAIL: KLANG@ROTHLANG.COM

SURVEYOR:

GILLIANS LAND CONSULTANTS
P.O. BOX 375
BENNETT, CO 80102
PH: 303-972-6640
CONTACT: ROBERT HARRIS, PLS
EMAIL: RHARRIS@GILLIANSLC.COM

LANDSCAPE ARCHITECT/PLANNER:

NORRIS DESIGN
1101 BANNOCK STREET
DENVER, CO 80204
PH: 303-892-1166
CONTACT: CARL RUNGE
EMAIL: CRUNGE@NORRIS-DESIGN.COM



VICINITY MAP
SCALE 1" = 2000'

SHEET INDEX:

1 COVER SHEET
2 EXISTING CONDITIONS
3 OVERALL PRELIMINARY PLAN
4 PRELIMINARY PLAN
5 OVERALL PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
6 PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
7 PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
8 PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
9 PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
10 CROSS SECTIONS AND DETAILS

NOTES:

1. ALL TRACTS WILL BE OWNED AND MAINTAINED BY THE H.O.A. / METRO DISTRICT, ITS SUCCESSORS AND ASSIGNS. THE H.O.A. / METRO DISTRICT WILL OWN AND HOLD THE MAINTENANCE RESPONSIBILITY FOR ALL LANDSCAPING, DETENTION PONDS, RETAINING WALLS, DRIVEWAYS, OPEN SPACE, AND COMMUNITY AMENITIES CONTAINED WITHIN THESE TRACTS.

2. SECONDARY DRAINAGE EASEMENTS WILL BE GRANTED TO DOUGLAS COUNTY AT THE TIME OF FINAL PLAT TO ACCOMMODATE DRAINAGE INFRASTRUCTURE FOR THE PURPOSES OF ACCESSING, MAINTAINING, AND REPAIRING STORM WATER MANAGEMENT IMPROVEMENTS, INCLUDING, BUT NOT LIMITED TO, INLETS, PIPES, CULVERTS, CHANNELS, DITCHES, HYDRAULIC STRUCTURES, RIPRAP, DETENTION BASINS, FOREBAYS, MICROPOOLS, AND WATER QUALITY FACILITIES (COLLECTIVELY, THE "FACILITIES"). THE MAINTENANCE AND REPAIR OF THE FACILITIES LOCATED IN THE SUBDIVISION WILL BE ACCEPTED BY DOUGLAS COUNTY AT THE TIME OF FINAL PLAT AND WILL BE THE RESPONSIBILITY OF THE SYSTEM OWNER. IN THE EVENT SUCH MAINTENANCE AND REPAIRS ARE NOT PERFORMED BY THE SYSTEM OWNER TO THE SATISFACTION OF DOUGLAS COUNTY, THEN DOUGLAS COUNTY WILL HAVE THE RIGHT, BUT NOT THE OBLIGATION, TO ENTER SAID SUBDIVISION AFTER TEN (10) DAYS PRIOR WRITTEN NOTICE TO THE SYSTEM OWNER, UNLESS THERE IS AN EMERGENCY, IN WHICH CASE DOUGLAS COUNTY WILL GIVE NOTICE AS SOON AS PRACTICABLE, TO PERFORM ALL NECESSARY WORK, THE COST OF WHICH WILL BE PAID BY THE SYSTEM OWNER UPON BILLING. IN THE EVENT THE SYSTEM OWNER FAILS TO REIMBURSE DOUGLAS COUNTY WITHIN THIRTY (30) DAYS AFTER SUBMISSION OF THE BILL FOR THE COSTS INCURRED, DOUGLAS COUNTY WILL HAVE THE RIGHT TO ENFORCE SUCH OBLIGATION BY APPROPRIATE LEGAL ACTION. IT IS THE SYSTEM OWNER'S RESPONSIBILITY TO CONSTRUCT, MAINTAIN AND REPAIR THE FACILITIES IN A MANNER CONSISTENT WITH ALL APPLICABLE PLANS APPROVED OR ACCEPTED BY DOUGLAS COUNTY.

Resp: Note added

ADD NOTE:
No improvements that conflict with or interfere with construction, maintenance or access to utilities shall be placed within the utility easements. Prohibited improvements include, but are not limited to, permanent structures, buildings, counter-forts, decks, attached porches, attached stairs, window wells, air conditioning units, retaining walls/components and other objects that may interfere with the utility facilities or access, use and maintenance thereof. Prohibited improvements may be removed by the entities responsible for providing the utility services. The owners of the property subject to or adjacent to the utility easements shown herein are responsible for the maintenance and operation of such areas, which does not include utility lines and related facilities. When the owner(s) or adjacent owners fail to adequately maintain such utility easements, including the removal of prohibited improvements, the maintenance, operation, reconstruction and removal shall be at the cost of the owner(s).

LAND USE TABLE:

GROSS AREA	39.53 AC	
NET AREA (EXCLUDING PUBLIC AND PRIVATE RIGHT-OF-WAY)	34.29 AC	86.74%
TOTAL NUMBER OF LOTS	136	
AREA OF LOTS	9.48 AC	23.97%
TOTAL NUMBER OF TRACTS	11	
AREA OF TRACTS	24.92 AC	63.04%
AREA OF LOCAL STREET DEDICATION	3.40 AC	8.60%
AREA OF PRIVATE ALLEYS (OWNED AND MAINTAINED BY H.O.A / METRO DISTRICT)	0.66 AC	1.67%
SMALLEST RESIDENTIAL LOT	2,378 SF / 0.05 AC	
LARGEST RESIDENTIAL LOT	5,848 SF / 0.13 AC	
AVERAGE RESIDENTIAL LOT	3,202 / 0.07 AC	
DENSITY (GROSS)	3.44 DU / AC	
ZONING/LAND USE	PLANNED DEVELOPMENT (PD) / SINGLE FAMILY (SF) DETACHED RESIDENTIAL / SINGLE FAMILY (SF) ATTACHED RESIDENTIAL	

TRACT AREA TABLE

TRACT	TRACT USE	OWNERSHIP / MAINTENANCE	SQUARE FEET	ACRES
TRACT A	LANDSCAPE, PARK, AMENITIES, AND CLUSTER DRIVEWAY	H.O.A. / METRO DISTRICT	31,890.14	0.73
TRACT B	RETAINING WALL, LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	164,390.80	3.77
TRACT C	DETENTION POND, RETAINING WALLS, OPEN SPACE, LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	837,698.41	19.23
TRACT D	LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	4,380.64	0.10
TRACT E	LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	11,963.05	0.27
TRACT F	LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	H.O.A. / METRO DISTRICT	8,194.13	0.19
TRACT G	LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	H.O.A. / METRO DISTRICT	8,067.95	0.19
TRACT H	LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	1,915.08	0.04
TRACT I	LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	H.O.A. / METRO DISTRICT	8,275.38	0.19
TRACT J	LANDSCAPE, BUFFER, AND UTILITIES	H.O.A. / METRO DISTRICT	1,915.08	0.04
TRACT K	LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	H.O.A. / METRO DISTRICT	7,605.18	0.17

RESULTS: SOUND LEVELS — **Pinery Meadows**

LSC — **26 February 2025**
KDF — **TNM 2.5**
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Pinery Meadows
RUN: 2045 Total PM Peak Hour
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH
Receiver

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existing		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated		Calculated minus Goal
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
Receiver2	2	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0
Receiver3	3	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
Receiver4	4	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
Receiver5	5	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Receiver6	6	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Receiver7	7	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Receiver8	8	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Receiver9	9	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Receiver10	10	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
Receiver11	11	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
Receiver12	12	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
Receiver13	13	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
Receiver14	14	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min dB	Avg dB	Max dB
All Selected	14	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

4/14/25

COVER SHEET
SHEET NUMBER: **1**
1 of 10

PINERY MEADOWS

PRELIMINARY PLAN

PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 135 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

SYMBOLS LEGEND	
1	NOISE RECIEVER LOCATION AND NUMBER (SEE SOUND LEVELS TABLE ON SHEET 1)(RE: NOISE IMPACT ANALYSIS BY LSC, DATED 3/7/25)

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.

N

50 0 50
HORIZONTAL SCALE: 1" = 50'

15' UE REQUIRED

Resp: Added. This easement overlaps an existing fiber optic easement and an existing gas easement

N89° 39' 49"E 2156.25'

PINERY WEST FILING NO. 2 (NOT INCLUDED IN THIS PLAT)

S01° 46' 32"W 20.22'

S89° 43' 24"W 5.60'

S10° 56' 47"W 130.03'

SOUTH PARKER ROAD
(ROW WIDTH VARIES)

20' SETBACK

5' SWLK CONNECTION (BY OTHERS)

DIRECTORS PARCEL

60' ROW (SEE NOTE 1)

APPROXIMATE 12.5' UTILITY EASEMENT BOOK 736, PAGE 968 (SHOWN BASED ON MANHOLES)

15' UTILITY EASEMENT BOOK 293, PAGE 815

15' UE

5' SWLK CONNECTION

RIPARIAN LINE

TRACT C
19.23 Ac

20' UE

CHERRY CREEK

FLOOD PLAIN

REVISE - 15' UE EASEMENT LEAVES 21-FOOT LEFT IN LOT

Resp: This has been revised. There is no longer an easement needed here.

PINERY CENTER BLVD (BY OTHERS)

ROAD A

ROAD B

ROAD C

ROAD D

ROAD E

ROAD F

TRACT H
0.04 Ac

TRACT J
0.04 Ac

TRACT K
0.17 Ac

TRACT A
0.73 Ac

TRACT B
3.77 Ac

TRACT D
0.10 Ac

TRACT E
0.27 Ac

TRACT F
0.19 Ac

TRACT G
0.19 Ac

TRACT I
0.19 Ac

COVERED GRILL AND PICNIC AREA

10' UE REQUIRED IN REAR LOT ALSO GAP BETWEEN LOTS AN 15' UE
15' UE INTENED FOR CORE MAIN FEEDER WITH OTHER UTILITIES

Resp: This easement has been revised to now overlap the lots by 5' (discussed in meeting with Brooks Kaufman on 5/19/25; Brooks to confirm if this is sufficient).

15' UE REQUIRED

Resp: Added

100' BUILDING SETBACK

DETENTION POND

RETAINING WALL

REVISE 15' UE OVERLAP TRACT AND REAR LOT

Resp: This easement overlaps the lots by 5' (discussed in meeting with Brooks Kaufman on 5/19/25; Brooks to confirm if this is sufficient).

10' SETBACK

S89° 43' 27"W 2088.14'

PARCEL NO. 2349-104-00-006
OWNER: SCOTT AVE LAND HOLDINGS LLC
(NOT INCLUDED IN THIS PLAT)

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

PRELIMINARY PLAN

SHEET NUMBER: **4**

4 of 10

4/14/25

PINERY MEADOWS

PRELIMINARY PLAN

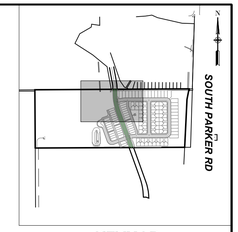
PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 135 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

SLOPE LEGEND	
	15% - 20%
	GREATER THAN 20%

HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

N

30 0 30
HORIZONTAL SCALE: 1" = 30'



KEYMAP
1" = 1000'

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.

PARCEL NO. 2349-103-01-001
OWNER: PINERY COMMERCIAL METRO DISTRICTS 1 & 2
(NOT INCLUDED IN THIS PLAT)

Resp: Grading has been adjusted to not exceed 15% within the easement

GRADE MAY NOT EXCEED 15% WITHIN UE

PINERY WEST FILING NO. 2
(NOT INCLUDED IN THIS PLAT)

48" FES
48" RCP
6' DIA MH
73.06 FG
ROAD A
SWALE
69.40 FG/ME
5' TYPE R INLET
Resp: Grading has been adjusted to not exceed 15% within the easement
GRADE MAY NOT EXCEED 15% WITHIN UE
ROAD E
71.50 FG
5' DIA MH
ROAD F
5' DIA MH
18" RCP
PINERY CENTER BOULEVARD
(60' ROW) (SEE NOTE 1)
ROAD C
GRADE MAY NOT EXCEED 15% WITHIN UE
Resp: Grading has been adjusted to not exceed 15% within the easement
MATCHLINE - SEE SHEET 8
MATCHLINE - SEE SHEET 7

PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

4/14/25

SHEET NUMBER:
6
6 of 10

PINERY MEADOWS

PRELIMINARY PLAN

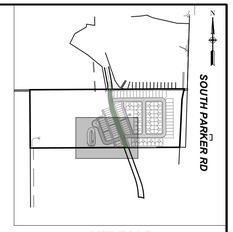
PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 135 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

SLOPE LEGEND	
	15% - 20%
	GREATER THAN 20%

HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

N

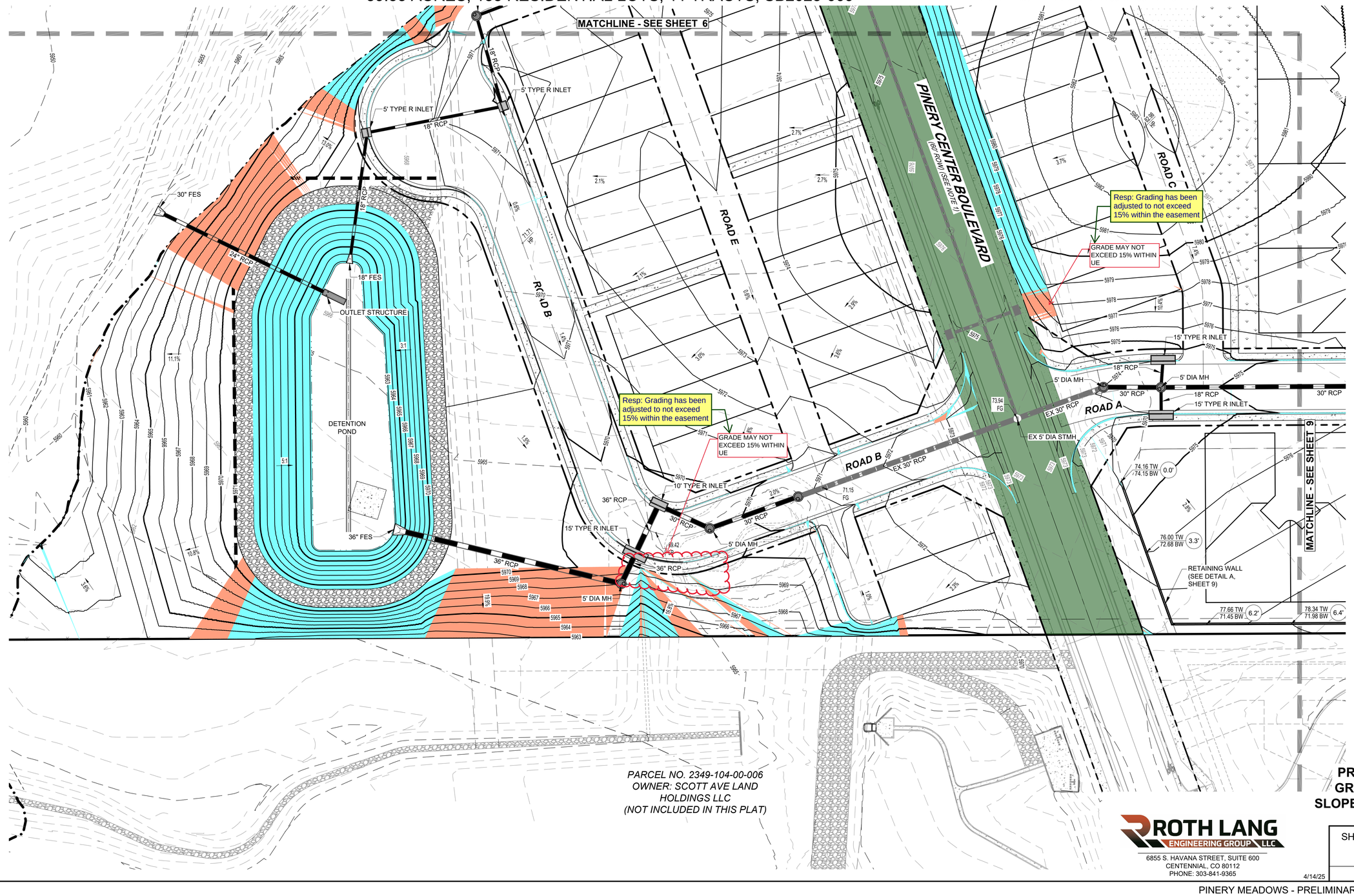
30 0 30
HORIZONTAL SCALE: 1" = 30'



KEYMAP
1" = 1000'

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.



PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN

SHEET NUMBER:
8
8 of 10

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

4/14/25

DOUGLAS COUNTY
HEALTH DEPARTMENT COLORADO

April 25th, 2025

Eric Pavlinek
100 Third St.
Castle Rock, CO 80104

RE: SB2025-009

Dear Mr. Pavlinek

Thank you for the opportunity to review and comment on the Pinery Meadows Preliminary Plan. Douglas County Health Department (DCHD) staff have reviewed the application for compliance with pertinent environmental and public health regulations. After reviewing the application, DCHD has the following comment(s).

Fugitive Dust - Developments of 25 acres and more than 6 months in duration
Exposure to air pollution is associated with a number of health problems including asthma, lung cancer, and heart disease. The Colorado Department of Public Health and Environment Air Pollution Control Division (APCD) regulates air emissions, including fugitive dust from developments of 25 acres or more that last at least 6 months. The applicant shall contact the APCD, at (303) 692-3100 for more information. Additional information is available at https://cdphe.colorado.gov/apens-and-air-permits.

Stormwater Impacts on Nearby Waterway
Development of the subject parcel will potentially result in an increase of stormwater and snowmelt runoff that may contribute significant pollutant loadings to Cherry Creek. These pollutants include bacteria, nutrients, metals, and oxygen consuming contaminants.

Sincerely,

RESPONSE: Noted, thank you. Construction practices will adhere to all County standards and requirements.

Caden Thompson
Environmental Health Specialist I
Douglas County Health Department

May 7, 2025

Eric Pavlinek
Planning Services
100 Third Street
Castle Rock, CO 80104

Re: SB2025-009 Pinery Meadows Preliminary Plan

Dear Mr. Pavlinek:

The letter provides comments regarding the request for approval of a preliminary plan application for 136 residential lots, and 11 tracts on approximately 39.5 acres within Pinery Meadows Planned Development. The proposal includes 40 single-family attached (duplex) and 96 single-family detached residential lots. The applicant submitted a cultural resource survey report.

The Curator has reviewed the completed cultural resource survey of the project site. New sites and artifacts were discovered but none are eligible to be listed on the national register. The cultural resource survey satisfies the Curators request.

Should buried artifacts and features be discovered in future phases, we recommend completion of the appropriate Colorado Office of Archaeology and Historic Preservation (OAHP) Data Management and Historic and/or Prehistoric Component forms, following OAHP guidelines, with accompanying sketch maps and photographs. Completed forms are submitted to OAHP to ensure that Douglas County's historic or prehistoric data is included in the Colorado OAHP state-wide database of cultural resources.

Thank you in advance for your attention to the preservation and protection of Douglas County's cultural resources for future generations.

RESPONSE: Noted, thank you.

Sincerely,

Brittany Cassell

Brittany Cassell, Curator

DOUGLAS COUNTY
COLORADO

May 6, 2025 DV 25-121

Eric Pavlinek – Principal Planner
Douglas County Planning
100 Third Street
Castle Rock, CO. 80104

RE: Pinery Meadows Preliminary Plan

Dear Eric,

Engineering has reviewed the Preliminary Plan and the following comments have been generated:

1. Please delineate the Public ROW across the private road sections.
   Resp: Completed.
2. Please label all roadway centerlines with their bearing and distances and define the cul-de-sac radii.
   Resp: Roadway centerline bearing and distances and cul-de-sac radii have been labeled.
3. Please show all proposed curb ramps.
   Resp: Proposed curb ramps have been added and labeled
4. Will the private alley sections be proposed with valley pans?
   Resp: Yes.
5. Will crosspans be proposed at either end of Road C and the southern end of Road E as it intersects both sides Road B?
   Resp: Yes. These are now shown on the plans.
6. As previously mentioned, County criteria defines that Local Streets must be a minimum of 160' in length (Collector ROW to local street centerline) prior to intersecting with other local roadways and residential fronting lots when accessing from a Collector Roadway. The County has already consented to support a variance of a length less than 160' for Roads A (southern access) and B. This same criteria and variance application would apply to Road A (northern access). As such, Lots 1 and 2 must be eliminated or relocated on this Preliminary Plan.
   Resp: Lot 1 has been removed. Lots 2-16 (renumbered to Lots 1-15) have been shifted to the east. There is 135' from the centerline of Pinery Center Boulevard to the centerline of the driveway for Lot 2 (renumbered to Lot 1).
7. Please submit the variance request for Roads A and B entry portions less than the 160' and label these distances on the Preliminary Plan.

   RESPONSE: Variance request for road portions less than 160' at entries has been included in resubmittal package.

8. Traffic Comments will be forthcoming when they have been received.

Should you have any questions in regard to these comments, I can be reached at 303-660-7490 or apeterso@douglas.co.us.

Respectfully,

Al Peterson
Sr. Development Review Engineer

c: Brad Jackson, P.E., Development Review Supervisor
DV File

SOUTH METRO FIRE RESCUE
FIRE MARSHAL'S OFFICE

Eric Pavlinek, Principal Planner
Douglas County Department of Community Development, Planning Services
100 Third St
Castle Rock Co 80104
303.660.7460
303.660.9550 Fax

Project Name:	Pinery Meadows Preliminary Plan
Project File #:	**SB2025-009**
S Metro Review #	REFSP25-00072
Review date:	April 21, 2025
Plan reviewer:	Aaron Miller 720.989.2246 aaron.miller@southmetro.org
Project Summary:	A preliminary plan application for 136 residential lots, and 11 tracts on approximately 39.5 acres within Pinery Meadows Planned Development. The proposal includes 40 single-family attached (duplex) and 96 single-family detached residential lots.
Code Reference:	Douglas County Fire Code, 2018 International Fire Code, and 2021 International Building Code with amendments as adopted by Douglas County.

South Metro Fire Rescue (SMFR) has reviewed the provided documents and has conditional non-objection to the proposed preliminary plan. See following comments.

COMMENTS:

1. Pinery Center Boulevard is to be completed South connecting to Scott Avenue prior to release of building permits. Without a completed connection, too long of a dead end is created exceeding max allowable dead end.

2. Wayfinding address signage to be placed adjacent to where cluster lot shared driveways meet the road as visibility of address signage on back homes will be limited.

3. Coordinate addressing with Douglas County Addressing analyst and SMFR prior to plat.

4. Coordinate fire hydrant placement with SMFR prior to plat.

1. RESPONSE: Noted, Pinery Center Blvd will be completed to the south and connect to Scott Avenue prior to beginning construction of buildings.
2. RESPONSE: Noted, wayfinding address signage will be coordinated with SMFR.
3. RESPONSE: We will work with Douglas County Addressing analyst and SMFR prior to recordation of final plat.
4. RESPONSE: Fire hydrant locations will be coordinated with SMFR prior to recordation of final plat.

Homeowners' Association, Inc.
A COLORADO NON-PROFIT CORPORATION
8170 Hillcrest Way
Parker, Colorado 80134-6360
303.841.8572

May 6, 2025

Eric Pavlinek
Planning Services
100 Third Street
Castle Rock, CO 80104
Re:SB2025-009

The Pinery Homeowners' Association (PHA) appreciates the opportunity to review and comment on the Preliminary Plan application for Pinery Meadows project.

Overall, as we review this preliminary plat, the compliance of the Comprehensive Master Plan, specifically the Pinery Separated Urban Area is our focus. It currently is difficult to comment as to the character of the development is not known. The 40 single family attached and 96 single family residential lots is high density as compared to the original Pinery, seemingly in opposition to the natural rural character of The Pinery. It is a challenge to see how the criteria of the SUA is taken into consideration - maintain community character, enhance community separation buffer, and ensure that new development is compatible with the character of the original Pinery.

The proposed design does not lend to custom homes, rather a tract-home design. Color palette, materials, finishes, structure design, heights will be topics of concern throughout the future approval process. The Pinery Meadows PD has been referred to many times throughout the updated Project Narrative. Access to this document would provide a better understanding of the guidelines set forth for this area.

The Traffic Study completed as part of this planned development, identified safety issues that the PHA has been reporting for years. While not specifically identified as part of the traffic impacts of this proposed development, it is identified as Background Traffic.

Recommended Improvements: WB to NB acceleration lane to mitigate poor existing levels of service (by others). Page 14 Figure 4 Year 2028 Background Traffic, lane geometry and traffic Control (attached)

Traffic studies completed over the years for any development along the SH 83 corridor have failed to recognize the lack of a dedicated northbound auxiliary deacceleration/acceleration lane at the entrance of The Pinery. Regardless of Level of Service ranking, the North Pinery Parkway existing configuration does not meet today's required traffic capacity and sets drivers' up for failure. The addition of a NB acceleration lane in conjunction with a dedicated westbound left turn lane (with modifications to the existing median on N Pinery Parkway) east leg of the intersection, certainly addresses many of our community traffic safety concerns. We are hopeful that this will be considered and taken under advisement for correction.

Sincerely,

Sonia Eyre,

Board President

Pinery Homeowners' Association

RESPONSE:
Additional detail surrounding the character of the community will become available at time of site improvement plan. The proposed preliminary plan complies with the approved PD and adheres to the Pinery SUA's vision of urban level development comprising a mix of single family detached and attached products. Residential density is limited to the east portion of the site, closer to Parker Rd, and the entire western portion of the site within the Cherry Creek floodplain is left undeveloped, maintaining the natural character of this area of the Pinery.

Our development team defers to the County's judgment as it pertains to any traffic improvements and interpretation of the submitted traffic study.

Right of Way & Permits

1123 West 3rd Avenue
Denver, Colorado 80223
Telephone: 303.285.6612
violeta.ciocanu@xcelenergy.com

April 17, 2025

Douglas County Planning Services
100 Third Street
Castle Rock, CO 80104

Attn: Eric Pavlinek

Re: Pinery Meadows Preliminary Plan, Case # SB2025-009

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has reviewed the **Pinery Meadows Preliminary Plan.** Please be aware PSCo owns and operates existing natural gas distribution facilities within the area to be developed.

Please note that before the plat approval can be granted, the facilities within the existing 30-foot easement must be relocated to a newly designated easement and the current easement must be legally relinquished through a quitclaim deed. Only after these steps are completed can the plat approval process proceed.

The property owner/developer/contractor must complete the application process for any new natural gas service, or *modification* to existing facilities, including relocation via xcelenergy.com/InstallAndConnect. It is then the responsibility of the developer to contact the Designer assigned to the project for approval of design details.

Additional easements may need to be acquired by separate document – be sure to ask the Designer to contact a Right-of-Way & Permits Agent in this event.

As a safety precaution, PSCo would like to remind the developer to call the Utility Notification Center by dialing 811 for utility locates prior to construction.

RESPONSE:
Noted, thank you.

Violeta Ciocanu (Chokanu)
Right of Way and Permits
Public Service Company of Colorado dba Xcel Energy
Office: 303-285-6612 – Email: violeta.ciocanu@xcelenergy.com

Douglas County School District
Learn Today, Lead Tomorrow
620 Wilcox Street
Castle Rock, Colorado 80104

May 15th, 2025

Eric Pavlinek | Principal Planner
Douglas County Department of Community Development
Planning Services Division
Address | 100 Third St., Castle Rock, CO 80104
Direct | 303.814.4377 Main | 303.660.7460
Email epavlinek@douglas.co.us

RE: Pinery Meadows Preliminary Plan-Subdivision - Preliminary Plan (SB2025-009)

Dear Mr. Pavlinek,

Thank you for the opportunity to respond to the above referenced application. It is our understanding that the applicant is requesting approval for 40 attached and 96 detached single-family lots on 39.5 acres within the Pinery Meadows Planned Development. The proposed development is generally located at the northwest corner of Parker Road (Hwy 83) and Scott Avenue.

On behalf of Douglas County School District (DCSD), we have a couple of comments regarding this proposed development that we would like to resolve prior to approval. DCSD has calculated the number of students that are expected from the 136 residential units. A total of 50 students are expected from this development which would equate to a total land dedication requirement of 1.2-acres. Since this amount of land dedication is smaller than DCSD's minimum site standards, DCSD requests cash-in-lieu of dedication.

PROJECT NAME: Pinery Meadows Preliminary Plan-Subdivision - Preliminary Plan (SB2025-009)				
DU/	ACRES		DENSITY	
136	12.88		10.56	
			Generation	Number
STUDENT GENERATION RATES	No. of DU's		Rate	of Students
ELEMENTARY	136	X	0.19	26
MIDDLE SCHOOL	136	X	0.06	8
HIGH SCHOOL	136	X	0.12	16
				Required
			School	Land
	Number		Acreage	Dedication
SCHOOL LAND DEDICATION	of Students		Per Student	Acreage
ELEMENTARY	26	X	0.018	0.465
MIDDLE SCHOOL	8	X	0.030	0.245
HIGH SCHOOL	16	X	0.030	0.490
			TOTAL	1.200

Pursuant to Section 1004.05.3 of the Douglas County Subdivision Resolution, "The cash-in-lieu fee shall be equivalent to the full market value of the acreage required for school land dedication. Value shall be based on anticipated market value after completion of platting. The applicant shall submit a proposal for the cash-in-lieu fee and supply the information necessary for the Board to evaluate the adequacy of the proposal. This information shall include at least one appraisal of the property by a qualified appraiser."

DCSD would ask that the cash-in-lieu fee be paid directly to DCSD, in one lump sum, upon site plan approval. Assuming the applicant agrees with the payment of these fee requirements, DCSD has no objection to approval of this application.

Shavon Caldwell-Planning Manager
Planning and Construction Department, Douglas County School District
shavon.caldwell@dcsdk12.org
303.387.0417

RESPONSE:
Noted, thank you.

Eric Pavlinek

Eric Pavlinek
Principal Planner

1. RESPONSE: See updated noise study included in this resubmittal package.

2. RESPONSE: There is a 20' buffer that is also a required utility easement. The easement does not allow large plant materials to be planted within it. On-lot fencing will provide some level of screening, and we comply with the requirements in the approved PD. The 20' buffer was set in place by the approved PD to provide adequate separation from the existing adjacent neighbors.

3. RESPONSE: We have been in communication with the County's weed management director and per his direction are preparing a weed management plan for review by the County.

4. RESPONSE: An 18A appeal has been included in the resubmittal package. We anticipate inclusion in the Pinery Water and Wastewater District at the time of Final Plat.

5. RESPONSE: Square footages for each lot and tract are included in the revised plans.

6. RESPONSE: Building envelopes for single family detached lots have been added to plans.

7. RESPONSE: Development team is in communication with CORE as it pertains to serving this property.

Applicant Response to Public Comments

DOUGLAS COUNTY
COLORADO

NOXIOUS WEED MANAGEMENT PLAN

FOR

THE PINERY MEDOWS

Prepared by:
Roth Lang Engineering Group, LLC
6855 S. Havana Street
Centennial, Colorado80112

June 1, 2025


PINERY
MEADOWS
39.5 Ac
S PARKER ROAD
83

TABLE OF CONTENTS

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- 1.01 Overview
- 1.02 Purpose of the Plan
- 1.03 Enactment Authority
- 1.04 Noxious Weed List

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- 2.01 Objectives
- 2.02 Prevention
- 2.03 Control
- 2.04 Restoration
- 2.05 Education and Awareness

SECTION III PLAN EVALUATION

SECTION IV Integrated Weed Management Plan Template

SECTION I

INTRODUCTION

1.01 Overview

Several species of non-native invasive plants, categorized as "noxious weeds", are known to exist in Douglas County. Without the natural controls that keep them in check, these weeds quickly dominate existing native and economic plant communities. Wildlife habitat deteriorates, water quality diminishes, erosion increases, fire regimes are altered, and recreation values are degraded. Native plant species play an integral role in all healthy ecosystems. They provide genetic material that strengthens our major food crops, provide food and shelter to animals, and enhances the landscape. To protect these ecosystems, invasive plant species must be controlled.

In the continuing effort to protect and restore the value of the land in the State of Colorado, the Colorado Noxious Weed Act[1] (Title 35, Article 5.5, of the Colorado Revised Statute, hereinafter "Act") was developed. The objective of the Act was to curb the threat posed by noxious weeds to the natural resources of the State. In accordance with the Act, on or about February 7, 1991, the Douglas County Board of Commissioners established a local Noxious Weed Advisory Commission whose primary function is the development of an integrated management plan for noxious weeds within the area governed by the County.

1.02 Purpose of the Plan

The purpose of this Douglas County Noxious Weed Management Plan ("Plan") is to provide guidelines for managing the noxious weeds that represent a threat to the natural and agricultural ecosystems of Douglas County. The Plan implements the mandates of the Act and strives to strengthen, support, and coordinate noxious weed management efforts between private, municipal, county, state, and federal entities. It is ultimately the responsibility of all landowners to employ methods and strategies to manage noxious weeds found on their property.

1.03 Enactment Authority

The Colorado Weed Management Act, (now known as the Colorado Noxious Weed Act), § 35-5.5-101, *et seq*., C.R.S., was signed into state law in 1990. This article declares that there is a need to ensure that all lands of the state of Colorado, whether in private or public ownership, are protected by and subject to the jurisdiction of a local government empowered to manage undesirable plants (noxious weeds), as designated by the State of Colorado and the local governing body (Douglas County).

1.04 Noxious Weed List

The Act designates undesirable plant species as determined by 8 CCR 1206-2, Rules Pertaining to the Administration and Enforcement of the Act, as noxious weeds within the State of Colorado. "Noxious weed" means an alien plant or parts of an alien plant that have been designated by rule as being noxious or has been declared a noxious weed by a local advisory board, and meets one or more of the following criteria:

- Aggressively invades or is detrimental to economic crops or native plant communities.
- Is poisonous to livestock.
- Is a carrier of detrimental insects, diseases, or parasites.
- The direct or indirect effect of the presence of this plant is detrimental to the environmentally sound management of natural or agricultural ecosystems.

The Act further categorizes noxious weeds into three lists:

- "List A", which means rare noxious weed species that are subject to eradication wherever detected statewide in order to protect neighboring lands and the state as a whole.
- "List B", which means noxious weed species with discrete statewide distributions that are subject to eradication, containment, or suppression in portions of the state designated by the commissioner, in order to stop the continued spread of these species.
- "List C", which means widespread and well-established noxious weed species for which control is recommended but not required by the state, although local governing bodies may require management.

This noxious weed list is updated annually and is available through Douglas County or the Colorado Department of Agriculture.

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SECTION II

PLAN OF WORK

2.01 Objectives

The objectives of this plan are to prevent the establishment of noxious weeds in the County in concurrence with the management of existing populations. Countywide noxious weed management efforts will include:

- Prevention
- Control
- Restoration
- Education and Awareness

2.02 Prevention

Prevention is the highest priority weed management technique. Prevention ensures that noxious weed species are not introduced into un-infested areas. Noxious weed proliferation is most likely to occur where soil has been disturbed either by man-made means, (such as road and trail cuts, construction sites, and overgrazing), or naturally in the case of wildfire, avalanche, mudslide, or flood. Strategies to prevent the introduction of noxious weeds include:

- Identifying and eradicating small infestations.
- Monitoring and evaluating to prevent recurrence.
- Promoting the Colorado Weed-Free Hay and Forage Program.
- Revegetating and reclaiming disturbed sites with appropriate native plant species.
- Restricting the unlawful sale of invasive ornamental plants and seed packets.

Some ornamental plant species, available for purchase in the past, have now been designated as noxious weeds. These plants are capable of escaping yards and gardens. Other known methods of weed introduction include:

- Contaminated seed, feed grain, hay, straw, and mulch.
- Contaminated agricultural, construction, and recreation equipment.
- Animal fur, fleece, human clothing.
- Dried flower arrangements.

2.03 Control

The most effective way to control established noxious weeds is through Integrated Weed Management (IWM). IWM incorporates weed biology, environmental information, and available management techniques, to create an Integrated Weed Management Plan (IWMP) that prevents unacceptable damage from weeds and poses the least risk to people and the environment. An IWMP outline has been provided in Appendix A and may be used as a guideline when developing site specific plans. IWM is a combination of treatment options that, when used

together, provide optimum control for noxious weeds; however, IWM does not necessarily imply that multiple control techniques must be used or that chemical control options should be avoided. According to the Act, "it is the duty of all persons to use integrated methods to manage noxious weeds if the same are likely to be materially damaging to the land of neighboring landowners."

IWM methods include:

- **Cultural:** Establishing healthy native or other desirable vegetation. methods include proper grazing management (prevention of overgrazing), re-vegetating or re-seeding, fertilizing, and irrigation.
- **Biological:** The use of an organism such as insects, diseases, and grazing animals to control noxious weeds; useful for large, heavily infested areas. Not an effective method when eradication is the objective but can be used to reduce the impact and dominance of noxious weeds.
- **Mechanical:** Manual or mechanical means to remove, kill, injure, or alter growing conditions of unwanted plants. Methods include mowing, hand-pulling, tilling, mulching, cutting, and clipping seed heads.
- **Chemical:** The use of herbicides to suppress or kill noxious weeds by disrupting biochemical processes unique to plants.

2.04 Restoration

Following the implementation of noxious weed control methods, native and beneficial plant species should be re-introduced.

Establishing desirable plant communities, after noxious weeds have been removed, requires timely cultivation and reseeding. Seeds from noxious weeds may lay dormant for several years. Revegetation with native and beneficial species deters the germination of weed seeds. Re-introducing native plants or seeds to reclaim disturbed land minimizes degradation of native ecosystems, reduces the need for herbicides, and conserves water resources. When selecting native plant seed, consider the following.

- Water availability and the vegetative requirements.
- Plant species that adapt to climate, soil, and topographical conditions of the designated area.
- Vegetative cover that is diverse and capable of self-regeneration. Native plants that provide cover and forage for wildlife.
- Seed packets containing non-native plant species should not be used.

2.05 Education and Awareness

Education plays an important role in the implementation of this Plan and is accomplished through the development of informational handouts and brochures, formal presentations, and the County website. The County welcomes opportunities to provide outreach and technical assistance regarding noxious weeds to community groups, homeowners, agencies, volunteers, students, and others.

SECTION III

PLAN EVALUATION

The scope of work in the Douglas County Noxious Weed Management Plan will be reviewed, evaluated, and endorsed by the Douglas County Noxious Weed Advisory Commission. It will be approved by resolution, by the Board of County Commissioners of Douglas County, Colorado, before becoming final. The plan must be reviewed at least every three (3) years per § 35-5.5-107(4)(a), *et seq.*, C.R.S., and the management plan and any recommended amendments to the plan shall be transmitted to the Board of County Commissioners of Douglas County, Colorado, for approval, modification, or rejection.

Section IV

Integrated Weed Management Plan Template

INTEGRATED WEED MANAGEMENT PLAN

Parcel / Schedule Number(s):

See: Douglas County Assessor

Property Owner(s):

Last Name:	First Name:
Last Name:	First Name:
Last Name:	First Name:
Last Name:	First Name:
Business:	
Trustee:	

Property Address:

Street:	
City:	State, Zip code:

Prepared by:

Date:

Introduction: Describe the area and the purpose of the management plan.

Example
Property is 150 acres in northern Douglas County near Black Forest. The property sits at an elevation of 7,200 ft. Parcel consists of grassy areas with a few pockets of ponderosa pine. Lower part of property near road has an intermittent stream bordered by willows and other shrubs. Property will be subdivided into 10-acre parcels to sell.

Survey/Inventory: Describe how the property was surveyed and list the noxious weeds found. Estimate the size of infestation. Include a map if possible.

Colorado state noxious weed list and control recommendations:
Colorado Department of Agriculture (CDA) Noxious Weeds

Example
Property was inventoried by XYZ & Associates. One area (20' x 20') of orange hawkweed was found in meadow near road. Two pockets of diffuse knapweed were also found. The first area is approximately 100' x 1000' and found near the NW property boundary and the second is approximately 30' x 100' and found just below the meadow (see accompanying map).

Management Goals: State the goal to eradicate, contain or suppress, noxious weed infestations on the property. Promote desirable self-sustaining native plant communities in areas where construction or other ground-disturbing activities will take place. All List A and High Priority List B species must be eradicated prior to any disturbance and notations to prevent the spread of all noxious weeds during the development must be addressed.

Example
Eradicate the Orange hawkweed, a List A species, and reseed with native plants adapted to this area.

Control the spread of diffuse knapweed near property boundary and reduce the density to 50% or less within two years. Within five years, lower population to a low level manageable by beneficial insects. Reduce density of smaller patch near the meadow to less than 50% within two years. Eliminate this patch completely within four years.

Example Ground Disturbing Activities
*Eradicate the Orange Hawkweed before **any** ground disturbing activity begins. (**NOTE**: eradication is required for all List A and high priority List B species prior to any ground movement.)*

Control the spread of diffuse knapweed in all areas of the property. Make every attempt to keep any noxious weeds from leaving the sites by employing proper, contain and control procedures.

Ensure that all equipment leaving the parcel is free of weed seeds or other plant parts. Clean seeds from tires, tracks and all other parts of machinery.

Prevent seed spread prior to any activity on the site, along with continued treatment during the construction. Clip, bag, and securely dispose of all noxious weed seeds and plant parts.

Control Methods: Detail the Integrated Weed Management (IWM) plan. Provide information on control methods for specific noxious weeds. Fact sheets for most species are found at:

Colorado Department of Agriculture Noxious Weed Species Identification

List which IWM measures will be applied to each species of noxious weed found in the management area using the following format:

a. **Cultural/Mechanical – Mowing, hand-pulling, irrigation, etc. Whenever possible, follow any control measure with an over-seeding using native plants adapted to the area. It is important whenever there is a disturbance to an area that has noxious weeds, to prevent the spread of seeds to other areas of land by equipment, vehicles, clothing and shoes.**
b. **Biological – For recommended control available of each specific plant species, contact the CDA Biocontrol division at:**
Colorado Department of Agriculture Biocontrol
c. **Chemical – List chemical controls by active ingredient and product name. (Please note the "Label is the Law" not all herbicides work equally well on all weeds, nor can every herbicide be used in every situation. Read the label and consult weed manuals and experts for the most effective chemical to use and how to use it safely.)**

Example
Orange hawkweed: List A species
a. Mechanical: Not recommended for orange hawkweed.
b. Biological: Not available. Eradication is the only option for List A species
c. Chemical: There are several herbicides that control orange hawkweed effectively; Aminopyralid, Clopyralid, Picloram or 2,4-D.

Diffuse knapweed: List B species.
a. Mechanical: Sever roots with a shovel well below the soil line.
b. Biological: The CDA has several beneficial insects available for diffuse knapweed control including a weevil that feeds on the seed head and another weevil that feeds on the roots.
c. Chemical: Several herbicides are available that control diffuse knapweed effectively; Aminopyralid, Clopyralid or 2,4-D.

d. **Timeline of Activities: Provide a specific timeline for each noxious weed management activity. Noxious weed management activities should be planned for the most susceptible time in the plants' life cycle in order to achieve the most effective control. The CDA fact sheets referenced above, will assist in determining the most appropriate timing. All List A and high priority List B will be eradicated before ground disturbance takes place.**

Example
Orange Hawkweed will be sprayed in the rosette growth stage (spring to early summer).
Diffuse knapweed will be dug during spring and fall rosette stage.
Spraying should be during bolting stage and fall rosette stage if present.
Biological control organisms release as recommended by CDA.

e. **Monitoring and Evaluation: Explain how and when monitoring will be conducted, how the effectiveness of applied management treatments will be evaluated, and how the records of activities and evaluations will be kept.**

Example
Photos of all noxious weed areas will be taken from specific locations marked with a metal stake before treatment begins. Determine area (size) of all noxious weed patches. Short-term

evaluations will be made by photo and visual counts after each treatment and long-term success will be measured and recorded each year and compared to management goals.

Additional Resources

Douglas County Environmental Division Invasive Weeds Management Program - Douglas County

Colorado Department of Agriculture – Noxious Weeds
https://ag.colorado.gov/conservation/noxious-weeds

Colorado Parks and Wildlife Noxious Weed Management
https://cpw.state.co.us/aboutus/Pages/RS-NoxiousWeedsSpeciesProfiles.aspx

Colorado State University Small Acreage Management
https://sam.extension.colostate.edu/topics/weeds/

LSC TRANSPORTATION CONSULTANTS, INC.

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

July 15, 2025

Mr. Jerry Richmond
Integrity Land Ventures, LLC
7200 S. Alton Way, Suite C400
Centennial, CO 80112

Re: Pinery Meadows
Updated Noise
Impact Analysis
Douglas County, CO
LSC #210873

Dear Mr. Richmond:

In response to your request, LSC Transportation Consultants, Inc. has prepared this updated analysis of the noise impacts of Parker Road (State Highway 83 (SH 83)) on the proposed Pinery Meadows residential subdivision to be located west of Parker Road (SH 83) and south of North Pinery Parkway in Douglas County. LSC has completed an evaluation of the noise exposure for submittal to Douglas County) in accordance with the *Douglas County 2040 Comprehensive Master Plan* (CMP).

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

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

- **Parker Road (SH 83)** is a six-lane, north/south state highway east of the site. It is classified as a Non-Rural Principal Highway (NR-A) by CDOT. The CDOT Straight Line Diagram is attached for reference. It provides access south to rural Douglas County and eventually to Colorado Springs and north to Parker and southeast metro Denver. The posted speed limit is 55 miles per hour (mph) adjacent to the site. The intersections with N. Pinery Parkway and Scott Avenue are traffic signal controlled.

LAND USE AND ACCESS

The site is planned as a residential development with 96 single-family detached homes and 40 single-family attached homes. Access is proposed to an extension of Pinery Center Boulevard. No direct access is proposed to Parker Road (SH 83). The site plan is shown in Figure 2.

2045 TOTAL TRAFFIC

Figure 2 shows the projected 2045 average weekday and afternoon peak hour traffic volumes and posted speed limits in the site's vicinity. The peak-hour traffic volumes were obtained from the *Pinery Meadows Traffic Impact Analysis* (TIS) by LSC Transportation Consultants, Inc., dated March 7, 2025. A copy of the TIS has been attached. The traffic volumes were assumed to include 2.2% single-unit trucks and 2.4% combination trucks based on information for the segment of SH 83 adjacent to the site obtained from the CDOT website. The noise analysis assumes 85% of the traffic occurs duing the day time hours (7:00 am to 10:00 pm) and 15% of the traffic occurs during the night time hours (10:00 pm to 7:00 am)

NOISE ANALYSIS

LSC used the software program *Traffic Noise Model* Version 3.2 (developed by FHWA) to predict the noise levels on the east side of the development adjacent to SH 83. TNM 3.2 was used instead of the HUD Day/Night Noise Level (DNL) Calculator because it takes into account the proposed grading of the site. The input data for the noise predictions included the 2045 average weekday traffic volumes, the 2045 afternoon peak-hour traffic volumes, roadway geometry, and the topographic elevations. The day-night average sound levels were calculated for the area adjacent to SH 83. The noise analysis inputs are attached.

Day-Night Average Sound Levels

The results of the day-night average sound level analysis were compared to Policy 2-6A.1 from the Douglas County 2040 CMP which requires residential area be located away from areas that exceed an outside noise level of 65 DNL. All of the residential lots are predicted to be outside of the 65 DNL contour zone. The attached exhibit shows the location of the 65 DNL contour line on the site plan.

Conclusions

No noise mitigation should be required as all of the residential lots are predicted to have noise levels less than the 65 DNL threshold set the 2040 Douglas County CMP.

* * *

We trust our findings will assist you in gaining approval of the proposed Pinery Meadows residential subdivision. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By _____
Kirstin D. Ferrin, P.E.,
Senior Transportation Engineer

COLORADO REGISTERED KIRSTIN DAY FERRIN 38417 7-15-25 PROFESSIONAL ENGINEER

KDF/wc

Enclosures: Figures 1 - 2
Exhibit 1
CDOT Data
TNM Input and Output Data
Pinery Meadows Traffic Impact Analysis

G:\Shared drives\Denver Projects 2021-2030\2021\210873-PineryMeadowsNoiseStudy\Report\Pinery Meadows Noise Analysis-071525.wpd

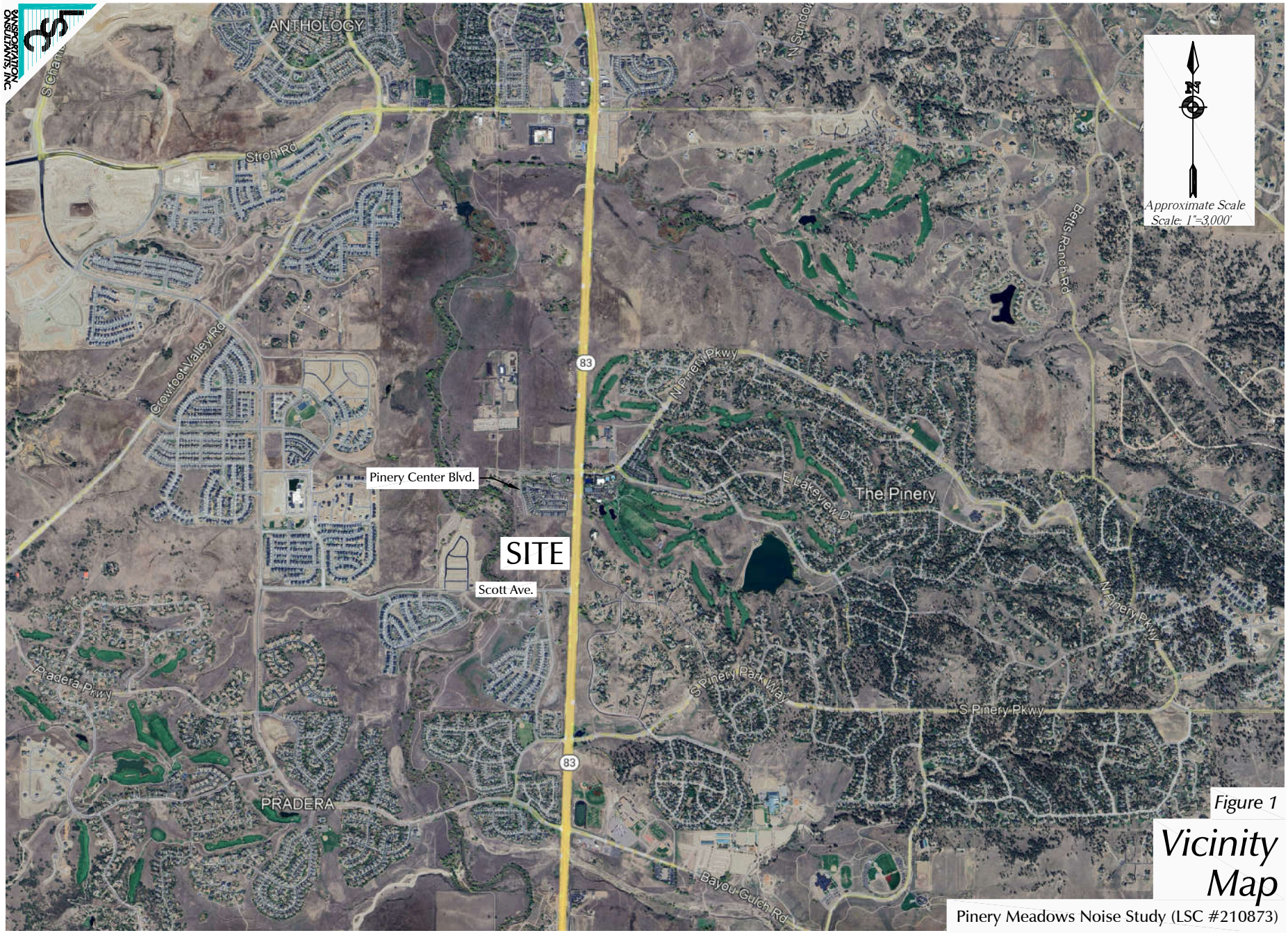


Figure 1

Vicinity Map

Pinery Meadows Noise Study (LSC #210873)

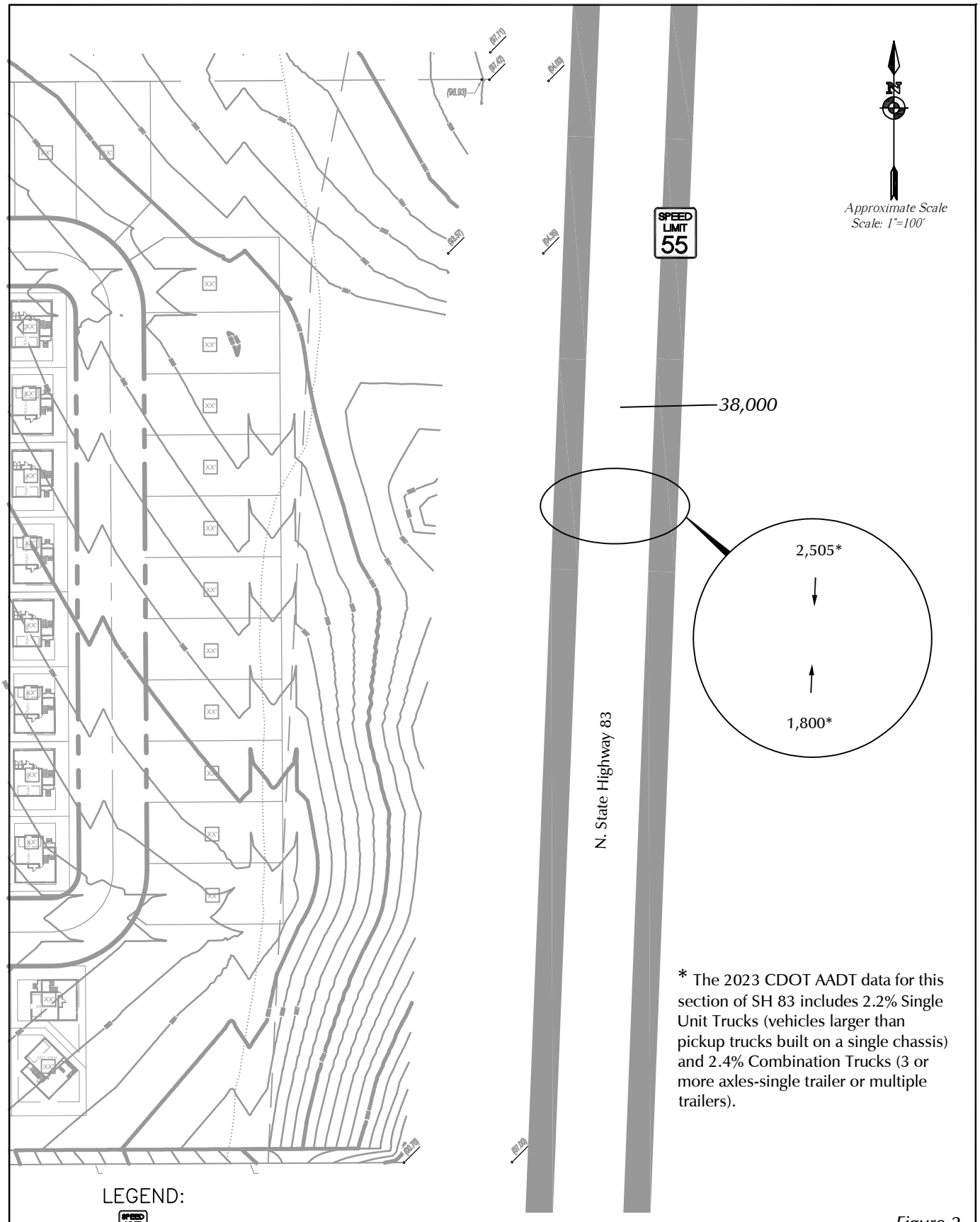


Figure 2

Noise Model Data

Pinery Meadows Noise Study (LSC #210873)

PROPERTY LINE

65 dB DNL

PARKER RD CENTERLINE

N

40 0 40

HORIZONTAL SCALE: 1" = 40'

55 56 57 58 59 60

87.74

PR LOT LINE (TYP)

86.84

86.32

PR BLDG ENVELOPE (TYP)

86.22

85.60

85.38

84.69

84.38

FINISHED GRADE SPOT ELEVATION (TYP)

84.06

83.38

82.95

84.13

84.54

85.17

161.3'
65 dB DNL - PARKER RD CENTERLINE

PROPERTY LINE

65 dB DNL

183.4'
65 DB DNL - PARKER RD CENTERLINE

185.4'
65 DB DNL - PARKER RD CENTERLINE

65 dB DNL

PARKER RD CENTERLINE

PROPERTY LINE

65 66 67 68 69

70 71 72 73 74

70 71 72 73 74

SOUTH PARKER ROAD

ROTH LANG ENGINEERING GROUP LLC

6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

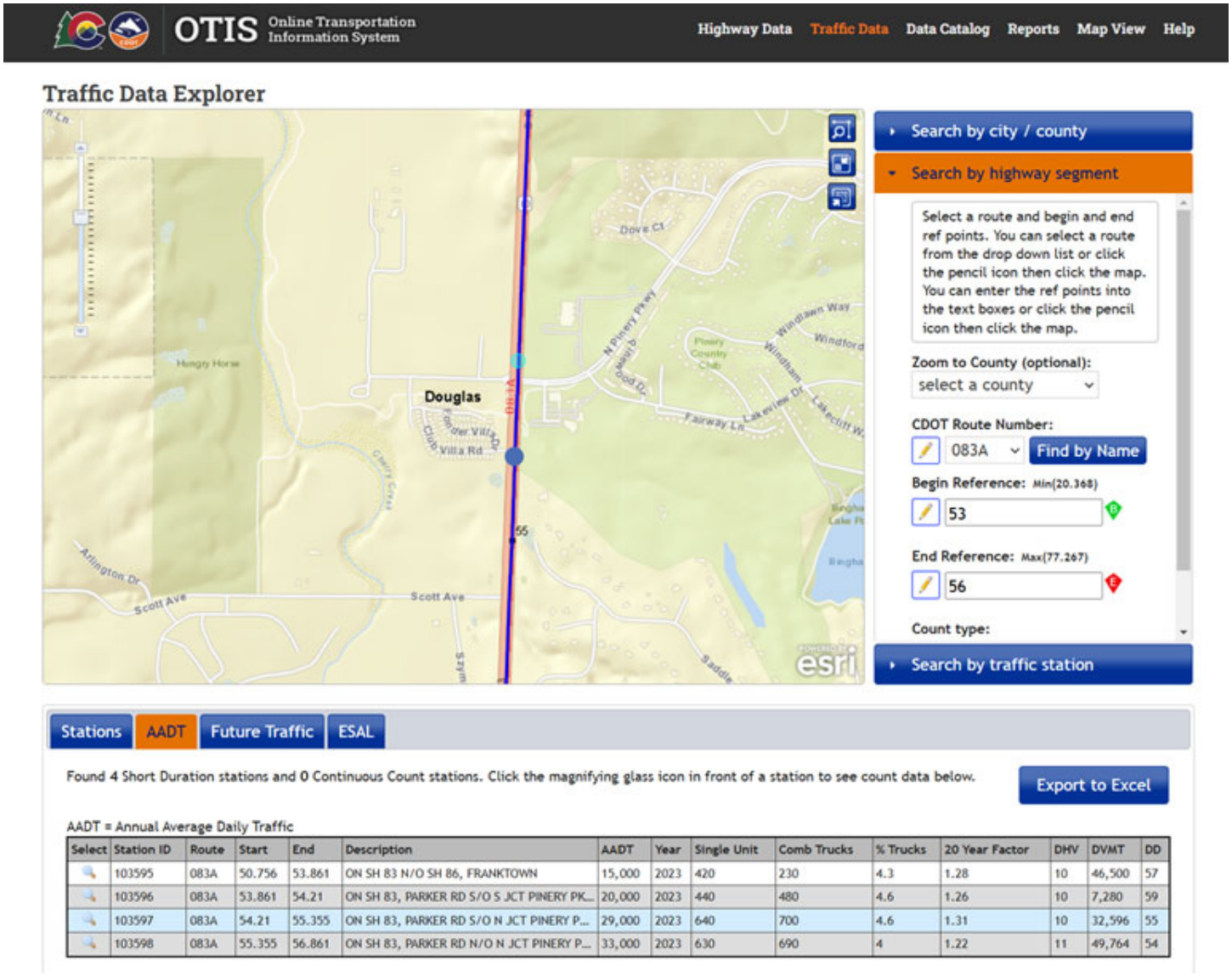
7/11/2025

65 DNL EXHIBIT

SHEET NUMBER:

1

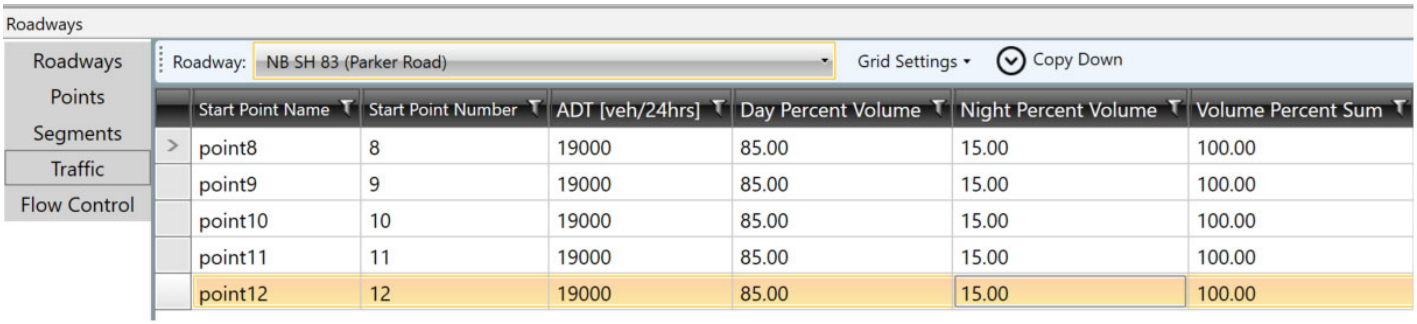
1 of 1



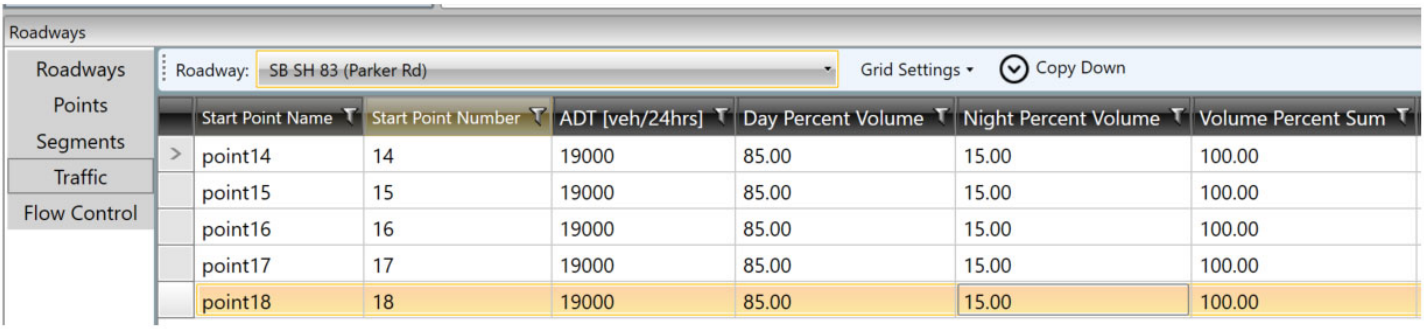
Select	Station ID	Route	Start	End	Description	AADT	Year	Single Unit	Comb Trucks	% Trucks	20 Year Factor	DHV	DVMT	DD
	103595	083A	50.756	53.861	ON SH 83 N/O SH 86, FRANKTOWN	15,000	2023	420	230	4.3	1.28	10	46,500	57
	103596	083A	53.861	54.21	ON SH 83, PARKER RD S/O S JCT PINERY PK...	20,000	2023	440	480	4.6	1.26	10	7,280	59
	103597	083A	54.21	55.355	ON SH 83, PARKER RD S/O N JCT PINERY P...	29,000	2023	640	700	4.6	1.31	10	32,596	55
	103598	083A	55.355	56.861	ON SH 83, PARKER RD N/O N JCT PINERY P...	33,000	2023	630	690	4	1.22	11	49,764	54

REPORT:	**INPUT TRAFFIC FOR TNM VEHICLES (Ldn)**		
TNM VERSION:	3.2.8741.34338	REPORT DATE:	8 July 2025
CALCULATED WITH:	TNM v3.2.8741.34338	CALCULATION DATE:	7/8/2025 2:52:27 PM
CASE:	Day-Night Noise Level Analysis	ORGANIZATION:	LSC
PATH:		ANALYSIS BY:	KDF
CALCULATION SEQUENCE NUMBER:		TNM SERIAL NUMBER:	
		PROJECT/CONTRACT:	Pinery Meadows

Roadway Name	Road Segment			Auto			Medium Truck			Heavy Truck			Bus			Motorcycle		
	Start Point		ADT	D	N	Speed	D	N	Speed	D	N	Speed	D	N	Speed	D	N	Speed
	Name	No.	[Veh/24 hr]	[%]	[%]	[mph]	[%]	[%]	[mph]	[%]	[%]	[mph]	[%]	[%]	[mph]	[%]	[%]	[mph]
NB SH 83 (Parker Road)	point8	8	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0
	point9	9	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0
	point10	10	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0
	point11	11	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0
	point12	12	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0
	point13	13	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0
SB SH 83 (Parker Rd)	point14	14	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0
	point15	15	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0
	point16	16	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0
	point17	17	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0
	point18	18	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0
	point19	19	19000	95.0	95.0	55	2.0	2.0	55	3.0	3.0	55	0.0	0.0	0	0.0	0.0	0



Start Point Name	Start Point Number	ADT [veh/24hrs]	Day Percent Volume	Night Percent Volume	Volume Percent Sum
point8	8	19000	85.00	15.00	100.00
point9	9	19000	85.00	15.00	100.00
point10	10	19000	85.00	15.00	100.00
point11	11	19000	85.00	15.00	100.00
point12	12	19000	85.00	15.00	100.00



Start Point Name	Start Point Number	ADT [veh/24hrs]	Day Percent Volume	Night Percent Volume	Volume Percent Sum
point14	14	19000	85.00	15.00	100.00
point15	15	19000	85.00	15.00	100.00
point16	16	19000	85.00	15.00	100.00
point17	17	19000	85.00	15.00	100.00
point18	18	19000	85.00	15.00	100.00

REPORT: **Sound-level Input: Receivers**

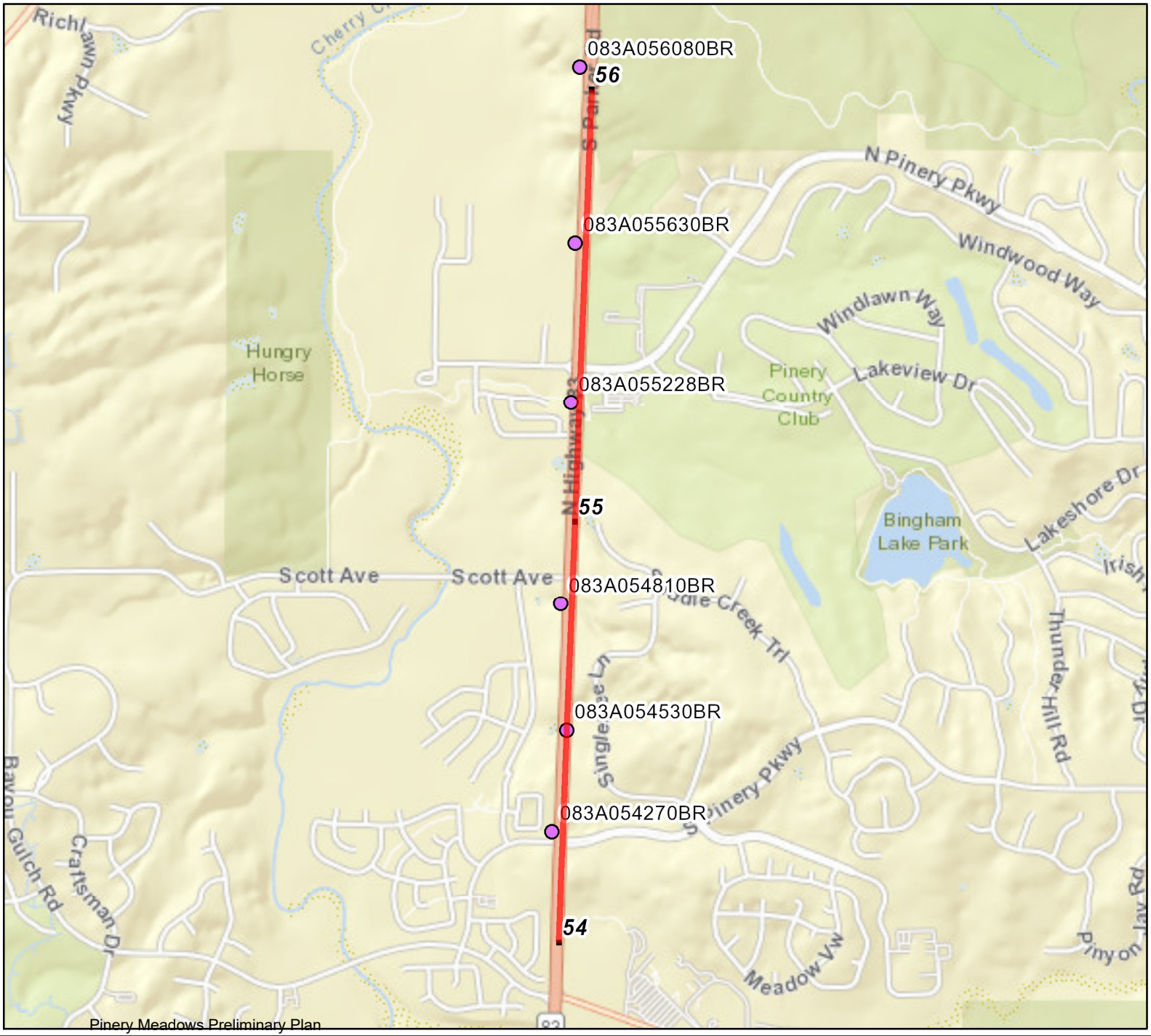
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CALCULATED WITH:	TNM v3.2.8741.34338	CALCULATION DATE:	7/8/2025 2:43:33 PM
CASE:	Day-Night Noise Level Analysis	ORGANIZATION:	LSC
ANALYSIS BY:	KDF	PROJECT/CONTRACT:	Pinery Meadows

Receiver Name	Sequence Number	Nb. R.R.	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.	Notes
			X	Y	Z		Existing Ldn	Absolute Criterion	Relative Criterion	Noise Reduction Goal		
			[ft]	[ft]	[ft]	[ft]	[dBA]	[dBA]	[dBA]	[dBA]		
Receiver1	1	1	3209781.00	1590858.00	5983.25	4.92	---	66	---	8	Y	
Receiver2	2	1	3209781.00	1590894.00	5982.50	4.92	---	66	---	8	Y	
Receiver3	3	1	3209932.00	1590965.00	5984.00	4.92	---	66	---	8	Y	
Receiver4	4	1	3209932.00	1591012.00	5984.00	4.92	---	66	---	8	Y	
Receiver5	5	1	3209932.00	1591073.00	5985.00	4.92	---	66	---	8	Y	
Receiver6	6	1	3209932.00	1591134.00	5986.00	4.92	---	66	---	8	Y	
Receiver7	7	1	3209931.00	1591195.00	5987.00	4.92	---	66	---	8	Y	
Receiver8	8	1	3209931.00	1591257.00	5988.00	4.92	---	66	---	8	Y	
Receiver9	9	1	3209930.00	1591318.00	5989.00	4.92	---	66	---	8	Y	
Receiver10	10	1	3209930.00	1591431.00	5990.00	4.92	---	66	---	8	Y	
Receiver11	11	1	3209929.00	1591470.00	5991.00	4.92	---	66	---	8		
Receiver12	12	1	3209891.00	1591485.00	5991.00	4.92	---	66	---	8		
Receiver13	13	1	3209891.00	1591524.00	5992.00	4.92	---	66	---	8	Y	
Receiver14	14	1	3209890.00	1591564.00	5993.00	4.92	---	66	---	8	Y	
Receiver15	15	1	3209891.00	1591585.00	5993.25	4.92	---	66	---	8	Y	

REPORT:	**INPUT ROADWAYS**		
TNM VERSION:	3.2.8741.34338	REPORT DATE:	8 July 2025
CALCULATED WITH:	TNM v3.2.8741.34338	CALCULATION DATE:	7/8/2025 2:52:27 PM
CASE:	Day-Night Noise Level Analysis	ORGANIZATION:	LSC
ANALYSIS BY:	KDF	PROJECT/CONTRACT:	Pinery Meadows

Roadway Name	Roadway Notes	Road Segment Start Point		Coordinates (pavement)			Width	Point Notes	Road Segment		
		Name	Number	X	Y	Z			Road Category	Pavement Type	On Structure
				[ft]	[ft]	[ft]	[ft]				
NB SH 83 (Parker Road)		point8	8	3210191.00	1590718.00	6007.00	36.00		Mainline	Average	No
		point9	9	3210211.00	1591224.00	6006.00	36.00		Mainline	Average	No
		point10	10	3210217.00	1591380.00	6005.00	36.00		Mainline	Average	No
		point11	11	3210223.00	1591542.00	6004.00	36.00		Mainline	Average	No
		point12	12	3210236.00	1591869.00	6004.00	36.00		Mainline	Average	No
		point13	13	3210245.00	1592125.00	6003.00	36.00		Mainline	Average	No
SB SH 83 (Parker Rd)		point14	14	3210175.00	1592129.00	6003.00	36.00		Mainline	Average	No
		point15	15	3210165.00	1591872.00	6004.00	36.00		Mainline	Average	No
		point16	16	3210151.00	1591544.00	6004.00	36.00		Mainline	Average	No
		point17	17	3210145.00	1591380.00	6005.00	36.00		Mainline	Average	No
		point18	18	3210139.00	1591226.00	6006.00	36.00		Mainline	Average	No
		point19	19	3210119.00	1590721.00	6007.00	36.00		Mainline	Average	No

Route 083A From 54 to 56



Legend

- Route
- Milepoint

Structures

- Major Structure
- Minor Structure

Created:

Date: 3/4/2025

Time: 12:05:53 PM

0 0.15 0.3 0.45 0.6

Miles

N W E S

CDOT

The information contained in this map is based on the most currently available data and has been checked for accuracy. CDOT does not guarantee the accuracy of any information presented, is not liable in any respect for any errors or omissions, and is not responsible for determining "fitness for use".



CLASSIFICATION

Access Control	NR-A: Non-Rural Principal Highway

SAFETY

Primary Speed Limit	55

TRAFFIC

AADT	20000	29000	33000	41000
V/C Ratio	0.53	0.50	0.61	0.68
Year 20 Factor	1.26	1.31	1.22	

It may appear that information is missing from the straight line diagram. If so, reduce the number of miles/page and re-submit the request.

LSC TRANSPORTATION CONSULTANTS, INC.

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

March 7, 2025

Mr. Jerry Richmond
Integrity Land Ventures, LLC
7200 S. Alton Way, Suite C400
Centennial, CO 80112

Re: Pinery Meadows
Douglas County, CO
LSC #210872

Dear Mr. Richmond:

In response to your request, LSC Transportation Consultants, Inc. has prepared this Traffic Impact Analysis for the proposed Pinery Meadows development in Douglas County, Colorado. The site was previously studied in the June 3, 2022 *Parker Road & Scott Road Traffic Impact Analysis* by LSC. As shown on Figure 1, the site is located west of SH 83 (S. Parker Road) and north of Scott Avenue.

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; the assignment of the projected traffic volumes to the area roadways; the projected long-term background and resulting total traffic volumes on the area roadways; the site's projected traffic impacts; and any recommended roadway improvements needed to mitigate the growth in background traffic or from the site's traffic impacts.

PROPOSED SITE LAND USE AND ACCESS

The site is proposed to include about 96 single-family detached dwelling units and about 40 single-family attached dwelling units. Access is proposed north to Pinery Parkway and south to Scott Avenue by an extension of Pinery Center Boulevard. The conceptual site plan is shown 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.

- **SH 83 (S. Parker Road)** is a north-south, six-lane state highway east of the site. It is classified by CDOT as NR-A (Non-Rural Principal Highway). The CDOT Straight Line Diagram is attached for reference. The intersections with N. Pinery Parkway and Scott Avenue are signalized with auxiliary turn lanes. The posted speed limit in the vicinity of the site is 55 mph.

- **N. Pinery Parkway** is an east-west four-lane collector roadway north of the site. The intersection with SH 83 (Parker Road) is signalized with auxiliary turn lanes and the intersection with Pinery Center Boulevard (Intersection #1) is planned to be signalized with auxiliary turn lanes as is Intersection #2. The posted speed limit in the vicinity of the site is 40 mph but reduces to 35 mph at SH 83 (S. Parker Road).

- **Pinery Center Boulevard** is a north-south, two-lane collector roadway northwest of the site. The intersection with N. Pinery Parkway is planned to be signalized with auxiliary turn lanes. Pinery Center Boulevard is planned to be connected between N. Pinery Parkway and Scott Road with development of the site. The posted speed limit in the vicinity of the site is 25 mph.

- **Scott Avenue** is an east-west, two-lane collector roadway south of the site. The intersection with SH 83 (Parker Road) is signalized with auxiliary turn lanes. The posted speed limit in the vicinity of the site is 30 mph.

- **Interlocken Street** is a north-south, two-lane collector roadway south of the site. The intersection with Scott Avenue is stop-sign controlled. The posted speed limit in the vicinity of the site is 30 mph.

Existing Traffic

Figure 3 shows the existing peak-hour and daily traffic volumes, existing lane geometries, and traffic controls in the site's vicinity on a typical weekday. The traffic volumes are based on the attached traffic counts conducted by Counter Measures, Inc. in February, 2025.

2028 AND 2045 BACKGROUND TRAFFIC

Figure 4 shows the estimated 2028 background traffic, lane geometry and traffic controls. It assumes an annual growth rate of 1.36 percent on SH 83 (Parker Road) based on the CDOT 20-year factor of 1.31 from the attached Straight Line Diagram. An annual growth rate of 1.5% was assumed on Scott Avenue. The growth on Pinery Parkway from Intersections #1 to #3 assumes one half development of the large Pinery West project proposed to the north. Figure 4 also shows the recommended lane geometry and traffic control.

Figure 5 shows the estimated 2045 background traffic, lane geometry and traffic controls based on the assumptions above with full buildout of the large Pinery West project proposed to the north. Figure 4 also shows the recommended lane geometry and traffic control.

EXISTING, 2028, AND 2045 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 through 5 were analyzed to determine the existing, 2028, and 2045 background levels of service using Synchro. Table 1 shows the level of service analysis results. The level of service reports are attached.

1. **N. Pinery Parkway/Pinery Center Boulevard:** This intersection is expected to be signalized by the Pinery West development to the north and operate at an overall LOS "A" during the morning peak-hour and LOS "B" during the afternoon peak-hour in 2028 and at an overall LOS "B" during both peak-hours in 2045. The site's impact to the intersection is minimal compared to Pinery West.

2. **N. Pinery Parkway/Pinery Peak Place:** All movements at this unsignalized intersection currently operate at LOS "A". This intersection is expected to be signalized by the Pinery West development to the north by 2028 and operate at an overall LOS "B" during both morning and afternoon peak-hours through 2045. The site's impact to the intersection is minimal compared to Pinery West.

3. **SH 83 (Parker Road)/N. Pinery Parkway:** This signalized intersection currently operates at an overall LOS "D" during the morning peak-hour and LOS "C" during the afternoon peak-hour and is expected to operate at an overall LOS "D" or better during both peak-hours through 2045 with the planned improvements.

4. **Scott Avenue/Interlocken Street/North Pinery Center:** All movements at this unsignalized intersection currently operate at LOS "B" or better during both morning and afternoon peak-hours and are expected to operate at LOS "C" or better through 2045.

5. **SH 83 (Parker Road)/Scott Avenue:** This signalized intersection currently operates at an overall LOS "B" during the morning peak-hour and LOS "A" during the afternoon peak-hour and is expected to operate at an overall LOS "B" or better during both peak-hours through 2045.

6. **N. Pinery Center/North Site Access:** This intersection was analyzed only in the total traffic scenarios.

7. **N. Pinery Center/South Site Access:** This intersection was analyzed only in the total traffic scenarios.

TRIP GENERATION

Table 2 shows the estimated average weekday, morning peak-hour, and afternoon peak-hour trip generation for the proposed land use based on the rates from *Trip Generation, 11th Edition, 2021* by the Institute of Transportation Engineers (ITE).

The site is projected to generate about 1,193 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 22 vehicles would enter and about 64 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 70 vehicles would enter and about 42 vehicles would exit.

DIRECTIONAL DISTRIBUTION

Figure 6 shows the estimated directional distribution of the 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 2028 assignment of site-generated traffic volumes based on the trip generation estimate (from Table 2) and the 2028 directional distribution shown in Figure 6.

Figure 7b shows the estimated 2045 assignment of site-generated traffic volumes based on the trip generation estimate (from Table 2) and the 2045 directional distribution shown in Figure 6.

2028 AND 2045 TOTAL TRAFFIC

Figure 8 shows the estimated 2028 total traffic which is the sum of the 2028 background traffic volumes (from Figure 4) and the 2028 site-generated traffic volumes (from Figure 7a). Figure 8 also shows the assumed 2028 lane geometry and traffic control.

Figure 9 shows the estimated 2045 total traffic which is the sum of the 2045 background traffic volumes (from Figure 5) and the 2045 site-generated traffic volumes (from Figure 7b). Figure 9 also shows the assumed 2045 lane geometry and traffic control.

PROJECTED LEVELS OF SERVICE

The intersections in Figures 8 and 9 were analyzed to determine the 2028 and 2045 total levels of service. Table 1 shows the level of service analysis results. The level of service reports are attached.

1. **N. Pinery Parkway/Pinery Center Boulevard:** This signalized intersection is expected to operate at an overall LOS "B" during both morning and afternoon peak-hours through 2045.

2. **N. Pinery Parkway/Pinery Peak Place:** This signalized intersection is expected to operate at an overall LOS "B" during both morning and afternoon peak-hours through 2045.

3. **SH 83 (Parker Road)/N. Pinery Parkway:** This signalized intersection is expected to operate at an overall LOS "D" or better during both morning and afternoon peak-hours through 2045.

4. **Scott Avenue/Interlocken Street/North Pinery Center:** All movements at this unsignalized intersection are expected to operate at LOS "C" or better during both morning and afternoon peak-hours through 2045.

5. **SH 83 (Parker Road)/Scott Avenue:** This signalized intersection is expected to operate at an overall LOS "B" or better during both morning and afternoon peak-hours through 2045.

6. **N. Pinery Center/North Site Access:** All movements at this unsignalized intersection are expected to operate at LOS "A" during both morning and afternoon peak-hours through 2045.

7. **N. Pinery Center/South Site Access:** All movements at this unsignalized intersection are expected to operate at LOS "A" during both morning and afternoon peak-hours through 2045.

95TH PERCENTILE QUEUE LENGTHS

Table 3 shows the estimated 95th percentile queue lengths for the signalized intersections by 2045. It also includes the existing turn lane lengths. The northern site access intersection (#6) is also included in the queuing table to show the expected westbound approach to Pinery Center Boulevard is expected to have a 95th percentile queue length of 0.1 vehicles. This suggests there will typically be no queued vehicles and when queuing occurs, it will likely be only one vehicle in the queue. This shows the proposed driveways will not likely be blocked by queuing - particularly if the westernmost driveway is located on the east side of the lot frontage.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

1. The site is projected to generate about 1,193 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 22 vehicles would enter and about 64 vehicles would exit the site. During the afternoon peak-hour, about 70 vehicles would enter and about 42 vehicles would exit.

Projected Levels of Service

2. All of the intersections analyzed are expected to operate at LOS "D" or better during both morning and afternoon peak-hours through 2045 with the planned and recommended improvements.

Conclusions

3. The impact of the site can be accommodated by the existing and planned roadway improvements with the following recommended improvements.

Recommendations

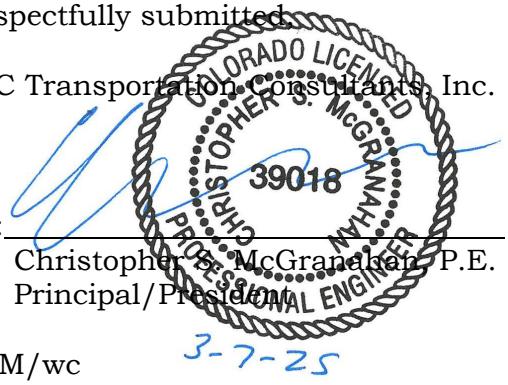
4. The recommended improvements and details are shown in Figures 4, 5, and 8. The applicant will work with the County to develop a cost sharing agreement for the construction of Pinery Center Boulevard.

* * * * *

We trust this information will assist you in planning for the proposed Pinery Meadows development.

Respectfully submitted,

LSC Transportation Consultants, Inc.



By: _____
Christopher S. McGranahan, P.E.
Principal/President

CSM/wc

Enclosures: Tables 1 - 3
Figures 1 - 9
SH 83 SLD
Level of Service Definitions
Level of Service Reports
Queuing Reports

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Table 1 (Page 1 of 2)
Intersection Levels of Service Analysis
Pinery Meadows
Douglas County, CO
LSC #210872; March, 2025

Intersection Location	Traffic Control	Existing Level of Service AM	Existing Level of Service PM	2028 Background Level of Service AM	2028 Background Level of Service PM	2028 Total Traffic Level of Service AM	2028 Total Traffic Level of Service PM	2045 Background Level of Service AM	2045 Background Level of Service PM	2045 Total Traffic Level of Service AM	2045 Total Traffic Level of Service PM
1) N. Pinery Parkway/Pinery Center Boulevard	Signalized										
EB Left		--	--	A	A	A	A	A	A	A	A
EB Through		--	--	A	A	A	B	A	B	A	B
EB Right		--	--	A	A	A	A	A	A	A	B
WB Left		--	--	A	A	A	A	A	A	A	A
WB Through		--	--	A	A	A	A	B	B	B	B
WB Right		--	--	A	A	A	A	A	B	A	B
NB Left		--	--	B	B	B	B	B	B	B	B
NB Through/Right		--	--	B	B	B	B	B	B	B	B
SB Left		--	--	B	B	B	B	B	B	B	B
SB Through/Right		--	--	B	B	B	B	B	B	B	B
Entire Intersection Delay (sec /veh)		--	--	9.6	11.4	10.2	12.2	11.0	12.5	11.2	13.1
Entire Intersection LOS		--	--	A	B	B	B	B	B	B	B
2) N. Pinery Parkway/Pinery Peak Place	TWSC										
NB Approach		A	A	--	--	--	--	--	--	--	--
WB Left		A	A	--	--	--	--	--	--	--	--
Critical Movement Delay		8.4	8.4	--	--	--	--	--	--	--	--
	Signalized										
EB Left		--	--	B	B	B	B	B	B	B	B
EB Through		--	--	B	B	B	B	B	B	B	B
EB Right		--	--	B	B	B	B	B	B	B	B
WB Left		--	--	B	B	B	B	B	B	B	B
WB Through		--	--	B	B	B	B	B	B	B	B
WB Right		--	--	B	B	B	B	B	B	B	B
NB Approach		--	--	A	A	A	A	B	B	B	B
SB Left		--	--	A	B	A	B	B	B	B	B
SB Through/Right		--	--	A	A	A	A	A	B	B	B
Entire Intersection Delay (sec /veh)		--	--	13.2	13.3	13.6	13.5	15.1	15.4	15.1	15.5
Entire Intersection LOS		--	--	B	B	B	B	B	B	B	B
3) SH 83 (Parker Road)/N. Pinery Parkway	Signalized										
EB Left		E	E	E	E	E	E	E	E	E	E
EB Through		E	D	D	D	D	D	D	D	D	D
EB Right		A	A	A	A	A	A	A	A	A	A
WB Left		--	--	--	--	--	--	D	D	D	D
WB Left/Through or Through		D	D	E	E	E	E	E	E	E	E
WB Right		F	F	A	A	A	A	A	A	A	A
NB Left		E	B	E	E	E	E	E	E	E	E
NB Through/Right		C	C	C	C	C	C	D	C	D	C
SB Left		E	E	E	E	E	E	E	E	E	E
SB Through		B	B	B	C	B	C	C	D	C	D
SB Right		A	A	A	A	A	A	A	A	A	A
Entire Intersection Delay (sec /veh)		42.8	34.3	27.4	34.5	29.8	35.6	35.2	45.1	36.5	45.7
Entire Intersection LOS		D	C	C	C	C	D	D	D	D	D

Table 1 (Page 2 of 2)
Intersection Levels of Service Analysis
Pinery Meadows
Douglas County, CO
LSC #210872; March, 2025

Intersection Location	Traffic Control	Existing		2028 Background		2028 Total Traffic		2045 Background		2045 Total Traffic	
		Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM
4) Scott Avenue/Interlocken Street/N. Pinery Ct.	TWSC										
NB Left		B	B	C	B	C	C	C	C	C	C
NB Right		A	A	B	B	B	B	B	B	B	B
EB Left		--	--	A	A	A	A	A	A	A	A
WB Left		A	A	A	A	A	A	A	A	A	A
SB Left		--	--	C	C	C	C	C	C	C	C
SB Through/Right		--	--	B	B	B	B	B	B	B	B
Critical Movement Delay		13.7	12.6	18.3	15.0	19.0	15.5	20.5	17.9	21.1	18.5
5) SH 83 (Parker Road)/Scott Avenue	Signalized										
EB Left		D	D	D	D	D	D	D	D	D	D
EB Right		D	D	D	D	D	D	D	D	D	D
NB Left		E	E	E	E	E	E	E	E	E	E
NB Through		A	A	A	A	A	A	A	A	A	A
SB Through		A	A	A	A	A	A	A	B	A	B
SB Right		A	A	A	A	A	A	A	A	A	A
Entire Intersection Delay (sec /veh)		10.7	8.6	11.4	9.5	11.6	9.8	13.1	12.0	13.2	12.3
Entire Intersection LOS		B	A	B	A	B	A	B	B	B	B
6) N. Pinery Parkway/North Site Access	TWSC										
WB Approach		--	--	--	--	A	A	--	--	A	A
SB Left/Through		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	8.7	8.6	--	--	8.8	8.7
7) N. Pinery Parkway/South Site Access	TWSC										
NB Approach		--	--	--	--	A	A	--	--	A	A
EB Approach		--	--	--	--	A	A	--	--	A	A
WB Approach		--	--	--	--	A	A	--	--	A	A
SB Approach		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	8.7	8.8	--	--	9.0	9.0

Table 2
ESTIMATED TRAFFIC GENERATION
Pinery Meadows
Douglas County, CO
LSC #210872; March, 2025

Trip Generating Category	Quantity	Trip Generation Rates [1] Average Weekday	AM Peak-Hour In	AM Peak-Hour Out	PM Peak-Hour In	PM Peak-Hour Out	Total Trips Generated Average Weekday	AM Peak-Hour In	AM Peak-Hour Out	PM Peak-Hour In	PM Peak-Hour Out
Currently Proposed Land Use											
Single Family Detached Housing [2]	96 DU [3]	9.43	0.175	0.525	0.592	0.348	905	17	50	57	33
Single Family Attached Housing [4]	40 DU [3]	7.20	0.120	0.360	0.336	0.234	288	5	14	13	9
						Total =	**1,193**	**22**	**64**	**70**	**42**

Notes:
(1) Source: *Trip Generation*, Institute of Transportation Engineers, 11th Edition, 2021.
(2) ITE Land Use No. 210 - Single-Family Detached Housing
(3) DU = dwelling units
(4) ITE Land Use No. 215 - Single-Family Attached Housing

Table 3
95th Percentile Queue Lengths
Pinery Meadows
Douglas County, CO
LSC #210872; March, 2025

Intersection No. & Location	Existing Turn Lane Length (feet)	Proposed Turn Lane Length (feet)	2045 Background Traffic 95th Percentile Queue Length (feet) AM	2045 Background Traffic 95th Percentile Queue Length (feet) PM	2045 Total Traffic 95th Percentile Queue Length (feet) AM	2045 Total Traffic 95th Percentile Queue Length (feet) PM
1) N. Pinery Parkway/Pinery Center Boulevard						
EB Left	--	By Pinery West	26	66	27	68
EB Through	--	--	44	116	46	120
EB Right	--	By Others	5	2	7	12
WB Left	125	125	8	16	12	31
WB Through	--	--	98	102	101	103
WB Right	125	125	15	27	15	27
NB Left	60	60	43	35	52	42
NB Through/Right	--	--	31	39	38	46
SB Left	--	By Pinery West	43	112	43	114
SB Through/Right	--	--	31	69	31	69
2) N. Pinery Parkway/Pinery Peak Place						
EB Left	80	80	24	36	24	36
EB Through	--	--	57	140	65	145
EB Right	80	80	20	15	20	15
WB Left	160	160	31	25	31	25
WB Through	--	--	132	94	135	104
WB Right	110	110	27	37	27	37
NB Approach	--	--	43	55	43	55
SB Left	--	By Pinery West	42	143	43	145
SB Through/Right	--	--	17	31	17	31
3) SH 83 (Parker Road)/N. Pinery Parkway						
EB Left	1 @ 225; 1 @ 500	1 @ 225; 1 @ 500	126	275	164	296
EB Through	--	--	74	211	74	211
EB Right	110	110	0	0	0	0
WB Left	--	By Others	85	127	85	127
WB Left/Through or Through	--	--	158	133	158	133
WB Right	Lane Drop	Lane Drop	337	302	337	302
NB Left	315	2 @ 380 (Pinery West)	269	186	269	186
NB Through/Right	--	--	969	430	969	430
SB Left	2 @ 675	2 @ 675	107	251	107	251
SB Through	--	--	340	817	340	817
SB Right	690	690	0	0	0	0
5) SH 83 (Parker Road)/Scott Avenue						
EB Left	2 @ 350	2 @ 350	164	103	164	103
EB Right	340	340	44	36	46	38
NB Left	300	300	107	74	109	83
NB Through	--	--	501	159	501	159
SB Through	--	--	79	m230	79	m230
SB Right	390	390	6	m31	6	m30
6) Pinery Center Boulevard/Northern Site Access						
WB Approach	--	--	--	--	<25	<25
SB Approach	--	--	--	--	<25	<25

m = metered by adjacent intersections

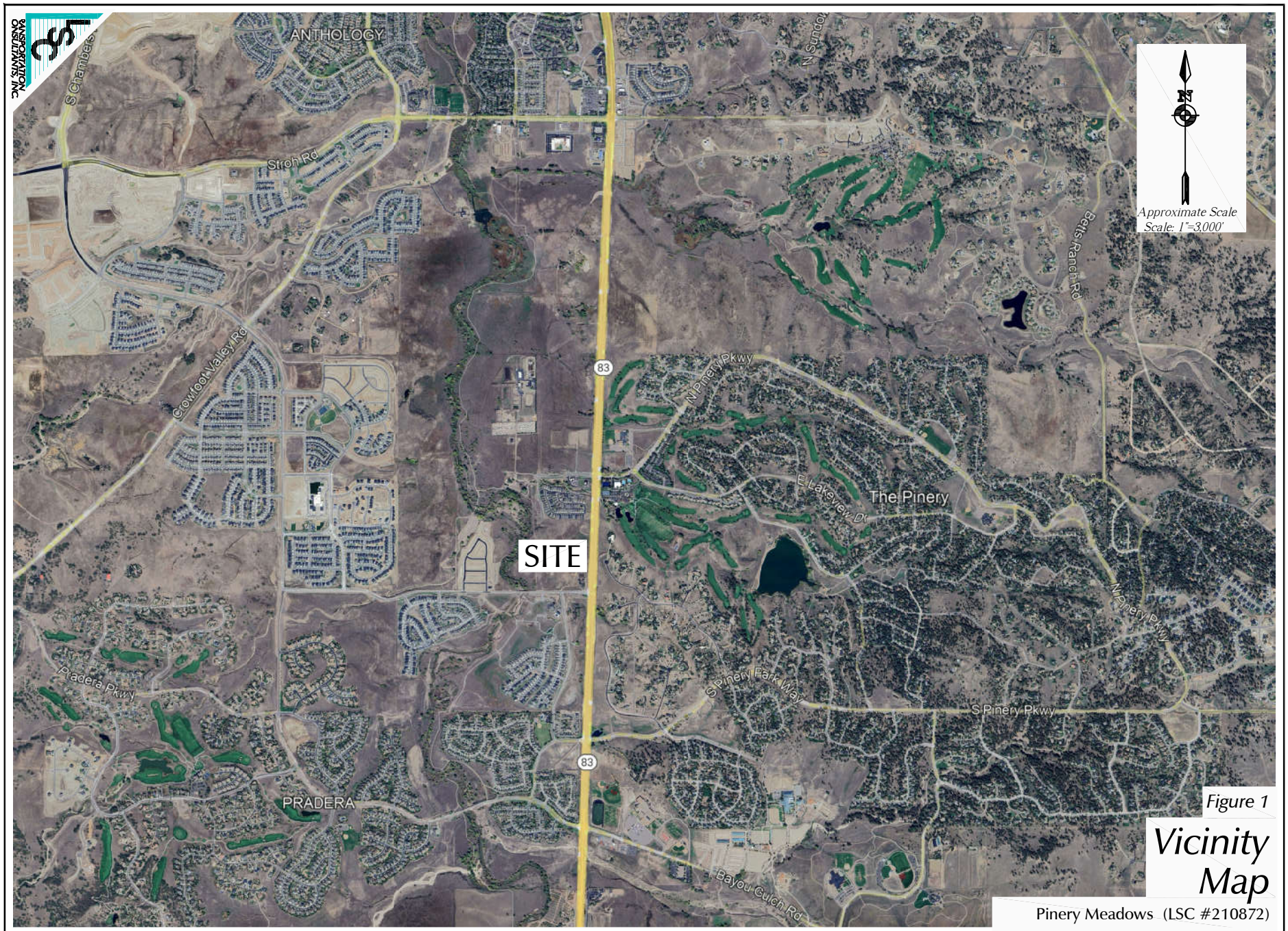
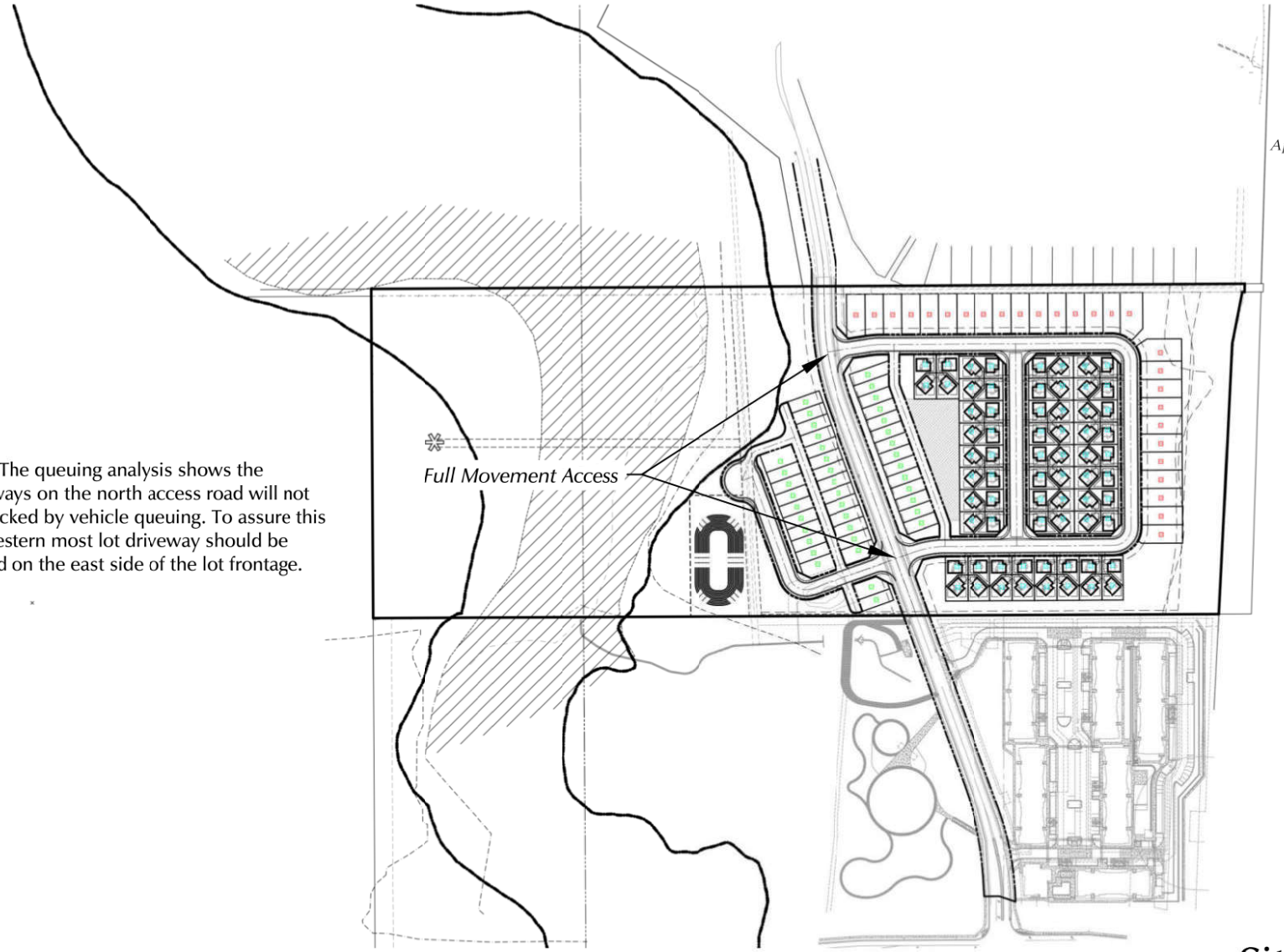


Figure 1

Vicinity Map

Pinery Meadows (LSC #210872)



Note: The queuing analysis shows the driveways on the north access road will not be blocked by vehicle queuing. To assure this the western most lot driveway should be located on the east side of the lot frontage.

Figure 2

Site Plan

Pinery Meadows (LSC #210872)

LEGEND:

= Stop Sign

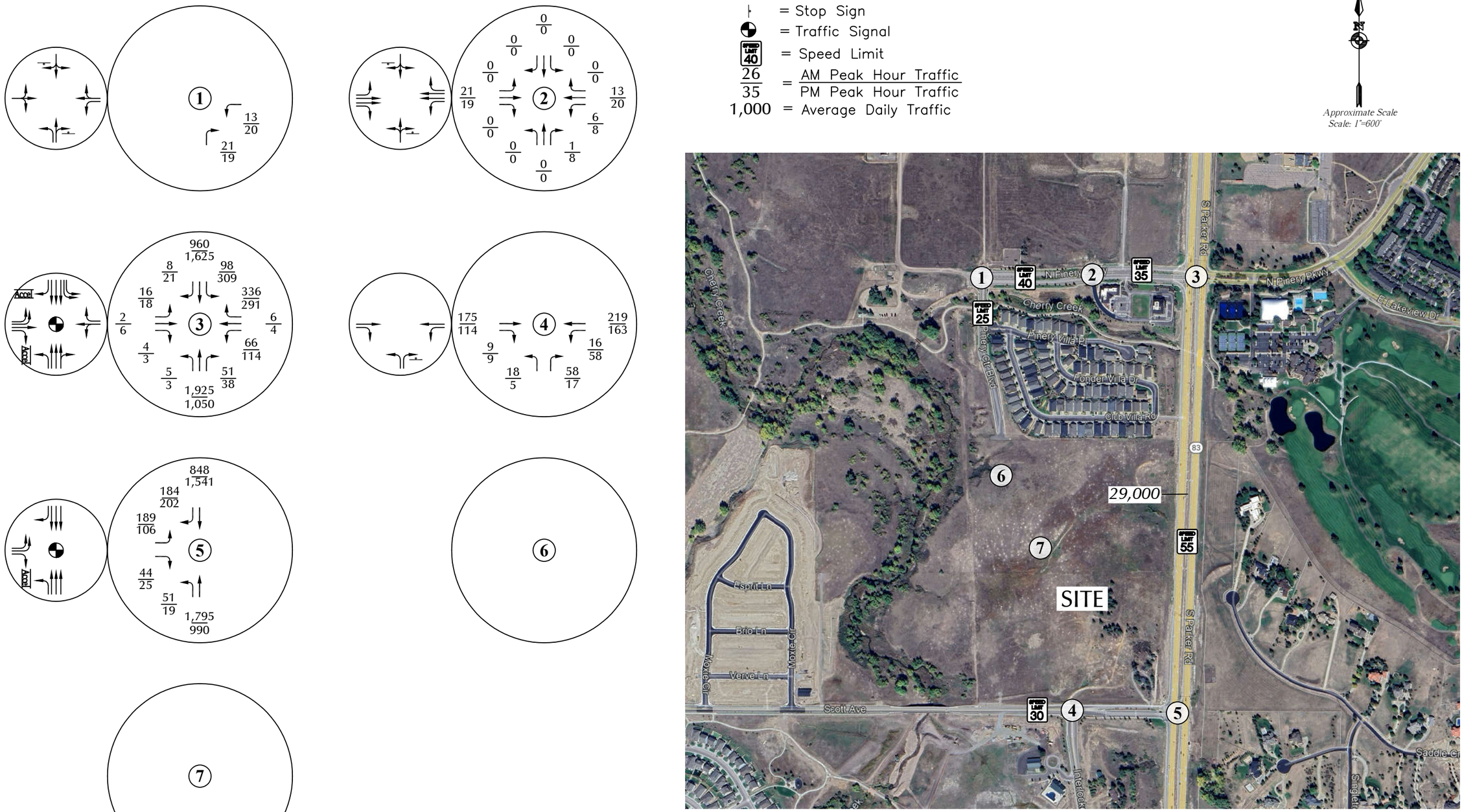
= Traffic Signal

= Speed Limit

$\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=600'

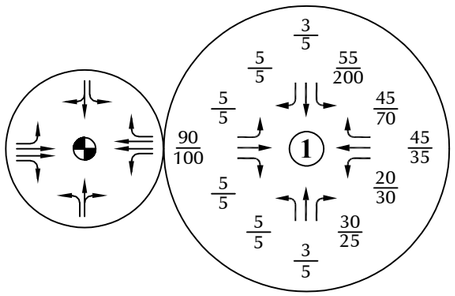


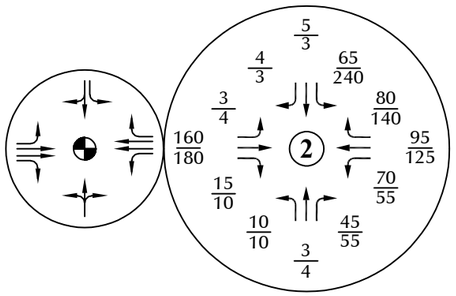
Note: Daily traffic volumes on SH 83 (S. Parker Road) is based on the attached CDOT Straight Line Diagram.

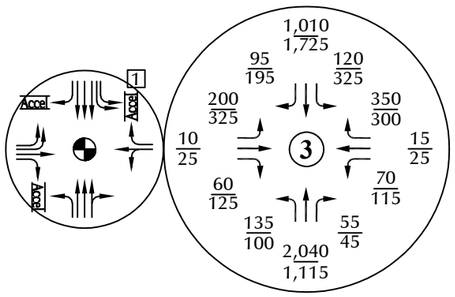
Figure 3

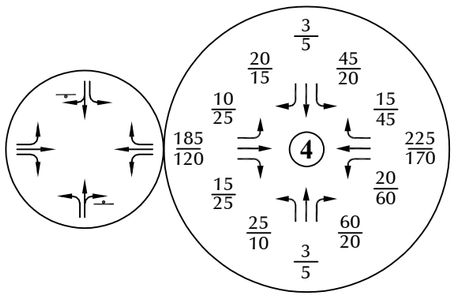
Existing Traffic, Lane Geometry and Traffic Control

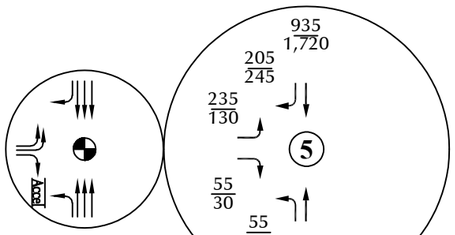
Pinery Meadows (LSC #210872)

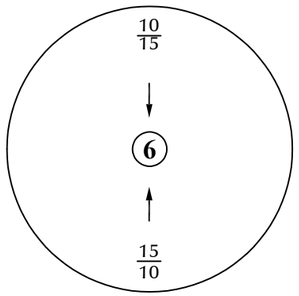


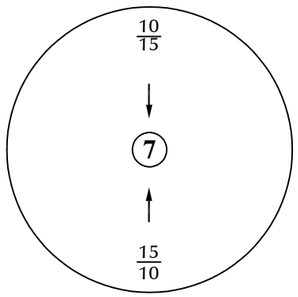












Recommended Improvements:

1 WB to NB Acceleration lane to mitigate poor existing levels of service (by others).

LEGEND:

= Stop Sign

= Traffic Signal

26/35 = AM Peak Hour Traffic / PM Peak Hour Traffic

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=600'

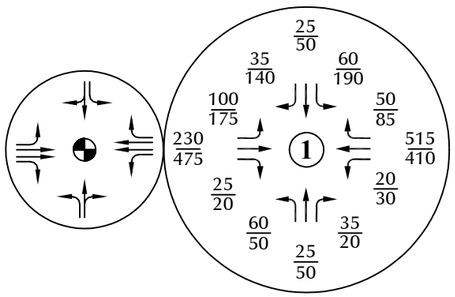


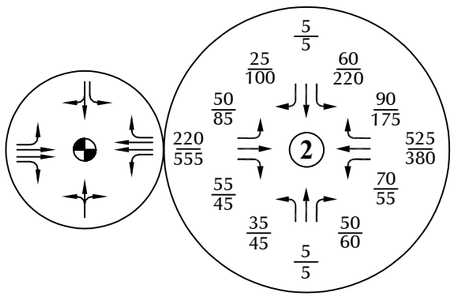
Notes:
1. An annual growth rate of 1.36% was assumed on SH 83 (Parker Road) based on the CDOT 20-year factor of 1.31 from the attached Straight Line Diagram.
2. An annual growth rate of 1.5% was assumed on Scott Avenue. The growth on Pinery Parkway from Intersections #1 to #3 assumes one half development of the Pinery West project proposed to the north.

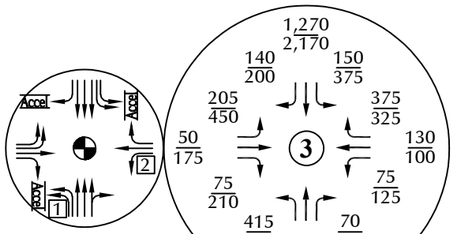
Figure 4

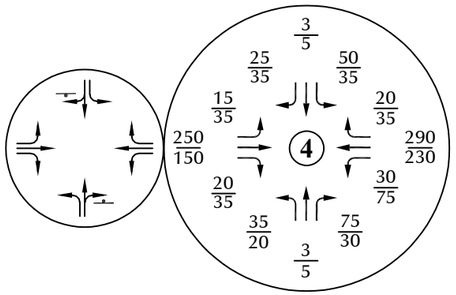
Year 2028 Background Traffic, Lane Geometry and Traffic Control

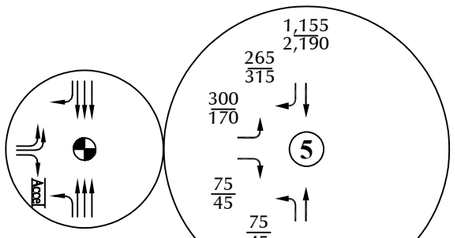
Pinery Meadows (LSC #210872)

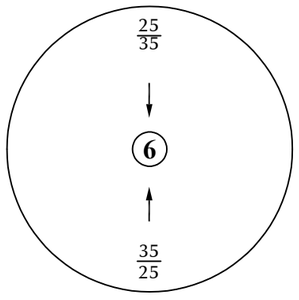


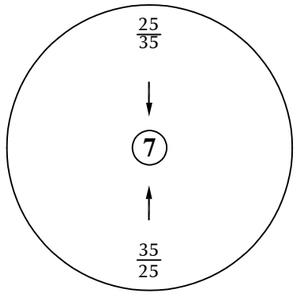












Recommended Improvements:
1 NB LT = Add second lane by Pinery west (by Pinery West).
2 WB LT = Add lane to mitigate impact of Pinery West and growth in background traffic (by Pinery West).

LEGEND:
= Stop Sign
= Traffic Signal
26/35 = AM Peak Hour Traffic / PM Peak Hour Traffic
1,000 = Average Daily Traffic

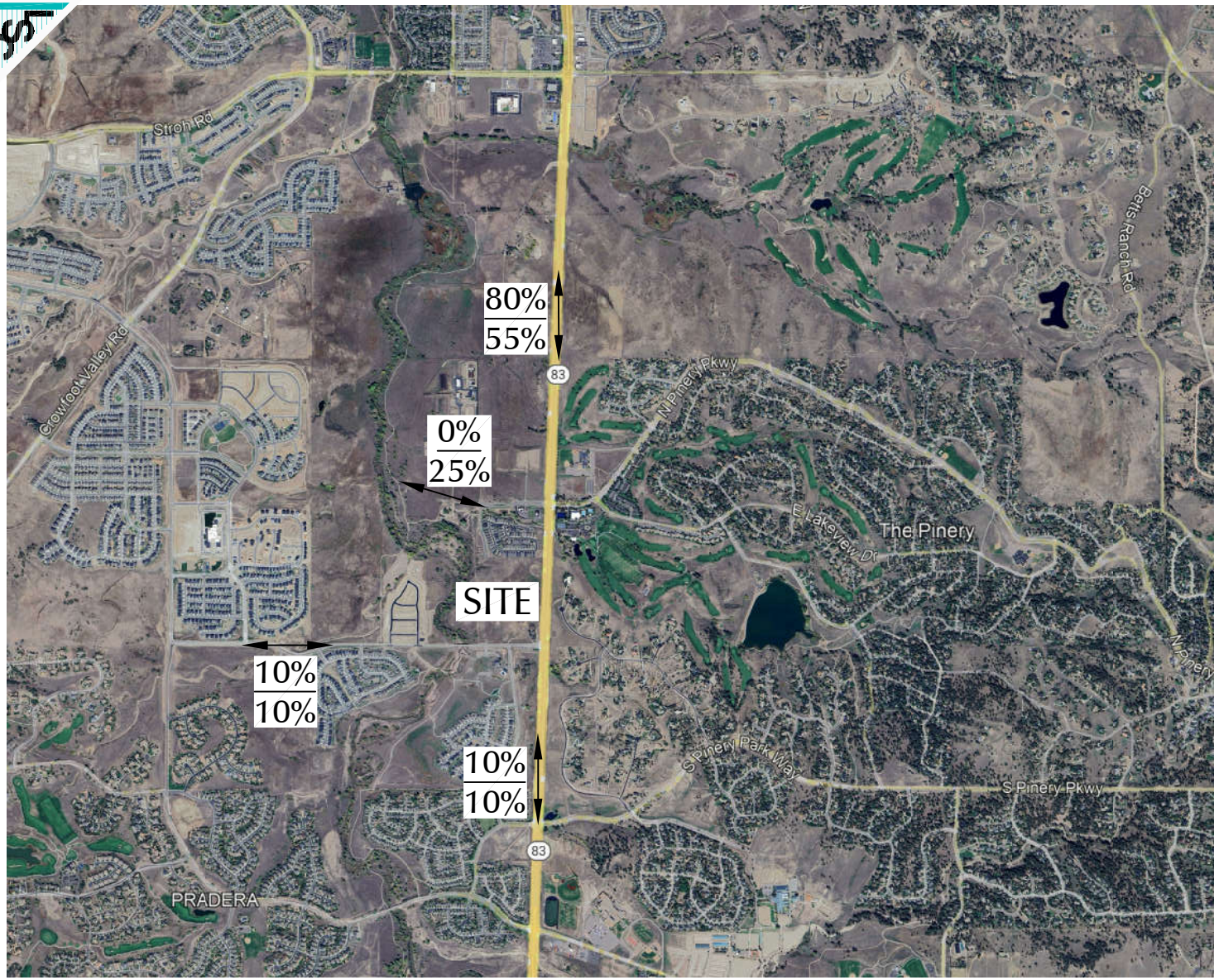
Approximate Scale
Scale: 1"=600'



Figure 5

Year 2045 Background Traffic, Lane Geometry and Traffic Control

Pinery Meadows (LSC #210872)



N

Approximate Scale
Scale: 1"=3,000'

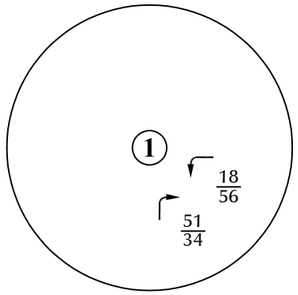
LEGEND:

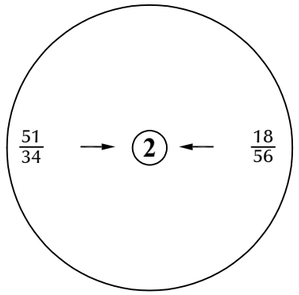
5% / 5% = Year 2028 Percent Directional Distribution / Year 2045 Percent Directional Distribution

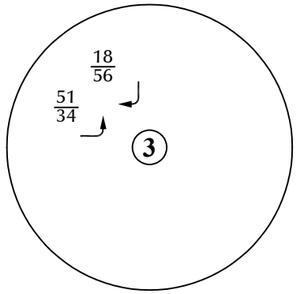
Figure 6

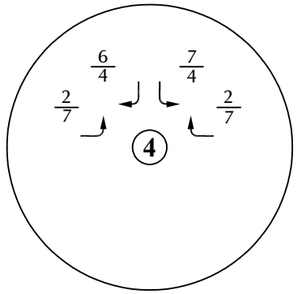
Directional Distribution of Site-Generated Traffic

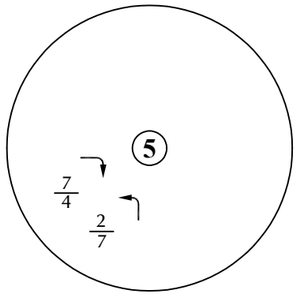
Pinery Meadows (LSC #210872)

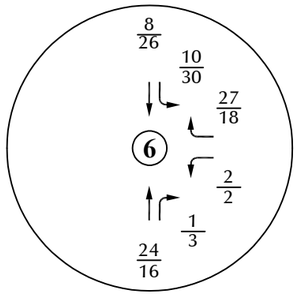


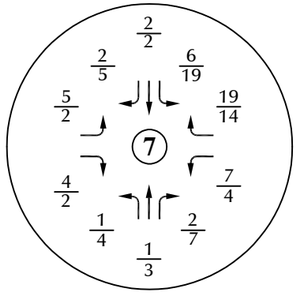












LEGEND:

$\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic

1,000 = Average Daily Traffic

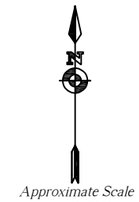
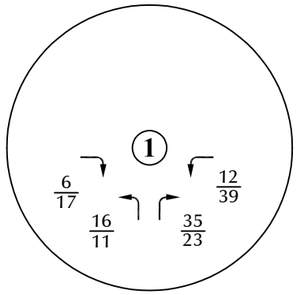


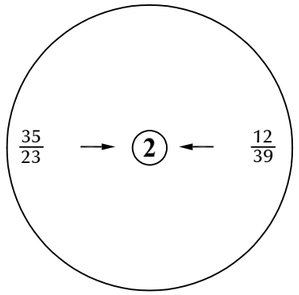


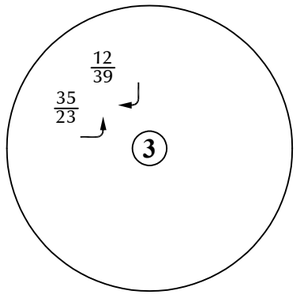
Figure 7a

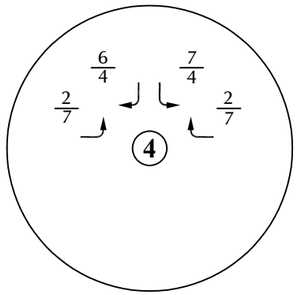
Year 2028 Assignment of Site-Generated Traffic

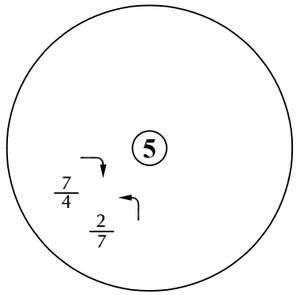
Pinery Meadows (LSC #210872)

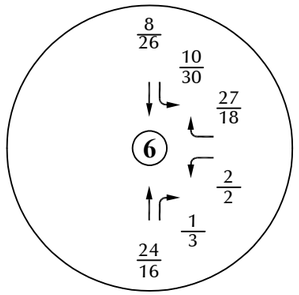


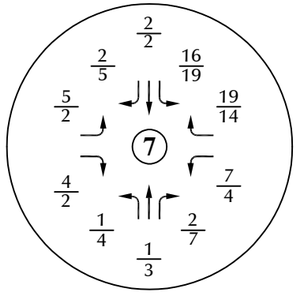












LEGEND:

$\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic

1,000 = Average Daily Traffic

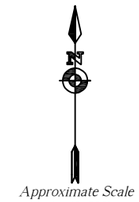
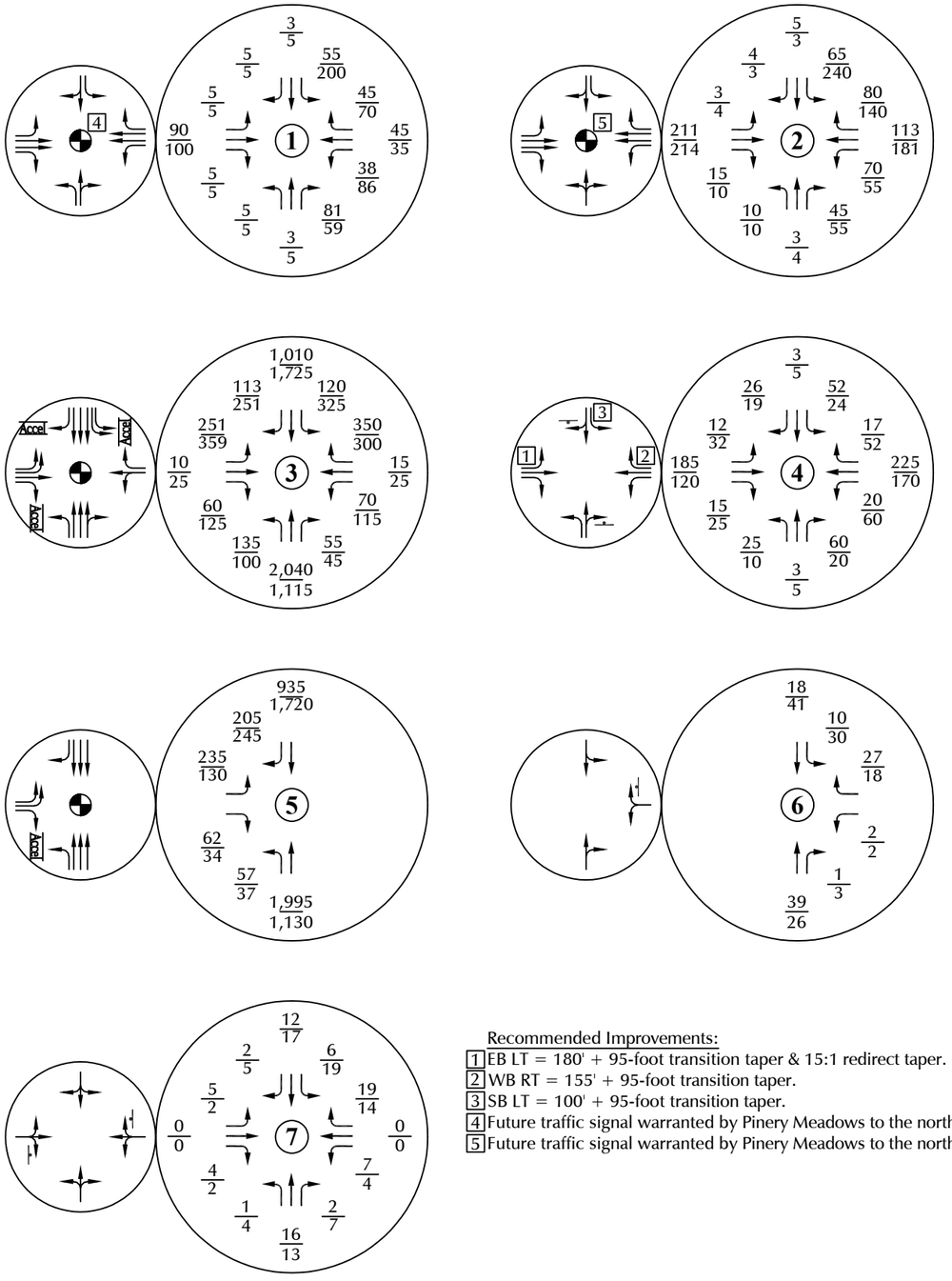




Figure 7b

Year 2045 Assignment of Site-Generated Traffic

Pinery Meadows (LSC #210872)



LEGEND:

= Stop Sign

= Traffic Signal

26/35 = AM Peak Hour Traffic / PM Peak Hour Traffic

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=600'



Recommended Improvements:

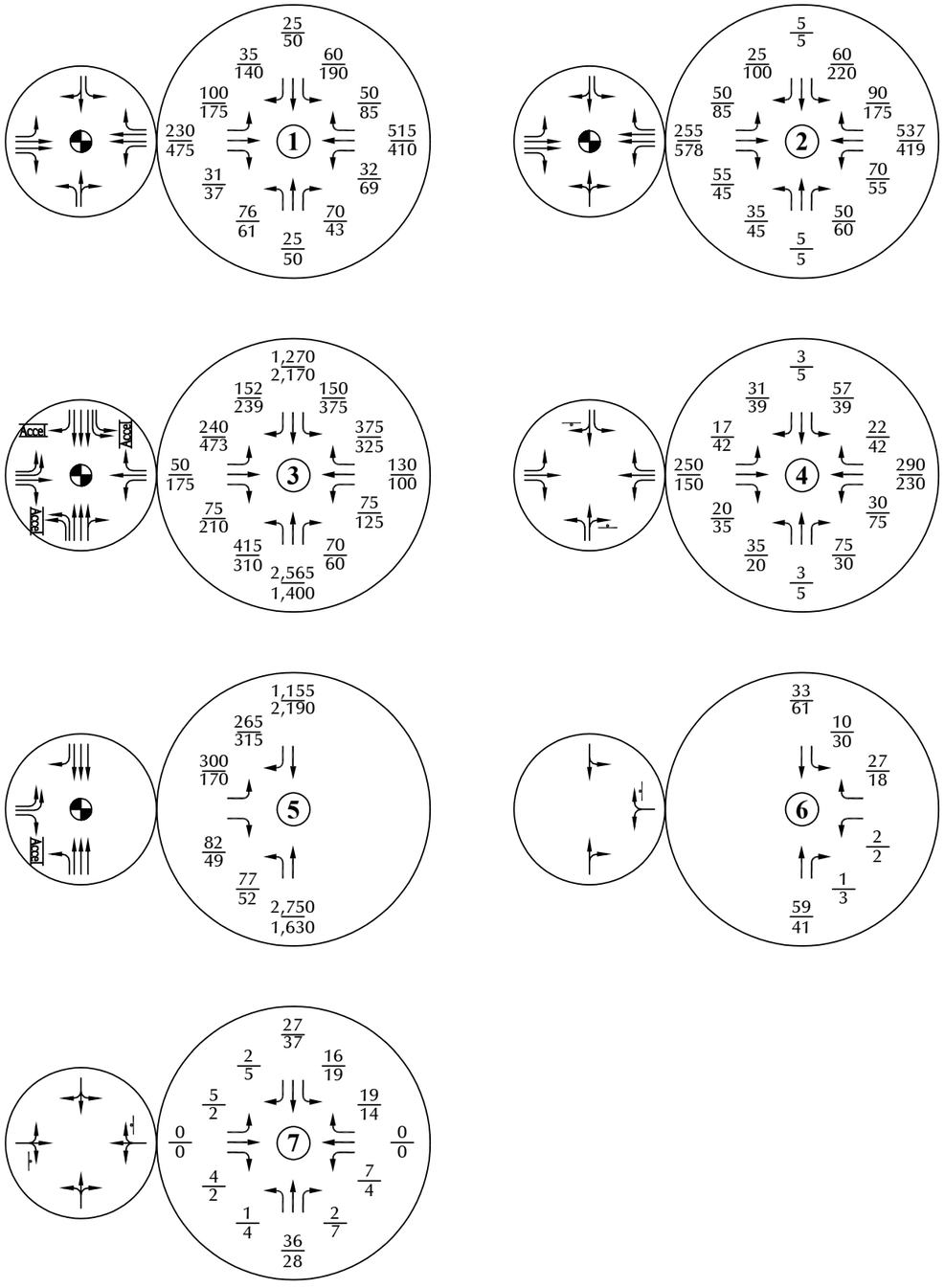
1 EB LT = 180' + 95-foot transition taper & 15:1 redirect taper.
2 WB RT = 155' + 95-foot transition taper.
3 SB LT = 100' + 95-foot transition taper.
4 Future traffic signal warranted by Pinery Meadows to the north.
5 Future traffic signal warranted by Pinery Meadows to the north.

Note: These volumes are the sum of the volumes in Figures 4 and 7a.

Figure 8

Year 2028 Total Traffic, Lane Geometry and Traffic Control

Pinery Meadows (LSC #210872)



LEGEND:

= Stop Sign

= Traffic Signal

26/35 = AM Peak Hour Traffic / PM Peak Hour Traffic

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=600'



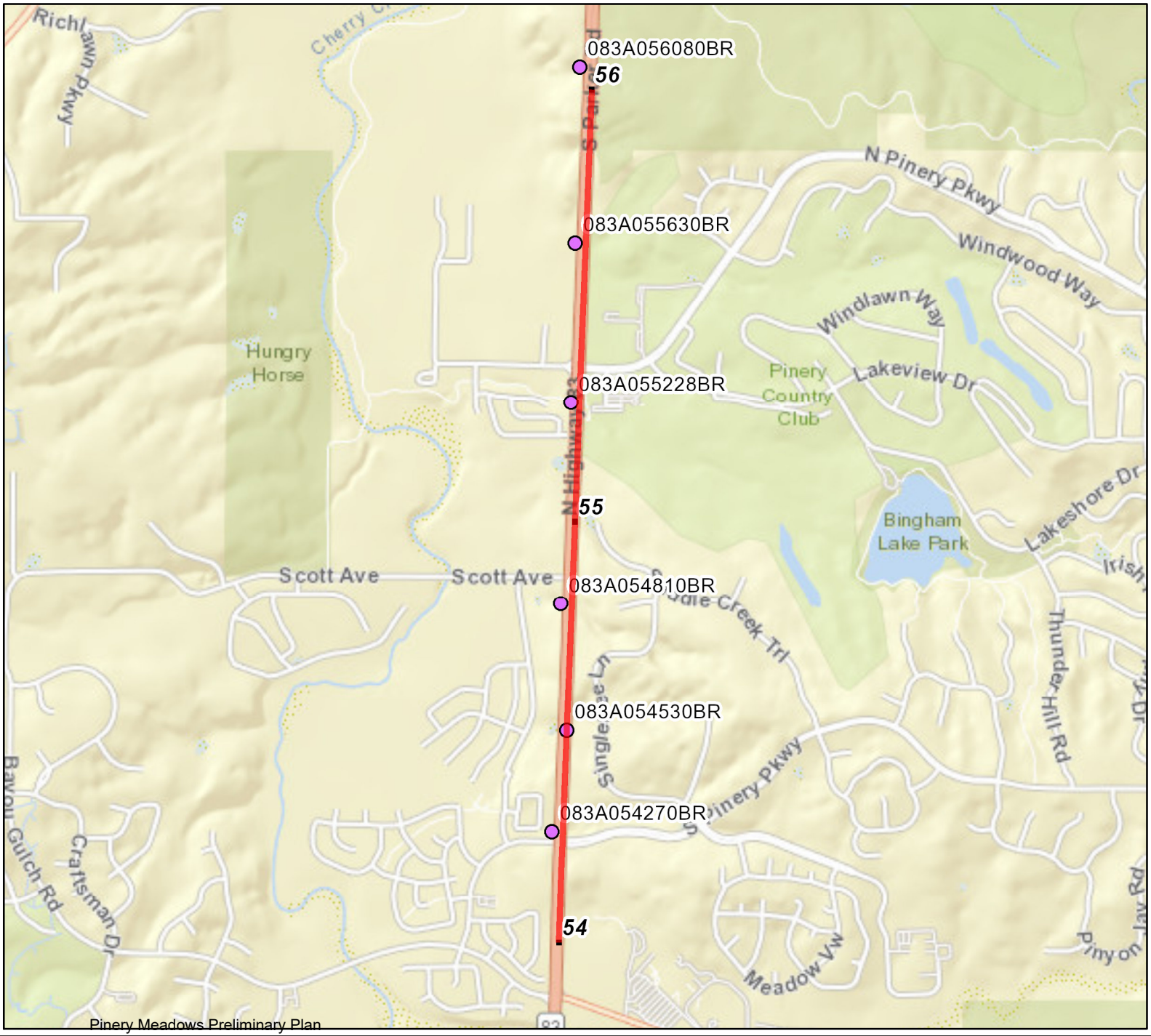
Note: These volumes are the sum of the volumes in Figures 5 and 7b.

Figure 9

Year 2045 Total Traffic, Lane Geometry and Traffic Control

Pinery Meadows (LSC #210872)

Route 083A From 54 to 56



Legend

- Route
- Milepoint

Structures

- Major Structure
- Minor Structure

Created:

Date: 2/15/2025

Time: 10:07:30 AM

0 0.15 0.3 0.45 0.6

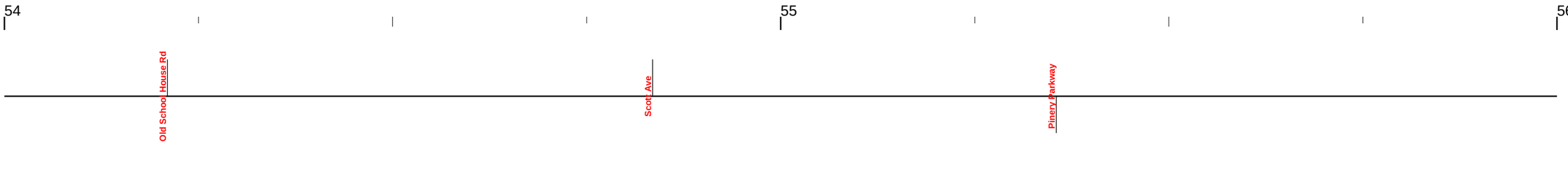
Miles

N W E S

The information contained in this map is based on the most currently available data and has been checked for accuracy. CDOT does not guarantee the accuracy of any information presented, is not liable in any respect for any errors or omissions, and is not responsible for determining "fitness for use".

Route 083A
From 54 To 56

Ramps
Overpass
Underpass
Structures



CLASSIFICATION

Access Control	NR-A: Non-Rural Principal Highway

SAFETY

Primary Speed Limit	55

TRAFFIC

AADT	20000	29000	33000
Design Hour Truck Percentage	0.10		
DHV	9.5	10.0	11.0
Off Peak Truck Percentage	4.60		4.00
Route Capacity	4250	6350	6400
V/C Ratio	0.53	0.50	0.61
V/C Ratio 20	0.67	0.66	0.74
VMT	7280	32596	49764
Year 20 Factor	1.26	1.31	1.22

It may appear that information is missing from the straight line diagram. If so, reduce the number of miles/page and re-submit the request.

COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: HWY 83
E/W STREET: NORTH PINERY PKWY
CITY: PARKER
COUNTY: DOUGLAS

File Name : HWY 83 PINERY NORTH
Site Code : 00000005
Start Date : 2/6/2025
Page No : 1

Groups Printed- Unshifted

	HWY 83 SOUTHBOUND				N. PINERY PKWY WESTBOUND				HWY 83 NORTHBOUND				N. PINERY PKWY EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	10	115	2	0	4	0	62	0	1	229	5	0	2	0	2	0	432
06:45 AM	14	188	6	0	12	0	67	0	2	334	3	0	2	0	1	0	629
Total	24	303	8	0	16	0	129	0	3	563	8	0	4	0	3	0	1061
07:00 AM	16	205	0	0	25	0	73	0	1	409	9	0	3	1	2	0	744
07:15 AM	13	266	1	0	17	2	96	0	1	547	5	0	6	0	1	0	955
07:30 AM	28	190	4	0	11	1	85	0	1	493	12	0	1	1	1	0	828
07:45 AM	41	187	3	0	13	3	82	0	2	346	25	1	6	0	0	0	709
Total	98	848	8	0	66	6	336	0	5	1795	51	1	16	2	4	0	3236
08:00 AM	37	226	7	0	13	0	78	4	0	310	12	0	2	0	0	0	689
08:15 AM	41	185	1	0	8	2	63	0	2	292	14	0	5	0	0	0	613
Total	78	411	8	0	21	2	141	4	2	602	26	0	7	0	0	0	1302
04:00 PM	76	379	2	0	74	1	120	0	1	257	8	0	2	1	0	0	921
04:15 PM	77	376	8	0	14	0	57	0	1	239	5	0	4	2	2	0	785
04:30 PM	66	395	8	0	12	2	58	0	1	245	14	0	5	2	0	0	808
04:45 PM	90	384	3	0	14	1	56	0	0	249	11	0	7	1	1	0	817
Total	309	1534	21	0	114	4	291	0	3	990	38	0	18	6	3	0	3331
05:00 PM	67	385	4	0	22	2	59	0	2	274	17	0	11	5	0	0	848
05:15 PM	83	393	5	0	9	0	50	0	1	249	14	0	1	2	0	0	807
05:30 PM	72	434	8	0	16	0	46	0	0	273	6	0	3	0	0	0	858
05:45 PM	87	354	5	0	15	0	42	0	0	159	13	0	2	2	0	0	679
Total	309	1566	22	0	62	2	197	0	3	955	50	0	17	9	0	0	3192
Grand Total	818	4662	67	0	279	14	1094	4	16	4905	173	1	62	17	10	0	12122
Apprch %	14.7	84	1.2	0	20.1	1	78.6	0.3	0.3	96.3	3.4	0	69.7	19.1	11.2	0	
Total %	6.7	38.5	0.6	0	2.3	0.1	9	0	0.1	40.5	1.4	0	0.5	0.1	0.1	0	

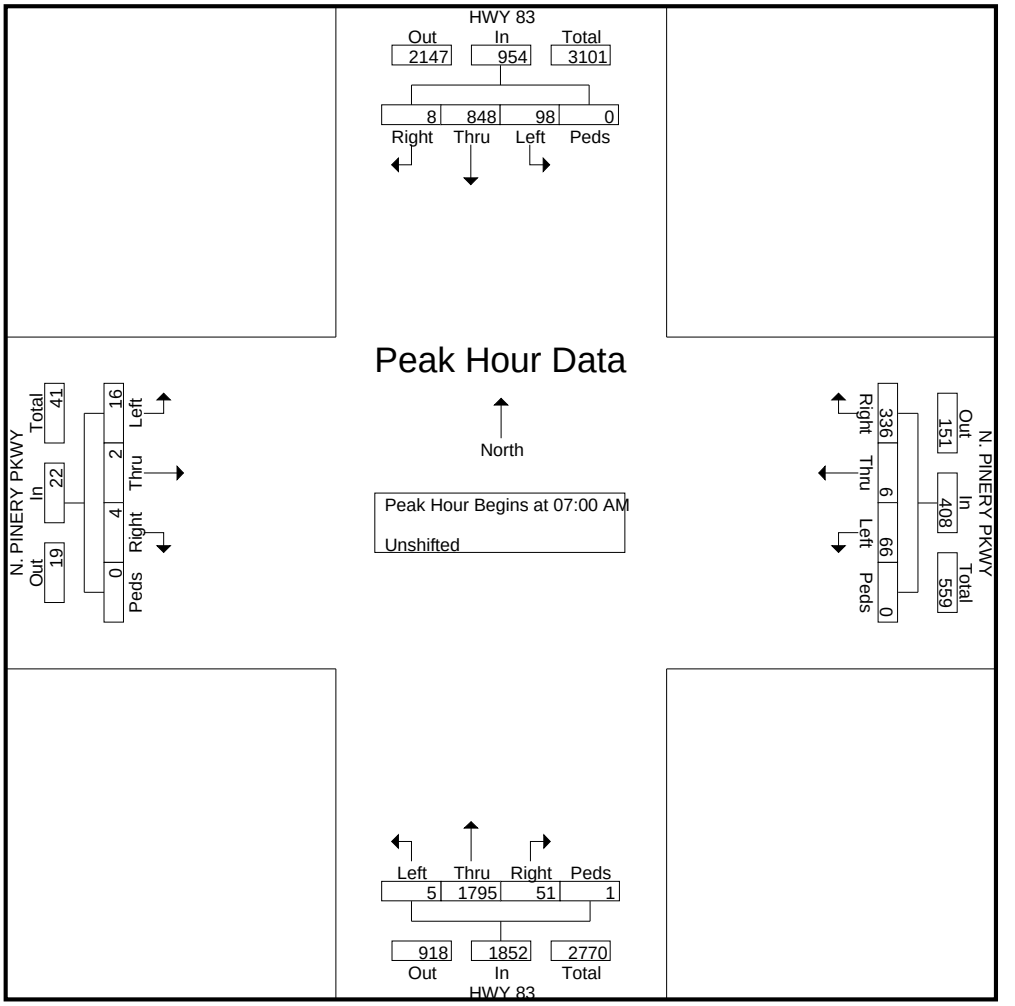
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: HWY 83
E/W STREET: NORTH PINERY PKWY
CITY: PARKER
COUNTY: DOUGLAS

File Name : HWY 83 PINERY NORTH
Site Code : 00000005
Start Date : 2/6/2025
Page No : 2

	HWY 83 SOUTHBOUND					N. PINERY PKWY WESTBOUND					HWY 83 NORTHBOUND					N. PINERY PKWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	16	205	0	0	221	**25**	0	73	0	98	1	409	9	0	419	3	**1**	**2**	0	6	744
07:15 AM	13	**266**	1	0	**280**	17	2	**96**	0	**115**	1	**547**	5	0	**553**	**6**	0	1	0	**7**	**955**
07:30 AM	28	190	**4**	0	222	11	1	85	0	97	1	493	12	0	506	1	1	1	0	3	828
07:45 AM	**41**	187	3	0	231	13	**3**	82	0	98	**2**	346	**25**	**1**	374	6	0	0	0	6	709
Total Volume	98	848	8	0	954	66	6	336	0	408	5	1795	51	1	1852	16	2	4	0	22	3236
% App. Total	10.3	88.9	0.8	0		16.2	1.5	82.4	0		0.3	96.9	2.8	0.1		72.7	9.1	18.2	0		
PHF	.598	.797	.500	.000	.852	.660	.500	.875	.000	.887	.625	.820	.510	.250	.837	.667	.500	.500	.000	.786	.847



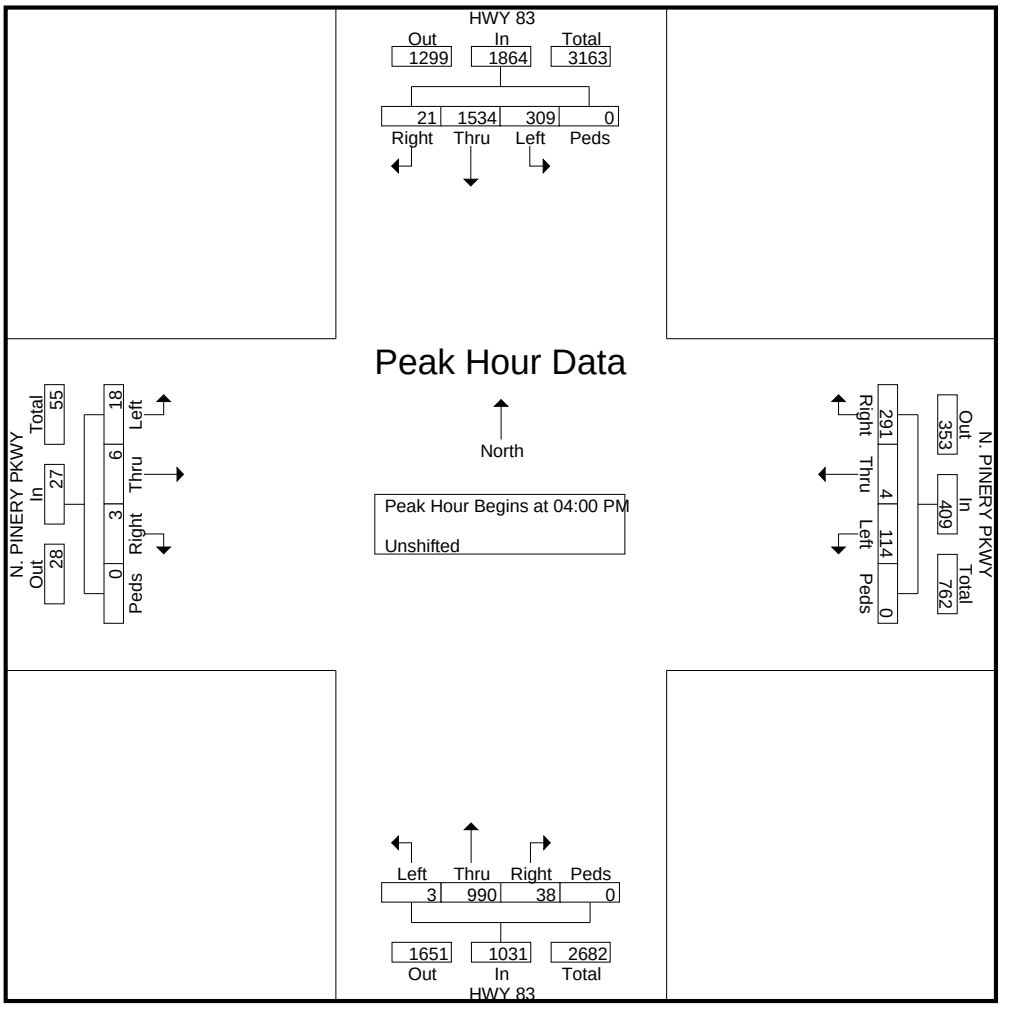
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File Name : HWY 83 PINERY NORTH
Site Code : 00000005
Start Date : 2/6/2025
Page No : 3

	HWY 83 SOUTHBOUND					N. PINERY PKWY WESTBOUND					HWY 83 NORTHBOUND					N. PINERY PKWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	76	379	2	0	457	**74**	1	**120**	0	**195**	**1**	**257**	8	0	**266**	2	1	0	0	3	**921**
04:15 PM	77	376	**8**	0	461	14	0	57	0	71	1	239	5	0	245	4	**2**	**2**	0	8	785
04:30 PM	66	**395**	8	0	469	12	**2**	58	0	72	1	245	**14**	0	260	5	2	0	0	7	808
04:45 PM	**90**	384	3	0	**477**	14	1	56	0	71	0	249	11	0	260	**7**	1	1	0	**9**	817
Total Volume	309	1534	21	0	1864	114	4	291	0	409	3	990	38	0	1031	18	6	3	0	27	3331
% App. Total	16.6	82.3	1.1	0		27.9	1	71.1	0		0.3	96	3.7	0		66.7	22.2	11.1	0		
PHF	.858	.971	.656	.000	.977	.385	.500	.606	.000	.524	.750	.963	.679	.000	.969	.643	.750	.375	.000	.750	.904



COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: HWY 83
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : hwy 83 scott ave
Site Code : 00000008
Start Date : 2/6/2025
Page No : 1

Groups Printed- Unshifted

	HWY 83 SOUTHBOUND				NO ACCESS WESTBOUND				HWY 83 NORTHBOUND				SCOTT AVE EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	115	14	1	0	0	0	0	2	225	0	0	22	0	0	0	379
06:45 AM	0	188	23	0	0	0	0	0	0	332	0	0	44	0	12	0	599
Total	0	303	37	1	0	0	0	0	2	557	0	0	66	0	12	0	978
07:00 AM	0	205	28	0	0	0	0	0	7	409	0	0	40	0	12	0	701
07:15 AM	0	266	46	0	0	0	0	0	12	547	0	0	43	0	7	0	921
07:30 AM	0	190	50	0	0	0	0	0	15	493	0	0	64	0	17	1	830
07:45 AM	0	187	60	0	0	0	0	0	17	346	0	0	42	0	8	0	660
Total	0	848	184	0	0	0	0	0	51	1795	0	0	189	0	44	1	3112
08:00 AM	0	226	45	0	0	0	0	0	12	310	0	0	37	0	8	0	638
08:15 AM	0	185	35	0	0	0	0	0	6	292	0	0	32	0	1	0	551
Total	0	411	80	0	0	0	0	0	18	602	0	0	69	0	9	0	1189
04:00 PM	0	386	70	0	0	0	0	0	2	257	0	0	19	0	5	0	739
04:15 PM	0	376	45	0	0	0	0	0	6	239	0	0	27	0	4	0	697
04:30 PM	0	395	40	0	0	0	0	0	2	245	0	0	27	0	4	0	713
04:45 PM	0	384	47	0	0	0	0	0	9	249	0	0	33	0	12	0	734
Total	0	1541	202	0	0	0	0	0	19	990	0	0	106	0	25	0	2883
05:00 PM	0	385	30	0	0	0	0	0	4	274	0	0	32	0	2	0	727
05:15 PM	0	393	46	0	0	0	0	0	4	249	0	0	28	0	6	0	726
05:30 PM	0	434	61	0	0	0	0	0	1	273	0	0	26	0	1	0	796
05:45 PM	0	354	28	0	0	0	0	0	4	159	0	0	35	0	2	0	582
Total	0	1566	165	0	0	0	0	0	13	955	0	0	121	0	11	0	2831
Grand Total	0	4669	668	1	0	0	0	0	103	4899	0	0	551	0	101	1	10993
Apprch %	0	87.5	12.5	0	0	0	0	0	2.1	97.9	0	0	84.4	0	15.5	0.2	
Total %	0	42.5	6.1	0	0	0	0	0	0.9	44.6	0	0	5	0	0.9	0	

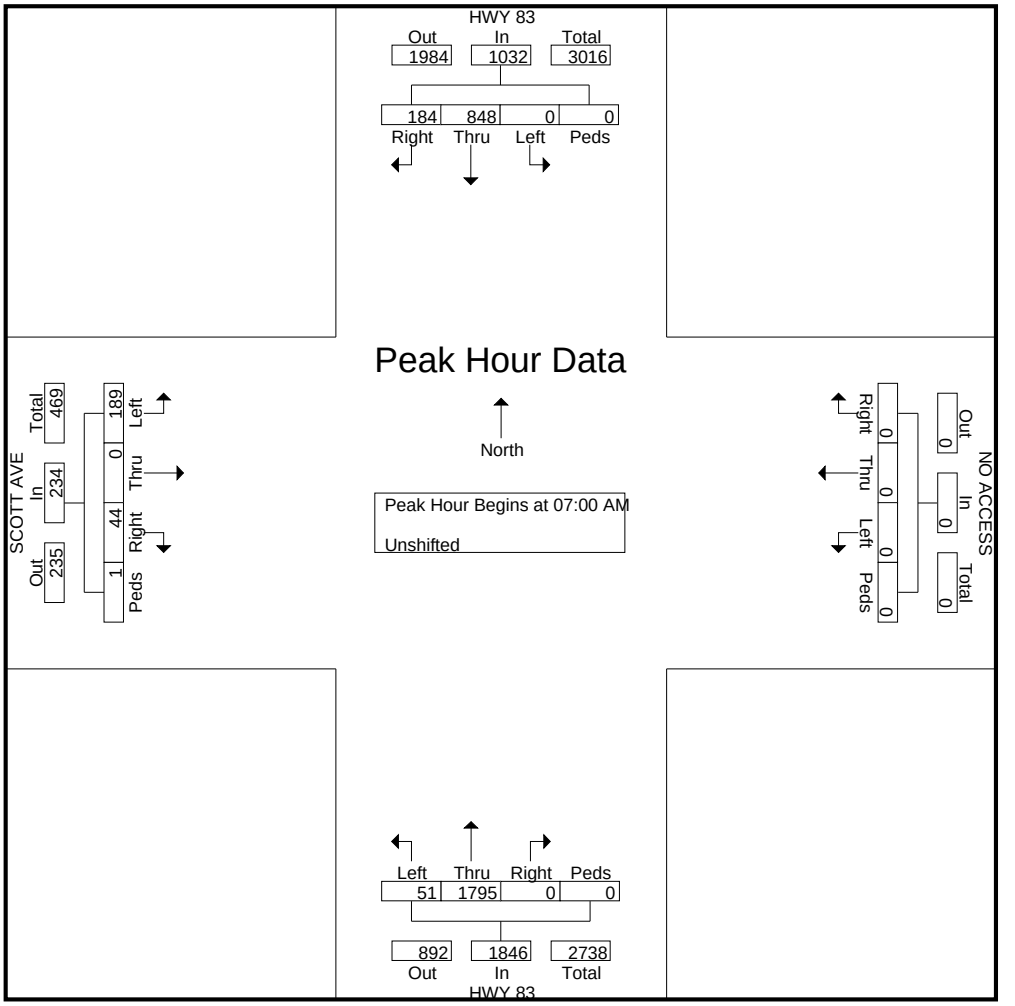
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: HWY 83
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : hwy 83 scott ave
Site Code : 00000008
Start Date : 2/6/2025
Page No : 2

	HWY 83 SOUTHBOUND					NO ACCESS WESTBOUND					HWY 83 NORTHBOUND					SCOTT AVE EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	205	28	0	233	0	0	0	0	0	7	409	0	0	416	40	0	12	0	52	701
07:15 AM	0	**266**	46	0	**312**	0	0	0	0	0	12	**547**	0	0	**559**	43	0	7	0	50	**921**
07:30 AM	0	190	50	0	240	0	0	0	0	0	15	493	0	0	508	**64**	0	**17**	**1**	**82**	830
07:45 AM	0	187	**60**	0	247	0	0	0	0	0	**17**	346	0	0	363	42	0	8	0	50	660
Total Volume	0	848	184	0	1032	0	0	0	0	0	51	1795	0	0	1846	189	0	44	1	234	3112
% App. Total	0	82.2	17.8	0		0	0	0	0		2.8	97.2	0	0		80.8	0	18.8	0.4		
PHF	.000	.797	.767	.000	.827	.000	.000	.000	.000	.000	.750	.820	.000	.000	.826	.738	.000	.647	.250	.713	.845



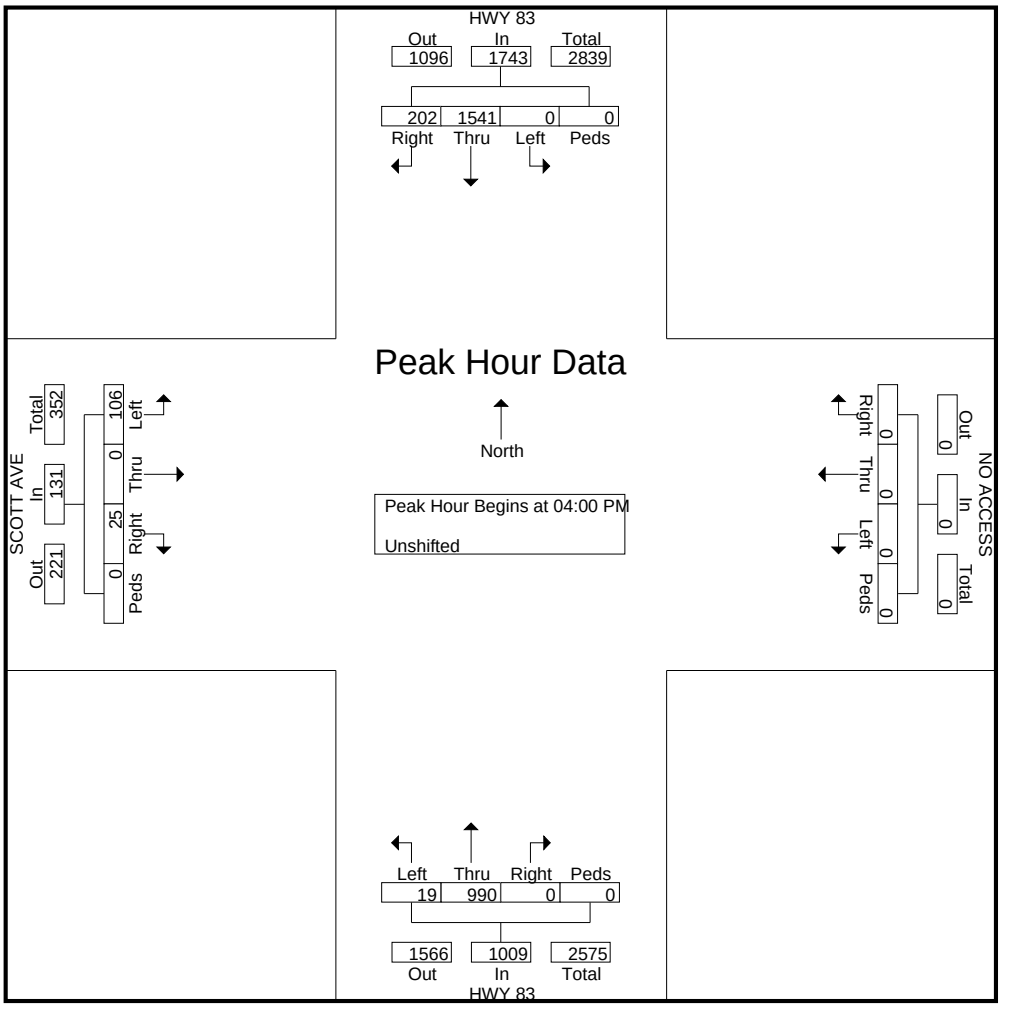
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: HWY 83
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : hwy 83 scott ave
Site Code : 00000008
Start Date : 2/6/2025
Page No : 3

	HWY 83 SOUTHBOUND					NO ACCESS WESTBOUND					HWY 83 NORTHBOUND					SCOTT AVE EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	386	**70**	0	**456**	0	0	0	0	0	2	**257**	0	0	**259**	19	0	5	0	24	**739**
04:15 PM	0	376	45	0	421	0	0	0	0	0	6	239	0	0	245	27	0	4	0	31	697
04:30 PM	0	**395**	40	0	435	0	0	0	0	0	2	245	0	0	247	27	0	4	0	31	713
04:45 PM	0	384	47	0	431	0	0	0	0	0	**9**	249	0	0	258	**33**	0	**12**	0	**45**	734
Total Volume	0	1541	202	0	1743	0	0	0	0	0	19	990	0	0	1009	106	0	25	0	131	2883
% App. Total	0	88.4	11.6	0		0	0	0	0		1.9	98.1	0	0		80.9	0	19.1	0		
PHF	.000	.975	.721	.000	.956	.000	.000	.000	.000	.000	.528	.963	.000	.000	.974	.803	.000	.521	.000	.728	.975



COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: INTERLOCKEN ST
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : INTERLOCKEN ST SCOTT AVE
Site Code : 00000008
Start Date : 2/11/2025
Page No : 1

Groups Printed- Unshifted

	NO ACCESS SOUTHBOUND				SCOTT AVE WESTBOUND				INTERLOCKEN ST NORTHBOUND				SCOTT AVE EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	0	0	0	1	12	0	0	1	0	12	0	0	11	1	0	38
06:45 AM	0	0	0	0	5	25	0	0	1	0	15	0	0	36	9	0	91
Total	0	0	0	0	6	37	0	0	2	0	27	0	0	47	10	0	129
07:00 AM	0	0	0	0	4	25	0	0	3	0	15	0	0	29	0	0	76
07:15 AM	0	0	0	0	3	21	0	0	6	0	14	0	0	36	6	0	86
07:30 AM	0	0	0	0	4	31	0	0	6	0	17	0	0	51	3	0	112
07:45 AM	0	0	0	0	5	19	0	0	3	0	12	0	0	30	0	0	69
Total	0	0	0	0	16	96	0	0	18	0	58	0	0	146	9	0	343
08:00 AM	0	0	0	0	5	31	0	0	1	0	8	0	0	21	1	0	67
08:15 AM	0	0	0	0	2	20	0	0	1	0	10	0	0	17	4	0	54
Total	0	0	0	0	7	51	0	0	2	0	18	0	0	38	5	0	121
04:00 PM	0	0	0	0	15	15	0	0	1	0	4	0	0	9	2	0	46
04:15 PM	0	0	0	0	13	47	0	0	0	0	4	0	0	21	3	0	88
04:30 PM	0	0	0	0	16	34	0	0	2	0	5	0	0	18	1	0	76
04:45 PM	0	0	0	0	14	46	0	0	2	0	4	0	0	22	3	0	91
Total	0	0	0	0	58	142	0	0	5	0	17	0	0	70	9	0	301
05:00 PM	0	0	0	0	17	51	0	0	3	0	3	0	0	23	2	0	99
05:15 PM	0	0	0	0	11	35	0	0	1	0	4	0	0	17	4	0	72
05:30 PM	0	0	0	0	10	31	0	0	0	0	3	0	0	11	3	0	58
05:45 PM	0	0	0	0	10	24	0	0	1	0	2	0	0	9	3	0	49
Total	0	0	0	0	48	141	0	0	5	0	12	0	0	60	12	0	278
Grand Total	0	0	0	0	135	467	0	0	32	0	132	0	0	361	45	0	1172
Apprch %	0	0	0	0	22.4	77.6	0	0	19.5	0	80.5	0	0	88.9	11.1	0	
Total %	0	0	0	0	11.5	39.8	0	0	2.7	0	11.3	0	0	30.8	3.8	0	

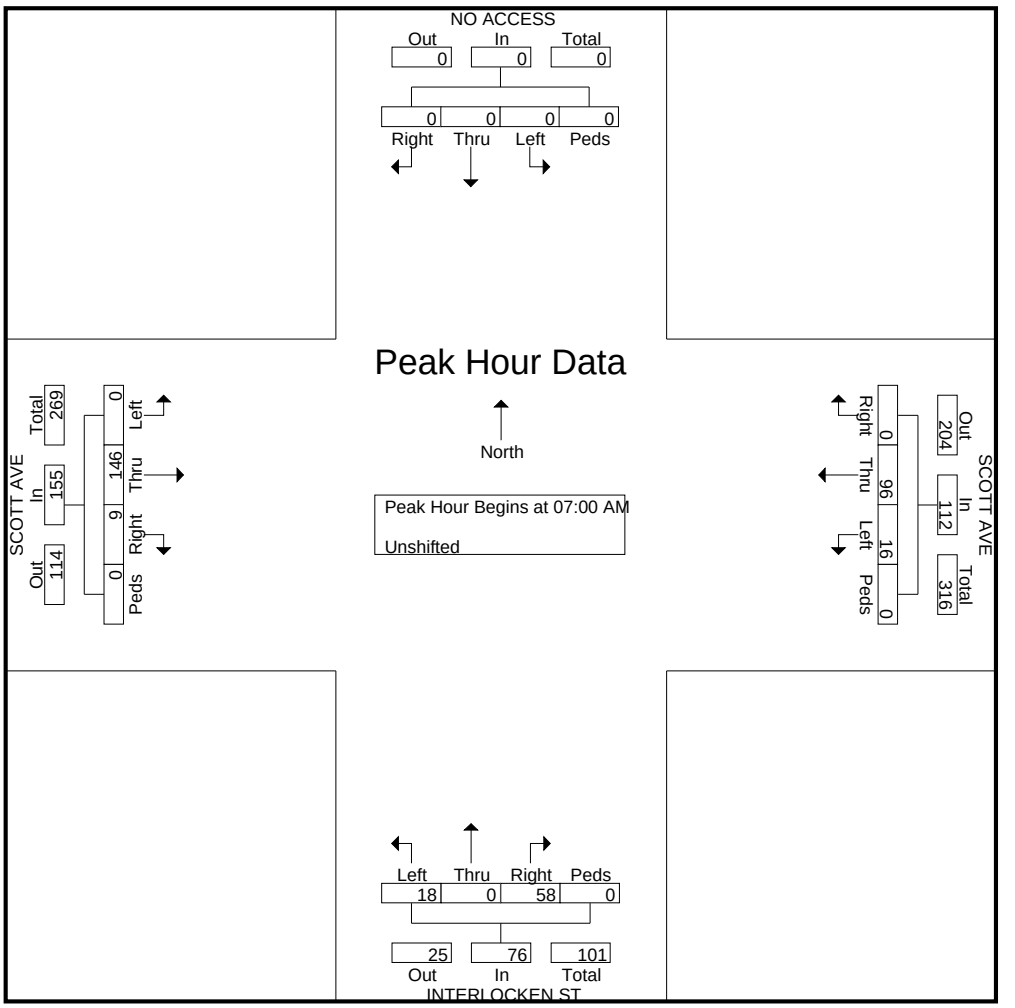
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: INTERLOCKEN ST
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : INTERLOCKEN ST SCOTT AVE
Site Code : 00000008
Start Date : 2/11/2025
Page No : 2

	NO ACCESS SOUTHBOUND					SCOTT AVE WESTBOUND					INTERLOCKEN ST NORTHBOUND					SCOTT AVE EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	4	25	0	0	29	3	0	15	0	18	0	29	0	0	29	76
07:15 AM	0	0	0	0	0	3	21	0	0	24	**6**	0	14	0	20	0	36	**6**	0	42	86
07:30 AM	0	0	0	0	0	4	**31**	0	0	**35**	6	0	**17**	0	**23**	0	**51**	3	0	**54**	**112**
07:45 AM	0	0	0	0	0	**5**	19	0	0	24	3	0	12	0	15	0	30	0	0	30	69
Total Volume	0	0	0	0	0	16	96	0	0	112	18	0	58	0	76	0	146	9	0	155	343
% App. Total	0	0	0	0		14.3	85.7	0	0		23.7	0	76.3	0		0	94.2	5.8	0		
PHF	.000	.000	.000	.000	.000	.800	.774	.000	.000	.800	.750	.000	.853	.000	.826	.000	.716	.375	.000	.718	.766



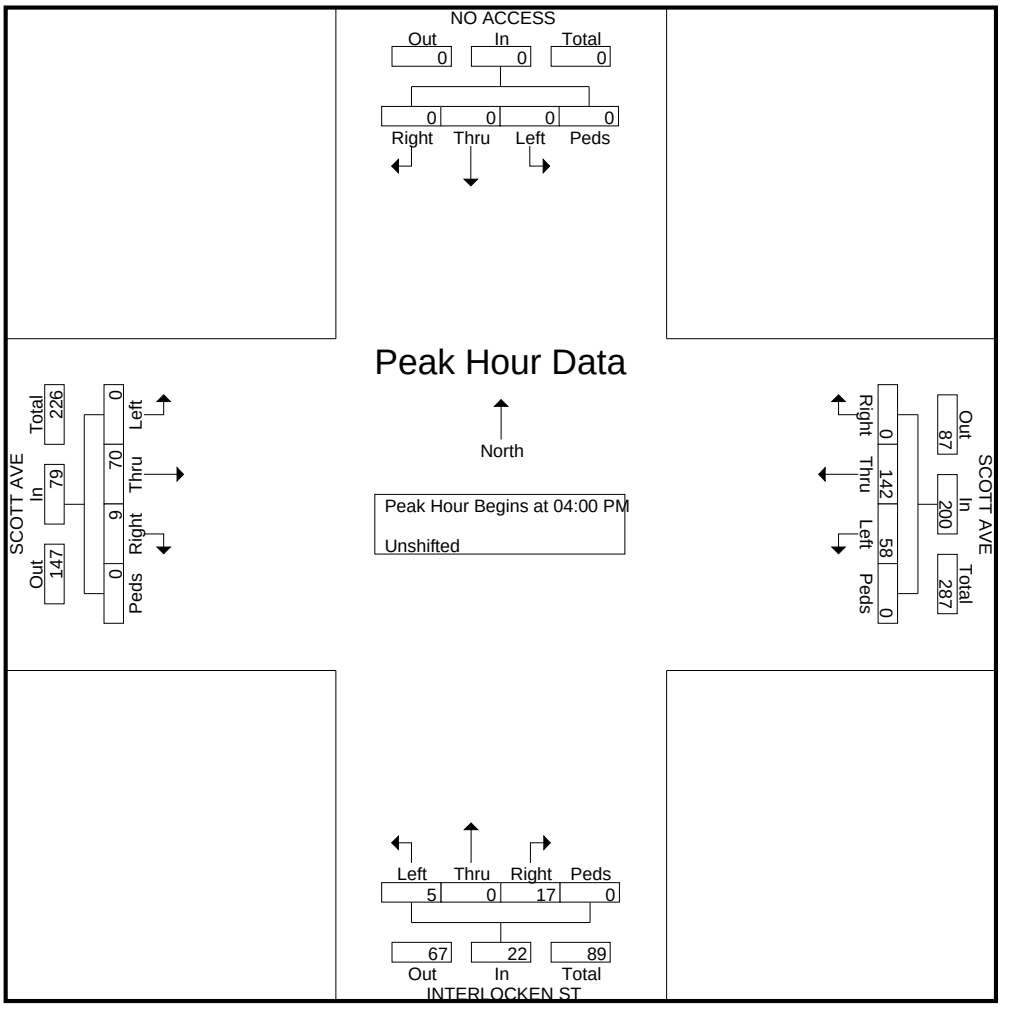
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: INTERLOCKEN ST
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : INTERLOCKEN ST SCOTT AVE
Site Code : 00000008
Start Date : 2/11/2025
Page No : 3

	NO ACCESS SOUTHBOUND					SCOTT AVE WESTBOUND					INTERLOCKEN ST NORTHBOUND					SCOTT AVE EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	15	15	0	0	30	1	0	4	0	5	0	9	2	0	11	46
04:15 PM	0	0	0	0	0	13	**47**	0	0	**60**	0	0	4	0	4	0	21	**3**	0	24	88
04:30 PM	0	0	0	0	0	**16**	34	0	0	50	**2**	0	**5**	0	**7**	0	18	1	0	19	76
04:45 PM	0	0	0	0	0	14	46	0	0	60	2	0	4	0	6	0	**22**	3	0	**25**	**91**
Total Volume	0	0	0	0	0	58	142	0	0	200	5	0	17	0	22	0	70	9	0	79	301
% App. Total	0	0	0	0		29	71	0	0		22.7	0	77.3	0		0	88.6	11.4	0		
PHF	.000	.000	.000	.000	.000	.906	.755	.000	.000	.833	.625	.000	.850	.000	.786	.000	.795	.750	.000	.790	.827



COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: REDSTONE BANK
E/W STREET: N. PINERY PKWY
CITY: PARKER
COUNTY: DOUGLAS

File Name : Not Named 1
Site Code : 00000015
Start Date : 2/11/2025
Page No : 1

Groups Printed- Unshifted

	NO ACCESS SOUTHBOUND				N. PINERY PKWY WESTBOUND				REDSTONE BANK LOT NORTHBOUND				N. PINERY PKWY EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	6	0	0	8
06:45 AM	0	0	0	0	0	5	0	0	0	0	0	0	0	3	0	0	8
Total	0	0	0	0	0	7	0	0	0	0	0	0	0	9	0	0	16
07:00 AM	0	0	0	0	1	5	0	0	0	0	0	0	0	5	0	0	11
07:15 AM	0	0	0	0	1	2	0	0	0	0	0	0	0	5	0	0	8
07:30 AM	0	0	0	0	1	4	0	0	0	0	1	0	0	5	0	0	11
07:45 AM	0	0	0	0	3	3	0	0	0	0	0	0	0	4	0	0	10
Total	0	0	0	0	6	14	0	0	0	0	1	0	0	19	0	0	40
08:00 AM	0	0	0	0	3	3	0	0	0	0	0	0	0	5	0	0	11
08:15 AM	0	0	0	0	2	4	0	0	0	0	0	0	0	3	0	0	9
Total	0	0	0	0	5	7	0	0	0	0	0	0	0	8	0	0	20
04:00 PM	0	0	0	0	2	7	0	0	0	0	1	0	0	3	0	0	13
04:15 PM	0	0	0	0	1	6	0	0	0	0	2	0	0	3	0	0	12
04:30 PM	0	0	0	0	2	8	0	0	0	0	2	0	0	2	0	0	14
04:45 PM	0	0	0	0	3	6	0	0	0	0	3	0	0	3	0	0	15
Total	0	0	0	0	8	27	0	0	0	0	8	0	0	11	0	0	54
05:00 PM	0	0	0	0	2	5	0	0	0	0	2	0	0	2	0	0	11
05:15 PM	0	0	0	0	1	4	0	0	0	0	3	0	0	1	0	0	9
05:30 PM	0	0	0	0	2	6	0	0	0	0	2	0	0	2	0	0	12
05:45 PM	0	0	0	0	1	4	0	0	0	0	1	0	0	3	0	0	9
Total	0	0	0	0	6	19	0	0	0	0	8	0	0	8	0	0	41
Grand Total	0	0	0	0	25	74	0	0	0	0	17	0	0	55	0	0	171
Apprch %	0	0	0	0	25.3	74.7	0	0	0	0	100	0	0	100	0	0	
Total %	0	0	0	0	14.6	43.3	0	0	0	0	9.9	0	0	32.2	0	0	

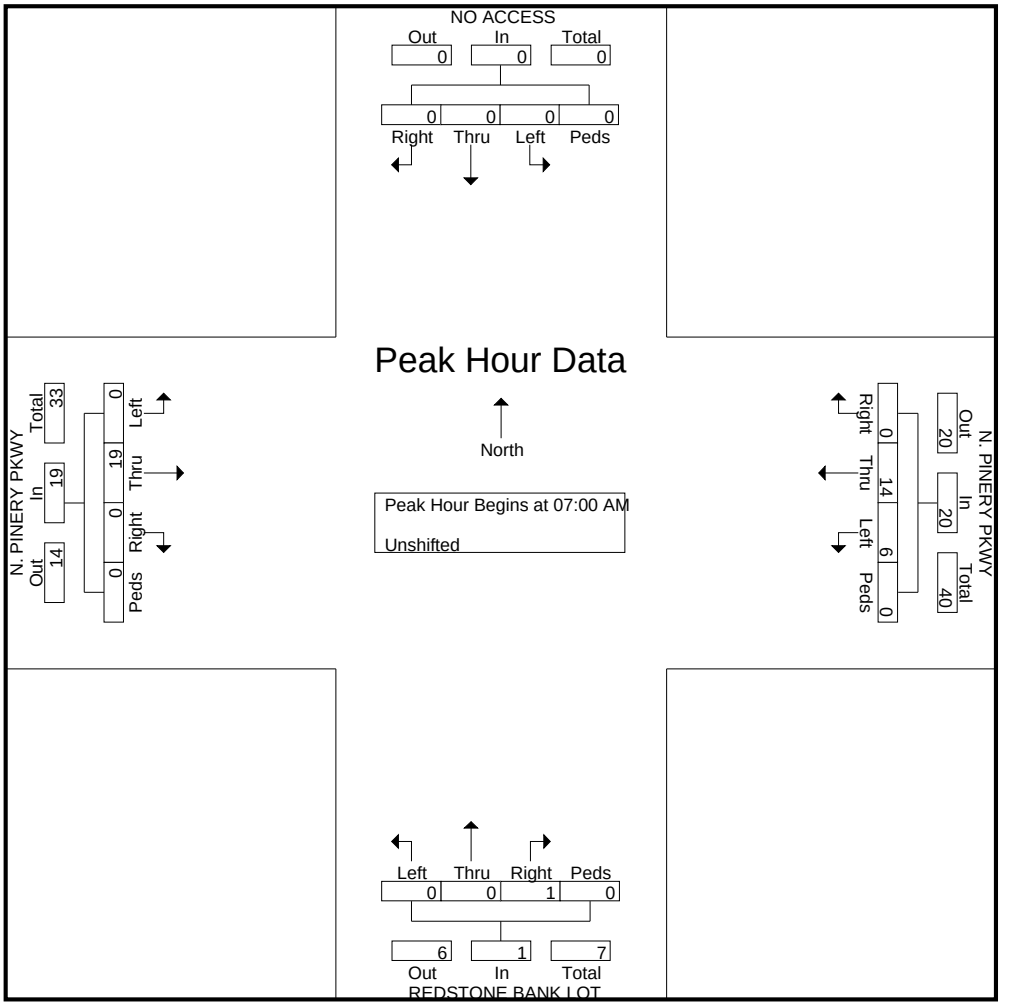
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: REDSTONE BANK
E/W STREET: N. PINERY PKWY
CITY: PARKER
COUNTY: DOUGLAS

File Name : Not Named 1
Site Code : 00000015
Start Date : 2/11/2025
Page No : 2

	NO ACCESS SOUTHBOUND					N. PINERY PKWY WESTBOUND					REDSTONE BANK LOT NORTHBOUND					N. PINERY PKWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	1	**5**	0	0	**6**	0	0	0	0	0	0	**5**	0	0	**5**	**11**
07:15 AM	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	5	0	0	5	8
07:30 AM	0	0	0	0	0	1	4	0	0	5	0	0	**1**	0	**1**	0	5	0	0	5	11
07:45 AM	0	0	0	0	0	**3**	3	0	0	6	0	0	0	0	0	0	4	0	0	4	10
Total Volume	0	0	0	0	0	6	14	0	0	20	0	0	1	0	1	0	19	0	0	19	40
% App. Total	0	0	0	0		30	70	0	0		0	0	100	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.500	.700	.000	.000	.833	.000	.000	.250	.000	.250	.000	.950	.000	.000	.950	.909



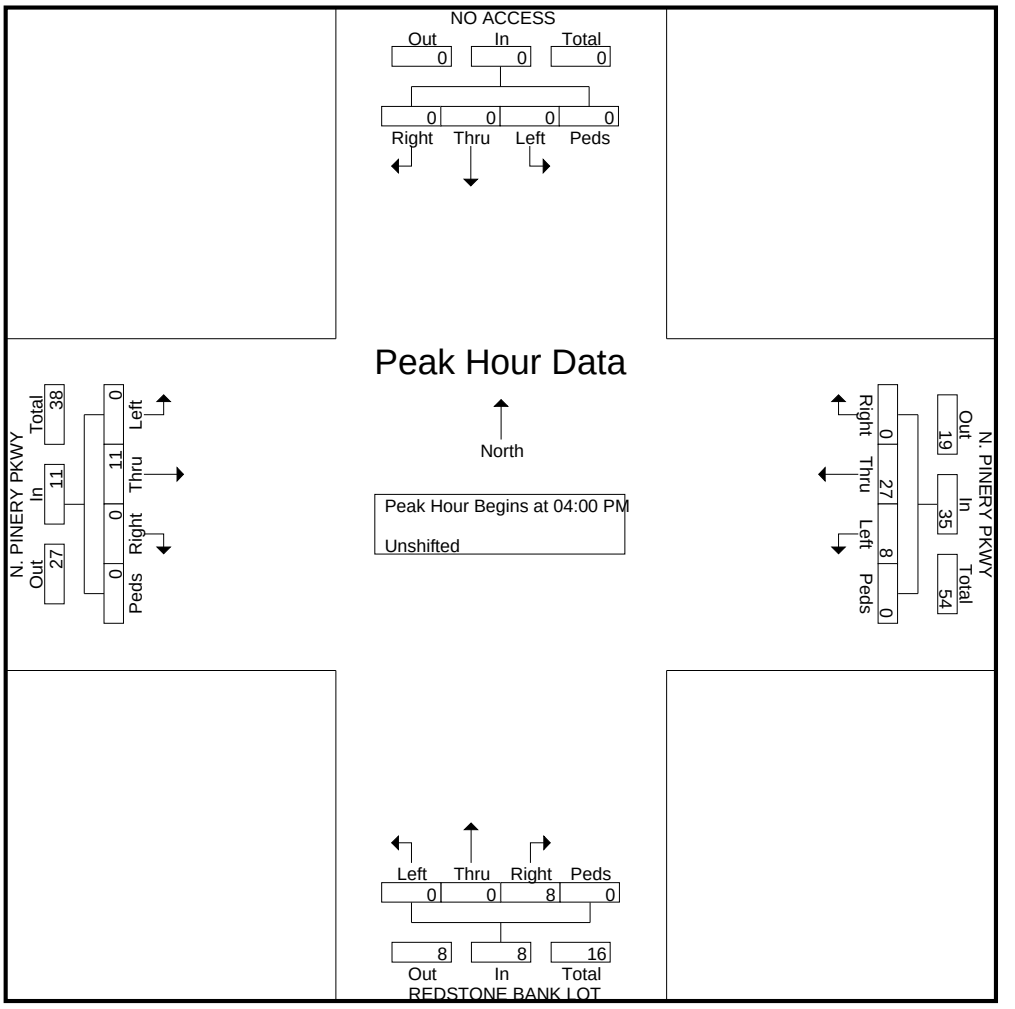
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: REDSTONE BANK
E/W STREET: N. PINERY PKWY
CITY: PARKER
COUNTY: DOUGLAS

File Name : Not Named 1
Site Code : 00000015
Start Date : 2/11/2025
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	NO ACCESS SOUTHBOUND					N. PINERY PKWY WESTBOUND					REDSTONE BANK LOT NORTHBOUND					N. PINERY PKWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	2	7	0	0	9	0	0	1	0	1	0	**3**	0	0	**3**	13
04:15 PM	0	0	0	0	0	1	6	0	0	7	0	0	2	0	2	0	3	0	0	3	12
04:30 PM	0	0	0	0	0	2	**8**	0	0	**10**	0	0	2	0	2	0	2	0	0	2	14
04:45 PM	0	0	0	0	0	**3**	6	0	0	9	0	0	**3**	0	**3**	0	3	0	0	3	**15**
Total Volume	0	0	0	0	0	8	27	0	0	35	0	0	8	0	8	0	11	0	0	11	54
% App. Total	0	0	0	0		22.9	77.1	0	0		0	0	100	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.667	.844	.000	.000	.875	.000	.000	.667	.000	.667	.000	.917	.000	.000	.917	.900



LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board

SIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

LOS	Average Vehicle Delay sec/vehicle	Operational Characteristics
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

UNSIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

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

LOS	Average Vehicle Control Delay	Operational Characteristics
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. The delay could be up to 15 seconds. 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. 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.
D	25 to 35 seconds	This is the point at which a traffic signal may be warranted for this intersection. 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. There is a high probability that this intersection will meet traffic signal warrants. 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. The only remedy for these long delays is installing a traffic signal or restricting the accesses. 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.

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	21	0	6	13	0	1
Future Vol, veh/h	21	0	6	13	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	85	85	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	0	7	14	0	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	23	0	44	12
Stage 1	-	-	-	-	23	-
Stage 2	-	-	-	-	21	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1591	-	961	1065
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	999	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1591	-	957	1065
Mov Cap-2 Maneuver	-	-	-	-	957	-
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	995	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1065	-	-	1591	-
HCM Lane V/C Ratio	0.001	-	-	0.004	-
HCM Control Delay (s)	8.4	-	-	7.3	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	2	4	66	6	336	5	1925	51	98	960	8
Future Volume (veh/h)	16	2	4	66	6	336	5	1925	51	98	960	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	19	2	0	78	7	395	6	2265	60	115	1129	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	72	39		274	25	291	43	2884	76	225	3088	
Arrive On Green	0.02	0.02	0.00	0.18	0.17	0.18	0.02	0.56	0.58	0.07	0.60	0.00
Sat Flow, veh/h	3456	1870	1585	1641	147	1585	1781	5115	135	3456	5106	1585
Grp Volume(v), veh/h	19	2	0	85	0	395	6	1505	820	115	1129	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1788	0	1585	1781	1702	1846	1728	1702	1585
Q Serve(g_s), s	0.6	0.1	0.0	4.9	0.0	22.0	0.4	41.5	41.8	3.9	13.5	0.0
Cycle Q Clear(g_c), s	0.6	0.1	0.0	4.9	0.0	22.0	0.4	41.5	41.8	3.9	13.5	0.0
Prop In Lane	1.00		1.00	0.92		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	72	39		298	0	291	43	1919	1041	225	3088	
V/C Ratio(X)	0.26	0.05		0.29	0.00	1.36	0.14	0.78	0.79	0.51	0.37	
Avail Cap(c_a), veh/h	432	234		298	0	291	104	1919	1041	346	3088	
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	57.8	57.6	0.0	42.9	0.0	49.0	57.3	20.5	20.5	54.2	12.0	0.0
Incr Delay (d2), s/veh	1.9	0.5	0.0	0.5	0.0	182.4	1.5	3.3	6.0	1.8	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.1	0.0	2.2	0.0	23.3	0.2	15.1	17.2	1.7	4.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.7	58.1	0.0	43.4	0.0	231.4	58.8	23.8	26.5	56.0	12.4	0.0
LnGrp LOS	E	E		D	A	F	E	C	C	E	B	
Approach Vol, veh/h		21			480			2331			1244	
Approach Delay, s/veh		59.6			198.2			24.8			16.4	
Approach LOS		E			F			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.8	74.7		7.5	7.9	79.6		25.0				
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0				
Max Green Setting (Gmax), s	10.0	51.0		15.0	5.0	56.0		20.0				
Max Q Clear Time (g_c+I1), s	5.9	43.8		2.6	2.4	15.5		24.0				
Green Ext Time (p_c), s	0.1	6.2		0.0	0.0	8.4		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		42.8
HCM 6th LOS		D

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	175	9	16	219	0	18	0	58	0	0	0
Future Vol, veh/h	0	175	9	16	219	0	18	0	58	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	227	12	21	284	0	23	0	75	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	284	0	0	239	0	0	553	553	227	597	565	284
Stage 1	-	-	-	-	-	-	227	227	-	326	326	-
Stage 2	-	-	-	-	-	-	326	326	-	271	239	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1278	-	-	1328	-	-	444	441	812	415	434	755
Stage 1	-	-	-	-	-	-	776	716	-	687	648	-
Stage 2	-	-	-	-	-	-	687	648	-	735	708	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1278	-	-	1328	-	-	439	434	812	372	427	755
Mov Cap-2 Maneuver	-	-	-	-	-	-	439	434	-	372	427	-
Stage 1	-	-	-	-	-	-	776	716	-	687	638	-
Stage 2	-	-	-	-	-	-	676	638	-	667	708	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	10.8	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	439	812	1278	-	-	1328	-	-	-	-
HCM Lane V/C Ratio	0.053	0.093	-	-	-	0.016	-	-	-	-
HCM Control Delay (s)	13.7	9.9	0	-	-	7.8	-	-	0	0
HCM Lane LOS	B	A	A	-	-	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.3	0	-	-	0	-	-	-	-



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	189	44	51	1795	848	184
Future Volume (veh/h)	189	44	51	1795	848	184
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	222	52	60	2112	998	216
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	77	3979	3459	1074
Arrive On Green	0.12	0.12	0.04	0.78	0.68	0.68
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	222	52	60	2112	998	216
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	7.2	3.6	4.0	18.7	9.4	6.1
Cycle Q Clear(g_c), s	7.2	3.6	4.0	18.7	9.4	6.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	77	3979	3459	1074
V/C Ratio(X)	0.51	0.26	0.78	0.53	0.29	0.20
Avail Cap(c_a), veh/h	590	271	119	3979	3459	1074
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	49.1	47.5	56.8	5.0	7.8	7.2
Incr Delay (d2), s/veh	0.9	0.7	15.7	0.5	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	3.3	2.1	4.2	2.9	9.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	50.0	48.2	72.6	5.5	8.0	7.6
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	274			2172	1214	
Approach Delay, s/veh	49.7			7.4	7.9	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.5		19.5	12.2	88.3
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		20.7		9.2	6.0	11.4
Green Ext Time (p_c), s		27.0		0.7	0.0	8.4

Intersection Summary	
HCM 6th Ctrl Delay	10.7
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	19	0	8	20	0	8
Future Vol, veh/h	19	0	8	20	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	85	85	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	0	9	22	0	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	21	0	50	11
Stage 1	-	-	-	-	21	-
Stage 2	-	-	-	-	29	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1593	-	953	1067
Stage 1	-	-	-	-	999	-
Stage 2	-	-	-	-	990	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1593	-	947	1067
Mov Cap-2 Maneuver	-	-	-	-	947	-
Stage 1	-	-	-	-	999	-
Stage 2	-	-	-	-	984	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.1	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1067	-	-	1593	-
HCM Lane V/C Ratio	0.008	-	-	0.006	-
HCM Control Delay (s)	8.4	-	-	7.3	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	6	4	114	4	291	3	1050	38	309	1625	21
Future Volume (veh/h)	18	6	4	114	4	291	3	1050	38	309	1625	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	20	7	0	125	4	320	3	1154	42	340	1786	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	170	108		286	9	288	162	2467	90	400	2977	
Arrive On Green	0.05	0.06	0.00	0.18	0.17	0.18	0.00	0.49	0.50	0.12	0.58	0.00
Sat Flow, veh/h	3456	1870	1585	1729	55	1585	1781	5057	184	3456	5106	1585
Grp Volume(v), veh/h	20	7	0	129	0	320	3	777	419	340	1786	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1784	0	1585	1781	1702	1837	1728	1702	1585
Q Serve(g_s), s	0.7	0.4	0.0	7.8	0.0	22.0	0.1	18.3	18.3	11.7	27.1	0.0
Cycle Q Clear(g_c), s	0.7	0.4	0.0	7.8	0.0	22.0	0.1	18.3	18.3	11.7	27.1	0.0
Prop In Lane	1.00		1.00	0.97		1.00	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	170	108		295	0	288	162	1661	896	400	2977	
V/C Ratio(X)	0.12	0.07		0.44	0.00	1.11	0.02	0.47	0.47	0.85	0.60	
Avail Cap(c_a), veh/h	600	340		295	0	288	317	1661	896	400	2977	
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	55.0	53.9	0.0	44.5	0.0	49.5	16.7	20.6	20.5	52.5	16.2	0.0
Incr Delay (d2), s/veh	0.3	0.3	0.0	1.0	0.0	86.0	0.0	0.9	1.8	15.8	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.2	0.0	3.5	0.0	15.5	0.0	6.9	7.6	5.7	9.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.3	54.2	0.0	45.6	0.0	135.5	16.7	21.5	22.2	68.3	17.1	0.0
LnGrp LOS	E	D		D	A	F	B	C	C	E	B	
Approach Vol, veh/h		27			449			1199			2126	
Approach Delay, s/veh		55.0			109.6			21.7			25.3	
Approach LOS		E			F			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.0	66.0		11.0	7.5	77.6		25.0				
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0				
Max Green Setting (Gmax), s	12.0	44.0		21.0	11.0	45.0		20.0				
Max Q Clear Time (g_c+I1), s	13.7	20.3		2.7	2.1	29.1		24.0				
Green Ext Time (p_c), s	0.0	7.4		0.0	0.0	10.1		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		34.3
HCM 6th LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	114	9	58	163	0	5	0	17	0	0	0
Future Vol, veh/h	0	114	9	58	163	0	5	0	17	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	137	11	70	196	0	6	0	20	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	196	0	0	148	0	0	473	473	137	489	484	196
Stage 1	-	-	-	-	-	-	137	137	-	336	336	-
Stage 2	-	-	-	-	-	-	336	336	-	153	148	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1377	-	-	1434	-	-	501	490	911	489	483	845
Stage 1	-	-	-	-	-	-	866	783	-	678	642	-
Stage 2	-	-	-	-	-	-	678	642	-	849	775	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1377	-	-	1434	-	-	482	466	911	460	459	845
Mov Cap-2 Maneuver	-	-	-	-	-	-	482	466	-	460	459	-
Stage 1	-	-	-	-	-	-	866	783	-	678	611	-
Stage 2	-	-	-	-	-	-	645	611	-	830	775	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2	9.8	0
HCM LOS			A	A

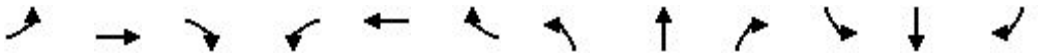
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	482	911	1377	-	-	1434	-	-	-	-
HCM Lane V/C Ratio	0.012	0.022	-	-	-	0.049	-	-	-	-
HCM Control Delay (s)	12.6	9	0	-	-	7.6	-	-	0	0
HCM Lane LOS	B	A	A	-	-	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0.2	-	-	-	-



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	25	19	990	1541	202
Future Volume (veh/h)	106	25	19	990	1541	202
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	108	26	19	1010	1572	206
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	427	196	50	3986	3588	1114
Arrive On Green	0.12	0.12	0.03	0.78	0.70	0.70
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	108	26	19	1010	1572	206
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	3.4	1.8	1.3	6.5	15.9	5.3
Cycle Q Clear(g_c), s	3.4	1.8	1.3	6.5	15.9	5.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	427	196	50	3986	3588	1114
V/C Ratio(X)	0.25	0.13	0.38	0.25	0.44	0.18
Avail Cap(c_a), veh/h	590	271	134	3986	3588	1114
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	47.6	46.9	57.3	3.6	7.7	6.1
Incr Delay (d2), s/veh	0.3	0.3	4.8	0.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.6	0.6	1.4	4.6	9.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	47.9	47.2	62.1	3.8	8.1	6.5
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	134			1029	1778	
Approach Delay, s/veh	47.7			4.8	7.9	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.7		19.3	9.3	91.3
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		8.5		5.4	3.3	17.9
Green Ext Time (p_c), s		7.5		0.3	0.0	16.3

Intersection Summary	
HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A



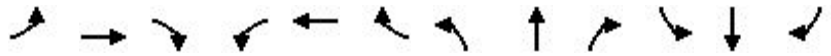
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	90	5	20	45	45	5	3	30	55	3	5
Future Volume (veh/h)	5	90	5	20	45	45	5	3	30	55	3	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	100	6	22	50	50	6	3	33	61	3	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	639	1215	542	646	1283	572	531	34	371	505	140	281
Arrive On Green	0.01	0.34	0.34	0.03	0.36	0.36	0.25	0.25	0.28	0.25	0.25	0.28
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1406	134	1472	1372	557	1113
Grp Volume(v), veh/h	6	100	6	22	50	50	6	0	36	61	0	9
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1406	0	1605	1372	0	1670
Q Serve(g_s), s	0.1	0.8	0.1	0.3	0.4	0.8	0.1	0.0	0.7	1.4	0.0	0.2
Cycle Q Clear(g_c), s	0.1	0.8	0.1	0.3	0.4	0.8	0.3	0.0	0.7	2.1	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.92	1.00		0.67
Lane Grp Cap(c), veh/h	639	1215	542	646	1283	572	531	0	405	505	0	421
V/C Ratio(X)	0.01	0.08	0.01	0.03	0.04	0.09	0.01	0.00	0.09	0.12	0.00	0.02
Avail Cap(c_a), veh/h	939	6996	3120	912	6996	3120	886	0	810	852	0	843
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.4	8.8	8.6	8.0	8.2	8.4	11.2	0.0	11.0	12.1	0.0	10.9
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.0	0.1	0.1	0.2	0.0	0.0	0.2	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	8.9	8.6	8.0	8.2	8.4	11.2	0.0	11.1	12.2	0.0	10.9
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	A	B
Approach Vol, veh/h		112			122			42			70	
Approach Delay, s/veh		8.8			8.3			11.1			12.0	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	18.5		15.0	5.3	19.3		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	2.8		4.1	2.1	2.8		2.7				
Green Ext Time (p_c), s	0.0	0.7		0.1	0.0	0.5		0.1				

Intersection Summary		
HCM 6th Ctrl Delay	9.6	
HCM 6th LOS	A	

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	160	15	70	95	80	10	3	45	65	5	4
Future Volume (veh/h)	3	160	15	70	95	80	10	3	45	65	5	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	176	16	77	104	88	11	3	49	71	5	4
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	403	734	327	465	956	427	155	79	515	721	400	320
Arrive On Green	0.00	0.21	0.21	0.07	0.27	0.27	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	163	191	1239	1352	962	770
Grp Volume(v), veh/h	3	176	16	77	104	88	63	0	0	71	0	9
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1594	0	0	1352	0	1732
Q Serve(g_s), s	0.1	2.0	0.4	1.6	1.1	2.1	0.0	0.0	0.0	0.1	0.0	0.1
Cycle Q Clear(g_c), s	0.1	2.0	0.4	1.6	1.1	2.1	1.1	0.0	0.0	1.2	0.0	0.1
Prop In Lane	1.00		1.00	1.00		1.00	0.17		0.78	1.00		0.44
Lane Grp Cap(c), veh/h	403	734	327	465	956	427	750	0	0	721	0	719
V/C Ratio(X)	0.01	0.24	0.05	0.17	0.11	0.21	0.08	0.00	0.00	0.10	0.00	0.01
Avail Cap(c_a), veh/h	654	5756	2567	605	5756	2567	750	0	0	721	0	719
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.0	16.0	15.3	13.3	13.2	13.6	8.6	0.0	0.0	8.6	0.0	8.3
Incr Delay (d2), s/veh	0.0	0.2	0.1	0.2	0.0	0.2	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.7	0.1	0.5	0.4	0.6	0.4	0.0	0.0	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	16.1	15.4	13.5	13.3	13.9	8.8	0.0	0.0	8.8	0.0	8.3
LnGrp LOS	B	B	B	B	B	B	A	A	A	A	A	A
Approach Vol, veh/h		195			269			63			80	
Approach Delay, s/veh		16.0			13.5			8.8			8.8	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	14.9		25.0	5.2	18.0		25.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.6	4.0		3.2	2.1	4.1		3.1				
Green Ext Time (p_c), s	0.0	1.2		0.2	0.0	1.0		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		13.2
HCM 6th LOS		B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	10	60	70	15	350	135	2040	55	120	1010	95
Future Volume (veh/h)	200	10	60	70	15	350	135	2040	55	120	1010	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	230	11	0	80	17	0	155	2345	63	138	1161	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	293	159		119	25		210	2959	79	194	2726	
Arrive On Green	0.08	0.08	0.00	0.10	0.08	0.00	0.12	0.58	0.60	0.06	0.53	0.00
Sat Flow, veh/h	3456	1870	1585	1481	315	1585	1781	5113	137	3456	5106	1585
Grp Volume(v), veh/h	230	11	0	97	0	0	155	1558	850	138	1161	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1796	0	1585	1781	1702	1846	1728	1702	1585
Q Serve(g_s), s	7.8	0.6	0.0	6.3	0.0	0.0	10.1	42.7	43.1	4.7	16.5	0.0
Cycle Q Clear(g_c), s	7.8	0.6	0.0	6.3	0.0	0.0	10.1	42.7	43.1	4.7	16.5	0.0
Prop In Lane	1.00		1.00	0.82		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	293	159		144	0		210	1970	1068	194	2726	
V/C Ratio(X)	0.78	0.07		0.67	0.00		0.74	0.79	0.80	0.71	0.43	
Avail Cap(c_a), veh/h	432	234		299	0		267	1970	1068	288	2726	
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)	0.99	0.99	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.8	50.5	0.0	52.9	0.0	0.0	51.1	19.6	19.7	55.7	16.9	0.0
Incr Delay (d2), s/veh	5.6	0.2	0.0	5.4	0.0	0.0	7.8	3.3	6.1	4.7	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.3	0.0	3.0	0.0	0.0	4.8	15.3	17.6	2.1	5.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.4	50.7	0.0	58.3	0.0	0.0	58.9	23.0	25.8	60.4	17.4	0.0
LnGrp LOS	E	D		E	A		E	C	C	E	B	
Approach Vol, veh/h		241			97			2563			1299	
Approach Delay, s/veh		59.0			58.3			26.1			21.9	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.7	76.5		15.2	19.1	71.1		14.6
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0
Max Green Setting (Gmax), s	10.0	51.0		15.0	16.0	45.0		20.0
Max Q Clear Time (g_c+I1), s	6.7	45.1		9.8	12.1	18.5		8.3
Green Ext Time (p_c), s	0.1	5.3		0.4	0.1	8.0		0.3

Intersection Summary	
HCM 6th Ctrl Delay	27.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	185	15	20	225	15	25	3	60	45	3	20
Future Vol, veh/h	10	185	15	20	225	15	25	3	60	45	3	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	240	19	26	292	19	32	4	78	58	4	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	311	0	0	259	0	0	635	629	240	661	629	292
Stage 1	-	-	-	-	-	-	266	266	-	344	344	-
Stage 2	-	-	-	-	-	-	369	363	-	317	285	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1249	-	-	1306	-	-	391	399	799	376	399	747
Stage 1	-	-	-	-	-	-	739	689	-	671	637	-
Stage 2	-	-	-	-	-	-	651	625	-	694	676	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1249	-	-	1306	-	-	366	387	799	329	387	747
Mov Cap-2 Maneuver	-	-	-	-	-	-	366	387	-	329	387	-
Stage 1	-	-	-	-	-	-	732	682	-	664	624	-
Stage 2	-	-	-	-	-	-	612	613	-	616	669	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.6	11.9	15.7
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	366	760	1249	-	-	1306	-	-	329	666
HCM Lane V/C Ratio	0.089	0.108	0.01	-	-	0.02	-	-	0.178	0.045
HCM Control Delay (s)	15.8	10.3	7.9	-	-	7.8	-	-	18.3	10.7
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0.4	0	-	-	0.1	-	-	0.6	0.1



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	235	55	55	1995	935	205
Future Volume (veh/h)	235	55	55	1995	935	205
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	276	65	65	2347	1100	241
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	98	3978	3443	1069
Arrive On Green	0.12	0.12	0.05	0.78	0.67	0.67
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	276	65	65	2347	1100	241
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	9.1	4.5	4.3	22.5	10.7	7.0
Cycle Q Clear(g_c), s	9.1	4.5	4.3	22.5	10.7	7.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	98	3978	3443	1069
V/C Ratio(X)	0.64	0.33	0.66	0.59	0.32	0.23
Avail Cap(c_a), veh/h	590	271	134	3978	3443	1069
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	49.9	47.9	55.6	5.4	8.1	7.5
Incr Delay (d2), s/veh	1.6	1.0	7.5	0.6	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	4.1	2.1	5.1	3.3	10.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	51.5	48.9	63.1	6.1	8.4	8.0
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	341			2412	1341	
Approach Delay, s/veh	51.0			7.6	8.3	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.5		19.5	12.6	87.9
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		24.5		11.1	6.3	12.7
Green Ext Time (p_c), s		32.6		0.8	0.0	9.7

Intersection Summary		
HCM 6th Ctrl Delay	11.4	
HCM 6th LOS	B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	100	5	30	35	70	5	5	25	200	5	5
Future Volume (veh/h)	5	100	5	30	35	70	5	5	25	200	5	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	111	6	33	39	78	6	6	28	222	6	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	632	1227	547	659	1334	595	516	71	331	495	212	212
Arrive On Green	0.01	0.35	0.35	0.04	0.38	0.38	0.25	0.25	0.27	0.25	0.25	0.27
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1402	287	1341	1375	858	858
Grp Volume(v), veh/h	6	111	6	33	39	78	6	0	34	222	0	12
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1402	0	1629	1375	0	1716
Q Serve(g_s), s	0.1	0.9	0.1	0.5	0.3	1.3	0.1	0.0	0.6	6.0	0.0	0.2
Cycle Q Clear(g_c), s	0.1	0.9	0.1	0.5	0.3	1.3	0.3	0.0	0.6	6.6	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.82	1.00		0.50
Lane Grp Cap(c), veh/h	632	1227	547	659	1334	595	516	0	402	495	0	423
V/C Ratio(X)	0.01	0.09	0.01	0.05	0.03	0.13	0.01	0.00	0.08	0.45	0.00	0.03
Avail Cap(c_a), veh/h	925	6836	3049	898	6836	3049	862	0	803	834	0	846
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.5	9.0	8.7	7.9	8.0	8.3	11.7	0.0	11.4	14.3	0.0	11.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.0	0.1	0.1	0.3	0.0	0.0	0.2	1.6	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.5	9.0	8.7	7.9	8.0	8.4	11.7	0.0	11.5	14.9	0.0	11.4
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	A	B
Approach Vol, veh/h		123			150			40			234	
Approach Delay, s/veh		9.0			8.2			11.5			14.8	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	19.0		15.0	5.3	20.2		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.5	2.9		8.6	2.1	3.3		2.6				
Green Ext Time (p_c), s	0.0	0.8		0.5	0.0	0.5		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		11.4
HCM 6th LOS		B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	180	10	55	125	140	10	4	55	240	3	3
Future Volume (veh/h)	4	180	10	55	125	140	10	4	55	240	3	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	4	200	11	61	139	156	11	4	61	267	3	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	387	743	331	444	930	415	137	82	538	723	359	359
Arrive On Green	0.01	0.21	0.21	0.06	0.26	0.26	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	121	195	1284	1337	858	858
Grp Volume(v), veh/h	4	200	11	61	139	156	76	0	0	267	0	6
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1600	0	0	1337	0	1716
Q Serve(g_s), s	0.1	2.3	0.3	1.2	1.4	3.8	0.0	0.0	0.0	5.0	0.0	0.1
Cycle Q Clear(g_c), s	0.1	2.3	0.3	1.2	1.4	3.8	1.4	0.0	0.0	6.4	0.0	0.1
Prop In Lane	1.00		1.00	1.00		1.00	0.14		0.80	1.00		0.50
Lane Grp Cap(c), veh/h	387	743	331	444	930	415	756	0	0	723	0	719
V/C Ratio(X)	0.01	0.27	0.03	0.14	0.15	0.38	0.10	0.00	0.00	0.37	0.00	0.01
Avail Cap(c_a), veh/h	639	5803	2589	601	5803	2589	756	0	0	723	0	719
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.8	15.8	15.0	13.3	13.5	14.4	8.5	0.0	0.0	9.8	0.0	8.1
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.1	0.1	0.6	0.3	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.8	0.1	0.4	0.5	1.2	0.4	0.0	0.0	1.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.8	16.0	15.1	13.5	13.6	15.0	8.7	0.0	0.0	11.3	0.0	8.1
LnGrp LOS	B	B	B	B	B	B	A	A	A	B	A	A
Approach Vol, veh/h		215			356			76			273	
Approach Delay, s/veh		15.9			14.2			8.7			11.2	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	15.0		25.0	5.3	17.5		25.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.8	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.2	4.3		8.4	2.1	5.8		3.4				
Green Ext Time (p_c), s	0.0	1.4		0.7	0.0	1.4		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	325	25	125	115	25	300	100	1115	45	325	1725	195
Future Volume (veh/h)	325	25	125	115	25	300	100	1115	45	325	1725	195
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	353	27	0	125	27	0	109	1212	49	353	1875	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	427	231		148	32		135	2409	97	400	2563	
Arrive On Green	0.12	0.12	0.00	0.12	0.10	0.00	0.08	0.48	0.50	0.12	0.50	0.00
Sat Flow, veh/h	3456	1870	1585	1477	319	1585	1781	5034	203	3456	5106	1585
Grp Volume(v), veh/h	353	27	0	152	0	0	109	819	442	353	1875	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1796	0	1585	1781	1702	1834	1728	1702	1585
Q Serve(g_s), s	12.1	1.6	0.0	10.0	0.0	0.0	7.3	20.0	20.0	12.2	35.0	0.0
Cycle Q Clear(g_c), s	12.1	1.6	0.0	10.0	0.0	0.0	7.3	20.0	20.0	12.2	35.0	0.0
Prop In Lane	1.00		1.00	0.82		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	427	231		180	0		135	1629	878	400	2563	
V/C Ratio(X)	0.83	0.12		0.84	0.00		0.81	0.50	0.50	0.88	0.73	
Avail Cap(c_a), veh/h	628	340		223	0		250	1629	878	400	2563	
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)	0.93	0.93	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.8	47.2	0.0	52.7	0.0	0.0	55.0	21.7	21.6	52.7	23.7	0.0
Incr Delay (d2), s/veh	5.5	0.2	0.0	20.8	0.0	0.0	10.7	1.1	2.1	20.1	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.7	0.0	5.5	0.0	0.0	3.5	7.5	8.3	6.2	13.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	47.4	0.0	73.5	0.0	0.0	65.8	22.8	23.6	72.8	25.6	0.0
LnGrp LOS	E	D		E	A		E	C	C	E	C	
Approach Vol, veh/h		380			152			1370			2228	
Approach Delay, s/veh		56.5			73.5			26.5			33.1	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	19.0	64.9		19.9	16.2	67.7		17.1
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0
Max Green Setting (Gmax), s	12.0	48.0		22.0	17.0	43.0		15.0
Max Q Clear Time (g_c+I1), s	14.2	22.0		14.1	9.3	37.0		12.0
Green Ext Time (p_c), s	0.0	8.2		0.9	0.1	4.8		0.2

Intersection Summary	
HCM 6th Ctrl Delay	34.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	120	25	60	170	45	10	5	20	20	5	15
Future Vol, veh/h	25	120	25	60	170	45	10	5	20	20	5	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	145	30	72	205	54	12	6	24	24	6	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	259	0	0	175	0	0	593	608	145	584	584	205
Stage 1	-	-	-	-	-	-	205	205	-	349	349	-
Stage 2	-	-	-	-	-	-	388	403	-	235	235	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1306	-	-	1401	-	-	417	410	902	423	423	836
Stage 1	-	-	-	-	-	-	797	732	-	667	633	-
Stage 2	-	-	-	-	-	-	636	600	-	768	710	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1306	-	-	1401	-	-	381	380	902	384	392	836
Mov Cap-2 Maneuver	-	-	-	-	-	-	381	380	-	384	392	-
Stage 1	-	-	-	-	-	-	779	715	-	652	601	-
Stage 2	-	-	-	-	-	-	584	569	-	724	694	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	1.7	11.6	12.9
HCM LOS			B	B

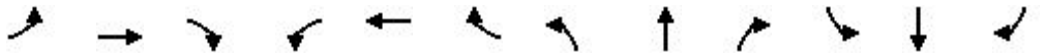
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	381	708	1306	-	-	1401	-	-	384	652
HCM Lane V/C Ratio	0.032	0.043	0.023	-	-	0.052	-	-	0.063	0.037
HCM Control Delay (s)	14.8	10.3	7.8	-	-	7.7	-	-	15	10.7
HCM Lane LOS	B	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	0.1	0.1	-	-	0.2	-	-	0.2	0.1



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	130	30	30	1130	1720	245
Future Volume (veh/h)	130	30	30	1130	1720	245
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	133	31	31	1153	1755	250
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	430	197	63	3981	3546	1101
Arrive On Green	0.12	0.12	0.04	0.78	0.69	0.69
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	133	31	31	1153	1755	250
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	4.2	2.1	2.1	7.7	19.2	6.9
Cycle Q Clear(g_c), s	4.2	2.1	2.1	7.7	19.2	6.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	430	197	63	3981	3546	1101
V/C Ratio(X)	0.31	0.16	0.49	0.29	0.49	0.23
Avail Cap(c_a), veh/h	590	271	134	3981	3546	1101
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	47.8	46.9	56.8	3.8	8.5	6.6
Incr Delay (d2), s/veh	0.4	0.4	5.9	0.2	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.0	1.0	1.7	5.7	11.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	48.2	47.3	62.8	3.9	9.0	7.1
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	164			1184	2005	
Approach Delay, s/veh	48.1			5.5	8.8	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.6		19.4	10.2	90.3
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		9.7		6.2	4.1	21.2
Green Ext Time (p_c), s		9.1		0.4	0.0	19.7

Intersection Summary	
HCM 6th Ctrl Delay	9.5
HCM 6th LOS	A



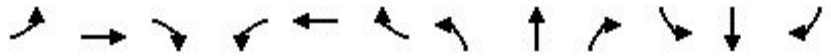
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	90	5	38	45	45	5	3	81	55	3	5
Future Volume (veh/h)	5	90	5	38	45	45	5	3	81	55	3	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	100	6	42	50	50	6	3	90	61	3	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	628	1195	533	669	1332	594	519	13	381	440	137	275
Arrive On Green	0.01	0.34	0.34	0.05	0.37	0.37	0.25	0.25	0.27	0.25	0.25	0.27
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1406	51	1542	1303	557	1113
Grp Volume(v), veh/h	6	100	6	42	50	50	6	0	93	61	0	9
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1406	0	1593	1303	0	1670
Q Serve(g_s), s	0.1	0.8	0.1	0.6	0.4	0.8	0.1	0.0	1.8	1.6	0.0	0.2
Cycle Q Clear(g_c), s	0.1	0.8	0.1	0.6	0.4	0.8	0.3	0.0	1.8	3.4	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.67
Lane Grp Cap(c), veh/h	628	1195	533	669	1332	594	519	0	393	440	0	412
V/C Ratio(X)	0.01	0.08	0.01	0.06	0.04	0.08	0.01	0.00	0.24	0.14	0.00	0.02
Avail Cap(c_a), veh/h	921	6844	3053	894	6844	3053	866	0	787	762	0	825
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	9.2	9.0	7.9	8.0	8.2	11.7	0.0	11.8	13.5	0.0	11.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.0	0.2	0.1	0.2	0.0	0.0	0.6	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.7	9.2	9.0	7.9	8.0	8.2	11.7	0.0	12.1	13.7	0.0	11.3
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	A	B
Approach Vol, veh/h		112			142			99			70	
Approach Delay, s/veh		9.2			8.1			12.1			13.4	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	18.6		15.0	5.3	20.2		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.6	2.8		5.4	2.1	2.8		3.8				
Green Ext Time (p_c), s	0.0	0.7		0.1	0.0	0.5		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		10.2
HCM 6th LOS		B

Notes

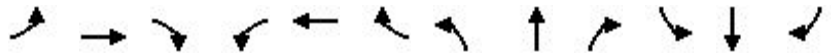
User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	211	15	70	113	80	10	3	45	65	5	4
Future Volume (veh/h)	3	211	15	70	113	80	10	3	45	65	5	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	234	17	78	126	89	11	3	50	72	6	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	398	736	328	440	960	428	153	79	516	720	434	289
Arrive On Green	0.00	0.21	0.21	0.07	0.27	0.27	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	159	190	1245	1351	1047	698
Grp Volume(v), veh/h	3	234	17	78	126	89	64	0	0	72	0	10
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1594	0	0	1351	0	1745
Q Serve(g_s), s	0.1	2.7	0.4	1.6	1.3	2.1	0.0	0.0	0.0	0.1	0.0	0.2
Cycle Q Clear(g_c), s	0.1	2.7	0.4	1.6	1.3	2.1	1.1	0.0	0.0	1.2	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	0.17		0.78	1.00		0.40
Lane Grp Cap(c), veh/h	398	736	328	440	960	428	748	0	0	720	0	724
V/C Ratio(X)	0.01	0.32	0.05	0.18	0.13	0.21	0.09	0.00	0.00	0.10	0.00	0.01
Avail Cap(c_a), veh/h	649	5748	2564	578	5748	2564	748	0	0	720	0	724
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.0	16.2	15.3	13.3	13.3	13.6	8.6	0.0	0.0	8.6	0.0	8.3
Incr Delay (d2), s/veh	0.0	0.2	0.1	0.2	0.1	0.2	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.0	0.1	0.6	0.4	0.7	0.4	0.0	0.0	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	16.5	15.4	13.5	13.4	13.8	8.8	0.0	0.0	8.9	0.0	8.3
LnGrp LOS	B	B	B	B	B	B	A	A	A	A	A	A
Approach Vol, veh/h		254			293			64			82	
Approach Delay, s/veh		16.4			13.6			8.8			8.8	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	15.0		25.0	5.2	18.0		25.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.3	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.6	4.7		3.2	2.1	4.1		3.1				
Green Ext Time (p_c), s	0.0	1.6		0.2	0.0	1.1		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	251	10	60	70	15	350	135	2040	55	120	1010	113
Future Volume (veh/h)	251	10	60	70	15	350	135	2040	55	120	1010	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	289	11	0	80	17	0	155	2345	63	138	1161	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	350	190		119	25		210	2875	77	194	2642	
Arrive On Green	0.10	0.10	0.00	0.10	0.08	0.00	0.12	0.56	0.58	0.06	0.52	0.00
Sat Flow, veh/h	3456	1870	1585	1481	315	1585	1781	5113	137	3456	5106	1585
Grp Volume(v), veh/h	289	11	0	97	0	0	155	1558	850	138	1161	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1796	0	1585	1781	1702	1846	1728	1702	1585
Q Serve(g_s), s	9.8	0.6	0.0	6.3	0.0	0.0	10.1	44.3	44.8	4.7	17.0	0.0
Cycle Q Clear(g_c), s	9.8	0.6	0.0	6.3	0.0	0.0	10.1	44.3	44.8	4.7	17.0	0.0
Prop In Lane	1.00		1.00	0.82		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	350	190		144	0		210	1914	1038	194	2642	
V/C Ratio(X)	0.82	0.06		0.67	0.00		0.74	0.81	0.82	0.71	0.44	
Avail Cap(c_a), veh/h	432	234		299	0		267	1914	1038	288	2642	
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)	0.97	0.97	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	52.9	48.7	0.0	52.9	0.0	0.0	51.1	21.2	21.2	55.7	18.1	0.0
Incr Delay (d2), s/veh	10.0	0.1	0.0	5.4	0.0	0.0	7.8	3.9	7.2	4.7	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.3	0.0	3.0	0.0	0.0	4.8	16.3	18.7	2.1	6.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.9	48.9	0.0	58.3	0.0	0.0	58.9	25.1	28.4	60.4	18.6	0.0
LnGrp LOS	E	D		E	A		E	C	C	E	B	
Approach Vol, veh/h		300			97			2563			1299	
Approach Delay, s/veh		62.4			58.3			28.3			23.1	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.7	74.5		17.2	19.1	69.1		14.6
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0
Max Green Setting (Gmax), s	10.0	51.0		15.0	16.0	45.0		20.0
Max Q Clear Time (g_c+I1), s	6.7	46.8		11.8	12.1	19.0		8.3
Green Ext Time (p_c), s	0.1	3.8		0.3	0.1	7.9		0.3

Intersection Summary	
HCM 6th Ctrl Delay	29.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	185	15	20	225	17	25	3	60	52	3	26
Future Vol, veh/h	12	185	15	20	225	17	25	3	60	52	3	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	240	19	26	292	22	32	4	78	68	4	34

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	314	0	0	259	0	0	646	638	240	667	635	292
Stage 1	-	-	-	-	-	-	272	272	-	344	344	-
Stage 2	-	-	-	-	-	-	374	366	-	323	291	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1246	-	-	1306	-	-	385	394	799	372	396	747
Stage 1	-	-	-	-	-	-	734	685	-	671	637	-
Stage 2	-	-	-	-	-	-	647	623	-	689	672	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1246	-	-	1306	-	-	356	381	799	325	383	747
Mov Cap-2 Maneuver	-	-	-	-	-	-	356	381	-	325	383	-
Stage 1	-	-	-	-	-	-	724	676	-	662	624	-
Stage 2	-	-	-	-	-	-	602	611	-	610	663	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.6	11.9	16
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	356	759	1246	-	-	1306	-	-	325	680
HCM Lane V/C Ratio	0.091	0.108	0.013	-	-	0.02	-	-	0.208	0.055
HCM Control Delay (s)	16.1	10.3	7.9	-	-	7.8	-	-	19	10.6
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0.4	0	-	-	0.1	-	-	0.8	0.2



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	235	62	57	1995	935	205
Future Volume (veh/h)	235	62	57	1995	935	205
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	276	73	67	2347	1100	241
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	100	3978	3436	1067
Arrive On Green	0.12	0.12	0.06	0.78	0.67	0.67
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	276	73	67	2347	1100	241
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	9.1	5.1	4.4	22.5	10.8	7.0
Cycle Q Clear(g_c), s	9.1	5.1	4.4	22.5	10.8	7.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	100	3978	3436	1067
V/C Ratio(X)	0.64	0.37	0.67	0.59	0.32	0.23
Avail Cap(c_a), veh/h	590	271	134	3978	3436	1067
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	49.9	48.2	55.5	5.4	8.2	7.6
Incr Delay (d2), s/veh	1.6	1.1	7.5	0.6	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	4.6	2.1	5.1	3.3	10.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	51.5	49.3	63.1	6.1	8.4	8.1
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	349			2414	1341	
Approach Delay, s/veh	51.0			7.6	8.4	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.5		19.5	12.8	87.7
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		24.5		11.1	6.4	12.8
Green Ext Time (p_c), s		32.6		0.8	0.0	9.7

Intersection Summary		
HCM 6th Ctrl Delay	11.6	
HCM 6th LOS	B	

Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	27	39	1	10	18
Future Vol, veh/h	2	27	39	1	10	18
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	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	31	44	1	11	20

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	87	45	0	0	45	0
Stage 1	45	-	-	-	-	-
Stage 2	42	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	914	1025	-	-	1563	-
Stage 1	977	-	-	-	-	-
Stage 2	980	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	908	1025	-	-	1563	-
Mov Cap-2 Maneuver	908	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	973	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	2.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1016	1563	-
HCM Lane V/C Ratio	-	-	0.032	0.007	-
HCM Control Delay (s)	-	-	8.7	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	0	4	7	0	19	1	16	2	6	12	2
Future Vol, veh/h	5	0	4	7	0	19	1	16	2	6	12	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	5	8	0	22	1	18	2	7	14	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	61	51	15	53	51	19	16	0	0	20	0	0
Stage 1	29	29	-	21	21	-	-	-	-	-	-	-
Stage 2	32	22	-	32	30	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	934	840	1065	946	840	1059	1602	-	-	1596	-	-
Stage 1	988	871	-	998	878	-	-	-	-	-	-	-
Stage 2	984	877	-	984	870	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	912	836	1065	938	836	1059	1602	-	-	1596	-	-
Mov Cap-2 Maneuver	912	836	-	938	836	-	-	-	-	-	-	-
Stage 1	987	868	-	997	877	-	-	-	-	-	-	-
Stage 2	963	876	-	976	867	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.7	8.6	0.4	2.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1602	-	-	974	1023	1596	-	-
HCM Lane V/C Ratio	0.001	-	-	0.011	0.029	0.004	-	-
HCM Control Delay (s)	7.2	0	-	8.7	8.6	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	100	5	86	35	70	5	5	59	200	5	5
Future Volume (veh/h)	5	100	5	86	35	70	5	5	59	200	5	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	111	6	96	39	78	6	6	66	222	6	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	596	1159	517	695	1411	629	508	33	367	452	214	214
Arrive On Green	0.01	0.33	0.33	0.08	0.40	0.40	0.25	0.25	0.27	0.25	0.25	0.27
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1402	134	1472	1328	858	858
Grp Volume(v), veh/h	6	111	6	96	39	78	6	0	72	222	0	12
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1402	0	1605	1328	0	1716
Q Serve(g_s), s	0.1	0.9	0.1	1.5	0.3	1.4	0.1	0.0	1.5	6.8	0.0	0.2
Cycle Q Clear(g_c), s	0.1	0.9	0.1	1.5	0.3	1.4	0.4	0.0	1.5	8.3	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.92	1.00		0.50
Lane Grp Cap(c), veh/h	596	1159	517	695	1411	629	508	0	401	452	0	428
V/C Ratio(X)	0.01	0.10	0.01	0.14	0.03	0.12	0.01	0.00	0.18	0.49	0.00	0.03
Avail Cap(c_a), veh/h	869	6381	2846	841	6381	2846	804	0	739	732	0	790
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.7	10.2	9.9	8.1	8.0	8.3	12.5	0.0	12.4	16.1	0.0	12.1
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.2	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	0.0	0.4	0.1	0.4	0.0	0.0	0.5	1.9	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.7	10.2	9.9	8.2	8.0	8.4	12.5	0.0	12.6	16.9	0.0	12.2
LnGrp LOS	A	B	A	A	A	A	B	A	B	B	A	B
Approach Vol, veh/h		123			213			78			234	
Approach Delay, s/veh		10.2			8.2			12.6			16.7	
Approach LOS		B			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.4	19.2		15.8	5.3	22.3		15.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.5	2.9		10.3	2.1	3.4		3.5				
Green Ext Time (p_c), s	0.1	0.8		0.5	0.0	0.5		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		12.2	
HCM 6th LOS		B	

Notes

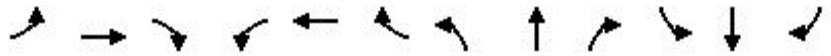
User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	214	10	55	181	140	10	4	55	240	3	3
Future Volume (veh/h)	4	214	10	55	181	140	10	4	55	240	3	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	4	238	11	61	201	156	11	4	61	267	3	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	375	744	332	427	931	415	137	82	538	723	359	359
Arrive On Green	0.01	0.21	0.21	0.06	0.26	0.26	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	121	195	1284	1337	858	858
Grp Volume(v), veh/h	4	238	11	61	201	156	76	0	0	267	0	6
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1600	0	0	1337	0	1716
Q Serve(g_s), s	0.1	2.7	0.3	1.2	2.1	3.8	0.0	0.0	0.0	5.0	0.0	0.1
Cycle Q Clear(g_c), s	0.1	2.7	0.3	1.2	2.1	3.8	1.4	0.0	0.0	6.4	0.0	0.1
Prop In Lane	1.00		1.00	1.00		1.00	0.14		0.80	1.00		0.50
Lane Grp Cap(c), veh/h	375	744	332	427	931	415	756	0	0	723	0	718
V/C Ratio(X)	0.01	0.32	0.03	0.14	0.22	0.38	0.10	0.00	0.00	0.37	0.00	0.01
Avail Cap(c_a), veh/h	626	5802	2588	584	5802	2588	756	0	0	723	0	718
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.8	16.0	15.0	13.4	13.8	14.4	8.5	0.0	0.0	9.8	0.0	8.1
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.2	0.1	0.6	0.3	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.0	0.1	0.4	0.7	1.2	0.4	0.0	0.0	1.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.8	16.3	15.1	13.5	13.9	15.0	8.7	0.0	0.0	11.3	0.0	8.1
LnGrp LOS	B	B	B	B	B	B	A	A	A	B	A	A
Approach Vol, veh/h		253			418			76			273	
Approach Delay, s/veh		16.2			14.3			8.7			11.2	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	15.0		25.0	5.3	17.5		25.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.8	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.2	4.7		8.4	2.1	5.8		3.4				
Green Ext Time (p_c), s	0.0	1.7		0.7	0.0	1.9		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	359	25	125	115	25	300	100	1115	45	325	1725	251
Future Volume (veh/h)	359	25	125	115	25	300	100	1115	45	325	1725	251
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	390	27	0	125	27	0	109	1212	49	353	1875	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	463	251		148	32		135	2357	95	400	2510	
Arrive On Green	0.13	0.13	0.00	0.12	0.10	0.00	0.08	0.47	0.48	0.12	0.49	0.00
Sat Flow, veh/h	3456	1870	1585	1477	319	1585	1781	5034	203	3456	5106	1585
Grp Volume(v), veh/h	390	27	0	152	0	0	109	819	442	353	1875	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1796	0	1585	1781	1702	1834	1728	1702	1585
Q Serve(g_s), s	13.3	1.5	0.0	10.0	0.0	0.0	7.3	20.4	20.4	12.2	35.7	0.0
Cycle Q Clear(g_c), s	13.3	1.5	0.0	10.0	0.0	0.0	7.3	20.4	20.4	12.2	35.7	0.0
Prop In Lane	1.00		1.00	0.82		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	463	251		180	0		135	1593	858	400	2510	
V/C Ratio(X)	0.84	0.11		0.84	0.00		0.81	0.51	0.51	0.88	0.75	
Avail Cap(c_a), veh/h	628	340		223	0		250	1593	858	400	2510	
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)	0.92	0.92	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.1	46.0	0.0	52.7	0.0	0.0	55.0	22.5	22.5	52.7	24.7	0.0
Incr Delay (d2), s/veh	7.0	0.2	0.0	20.8	0.0	0.0	10.7	1.2	2.2	20.1	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.7	0.0	5.5	0.0	0.0	3.5	7.8	8.5	6.2	13.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.2	46.2	0.0	73.5	0.0	0.0	65.8	23.7	24.7	72.8	26.8	0.0
LnGrp LOS	E	D		E	A		E	C	C	E	C	
Approach Vol, veh/h		417			152			1370			2228	
Approach Delay, s/veh		57.4			73.5			27.4			34.1	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	19.0	63.6		21.2	16.2	66.5		17.1
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0
Max Green Setting (Gmax), s	12.0	48.0		22.0	17.0	43.0		15.0
Max Q Clear Time (g_c+I1), s	14.3	22.4		15.3	9.3	37.7		12.0
Green Ext Time (p_c), s	0.0	8.1		0.9	0.1	4.3		0.2

Intersection Summary	
HCM 6th Ctrl Delay	35.6
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	120	25	60	170	52	10	5	20	24	5	19
Future Vol, veh/h	32	120	25	60	170	52	10	5	20	24	5	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	39	145	30	72	205	63	12	6	24	29	6	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	268	0	0	175	0	0	618	635	145	602	602	205
Stage 1	-	-	-	-	-	-	223	223	-	349	349	-
Stage 2	-	-	-	-	-	-	395	412	-	253	253	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1296	-	-	1401	-	-	402	396	902	412	414	836
Stage 1	-	-	-	-	-	-	780	719	-	667	633	-
Stage 2	-	-	-	-	-	-	630	594	-	751	698	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1296	-	-	1401	-	-	363	365	902	372	381	836
Mov Cap-2 Maneuver	-	-	-	-	-	-	363	365	-	372	381	-
Stage 1	-	-	-	-	-	-	757	697	-	647	601	-
Stage 2	-	-	-	-	-	-	575	564	-	703	677	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	1.6	11.8	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	363	697	1296	-	-	1401	-	-	372	669
HCM Lane V/C Ratio	0.033	0.043	0.03	-	-	0.052	-	-	0.078	0.043
HCM Control Delay (s)	15.3	10.4	7.9	-	-	7.7	-	-	15.5	10.6
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	0.1	0.1	-	-	0.2	-	-	0.3	0.1



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	130	34	37	1130	1720	245
Future Volume (veh/h)	130	34	37	1130	1720	245
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	133	35	38	1153	1755	250
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	430	197	68	3981	3530	1096
Arrive On Green	0.12	0.12	0.04	0.78	0.69	0.69
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	133	35	38	1153	1755	250
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	4.2	2.4	2.5	7.7	19.4	6.9
Cycle Q Clear(g_c), s	4.2	2.4	2.5	7.7	19.4	6.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	430	197	68	3981	3530	1096
V/C Ratio(X)	0.31	0.18	0.56	0.29	0.50	0.23
Avail Cap(c_a), veh/h	590	271	134	3981	3530	1096
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	47.8	47.0	56.7	3.8	8.7	6.8
Incr Delay (d2), s/veh	0.4	0.4	6.9	0.2	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.2	1.2	1.7	5.8	11.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	48.2	47.4	63.7	3.9	9.2	7.3
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	168			1191	2005	
Approach Delay, s/veh	48.1			5.9	9.0	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.6		19.4	10.6	90.0
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		9.7		6.2	4.5	21.4
Green Ext Time (p_c), s		9.1		0.4	0.0	19.7

Intersection Summary	
HCM 6th Ctrl Delay	9.8
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	18	26	3	30	41
Future Vol, veh/h	2	18	26	3	30	41
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	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	20	30	3	34	47

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	147	32	0	0	33	0
Stage 1	32	-	-	-	-	-
Stage 2	115	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	845	1042	-	-	1579	-
Stage 1	991	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	826	1042	-	-	1579	-
Mov Cap-2 Maneuver	826	-	-	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	890	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	3.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1015	1579	-
HCM Lane V/C Ratio	-	-	0.022	0.022	-
HCM Control Delay (s)	-	-	8.6	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

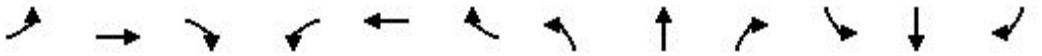
Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	2	4	0	14	4	13	7	19	17	5
Future Vol, veh/h	2	0	2	4	0	14	4	13	7	19	17	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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	2	5	0	16	5	15	8	22	19	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	103	99	22	96	98	19	25	0	0	23	0	0
Stage 1	66	66	-	29	29	-	-	-	-	-	-	-
Stage 2	37	33	-	67	69	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	877	791	1055	887	792	1059	1589	-	-	1592	-	-
Stage 1	945	840	-	988	871	-	-	-	-	-	-	-
Stage 2	978	868	-	943	837	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	852	778	1055	874	779	1059	1589	-	-	1592	-	-
Mov Cap-2 Maneuver	852	778	-	874	779	-	-	-	-	-	-	-
Stage 1	942	828	-	985	868	-	-	-	-	-	-	-
Stage 2	960	865	-	928	825	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	8.6	1.2	3.4
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1589	-	-	943	1011	1592	-	-
HCM Lane V/C Ratio	0.003	-	-	0.005	0.02	0.014	-	-
HCM Control Delay (s)	7.3	0	-	8.8	8.6	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-



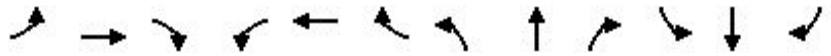
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	230	25	20	515	50	60	25	35	60	25	35
Future Volume (veh/h)	100	230	25	20	515	50	60	25	35	60	25	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	109	250	27	22	560	54	65	27	38	65	27	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	493	1424	635	591	1221	544	430	161	227	430	161	227
Arrive On Green	0.08	0.40	0.40	0.03	0.34	0.34	0.23	0.23	0.25	0.23	0.23	0.25
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1337	703	989	1337	703	989
Grp Volume(v), veh/h	109	250	27	22	560	54	65	0	65	65	0	65
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1337	0	1692	1337	0	1692
Q Serve(g_s), s	1.6	2.0	0.5	0.3	5.4	1.0	1.8	0.0	1.3	1.8	0.0	1.3
Cycle Q Clear(g_c), s	1.6	2.0	0.5	0.3	5.4	1.0	3.1	0.0	1.3	3.1	0.0	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.58	1.00		0.58
Lane Grp Cap(c), veh/h	493	1424	635	591	1221	544	430	0	388	430	0	388
V/C Ratio(X)	0.22	0.18	0.04	0.04	0.46	0.10	0.15	0.00	0.17	0.15	0.00	0.17
Avail Cap(c_a), veh/h	629	6348	2831	829	6348	2831	737	0	775	737	0	775
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.0	8.4	8.0	8.8	11.2	9.7	14.7	0.0	13.3	14.7	0.0	13.3
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.0	0.3	0.1	0.2	0.0	0.2	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.6	0.1	0.1	1.7	0.3	0.5	0.0	0.5	0.5	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.2	8.5	8.0	8.8	11.4	9.8	14.9	0.0	13.5	14.9	0.0	13.5
LnGrp LOS	A	A	A	A	B	A	B	A	B	B	A	B
Approach Vol, veh/h		386			636			130			130	
Approach Delay, s/veh		8.4			11.2			14.2			14.2	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	22.5		15.0	8.7	20.0		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	4.0		5.1	3.6	7.4		5.1				
Green Ext Time (p_c), s	0.0	1.8		0.4	0.1	4.4		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		11.0
HCM 6th LOS		B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	220	55	70	525	90	35	5	50	60	5	25
Future Volume (veh/h)	50	220	55	70	525	90	35	5	50	60	5	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	239	60	76	571	98	38	5	54	65	5	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	332	912	407	474	955	426	291	71	332	677	98	532
Arrive On Green	0.05	0.26	0.26	0.06	0.27	0.27	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	500	182	856	1344	254	1370
Grp Volume(v), veh/h	54	239	60	76	571	98	97	0	0	65	0	32
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1537	0	0	1344	0	1624
Q Serve(g_s), s	1.1	2.8	1.5	1.6	7.2	2.5	0.0	0.0	0.0	0.0	0.0	0.6
Cycle Q Clear(g_c), s	1.1	2.8	1.5	1.6	7.2	2.5	1.9	0.0	0.0	1.2	0.0	0.6
Prop In Lane	1.00		1.00	1.00		1.00	0.39		0.56	1.00		0.84
Lane Grp Cap(c), veh/h	332	912	407	474	955	426	694	0	0	677	0	630
V/C Ratio(X)	0.16	0.26	0.15	0.16	0.60	0.23	0.14	0.00	0.00	0.10	0.00	0.05
Avail Cap(c_a), veh/h	480	5378	2399	601	5378	2399	694	0	0	677	0	630
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.1	15.3	14.8	12.5	16.4	14.7	10.2	0.0	0.0	10.0	0.0	9.8
Incr Delay (d2), s/veh	0.2	0.2	0.2	0.2	0.6	0.3	0.4	0.0	0.0	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.0	0.5	0.5	2.6	0.8	0.7	0.0	0.0	0.5	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.4	15.4	15.0	12.7	17.0	15.0	10.7	0.0	0.0	10.3	0.0	10.0
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	A	A
Approach Vol, veh/h		353			745			97			97	
Approach Delay, s/veh		15.0			16.3			10.7			10.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.3	18.2		25.0	7.7	18.8		25.0
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	7.3	78.0		20.0	7.0	78.0		20.0
Max Q Clear Time (g_c+I1), s	3.6	4.8		3.2	3.1	9.2		3.9
Green Ext Time (p_c), s	0.0	1.8		0.3	0.0	4.6		0.4

Intersection Summary		
HCM 6th Ctrl Delay		15.1
HCM 6th LOS		B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	205	50	75	75	130	375	415	2565	70	150	1270	140
Future Volume (veh/h)	205	50	75	75	130	375	415	2565	70	150	1270	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	216	53	0	79	137	0	437	2700	74	158	1337	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	298	209		277	200		490	2972	81	230	2586	
Arrive On Green	0.09	0.11	0.00	0.06	0.11	0.00	0.14	0.58	0.60	0.07	0.51	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1870	1585	3456	5110	139	3456	5106	1585
Grp Volume(v), veh/h	216	53	0	79	137	0	437	1792	982	158	1337	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	1870	1585	1728	1702	1845	1728	1702	1585
Q Serve(g_s), s	7.3	3.1	0.0	4.7	8.5	0.0	14.9	55.8	57.1	5.4	21.0	0.0
Cycle Q Clear(g_c), s	7.3	3.1	0.0	4.7	8.5	0.0	14.9	55.8	57.1	5.4	21.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	298	209		277	200		490	1979	1073	230	2586	
V/C Ratio(X)	0.72	0.25		0.29	0.68		0.89	0.91	0.92	0.69	0.52	
Avail Cap(c_a), veh/h	317	312		325	343		490	1979	1073	230	2586	
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)	0.98	0.98	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.4	48.7	0.0	45.7	51.6	0.0	50.6	22.2	22.4	54.8	19.8	0.0
Incr Delay (d2), s/veh	7.3	0.6	0.0	0.6	4.1	0.0	18.4	7.4	13.4	8.2	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	1.5	0.0	2.1	4.2	0.0	7.4	20.9	24.8	2.5	7.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.8	49.3	0.0	46.2	55.7	0.0	69.0	29.6	35.8	63.0	20.5	0.0
LnGrp LOS	E	D		D	E		E	C	D	E	C	
Approach Vol, veh/h		269			216			3211			1495	
Approach Delay, s/veh		58.5			52.2			36.9			25.0	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	76.8	11.8	18.4	22.0	67.8	14.4	15.9
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	7.0	7.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	60.0	10.0	20.0	15.0	51.0	10.0	20.0
Max Q Clear Time (g_c+I1), s	11.4	59.1	6.7	5.1	16.9	23.0	9.3	10.5
Green Ext Time (p_c), s	0.0	0.9	0.0	0.1	0.0	9.7	0.1	0.4

Intersection Summary	
HCM 6th Ctrl Delay	35.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	250	20	30	290	20	35	3	75	50	3	25
Future Vol, veh/h	15	250	20	30	290	20	35	3	75	50	3	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	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	16	272	22	33	315	22	38	3	82	54	3	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	337	0	0	294	0	0	711	707	272	739	707	315
Stage 1	-	-	-	-	-	-	304	304	-	381	381	-
Stage 2	-	-	-	-	-	-	407	403	-	358	326	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1222	-	-	1268	-	-	348	360	767	333	360	725
Stage 1	-	-	-	-	-	-	705	663	-	641	613	-
Stage 2	-	-	-	-	-	-	621	600	-	660	648	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1222	-	-	1268	-	-	323	346	767	287	346	725
Mov Cap-2 Maneuver	-	-	-	-	-	-	323	346	-	287	346	-
Stage 1	-	-	-	-	-	-	696	654	-	633	597	-
Stage 2	-	-	-	-	-	-	579	584	-	579	640	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.7	12.8	17
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	323	733	1222	-	-	1268	-	-	287	649
HCM Lane V/C Ratio	0.118	0.116	0.013	-	-	0.026	-	-	0.189	0.047
HCM Control Delay (s)	17.6	10.6	8	-	-	7.9	-	-	20.5	10.8
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.4	0.4	0	-	-	0.1	-	-	0.7	0.1



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	300	75	75	2750	1155	265
Future Volume (veh/h)	300	75	75	2750	1155	265
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	316	79	79	2895	1216	279
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	138	3957	3350	1040
Arrive On Green	0.12	0.12	0.08	0.78	0.66	0.66
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	316	79	79	2895	1216	279
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	10.6	5.5	5.1	35.4	12.9	8.8
Cycle Q Clear(g_c), s	10.6	5.5	5.1	35.4	12.9	8.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	138	3957	3350	1040
V/C Ratio(X)	0.73	0.40	0.57	0.73	0.36	0.27
Avail Cap(c_a), veh/h	576	264	223	3957	3350	1040
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	50.6	48.3	53.4	7.0	9.3	8.6
Incr Delay (d2), s/veh	3.2	1.3	3.7	1.2	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	5.0	2.4	8.2	4.1	12.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	53.8	49.6	57.2	8.2	9.6	9.3
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	395			2974	1495	
Approach Delay, s/veh	53.0			9.5	9.6	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.0		20.0	14.3	85.7
Change Period (Y+Rc), s		7.0		5.0	5.0	7.0
Max Green Setting (Gmax), s		88.0		20.0	15.0	68.0
Max Q Clear Time (g_c+I1), s		37.4		12.6	7.1	14.9
Green Ext Time (p_c), s		39.5		0.8	0.1	11.3

Intersection Summary	
HCM 6th Ctrl Delay	13.1
HCM 6th LOS	B

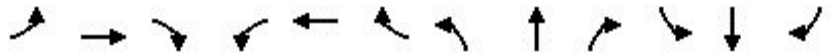
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	475	20	30	410	85	50	50	20	190	50	140
Future Volume (veh/h)	175	475	20	30	410	85	50	50	20	190	50	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	190	516	22	33	446	92	54	54	22	207	54	152
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	535	1382	617	469	1147	512	326	317	129	443	109	306
Arrive On Green	0.10	0.39	0.39	0.04	0.32	0.32	0.25	0.25	0.27	0.25	0.25	0.27
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1176	1263	515	1323	433	1218
Grp Volume(v), veh/h	190	516	22	33	446	92	54	0	76	207	0	206
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1176	0	1778	1323	0	1651
Q Serve(g_s), s	3.2	4.8	0.4	0.6	4.5	1.9	1.9	0.0	1.5	6.7	0.0	4.9
Cycle Q Clear(g_c), s	3.2	4.8	0.4	0.6	4.5	1.9	6.8	0.0	1.5	8.3	0.0	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.29	1.00		0.74
Lane Grp Cap(c), veh/h	535	1382	617	469	1147	512	326	0	446	443	0	414
V/C Ratio(X)	0.36	0.37	0.04	0.07	0.39	0.18	0.17	0.00	0.17	0.47	0.00	0.50
Avail Cap(c_a), veh/h	619	5965	2660	671	5965	2660	537	0	765	681	0	711
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.8	10.1	8.8	9.7	12.2	11.3	17.8	0.0	13.5	16.9	0.0	14.6
Incr Delay (d2), s/veh	0.4	0.2	0.0	0.1	0.2	0.2	0.2	0.0	0.2	0.8	0.0	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 BackOfQ(50%),veh/ln	1.0	1.5	0.1	0.2	1.5	0.6	0.5	0.0	0.6	1.9	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.2	10.3	8.8	9.8	12.4	11.5	18.0	0.0	13.7	17.6	0.0	15.5
LnGrp LOS	A	B	A	A	B	B	B	A	B	B	A	B
Approach Vol, veh/h		728			571			130			413	
Approach Delay, s/veh		10.0			12.1			15.5			16.6	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	23.1		16.7	9.8	20.0		16.7				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.6	6.8		10.3	5.2	6.5		8.8				
Green Ext Time (p_c), s	0.0	3.9		1.4	0.1	3.5		0.4				

Intersection Summary			
HCM 6th Ctrl Delay		12.5	
HCM 6th LOS		B	

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	555	45	55	380	175	45	5	60	220	5	100
Future Volume (veh/h)	85	555	45	55	380	175	45	5	60	220	5	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	92	603	49	60	413	190	49	5	65	239	5	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	397	983	438	337	930	415	293	62	310	666	27	582
Arrive On Green	0.07	0.28	0.28	0.06	0.26	0.26	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	513	162	812	1331	70	1526
Grp Volume(v), veh/h	92	603	49	60	413	190	119	0	0	239	0	114
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1487	0	0	1331	0	1596
Q Serve(g_s), s	1.9	7.7	1.2	1.2	5.1	5.3	0.0	0.0	0.0	3.7	0.0	2.5
Cycle Q Clear(g_c), s	1.9	7.7	1.2	1.2	5.1	5.3	2.4	0.0	0.0	6.1	0.0	2.5
Prop In Lane	1.00		1.00	1.00		1.00	0.41		0.55	1.00		0.96
Lane Grp Cap(c), veh/h	397	983	438	337	930	415	664	0	0	666	0	609
V/C Ratio(X)	0.23	0.61	0.11	0.18	0.44	0.46	0.18	0.00	0.00	0.36	0.00	0.19
Avail Cap(c_a), veh/h	510	5289	2359	476	5289	2359	664	0	0	666	0	609
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	16.5	14.2	13.1	16.2	16.2	10.8	0.0	0.0	11.7	0.0	10.8
Incr Delay (d2), s/veh	0.3	0.6	0.1	0.3	0.3	0.8	0.6	0.0	0.0	1.5	0.0	0.7
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 BackOfQ(50%),veh/ln	0.7	2.8	0.4	0.4	1.8	1.7	0.9	0.0	0.0	2.0	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.9	17.1	14.3	13.4	16.5	17.0	11.4	0.0	0.0	13.2	0.0	11.5
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	A	B
Approach Vol, veh/h		744			663			119			353	
Approach Delay, s/veh		16.4			16.4			11.4			12.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	19.5		25.0	8.7	18.7		25.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.2	9.7		8.1	3.9	7.3		4.4				
Green Ext Time (p_c), s	0.0	4.7		1.1	0.0	3.6		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	450	175	210	125	100	325	310	1400	60	375	2170	200
Future Volume (veh/h)	450	175	210	125	100	325	310	1400	60	375	2170	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	474	184	0	132	105	0	326	1474	63	395	2284	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	547	279		277	171		431	2301	98	432	2342	
Arrive On Green	0.16	0.15	0.00	0.08	0.09	0.00	0.12	0.46	0.48	0.13	0.46	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1870	1585	3456	5021	215	3456	5106	1585
Grp Volume(v), veh/h	474	184	0	132	105	0	326	999	538	395	2284	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	1870	1585	1728	1702	1832	1728	1702	1585
Q Serve(g_s), s	16.1	11.1	0.0	8.0	6.5	0.0	10.9	27.0	27.0	13.6	52.6	0.0
Cycle Q Clear(g_c), s	16.1	11.1	0.0	8.0	6.5	0.0	10.9	27.0	27.0	13.6	52.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	547	279		277	171		431	1560	840	432	2342	
V/C Ratio(X)	0.87	0.66		0.48	0.61		0.76	0.64	0.64	0.91	0.98	
Avail Cap(c_a), veh/h	547	312		321	249		432	1560	840	432	2342	
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)	0.84	0.84	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.3	48.2	0.0	45.0	52.4	0.0	50.8	24.9	24.8	51.9	31.8	0.0
Incr Delay (d2), s/veh	11.8	3.6	0.0	1.3	3.5	0.0	7.5	2.0	3.7	23.8	13.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	5.4	0.0	3.6	3.2	0.0	5.0	10.4	11.5	7.0	22.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.1	51.8	0.0	46.2	56.0	0.0	58.3	26.9	28.6	75.7	45.4	0.0
LnGrp LOS	E	D		D	E		E	C	C	E	D	
Approach Vol, veh/h		658			237			1863			2679	
Approach Delay, s/veh		58.5			50.5			32.9			49.9	
Approach LOS		E			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	62.0	15.1	22.9	19.9	62.1	23.0	15.0
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	7.0	7.0	5.0	5.0
Max Green Setting (Gmax), s	13.0	50.0	13.0	20.0	13.0	50.0	18.0	15.0
Max Q Clear Time (g_c+I1), s	15.6	29.0	10.0	13.1	12.9	54.6	18.1	8.5
Green Ext Time (p_c), s	0.0	9.6	0.1	0.5	0.0	0.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	45.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	150	35	75	230	35	20	5	30	35	5	35
Future Vol, veh/h	35	150	35	75	230	35	20	5	30	35	5	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	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	38	163	38	82	250	38	22	5	33	38	5	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	288	0	0	201	0	0	694	691	163	691	691	250
Stage 1	-	-	-	-	-	-	239	239	-	414	414	-
Stage 2	-	-	-	-	-	-	455	452	-	277	277	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1274	-	-	1371	-	-	357	368	882	359	368	789
Stage 1	-	-	-	-	-	-	764	708	-	616	593	-
Stage 2	-	-	-	-	-	-	585	570	-	729	681	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1274	-	-	1371	-	-	313	336	882	318	336	789
Mov Cap-2 Maneuver	-	-	-	-	-	-	313	336	-	318	336	-
Stage 1	-	-	-	-	-	-	741	687	-	598	557	-
Stage 2	-	-	-	-	-	-	518	536	-	676	661	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	1.7	12.9	14.1
HCM LOS			B	B

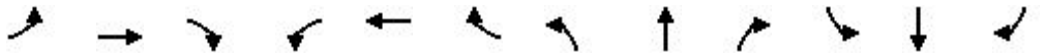
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	313	716	1274	-	-	1371	-	-	318	675
HCM Lane V/C Ratio	0.069	0.053	0.03	-	-	0.059	-	-	0.12	0.064
HCM Control Delay (s)	17.4	10.3	7.9	-	-	7.8	-	-	17.9	10.7
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0.2	0.1	-	-	0.2	-	-	0.4	0.2



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	170	45	45	1630	2190	315
Future Volume (veh/h)	170	45	45	1630	2190	315
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	179	47	47	1716	2305	332
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	117	3958	3408	1058
Arrive On Green	0.12	0.12	0.07	0.78	0.67	0.67
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	179	47	47	1716	2305	332
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	5.7	3.2	3.0	13.7	32.8	10.6
Cycle Q Clear(g_c), s	5.7	3.2	3.0	13.7	32.8	10.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	117	3958	3408	1058
V/C Ratio(X)	0.41	0.24	0.40	0.43	0.68	0.31
Avail Cap(c_a), veh/h	576	264	223	3958	3408	1058
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	48.5	47.3	53.8	4.6	12.1	8.4
Incr Delay (d2), s/veh	0.6	0.6	2.2	0.3	1.1	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	3.0	1.4	3.1	10.3	15.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	49.1	48.0	56.0	4.9	13.2	9.2
LnGrp LOS	D	D	E	A	B	A
Approach Vol, veh/h	226			1763	2637	
Approach Delay, s/veh	48.9			6.3	12.7	
Approach LOS	D			A	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.0		20.0	12.9	87.1
Change Period (Y+Rc), s		7.0		5.0	5.0	7.0
Max Green Setting (Gmax), s		88.0		20.0	15.0	68.0
Max Q Clear Time (g_c+I1), s		15.7		7.7	5.0	34.8
Green Ext Time (p_c), s		18.0		0.6	0.0	23.6

Intersection Summary	
HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B



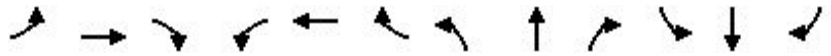
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	230	31	32	515	50	76	25	70	60	25	35
Future Volume (veh/h)	100	230	31	32	515	50	76	25	70	60	25	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	109	250	34	35	560	54	83	27	76	65	27	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	493	1378	615	610	1221	544	430	99	279	396	161	227
Arrive On Green	0.08	0.39	0.39	0.04	0.34	0.34	0.23	0.23	0.25	0.23	0.23	0.25
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1337	433	1218	1291	703	989
Grp Volume(v), veh/h	109	250	34	35	560	54	83	0	103	65	0	65
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1337	0	1651	1291	0	1692
Q Serve(g_s), s	1.6	2.0	0.6	0.5	5.4	1.0	2.3	0.0	2.2	1.9	0.0	1.3
Cycle Q Clear(g_c), s	1.6	2.0	0.6	0.5	5.4	1.0	3.6	0.0	2.2	4.1	0.0	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.74	1.00		0.58
Lane Grp Cap(c), veh/h	493	1378	615	610	1221	544	430	0	378	396	0	388
V/C Ratio(X)	0.22	0.18	0.06	0.06	0.46	0.10	0.19	0.00	0.27	0.16	0.00	0.17
Avail Cap(c_a), veh/h	629	6348	2831	824	6348	2831	737	0	756	691	0	775
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.0	8.8	8.4	8.5	11.2	9.7	14.9	0.0	13.5	15.5	0.0	13.3
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.0	0.3	0.1	0.2	0.0	0.4	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.6	0.2	0.2	1.7	0.3	0.6	0.0	0.7	0.5	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.2	8.9	8.4	8.5	11.4	9.8	15.2	0.0	13.9	15.7	0.0	13.5
LnGrp LOS	A	A	A	A	B	A	B	A	B	B	A	B
Approach Vol, veh/h		393			649			186			130	
Approach Delay, s/veh		8.6			11.1			14.5			14.6	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	21.9		15.0	8.7	20.0		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.5	4.0		6.1	3.6	7.4		5.6				
Green Ext Time (p_c), s	0.0	1.8		0.4	0.1	4.4		0.7				

Intersection Summary		
HCM 6th Ctrl Delay		11.2
HCM 6th LOS		B

Notes

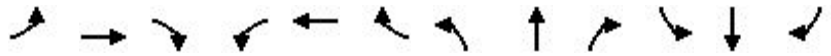
User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	255	55	70	537	90	35	5	50	60	5	25
Future Volume (veh/h)	50	255	55	70	537	90	35	5	50	60	5	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	277	60	76	584	98	38	5	54	65	5	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	330	928	414	460	971	433	289	70	330	673	98	528
Arrive On Green	0.05	0.26	0.26	0.06	0.27	0.27	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	500	182	856	1344	254	1370
Grp Volume(v), veh/h	54	277	60	76	584	98	97	0	0	65	0	32
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1537	0	0	1344	0	1624
Q Serve(g_s), s	1.1	3.2	1.5	1.6	7.4	2.5	0.0	0.0	0.0	0.0	0.0	0.6
Cycle Q Clear(g_c), s	1.1	3.2	1.5	1.6	7.4	2.5	1.9	0.0	0.0	1.2	0.0	0.6
Prop In Lane	1.00		1.00	1.00		1.00	0.39		0.56	1.00		0.84
Lane Grp Cap(c), veh/h	330	928	414	460	971	433	689	0	0	673	0	626
V/C Ratio(X)	0.16	0.30	0.14	0.17	0.60	0.23	0.14	0.00	0.00	0.10	0.00	0.05
Avail Cap(c_a), veh/h	478	5344	2383	586	5344	2383	689	0	0	673	0	626
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.1	15.4	14.7	12.4	16.4	14.6	10.4	0.0	0.0	10.2	0.0	10.0
Incr Delay (d2), s/veh	0.2	0.2	0.2	0.2	0.6	0.3	0.4	0.0	0.0	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.2	0.5	0.5	2.7	0.8	0.7	0.0	0.0	0.5	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	15.5	14.9	12.6	17.0	14.9	10.8	0.0	0.0	10.4	0.0	10.1
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	A	B
Approach Vol, veh/h		391			758			97			97	
Approach Delay, s/veh		15.1			16.3			10.8			10.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.3	18.5		25.0	7.7	19.2		25.0
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	7.3	78.0		20.0	7.0	78.0		20.0
Max Q Clear Time (g_c+I1), s	3.6	5.2		3.2	3.1	9.4		3.9
Green Ext Time (p_c), s	0.0	2.1		0.3	0.0	4.8		0.4

Intersection Summary		
HCM 6th Ctrl Delay		15.1
HCM 6th LOS		B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	50	75	75	130	375	415	2565	70	150	1270	152
Future Volume (veh/h)	240	50	75	75	130	375	415	2565	70	150	1270	152
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	253	53	0	79	137	0	437	2700	74	158	1337	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	317	219		283	200		490	2944	80	230	2559	
Arrive On Green	0.09	0.12	0.00	0.06	0.11	0.00	0.14	0.58	0.59	0.07	0.50	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1870	1585	3456	5110	139	3456	5106	1585
Grp Volume(v), veh/h	253	53	0	79	137	0	437	1792	982	158	1337	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	1870	1585	1728	1702	1845	1728	1702	1585
Q Serve(g_s), s	8.6	3.1	0.0	4.7	8.5	0.0	14.9	56.5	57.8	5.4	21.2	0.0
Cycle Q Clear(g_c), s	8.6	3.1	0.0	4.7	8.5	0.0	14.9	56.5	57.8	5.4	21.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	317	219		283	200		490	1961	1063	230	2559	
V/C Ratio(X)	0.80	0.24		0.28	0.68		0.89	0.91	0.92	0.69	0.52	
Avail Cap(c_a), veh/h	317	312		331	343		490	1961	1063	230	2559	
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)	0.97	0.97	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.4	48.1	0.0	45.7	51.6	0.0	50.6	22.8	23.0	54.8	20.2	0.0
Incr Delay (d2), s/veh	13.1	0.5	0.0	0.5	4.1	0.0	18.4	8.0	14.4	8.2	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	1.5	0.0	2.1	4.2	0.0	7.4	21.3	25.5	2.5	7.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.5	48.7	0.0	46.2	55.7	0.0	69.0	30.8	37.4	63.0	21.0	0.0
LnGrp LOS	E	D		D	E		E	C	D	E	C	
Approach Vol, veh/h		306			216			3211			1495	
Approach Delay, s/veh		63.4			52.2			38.0			25.4	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	76.1	11.8	19.1	22.0	67.1	15.0	15.9
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	7.0	7.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	60.0	10.0	20.0	15.0	51.0	10.0	20.0
Max Q Clear Time (g_c+I1), s	7.4	59.8	6.7	5.1	16.9	23.2	10.6	10.5
Green Ext Time (p_c), s	0.0	0.2	0.0	0.1	0.0	9.7	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	36.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	250	20	30	290	22	35	3	75	57	3	31
Future Vol, veh/h	17	250	20	30	290	22	35	3	75	57	3	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	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	18	272	22	33	315	24	38	3	82	62	3	34

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	339	0	0	294	0	0	720	713	272	743	711	315
Stage 1	-	-	-	-	-	-	308	308	-	381	381	-
Stage 2	-	-	-	-	-	-	412	405	-	362	330	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1220	-	-	1268	-	-	343	357	767	331	358	725
Stage 1	-	-	-	-	-	-	702	660	-	641	613	-
Stage 2	-	-	-	-	-	-	617	598	-	657	646	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1220	-	-	1268	-	-	315	342	767	285	343	725
Mov Cap-2 Maneuver	-	-	-	-	-	-	315	342	-	285	343	-
Stage 1	-	-	-	-	-	-	691	650	-	631	597	-
Stage 2	-	-	-	-	-	-	570	582	-	576	636	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.7	12.9	17.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	315	732	1220	-	-	1268	-	-	285	660
HCM Lane V/C Ratio	0.121	0.116	0.015	-	-	0.026	-	-	0.217	0.056
HCM Control Delay (s)	18	10.6	8	-	-	7.9	-	-	21.1	10.8
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.4	0.4	0	-	-	0.1	-	-	0.8	0.2



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	300	82	77	2750	1155	265
Future Volume (veh/h)	300	82	77	2750	1155	265
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	316	86	81	2895	1216	279
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	138	3957	3348	1039
Arrive On Green	0.12	0.12	0.08	0.78	0.66	0.66
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	316	86	81	2895	1216	279
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	10.6	6.0	5.3	35.4	12.9	8.8
Cycle Q Clear(g_c), s	10.6	6.0	5.3	35.4	12.9	8.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	138	3957	3348	1039
V/C Ratio(X)	0.73	0.43	0.58	0.73	0.36	0.27
Avail Cap(c_a), veh/h	576	264	223	3957	3348	1039
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	50.6	48.6	53.5	7.0	9.3	8.6
Incr Delay (d2), s/veh	3.2	1.5	3.9	1.2	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	5.5	2.4	8.2	4.1	12.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	53.8	50.1	57.3	8.2	9.6	9.3
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	402			2976	1495	
Approach Delay, s/veh	53.0			9.6	9.6	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.0		20.0	14.3	85.7
Change Period (Y+Rc), s		7.0		5.0	5.0	7.0
Max Green Setting (Gmax), s		88.0		20.0	15.0	68.0
Max Q Clear Time (g_c+I1), s		37.4		12.6	7.3	14.9
Green Ext Time (p_c), s		39.5		0.9	0.1	11.3

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	27	59	1	10	33
Future Vol, veh/h	2	27	59	1	10	33
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	-	-	-	-	-
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	2	29	64	1	11	36

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	123	65	0	0	65	0
Stage 1	65	-	-	-	-	-
Stage 2	58	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	872	999	-	-	1537	-
Stage 1	958	-	-	-	-	-
Stage 2	965	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	866	999	-	-	1537	-
Mov Cap-2 Maneuver	866	-	-	-	-	-
Stage 1	958	-	-	-	-	-
Stage 2	958	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	1.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	989	1537	-
HCM Lane V/C Ratio	-	-	0.032	0.007	-
HCM Control Delay (s)	-	-	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	0	4	7	0	19	1	36	2	16	27	2
Future Vol, veh/h	5	0	4	7	0	19	1	36	2	16	27	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	4	8	0	21	1	39	2	17	29	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	117	107	30	108	107	40	31	0	0	41	0	0
Stage 1	64	64	-	42	42	-	-	-	-	-	-	-
Stage 2	53	43	-	66	65	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	859	783	1044	871	783	1031	1582	-	-	1568	-	-
Stage 1	947	842	-	972	860	-	-	-	-	-	-	-
Stage 2	960	859	-	945	841	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	834	774	1044	860	774	1031	1582	-	-	1568	-	-
Mov Cap-2 Maneuver	834	774	-	860	774	-	-	-	-	-	-	-
Stage 1	946	833	-	971	859	-	-	-	-	-	-	-
Stage 2	940	858	-	931	832	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	8.8	0.2	2.6
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1582	-	-	916	979	1568	-	-
HCM Lane V/C Ratio	0.001	-	-	0.011	0.029	0.011	-	-
HCM Control Delay (s)	7.3	0	-	9	8.8	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

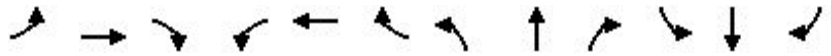
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	475	37	69	410	85	61	50	43	190	50	140
Future Volume (veh/h)	175	475	37	69	410	85	61	50	43	190	50	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	190	516	40	75	446	92	66	54	47	207	54	152
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	526	1258	561	478	1123	501	340	244	212	435	114	322
Arrive On Green	0.10	0.35	0.35	0.07	0.32	0.32	0.26	0.26	0.28	0.26	0.26	0.28
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1176	923	803	1294	433	1218
Grp Volume(v), veh/h	190	516	40	75	446	92	66	0	101	207	0	206
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1176	0	1726	1294	0	1651
Q Serve(g_s), s	3.3	5.2	0.8	1.3	4.7	2.0	2.4	0.0	2.1	7.1	0.0	4.9
Cycle Q Clear(g_c), s	3.3	5.2	0.8	1.3	4.7	2.0	7.3	0.0	2.1	9.2	0.0	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.47	1.00		0.74
Lane Grp Cap(c), veh/h	526	1258	561	478	1123	501	340	0	455	435	0	436
V/C Ratio(X)	0.36	0.41	0.07	0.16	0.40	0.18	0.19	0.00	0.22	0.48	0.00	0.47
Avail Cap(c_a), veh/h	603	5841	2605	623	5841	2605	525	0	727	638	0	696
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.2	11.6	10.2	9.6	12.7	11.8	17.7	0.0	13.5	17.2	0.0	14.4
Incr Delay (d2), s/veh	0.4	0.2	0.1	0.2	0.2	0.2	0.3	0.0	0.2	0.8	0.0	0.8
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 BackOfQ(50%),veh/ln	1.0	1.7	0.2	0.4	1.5	0.6	0.6	0.0	0.8	1.9	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.6	11.8	10.2	9.7	12.9	12.0	18.0	0.0	13.7	18.1	0.0	15.2
LnGrp LOS	A	B	B	A	B	B	B	A	B	B	A	B
Approach Vol, veh/h		746			613			167			413	
Approach Delay, s/veh		11.2			12.4			15.4			16.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.1	21.8		17.5	9.9	20.0		17.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.3	7.2		11.2	5.3	6.7		9.3				
Green Ext Time (p_c), s	0.0	3.9		1.3	0.1	3.5		0.5				

Intersection Summary		
HCM 6th Ctrl Delay		13.1
HCM 6th LOS		B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	578	45	55	419	175	45	5	60	220	5	100
Future Volume (veh/h)	85	578	45	55	419	175	45	5	60	220	5	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	92	628	49	60	455	190	49	5	65	239	5	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	389	1013	452	335	961	429	289	61	306	658	26	575
Arrive On Green	0.07	0.29	0.29	0.06	0.27	0.27	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	513	162	812	1331	70	1526
Grp Volume(v), veh/h	92	628	49	60	455	190	119	0	0	239	0	114
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1487	0	0	1331	0	1596
Q Serve(g_s), s	1.9	8.1	1.2	1.2	5.7	5.3	0.0	0.0	0.0	3.7	0.0	2.5
Cycle Q Clear(g_c), s	1.9	8.1	1.2	1.2	5.7	5.3	2.5	0.0	0.0	6.2	0.0	2.5
Prop In Lane	1.00		1.00	1.00		1.00	0.41		0.55	1.00		0.96
Lane Grp Cap(c), veh/h	389	1013	452	335	961	429	656	0	0	658	0	601
V/C Ratio(X)	0.24	0.62	0.11	0.18	0.47	0.44	0.18	0.00	0.00	0.36	0.00	0.19
Avail Cap(c_a), veh/h	499	5224	2330	471	5224	2330	656	0	0	658	0	601
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.5	16.5	14.0	13.0	16.2	16.0	11.1	0.0	0.0	12.1	0.0	11.1
Incr Delay (d2), s/veh	0.3	0.6	0.1	0.3	0.4	0.7	0.6	0.0	0.0	1.6	0.0	0.7
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 BackOfQ(50%),veh/ln	0.7	2.9	0.4	0.4	2.0	1.7	0.9	0.0	0.0	2.0	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.8	17.1	14.1	13.3	16.6	16.8	11.7	0.0	0.0	13.6	0.0	11.8
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	A	B
Approach Vol, veh/h		769			705			119			353	
Approach Delay, s/veh		16.4			16.3			11.7			13.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	20.1		25.0	8.7	19.4		25.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.2	10.1		8.2	3.9	7.7		4.5				
Green Ext Time (p_c), s	0.0	5.0		1.1	0.0	4.0		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	15.5
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	473	175	210	125	100	325	310	1400	60	375	2170	239
Future Volume (veh/h)	473	175	210	125	100	325	310	1400	60	375	2170	239
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	498	184	0	132	105	0	326	1474	63	395	2284	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	547	279		277	171		431	2301	98	432	2342	
Arrive On Green	0.16	0.15	0.00	0.08	0.09	0.00	0.12	0.46	0.48	0.13	0.46	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1870	1585	3456	5021	215	3456	5106	1585
Grp Volume(v), veh/h	498	184	0	132	105	0	326	999	538	395	2284	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	1870	1585	1728	1702	1832	1728	1702	1585
Q Serve(g_s), s	17.0	11.1	0.0	8.0	6.5	0.0	10.9	27.0	27.0	13.6	52.6	0.0
Cycle Q Clear(g_c), s	17.0	11.1	0.0	8.0	6.5	0.0	10.9	27.0	27.0	13.6	52.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	547	279		277	171		431	1560	840	432	2342	
V/C Ratio(X)	0.91	0.66		0.48	0.61		0.76	0.64	0.64	0.91	0.98	
Avail Cap(c_a), veh/h	547	312		321	249		432	1560	840	432	2342	
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)	0.83	0.83	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.7	48.2	0.0	45.0	52.4	0.0	50.8	24.9	24.8	51.9	31.8	0.0
Incr Delay (d2), s/veh	16.8	3.6	0.0	1.3	3.5	0.0	7.5	2.0	3.7	23.8	13.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	5.4	0.0	3.6	3.2	0.0	5.0	10.4	11.5	7.0	22.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.5	51.8	0.0	46.2	56.0	0.0	58.3	26.9	28.6	75.7	45.4	0.0
LnGrp LOS	E	D		D	E		E	C	C	E	D	
Approach Vol, veh/h		682			237			1863			2679	
Approach Delay, s/veh		62.5			50.5			32.9			49.9	
Approach LOS		E			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	62.0	15.1	22.9	19.9	62.1	23.0	15.0
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	7.0	7.0	5.0	5.0
Max Green Setting (Gmax), s	13.0	50.0	13.0	20.0	13.0	50.0	18.0	15.0
Max Q Clear Time (g_c+I1), s	15.6	29.0	10.0	13.1	12.9	54.6	19.0	8.5
Green Ext Time (p_c), s	0.0	9.6	0.1	0.5	0.0	0.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	45.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	150	35	75	230	42	20	5	30	39	5	39
Future Vol, veh/h	42	150	35	75	230	42	20	5	30	39	5	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	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	46	163	38	82	250	46	22	5	33	42	5	42

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	296	0	0	201	0	0	716	715	163	707	707	250
Stage 1	-	-	-	-	-	-	255	255	-	414	414	-
Stage 2	-	-	-	-	-	-	461	460	-	293	293	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1265	-	-	1371	-	-	345	356	882	350	360	789
Stage 1	-	-	-	-	-	-	749	696	-	616	593	-
Stage 2	-	-	-	-	-	-	581	566	-	715	670	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1265	-	-	1371	-	-	299	323	882	309	326	789
Mov Cap-2 Maneuver	-	-	-	-	-	-	299	323	-	309	326	-
Stage 1	-	-	-	-	-	-	722	671	-	594	557	-
Stage 2	-	-	-	-	-	-	512	532	-	658	646	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	1.7	13.2	14.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	299	707	1265	-	-	1371	-	-	309	679
HCM Lane V/C Ratio	0.073	0.054	0.036	-	-	0.059	-	-	0.137	0.07
HCM Control Delay (s)	18	10.4	8	-	-	7.8	-	-	18.5	10.7
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0.2	0.1	-	-	0.2	-	-	0.5	0.2



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	170	49	52	1630	2190	315
Future Volume (veh/h)	170	49	52	1630	2190	315
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	179	52	55	1716	2305	332
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	125	3958	3387	1051
Arrive On Green	0.12	0.12	0.07	0.78	0.66	0.66
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	179	52	55	1716	2305	332
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	5.7	3.6	3.6	13.7	33.2	10.7
Cycle Q Clear(g_c), s	5.7	3.6	3.6	13.7	33.2	10.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	125	3958	3387	1051
V/C Ratio(X)	0.41	0.26	0.44	0.43	0.68	0.32
Avail Cap(c_a), veh/h	576	264	223	3958	3387	1051
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	48.5	47.5	53.5	4.6	12.4	8.6
Incr Delay (d2), s/veh	0.6	0.7	2.4	0.3	1.1	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	3.3	1.6	3.1	10.4	15.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	49.1	48.2	56.0	4.9	13.5	9.4
LnGrp LOS	D	D	E	A	B	A
Approach Vol, veh/h	231			1771	2637	
Approach Delay, s/veh	48.9			6.5	13.0	
Approach LOS	D			A	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.0		20.0	13.4	86.6
Change Period (Y+Rc), s		7.0		5.0	5.0	7.0
Max Green Setting (Gmax), s		88.0		20.0	15.0	68.0
Max Q Clear Time (g_c+I1), s		15.7		7.7	5.6	35.2
Green Ext Time (p_c), s		18.0		0.6	0.1	23.4

Intersection Summary	
HCM 6th Ctrl Delay	12.3
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	18	41	3	30	61
Future Vol, veh/h	2	18	41	3	30	61
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	-	-	-	-	-
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	2	20	45	3	33	66

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	179	47	0	0	48	0
Stage 1	47	-	-	-	-	-
Stage 2	132	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	811	1022	-	-	1559	-
Stage 1	975	-	-	-	-	-
Stage 2	894	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	793	1022	-	-	1559	-
Mov Cap-2 Maneuver	793	-	-	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	874	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	2.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	993	1559	-
HCM Lane V/C Ratio	-	-	0.022	0.021	-
HCM Control Delay (s)	-	-	8.7	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

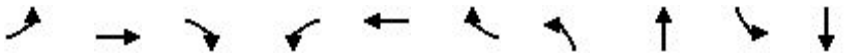
Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	2	4	0	14	4	28	7	19	37	5
Future Vol, veh/h	2	0	2	4	0	14	4	28	7	19	37	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	-	-	-	-	-	-	-	-	-	-	-	-
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	2	0	2	4	0	15	4	30	8	21	40	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	135	131	43	128	129	34	45	0	0	38	0	0
Stage 1	85	85	-	42	42	-	-	-	-	-	-	-
Stage 2	50	46	-	86	87	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	836	760	1027	845	762	1039	1563	-	-	1572	-	-
Stage 1	923	824	-	972	860	-	-	-	-	-	-	-
Stage 2	963	857	-	922	823	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	813	747	1027	832	749	1039	1563	-	-	1572	-	-
Mov Cap-2 Maneuver	813	747	-	832	749	-	-	-	-	-	-	-
Stage 1	920	812	-	969	857	-	-	-	-	-	-	-
Stage 2	946	854	-	907	811	-	-	-	-	-	-	-

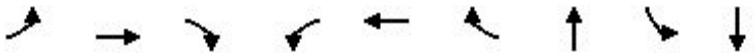
Approach	EB	WB	NB	SB
HCM Control Delay, s	9	8.7	0.7	2.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1563	-	-	908	985	1572	-	-
HCM Lane V/C Ratio	0.003	-	-	0.005	0.02	0.013	-	-
HCM Control Delay (s)	7.3	0	-	9	8.7	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	109	250	27	22	560	54	65	65	65	65
v/c Ratio	0.21	0.14	0.03	0.04	0.45	0.09	0.22	0.16	0.22	0.16
Control Delay	5.6	7.0	1.3	4.8	13.6	3.7	18.3	10.5	18.3	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	7.0	1.3	4.8	13.6	3.7	18.3	10.5	18.3	10.5
Queue Length 50th (ft)	11	13	0	2	63	0	15	6	15	6
Queue Length 95th (ft)	26	44	5	8	98	15	43	31	43	31
Internal Link Dist (ft)		888			561			492		376
Turn Bay Length (ft)	250		250	250		250	250		250	
Base Capacity (vph)	517	3539	1583	623	3539	1583	598	783	598	783
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.07	0.02	0.04	0.16	0.03	0.11	0.08	0.11	0.08

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	54	239	60	76	571	98	97	65	32
v/c Ratio	0.14	0.26	0.13	0.16	0.52	0.18	0.16	0.13	0.05
Control Delay	9.0	16.8	5.3	9.1	18.1	5.0	9.6	14.8	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	16.8	5.3	9.1	18.1	5.0	9.6	14.8	7.4
Queue Length 50th (ft)	9	33	0	13	88	0	11	15	1
Queue Length 95th (ft)	24	57	20	31	132	27	43	42	17
Internal Link Dist (ft)		561			537		350		294
Turn Bay Length (ft)	85		85	85		85		200	
Base Capacity (vph)	404	3539	1583	489	3539	1583	618	492	636
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.07	0.04	0.16	0.16	0.06	0.16	0.13	0.05

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	216	53	79	79	137	395	437	2774	158	1337	147
v/c Ratio	0.70	0.16	0.05	0.24	0.43	0.94	0.88	1.07	0.66	0.60	0.09
Control Delay	65.5	44.1	0.1	34.0	48.6	54.8	68.3	63.5	68.0	27.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.5	44.1	0.1	34.0	48.6	54.8	68.3	63.5	68.0	27.6	0.1
Queue Length 50th (ft)	85	35	0	45	94	150	175	~675	62	290	0
Queue Length 95th (ft)	126	74	0	85	158	#337	#269	#969	#107	340	0
Internal Link Dist (ft)		537			577			788		999	
Turn Bay Length (ft)	220		100	200			310		485		685
Base Capacity (vph)	314	338	1583	354	341	438	497	2586	241	2216	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.16	0.05	0.22	0.40	0.90	0.88	1.07	0.66	0.60	0.09

Intersection Summary

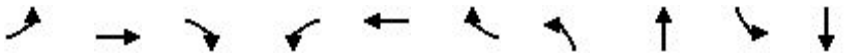
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	316	79	79	2895	1216	279
v/c Ratio	0.66	0.27	0.46	0.75	0.37	0.25
Control Delay	55.5	12.0	59.9	9.9	6.2	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	12.0	59.9	9.9	6.2	0.6
Queue Length 50th (ft)	121	0	59	381	67	0
Queue Length 95th (ft)	164	44	107	501	79	6
Internal Link Dist (ft)	571			838	1675	
Turn Bay Length (ft)	325	325	325			415
Base Capacity (vph)	572	329	221	3861	3286	1121
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.24	0.36	0.75	0.37	0.25

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	190	516	22	33	446	92	54	76	207	206
v/c Ratio	0.40	0.34	0.03	0.07	0.44	0.18	0.15	0.13	0.50	0.35
Control Delay	10.9	13.4	0.6	8.0	17.9	5.3	14.9	12.1	20.4	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	13.4	0.6	8.0	17.9	5.3	14.9	12.1	20.4	9.7
Queue Length 50th (ft)	31	46	0	5	61	0	12	14	53	24
Queue Length 95th (ft)	66	116	2	16	102	27	35	39	112	69
Internal Link Dist (ft)		888			561			492		376
Turn Bay Length (ft)	250		250	250		250	250		250	
Base Capacity (vph)	471	3539	1583	471	3539	1583	424	664	484	672
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.15	0.01	0.07	0.13	0.06	0.13	0.11	0.43	0.31

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	92	603	49	60	413	190	119	239	114
v/c Ratio	0.21	0.54	0.09	0.16	0.44	0.34	0.20	0.50	0.17
Control Delay	9.5	18.1	4.0	9.1	18.4	4.8	11.2	20.4	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	18.1	4.0	9.1	18.4	4.8	11.2	20.4	4.9
Queue Length 50th (ft)	16	94	0	10	61	0	17	63	1
Queue Length 95th (ft)	36	140	15	25	94	37	55	143	31
Internal Link Dist (ft)		561			537		350		294
Turn Bay Length (ft)	85		85	85		85		200	
Base Capacity (vph)	444	3539	1583	396	3539	1583	585	478	669
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.17	0.03	0.15	0.12	0.12	0.20	0.50	0.17

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	474	184	221	132	105	342	326	1537	395	2284	211
v/c Ratio	0.88	0.57	0.14	0.43	0.44	0.95	0.77	0.72	0.89	1.06	0.13
Control Delay	68.0	53.4	0.2	35.8	54.5	59.4	67.0	26.9	74.1	70.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.0	53.4	0.2	35.8	54.5	59.4	67.0	26.9	74.1	70.8	0.2
Queue Length 50th (ft)	187	132	0	75	76	119	127	372	158	~723	0
Queue Length 95th (ft)	#275	211	0	127	133	#302	#186	430	#251	#817	0
Internal Link Dist (ft)		537			577			788		999	
Turn Bay Length (ft)	220		100	200			310		485		685
Base Capacity (vph)	543	323	1583	334	248	368	429	2122	445	2160	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.57	0.14	0.40	0.42	0.93	0.76	0.72	0.89	1.06	0.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

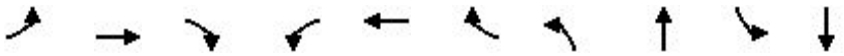
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	179	47	47	1716	2305	332
v/c Ratio	0.42	0.20	0.31	0.44	0.67	0.28
Control Delay	51.8	15.4	57.0	5.0	13.8	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.8	15.4	57.0	5.0	13.8	3.3
Queue Length 50th (ft)	67	0	35	138	238	31
Queue Length 95th (ft)	103	36	74	159	m230	m31
Internal Link Dist (ft)	571			838	1675	
Turn Bay Length (ft)	325	325	325			415
Base Capacity (vph)	572	303	221	3940	3418	1173
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.16	0.21	0.44	0.67	0.28

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	109	250	34	35	560	54	83	103	65	65
v/c Ratio	0.21	0.14	0.04	0.06	0.45	0.09	0.28	0.24	0.22	0.16
Control Delay	5.7	7.2	1.8	4.9	13.6	3.7	19.2	8.8	18.6	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	7.2	1.8	4.9	13.6	3.7	19.2	8.8	18.6	10.5
Queue Length 50th (ft)	11	13	0	4	63	0	19	6	15	6
Queue Length 95th (ft)	27	46	7	12	101	15	52	38	43	31
Internal Link Dist (ft)		888			561			492		376
Turn Bay Length (ft)	250		250	250		250	250		250	
Base Capacity (vph)	517	3539	1583	623	3539	1583	594	780	573	779
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.07	0.02	0.06	0.16	0.03	0.14	0.13	0.11	0.08

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	54	277	60	76	584	98	97	65	32
v/c Ratio	0.14	0.29	0.13	0.16	0.53	0.18	0.16	0.13	0.05
Control Delay	9.0	17.1	5.3	9.1	18.2	4.9	9.6	14.9	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	17.1	5.3	9.1	18.2	4.9	9.6	14.9	7.5
Queue Length 50th (ft)	9	39	0	13	91	0	12	15	1
Queue Length 95th (ft)	24	65	20	31	135	27	43	43	17
Internal Link Dist (ft)		561			537		350		294
Turn Bay Length (ft)	85		85	85		85		200	
Base Capacity (vph)	400	3539	1583	482	3539	1583	617	491	634
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.08	0.04	0.16	0.17	0.06	0.16	0.13	0.05

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	253	53	79	79	137	395	437	2774	158	1337	160
v/c Ratio	0.81	0.16	0.05	0.24	0.43	0.94	0.88	1.08	0.66	0.60	0.10
Control Delay	73.2	44.1	0.1	34.0	48.6	54.8	68.3	64.5	68.0	27.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.2	44.1	0.1	34.0	48.6	54.8	68.3	64.5	68.0	27.7	0.1
Queue Length 50th (ft)	100	35	0	45	94	150	175	~675	62	290	0
Queue Length 95th (ft)	#164	74	0	85	158	#337	#269	#969	#107	340	0
Internal Link Dist (ft)		537			577			788		999	
Turn Bay Length (ft)	220		100	200			310		485		685
Base Capacity (vph)	314	340	1583	354	341	438	497	2580	241	2210	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.16	0.05	0.22	0.40	0.90	0.88	1.08	0.66	0.60	0.10

Intersection Summary

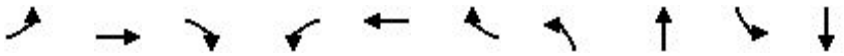
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	316	86	81	2895	1216	279
v/c Ratio	0.66	0.29	0.47	0.75	0.37	0.25
Control Delay	55.5	11.8	60.1	9.9	6.2	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	11.8	60.1	9.9	6.2	0.6
Queue Length 50th (ft)	121	0	61	381	67	0
Queue Length 95th (ft)	164	46	109	501	79	6
Internal Link Dist (ft)	571			838	1675	
Turn Bay Length (ft)	325	325	325			415
Base Capacity (vph)	572	335	221	3861	3283	1120
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.26	0.37	0.75	0.37	0.25

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	190	516	40	75	446	92	66	101	207	206
v/c Ratio	0.43	0.46	0.07	0.18	0.46	0.19	0.16	0.16	0.47	0.32
Control Delay	12.2	18.3	3.0	9.3	19.2	5.4	14.8	10.9	19.2	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	18.3	3.0	9.3	19.2	5.4	14.8	10.9	19.2	9.2
Queue Length 50th (ft)	35	77	0	13	65	0	15	16	53	24
Queue Length 95th (ft)	68	120	12	31	103	27	42	46	114	69
Internal Link Dist (ft)		888			561			492		376
Turn Bay Length (ft)	250		250	250		250	250		250	
Base Capacity (vph)	442	3539	1583	441	3539	1583	408	623	449	642
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.15	0.03	0.17	0.13	0.06	0.16	0.16	0.46	0.32

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	92	628	49	60	455	190	119	239	114
v/c Ratio	0.22	0.55	0.09	0.16	0.46	0.33	0.21	0.51	0.17
Control Delay	9.4	18.1	4.0	9.0	18.5	4.7	11.4	20.9	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	18.1	4.0	9.0	18.5	4.7	11.4	20.9	5.0
Queue Length 50th (ft)	16	98	0	10	68	0	18	64	1
Queue Length 95th (ft)	36	145	15	25	104	37	55	145	31
Internal Link Dist (ft)		561			537		350		294
Turn Bay Length (ft)	85		85	85		85		200	
Base Capacity (vph)	432	3539	1583	392	3539	1583	578	472	663
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.18	0.03	0.15	0.13	0.12	0.21	0.51	0.17

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	498	184	221	132	105	342	326	1537	395	2284	252
v/c Ratio	0.92	0.56	0.14	0.43	0.44	0.95	0.77	0.73	0.89	1.06	0.16
Control Delay	72.8	53.2	0.2	35.8	54.5	59.4	67.0	27.0	74.1	71.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.8	53.2	0.2	35.8	54.5	59.4	67.0	27.0	74.1	71.9	0.2
Queue Length 50th (ft)	197	132	0	75	76	119	127	372	158	~723	0
Queue Length 95th (ft)	#296	211	0	127	133	#302	#186	430	#251	#817	0
Internal Link Dist (ft)		537			577			788		999	
Turn Bay Length (ft)	220		100	200			310		485		685
Base Capacity (vph)	543	326	1583	334	248	368	429	2116	445	2154	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.56	0.14	0.40	0.42	0.93	0.76	0.73	0.89	1.06	0.16

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	179	52	55	1716	2305	332
v/c Ratio	0.42	0.21	0.35	0.44	0.68	0.28
Control Delay	51.8	15.1	57.8	5.0	14.0	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.8	15.1	57.8	5.0	14.0	3.3
Queue Length 50th (ft)	67	0	41	138	238	31
Queue Length 95th (ft)	103	38	83	159	m230	m30
Internal Link Dist (ft)	571			838	1675	
Turn Bay Length (ft)	325	325	325			415
Base Capacity (vph)	572	307	221	3940	3407	1170
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.17	0.25	0.44	0.68	0.28

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

PHASE II DRAINAGE REPORT
FOR
PINERY MEADOWS

DOUGLAS COUNTY, STATE OF COLORADO

Prepared for:

Owner/Developer:

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Submittal Date:
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Revision Date:

RLEG NO. 241004

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CERTIFICATION

Professional Engineer:

"This report and plan for the Phase III drainage design of PINERY MEADOWS was prepared by me (or under my direct supervision) in accordance with the provisions of Douglas County Drainage Design and Technical Criteria for the owners thereof. I understand that Douglas County does not and will not assume liability for drainage facilities designed by others."

_____

Kurt Lang
Registered Professional Engineer
State of Colorado No. 32249

Developer:

"The owner hereby certifies that the drainage facilities for PINERY MEADOWS shall be constructed according to the design presented in this report. I understand that Douglas County does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that Douglas County reviews drainage plans pursuant to Colorado Revised Statutes, Title 30, Article 28; but cannot, on behalf of PINERY MEADOWS, guarantee that final drainage design review will absolve the owner and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design."

_____

Name of Developer

_____

Authorized Signature

GENERAL LOCATION AND DESCRIPTION

A. Site Location

Pinery Meadows (hereafter referred to as the Project or the Site) are a part of the southwest 1/4 and the south 1/4 of Section 10, Township 7 South, Range 66 West of the 6th Principal Meridian in Douglas County and the State of Colorado. The approximate center of the project has latitude of 39°27'10" N and longitude of 104°45'44" W. A Vicinity Map of the Project has been included in Appendix A.

The site is southwest of the intersection of Club Villa Road and S Parker Road.

Adjacent to the Site, towards the west, is the Cherry Creek tributary. North of the site is an existing single family home residential subdivision. East of the site is S Parker Rd. South of the site is currently vacant, however to be developed into multifamily residential property. The property and surrounding areas to the north and south is zoned The Pinery PD Planned Development.

B. Description of Property

The area of the Site is 39.53 acres. However, only 22.0 acres are to be developed for the purposes of this drainage report. Portions of the site (to remain undeveloped) lay within the Cherry Creek floodway and special flood hazard area. These portions are to remain undeveloped. The remaining area of the site are located in Zone X and not within a flood hazard area according to FEMA FIRM Map 08035C0184G (Appendix A) (Effective Date: 2/27/2025). The entire Site consists of native vegetation and is currently vacant. It contains a temporary sediment basin and receives offsite flows east of the site. The surface water flows across the entire Site from the northeast to the southwest towards Cherry Creek. The existing slopes range from about 2% to 4%. The slopes near the Cherry Creek tributary edge are much steeper and range from 4:1 to 2:1 in slope. The slopes in the Cherry Creek floodway and area west of the tributary are variable, however this area is not being developed and all flows are captured by either Cherry Creek or pond within the drainage basin.

The Cherry Creek Reservoir is approximately 14 miles north of the site.

The existing soil conditions are as follows. The Site soil, as detailed in the USDA NRCS Web Soil Survey of the area (Appendix A), consists predominately of Sandy loam, Bresser sandy loam, Bresser-Truckton sandy loam and Sandy alluvial land, which classify as Hydrologic Soil Group Type B predominantly as well as Type A. Type B soil was used for this report as a more conservative estimation. Type B soils exhibit a moderate infiltration rate when thoroughly wet.

There is evidence of active erosion from the 18'' CMP culvert pipe underneath Parker Rd which has created a rill type erosion following the natural existing grade toward the southwest. This piped flow will be routed further west to Cherry Creek via buried storm pipe as part of the improvements of the site. Another evidence of erosion is a ditch formed from the upstream hillside property south of the site which enters the property. This flow is considered minor nuisance flow and will be remedied by the regrading of the area.

The Site is not impacted by any known irrigation canals. Ground water was measured via borings at a depth ranging from 15 to 28 feet below existing natural ground (Appendix A).

The proposed development includes 146 single-family homes, park, drive lanes and related utility and roadway improvements.

DRAINAGE BASINS AND SUB-BASINS

A. Existing Drainage Basins

The existing basins for the Property contain collectively 39.53 acres. Runoff from these basins is directed into Cherry Creek. See the existing and offsite drainage plan in Appendix G. Detailed descriptions of the basins are as follows:

Sub-Basin EX1 (0.70 acres), is located at the northeast corner of the site at DP-1. It consists of a 9-ft deep temporary sediment basin depression with no known outlet. It is assumed to collect flows and allow for infiltration and to protect the site from further erosion. Due to the unknown origins of the basins or any other referenced reports, it is assumed to detain runoff from the twin 42-inch culvert pipes extending underneath Parker Road. Once full, flows overtop the embankment and spill out towards DP-2.

Sub-Basin EX2 (17.24 acres), is located in the east half of the site. It contains vacant land. Runoff generated from the basins sheet flows to the southwest to DP-2.

Sub-Basin EX-3 (7.66 acres), is located in the middle of the site. It contains vacant land. Flows are directed by various paths to Cherry Creek. It contains a short segment of culvert pipe of unknown material and size. It contains Zone X and AE SFHA of the Cherry Creek floodway.

Sub-Basin EX-4 (6.84 acres), consists of Cherry Creek and Zone AE floodway. It is vacant land with contains steep river banks for the Cherry Creek. The river flows to the north towards the Cherry Creek Reservoir.

Sub-Basin EX-5 (7.09 acres), consists of Zone AE SFHA of Cherry Creek and is similarly vacant land. It has no defined drainage path or infrastructure. Flows are directed to the north and northeast to Cherry Creek floodway.

B. Offsite Drainage Basins

The existing offsite drainage basins for the Property contain collectively 55.42 acres.

- Runoff from Basins OS-1 and OS-2 will bypass the site and detention pond and will be routed via a separate storm pipe system and discharged directly into Cherry Creek.
- Runoff from Basins OS-3 and OS-4 will be collected onsite and discharged into the detention pond onsite.

See the existing and offsite drainage plan in Appendix G. Detailed descriptions of the basins are as follows:

Sub-Basin OS-1 (48.9 acres), is located east and southeast of the Site. It consists of rural residential single-family homes, roadway and vegetated lawn area. Runoff generated from this basin is collected by private roadway drains and discharged into an offsite detention pond and outlet structure. Flows are then discharged from the outlet and daylighted at DP-H1, to an existing storm culvert. Because there are no known reports of this drainage basin area, it is believed these flows are collected entirely in the existing storm culvert crossing and discharge onto the site at DP-H2. This culvert will be connected to a storm pipe and routed to Cherry Creek, bypassing the detention pond. An additional dual 42'' CMP culvert exists further north at DP-H3 and may also collect some minor flows from the basin. It is unknown if the larger dual 42'' storm culvert serves as emergency overflow should the storm culvert at DP-H1 fail or may have been installed before the x storm culvert crossing at DP-H1 and originally discharged

undetained flows onto the property. Flows will be directed by buried pipe and discharged into Cherry Creek directly.

Sub-Basin OS-2 (2.63 acres), is located east and southeast of the Site. It contains NB S Parker roadway and ROW area. Roadway flows are sheet flowed, per Douglas County GIS Contours, to the northeast and collected at DP-H1 and DP-H3 storm culverts inflow points. Flows are then daylight underneath Parker Road onto the site at DP-H2 and DP-4. Runoff south of the basin limits is collected in a large diameter storm culvert crossing and low point at DP-H7. Flows will be directed by buried pipe and discharged into Cherry Creek directly.

Sub-Basin OS-3 (2.31 acres), is located east and southeast of the Site. It contains SB S Parker roadway and ROW area. Roadway flows and ROW are primarily collected between an existing hill top and the roadway and along the west edge of the road and gradually are discharged onto the Site at DP-H9 by evidence of natural erosion/ditch in this area. Flows upstream south of this basin are intercepted by the low point culvert crossing at DP-H8 and Scott Ave roadway drainage improvements. Flows will sheet flow onto the property and will be collected by inlets and directed into the detention pond onsite.

Sub-Basin OS-4 (1.55 acres) is located east of the Site. It also contains SB S Parker roadway and ROW. Runoff generated is sheet flowed onto the property and uncollected. Flows will sheet flow onto the property and will be collected by inlets and directed into the detention pond onsite.

C. Proposed Drainage Basins

The proposed drainage basins for the site development, consists of 21.57 acres and includes:

- 146 single family homes
- Pinery Center Bldg extension from north edge of property to southern edge (design by others).
- Water quality and detention pond
- A 5.0 acres park
- Open space and streets
- Utility and drainage infrastructure improvements

Basin A (3.17 acres), is located along the east edge of the Site. It contains high-density single-family detached homes, roadway and grass lawn buffer area between S Parker Rd. Runoff generated is collected in the local street and discharged south to DP-1 inlet.

Flows are captured by a roadway inlet and discharged to the detention pond.

Basin B-1 (1.62 acres), is located in the middle of the site and contains high-density cluster single family detached homes and roadway. Runoff generated is collected in the roadway and collected in a roadway inlet at DP-2. Flows are then discharged to the detention pond.

Basin B-2 (1.68 acres), is located in the middle of the site and contains high-density cluster single family detached homes and roadway. Runoff generated is collected in the roadway and collected in a roadway inlet at DP-18. Flows are then discharged to the detention pond.

Basin C-1 (1.54 acres), is located in the middle of the site and contains high-density cluster single family detached homes and roadway. Runoff generated is collected in the roadway and collected in a roadway inlet at DP-17. Flows are then discharged to the detention pond.

Basin C-2 (1.18 acres), is located in the middle of the site and contains a 5.0 acre park, high-density cluster single family detached homes, alley and roadway. Runoff generated is collected in the roadway and alley and collected by the roadway inlet at DP-5. Flows are then discharged to the detention pond.

Basin C-3 (0.29 acres), is located in the middle of the site and contains a portion of the 5.0 acre park, alley and roadway. Runoff generated is collected in a roadway inlet at DP-3. Flows are then discharged to the detention pond.

Basin D (2.94 acres), is located along the south property line and contains high-density cluster single family detached homes and roadway. It also contains a grass lawn area and buffer. Flows are collected by a roadway inlet at DP-4. Flows are then discharged to the detention pond.

Basin E-1 (1.38 acres), is located in the middle of the site and contains medium-density single family home duplexes adjacent to Pinery Center Blvd. Flows are discharged into the alley east of the basin and collected by a roadway inlet at DP-5. Flows are then discharged to the detention pond.

Basin E-2 (0.28 acres), is located in the middle of the site and contains medium-density single family home duplexes adjacent to Pinery Center Blvd. Flows are discharged into the alley east of the basin and collected by a roadway inlet at DP-3. Flows are then discharged to the detention pond.

Basin E-3 (0.35 acres), is located in Pinery Center Blvd. It contains roadway, sidewalk and treelawn within the right-of-way. Flows are captured by the roadway and collected at the DP-5 roadway inlet. Flows are then discharged to the detention pond.

Basin E-4 (0.16 acres), is located in Pinery Center Blvd. It contains roadway, sidewalk and treelawn within the right-of-way. Flows are captured by the roadway and collected at the DP-6 roadway inlet. Flows are then discharged to the detention pond.

Basin F-1 (0.76 acres), is located on the west half of the site. It contains medium-density single family duplexes adjacent to Piner Center Blvd and an alley. Flows are discharged into the alley west of the homes and collected at the DP-7 sump inlet. Flows are then discharged to the detention pond.

Basin F-2 (0.47 acres), is located on the west half of the site. It contains medium-density single family duplexes adjacent to Pinery Center Blvd and an alley. Flows are discharged into the alley west of the homes and collected ultimately at the DP-14 roadway inlet. Flows are then discharged into the detention pond.

Basin F-3 (0.37 acres), is located in Pinery Center Blvd. It contains roadway, sidewalk and treelawn within the right-of-way. Flows are captured by the roadway and collected at the DP-12 roadway inlet. Flows are then discharged to the detention pond.

Basin F-4 (0.12 acres), is located in Pinery Center Blvd. It contains roadway, sidewalk and treelawn within the right-of-way. Flows are captured by the roadway and collected at the DP-13 roadway inlet. Flows are then discharged to the detention pond.

Basin G-1 (0.53 acres), is located on the west side of the site. It contains medium-density single family duplexes, roadway, sidewalk and landscape area. Flow is collected by a sump roadway inlet at DP-15. Flows are then discharged into the detention pond.

Basin G-2 (0.46 acres), is located on the west side of the site. It contains medium-density single family duplexes, roadway, sidewalk and landscape area. Flow is collected by a sump roadway inlet at DP-14. Flows are then discharged into the detention pond.

Basin H-1 (0.21 acres) is located on the eastern edge of the neighborhood. It consists of roadway and sidewalk only. Flows are collected by a sump inlet at DP-16. Flows are then discharged into the detention pond.

Basin H-2 (0.19 acres) is located on the eastern edge of the neighborhood. It consists of roadway, sidewalk and treelawn only. Flows are collected by a roadway inlet at DP-8. Flows are then discharged into the detention pond.

Basin I (0.25 acres) is located along the southern edge of the property. It contains medium-density duplexes and roadway. Flows are collected the roadway inlet at DP-8. Flows are then discharged into the detention pond.

Basin J (0.84 acres) contains the detention pond, maintenance access road and grass area. Flows are collected by the outlet structure at DP-10 and then discharged into Cherry Creek at DP-11 outfall point.

Basin K (2.79 acres) is located at the north of the site. It contains high-density single-family detached homes and roadway. Flows are directed via cross pan into the roadway inlet at DP-5 in Pinery Center Blvd. Flows are discharged into the detention pond.

Undetained Basins

Basin UD1 (1.33 acres) is located along the west edge of the site to be developed. It is along the east edge of the Cherry Creek riparian line, and is an area not to be developed. Runoff generated from the basin flows directly into Cherry Creek.

Basin UD2 (0.75 acres) is located between the detention pond and roadway. It contains lawn area that is discharged offsite to the south and is collected by an existing channel to convey runoff into Cherry Creek.

Basin UD3 (0.25 acres) is located at the south end of Pinery Center Blvd. It contains roadway, sidewalk and treelawn only. Runoff generated from the basin flows south offsite.

DRAINAGE DESIGN CRITERIA

A. Regulations

The drainage design for the proposed site has been prepared following the regulations outlined in the Douglas County Storm Drainage Design and Technical Criteria Manual (SDDTCM) and Volumes 1, 2, and 3 of the Urban Storm Drainage Criteria Manual (USDCM) from the Mile High Flood District.

B. Drainage Studies, Outfall Systems Plans, Site Constraints

There are no known drainage studies, Outfall Systems Plans, master plans, or site constraints associated with this project.

C. Hydrology

The design minor storm for the Site is the 5-Year and the design major storm for the Site is the 100-Year. According to Figure 6-1 of the Douglas County (SDDTCM) the Site is located in Zone 1. The 1-hour point rainfall values were obtained from Table 6-1 of the Douglas County (SDDTCM). For the 5-Year storm, P1 = 1.43 inches and for the 100-Year storm, P1 = 2.60 inches.

Runoff generated from the site was determined using the Rational Method. The Rational Method was used to determine the peak runoffs. Equations for runoff coefficients for hydrologic soil group B were taken from Table 6-4 (USDCM) and utilized in the runoff coefficient calculations. Recommended percentage imperviousness values were taken from Table 6-3 (USDCM).

Hydrologic calculations have been prepared for the 5-Year (Minor) and 100-Year (Major) storm events. See Appendix C for Hydrology Calculations.

This Project will require onsite water quality and detention. Stormwater detention is based upon the Water Quality Capture Volume (WQCV), Excess Urban Runoff Volume (EURV), and the (100-Year) Volume. Detention pond volumes and release rates are per UDFCD MHFD criteria. The Mile High Flood District's Detention Basin Design Workbook was used for storage and release rate calculations.

D. Hydraulics

Site storm sewers have been designed to adequately convey the runoff from the 5 and 100-Year storm event. The storm pipes will convey the 5 and 100-Year storm flows to the detention pond. Inlets have been sized to collect 100% of the 5-year flows and most of the 100-Year flows. Bypassed 100-year flows are collected in other roadway inlets.

Hydraflow Storm Sewers Extension for Autodesk Civil 3D was used to calculate pipe capacities and hydraulic grade lines (HGLs) for the 5-Year and 100-Year flows. The Hydraflow program uses built-in loss coefficients to determine HGLs.

Hydraflow Express Extension for Autodesk Civil 3D was used to calculate swale/channel capacities.

Routing of flows to the detention pond are laid out in the Hydrology Spreadsheets located in Appendix B.

The Mile High Flood District's Detention Basin Design Workbook (Version 4.04 – February 2021) was used for determining water surface profiles.

Hydraulic calculations are located in Appendix C.

E. Water Quality Enhancement

The detention pond that is designed for this Site is only for the subject site and not a regional or sub-regional facility. It was designed as an extended detention basin per Douglas County and MHFD requirements.

Other structural BMPs are not proposed for water quality treatment for this Site. The Project will minimize the source discharges of pollutants beginning with construction and extending for the life of the development. Refer to the GESC Plan & Report for more information on construction BMPs and design procedures.

STORMWATER MANAGEMENT FACILITY DESIGN

A. Stormwater Conveyance Facilities

The overall drainage and grading design of the site is similar to historic drainage flow patterns of runoff from the northeast to southwest, where the detention pond is located. Runoff from the site will be collected by curb inlets and storm pipes and discharged into the detention pond. Additional improvements include the construction and extension of Pinery Center Blvd (by others) which traverses the site and alters the historic drainage pattern through the site, however flows are still routed and discharged into Cherry Creek. Runoff generated from Pinery Center Blvd onsite is discharged to the detention pond. Because of the addition of a detention pond, no adverse affects downstream of the Project Site are anticipated.

The proposed storm sewer pipes and inlets are sized to collect and convey for the 5-year and 100-year storm events.

Roof drains from the single family homes and duplexes discharge on the surface and are collected by the roadways and inlets.

The Site has a handful of alleyways, of which, is used to convey stormwater into the roadway. These have been designed to adequately contain the 100-year storm event and be contained in the right-of-way.

The Site's storm system outside of the Pinery Center Blvd ROW will be private and will be maintained by the landowner. An Operations and Maintenance Manual will be created and recorded with the SOP process detailing maintenance requirements of the pond and storm conveyance systems.

B. Stormwater Storage Facilities

The site will contain a water quality and detention pond. It will contain a sediment forebay to collect sediment as well as dissipate energy for both inflow points into the pond. It will contain a concrete trickle channel as well as an outlet structure, maintenance access road and emergency spillway. In case the pond becomes clogged, flows will spill over into the Cherry Creek river. Inside the pond will also be tiered walls around no more than 50% of the circumference of the top of the pond. This is to provide additional storage.

Discharge from the detention pond is allowed per the outlet structure and pipe into Cherry Creek.

The proposed detention pond is an Extended Detention Pond and has been sized in accordance with Douglas County's and the Mile High Flood District's criteria. The detention pond has a watershed area of 25.42 acres and a top of pond surface area of 25,836 square feet. The detention pond volumes are as follows:

- WQCV Volume = 0.479 acre-feet
- EURV Volume = 1.562 acre-feet
- 100-Year Detention Volume = 2.699 acre-feet

The spreadsheet for detention pond sizing and outlet structure design is included in Appendix E.

The emergency overflow weir will release flows into the Titan Court roadside ditch.

There will be a drainage easement for the detention pond that will allow access to perform maintenance and repairs.

C. Water Quality Enhancement BMPs

The maintenance of the detention pond shall be performed by the landowner. Maintenance includes debris and sediment removal. If the appropriate maintenance is not performed by the landowner, the County will provide the maintenance and shall assess the costs to the landowner.

Non-Structural BMPs

Roof drain downspouts will be utilized to capture runoff and pipe to storm mainline to avoid surface flow over drive aisles which will improve water quality entering storm mainline.

Structural BMPs

An outlet structure which includes a trash rack will remove pollutants, trash and debris from the pond and site.

Source Control

Site activities and operations such as onsite spills, illicit discharge of materials, and improperly maintained equipment/vehicles have the potential to impact water quality on this Site.

Source controls such as illicit discharge controls, good housekeeping, preventative vehicle maintenance, and proper fueling/storage practices will be required during construction activities.

Workers shall be trained to incorporate pollution prevention and good housekeeping practices into site operations. Implementing BMPs and measurable goals for the prevention or reduction of the amount of polluted stormwater will be beneficial during site operations.

After site construction has been completed, source controls such as landscape management, snow and ice management, street sweeping and cleaning, and storm sewer system cleaning will need to be implemented.

Appropriate landscape maintenance, including vegetated areas of the detention pond, will need to be properly executed.

It is important to reduce nuisance flows and standing water by clearing debris from BMPs during site operations.

Snow and ice management practices will need to be executed to ensure soil stability and to ensure that excess water runoff does not negatively affect the site's drainage and water quality. When considering snow removal, the onsite storage of snow, and the use of deicing chemicals, methods that will create the least amount of erosion and landscape impacts should be utilized.

Street sweeping and cleaning should be utilized throughout the year, when necessary, to reduce sediment, debris, and litter. Street sweeping is necessary to reduce the amount of pollutants entering the storm system and to reduce the chance of clogging the detention pond outlet structure.

Periodic cleaning of the site's storm sewer system will need to be implemented in order to keep the onsite detention pond, inlets, and pipes operating as designed. Removal of sediment and debris is essential to reduce clogging of the storm system and to avoid drains from overflowing which ultimately leads to increased site erosion.

The construction plans will include detailed Construction BMP Plans to mitigate and prevent erosion and sediment transportation. The erosion control measures are placed on the site to reduce the on-site erosion, prevent sediment from entering the storm sewer system, and to eliminate sediment deposit off-site. Vehicle tracking control pads will be placed at the entrances to the site. Silt fences and straw bale barriers will be used in swales and around the site. Inlet protection will be constructed around all inlets. Surface roughening will be used on all slopes 4:1 and greater. All disturbed areas not being covered by asphalt, concrete, or landscaping will be reseeded with an approved seeding mixture as soon as practical after grading. All erosion control measures shall be maintained and repaired by the contractor during construction. The contractor shall inspect and repair all erosion control measures as needed following each heavy precipitation or snowmelt event.

D. Floodplain Modification

The property is located within the Cherry Creek floodplain, however no construction is to occur in the 100-year floodplain with the exception of installation of the two storm sewer outfalls into Cherry Creek. Therefore, no floodplain development permit will be required. Improvements to the floodplain in addition to the storm sewer outfalls will be made by the MHFD Development Improvement Project.

E. Additional Permitting Requirements

The Project will require the standard construction permits.

F. General

Recommended imperviousness values and runoff coefficients were taken from Tables 6-3 and 6-4, respectively of Volume 1 of the Mile High Flood District's USDCM. Inlet and street analyses were performed using the Mile High Flood District's Street and Inlet Hydraulics Workbook (Version 5.01 – April 2021). Detention pond stage and storage calculations were performed using the Mile High Flood District's Detention Basin Design Workbook (Version 4.04 - February 2021). Additionally, design calculations for the sand filter underdrain orifice, the EURV orifice, and the 100-year restrictor plate opening were performed using the Mile High Flood District's Detention Basin Design Workbook (Version 4.04 - February 2021). Pipe capacities and HGLs were calculated using Hydraflow Storm Sewers Extension for Autodesk Civil 3D. Swale and channel capacities were calculated using Hydraflow Express Extension for Autodesk Civil 3D.

CONCLUSIONS

A. Compliance with Standards

This drainage report complies with the standards set forth in the Douglas County Storm Drainage Design and Technical Criteria Manual and the Mile High Flood District's Urban Storm Drainage Criteria Manual. The Project lies within the center of the Cherry Creek Basin and is subjected to the requirements of Cherry Creek Reservoir Control Regulation No. 72 (CRS 25-8.5-101).

B. Variances

No variances are proposed for the project.

C. Drainage Concept

The storm system has been designed to effectively intercept and convey flows up to and including the 100-year storm away from structures and to the downstream system. Conveyed flows will be treated and detained with attenuated releases at the water quality and detention pond. Therefore, this Project will create no adverse impact to upstream or downstream developments or infrastructure if constructed as proposed.

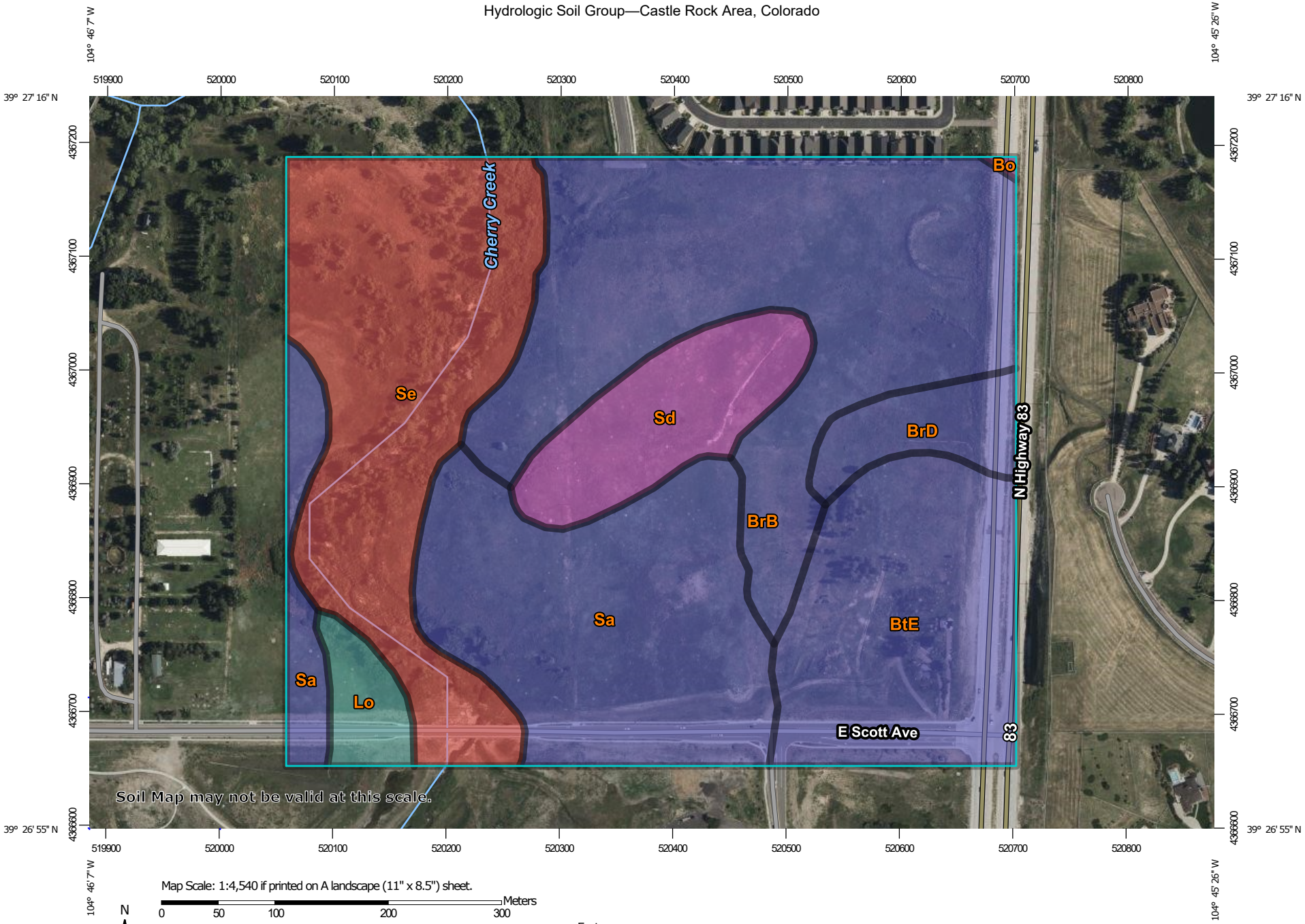
The storm system is a private system located within proposed easements. The maintenance responsibility of the on-site storm system will be borne by the landowner.

The Sediment and Erosion Concept is designed to mitigate and prevent erosion and sediment transport.

REFERENCES

- Hydraflow Storm Sewers Extension for Autodesk Civil 3D (Version 2022)
- Hydraflow Express Extension for Autodesk Civil 3D (Version 2022)
- Douglas County - Storm Drainage Design and Technical Criteria Manual (Latest Revision: June 2019)
- Mile High Flood District - Urban Storm Drainage Criteria Manual (Volume 1 – Revised August 2018, Volume 2 – Revised September 2017, and Volume 3 – Revised January 2021)
- Mile High Flood District - Street and Inlet Hydraulics Workbook (Version 5.01 – April 2021)
- Mile High Flood District - Detention Basin Design Workbook (Version 4.04 - February 2021).
- AGW – Geotechnical Site Development Study Pinery Meadows - Douglas County, Colorado (Report Dated: December 16, 2024)

APPENDIX A – Maps, Soil Report



Map Scale: 1:4,540 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

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

USDA Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

2/24/2025
Page 1 of 4

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Castle Rock Area, Colorado
Survey Area Data: Version 17, Aug 29, 2024

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

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Bo	Blakeland-Orsa association, 1 to 4 percent slopes	A	0.1	0.1%
BrB	Bresser sandy loam, cool, 1 to 3 percent slopes	B	23.8	27.8%
BrD	Bresser sandy loam, cool, 5 to 9 percent slopes	B	3.0	3.5%
BtE	Bresser-Truckton sandy loams, 5 to 25 percent slopes	B	12.8	15.0%
Lo	Loamy alluvial land	C	1.9	2.3%
Sa	Sampson loam	B	18.8	22.0%
Sd	Sandy alluvial land	A	6.2	7.3%
Se	Sandy wet alluvial land	D	18.9	22.1%
Totals for Area of Interest			**85.5**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMette

104°46'1"W 39°27'24"N



104°45'23"W 39°26'56"N

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

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

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

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 2/27/2025 at 9:15 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables shown on this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Floodway Data table shown on this FIRM.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided by the Douglas County GIS Department and the Town of Castle Rock GIS Department. Additional input was provided by the City of Lone Tree and Town of Parker. These data are current as of 2010.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

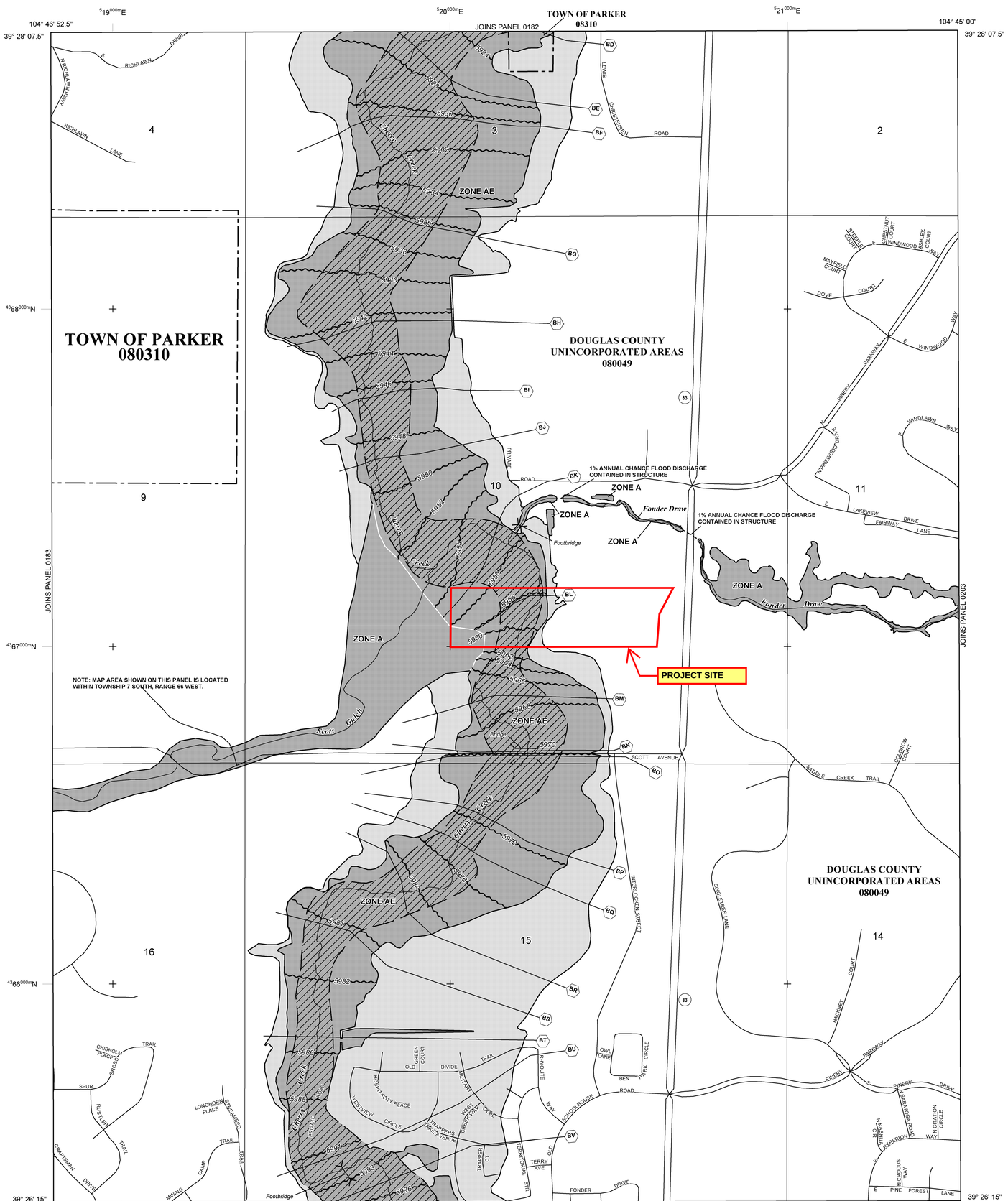
Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- (A) (A) — Cross section line
- (23) (23) — Transect line
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- $^{4}88^{000m}$N — 1000-meter Universal Transverse Mercator grid values, zone 13
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 • — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

SEPTEMBER 30, 2005

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

MARCH 16, 2016: to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to update map format, to add roads and road names, to reflect updated topographic information, to incorporate previously issued letters of map revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0184G

FIRM

FLOOD INSURANCE RATE MAP

DOUGLAS COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 184 OF 495
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DOUGLAS COUNTY	080049	0184	G
PARKER, TOWN OF	080310	0184	G

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

MAP NUMBER
08035C0184G
MAP REVISED
MARCH 16, 2016

Federal Emergency Management Agency

APPENDIX B – Tables and Figures

Site-specific conditions may vary from the representative values presented in this chapter. The engineer is responsible for assuring that the selected imperviousness values represent the imperviousness of the catchment or the proposed development. During master planning or in early stages of design, select imperviousness values that are unlikely to be exceeded as final design plans are developed to avoid the need to increase the size of infrastructure during later design stages.

TABLE 6-2. RECOMMENDED IMPERVIOUSNESS BY LAND USE

LAND USE/DENSITY	IMPERVIOUSNESS
Residential	
Single-family Housing (SFH) – Rural (0 – 3 du/ac)	35%
SFH – Low & Medium-density (3 – 5 du/ac)	55%
SFH – High-density (5 - 20 du/ac)	65%
Manufactured Housing (>= 10 du/ac)	65%
Multi-family Housing (MFH) – Medium-density (5 – 20 du/ac)	65%
MFH – High-density MFH (>20 du/ac)	70%
Commercial	
Commercial – Low-density	65%
Commercial – Medium- to High-density	80%
Commercial – Urban Core	90%
Industrial/Institutional	
Schools	55%
Office/institutional	65%
Industrial Areas	75%
Solar Fields, Gravel Cover[1,2]	60%
Solar Fields, Grass Cover[1,2]	45%
Parks and Open Space	
Open Space, Undisturbed Native Grasses	5%
Community Parks	25%
Neighborhood Parks	15%
Golf Courses	30%
Cemeteries	25%

Note: Recommended imperviousness values shown in the table are the minimum imperviousness values for a specific land use. It is the engineer's responsibility to select imperviousness values that appropriately reflect the actual density of the proposed development.

[1] Use these values at the master planning scale or when the specific layout of panels is not known. Use values from the surface type (Table 6-3) at the site planning and design stage when panel width, panel spacing, and panel orientation relative to contours are known.

[2] Assumes 1:1 ratio of panels to aisles. See MHFD's technical memorandum regarding *Determination of Solar Panel Field Runoff Coefficients and Imperviousness Values* for additional information on procedures to reflect other impervious areas such as roads and pads that may be part of a solar field and layouts with wider inter-panel spacing.

TABLE 6-3. RECOMMENDED IMPERVIOUSNESS BY SURFACE TYPES

SURFACE TYPES		IMPERVIOUSNESS
Roadways and Paved Streets		95%
Concrete Driveways and Walks		95%
Roofs		95%
Gravel	No Traffic (Pedestrian Use)	40%
	Low-traffic Areas (Maintenance Paths and Substations)	60%
	High-traffic Areas (Roadways and Parking)	80%
Disturbed Soil (Including Lawns, Managed/Active Turf, Landscaped Areas with Water-Wise Vegetation, and Uncompacted Gravel/Mulch Planting Beds)		20%
Undisturbed or Decompacted Soil (Native Grasses and Open Space Areas)		5%
Artificial Turfs[1]	Landscape Applications (without Subgrade Drainage Layer)	25% – 45%
	Sport Fields (with Underdrain Pipe System)	60% – 80%
Water Surfaces (Lakes/Reservoirs/Irrigation Ponds)		100%
Solar Fields[2]	Grass Cover (Varies with Panel Orientation Relative to Ground Contours)	10% – 45%
	Gravel Cover (Varies with Panel Orientation Relative to Ground Contours)	50% – 75%
Historic Flow Analysis, Greenbelts, Agricultural		5%
Newly Graded Areas		65%
Stormwater Control Measures[3]	Retention Ponds & Constructed Wetland Ponds	100%
	Rooftop Systems – Blue Roofs	95%
	Rooftop Systems – Green Roofs (extensive)	65%
	Rooftop Systems – Green Roofs (intensive)	50%
	Permeable Pavement – CGP/PGP/RGP	55%
	Permeable Pavement – PICP	45%
	Extended Detention Basins	25%
	Receiving Pervious Areas (incl. Grass Buffers & Grass Swales)	20%
	Bioretention & Sand Filters	10%

[1] Consult with the manufacturer to get a recommended value.

[2] Assumes 1:1 ratio of panels to aisles. See MHFD's technical memorandum regarding *Determination of Solar Panel Field Runoff Coefficients and Imperviousness Values* for additional information on procedures for determining percent imperviousness based on panel width, panel spacing, and panel orientation relative to ground contours and how to reflect other impervious areas such as roads and pads that may be part of a solar field and layouts with wider inter-panel spacing.

[3] See MHFD's technical memorandum regarding *Evaluation of Percent Imperviousness for Stormwater Control Measures* for background information.

FIGURE 6-1
DOUGLAS COUNTY RAINFALL ZONES

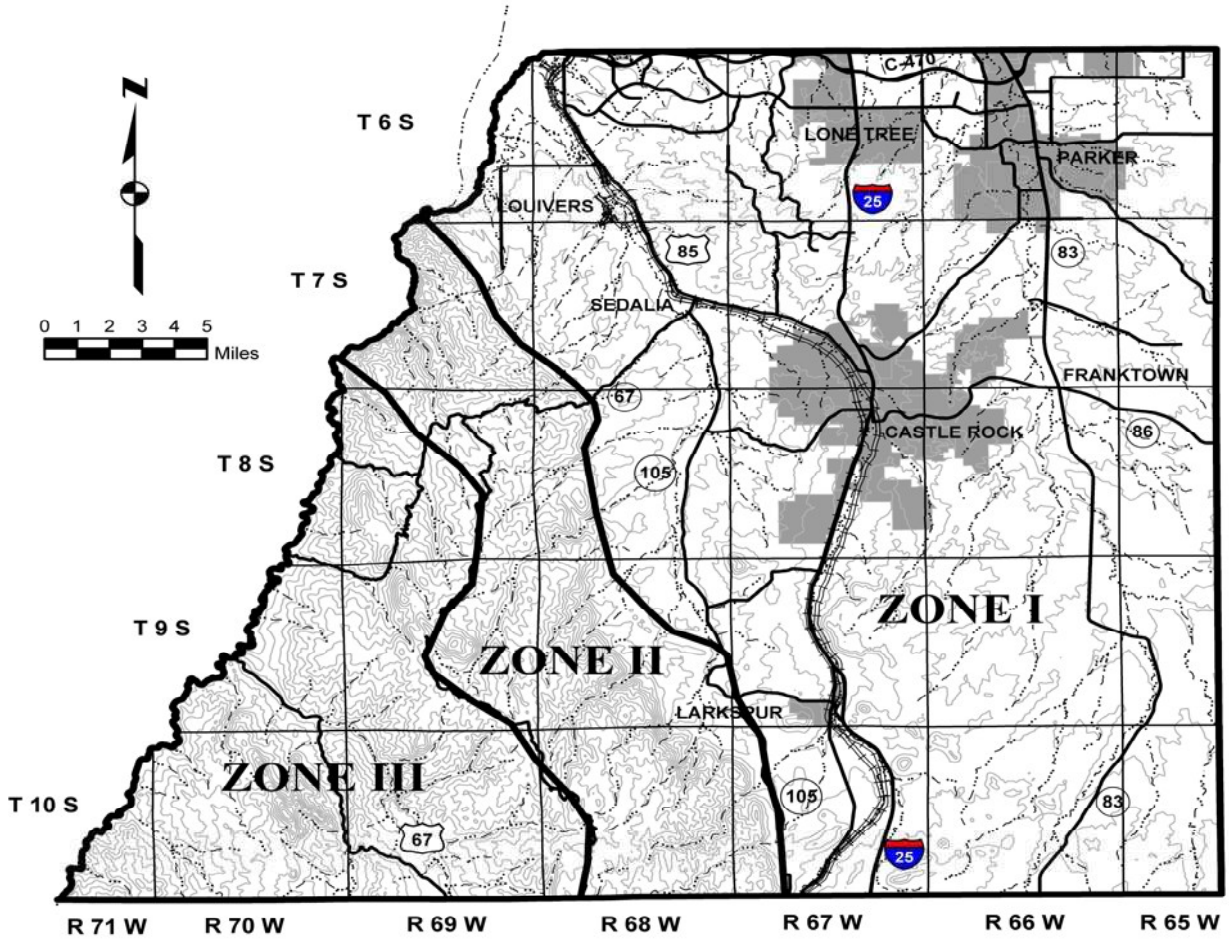
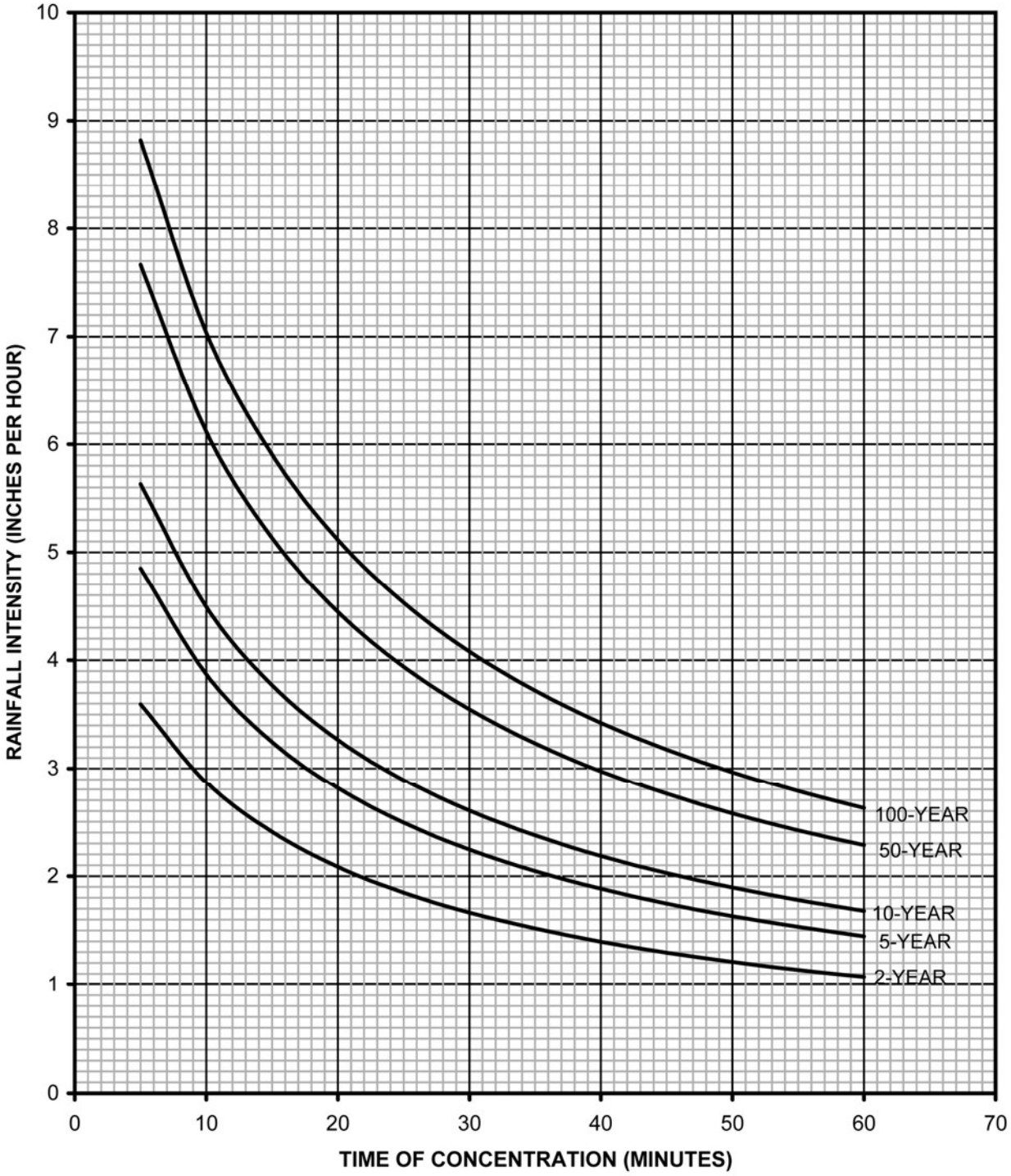


FIGURE 6-2
RAINFALL INTENSITY-DURATION CURVE
DOUGLAS COUNTY *ZONE I*



Chapter. Table 6-1 indicates the one-hour design point rainfall values for each zone.

Zone 1 includes the area from the Douglas/Elbert County line west to the base of the foothills. **Zone 2** includes the area from the base of the foothills west to the South Platte River drainage basin line. **Zone 3** includes the area from the South Platte River drainage basin line west to the Douglas/Jefferson County line.

TABLE 6-1
1-HOUR POINT RAINFALL VALUES FOR DOUGLAS COUNTY (INCHES)

	2- YR	5-YR	10-YR	50-YR	100-YR
ZONE 1	1.06	1.43	1.66	2.26	2.60
ZONE 2	0.98	1.32	1.53	2.07	2.34
ZONE 3	0.72	1.05	1.26	1.78	2.05

If the watershed(s) for a specific project site lies within multiple rainfall zones, runoff calculations shall be based upon the rainfall data from the zone with the greatest precipitation depth. If the watershed is divided into smaller sub-watersheds, the rainfall depth that shall be used is from the zone where the majority of the sub-watershed area is located.

6.1.2 Intensity-Duration Curves. Rainfall intensity based on storm duration for a variety of storm return periods and for the three rainfall zones are shown in Figures 6-2, 6-3, and 6-4, respectively. These curves were developed using distribution factors provided in the NOAA Atlas and also provided in Table RA-4 of the *UDFCD Manual*.

6.1.3 Six-hour Rainfall. In order to use the Colorado Urban Hydrograph Procedure (CUHP), 2-, 3- or 6-hour rainfall distributions are required, depending on watershed area. Table RA-1 in the *UDFCD Manual* summarizes storm durations, area adjustments, and incremental rainfall depths to be used in CUHP based on watershed area. The UD-Raincurve Spreadsheet included in the *UDFCD Manual* shall be used to generate the rainfall distribution curves necessary for a CUHP model. In order to generate these distribution curves, the 1-hour and 6-hour rainfall depths for the design return periods are necessary. Since not all of Douglas County is located within UDFCD boundaries, the rainfall depth-duration-frequency curves provided in the *UDFCD Manual* do not provide rainfall values for the entire County. Therefore these values are provided in these *Criteria*. The 1-hour point values can be found in Table 6-1 of this chapter. The 6-hour point values are as follows:

the applicable roadway section. Each roadway section has a different capacity, so it is important to use the section dimensions or capacity chart that applies to the particular street section of interest. The use of these charts will be discussed later in this chapter.

7.2.2 Drainage Classification. The streets in the County are assigned a drainage classification of Type A, B, or C based on the average daily traffic (ADT) for which the street is designed or the roadway classification. In general, the higher the ADT or mobility that the roadway provides, the more restrictive the allowable drainage encroachment into the driving lanes. Table 7-1 summarizes the drainage classification for each County roadway section:

TABLE 7-1
DRAINAGE CLASSIFICATION FOR
STANDARD ROADWAY SECTIONS

Street Classification	Drainage Classification
Urban Local Type I/Cul-de-Sac (SF)	A
Urban Local Type I/Cul-de-Sac (MF)	A
Urban Local Type II	A
Urban Local Type III	A
Rural Local Type II	A
Entry /School Access/Street/Commercial & Industrial Streets	A
Minor Urban Collector	B
Major Urban Collector	B
Minor Arterial	B
Four-Lane Principle Arterial	C
Six-Lane Principle Arterial	C
Arterial (by functional classification)	C

7.3 Minor (5-year) Storm Allowable Street Flow

7.3.1 Allowable Flow Depth and Roadway Encroachment for Streets with Curb and Gutter. The County allows the use of streets for drainage conveyance in the minor storm with limitations on the depth of flow in the curb and gutter and the spread of flow onto the roadway. Table 7-2 summarizes these limitations for each drainage classification. The maximum allowable street capacity is determined by whichever limitation is more restrictive, based on the geometry of the street section.

TABLE 7-2
MINOR STORM ALLOWABLE FLOW DEPTH AND ROADWAY ENCROACHMENT FOR STREETS WITH CURB AND GUTTER

Drainage Classification	Allowable Flow Depth in Gutter Flowline[1]	Maximum Roadway Encroachment
Type A	No curb overtopping.	Flow may spread to crown of street.
Type B	No curb overtopping.	Flow spread must leave at least one 10-foot lane free of water (5-feet either side of the street crown).
Type C	No curb overtopping.	Flow spread must leave at least two 10-foot lanes free of water (10-feet each side of the street crown or median).

[1] If a 4-inch curb with an attached sidewalk is used (i.e., combination or rollover curb), the flow may spread to the back of sidewalk.

7.4 Major (100-year) Storm Allowable Street Flow

7.4.1 Allowable Flow Depth for a Street with Curb and Gutter. The County allows the use of streets for drainage conveyance in the major storm with limitations on the depth of flow in the curb and gutter. Table 7-3 summarizes these limitations for each drainage classification. The maximum street capacity is based on the allowable depth at the gutter flowline.

TABLE 7-3
MAJOR STORM ALLOWABLE FLOW DEPTH FOR STREETS WITH CURB AND GUTTER

Drainage Classification	Allowable Flow Depth
Type A, B and C	The depth of water at the gutter flowline shall not exceed 12-inches.[1]

[1] In some cases the major storm allowable street capacities must be based on a depth of flow in the gutter that is less than 12-inches. Additional discussion regarding this subject is provided in Section 7.5.4.

7.5 Hydraulic Evaluation of Street Capacity

Once the design discharge is calculated (see Chapter 6, Hydrology), hydraulic calculations are to be completed to determine the capacity of street gutters and the resulting encroachment onto the street section. All street capacity and encroachment calculations shall conform to the Streets/Inlets/Storm Sewers chapter in Volume 1 of the *UDFCD Manual* unless otherwise noted herein. For more detailed information on the methodology used for the hydraulic evaluation of street capacity see Section 2.3 in Volume 1 of the *UDFCD Manual*.

7.5.1 Minor (5-year) Storm Street Capacity Worksheet. The Streets/Inlets/Storm Sewers chapter in Volume 1 of the *UDFCD Manual* provides an analysis tool used for determining the minor storm street capacity and flow encroachment. The "Q-Allow" worksheet is contained within the UD-Inlet spreadsheet which can be accessed via the internet at www.udfcd.org. This worksheet completes a hydraulic evaluation of the theoretical street capacity for the minor storm by calculating the theoretical minor event street gutter flow capacity based on both 1) the allowable spread, and 2) the allowable gutter depth. A reduction factor is then applied to the theoretical gutter flow based on allowable depth and the lesser of the allowable street capacities governs for the minor event.

7.5.2 Minor Storm Street Capacity Charts. The allowable minor storm street capacity for each Douglas County standard street cross-section has been calculated based on the "Q-Allow" worksheet and is presented at the end of this chapter. These charts shall only be used for streets that are consistent with all the referenced standard street parameters, including street width, pavement cross slope of 2%, and a depressed gutter consistent with the County's standard cross-section as noted. A Manning's n-value of 0.016 was used. These minor event capacity calculations were performed for various street slopes to generate the street capacity charts located at the end of this chapter. These charts apply for one-half of the street section, on one side of the street crown or the other.

7.5.3 Major (100-year) Storm Street Capacity Worksheet. Similar to the minor storm, the Streets/Inlets/Storm Sewers chapter in Volume 1 of the *UDFCD Manual* provides an analysis tool used for determining the major storm street capacity. The "Q-Allow" worksheet is contained within the UD-Inlet spreadsheet which can be accessed via the internet at www.udfcd.org. This worksheet completes a hydraulic evaluation of the theoretical street capacity for the major storm and then applies the major storm reduction factor.

7.5.4 Major Storm Street Capacity Charts. The allowable major storm street capacity for all Douglas County street cross-sections have been calculated based on the "Q-Allow" worksheet and is presented at the end of this chapter. These charts shall only be used for streets that are consistent with all the referenced standard street parameters, including street width, pavement cross slope of 2%, and a depressed gutter consistent with the County's standard cross-section as noted. A Manning's n-value of 0.016 was used. These charts present the allowable capacity for one-half of the street section.

The major storm street capacity charts at the end of this chapter contain two curves, which represent the capacities at full curb depth and at 12-inches of depth at the gutter flowline, respectively. The 12-inch depth allowable capacity curve is based on the assumption of a vertical "wall" at the back of the curb. Although flow may be conveyed in the area behind the curb, the additional capacity is ignored to account for potential obstructions in the gutter and to allow for a reasonable capacity to be calculated, independent of the various grading scenarios and landscaping improvements that may be proposed adjacent to the roadway. The 12-inch depth curve may be used if the following conditions apply:

13.0 Introduction

This chapter summarizes evaluation methods and design criteria for flood control detention facilities, referencing the Storage Chapter of Volume 2 of the *UDFCD Manual* for much of the background information. Criteria presented in the Storage Chapter of Volume 2 of the *UDFCD Manual* shall govern except as modified or added to herein.

13.0.1 Stormwater Quality Considerations. Detention facilities are used both for attenuating peak flows during large flood events and for providing extended detention and sedimentation during small, frequent events to enhance stormwater quality. Extended detention facilities used for water quality management may be incorporated into flood control detention basins or kept separate. Extended detention and other water quality best management practices are discussed in Chapter 14, Stormwater Quality, and in Volume 3 of the *UDFCD Manual*.

13.1 General Requirements

13.1.1 Detention shall be Provided for all New Development, Redevelopment and Expansion. The County requires that Water Quality Capture Volume and flood control detention be provided for all new development, redevelopment, or expansion of a site. Storage volume and release rate criteria are based on three design events, as follows:

1. Water Quality Capture Volume (WQCV). This is defined in Volume 3 of the *UDFCD Manual*.

2. Excess Urban Runoff Volume (EURV). This is a volume that, for Type C or D soils, is about twice as large as the Water Quality Capture Volume, or slightly larger than the total 2-year runoff volume, and is similar to the 10-year detention volume using the UDFCD simplified equation. Excess Urban Runoff Volume is further explained in Section 13.1.2.

3. The 100-year event. Procedures for sizing detention facilities for these design events are discussed in Section 13.3 and the Storage Chapter of the *UDFCD Manual*. Facilities that combine the first two events or all three events generally do not require a separate design for Water Quality Capture Volume; the Water Quality Capture Volume and water quality release rate are "built in" to the Excess Urban Runoff Volume design.

13.1.2 Excess Urban Runoff Volume. Excess urban runoff volume is the difference between the developed and pre-developed runoff volume for the range of storms that produce runoff from pervious land surfaces (generally beyond the 2-year event). Excess urban runoff volume is illustrated in Figure 13-1 and is relatively constant for a given imperviousness over a wide range of storm events. Designing a detention basin to capture excess urban runoff volume and release it slowly (at a rate similar to water quality capture volume release) means that all the frequent storms smaller than approximately the 2-year event will be reduced down to flows that are as near to zero as possible and typically less than the threshold value for erosion in most drainageways. In addition, by incorporating an

APPENDIX C – Hydrology

ROTH LANG ENGINEERING GROUP LLC

COMPOSITE IMPERVIOUSNESS AND RUNOFF COEFFICIENT CALCULATIONS EXISTING CONDITIONS

	EXISTING LAND USE [a.] (sf)									RUNOFF COEFFICIENTS [b.] HYDROLOGIC SOIL GROUP B [c.]				
SUB-BASIN	PAVED STREET (ASPHALT) 95%	DRIVE & WALKS (CONC) 95%	ROOF 95%	LAWN 20%	UNDISTURBED OR DECOMPACTED SOIL (NATIVE GRASSES AND OPEN SPACE AREAS) 5%	SINGLE FAMILY HOUSING (RURAL) 35%	TOTAL AREA (sf)	TOTAL AREA (acres)	COMPOSITE PERCENT IMPERVIOUS *i*	C_2	C_5	C_{10}	C_{100}	NOTES
OS-1						2,131,723	2,131,723	48.94	35.0%	0.24	0.27	0.34	0.59	
OS-2	114,566						114,566	2.63	95.0%	0.79	0.81	0.82	0.87	
OS-3	46,188			50,838			97,026	2.23	55.7%	0.42	0.45	0.51	0.69	
OS-4	27,735			42,970			70,705	1.62	49.4%	0.37	0.40	0.46	0.66	
Total	**188,489**	**-**	**-**	**93,808**	**-**	**2,131,723**	**2,414,020**	**55.42**	**39.1%**	**0.28**	**0.31**	**0.37**	**0.61**	
EX-1					30,328		30,328	0.70	5.0%	0.03	0.03	0.10	0.45	
EX-2					750,843		750,843	17.24	5.0%	0.03	0.03	0.10	0.45	
EX-3					333,627		333,627	7.66	5.0%	0.03	0.03	0.10	0.45	
EX-4					297,923		297,923	6.84	5.0%	0.03	0.03	0.10	0.45	
EX-5					309,018		309,018	7.09	5.0%	0.03	0.03	0.10	0.45	
Total	-	-	-	-	1,721,739	-	1,721,739	**39.53**	**5.0%**	0.03	0.03	0.10	0.45	
Sum Total	**188,489**	**-**	**-**	**93,808**	**1,721,739**	**2,131,723**	**4,135,759**	**94.94**	**24.9%**	**0.16**	**0.19**	**0.26**	**0.54**	

NOTES:

a. UDFCD, USDCM Volume 1, Table 6-3
b. UDFCD, USDCM Volume 1, Table 6-4 and Table 6-5
c. NRCS Web Soil Survey

$C_2 = 0.84i^{1.302}$ $C_5 = 0.86i^{1.276}$ $C_{10} = 0.87i^{1.232}$ $C_{100} = 0.78i + 0.110$

ROTH LANG ENGINEERING GROUP LLC

TIME OF CONCENTRATION
EXISTING CONDITIONS

PINERY RESIDENTIAL - EXISTING CONDITIONS
AND OFFSITE BASIN

BASIN DATA			INITIAL/OVERLAND TIME (t_i) [a.]			TRAVEL TIME (t_t) [b.]					TIME OF CONC. (t_c) [d.]	FIRST DESIGN POINT TIME OF CONC. IN URBAN CATCHEMENT (t_c) [e.]			FINAL (t_c) [f. g.]	CONVEYANCE REMARKS
SUB-BASIN	AREA (acres)	C_5	LENGTH L_i (ft)	SLOPE S_o (ft/ft)	t_i (minutes)	LENGTH L_t (ft)	SLOPE S_t (ft/ft)	CONVEYANCE FACTOR K [c.]	VELOCITY V_t (ft/s)	t_t (minutes)	t_c (minutes)	LENGTH L_t (ft)	IMPERVIOUS i (decimal)	t_c (minutes)	t_c (minutes)	
OS-1	48.94	0.27	300	0.130	11.1	2,550	0.050	20	4.5	9.50	20.6	2,550	0.350	33.72	**20.6**	
OS-2	2.63	0.81	75	0.020	3.6	1,635	0.015	20	2.4	11.12	14.7	1,635	0.950	19.83	**14.7**	
OS-3	2.23	0.45	220	0.032	11.8	910	0.030	7	1.2	12.51	24.3	910	0.557	21.74	**21.7**	
OS-4	1.62	0.40	30	0.020	5.5	70	0.250	7	3.5	0.33	5.9	70	0.494	17.75	**5.9**	
EX-1	0.70	0.03	-	-	-	100	0.013	10	1.1	1.46	1.5	100	0.050	26.66	**5.0**	
EX-2	17.24	0.03	-	-	-	1,500	0.020	7	1.0	25.25	25.3	1,500	0.050	43.37	**25.3**	
EX-3	7.66	0.03	530	0.044	27.2	250	0.038	7	1.4	3.05	30.3	250	0.050	27.35	**27.4**	
EX-4	6.84	0.03	210	0.048	16.6	810	0.002	7	0.3	43.12	59.8	810	0.050	56.27	**56.3**	
EX-5	7.09	0.03	-	0.040	-	645	0.025	7	1.1	9.71	9.7	645	0.050	32.16	**9.7**	

NOTES:

a. UDFCD, USDCM Volume 1, Equation 6-3: $t_i = 0.395(1.1 - C_5) * \text{sqrt}(L_i) / S_o^{0.33}$

b. UDFCD, USDCM Volume 1, Equation 6-4: $t_t = L_t / 60 * K * \text{sqrt}(S_o) = L_t / 60 * V_t$

c. UDFCD, USDCM Volume 1, Table 6-2: Heavy Meadow = 2.5, Tillage/field = 5, Short Pasture & Lawn = 7, Nearly Bare Ground = 10, Grassed Waterway = 15, Paved Areas & Shallow Paved Swales = 20

d. UDFCD, USDCM Volume 1, Equation 6-2: $t_c = t_i + t_t$

e. UDFCD, USDCM Volume 1, Equation 6-5: $t_t = (26 - 17i) + (L_t / 60(14i + 9) * \text{sqrt}(S_t))$

f. UDFCD, USDCM Volume 1, Section 2.4.3, "The time of concentration shall be the lesser of the values calculated by Equation 6-2 and Equation 6-5."

g. UDFCD, USDCM Volume 1, Section 2.4.4, "Use a minimum t_c value of 5 minutes for urbanized areas."

ROTH LANG ENGINEERING GROUP LLC

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
EXISTING CONDITIONS
RETURN PERIOD MINOR: 5-YEAR

	DIRECT RUNOFF								TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
MASTER BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C * A (Acres)	P1[a]	I[b] (in/hour)	Q (cfs)[c]	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
OS-1		48.94	0.27	20.6	13.38	1.43	2.77	37.08													
OS-2		2.63	0.81	14.7	2.13	1.43	3.27	6.98													
OS-3		2.23	0.45	21.7	1.01	1.43	2.69	2.72													
OS-4		1.62	0.40	5.9	0.65	1.43	4.64	3.00													
Sub-Total		**55.42**						**49.77**													
EX-1		0.70	0.03	5.0	0.02	1.43	4.85	0.11													
EX-2		17.24	0.03	25.3	0.57	1.43	2.48	1.41													
EX-3		7.66	0.03	27.4	0.25	1.43	2.37	0.60													
EX-4		6.84	0.03	56.3	0.23	1.43	1.51	0.34													
EX-5		7.09	0.03	9.7	0.23	1.43	3.91	0.91													
Sub-Total		**39.53**						**3.37**													

NOTES:
a. UDFCD, USDCM Volume 1, Section 5.1: "One=hour point precipitation values in Denver ar as follows: 500-year (3.14), 100-year (2.31), 10-year (1.33), 5-year (1.09), 2-year (0.83)".
b. UDFCD, USDCM Volume 1, Equation 5-1: $I = (28.5 * P_1) / (10 + T_c)^{0.786}$
c. UDFCD, USDCM Volume 1, Equation 6-1: $Q = CIA$

ROTH LANG ENGINEERING GROUP LLC

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
EXISTING CONDITIONS
RETURN PERIOD MAJOR: 100-YEAR

	DIRECT RUNOFF								TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
MASTER BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C * A (Acres)	P1[a]	I[b] (in/hour)	Q (cfs)[c]	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
OS-1		48.94	0.59	20.6	28.81	2.60	5.04	145.12													
OS-2		2.63	0.87	14.7	2.28	2.60	5.95	13.59													
OS-3		2.23	0.69	21.7	1.53	2.60	4.89	7.46													
OS-4		1.62	0.66	5.9	1.06	2.60	8.44	8.99													
Sub-Total		**55.42**						**175.16**													
EX-1		0.70	0.45	5.0	0.31	2.60	8.82	2.76													
EX-2		17.24	0.45	25.3	7.74	2.60	4.51	34.89													
EX-3		7.66	0.45	27.4	3.44	2.60	4.30	14.81													
EX-4		6.84	0.45	56.3	3.07	2.60	2.74	8.43													
EX-5		7.09	0.45	9.7	3.19	2.60	7.11	22.67													
Sub-Total		**39.53**						**83.56**													

NOTES:
a. UDFCD, USDCM Volume 1, Section 5.1: "One=hour point precipitation values in Denver ar as follows: 500-year (3.14), 100-year (2.31), 10-year (1.33), 5-year (1.09), 2-year (0.83)".
b. UDFCD, USDCM Volume 1, Equation 5-1: $I = (28.5 * P_1) / (10 + T_c)^{0.786}$
c. UDFCD, USDCM Volume 1, Equation 6-1: $Q = CIA$

ROTH LANG ENGINEERING GROUP LLC

COMPOSITE IMPERVIOUSNESS AND RUNOFF COEFFICIENT CALCULATIONS DEVELOPED CONDITIONS

	PROPOSED LAND USE AND TRIBUTARY EXISTING OFFSITE BASINS [a.] (sf)									RUNOFF COEFFICIENTS [b.] HYDROLOGIC SOIL GROUP B [c.]				
SUB-BASIN	PAVED STREET (ASPHALT) 95%	DRIVE & WALKS (CONC) 95%	ROOF 95%	LAWN 20%	MULTI FAMILY HOUSING (MEDIUM DENSITY) 65%	SINGLE FAMILY HOUSING (HIGH DENSITY) 65%	TOTAL AREA (sf)	TOTAL AREA (acres)	COMPOSITE PERCENT IMPERVIOUS *i*	C_2	C_5	C_{10}	C_{100}	NOTES
A				78,824		59,313	138,137	3.17	39.3%	0.28	0.31	0.37	0.61	
B-1						70,617	70,617	1.62	65.0%	0.50	0.54	0.58	0.73	
B-2						73,103	73,103	1.68	65.0%	0.50	0.54	0.58	0.73	
C-1						66,900	66,900	1.54	65.0%	0.50	0.54	0.58	0.73	
C-2				18,323		33,211	51,534	1.18	49.0%	0.36	0.39	0.45	0.65	
C-3	7,141			5,328			12,469	0.29	63.0%	0.49	0.52	0.57	0.72	
D				63,126		64,873	127,999	2.94	42.8%	0.31	0.34	0.40	0.63	
E-1		12,743			47,285		60,028	1.38	71.4%	0.56	0.59	0.63	0.76	
E-2					12,303		12,303	0.28	65.0%	0.50	0.54	0.58	0.73	
E-3	12,748			2,658			15,406	0.35	82.1%	0.66	0.69	0.72	0.81	
E-4	5,792			1,197			6,989	0.16	82.2%	0.66	0.69	0.72	0.81	
F-1		7,302			25,613		32,915	0.76	71.7%	0.57	0.60	0.64	0.76	
F-2	1,784	4,138			14,398		20,320	0.47	73.7%	0.58	0.62	0.65	0.77	
F-3	13,010			2,989			15,999	0.37	81.0%	0.65	0.68	0.71	0.80	
F-4	4,483			727			5,210	0.12	84.5%	0.69	0.71	0.74	0.82	
G-1					23,235		23,235	0.53	65.0%	0.50	0.54	0.58	0.73	
G-2					19,872		19,872	0.46	65.0%	0.50	0.54	0.58	0.73	
H-1	8,467			651			9,118	0.21	89.6%	0.73	0.76	0.78	0.84	
H-2	7,233			1,073			8,306	0.19	85.3%	0.69	0.72	0.75	0.82	
I					11,047		11,047	0.25	65.0%	0.50	0.54	0.58	0.73	
J				36,385			36,385	0.84	20.0%	0.13	0.15	0.22	0.52	
K						121,600	121,600	2.79	65.0%	0.50	0.54	0.58	0.73	
OS3	46,188			50,838			97,026	2.23	55.7%	0.42	0.45	0.51	0.69	
OS4	27,735			42,970			70,705	1.62	49.4%	0.37	0.40	0.46	0.66	
Total	**134,581**	**24,183**	**-**	**305,089**	**153,753**	**489,617**	**1,107,223**	**25.42**	**56.9%**	**0.43**	**0.46**	**0.52**	**0.69**	
UD1				57,870			57,870	1.33	20.0%	0.13	0.15	0.22	0.52	
UD2				32,828			32,828	0.75	20.0%	0.13	0.15	0.22	0.52	
UD3	11,104						11,104	0.25	95.0%	0.79	0.81	0.82	0.87	
Total	11,104	-	-	90,698	-	-	101,802	2.34	28.2%	0.19	0.22	0.28	0.56	

NOTES:
a. UDFCD, USDCM Volume 1, Table 6-3
b. UDFCD, USDCM Volume 1, Table 6-4 and Table 6-5
c. NRCS Web Soil Survey

ROTH LANG ENGINEERING GROUP LLC

TIME OF CONCENTRATION
DEVELOPED CONDITIONS

PINERY RESIDENTIAL - OFFSITE BASIN

BASIN DATA			INITIAL/OVERLAND TIME (t_i) [a.]			TRAVEL TIME (t_t) [b.]					TIME OF CONC. (t_c) [d.]	FIRST DESIGN POINT TIME OF CONC. IN URBAN CATCHEMENT (t_c) [e.]			FINAL (t_c) [f. g.]	CONVEYANCE REMARKS
SUB-BASIN	AREA (acres)	C_5	LENGTH L_i (ft)	SLOPE S_o (ft/ft)	t_i (minutes)	LENGTH L_t (ft)	SLOPE S_t (ft/ft)	CONVEYANCE FACTOR K [c.]	VELOCITY V_t (ft/s)	t_t (minutes)	t_c (minutes)	LENGTH L_t (ft)	IMPERVIOUS i (decimal)	t_c (minutes)	t_c (minutes)	
A	3.17	0.31	300	0.130	10.6	450	0.013	20	2.2	3.35	13.9	450	0.393	23.94	**13.9**	
B-1	1.62	0.54	120	0.025	8.2	600	0.013	20	2.2	4.47	12.7	600	0.650	19.89	**12.7**	
B-2	1.68	0.54	120	0.025	8.2	550	0.010	20	2.0	4.58	12.8	550	0.650	20.01	**12.8**	
C-1	1.54	0.54	120	0.025	8.2	400	0.010	20	2.0	3.33	11.6	400	0.650	18.63	**11.6**	
C-2	1.18	0.39	90	0.020	9.6	330	0.010	20	2.0	2.75	12.4	330	0.490	21.14	**12.4**	
C-3	0.29	0.52	100	0.020	8.4	80	0.010	20	2.0	0.67	9.0	80	0.630	16.05	**9.0**	
D	2.94	0.34	110	0.025	10.6	430	0.013	20	2.2	3.21	13.8	430	0.428	23.00	**13.8**	
E-1	1.38	0.59	100	0.020	7.3	400	0.010	20	2.0	3.33	10.6	400	0.714	17.38	**10.6**	
E-2	0.28	0.54	100	0.020	8.1	180	0.010	20	2.0	1.50	9.6	180	0.650	16.61	**9.6**	
E-3	0.35	0.69	10	0.020	1.9	290	0.020	20	2.8	1.71	3.6	290	0.821	13.72	**5.0**	
E-4	0.16	0.69	10	0.020	1.9	120	0.020	20	2.8	0.71	2.6	120	0.822	12.72	**5.0**	
F-1	0.76	0.60	100	0.020	7.2	280	0.012	20	2.2	2.13	9.4	280	0.717	16.06	**9.4**	
F-2	0.47	0.62	100	0.020	7.0	275	0.012	20	2.2	2.09	9.1	275	0.737	15.63	**9.1**	
F-3	0.37	0.68	10	0.020	1.9	265	0.012	20	2.2	2.02	3.9	265	0.810	14.21	**5.0**	
F-4	0.12	0.71	10	0.020	1.8	110	0.012	20	2.2	0.84	2.6	110	0.845	12.43	**5.0**	
G-1	0.53	0.54	100	0.020	8.1	130	0.010	20	2.0	1.08	9.2	130	0.650	16.15	**9.2**	
G-2	0.46	0.54	100	0.020	8.1	150	0.010	20	2.0	1.25	9.3	150	0.650	16.33	**9.3**	
H-1	0.21	0.76	10	0.020	1.5	120	0.010	20	2.0	1.00	2.5	120	0.896	11.69	**5.0**	
H-2	0.19	0.72	10	0.020	1.7	210	0.010	20	2.0	1.75	3.5	210	0.853	13.17	**5.0**	
I	0.25	0.54	90	0.020	7.7	90	0.020	20	2.8	0.53	8.2	90	0.650	15.54	**8.2**	
J	0.84	0.15	65	0.120	6.1	90	0.005	20	1.4	1.06	7.2	90	0.200	24.40	**7.2**	
K	2.79	0.54	110	0.020	8.5	710	0.010	20	2.0	5.92	14.4	710	0.650	21.49	**14.4**	
OS3	2.23	0.45	270	0.070	10.1	490	0.013	20	2.2	3.65	13.7	490	0.557	20.88	**13.7**	
OS4	1.62	0.40	300	0.130	9.4	450	0.013	20	2.3	3.29	12.7	450	0.494	21.73	**12.7**	

NOTES:

a. UDFCD, USDCM Volume 1, Equation 6-3: $t_i = 0.395(1.1 - C_5) * \text{sqrt}(L_i) / S_o^{0.33}$

b. UDFCD, USDCM Volume 1, Equation 6-4: $t_t = L_t / 60 * K * \text{sqrt}(S_o) = L_t / 60 * V_t$

c. UDFCD, USDCM Volume 1, Table 6-2: Heavy Meadow = 2.5, Tillage/field = 5, Short Pasture & Lawn = 7, Nearly Bare Ground = 10, Grassed Waterway = 15, Paved Areas & Shallow Paved Swales = 20

d. UDFCD, USDCM Volume 1, Equation 6-2: $t_c = t_i + t_t$

e. UDFCD, USDCM Volume 1, Equation 6-5: $t_t = (26 - 17i) + (L_t / 60(14i + 9)* \text{sqrt}(S_t))$

f. UDFCD, USDCM Volume 1, Section 2.4.3, "The time of concentration shall be the lesser of the values calculated by Equation 6-2 and Equation 6-5."

g. UDFCD, USDCM Volume 1, Section 2.4.4, "Use a minimum t_c value of 5 minutes for urbanized areas."

ROTH LANG ENGINEERING GROUP LLC

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
DEVELOPED CONDITIONS
RETURN PERIOD MAJOR: 100-YEAR

	DIRECT RUNOFF								TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
MASTER BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C * A (Acres)	$P1^{a}$	I^{b}, (in/hour)	Q (cfs) ^{c}	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
A		3.17	0.31	13.9	0.98	1.43	3.36	3.31													
B-1		1.62	0.54	12.7	0.87	1.43	3.50	3.04													
B-2		1.68	0.54	12.8	0.90	1.43	3.49	3.14													
C-1		1.54	0.54	11.6	0.82	1.43	3.65	3.00													
C-2		1.18	0.39	12.4	0.47	1.43	3.54	1.65													
C-3		0.29	0.52	9.0	0.15	1.43	4.02	0.60													
D		2.94	0.34	13.8	1.00	1.43	3.37	3.37													
E-1		1.38	0.59	10.6	0.82	1.43	3.78	3.09													
E-2		0.28	0.54	9.6	0.15	1.43	3.93	0.60													
E-3		0.35	0.69	5.0	0.24	1.43	4.85	1.19													
E-4		0.16	0.69	5.0	0.11	1.43	4.85	0.54													
F-1		0.76	0.60	9.4	0.45	1.43	3.97	1.79													
F-2		0.47	0.62	9.1	0.29	1.43	4.02	1.15													
F-3		0.37	0.68	5.0	0.25	1.43	4.85	1.21													
F-4		0.12	0.71	5.0	0.09	1.43	4.85	0.41													
G-1		0.53	0.54	9.2	0.29	1.43	4.00	1.14													
G-2		0.46	0.54	9.3	0.24	1.43	3.97	0.97													
H-1		0.21	0.76	5.0	0.16	1.43	4.85	0.77													
H-2		0.19	0.72	5.0	0.14	1.43	4.85	0.67													
I		0.25	0.54	8.2	0.14	1.43	4.16	0.57													
J		0.84	0.15	7.2	0.12	1.43	4.36	0.54													
K		2.79	0.54	14.4	1.50	1.43	3.31	4.95													
OS3		2.23	0.45	13.7	1.01	1.43	3.38	3.41													
OS4		1.62	0.40	12.7	0.65	1.43	3.50	2.26													
Total								**12.49**													

NOTES:
a. UDFCD, USDCM Volume 1, Section 5.1: "One=hour point precipitation values in Denver ar as follows: 500-year (3.14), 100-year (2.31), 10-year (1.33), 5-year (1.09), 2-year (0.83)".
b. UDFCD, USDCM Volume 1, Equation 5-1: $I = (28.5 * P_1) / (10 + T_c)^{0.786}$
c. UDFCD, USDCM Volume 1, Equation 6-1: $Q = CIA$

ROTH LANG ENGINEERING GROUP LLC

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
DEVELOPED CONDITIONS
RETURN PERIOD MINOR: 5-YEAR

	DIRECT RUNOFF								TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
MASTER BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C * A (Acres)	P1[a]	I[b] (in/hour)	Q (cfs) [c]	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
OS4		1.62	0.40	12.7	0.65	1.43	3.50	**2.26**													
A		3.17	0.31	13.9	0.98	1.43	3.36	**3.31**													
	DP-1								13.9	1.63	3.36	**5.48**			5.48	0.5	18	560	4.6	2.03	ΣOS4 and A combined at DP-1 Inlet. Routed to DP-4 MH via pipe.
OS3		2.23	0.45	13.7	1.01	1.43	3.38	**3.41**							3.41	0.5	30	560	3.9	2.39	Routed via pipe to DP-4 MH
	DP-19																				
D		2.94	0.34	13.8	1.00	1.43	3.37	**3.37**													
	DP-4 Inlet								13.8	1.00	3.37	**3.37**									ΣOS3 and D combined at DP-4 Inlet
B-1		1.62	0.54	12.7	0.87	1.43	3.50	**3.04**							3.04	0.5	18	260	4.0	1.08	Routed from DP-2 Inlet to DP-4 MH via pipe
	DP-2																				
B-2		1.68	0.54	12.8	0.90	1.43	3.49	**3.14**							3.14	0.5	30	330	3.8	1.45	Routed via pipe to DP-4 MH
	DP-18																				
C-1		1.54	0.54	11.6	0.82	1.43	3.65	**3.00**							3.00	0.5	30	330	3.8	1.45	Routed via pipe to DP-4 MH
	DP-17																				
C-3		0.29	0.52	9.0	0.15	1.43	4.02	**0.60**													
E-2		0.28	0.54	9.6	0.15	1.43	3.93	**0.60**													
	DP-3 Inlet								9.6	0.30	3.93	**1.18**			1.18	0.5	30	410	4.8	1.42	ΣB-2, C-1 and C-3 combined at DP-3 Inlet. Routed via pipe to DP-8 Inl
	DP-4 MH								16.0	6.53	3.15	**20.58**			20.58	0.5	30	380	6.4	0.99	ΣDP1, DP2 and DP3 combined at DP-4 MH. Routed to DP-8 Inlet.
C-2		1.18	0.39	12.4	0.47	1.43	3.54	**1.65**					1	1.65				230	2.0	1.92	Routed via street to DP-5 Inlet
E-1		1.38	0.59	10.6	0.82	1.43	3.78	**3.09**					1	3.09				230	2.0	1.92	Routed via street to DP-5 Inlet
E-3		0.35	0.69	5.0	0.24	1.43	4.85	**1.19**													
K		2.79	0.54	14.4	1.50	1.43	3.31	**4.95**					1	4.95				120	2.0	1.00	Routed via street to DP-5 Inlet
	DP-5								15.4	3.03	3.21	**9.70**			9.70	0.5	30	725	5.3	2.28	ΣC-2,E-1,E-3 and K combined at DP-5 Inlet. Routed via pipe to DP-8 I
E-4		0.16	0.69	5.0	0.11	1.43	4.85	**0.54**							0.54	0.5	30	350	2.2	2.65	Routed via pipe to DP-8 Inlet.
	DP-6																				
F-3		0.37	0.68	5.0	0.25	1.43	4.85	**1.21**							1.21	0.5	18	710	2.9	4.08	Routed via pipe to DP-8 Inlet.
	DP-12																				
F-4		0.12	0.71	5.0	0.09	1.43	4.85	**0.41**							0.41	0.5	18	350	2.1	2.78	Routed via pipe to DP-8 Inlet.
	DP-13																				
	DP-14 MH								17.7	10.01	3.00	**29.98**									
F-2		0.47	0.62	9.1	0.29	1.43	4.02	**1.15**					1	1.15				90	2.0	0.75	Routed via street to DP-14 Inlet
G-2		0.46	0.54	9.3	0.24	1.43	3.97	**0.97**													
	DP-14 Inlet								9.3	0.53	3.97	**2.11**									ΣF-2,G-2 combined at DP-14 Inlet.
	DP-14 Total								17.7	10.54	3.00	**31.57**									ΣDP-1,DP-2,DP-3,DP-4,DP-5,DP-6,DP-12 and DP-13 combined at DP-14 Inlet.
I		0.25	0.54	8.2	0.14	1.43	4.16	**0.57**					1	0.57				130	2.0	1.08	Routed via street to DP-8 Inlet
H-2		0.19	0.72	5.0	0.14	1.43	4.85	**0.67**													
	DP-8 Inlet								9.3	0.27	3.98	**1.09**									ΣI, H-2 combined at DP-8 Inlet.
	DP-8 Total								17.7	10.81	3.00	**32.39**									ΣDP-1,DP-2,DP-3,DP-4,DP-5,DP-6,DP-8,DP-12,DP-13 and DP-14 combined at DP-8 Inlet.
J		0.84	0.15	7.2	0.12	1.43	4.36	**0.54**													
F-1		0.76	0.60	9.4	0.45	1.43	3.97	**1.79**							1.79	0.5	18	350	3.4	1.72	Routed via pipe to DP-16 Inlet.
	DP-7																				
G-1		0.53	0.54	9.2	0.29	1.43	4.00	**1.14**							1.14	0.5	18	100	3.4	0.49	Routed via pipe to DP-16 Inlet.
	DP-15																				
H-1		0.21	0.76	5.0	0.16	1.43	4.85	**0.77**													
	DP-16								11.1	1.43	3.71	**5.30**									ΣF-1,G-1 and H-1 combined at DP-16 Inlet.

NOTES:
a. UDFCD, USDCM Volume 1, Section 5.1: "One=hour point precipitation values in Denver ar as follows: 500-year (3.14), 100-year (2.31), 10-year (1.33), 5-year (1.09), 2-year (0.83)".
b. UDFCD, USDCM Volume 1, Equation 5-1: $I = (28.5 * P_1) / (10 + T_c)^{0.786}$
c. UDFCD, USDCM Volume 1, Equation 6-1: $Q = CIA$

ROTH LANG ENGINEERING GROUP LLC

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
EXISTING CONDITIONS
RETURN PERIOD MAJOR: 100-YEAR

	DIRECT RUNOFF								TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
MASTER BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C * A (Acres)	$P1^{a.}$	$I^{b.}$ (in/hour)	Q (cfs) $^{c.}$	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
A		3.17	0.61	13.9	1.93	2.60	6.11	11.79													
B-1		1.62	0.73	12.7	1.18	2.60	6.37	7.51													
B-2		1.68	0.73	12.8	1.22	2.60	6.34	7.75													
C-1		1.54	0.73	11.6	1.12	2.60	6.63	7.41													
C-2		1.18	0.65	12.4	0.77	2.60	6.44	4.98													
C-3		0.29	0.72	9.0	0.21	2.60	7.32	1.51													
D		2.94	0.63	13.8	1.84	2.60	6.13	11.26													
E-1		1.38	0.76	10.6	1.04	2.60	6.87	7.18													
E-2		0.28	0.73	9.6	0.21	2.60	7.15	1.47													
E-3		0.35	0.81	5.0	0.29	2.60	8.82	2.52													
E-4		0.16	0.81	5.0	0.13	2.60	8.82	1.14													
F-1		0.76	0.76	9.4	0.57	2.60	7.21	4.14													
F-2		0.47	0.77	9.1	0.36	3.60	10.12	3.63													
F-3		0.37	0.80	5.0	0.29	2.60	8.82	2.60													
F-4		0.12	0.82	5.0	0.10	2.60	8.82	0.86													
G-1		0.53	0.73	9.2	0.39	2.00	5.59	2.17													
G-2		0.46	0.73	9.3	0.33	2.60	7.22	2.40													
H-1		0.21	0.84	5.0	0.18	2.60	8.82	1.56													
H-2		0.19	0.82	5.0	0.16	2.60	8.82	1.38													
I		0.25	0.73	8.2	0.18	2.60	7.57	1.40													
J		0.84	0.52	7.2	0.43	2.60	7.93	3.44													
K		2.79	0.73	14.4	2.03	2.60	6.01	12.23													
OS3		2.23	0.69	13.7	1.53	2.60	6.15	9.38													
OS4		1.62	0.66	12.7	1.06	2.60	6.37	6.78													
Total								**34.47**													

NOTES:
a. UDFCD, USDCM Volume 1, Section 5.1: "One=hour point precipitation values in Denver ar as follows: 500-year (3.14), 100-year (2.31), 10-year (1.33), 5-year (1.09), 2-year (0.83)".
b. UDFCD, USDCM Volume 1, Equation 5-1: $I = (28.5 * P_1) / (10 + T_c)^{0.786}$
c. UDFCD, USDCM Volume 1, Equation 6-1: $Q = CIA$

ROTH LANG ENGINEERING GROUP LLC

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)
DEVELOPED CONDITIONS
RETURN PERIOD MAJOR: 100-YEAR

	DIRECT RUNOFF								TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
MASTER BASIN	DESIGN POINT	AREA (Acres)	RUNOFF COEFF	Tc (min)	C * A (Acres)	P1 [a]	I^b, (in/hour)	Q (cfs) [c]	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
OS4		1.62	0.66	12.7	1.06	2.60	6.37	**6.78**													
A		3.17	0.61	13.9	1.93	2.60	6.11	**11.79**													
	DP-1								13.9	3.00	6.11	**18.29**			18.29	0.5	18	560	4.6	2.03	ΣOS4 and A combined at DP-1 Inlet. Routed to DP-4 MH via pipe.
												13.49									Total flow captured by DP-1 Inlet. Excess flow bypasses to DP-2 Inlet.
OS3		2.23	0.69	13.7	1.53	2.60	6.15	**9.38**							9.38	0.5	30	560	5.2	1.79	Routed via pipe to DP-4 MH
	DP-19																				
D		2.94	0.63	13.8	1.84	2.60	6.13	**11.26**													
	DP-4 Inlet								13.8	1.84	6.13	**11.26**									ΣOS3 and D combined at DP-4 Inlet
B-1		1.62	0.73	12.7	1.18	2.60	6.37	7.51							7.51	0.5	18	260	4.0	1.08	Routed from DP-2 Inlet to DP-4 MH via pipe
							**	**4.80**													DP-1 excess flow overtops street crown and bypasses to DP-2 Inlet
	DP-2							**12.31**													
B-2		1.68	0.73	12.8	1.22	2.60	6.34	**7.75**							7.75	0.5	30	330	5.0	1.10	Routed via pipe to DP-4 MH
	DP-18																				
C-1		1.54	0.73	11.6	1.12	2.60	6.63	**7.41**							7.41	0.5	30	330	4.9	1.12	Routed via pipe to DP-4 MH
	DP-17																				
C-3		0.29	0.72	9.0	0.21	2.60	7.32	**1.51**													
E-2		0.28	0.73	9.6	0.21	2.60	7.15	**1.47**													
							**	**4.40**													DP-2, DP-17 and DP-18 flow bypasses street inlet and flows to DP-3 Inl
	DP-3 Inlet								9.6	0.41	7.15	**7.34**			7.34	0.5	30	410	4.8	1.42	ΣB-2, C-1 and C-3 combined at DP-3 Inlet. Routed via pipe to DP-8 Inlet
	DP-4 MH								16.0	10.29	5.73	**58.94**			58.94	0.5	30	380	6.4	0.99	ΣDP1, DP2 and DP3 combined at DP-4 MH. Routed to DP-8 Inlet.
C-2		1.18	0.65	12.4	0.77	2.60	6.44	**4.98**					1	4.98				230	2.0	1.92	Routed via street to DP-5 Inlet
E-1		1.38	0.76	10.6	1.04	2.60	6.87	**7.18**					1	7.18				230	2.0	1.92	Routed via street to DP-5 Inlet
E-3		0.35	0.81	5.0	0.29	2.60	8.82	**2.52**													
K		2.79	0.73	14.4	2.03	2.60	6.01	**12.23**					1	12.23				120	2.0	1.00	Routed via street to DP-5 Inlet
	DP-5								15.4	4.14	5.83	**24.11**			24.11	0.5	30	725	5.3	2.28	ΣC-2,E-1,E-3 and K combined at DP-5 Inlet. Routed via pipe to DP-8 Inl
E-4		0.16	0.81	5.0	0.13	2.60	8.82	**1.14**							1.14	0.5	30	350	2.2	2.65	Routed via pipe to DP-8 Inlet.
	DP-6																				
F-3		0.37	0.80	5.0	0.29	2.60	8.82	**2.60**							2.60	0.5	18	710	2.9	4.08	Routed via pipe to DP-8 Inlet.
	DP-12																				
F-4		0.12	0.82	5.0	0.10	2.60	8.82	**0.86**							0.86	0.5	18	350	2.1	2.78	Routed via pipe to DP-8 Inlet.
	DP-13 Inlet																				
	DP-8 MH								17.7	14.95	5.45	**81.43**									
F-2		0.47	0.77	9.1	0.36	2.60	7.31	**2.62**					1	2.62				90	2.0	0.75	Routed via street to DP-14 Inlet
G-2		0.46	0.73	9.3	0.33	2.60	7.22	**2.40**													
	DP-14 Inlet								9.3	0.69	7.22	**4.99**									ΣF-2,G-2 combined at DP-14 Inlet.
	DP-14 Total								17.7	15.64	5.45	**85.20**									ΣDP-1,DP-2,DP-3,DP-4,DP-5,DP-6,DP-12 and DP-13 combined at DP-14 Inlet.
I		0.25	0.73	8.2	0.18	2.60	7.57	**1.40**					1	1.40				130	2.0	1.08	Routed via street to DP-8 Inlet
H-2		0.19	0.82	5.0	0.16	2.60	8.82	**1.38**													
	DP-8 Inlet								9.3	0.34	7.24	**2.47**									ΣI, H-2 combined at DP-8 Inlet.
	DP-8 Total								17.7	15.98	5.45	**87.06**									ΣDP-1,DP-2,DP-3,DP-4,DP-5,DP-6,DP-8,DP-12,DP-13 and DP-14 combined at DP-8 Inlet.
J		0.84	0.52	7.2	0.43	2.60	7.93	**3.44**													
F-1		0.76	0.76	9.4	0.57	2.60	7.21	**4.14**							4.14	0.5	18	350	3.4	1.72	Routed via pipe to DP-16 Inlet.
	DP-7																				
G-1		0.53	0.73	9.2	0.39	2.60	7.27	**2.82**							2.82	0.5	18	100	3.4	0.49	Routed via pipe to DP-16 Inlet.
	DP-15																				
H-1		0.21	0.84	5.0	0.18	2.60	8.82	**1.56**													
	DP-16								11.1	1.83	6.75	**12.35**									ΣF-1,G-1 and H-1 combined at DP-16 Inlet.

NOTES:

a. UDFCD, USDCM Volume 1, Section 5.1: "One=hour point precipitation values in Denver ar as follows: 500-year (3.14), 100-year (2.31), 10-year (1.33), 5-year (1.09), 2-year (0.83)".

b. UDFCD, USDCM Volume 1, Equation 5-1: $I = (28.5 * P_1) / (10 + T_c)^{0.786}$

c. UDFCD, USDCM Volume 1, Equation 6-1: $Q = CIA$

APPENDIX D – Hydraulics

Channel Report

STORM LINE A - 48" STORM PIPE EXTENSION FROM EXISTING DUAL 42" CULVERT NORTH OF SITE

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Feb 19 2025

48" RCP STORM PIPE EXTENSION FROM EX 42" CMP DUAL CULVERT

Circular

Diameter (ft)	= 4.00
Invert Elev (ft)	= 1.00
Slope (%)	= 1.50
N-Value	= 0.013

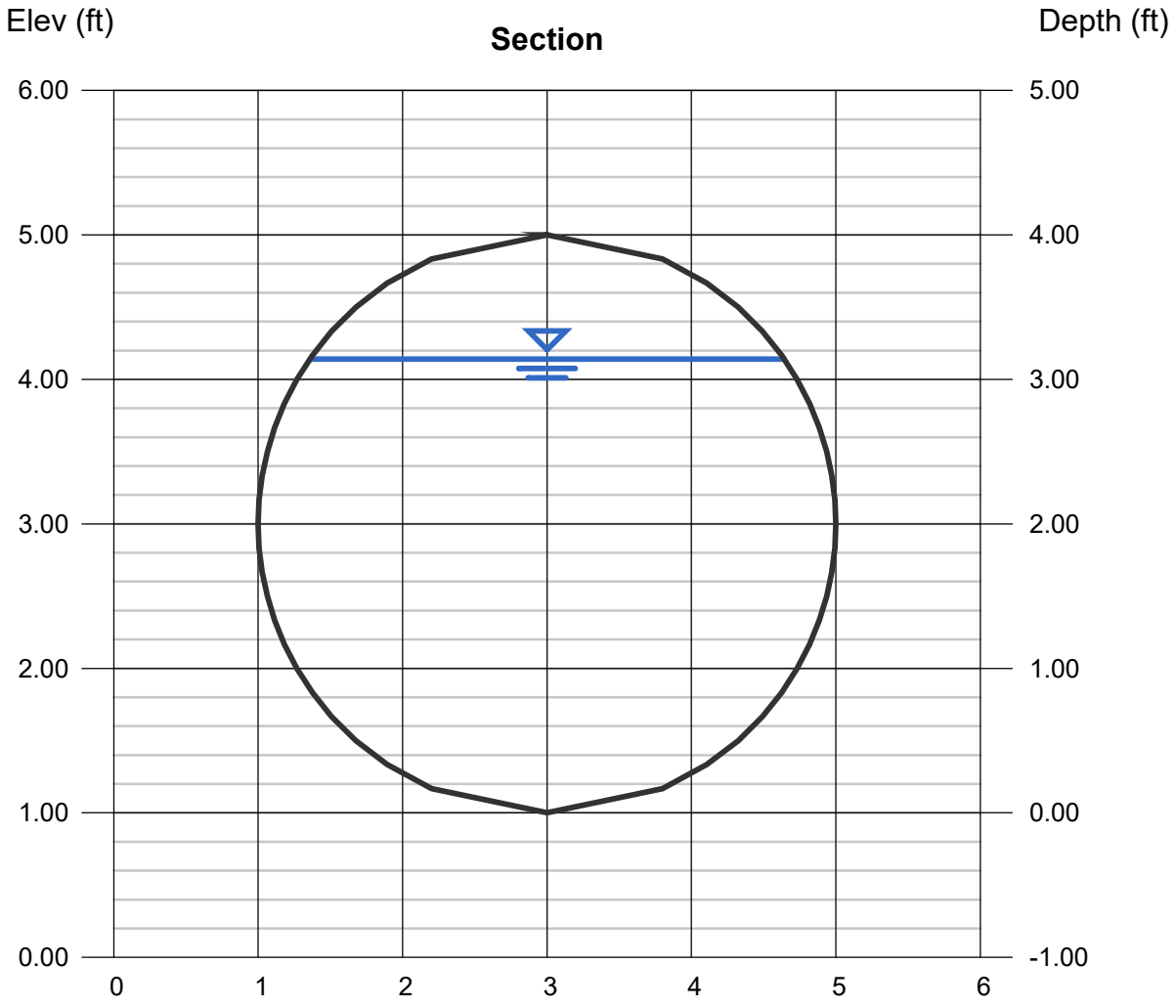
Calculations

Compute by:	Known Q
Known Q (cfs)	= 168.66

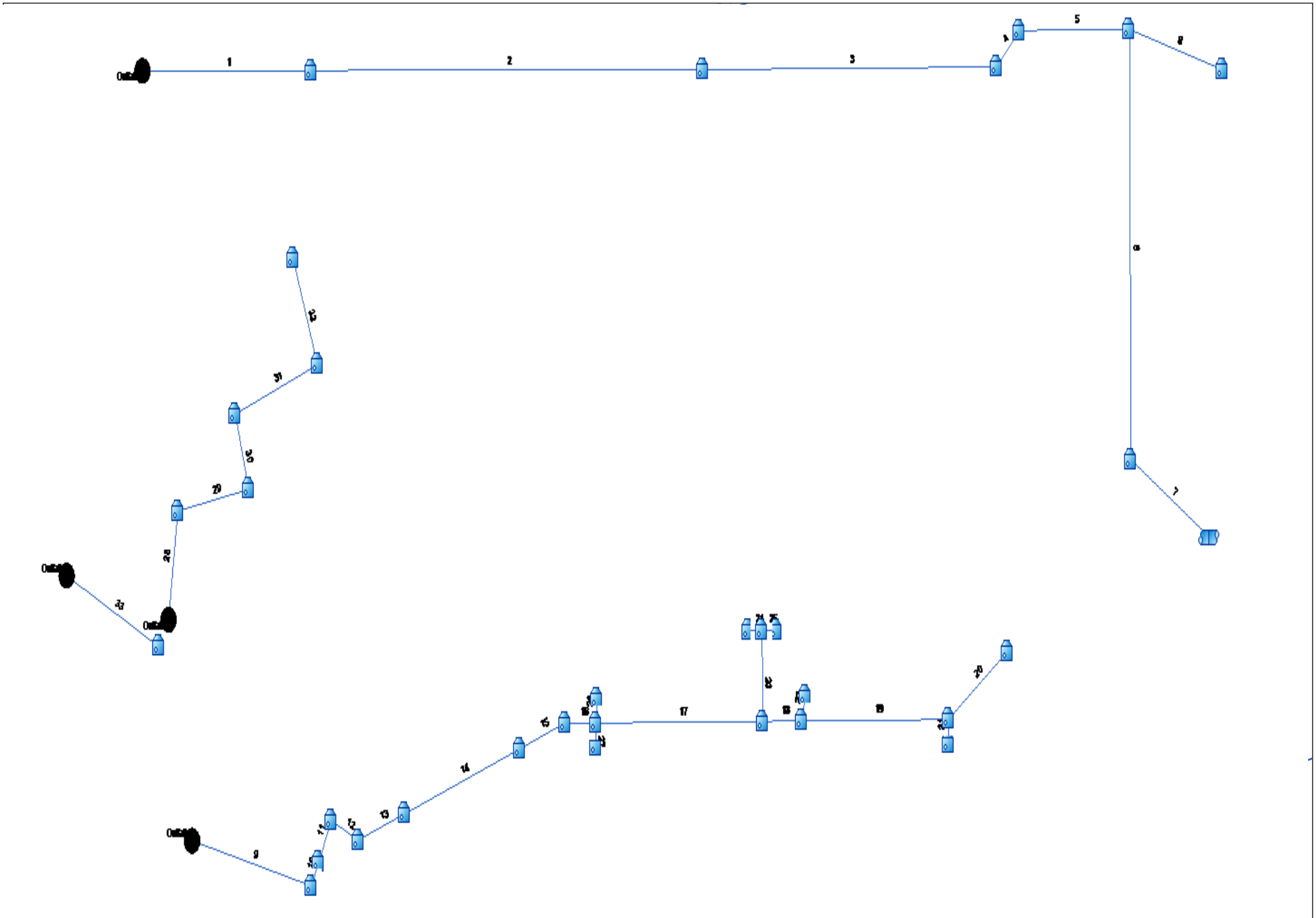
Highlighted

Depth (ft)	= 3.14
Q (cfs)	= 168.66
Area (sqft)	= 10.60
Velocity (ft/s)	= 15.92
Wetted Perim (ft)	= 8.72
Crit Depth, Yc (ft)	= 3.72
Top Width (ft)	= 3.28
EGL (ft)	= 7.08

SUMMARY:
PIPE CAPACITY = 169 CFS.
Q 100 DEMAND = 142 CFS
PIPE CAP > Q DEMAND. GOOD.



Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: STORM (100-YR).stm	Number of lines: 33	Date: 3/6/2025

Hydraflow HGL Computation Procedure

General Procedure:

Hydraflow computes the HGL using the Bernoulli energy equation. Manning's equation is used to determine energy losses due to pipe friction. In a standard step, iterative procedure, Hydraflow assumes upstream HGLs until the energy equation balances. If the energy equation cannot balance, supercritical flow exists and critical depth is temporarily assumed at the upstream end. A supercritical flow Profile is then computed using the same procedure in a downstream direction using momentum principles.

Col. 1 The line number being computed. Calculations begin at Line 1 and proceed upstream.

Col. 2 The line size. In the case of non-circular pipes, the line rise is printed above the span.

Col. 3 Total flow rate in the line.

Col. 4 The elevation of the downstream invert.

Col. 5 Elevation of the hydraulic grade line at the downstream end. This is computed as the upstream HGL + Minor loss of this line's downstream line.

Col. 6 The downstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.

Col. 7 Cross-sectional area of the flow at the downstream end.

Col. 8 The velocity of the flow at the downstream end, (Col. 3 / Col. 7).

Col. 9 Velocity head (Velocity squared / 2g).

Col. 10 The elevation of the energy grade line at the downstream end, HGL + Velocity head, (Col. 5 + Col. 9).

Col. 11 The friction slope at the downstream end (the S or Slope term in Manning's equation).

Col. 12 The line length.

Col. 13 The elevation of the upstream invert.

Col. 14 Elevation of the hydraulic grade line at the upstream end.

Col. 15 The upstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.

Col. 16 Cross-sectional area of the flow at the upstream end.

Col. 17 The velocity of the flow at the upstream end, (Col. 3 / Col. 16).

Col. 18 Velocity head (Velocity squared / 2g).

Col. 19 The elevation of the energy grade line at the upstream end, HGL + Velocity head, (Col. 14 + Col. 18) .

Col. 20 The friction slope at the upstream end (the S or Slope term in Manning's equation).

Col. 21 The average of the downstream and upstream friction slopes.

Col. 22 Energy loss. Average Sf/100 x Line Length (Col. 21/100 x Col. 12). Equals (EGL upstream - EGL downstream) +/- tolerance.

Col. 23 The junction loss coefficient (K).

Col. 24 Minor loss. (Col. 23 x Col. 18). Is added to upstream HGL and used as the starting HGL for the next upstream line(s).

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
(1)	(in) (2)	(cfs) (3)	(ft) (4)	(ft) (5)	(ft) (6)	(sqft) (7)	(ft/s) (8)	(ft) (9)	(ft) (10)	(%) (11)	(ft) (12)	(ft) (13)	(ft) (14)	(ft) (15)	(sqft) (16)	(ft/s) (17)	(ft) (18)	(ft) (19)	(%) (20)	(%) (21)	(ft) (22)	(K) (23)	(ft) (24)
1	48	44.06	5948.10	5952.10	4.00	12.56	3.51	0.19	5952.29	0.080	208.777	5949.77	5952.04	2.27	7.37	5.98	0.56	5952.60	0.211	0.145	0.304	0.15	0.08
2	48	44.06	5953.77	5954.88	1.11*	2.84	15.51	0.78	5955.66	0.000	482.991	5967.51	5969.49	1.98**	6.22	7.09	0.78	5970.27	0.000	0.000	n/a	0.15	0.12
3	48	44.06	5967.71	5969.49	1.78	5.42	8.13	0.78	5970.27	0.000	362.236	5973.14	5975.13	1.98**	6.22	7.09	0.78	5975.91	0.000	0.000	n/a	0.75	0.59
4	48	44.06	5973.34	5975.13	1.79	5.44	8.11	0.78	5975.91	0.000	40.000	5973.94	5975.92	1.98**	6.22	7.09	0.78	5976.70	0.000	0.000	n/a	0.75	0.59
5	48	44.06	5974.94	5976.25	1.31*	3.58	12.32	0.78	5977.03	0.000	135.429	5976.97	5978.96	1.98**	6.22	7.09	0.78	5979.74	0.000	0.000	n/a	1.00	0.78
6	48	6.98	5978.00	5978.96	0.95	1.68	3.03	0.27	5979.22	0.000	336.404	5983.05	5983.81 j	0.77**	1.68	4.15	0.27	5984.08	0.000	0.000	n/a	0.87	n/a
7	48	6.98	5984.00	5984.40	0.39*	0.64	10.89	0.27	5984.66	0.000	114.197	5989.61	5990.38	0.77**	1.68	4.15	0.27	5990.64	0.000	0.000	n/a	1.00	n/a
8	48	37.08	5978.00	5979.20	1.20*	3.16	11.75	0.70	5979.89	0.000	119.212	5979.79	5981.60	1.81**	5.53	6.70	0.70	5982.30	0.000	0.000	n/a	1.00	n/a
9	36	37.79	5960.07	5963.07	3.00*	7.07	5.35	0.44	5963.51	0.274	151.783	5960.83	5963.37	2.54	6.39	5.92	0.54	5963.92	0.259	0.266	0.404	0.98	0.53
10	36	37.79	5961.03	5963.91	2.88	5.00	5.42	0.89	5964.79	0.000	20.443	5961.13	5963.13	2.00**	5.00	7.56	0.89	5964.02	0.000	0.000	n/a	0.15	0.13
11	36	36.70	5961.33	5963.22	1.89*	4.68	7.85	0.87	5964.08	0.000	36.100	5961.51	5963.48	1.97**	4.92	7.46	0.87	5964.35	0.000	0.000	n/a	1.00	0.87
12	36	34.59	5961.21	5963.48	2.27	4.75	6.02	0.83	5964.30	0.000	36.594	5961.39	5963.30	1.91**	4.75	7.29	0.83	5964.13	0.000	0.000	n/a	0.74	0.61
13	36	34.59	5961.59	5963.40	1.81*	4.45	7.76	0.83	5964.23	0.000	61.124	5961.90	5963.81	1.91**	4.75	7.29	0.83	5964.64	0.000	0.000	n/a	0.15	0.12
14	36	34.59	5962.10	5963.88	1.78*	4.38	7.90	0.83	5964.71	0.000	151.121	5962.89	5964.80	1.91**	4.75	7.29	0.83	5965.63	0.000	0.000	n/a	0.15	0.12
15	36	22.72	5963.09	5964.80	1.71	3.63	5.46	0.61	5965.41	0.000	59.500	5963.49	5965.02 j	1.53**	3.63	6.25	0.61	5965.63	0.000	0.000	n/a	0.40	0.24
16	36	22.72	5965.48	5966.63	1.16*	2.51	9.04	0.61	5967.24	0.000	37.418	5965.85	5967.38	1.53**	3.63	6.25	0.61	5967.99	0.000	0.000	n/a	1.00	0.61
17	36	18.17	5967.85	5968.77	0.92*	1.85	9.84	0.53	5969.29	0.000	205.609	5970.93	5972.29	1.36**	3.13	5.81	0.53	5972.82	0.000	0.000	n/a	1.00	n/a
18	36	12.03	5971.13	5972.29	1.16	2.35	4.75	0.41	5972.70	0.000	48.000	5971.61	5972.71 j	1.10**	2.35	5.12	0.41	5973.12	0.000	0.000	n/a	0.97	n/a
19	30	8.89	5972.11	5972.87	0.76*	1.26	7.06	0.37	5973.24	0.000	181.111	5973.92	5974.91	0.99**	1.82	4.90	0.37	5975.29	0.000	0.000	n/a	1.00	n/a
20	30	5.48	5974.12	5974.91	0.79	1.29	4.10	0.28	5975.19	0.000	90.718	5975.03	5975.80 j	0.77**	1.29	4.25	0.28	5976.08	0.000	0.000	n/a	1.00	n/a
21	18	3.41	5974.92	5975.80	0.88*	1.08	3.15	0.15	5975.96	0.211	18.983	5974.96	5975.84	0.88	1.08	3.15	0.15	5976.00	0.211	0.211	0.040	1.00	0.15

Project File: STORM (5-YR).stm | Number of lines: 33 | Run Date: 3/6/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
(1)	(in) (2)	(cfs) (3)	(ft) (4)	(ft) (5)	(ft) (6)	(sqft) (7)	(ft/s) (8)	(ft) (9)	(ft) (10)	(%) (11)	(ft) (12)	(ft) (13)	(ft) (14)	(ft) (15)	(sqft) (16)	(ft/s) (17)	(ft) (18)	(ft) (19)	(%) (20)	(%) (21)	(ft) (22)	(K) (23)	(ft) (24)
22	24	3.14	5972.61	5973.34	0.73*	1.04	3.03	0.14	5973.48	0.204	19.613	5972.65	5973.38	0.73	1.03	3.04	0.14	5973.52	0.206	0.205	0.040	1.00	0.14
23	30	6.14	5971.43	5972.39	0.96*	1.73	3.56	0.20	5972.58	0.199	71.125	5971.57	5972.53	0.96	1.73	3.55	0.20	5972.73	0.198	0.198	0.141	1.00	0.20
24	18	3.00	5972.57	5973.37	0.79*	0.95	3.15	0.15	5973.52	0.229	17.500	5972.61	5973.41	0.80	0.95	3.15	0.15	5973.56	0.227	0.228	0.040	1.00	0.15
25	18	3.14	5972.57	5973.39	0.82*	0.98	3.19	0.16	5973.55	0.229	17.500	5972.61	5973.43	0.82	0.98	3.20	0.16	5973.58	0.230	0.229	0.040	1.00	0.16
26	18	1.18	5967.35	5967.84	0.48*	0.49	2.39	0.09	5967.92	0.211	19.017	5967.39	5967.88	0.48	0.49	2.39	0.09	5967.96	0.211	0.211	0.040	1.00	0.09
27	24	3.37	5966.85	5967.59	0.74*	1.06	3.19	0.16	5967.75	0.222	17.960	5966.89	5967.63	0.74	1.06	3.18	0.16	5967.79	0.221	0.222	0.040	1.00	0.16
28	18	3.05	5960.00	5961.50	1.50*	0.75	1.73	0.05	5961.55	0.072	85.716	5960.86	5961.53 j	0.67**	0.76	4.01	0.25	5961.78	0.431	0.252	0.216	0.96	0.24
29	18	2.28	5962.86	5963.32	0.46*	0.45	5.02	0.21	5963.53	0.000	89.294	5963.75	5964.32	0.57**	0.62	3.70	0.21	5964.53	0.000	0.000	n/a	1.00	n/a
30	18	1.14	5964.38	5964.70	0.32*	0.28	4.12	0.14	5964.84	0.000	61.269	5964.99	5965.39	0.40**	0.38	3.03	0.14	5965.53	0.000	0.000	n/a	1.00	n/a
31	18	1.14	5965.29	5965.67	0.38*	0.35	3.22	0.14	5965.81	0.000	108.337	5965.83	5966.23	0.40**	0.38	3.03	0.14	5966.37	0.000	0.000	n/a	1.00	n/a
32	18	1.14	5966.03	5966.41	0.38*	0.35	3.22	0.14	5966.55	0.000	88.321	5966.47	5966.87	0.40**	0.38	3.03	0.14	5967.01	0.000	0.000	n/a	1.00	n/a
33	24	0.60	5959.77	5961.66	1.89	0.25	0.20	0.09	5961.75	0.000	127.094	5961.13	5961.40	0.27**	0.25	2.42	0.09	5961.49	0.000	0.000	n/a	1.00	0.09

Project File: STORM (5-YR).stm | Number of lines: 33 | Run Date: 3/6/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
(1)	(in) (2)	(cfs) (3)	(ft) (4)	(ft) (5)	(ft) (6)	(sqft) (7)	(ft/s) (8)	(ft) (9)	(ft) (10)	(%) (11)	(ft) (12)	(ft) (13)	(ft) (14)	(ft) (15)	(sqft) (16)	(ft/s) (17)	(ft) (18)	(ft) (19)	(%) (20)	(%) (21)	(ft) (22)	(K) (23)	(ft) (24)
1	48	158.7	5948.10	5952.10	4.00	12.56	12.63	2.48	5954.58	1.041	208.777	5949.77	5954.27	4.00	12.57	12.63	2.48	5956.75	1.040	1.040	2.172	0.15	0.37
2	48	158.7	5953.77	5956.02	2.24*	7.26	21.86	2.70	5958.71	0.000	482.991	5967.51	5971.17	3.66**	12.04	13.18	2.70	5973.87	0.000	0.000	n/a	0.15	0.40
3	48	158.7	5967.71	5971.17	3.46	11.54	13.75	2.70	5973.87	0.000	362.236	5973.14	5976.80	3.66**	12.04	13.18	2.70	5979.50	0.000	0.000	n/a	0.75	2.02
4	48	158.7	5973.34	5976.80	3.46	11.55	13.74	2.70	5979.50	0.000	40.000	5973.94	5977.60	3.66**	12.04	13.18	2.70	5980.30	0.000	0.000	n/a	0.75	2.02
5	48	158.7	5974.94	5977.73	2.79*	9.36	16.96	2.70	5980.43	0.000	135.429	5976.97	5980.63	3.66**	12.04	13.18	2.70	5983.33	0.000	0.000	n/a	1.00	2.70
6	48	13.59	5978.00	5980.63	2.63	2.73	1.55	0.39	5981.01	0.000	336.404	5983.05	5984.12 j	1.08**	2.73	4.98	0.39	5984.51	0.000	0.000	n/a	0.87	n/a
7	48	13.59	5984.00	5984.54	0.54*	1.02	13.29	0.39	5984.93	0.000	114.197	5989.61	5990.69	1.08**	2.73	4.98	0.39	5991.07	0.000	0.000	n/a	1.00	n/a
8	48	145.1	5978.00	5980.63	2.63	8.75	16.58	2.35	5982.98	0.000	119.212	5979.79	5983.34	3.55**	11.80	12.30	2.35	5985.70	0.000	0.000	n/a	1.00	2.35
9	36	105.1	5960.07	5963.07	3.00*	7.07	14.87	3.44	5966.51	2.117	151.783	5960.83	5966.28	3.00	7.07	14.87	3.44	5969.72	2.116	2.117	3.213	0.98	3.37
10	36	105.1	5961.03	5969.65	3.00	7.07	14.87	3.44	5973.09	2.117	20.443	5961.13	5970.09	3.00	7.07	14.87	3.44	5973.52	2.116	2.117	0.433	0.15	0.52
11	36	102.6	5961.33	5970.60	3.00	7.07	14.52	3.28	5973.88	2.019	36.100	5961.51	5971.33	3.00	7.07	14.52	3.28	5974.61	2.018	2.019	0.729	1.00	3.28
12	30	97.65	5961.71	5974.61	2.50	4.91	19.90	6.15	5980.77	4.833	36.594	5961.89	5976.38	2.50	4.91	19.89	6.15	5982.53	4.831	4.832	1.768	0.74	4.55
13	30	97.65	5962.09	5980.93	2.50	4.91	19.90	6.15	5987.09	4.833	61.124	5962.40	5983.89	2.50	4.91	19.89	6.15	5990.04	4.831	4.832	2.953	0.15	0.92
14	30	97.65	5962.60	5984.81	2.50	4.91	19.90	6.15	5990.97	4.833	151.121	5963.39	5992.12	2.50	4.91	19.89	6.15	5998.27	4.831	4.832	7.302	0.15	0.92
15	30	68.94	5963.59	5993.04	2.50	4.91	14.05	3.07	5996.11	2.409	59.500	5963.99	5994.47	2.50	4.91	14.04	3.07	5997.54	2.408	2.408	1.433	0.40	1.23
16	30	68.94	5965.98	5995.70	2.50	4.91	14.05	3.07	5998.77	2.409	37.418	5966.35	5996.60	2.50	4.91	14.04	3.07	5999.67	2.408	2.408	0.901	1.00	3.07
17	30	50.34	5968.35	5999.67	2.50	4.91	10.26	1.64	6001.30	1.284	205.609	5971.43	6002.31	2.50	4.91	10.26	1.64	6003.94	1.284	1.284	2.640	1.00	1.64
18	30	35.18	5971.63	6003.94	2.50	4.91	7.17	0.80	6004.74	0.627	48.000	5972.11	6004.25	2.50	4.91	7.17	0.80	6005.04	0.627	0.627	0.301	0.97	0.77
19	18	22.87	5973.11	6005.02	1.50	1.77	12.94	2.60	6007.63	4.043	181.111	5974.92	6012.34	1.50	1.77	12.94	2.60	6014.95	4.042	4.042	7.321	1.00	2.60
20	18	13.49	5975.12	6014.95	1.50	1.77	7.64	0.91	6015.85	1.407	90.718	5976.03	6016.22	1.50	1.77	7.63	0.91	6017.13	1.406	1.406	1.276	1.00	0.91
21	18	9.38	5974.92	6014.95	1.50	1.77	5.31	0.44	6015.38	0.680	18.983	5975.11	6015.08	1.50	1.77	5.31	0.44	6015.51	0.680	0.680	0.129	1.00	0.44

Project File: STORM (100-YR).stm | Number of lines: 33 | Run Date: 3/6/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf		Invert elev	HGL elev	Depth	Area	Vel	Vel head	EGL elev	Sf	Ave Sf	Enrgy loss		
(1)	(in) (2)	(cfs) (3)	(ft) (4)	(ft) (5)	(ft) (6)	(sqft) (7)	(ft/s) (8)	(ft) (9)	(ft) (10)	(%) (11)	(ft) (12)	(ft) (13)	(ft) (14)	(ft) (15)	(sqft) (16)	(ft/s) (17)	(ft) (18)	(ft) (19)	(%) (20)	(%) (21)	(ft) (22)	(K) (23)	(ft) (24)
22	18	12.31	5973.11	6005.02	1.50	1.77	6.97	0.75	6005.77	1.171	19.613	5973.31	6005.25	1.50	1.77	6.97	0.75	6006.00	1.171	1.171	0.230	1.00	0.75
23	18	15.16	5971.63	6003.94	1.50	1.77	8.58	1.14	6005.09	1.777	71.125	5972.34	6005.21	1.50	1.77	8.58	1.14	6006.35	1.776	1.776	1.263	1.00	1.14
24	15	7.41	5972.54	6006.35	1.25	1.23	6.04	0.57	6006.92	1.122	17.500	5972.72	6006.55	1.25	1.23	6.04	0.57	6007.12	1.122	1.122	0.196	1.00	0.57
25	15	7.75	5972.54	6006.35	1.25	1.23	6.32	0.62	6006.97	1.228	17.500	5972.72	6006.57	1.25	1.23	6.32	0.62	6007.19	1.227	1.228	0.215	1.00	0.62
26	18	7.34	5966.55	5999.67	1.50	1.77	4.15	0.27	5999.94	0.416	19.017	5966.65	5999.75	1.50	1.77	4.15	0.27	6000.02	0.416	0.416	0.079	1.00	0.27
27	18	11.26	5966.55	5999.67	1.50	1.77	6.37	0.63	6000.30	0.980	17.960	5966.64	5999.84	1.50	1.77	6.37	0.63	6000.48	0.980	0.980	0.176	1.00	0.63
28	18	8.52	5960.00	5961.50	1.50*	1.43	4.82	0.36	5961.86	0.561	85.716	5960.86	5961.99 j	1.13**	1.43	5.97	0.55	5962.54	0.669	0.615	n/a	0.96	0.53
29	18	6.96	5962.86	5963.71	0.85*	1.03	6.75	0.46	5964.17	0.000	89.294	5963.75	5964.77	1.02**	1.28	5.44	0.46	5965.23	0.000	0.000	n/a	1.00	0.46
30	18	4.14	5964.38	5965.00	0.63*	0.70	5.93	0.31	5965.31	0.000	61.269	5964.99	5965.77	0.78**	0.93	4.47	0.31	5966.08	0.000	0.000	n/a	1.00	0.31
31	18	4.14	5965.29	5966.05	0.76*	0.90	4.59	0.31	5966.36	0.000	108.337	5965.83	5966.61	0.78**	0.93	4.47	0.31	5966.92	0.000	0.000	n/a	1.00	0.31
32	18	4.14	5966.03	5966.79	0.76*	0.90	4.58	0.31	5967.10	0.000	88.321	5966.47	5967.25	0.78**	0.93	4.47	0.31	5967.56	0.000	0.000	n/a	1.00	0.31
33	24	32.30	5959.77	5961.66	1.89*	3.08	10.50	1.71	5963.38	1.503	127.094	5961.13	5963.79	2.00	3.14	10.28	1.64	5965.44	1.738	1.621	2.060	1.00	1.64

Project File: STORM (100-YR).stm | Number of lines: 33 | Run Date: 3/6/2025

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraflow HGL Computation Procedure

General Procedure:

Hydraflow computes the HGL using the Bernoulli energy equation. Manning's equation is used to determine energy losses due to pipe friction. In a standard step, iterative procedure, Hydraflow assumes upstream HGLs until the energy equation balances. If the energy equation cannot balance, supercritical flow exists and critical depth is temporarily assumed at the upstream end. A supercritical flow Profile is then computed using the same procedure in a downstream direction using momentum principles.

Col. 1 The line number being computed. Calculations begin at Line 1 and proceed upstream.

Col. 2 The line size. In the case of non-circular pipes, the line rise is printed above the span.

Col. 3 Total flow rate in the line.

Col. 4 The elevation of the downstream invert.

Col. 5 Elevation of the hydraulic grade line at the downstream end. This is computed as the upstream HGL + Minor loss of this line's downstream line.

Col. 6 The downstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.

Col. 7 Cross-sectional area of the flow at the downstream end.

Col. 8 The velocity of the flow at the downstream end, (Col. 3 / Col. 7).

Col. 9 Velocity head (Velocity squared / 2g).

Col. 10 The elevation of the energy grade line at the downstream end, HGL + Velocity head, (Col. 5 + Col. 9).

Col. 11 The friction slope at the downstream end (the S or Slope term in Manning's equation).

Col. 12 The line length.

Col. 13 The elevation of the upstream invert.

Col. 14 Elevation of the hydraulic grade line at the upstream end.

Col. 15 The upstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.

Col. 16 Cross-sectional area of the flow at the upstream end.

Col. 17 The velocity of the flow at the upstream end, (Col. 3 / Col. 16).

Col. 18 Velocity head (Velocity squared / 2g).

Col. 19 The elevation of the energy grade line at the upstream end, HGL + Velocity head, (Col. 14 + Col. 18) .

Col. 20 The friction slope at the upstream end (the S or Slope term in Manning's equation).

Col. 21 The average of the downstream and upstream friction slopes.

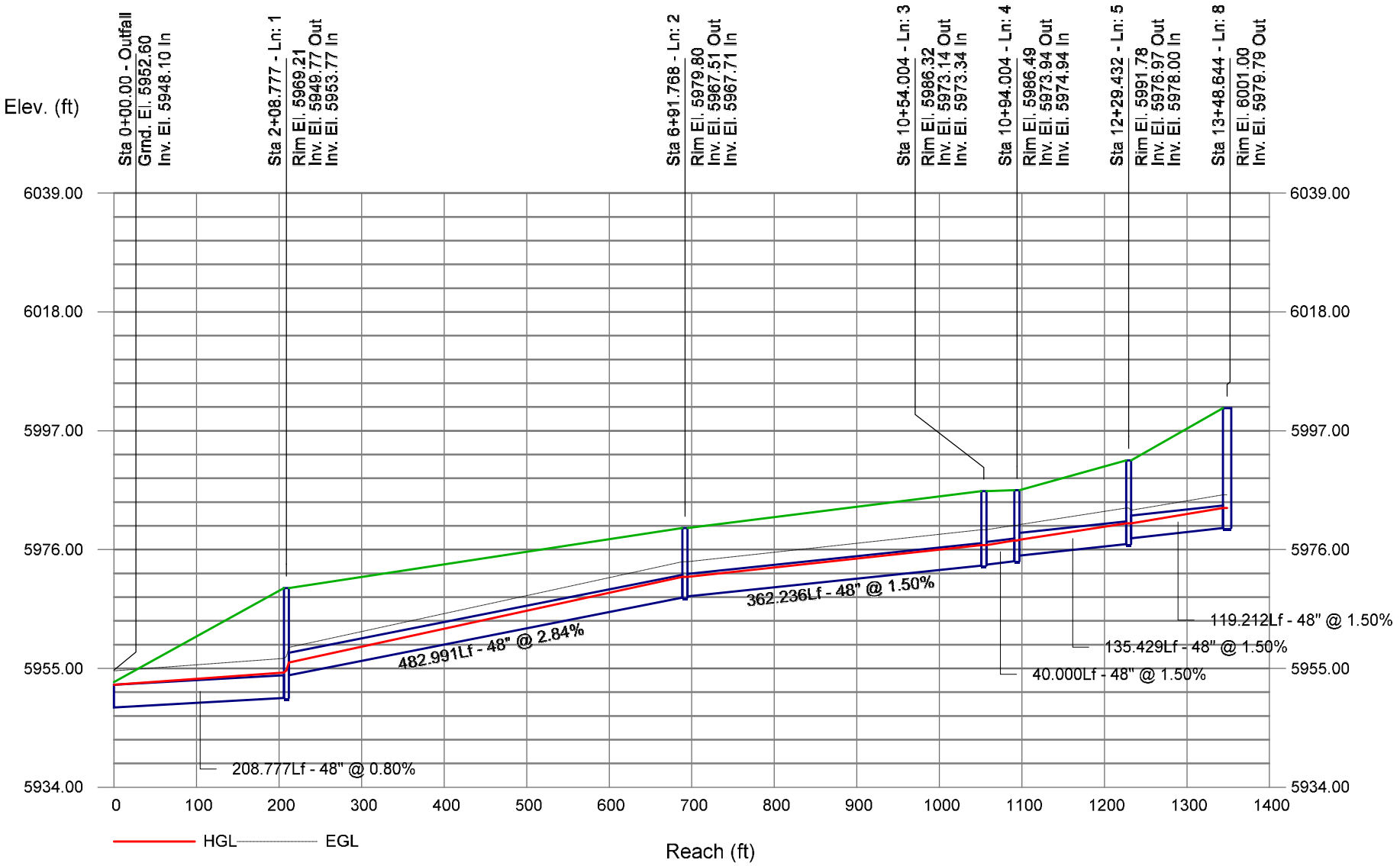
Col. 22 Energy loss. Average Sf/100 x Line Length (Col. 21/100 x Col. 12). Equals (EGL upstream - EGL downstream) +/- tolerance.

Col. 23 The junction loss coefficient (K).

Col. 24 Minor loss. (Col. 23 x Col. 18). Is added to upstream HGL and used as the starting HGL for the next upstream line(s).

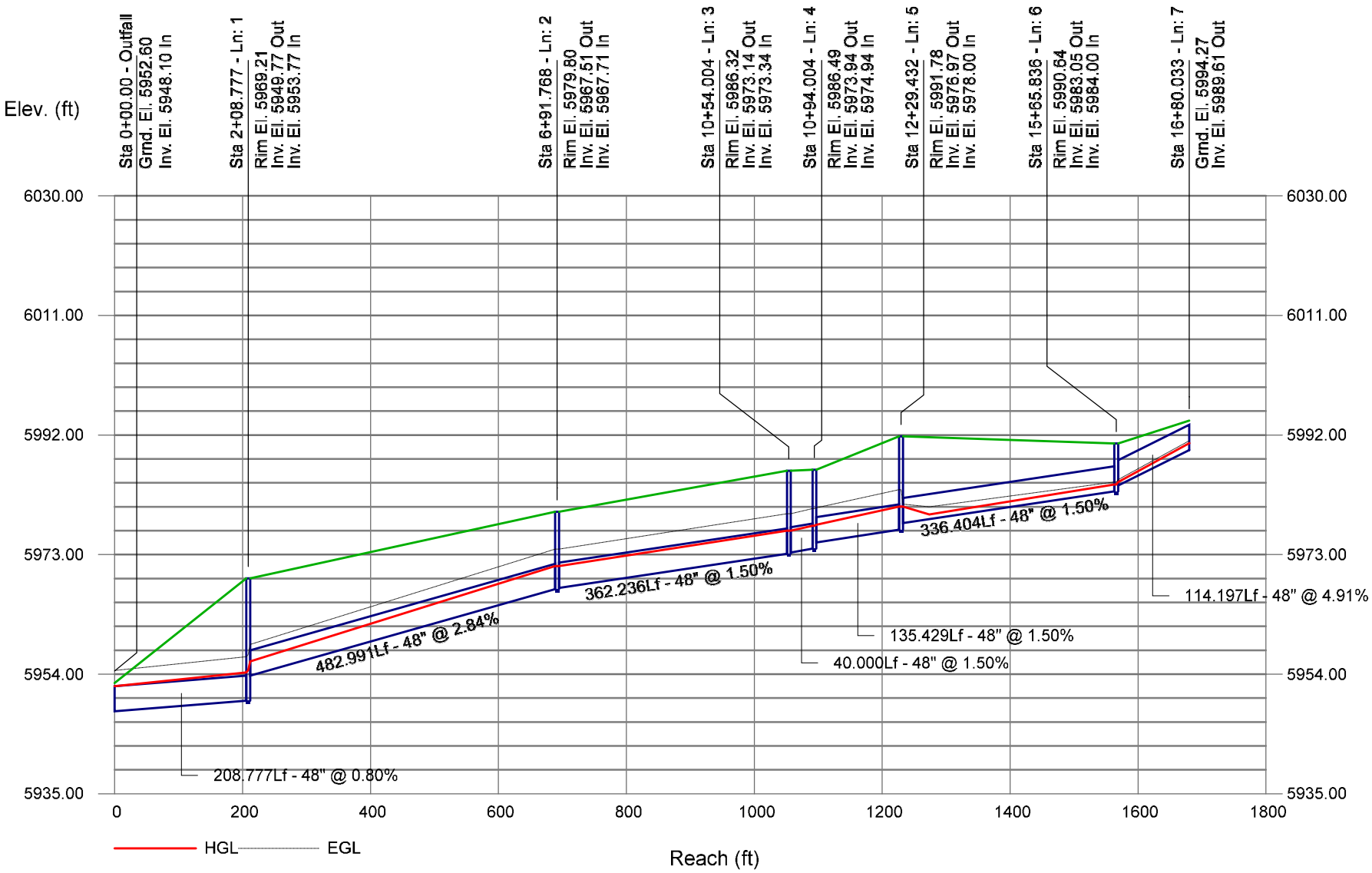
Storm Sewer Profile

Proj. file: STORM (100-YR).stm



Storm Sewer Profile

Proj. file: STORM (100-YR).stm



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Mar 5 2025

CONC ALLEY NEXT TO PARK

Triangular

Side Slopes (z:1)	= 50.00, 50.00
Total Depth (ft)	= 0.26
Invert Elev (ft)	= 1.00
Slope (%)	= 1.00
N-Value	= 0.016

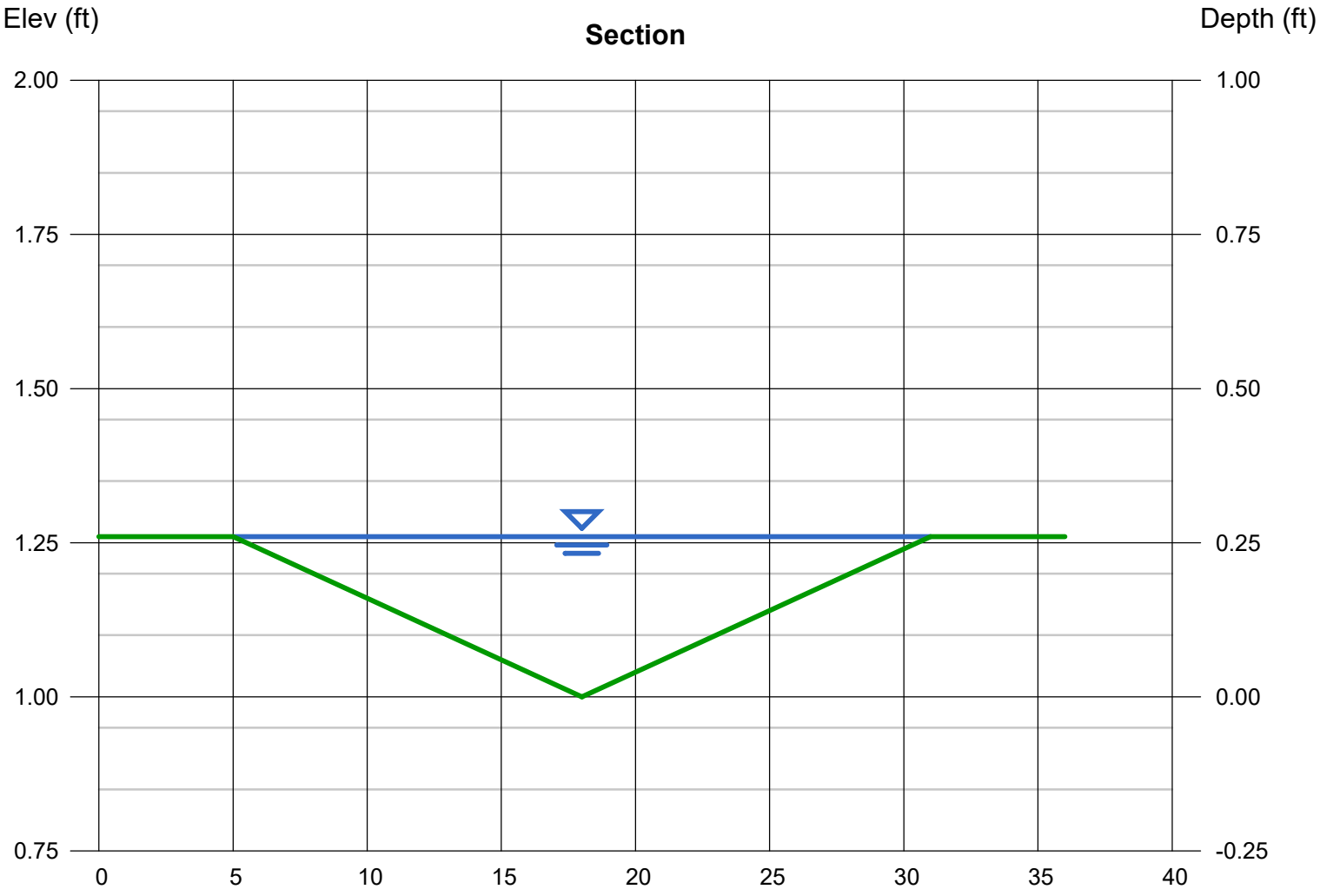
Calculations

Compute by:	Q vs Depth
No. Increments	= 5

Highlighted

Depth (ft)	= 0.26
Q (cfs)	= 8.049
Area (sqft)	= 3.38
Velocity (ft/s)	= 2.38
Wetted Perim (ft)	= 26.01
Crit Depth, Yc (ft)	= 0.26
Top Width (ft)	= 26.00
EGL (ft)	= 0.35

HOUSING AND ALLEY
Q100 DEMAND = 7.2 CFS



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Mar 6 2025

TYPICAL ROADWAY SECTION (34' FL-FL) WITH 4" MOUNTABLE CURB GUTTER @ 1%

User-defined

Invert Elev (ft)	= 0.53
Slope (%)	= 1.00
N-Value	= Composite

Calculations

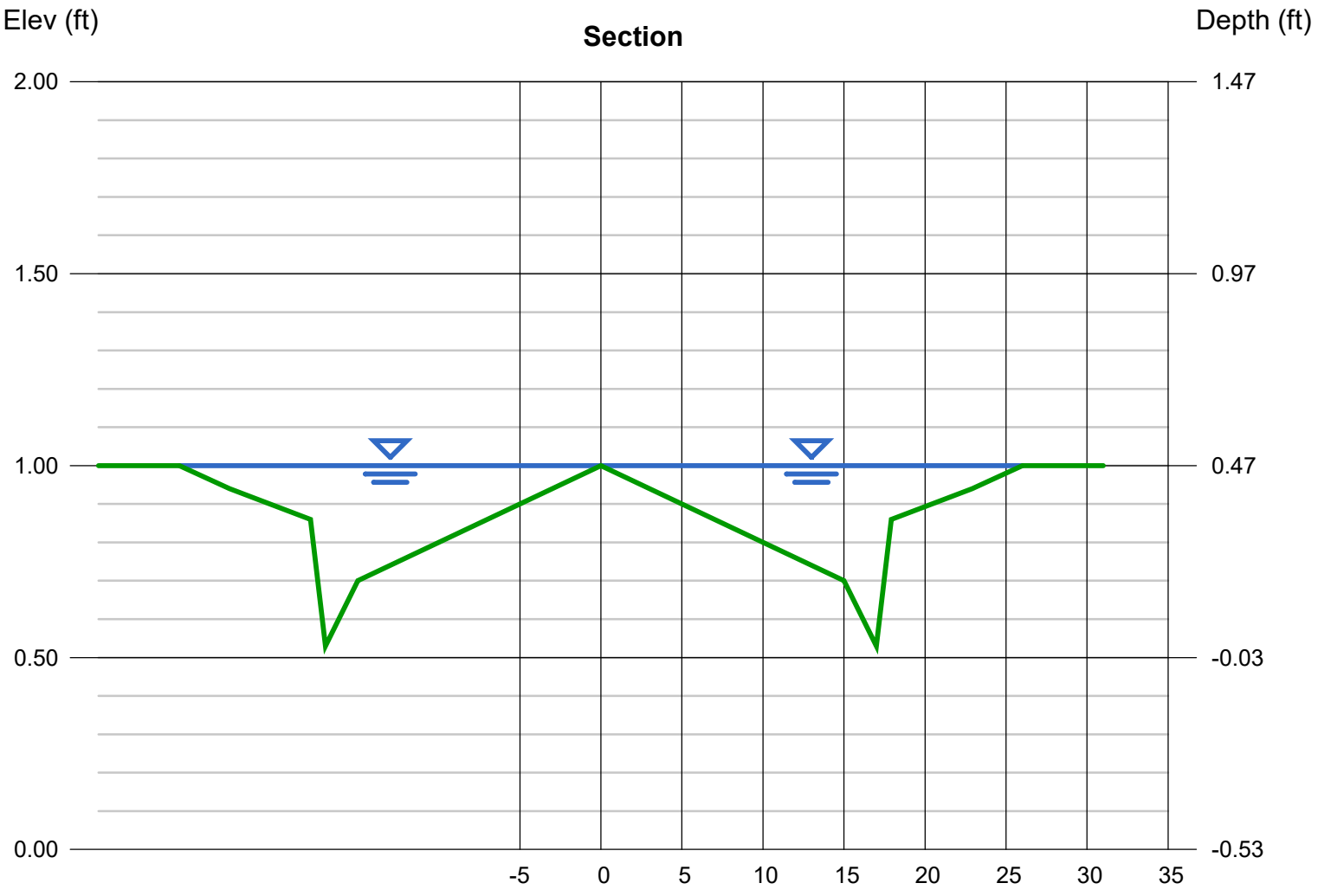
Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 0.47
Q (cfs)	= 20.38
Area (sqft)	= 7.79
Velocity (ft/s)	= 2.62
Wetted Perim (ft)	= 52.14
Crit Depth, Yc (ft)	= 0.47
Top Width (ft)	= 52.00
EGL (ft)	= 0.58

(Sta, El, n)-(Sta, El, n)...

(-26.00, 1.00)-(15.00, 0.70, 0.016)-(17.00, 0.53, 0.016)-(17.92, 0.86, 0.016)-(22.92, 0.94, 0.016)-(26.00, 1.00, 0.016)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Mar 4 2025

TYPICAL ROADWAY SECTION (34' FL-FL) WITH 4" MOUNTABLE CURB GUTTER @ 1%

User-defined

Invert Elev (ft)	= 0.53
Slope (%)	= 1.00
N-Value	= 0.016

Calculations

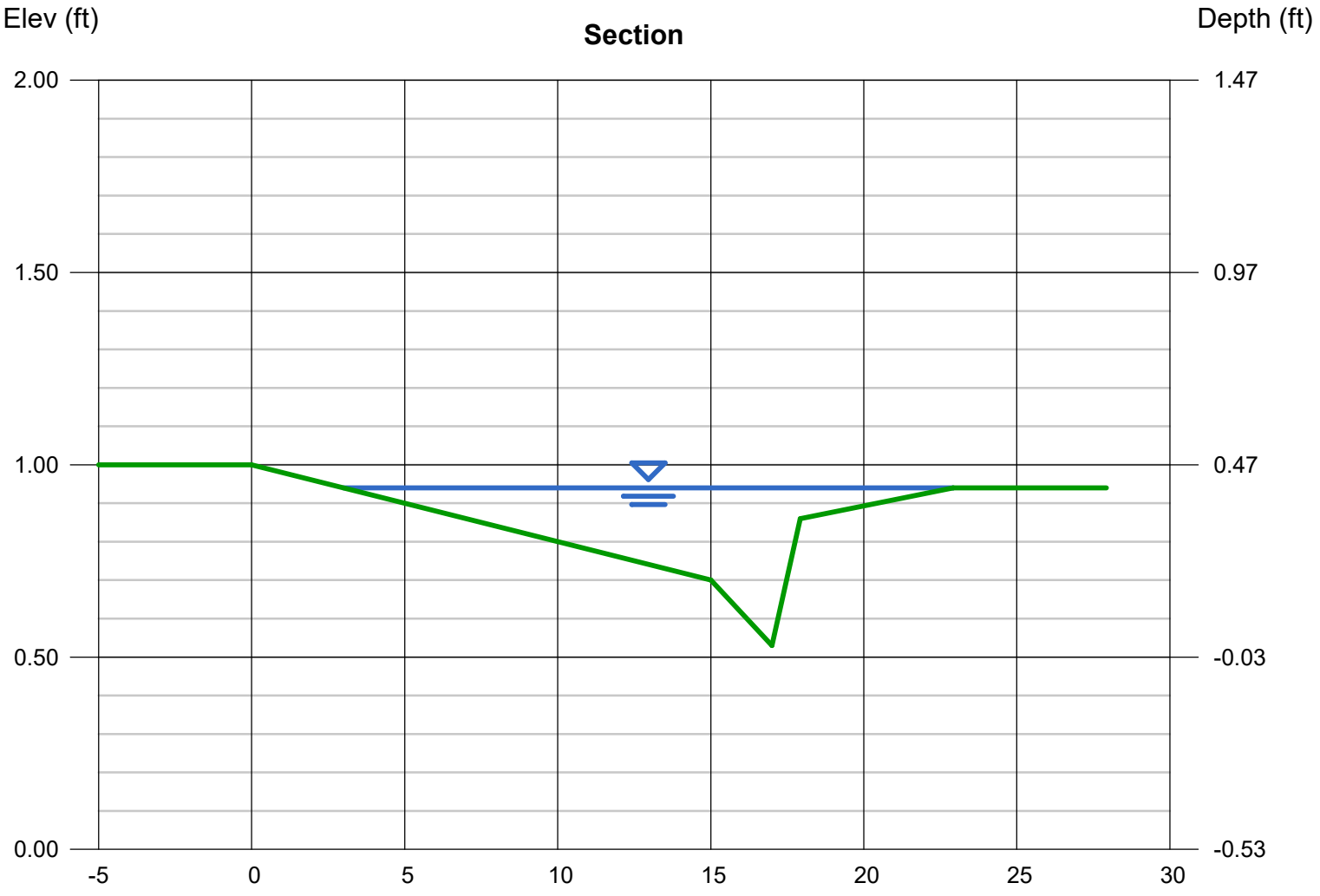
Compute by:	Known Depth
Known Depth (ft)	= 0.41

Highlighted

Depth (ft)	= 0.41
Q (cfs)	= 5.875
Area (sqft)	= 2.52
Velocity (ft/s)	= 2.34
Wetted Perim (ft)	= 19.99
Crit Depth, Yc (ft)	= 0.43
Top Width (ft)	= 19.92
EGL (ft)	= 0.49

(Sta, El, n)-(Sta, El, n)...

(0.00, 1.00)-(15.00, 0.70, 0.016)-(17.00, 0.53, 0.016)-(17.92, 0.86, 0.016)-(22.92, 0.94, 0.016)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Mar 6 2025

TYPICAL ROADWAY SECTION (34' FL-FL) WITH 4" MOUNTABLE CURB GUTTER @ 1.25

User-defined

Invert Elev (ft)	= 0.53
Slope (%)	= 1.25
N-Value	= Composite

Calculations

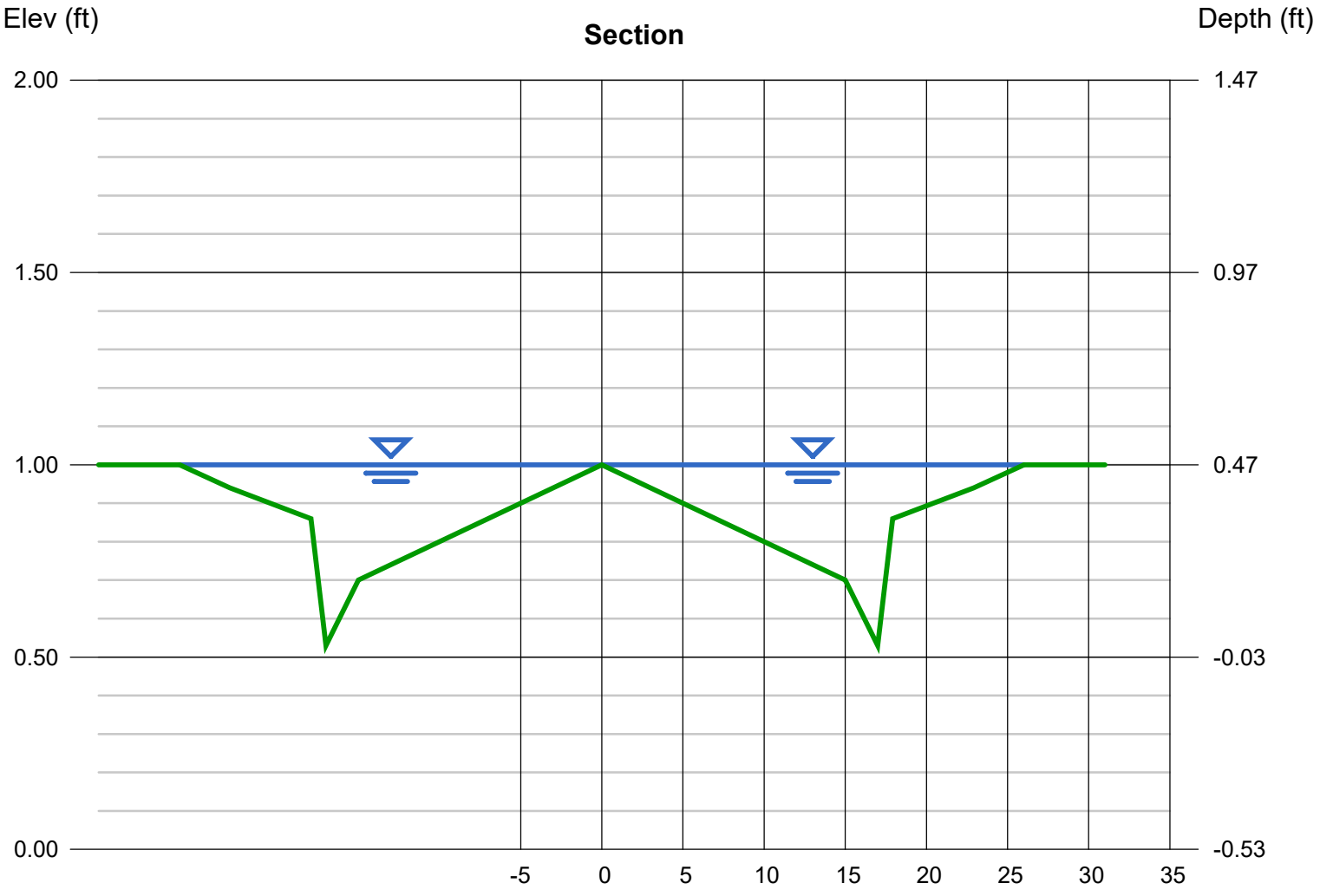
Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 0.47
Q (cfs)	= 22.79
Area (sqft)	= 7.79
Velocity (ft/s)	= 2.93
Wetted Perim (ft)	= 52.14
Crit Depth, Yc (ft)	= 0.47
Top Width (ft)	= 52.00
EGL (ft)	= 0.60

(Sta, El, n)-(Sta, El, n)...

(-26.00, 1.00)-(15.00, 0.70, 0.016)-(17.00, 0.53, 0.016)-(17.92, 0.86, 0.016)-(22.92, 0.94, 0.016)-(26.00, 1.00, 0.016)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Mar 5 2025

TYPICAL ROADWAY SECTION (34' FL-FL) WITH 4" MOUNTABLE CURB GUTTER @ 1.25

User-defined

Invert Elev (ft)	= 0.53
Slope (%)	= 1.25
N-Value	= 0.016

Calculations

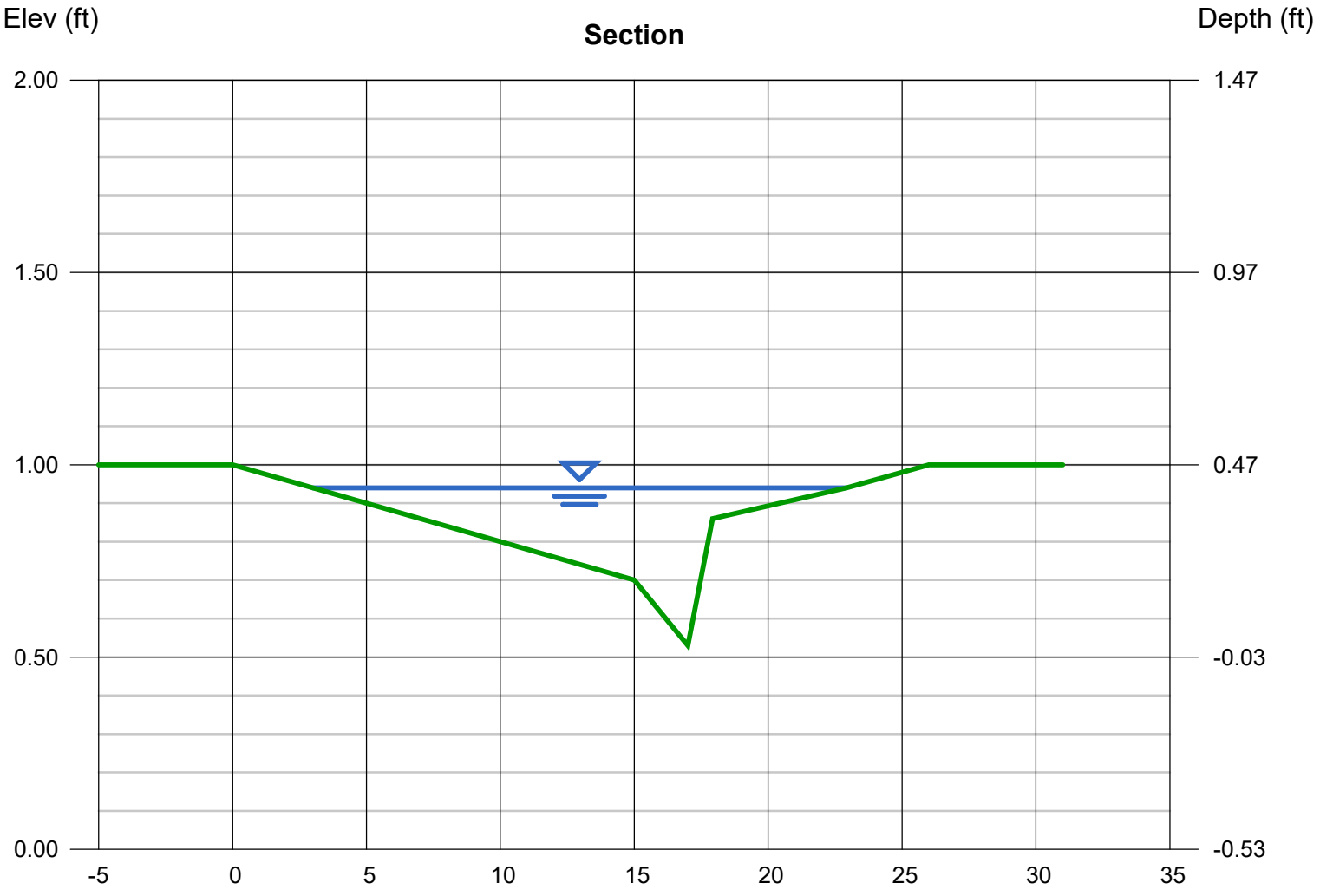
Compute by:	Known Depth
Known Depth (ft)	= 0.41

Highlighted

Depth (ft)	= 0.41
Q (cfs)	= 6.568
Area (sqft)	= 2.52
Velocity (ft/s)	= 2.61
Wetted Perim (ft)	= 19.99
Crit Depth, Yc (ft)	= 0.44
Top Width (ft)	= 19.92
EGL (ft)	= 0.52

(Sta, El, n)-(Sta, El, n)...

(0.00, 1.00)-(15.00, 0.70, 0.016)-(17.00, 0.53, 0.016)-(17.92, 0.86, 0.016)-(22.92, 0.94, 0.016)-(26.00, 1.00, 0.016)



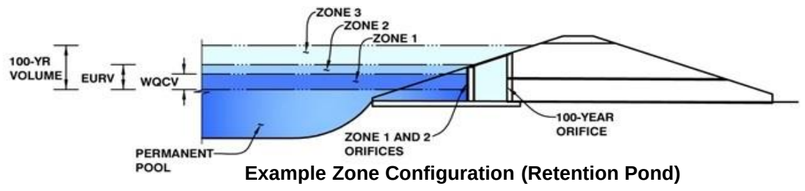
APPENDIX E – Detention and Water Quality

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: **THE PINERY MEADOWS SINGLE FAMILY HOMES SUBDIVISION**

Basin ID:



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	25.42	acres
Watershed Length =	1,466	ft
Watershed Length to Centroid =	733	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	56.90%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Parker - The Pinery Country Club	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.479	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	1.562	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.06 in.) =	1.217	acre-feet	1.06	inches
5-yr Runoff Volume (P1 = 1.43 in.) =	1.889	acre-feet	1.43	inches
10-yr Runoff Volume (P1 = 1.66 in.) =	2.330	acre-feet	1.66	inches
25-yr Runoff Volume (P1 = 1.72 in.) =	2.575	acre-feet		inches
50-yr Runoff Volume (P1 = 2.26 in.) =	3.717	acre-feet	2.26	inches
100-yr Runoff Volume (P1 = 2.6 in.) =	4.532	acre-feet	2.60	inches
500-yr Runoff Volume (P1 = 3.1 in.) =	5.634	acre-feet		inches
Approximate 2-yr Detention Volume =	1.064	acre-feet		
Approximate 5-yr Detention Volume =	1.544	acre-feet		
Approximate 10-yr Detention Volume =	1.996	acre-feet		
Approximate 25-yr Detention Volume =	1.963	acre-feet		
Approximate 50-yr Detention Volume =	2.392	acre-feet		
Approximate 100-yr Detention Volume =	2.699	acre-feet		

Define Zones and Basin Geometry

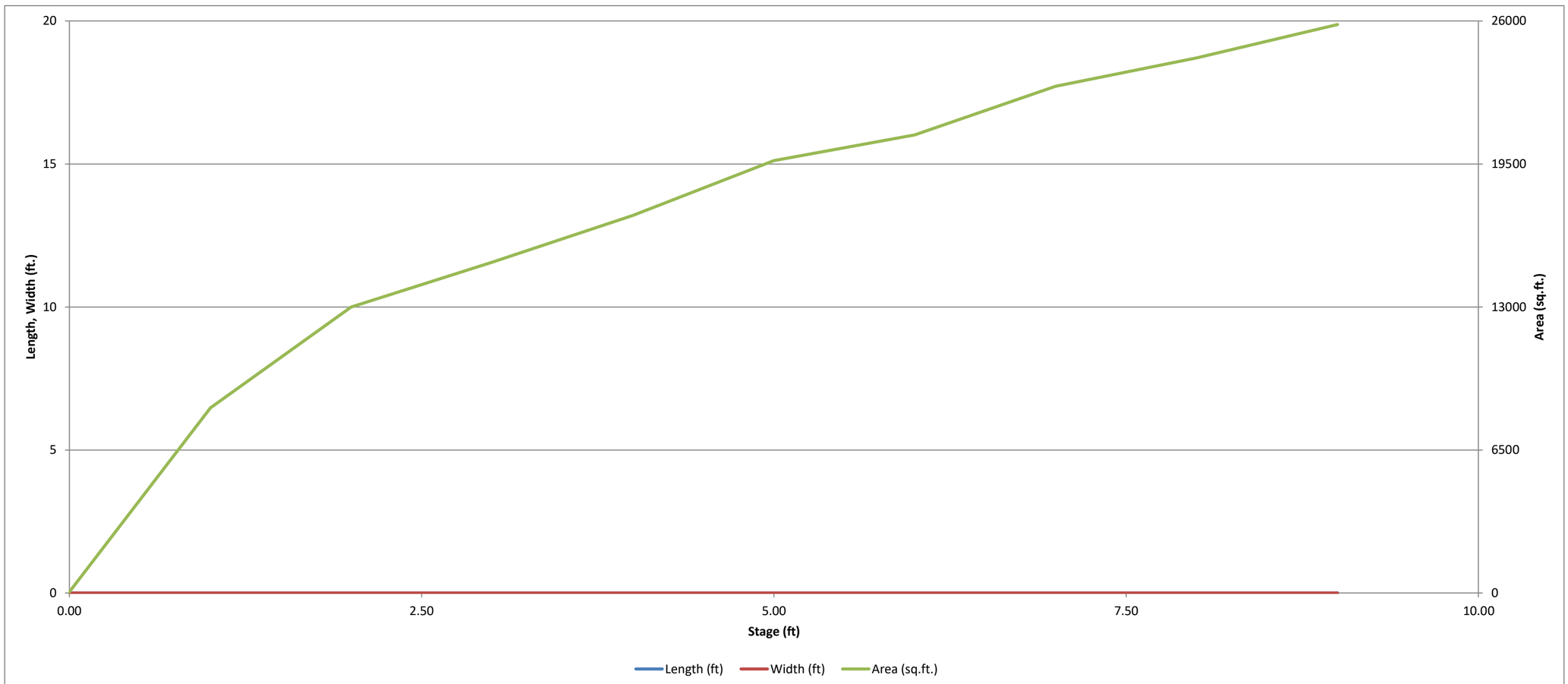
Zone 1 Volume (WQCV) =	0.479	acre-feet
Zone 2 Volume (EURV - Zone 1) =	1.083	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.137	acre-feet
Total Detention Basin Volume =	2.699	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

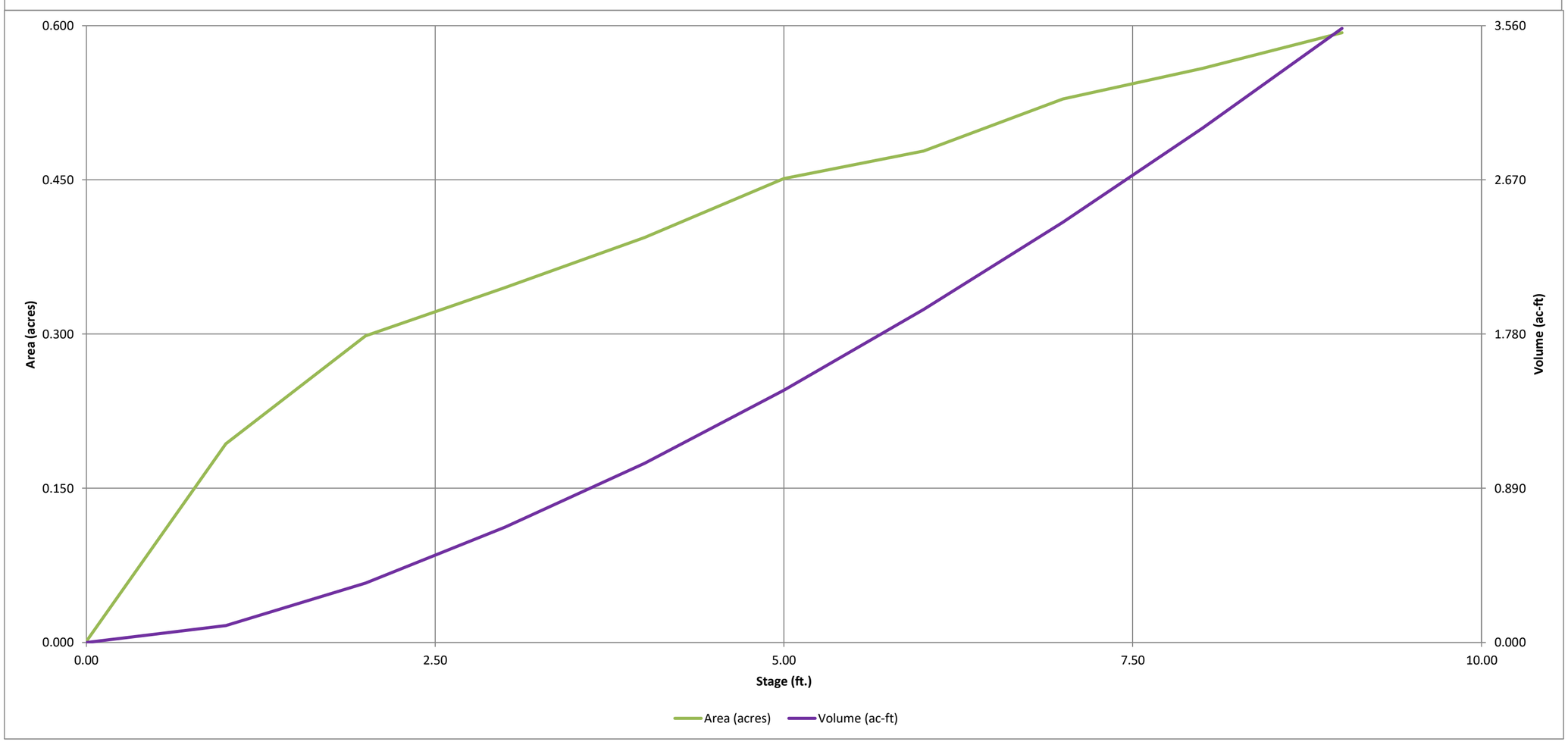
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	50	0.001		
5960	--	1.00	--	--	--	8,421	0.193	4,235	0.097
5961	--	2.00	--	--	--	12,995	0.298	14,943	0.343
5962	--	3.00	--	--	--	15,028	0.345	28,955	0.665
5963	--	4.00	--	--	--	17,163	0.394	45,050	1.034
5964	--	5.00	--	--	--	19,657	0.451	63,460	1.457
5965	--	6.00	--	--	--	20,823	0.478	83,700	1.921
5966	--	7.00	--	--	--	23,034	0.529	105,629	2.425
5967	--	8.00	--	--	--	24,321	0.558	129,306	2.968
5968	--	9.00	--	--	--	25,836	0.593	154,385	3.544

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



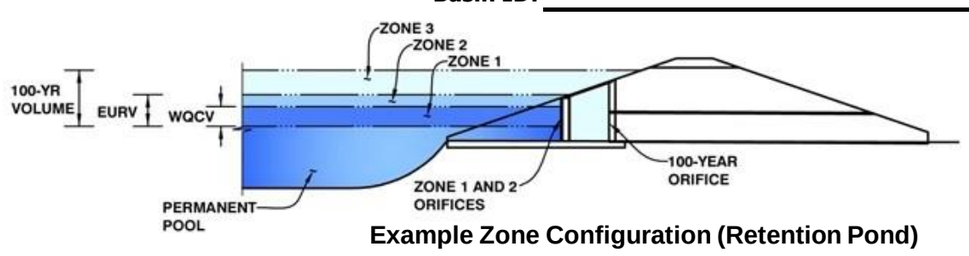


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **THE PINERY MEADOWS SINGLE FAMILY HOMES SUBDIVISION**

Basin ID:



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.45	0.479	Orifice Plate
Zone 2 (EURV)	5.24	1.083	Orifice Plate
Zone 3 (100-year)	7.52	1.137	Weir&Pipe (Restrict)
Total (all zones)		2.699	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

			Calculated Parameters for Underdrain		
Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

			Calculated Parameters for Plate		
Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	2.326E-02	ft^2
Depth at top of Zone using Orifice Plate =	5.24	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	21.00	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	3.35	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.75	3.49					
Orifice Area (sq. inches)	3.35	3.35	3.35					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

				Calculated Parameters for Vertical Orif		
	Not Selected	Not Selected			Not Selected	Not Selected
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A
Vertical Orifice Diameter =	N/A	N/A	inches			

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

				Calculated Parameters for Overflow W		
	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected
Overflow Weir Front Edge Height, Ho =	5.24	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	6.04	N/A
Overflow Weir Front Edge Length =	6.00	N/A	feet	Overflow Weir Slope Length =	4.08	N/A
Overflow Weir Grate Slope =	5.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	6.63	N/A
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	17.03	N/A
Overflow Grate Type =	Type C Grate	N/A		Overflow Grate Open Area w/ Debris =	8.52	N/A
Debris Clogging % =	50%	N/A	%			

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

				Calculated Parameters for Outlet Pipe w/ Flow Restriction Pla		
	Zone 3 Restrictor	Not Selected			Zone 3 Restrictor	Not Selected
Depth to Invert of Outlet Pipe =	0.25	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	2.57	N/A
Outlet Pipe Diameter =	24.00	N/A	inches	Outlet Orifice Centroid =	0.84	N/A
Restrictor Plate Height Above Pipe Invert =	18.30		inches	Half-Central Angle of Restrictor Plate on Pipe =	2.12	N/A

User Input: Emergency Spillway (Rectangular or Trapezoidal)

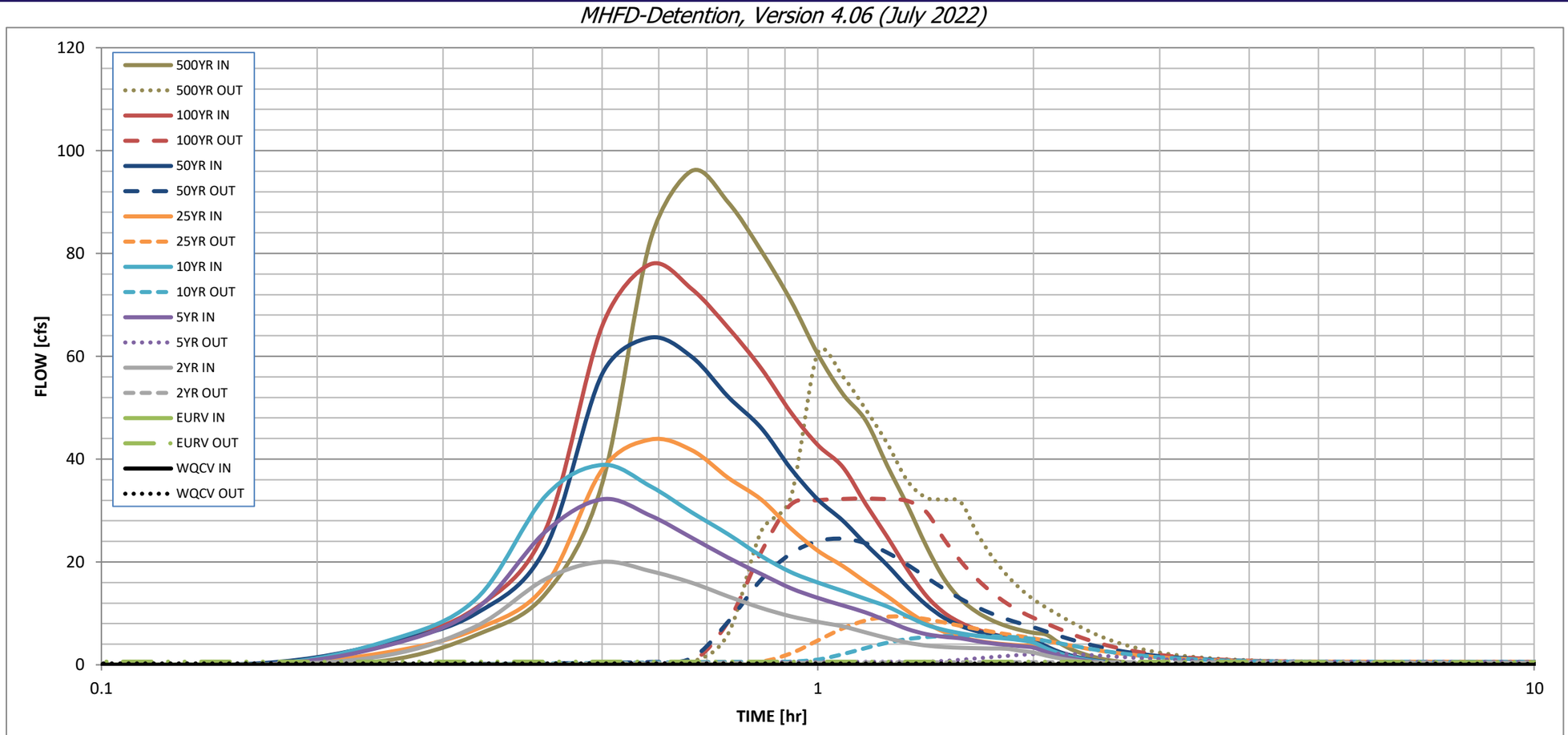
			Calculated Parameters for Spillway		
Spillway Invert Stage=	7.53	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.40	feet
Spillway Crest Length =	100.00	feet	Stage at Top of Freeboard =	8.93	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.59	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	3.50	acre-ft

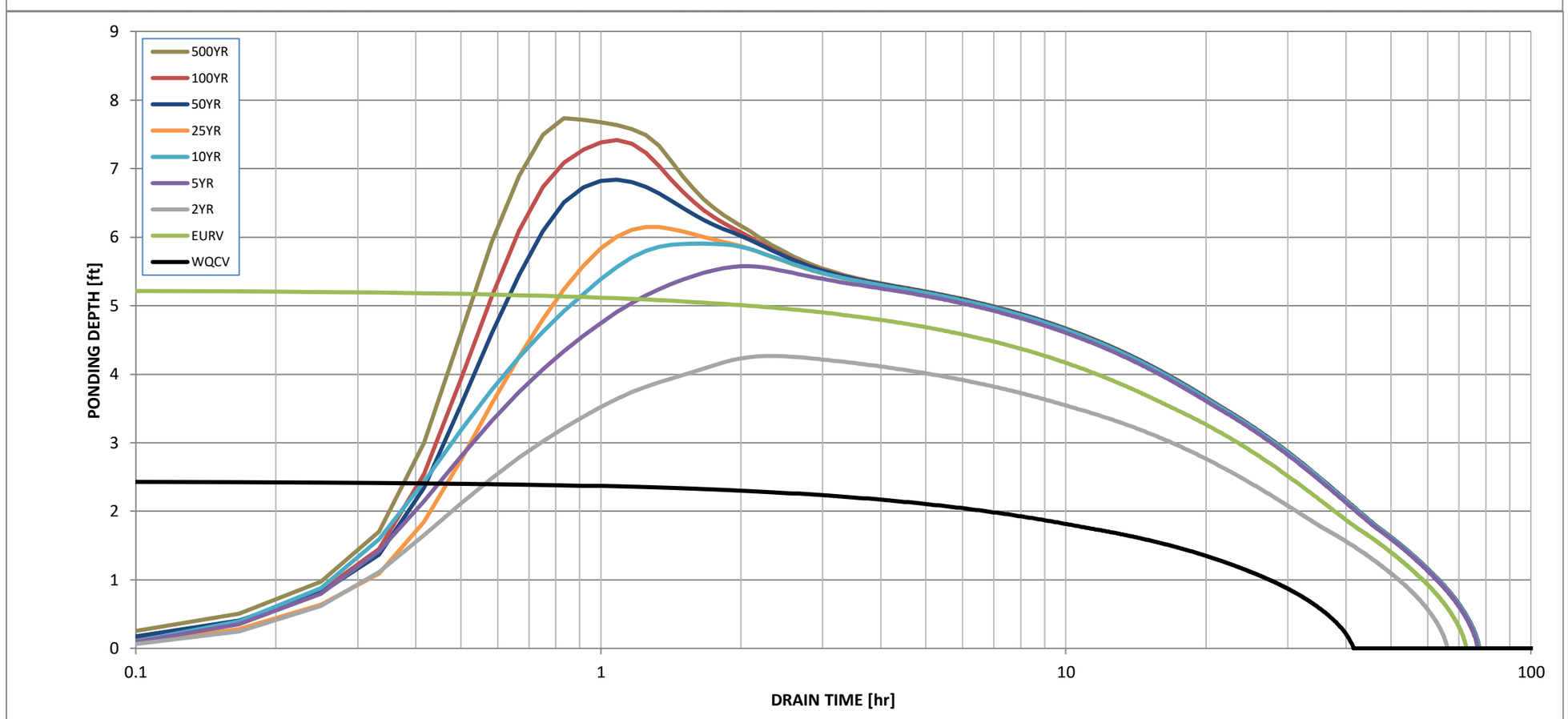
Routed Hydrograph Results — *The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AI*

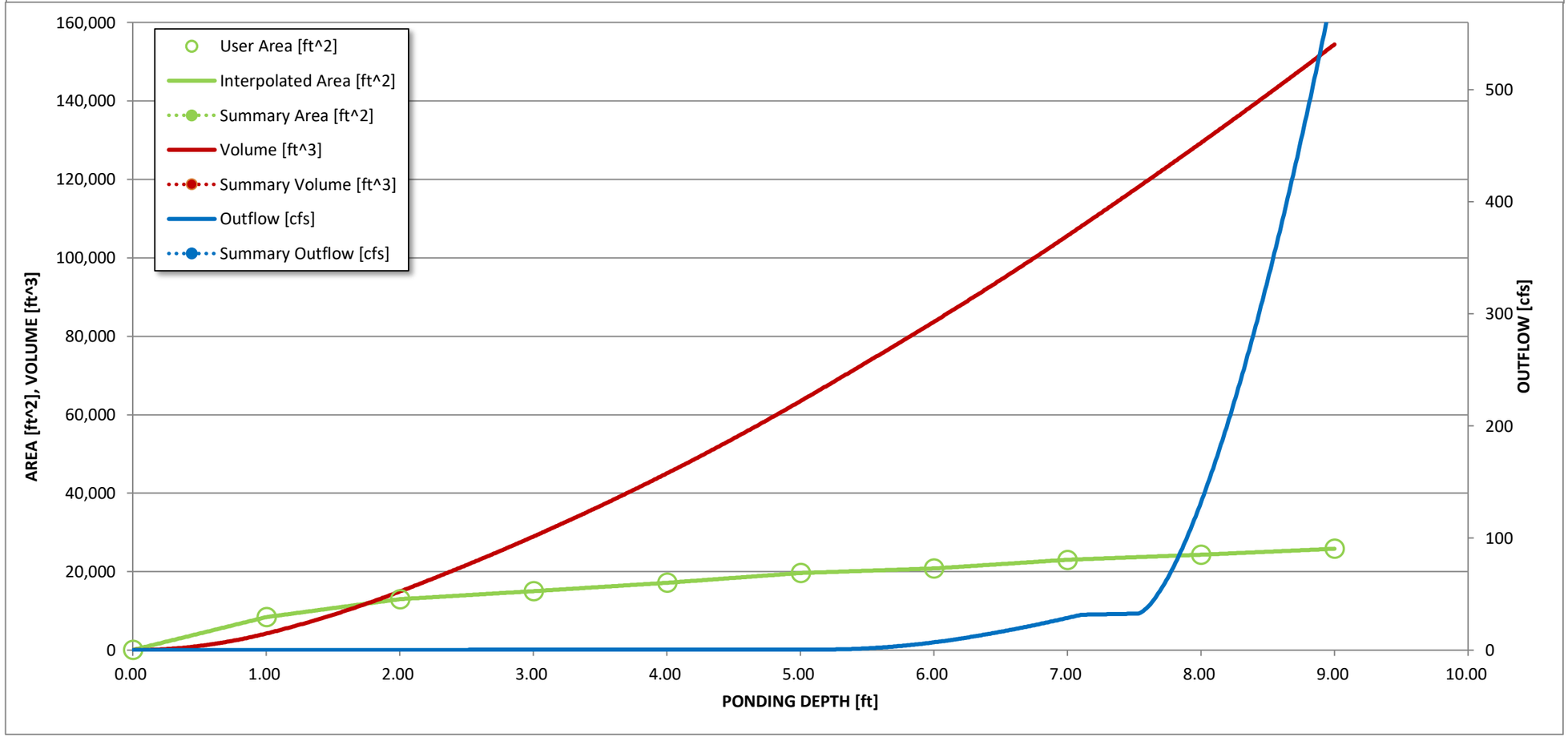
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.06	1.43	1.66	1.72	2.26	2.60
CUHP Runoff Volume (acre-ft) =	0.479	1.562	1.217	1.889	2.330	2.575	3.717	4.532
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	1.217	1.889	2.330	2.575	3.717	4.532
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.4	6.4	9.9	14.9	26.3	35.1
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A						
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.02	0.25	0.39	0.59	1.04	1.38
Peak Inflow Q (cfs) =	N/A	N/A	20.0	32.2	38.9	43.8	63.6	77.9
Peak Outflow Q (cfs) =	0.3	0.6	0.5	2.2	5.6	9.3	24.5	32.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.3	0.6	0.6	0.9	0.9
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.1	0.3	0.5	1.4	1.9
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	65	59	67	66	65	62	59
Time to Drain 99% of Inflow Volume (hours) =	**40**	69	63	73	72	72	71	69
Maximum Ponding Depth (ft) =	2.45	5.24	4.27	5.58	5.91	6.15	6.84	7.41
Area at Maximum Ponding Depth (acres) =	0.32	0.46	0.41	0.47	0.48	0.49	0.52	0.54
Maximum Volume Stored (acre-ft) =	0.482	1.566	1.139	1.718	1.874	1.989	2.336	2.644

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.14	0.85
	0:15:00	0.00	0.00	1.83	3.72	4.60	2.41	4.25	4.35	5.78
	0:20:00	0.00	0.00	7.49	10.86	12.78	6.91	9.98	11.06	13.81
	0:25:00	0.00	0.00	16.66	25.90	32.81	15.43	22.67	26.21	35.20
	0:30:00	0.00	0.00	20.03	32.20	38.87	37.94	56.55	65.87	82.34
	0:35:00	0.00	0.00	18.24	29.04	34.75	43.80	63.62	77.89	96.05
	0:40:00	0.00	0.00	15.96	24.72	29.65	41.75	59.91	73.11	89.91
	0:45:00	0.00	0.00	13.28	20.82	25.37	36.34	52.11	65.52	80.56
	0:50:00	0.00	0.00	11.06	17.67	21.18	32.16	46.09	57.68	70.87
	0:55:00	0.00	0.00	9.43	14.90	18.03	26.54	38.18	49.13	60.44
	1:00:00	0.00	0.00	8.34	13.01	16.00	22.19	32.15	42.75	52.71
	1:05:00	0.00	0.00	7.47	11.55	14.37	19.22	28.06	38.48	47.50
	1:10:00	0.00	0.00	6.29	10.17	12.80	16.09	23.45	31.25	38.75
	1:15:00	0.00	0.00	5.19	8.54	11.34	13.33	19.39	24.89	31.03
	1:20:00	0.00	0.00	4.31	6.96	9.46	10.49	15.16	18.60	23.16
	1:25:00	0.00	0.00	3.75	5.96	7.80	8.13	11.68	13.45	16.79
	1:30:00	0.00	0.00	3.46	5.45	6.79	6.42	9.15	10.16	12.73
	1:35:00	0.00	0.00	3.31	5.15	6.13	5.36	7.56	8.18	10.28
	1:40:00	0.00	0.00	3.23	4.60	5.66	4.70	6.54	6.89	8.66
	1:45:00	0.00	0.00	3.18	4.17	5.33	4.26	5.84	5.99	7.54
	1:50:00	0.00	0.00	3.13	3.86	5.10	3.98	5.39	5.38	6.77
	1:55:00	0.00	0.00	2.73	3.63	4.80	3.79	5.08	4.94	6.21
	2:00:00	0.00	0.00	2.40	3.35	4.33	3.66	4.86	4.68	5.87
	2:05:00	0.00	0.00	1.79	2.49	3.19	2.73	3.61	3.47	4.35
	2:10:00	0.00	0.00	1.30	1.80	2.28	1.96	2.58	2.49	3.11
	2:15:00	0.00	0.00	0.94	1.29	1.63	1.41	1.85	1.80	2.25
	2:20:00	0.00	0.00	0.67	0.91	1.16	1.01	1.32	1.29	1.61
	2:25:00	0.00	0.00	0.47	0.62	0.81	0.70	0.91	0.90	1.12
	2:30:00	0.00	0.00	0.31	0.42	0.56	0.49	0.63	0.62	0.77
	2:35:00	0.00	0.00	0.20	0.28	0.37	0.33	0.43	0.42	0.52
	2:40:00	0.00	0.00	0.12	0.17	0.22	0.21	0.26	0.26	0.32
	2:45:00	0.00	0.00	0.06	0.09	0.11	0.11	0.14	0.14	0.17
	2:50:00	0.00	0.00	0.02	0.04	0.04	0.04	0.05	0.05	0.06
	2:55:00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]

BMP Capture Volume - Extended Detention Basin with Full Spectrum Detention

Criteria				Reference
Urban Storm Drainage Criteria Manual (USDCM)				
Sizing of Full Spectrum Detention Storage Volumes				*USDCM V2 Ch.4*
EDB Sizing Criteria				*USDCM V3 Ch.4*

Water Quality Capture Volume (WQCV)

WQCV (in.)	$a(0.91i^3 - 1.19i^2 + 0.78i)$		0.22	in.	*USDCM V3 Eqn. 3-1*
	a	WQCV drain time coefficient, 40 hrs.	1.00		*USDCM V3 Table 3-2, V2 Table 1*
	i	imperviouseness	0.537		*Appendix C of Drainage Report*
WQCV (ac.-ft.)	(WQCV/12)A		0.47	ac.-ft.	*USDCM V3 Eqn. 3-2*
	A	tributary catchment area upstream	25.85	ac.	*Appendix C of Drainage Report*

Excess Urban Runoff Volume (EURV)

$EURV_B$ (in.)	$1.36i^{1.08}$		0.69	in.	*USDCM V2 Eqn. 12-3*
	i	imperviouseness	0.537		*Appendix C of Drainage Report*
EURV (ac-.ft.)	(EURV/12)A		1.50	ac.-ft.	
	A	tributary catchment area upstream	25.85	ac.	*Appendix C of Drainage Report*

100-Year Volume

V_{100} (in.)	$P_1[(0.806i^{1.225} + 0.109i^{0.225})A + (0.412i^{1.371} + 0.371i^{0.371})B + (0.341i^{1.389} + 0.398i^{0.389})CD]$		1.22	in.	*USDCM V2 Eqn. 12-4*
	P1	one hour rainafall depth 100-year	2.60		
	i	imperviouseness	0.537		*Appendix C of Drainage Report*
V_{100} (ac.-ft.)	(V_{100}/12)A		2.63	ac.-ft.	
	A	tributary catchment area upstream	25.85	ac.	*Appendix C of Drainage Report*

Allowable Release Rates for Detention Pond

100-Year C/D	1.00 cfs/acre			cfs	*USDCM V3 Eqn. 12-5*
	##	acres			*Appendix C of Drainage Report*

Stage-Storage Volume

Pinery Meadows Subdivision

Job No.	210706
Date	02/20/25
Calculated By	DRT
Checked By	DRT

VOLUME EQUATION

Vol (V) = 1/3h(A1+A2+SQRT(A1*A2))

Where:

V = Volume in Cubic Feet (CF) or Acre-Feet (Ac-Ft)
h = Contour Interval in Feet (Ft)
A1,A2 = Area Enclosed by Successive Contours In Square Feet (SF)

STAGE-STORAGE RELATIONSHIP

Contour Elev. (ft)	Area (sf)	A1+A2 (sf)	SQRT(A1*A2) (sf)	(A1+A2)+ SQRT(A1*A2) (sf)	h (ft)	h/3 (ft)	Volume V (cf)	Accum. Vol. AV (cf)	Accum. Vol. AV (ac-ft)
5963.00	8421							0	0.000
		21416	10461	31877	1.00	0.33	10625.6		
5964.00	12995							10626	0.244
		28023	13975	41998	1.00	0.33	13999.2		
5965.00	15028							24625	0.565
		32191	16060	48251	1.00	0.33	16083.7		
5966.00	17163							40709	0.935
		36820	18368	55188	1.00	0.33	18395.9		
5967.00	19657							59104	1.357
		40480	20232	60712	1.00	0.33	20237.2		
5968.00	20823							79342	1.821
		43857	21901	65758	1.00	0.33	21919.2		
5969.00	23034							101261	2.32
		47355	23669	71024	1.00	0.33	23674.6		**100-YR**
5970.00	24321							124935	2.87
		50157	25067	75224	1.00	0.33	25074.7		
5971.00	25836							150010	3.44

VOLUMES

100-YR Volume	2.70
Required Pond Volume	2.97
Provided Pond Volume	2.32

WATER SURFACE INTERPOLATIONS

Contour	Volume	Ac-ft
5969.0	59104	2.325
100-YR		**2.699**
5970.0	79342	2.868

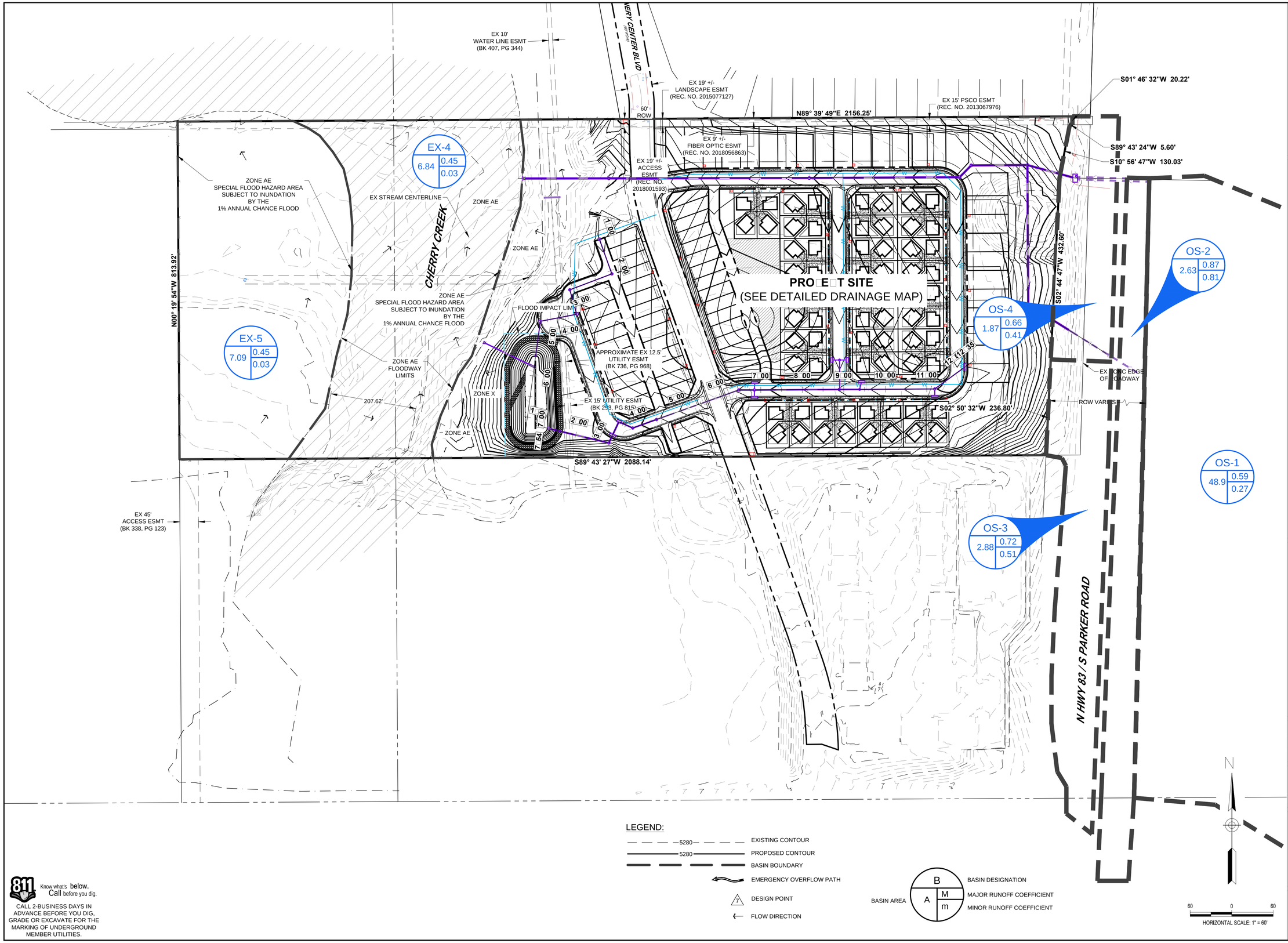
100-YR Volume

Water Surface Elev. = 5969.69

1-ft Freeboard Elev. = 5970.69

Top of Pond Elev. = 5971.00

APPENDIX F – Drainage Map



LEGEND:

- EXISTING CONTOUR (5280)
- PROPOSED CONTOUR (5280)
- BASIN BOUNDARY
- EMERGENCY OVERFLOW PATH
- DESIGN POINT (7)
- FLOW DIRECTION

BASIN AREA: B = BASIN DESIGNATION; A = BASIN AREA; M = MAJOR RUNOFF COEFFICIENT; m = MINOR RUNOFF COEFFICIENT

811 Know what's below. Call before you dig.

CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

ROTH LANG ENGINEERING GROUP LLC
7853 E. ARAPAHOE COURT, SUITE 2500
CENTENNIAL, CO 80112
PHONE: 303-841-9365

PINERY MEADOWS

DRAINAGE PLAN

PROPOSED - O□ERALL DRAINAGE PLAN

PREPARED FOR:

ISSUE DATE: 00/00/00	DATE	REVISIONS	BY

DESIGNED BY:	AAA
DRAWN BY:	BBB
JOB NUMBER:	00000

PRELIMINARY NOT FOR CONSTRUCTION

SHEET NUMBER: ----

File Name: S:_Projects\241004 - Pinery Meadows\CADD\Sheet Sets\CD's\OVERALL DRAINAGE PLAN.dwg Plotted by: David Terron Date: 3/6/2025 7:39 PM

811 Know what's below. Call before you dig.

CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

ROTH LANG ENGINEERING GROUP LLC
7853 E. ARAPAHOE COURT, SUITE 2500
CENTENNIAL, CO 80112
PHONE: 303-841-9365

PINERY MEADOWS

DRAINAGE PLAN

PROPOSED - DETAILED DRAINAGE PLAN

PREPARED FOR:

ISSUE DATE:	00/00/00

DATE	REVISIONS	BY

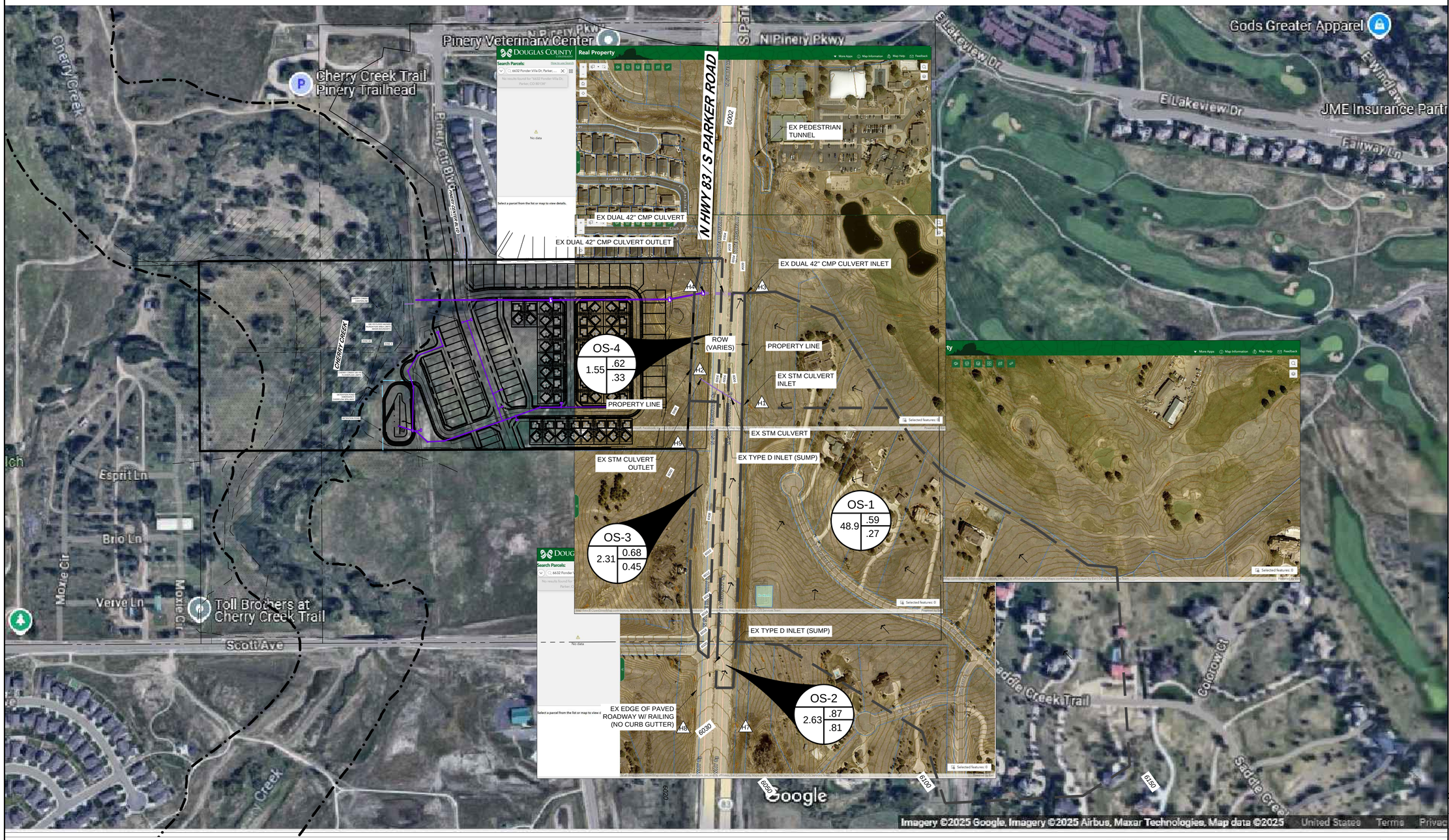
DESIGNED BY:	AAA
DRAWN BY:	BBB
JOB NUMBER:	00000

PRELIMINARY NOT FOR CONSTRUCTION

SHEET NUMBER:

Plotted by: David Terron Date: 3/6/2025 8:56 PM

File Name: S:_Projects\241004 - Pinery Meadows\CADD\Sheet Sets\CD's\DETAILED DRAINAGE PLAN.dwg



OFFSITE DRAINAGE BASIN SUMMARY

	BASIN	AREA (ACRES)	% IMPERVIOUSNESS	C5	C100	Q5	Q100
OFFSITE BASINS	OS-1	48.94	35.00%	0.27	0.59	37.08	145.12
	OS-2	2.63	95.00%	0.81	0.87	6.98	13.59
	OS-3	2.31	55.30%	0.45	0.68	2.78	7.69
	OS-4	1.55	41.10%	0.33	0.62	2.26	7.80
	TOTAL	55.42	38.90%	0.31	0.61	49.10	174.20

LEGEND:

- EXISTING CONTOUR
- PROPOSED CONTOUR
- BASIN BOUNDARY
- EMERGENCY OVERFLOW PATH
- DESIGN POINT
- FLOW DIRECTION
- BASIN DESIGNATION
- BASIN AREA
- MAJOR RUNOFF COEFFICIENT
- MINOR RUNOFF COEFFICIENT

N

HORIZONTAL SCALE: 1" = 60'

811 Know what's below. Call before you dig.

CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

ROTH LANG ENGINEERING GROUP LLC
7853 E. ARAPAHOE COURT, SUITE 2500
CENTENNIAL, CO 80112
PHONE: 303-841-9365

PINERY MEADOWS
DRAINAGE PLAN

EXISTING - OFFSITE DRAINAGE PLAN

PREPARED FOR:

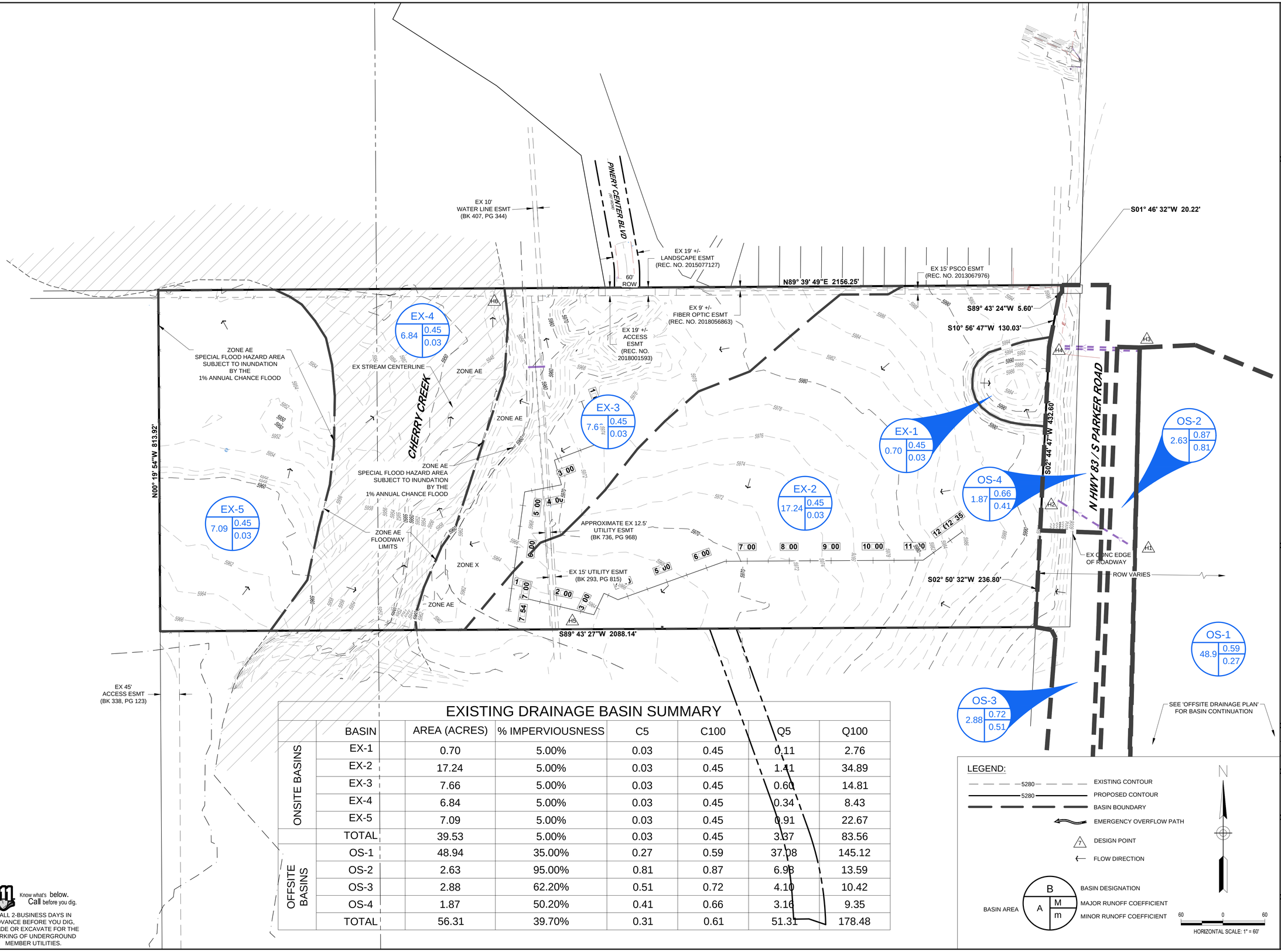
ISSUE DATE: 00/00/00	DATE	REVISIONS	BY

DESIGNED BY:	AAA
DRAWN BY:	BBB
JOB NUMBER:	00000

PRELIMINARY NOT FOR CONSTRUCTION

SHEET NUMBER: ----

Plotted by: David Terron Date: 3/6/2025 7:42 PM
File Name: S:_Projects\241004 - Pinery Meadows\CADD\Sheet Sets\CD's\OFFSITE DRAINAGE PLAN.dwg



EXISTING DRAINAGE BASIN SUMMARY

	BASIN	AREA (ACRES)	% IMPERVIOUSNESS	C5	C100	Q5	Q100
ONSITE BASINS	EX-1	0.70	5.00%	0.03	0.45	0.11	2.76
	EX-2	17.24	5.00%	0.03	0.45	1.41	34.89
	EX-3	7.66	5.00%	0.03	0.45	0.60	14.81
	EX-4	6.84	5.00%	0.03	0.45	0.34	8.43
	EX-5	7.09	5.00%	0.03	0.45	0.91	22.67
	TOTAL	39.53	5.00%	0.03	0.45	3.37	83.56
OFFSITE BASINS	OS-1	48.94	35.00%	0.27	0.59	37.08	145.12
	OS-2	2.63	95.00%	0.81	0.87	6.98	13.59
	OS-3	2.88	62.20%	0.51	0.72	4.10	10.42
	OS-4	1.87	50.20%	0.41	0.66	3.16	9.35
	TOTAL	56.31	39.70%	0.31	0.61	51.31	178.48

LEGEND:

- EXISTING CONTOUR
- PROPOSED CONTOUR
- BASIN BOUNDARY
- EMERGENCY OVERFLOW PATH
- DESIGN POINT
- FLOW DIRECTION
- BASIN AREA / BASIN DESIGNATION / MAJOR RUNOFF COEFFICIENT / MINOR RUNOFF COEFFICIENT

HORIZONTAL SCALE: 1" = 60'

811 Know what's below. Call before you dig.
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

ROTH LANG ENGINEERING GROUP, LLC
7853 E. ARAPAHOE COURT, SUITE 2500
CENTENNIAL, CO 80112
PHONE: 303-841-9365

PINERY MEADOWS
DRAINAGE PLAN
EXISTING - ONSITE DRAINAGE PLAN

PREPARED FOR: ----

ISSUE DATE: 00/00/00

DATE	REVISIONS	BY

DESIGNED BY:	AAA
DRAWN BY:	BBB
JOB NUMBER:	00000

PRELIMINARY NOT FOR CONSTRUCTION

SHEET NUMBER: ----

Plotted by: David Terron Date: 3/6/2025 7:42 PM
File Name: S:_Projects\241004 - Pinery Meadows\CADD\Sheet Sets\CD's\EXISTING DRAINAGE PLAN.dwg

APPENDIX G – Existing Studies and Maps

LSC TRANSPORTATION CONSULTANTS, INC.

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

March 7, 2025

Mr. Jerry Richmond
Integrity Land Ventures, LLC
7200 S. Alton Way, Suite C400
Centennial, CO 80112

Re: Pinery Meadows
Douglas County, CO
LSC #210872

Dear Mr. Richmond:

In response to your request, LSC Transportation Consultants, Inc. has prepared this Traffic Impact Analysis for the proposed Pinery Meadows development in Douglas County, Colorado. The site was previously studied in the June 3, 2022 *Parker Road & Scott Road Traffic Impact Analysis* by LSC. As shown on Figure 1, the site is located west of SH 83 (S. Parker Road) and north of Scott Avenue.

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; the assignment of the projected traffic volumes to the area roadways; the projected long-term background and resulting total traffic volumes on the area roadways; the site's projected traffic impacts; and any recommended roadway improvements needed to mitigate the growth in background traffic or from the site's traffic impacts.

PROPOSED SITE LAND USE AND ACCESS

The site is proposed to include about 96 single-family detached dwelling units and about 40 single-family attached dwelling units. Access is proposed north to Pinery Parkway and south to Scott Avenue by an extension of Pinery Center Boulevard. The conceptual site plan is shown 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.

- **SH 83 (S. Parker Road)** is a north-south, six-lane state highway east of the site. It is classified by CDOT as NR-A (Non-Rural Principal Highway). The CDOT Straight Line Diagram is attached for reference. The intersections with N. Pinery Parkway and Scott Avenue are signalized with auxiliary turn lanes. The posted speed limit in the vicinity of the site is 55 mph.

- **N. Pinery Parkway** is an east-west four-lane collector roadway north of the site. The intersection with SH 83 (Parker Road) is signalized with auxiliary turn lanes and the intersection with Pinery Center Boulevard (Intersection #1) is planned to be signalized with auxiliary turn lanes as is Intersection #2. The posted speed limit in the vicinity of the site is 40 mph but reduces to 35 mph at SH 83 (S. Parker Road).

- **Pinery Center Boulevard** is a north-south, two-lane collector roadway northwest of the site. The intersection with N. Pinery Parkway is planned to be signalized with auxiliary turn lanes. Pinery Center Boulevard is planned to be connected between N. Pinery Parkway and Scott Road with development of the site. The posted speed limit in the vicinity of the site is 25 mph.

- **Scott Avenue** is an east-west, two-lane collector roadway south of the site. The intersection with SH 83 (Parker Road) is signalized with auxiliary turn lanes. The posted speed limit in the vicinity of the site is 30 mph.

- **Interlocken Street** is a north-south, two-lane collector roadway south of the site. The intersection with Scott Avenue is stop-sign controlled. The posted speed limit in the vicinity of the site is 30 mph.

Existing Traffic

Figure 3 shows the existing peak-hour and daily traffic volumes, existing lane geometries, and traffic controls in the site's vicinity on a typical weekday. The traffic volumes are based on the attached traffic counts conducted by Counter Measures, Inc. in February, 2025.

2028 AND 2045 BACKGROUND TRAFFIC

Figure 4 shows the estimated 2028 background traffic, lane geometry and traffic controls. It assumes an annual growth rate of 1.36 percent on SH 83 (Parker Road) based on the CDOT 20-year factor of 1.31 from the attached Straight Line Diagram. An annual growth rate of 1.5% was assumed on Scott Avenue. The growth on Pinery Parkway from Intersections #1 to #3 assumes one half development of the large Pinery West project proposed to the north. Figure 4 also shows the recommended lane geometry and traffic control.

Figure 5 shows the estimated 2045 background traffic, lane geometry and traffic controls based on the assumptions above with full buildout of the large Pinery West project proposed to the north. Figure 4 also shows the recommended lane geometry and traffic control.

EXISTING, 2028, AND 2045 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 through 5 were analyzed to determine the existing, 2028, and 2045 background levels of service using Synchro. Table 1 shows the level of service analysis results. The level of service reports are attached.

1. **N. Pinery Parkway/Pinery Center Boulevard:** This intersection is expected to be signalized by the Pinery West development to the north and operate at an overall LOS "A" during the morning peak-hour and LOS "B" during the afternoon peak-hour in 2028 and at an overall LOS "B" during both peak-hours in 2045. The site's impact to the intersection is minimal compared to Pinery West.

2. **N. Pinery Parkway/Pinery Peak Place:** All movements at this unsignalized intersection currently operate at LOS "A". This intersection is expected to be signalized by the Pinery West development to the north by 2028 and operate at an overall LOS "B" during both morning and afternoon peak-hours through 2045. The site's impact to the intersection is minimal compared to Pinery West.

3. **SH 83 (Parker Road)/N. Pinery Parkway:** This signalized intersection currently operates at an overall LOS "D" during the morning peak-hour and LOS "C" during the afternoon peak-hour and is expected to operate at an overall LOS "D" or better during both peak-hours through 2045 with the planned improvements.

4. **Scott Avenue/Interlocken Street/North Pinery Center:** All movements at this unsignalized intersection currently operate at LOS "B" or better during both morning and afternoon peak-hours and are expected to operate at LOS "C" or better through 2045.

5. **SH 83 (Parker Road)/Scott Avenue:** This signalized intersection currently operates at an overall LOS "B" during the morning peak-hour and LOS "A" during the afternoon peak-hour and is expected to operate at an overall LOS "B" or better during both peak-hours through 2045.

6. **N. Pinery Center/North Site Access:** This intersection was analyzed only in the total traffic scenarios.

7. **N. Pinery Center/South Site Access:** This intersection was analyzed only in the total traffic scenarios.

TRIP GENERATION

Table 2 shows the estimated average weekday, morning peak-hour, and afternoon peak-hour trip generation for the proposed land use based on the rates from *Trip Generation, 11th Edition, 2021* by the Institute of Transportation Engineers (ITE).

The site is projected to generate about 1,193 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 22 vehicles would enter and about 64 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 70 vehicles would enter and about 42 vehicles would exit.

DIRECTIONAL DISTRIBUTION

Figure 6 shows the estimated directional distribution of the 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 2028 assignment of site-generated traffic volumes based on the trip generation estimate (from Table 2) and the 2028 directional distribution shown in Figure 6.

Figure 7b shows the estimated 2045 assignment of site-generated traffic volumes based on the trip generation estimate (from Table 2) and the 2045 directional distribution shown in Figure 6.

2028 AND 2045 TOTAL TRAFFIC

Figure 8 shows the estimated 2028 total traffic which is the sum of the 2028 background traffic volumes (from Figure 4) and the 2028 site-generated traffic volumes (from Figure 7a). Figure 8 also shows the assumed 2028 lane geometry and traffic control.

Figure 9 shows the estimated 2045 total traffic which is the sum of the 2045 background traffic volumes (from Figure 5) and the 2045 site-generated traffic volumes (from Figure 7b). Figure 9 also shows the assumed 2045 lane geometry and traffic control.

PROJECTED LEVELS OF SERVICE

The intersections in Figures 8 and 9 were analyzed to determine the 2028 and 2045 total levels of service. Table 1 shows the level of service analysis results. The level of service reports are attached.

1. **N. Pinery Parkway/Pinery Center Boulevard:** This signalized intersection is expected to operate at an overall LOS "B" during both morning and afternoon peak-hours through 2045.

2. **N. Pinery Parkway/Pinery Peak Place:** This signalized intersection is expected to operate at an overall LOS "B" during both morning and afternoon peak-hours through 2045.

3. **SH 83 (Parker Road)/N. Pinery Parkway:** This signalized intersection is expected to operate at an overall LOS "D" or better during both morning and afternoon peak-hours through 2045.

4. **Scott Avenue/Interlocken Street/North Pinery Center:** All movements at this unsignalized intersection are expected to operate at LOS "C" or better during both morning and afternoon peak-hours through 2045.

5. **SH 83 (Parker Road)/Scott Avenue:** This signalized intersection is expected to operate at an overall LOS "B" or better during both morning and afternoon peak-hours through 2045.

6. **N. Pinery Center/North Site Access:** All movements at this unsignalized intersection are expected to operate at LOS "A" during both morning and afternoon peak-hours through 2045.

7. **N. Pinery Center/South Site Access:** All movements at this unsignalized intersection are expected to operate at LOS "A" during both morning and afternoon peak-hours through 2045.

95TH PERCENTILE QUEUE LENGTHS

Table 3 shows the estimated 95th percentile queue lengths for the signalized intersections by 2045. It also includes the existing turn lane lengths. The northern site access intersection (#6) is also included in the queuing table to show the expected westbound approach to Pinery Center Boulevard is expected to have a 95th percentile queue length of 0.1 vehicles. This suggests there will typically be no queued vehicles and when queuing occurs, it will likely be only one vehicle in the queue. This shows the proposed driveways will not likely be blocked by queuing - particularly if the westernmost driveway is located on the east side of the lot frontage.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

1. The site is projected to generate about 1,193 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 22 vehicles would enter and about 64 vehicles would exit the site. During the afternoon peak-hour, about 70 vehicles would enter and about 42 vehicles would exit.

Projected Levels of Service

2. All of the intersections analyzed are expected to operate at LOS "D" or better during both morning and afternoon peak-hours through 2045 with the planned and recommended improvements.

Conclusions

3. The impact of the site can be accommodated by the existing and planned roadway improvements with the following recommended improvements.

Recommendations

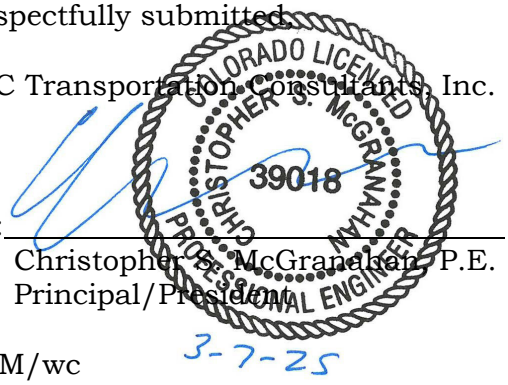
4. The recommended improvements and details are shown in Figures 4, 5, and 8. The applicant will work with the County to develop a cost sharing agreement for the construction of Pinery Center Boulevard.

* * * * *

We trust this information will assist you in planning for the proposed Pinery Meadows development.

Respectfully submitted,

LSC Transportation Consultants, Inc.



By: _____
Christopher S. McGranahan, P.E.
Principal/President

CSM/wc

Enclosures: Tables 1 - 3
Figures 1 - 9
SH 83 SLD
Level of Service Definitions
Level of Service Reports
Queuing Reports

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Table 1 (Page 1 of 2)
Intersection Levels of Service Analysis
Pinery Meadows
Douglas County, CO
LSC #210872; March, 2025

Intersection Location	Traffic Control	Existing Level of Service AM	Existing Level of Service PM	2028 Background Level of Service AM	2028 Background Level of Service PM	2028 Total Traffic Level of Service AM	2028 Total Traffic Level of Service PM	2045 Background Level of Service AM	2045 Background Level of Service PM	2045 Total Traffic Level of Service AM	2045 Total Traffic Level of Service PM
1) N. Pinery Parkway/Pinery Center Boulevard	Signalized										
EB Left		--	--	A	A	A	A	A	A	A	A
EB Through		--	--	A	A	A	B	A	B	A	B
EB Right		--	--	A	A	A	A	A	A	A	B
WB Left		--	--	A	A	A	A	A	A	A	A
WB Through		--	--	A	A	A	A	B	B	B	B
WB Right		--	--	A	A	A	A	A	B	A	B
NB Left		--	--	B	B	B	B	B	B	B	B
NB Through/Right		--	--	B	B	B	B	B	B	B	B
SB Left		--	--	B	B	B	B	B	B	B	B
SB Through/Right		--	--	B	B	B	B	B	B	B	B
Entire Intersection Delay (sec /veh)		--	--	9.6	11.4	10.2	12.2	11.0	12.5	11.2	13.1
Entire Intersection LOS		--	--	A	B	B	B	B	B	B	B
2) N. Pinery Parkway/Pinery Peak Place	TWSC										
NB Approach		A	A	--	--	--	--	--	--	--	--
WB Left		A	A	--	--	--	--	--	--	--	--
Critical Movement Delay		8.4	8.4	--	--	--	--	--	--	--	--
	Signalized										
EB Left		--	--	B	B	B	B	B	B	B	B
EB Through		--	--	B	B	B	B	B	B	B	B
EB Right		--	--	B	B	B	B	B	B	B	B
WB Left		--	--	B	B	B	B	B	B	B	B
WB Through		--	--	B	B	B	B	B	B	B	B
WB Right		--	--	B	B	B	B	B	B	B	B
NB Approach		--	--	A	A	A	A	B	B	B	B
SB Left		--	--	A	B	A	B	B	B	B	B
SB Through/Right		--	--	A	A	A	A	A	B	B	B
Entire Intersection Delay (sec /veh)		--	--	13.2	13.3	13.6	13.5	15.1	15.4	15.1	15.5
Entire Intersection LOS		--	--	B	B	B	B	B	B	B	B
3) SH 83 (Parker Road)/N. Pinery Parkway	Signalized										
EB Left		E	E	E	E	E	E	E	E	E	E
EB Through		E	D	D	D	D	D	D	D	D	D
EB Right		A	A	A	A	A	A	A	A	A	A
WB Left		--	--	--	--	--	--	D	D	D	D
WB Left/Through or Through		D	D	E	E	E	E	E	E	E	E
WB Right		F	F	A	A	A	A	A	A	A	A
NB Left		E	B	E	E	E	E	E	E	E	E
NB Through/Right		C	C	C	C	C	C	D	C	D	C
SB Left		E	E	E	E	E	E	E	E	E	E
SB Through		B	B	B	C	B	C	C	D	C	D
SB Right		A	A	A	A	A	A	A	A	A	A
Entire Intersection Delay (sec /veh)		42.8	34.3	27.4	34.5	29.8	35.6	35.2	45.1	36.5	45.7
Entire Intersection LOS		D	C	C	C	C	D	D	D	D	D

Table 1 (Page 2 of 2)
Intersection Levels of Service Analysis
Pinery Meadows
Douglas County, CO
LSC #210872; March, 2025

Intersection Location	Traffic Control	Existing		2028 Background		2028 Total Traffic		2045 Background		2045 Total Traffic	
		Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM
4) Scott Avenue/Interlocken Street/N. Pinery Ct.	TWSC										
NB Left		B	B	C	B	C	C	C	C	C	C
NB Right		A	A	B	B	B	B	B	B	B	B
EB Left		--	--	A	A	A	A	A	A	A	A
WB Left		A	A	A	A	A	A	A	A	A	A
SB Left		--	--	C	C	C	C	C	C	C	C
SB Through/Right		--	--	B	B	B	B	B	B	B	B
Critical Movement Delay		13.7	12.6	18.3	15.0	19.0	15.5	20.5	17.9	21.1	18.5
5) SH 83 (Parker Road)/Scott Avenue	Signalized										
EB Left		D	D	D	D	D	D	D	D	D	D
EB Right		D	D	D	D	D	D	D	D	D	D
NB Left		E	E	E	E	E	E	E	E	E	E
NB Through		A	A	A	A	A	A	A	A	A	A
SB Through		A	A	A	A	A	A	A	B	A	B
SB Right		A	A	A	A	A	A	A	A	A	A
Entire Intersection Delay (sec /veh)		10.7	8.6	11.4	9.5	11.6	9.8	13.1	12.0	13.2	12.3
Entire Intersection LOS		B	A	B	A	B	A	B	B	B	B
6) N. Pinery Parkway/North Site Access	TWSC										
WB Approach		--	--	--	--	A	A	--	--	A	A
SB Left/Through		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	8.7	8.6	--	--	8.8	8.7
7) N. Pinery Parkway/South Site Access	TWSC										
NB Approach		--	--	--	--	A	A	--	--	A	A
EB Approach		--	--	--	--	A	A	--	--	A	A
WB Approach		--	--	--	--	A	A	--	--	A	A
SB Approach		--	--	--	--	A	A	--	--	A	A
Critical Movement Delay		--	--	--	--	8.7	8.8	--	--	9.0	9.0

Table 2
ESTIMATED TRAFFIC GENERATION
Pinery Meadows
Douglas County, CO
LSC #210872; March, 2025

Trip Generating Category	Quantity	Trip Generation Rates [1] Average Weekday	AM Peak-Hour In	AM Peak-Hour Out	PM Peak-Hour In	PM Peak-Hour Out	Total Trips Generated Average Weekday	AM Peak-Hour In	AM Peak-Hour Out	PM Peak-Hour In	PM Peak-Hour Out
Currently Proposed Land Use											
Single Family Detached Housing [2]	96 DU [3]	9.43	0.175	0.525	0.592	0.348	905	17	50	57	33
Single Family Attached Housing [4]	40 DU [3]	7.20	0.120	0.360	0.336	0.234	288	5	14	13	9
						Total =	**1,193**	**22**	**64**	**70**	**42**

Notes:
(1) Source: *Trip Generation*, Institute of Transportation Engineers, 11th Edition, 2021.
(2) ITE Land Use No. 210 - Single-Family Detached Housing
(3) DU = dwelling units
(4) ITE Land Use No. 215 - Single-Family Attached Housing

Table 3
95th Percentile Queue Lengths
Pinery Meadows
Douglas County, CO
LSC #210872; March, 2025

Intersection No. & Location	Existing Turn Lane Length (feet)	Proposed Turn Lane Length (feet)	2045 Background Traffic 95th Percentile Queue Length (feet) AM	2045 Background Traffic 95th Percentile Queue Length (feet) PM	2045 Total Traffic 95th Percentile Queue Length (feet) AM	2045 Total Traffic 95th Percentile Queue Length (feet) PM
1) N. Pinery Parkway/Pinery Center Boulevard						
EB Left	--	By Pinery West	26	66	27	68
EB Through	--	--	44	116	46	120
EB Right	--	By Others	5	2	7	12
WB Left	125	125	8	16	12	31
WB Through	--	--	98	102	101	103
WB Right	125	125	15	27	15	27
NB Left	60	60	43	35	52	42
NB Through/Right	--	--	31	39	38	46
SB Left	--	By Pinery West	43	112	43	114
SB Through/Right	--	--	31	69	31	69
2) N. Pinery Parkway/Pinery Peak Place						
EB Left	80	80	24	36	24	36
EB Through	--	--	57	140	65	145
EB Right	80	80	20	15	20	15
WB Left	160	160	31	25	31	25
WB Through	--	--	132	94	135	104
WB Right	110	110	27	37	27	37
NB Approach	--	--	43	55	43	55
SB Left	--	By Pinery West	42	143	43	145
SB Through/Right	--	--	17	31	17	31
3) SH 83 (Parker Road)/N. Pinery Parkway						
EB Left	1 @ 225; 1 @ 500	1 @ 225; 1 @ 500	126	275	164	296
EB Through	--	--	74	211	74	211
EB Right	110	110	0	0	0	0
WB Left	--	By Others	85	127	85	127
WB Left/Through or Through	--	--	158	133	158	133
WB Right	Lane Drop	Lane Drop	337	302	337	302
NB Left	315	2 @ 380 (Pinery West)	269	186	269	186
NB Through/Right	--	--	969	430	969	430
SB Left	2 @ 675	2 @ 675	107	251	107	251
SB Through	--	--	340	817	340	817
SB Right	690	690	0	0	0	0
5) SH 83 (Parker Road)/Scott Avenue						
EB Left	2 @ 350	2 @ 350	164	103	164	103
EB Right	340	340	44	36	46	38
NB Left	300	300	107	74	109	83
NB Through	--	--	501	159	501	159
SB Through	--	--	79	m230	79	m230
SB Right	390	390	6	m31	6	m30
6) Pinery Center Boulevard/Northern Site Access						
WB Approach	--	--	--	--	<25	<25
SB Approach	--	--	--	--	<25	<25

m = metered by adjacent intersections

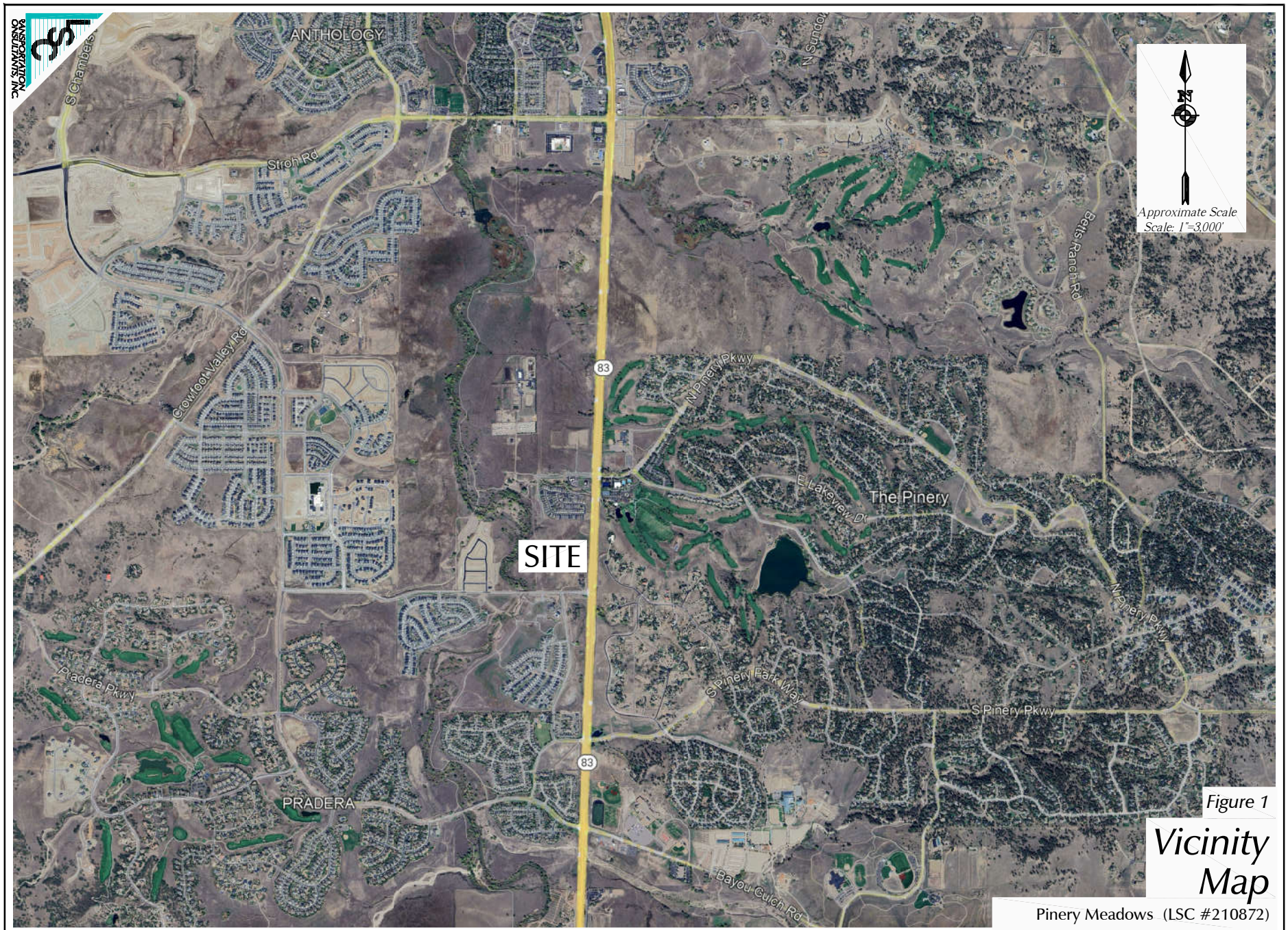


Figure 1

Vicinity Map

Pinery Meadows (LSC #210872)

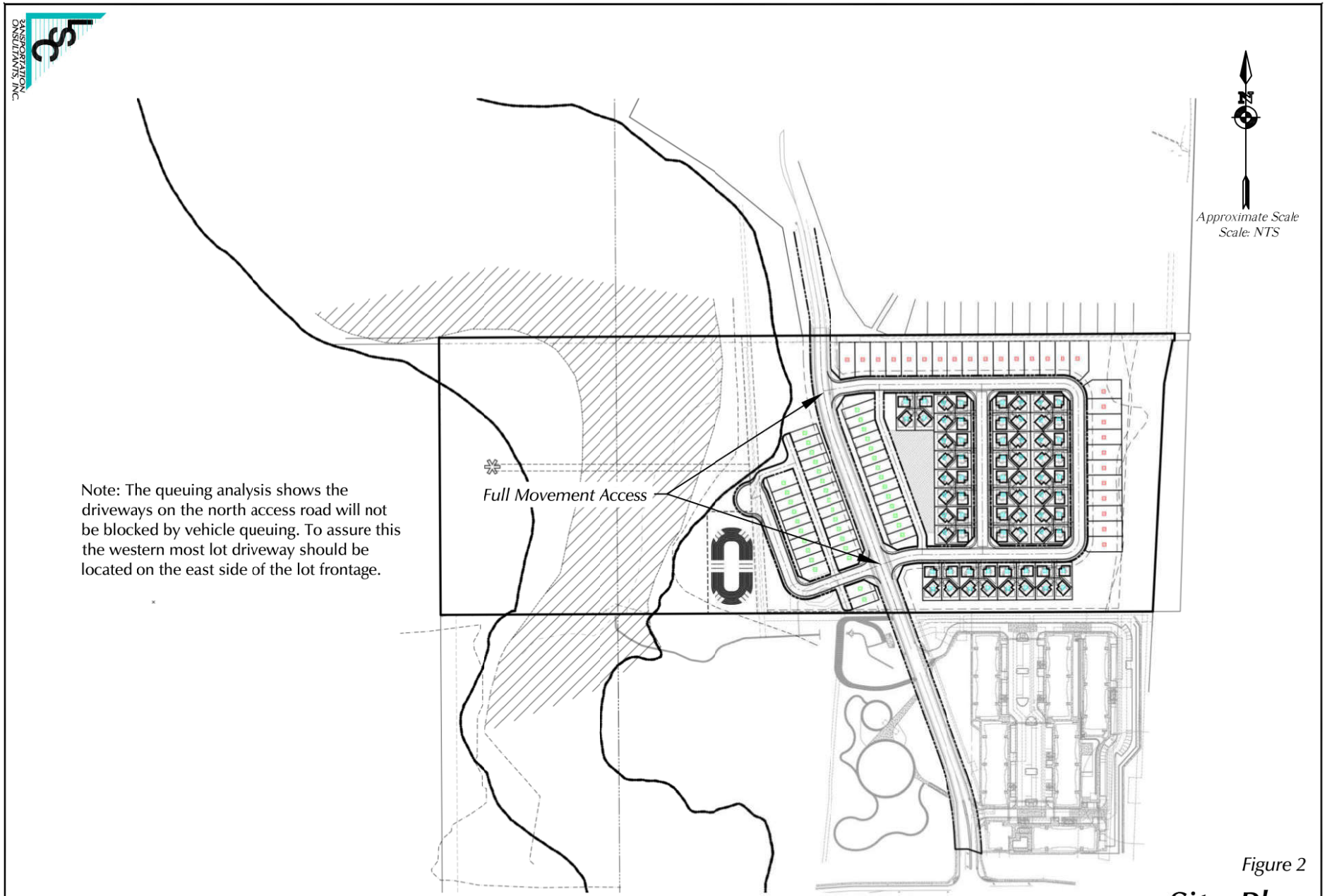
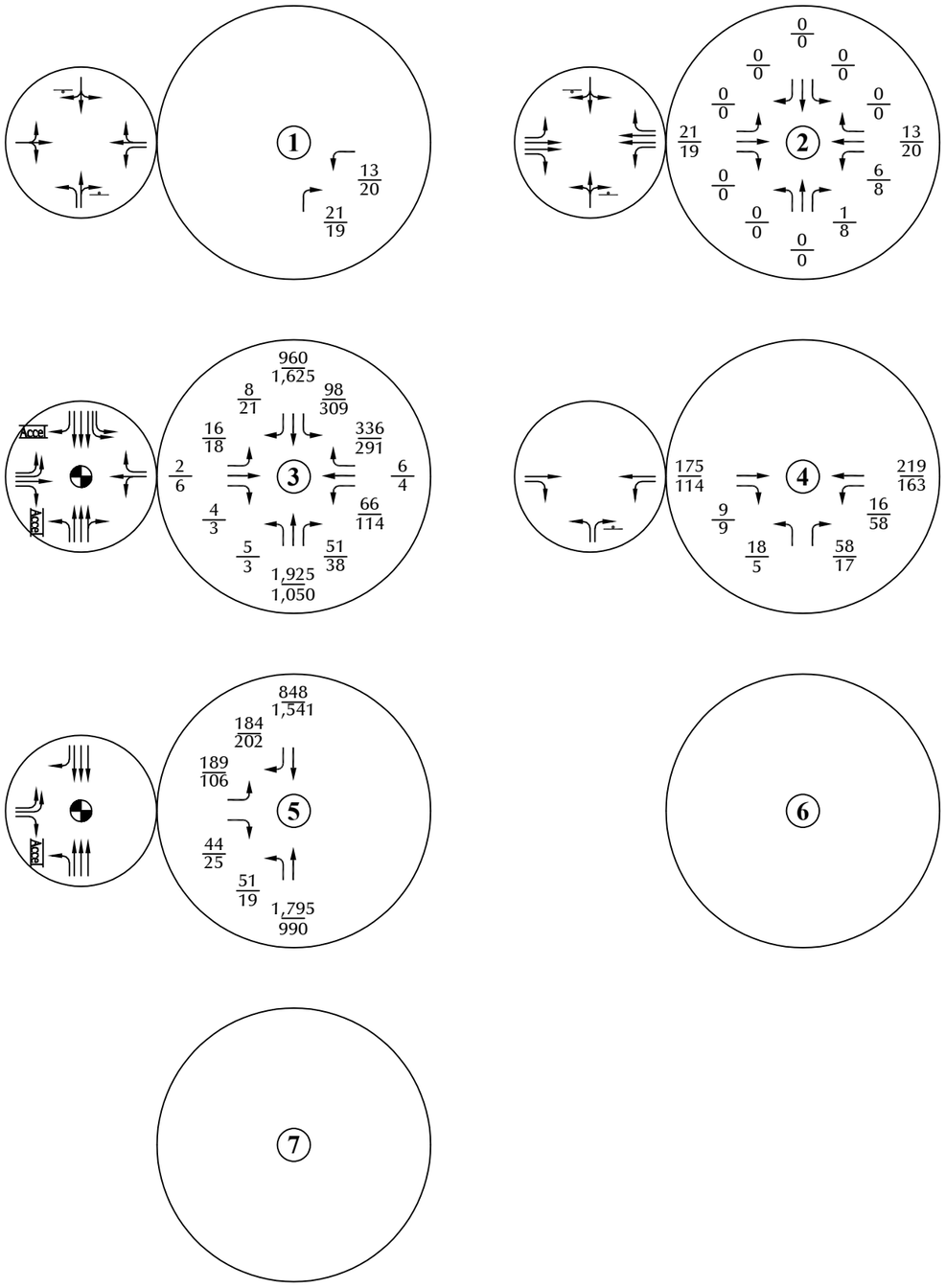


Figure 2

Site Plan

Pinery Meadows (LSC #210872)



LEGEND:

= Stop Sign

= Traffic Signal

= Speed Limit

26/35 = AM Peak Hour Traffic / PM Peak Hour Traffic

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=600'

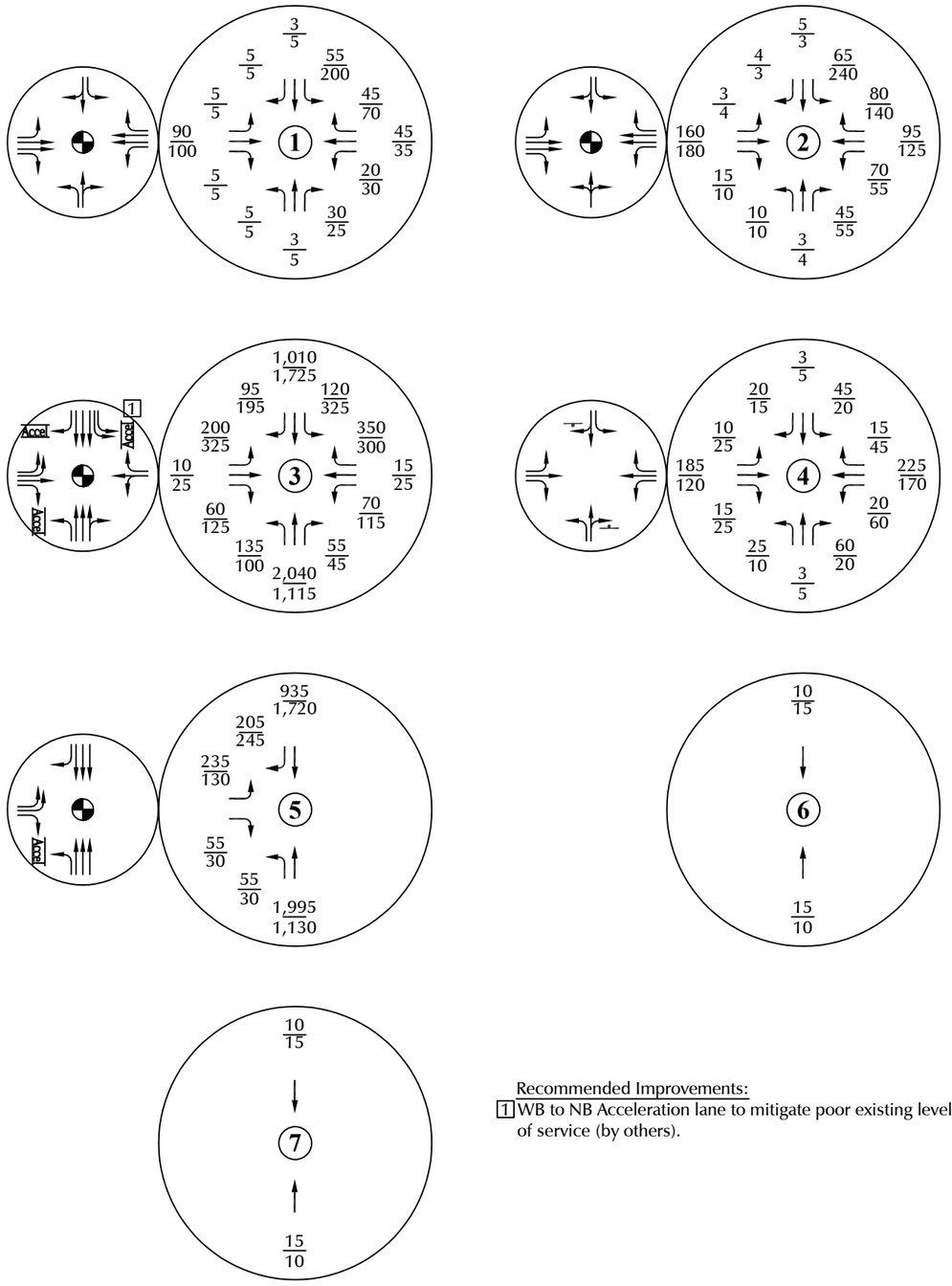


Note: Daily traffic volumes on SH 83 (S. Parker Road) is based on the attached CDOT Straight Line Diagram.

Figure 3

Existing Traffic, Lane Geometry and Traffic Control

Pinery Meadows (LSC #210872)



Recommended Improvements:

1 WB to NB Acceleration lane to mitigate poor existing levels of service (by others).

LEGEND:

= Stop Sign

= Traffic Signal

26/35 = AM Peak Hour Traffic / PM Peak Hour Traffic

1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=600'

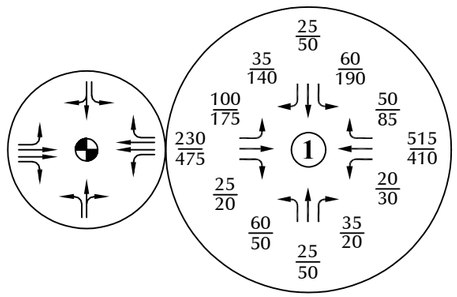


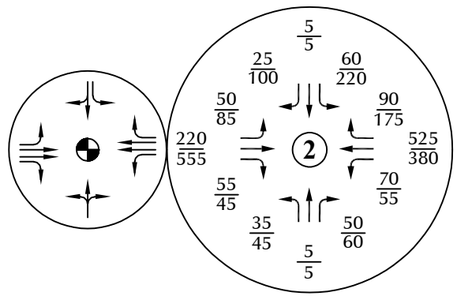
Notes:
1. An annual growth rate of 1.36% was assumed on SH 83 (Parker Road) based on the CDOT 20-year factor of 1.31 from the attached Straight Line Diagram.
2. An annual growth rate of 1.5% was assumed on Scott Avenue. The growth on Pinery Parkway from Intersections #1 to #3 assumes one half development of the Pinery West project proposed to the north.

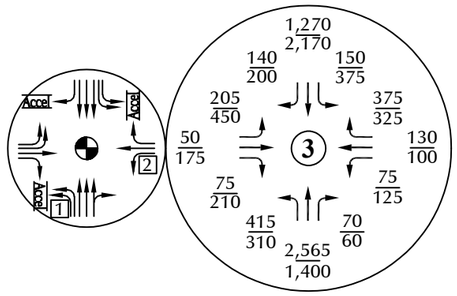
Figure 4

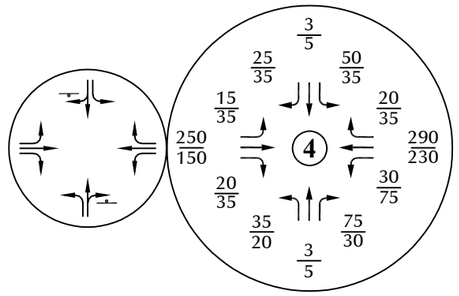
Year 2028 Background Traffic, Lane Geometry and Traffic Control

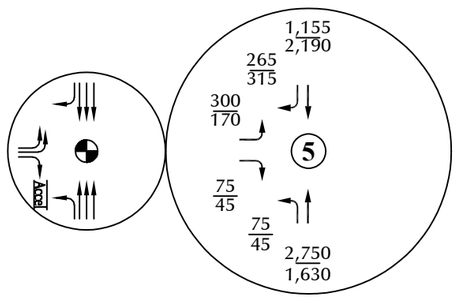
Pinery Meadows (LSC #210872)

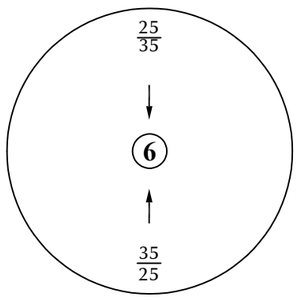


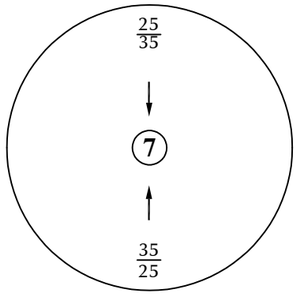












Recommended Improvements:
1 NB LT = Add second lane by Pinery west (by Pinery West).
2 WB LT = Add lane to mitigate impact of Pinery West and growth in background traffic (by Pinery West).

LEGEND:
= Stop Sign
= Traffic Signal
26/35 = AM Peak Hour Traffic / PM Peak Hour Traffic
1,000 = Average Daily Traffic

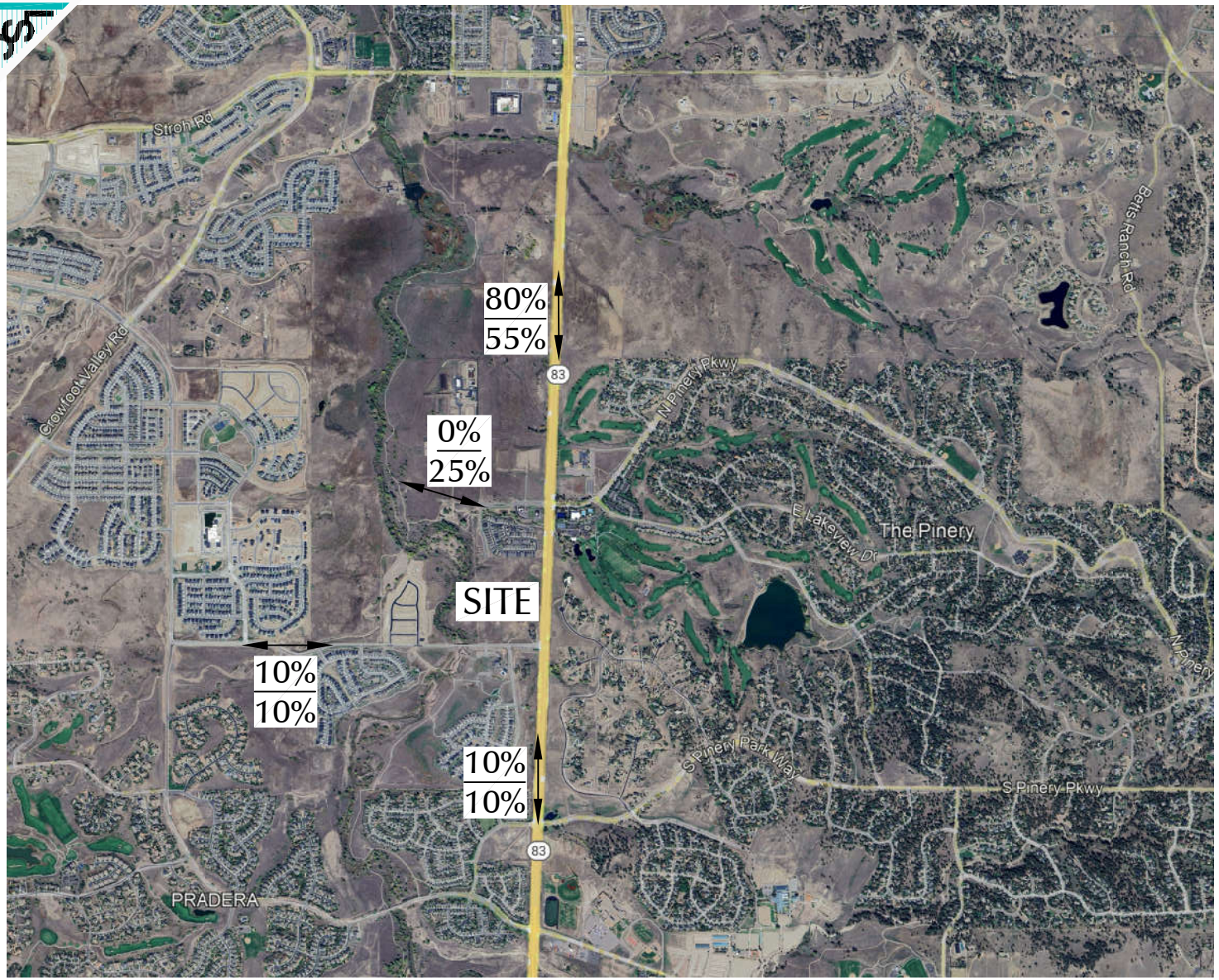
Approximate Scale
Scale: 1"=600'



Figure 5

Year 2045 Background Traffic, Lane Geometry and Traffic Control

Pinery Meadows (LSC #210872)



N

Approximate Scale
Scale: 1"=3,000'

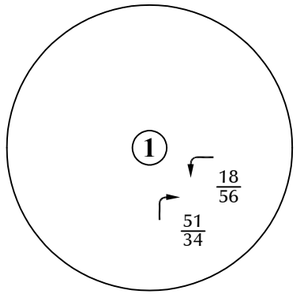
LEGEND:

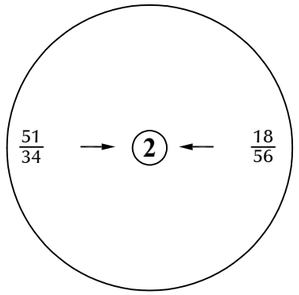
5% / 5% = Year 2028 Percent Directional Distribution / Year 2045 Percent Directional Distribution

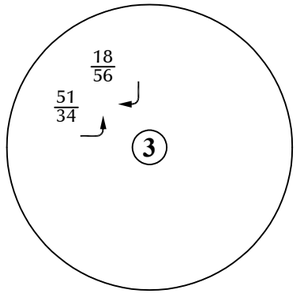
Figure 6

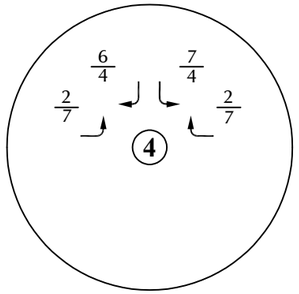
Directional Distribution of Site-Generated Traffic

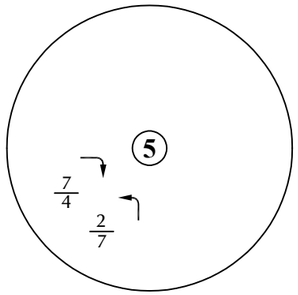
Pinery Meadows (LSC #210872)

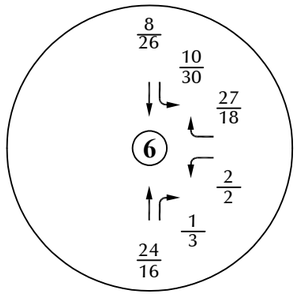


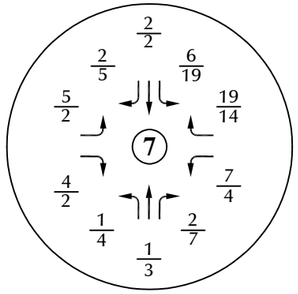












LEGEND:

$\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$

1,000 = Average Daily Traffic

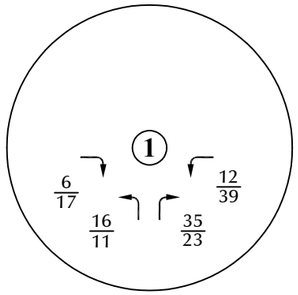
Approximate Scale
Scale: 1"=600'

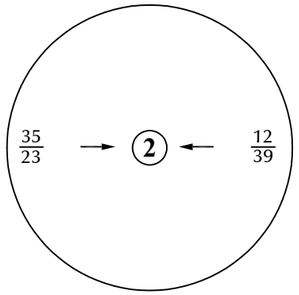


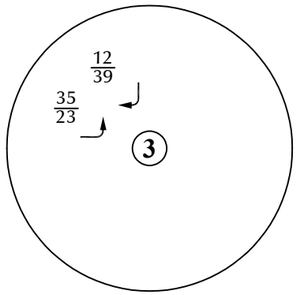
Figure 7a

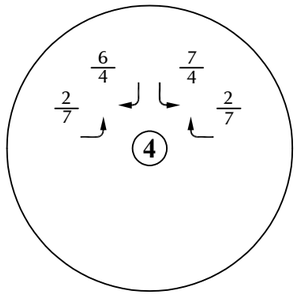
Year 2028 Assignment of Site-Generated Traffic

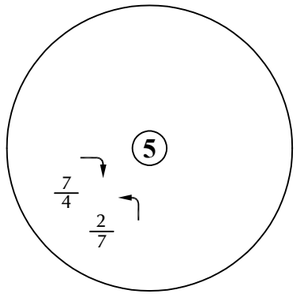
Pinery Meadows (LSC #210872)

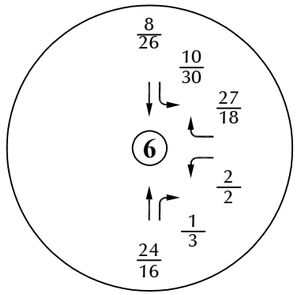


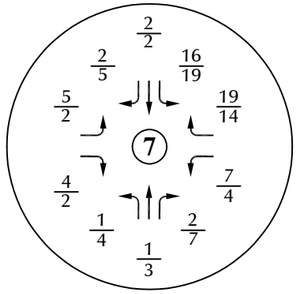












LEGEND:

$\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic

1,000 = Average Daily Traffic

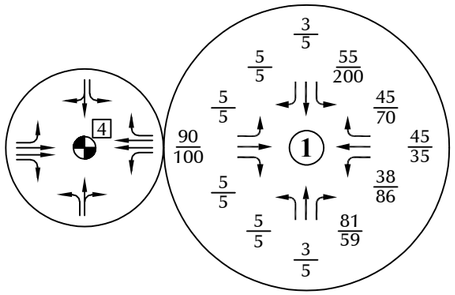
Approximate Scale
Scale: 1"=600'

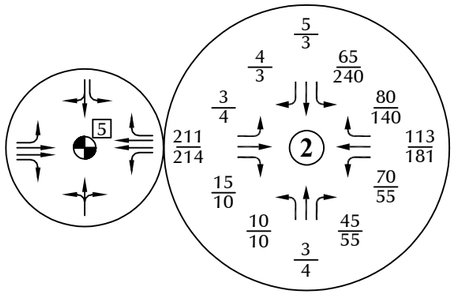


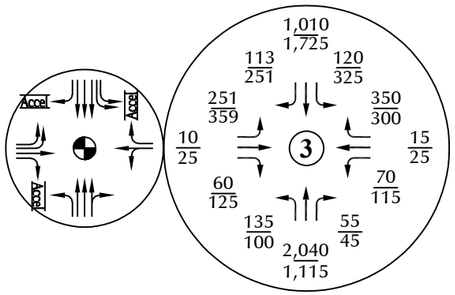
Figure 7b

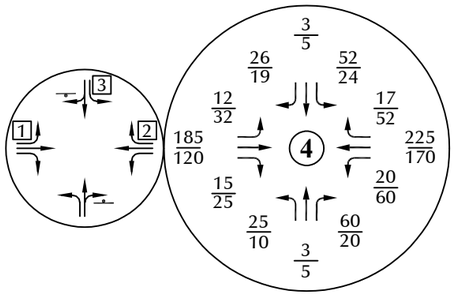
Year 2045 Assignment of Site-Generated Traffic

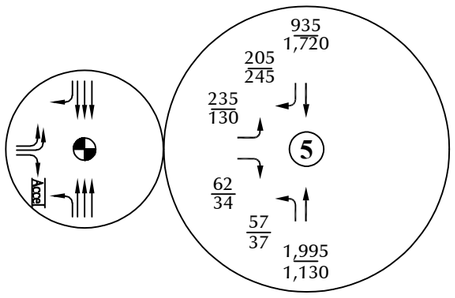
Pinery Meadows (LSC #210872)

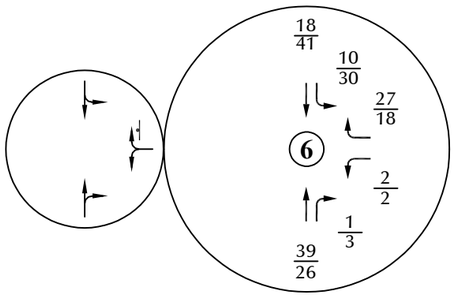


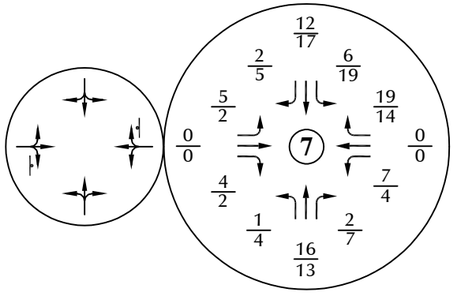












Recommended Improvements:

1 EB LT = 180' + 95-foot transition taper & 15:1 redirect taper.
2 WB RT = 155' + 95-foot transition taper.
3 SB LT = 100' + 95-foot transition taper.
4 Future traffic signal warranted by Pinery Meadows to the north.
5 Future traffic signal warranted by Pinery Meadows to the north.

LEGEND:

= Stop Sign
= Traffic Signal
26/35 = AM Peak Hour Traffic / PM Peak Hour Traffic
1,000 = Average Daily Traffic

Approximate Scale
Scale: 1"=600'

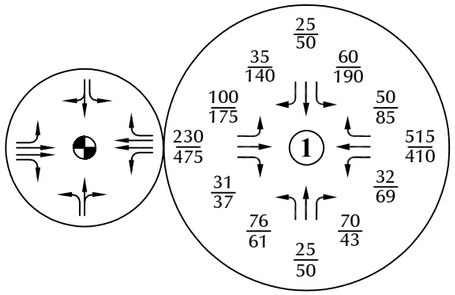


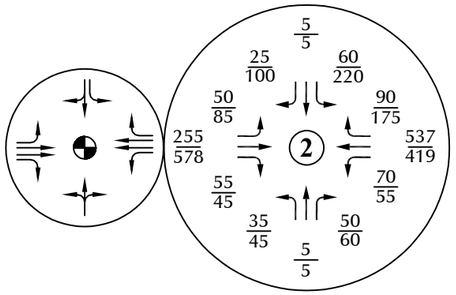
Note: These volumes are the sum of the volumes in Figures 4 and 7a.

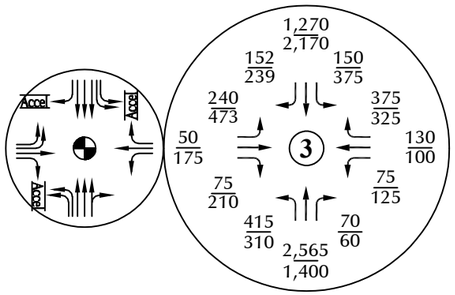
Figure 8

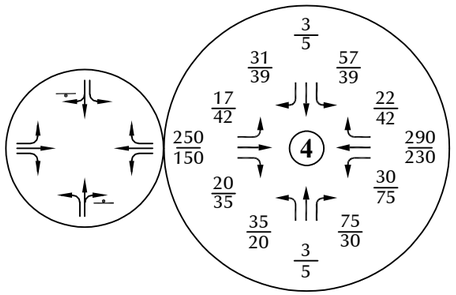
Year 2028 Total Traffic, Lane Geometry and Traffic Control

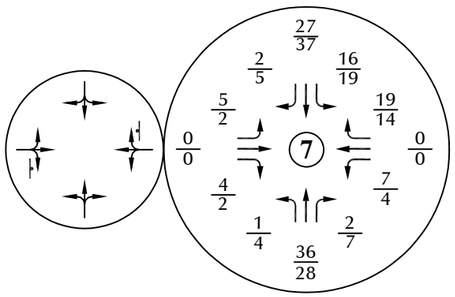
Pinery Meadows (LSC #210872)











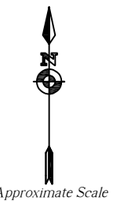
LEGEND:

= Stop Sign

= Traffic Signal

26/35 = AM Peak Hour Traffic / PM Peak Hour Traffic

1,000 = Average Daily Traffic



Approximate Scale
Scale: 1"=600'



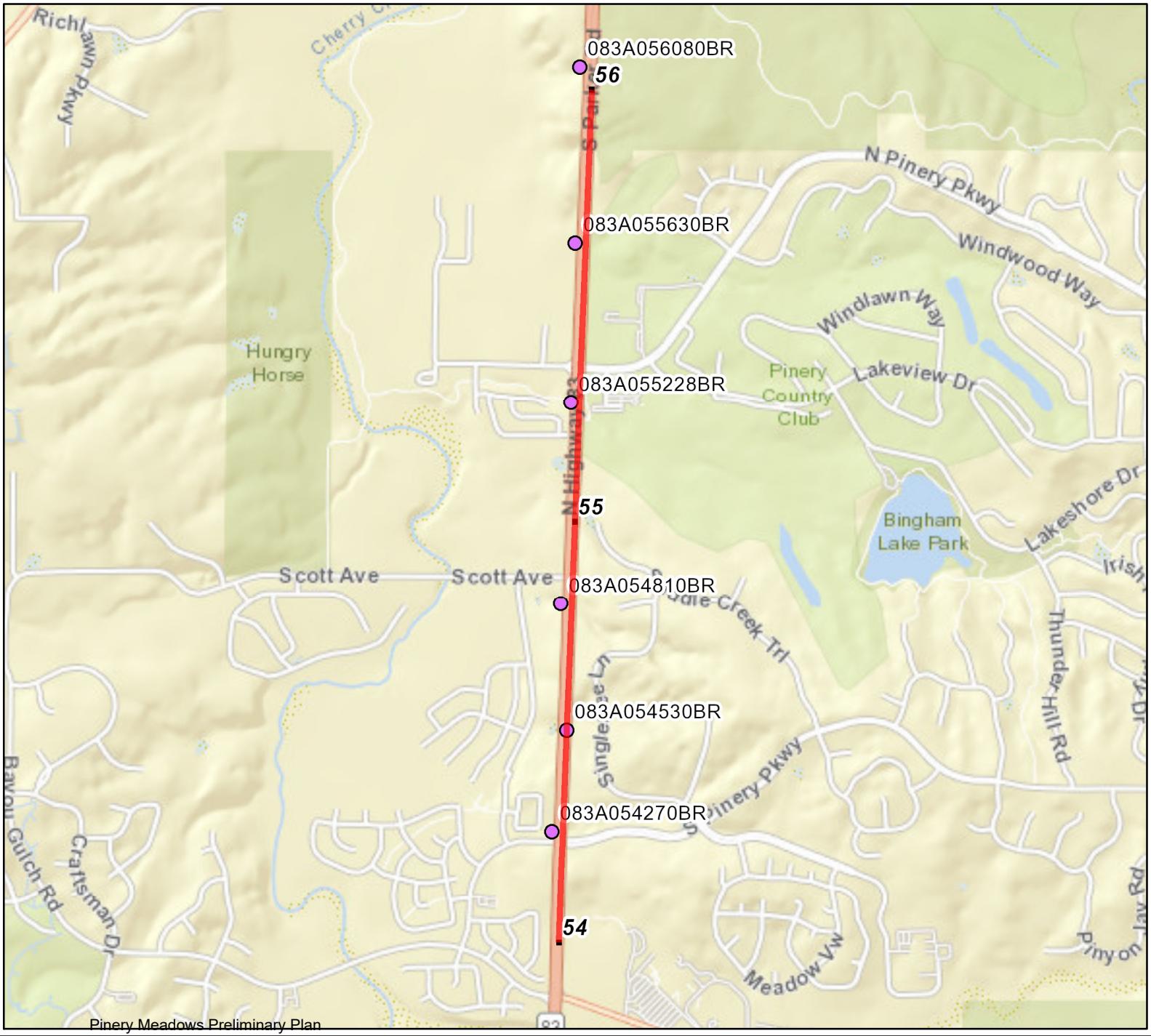
Note: These volumes are the sum of the volumes in Figures 5 and 7b.

Figure 9

Year 2045 Total Traffic, Lane Geometry and Traffic Control

Pinery Meadows (LSC #210872)

Route 083A From 54 to 56



Legend

- Route
- Milepoint

Structures

- Major Structure
- Minor Structure

Created:

Date: 2/15/2025

Time: 10:07:30 AM

0 0.15 0.3 0.45 0.6

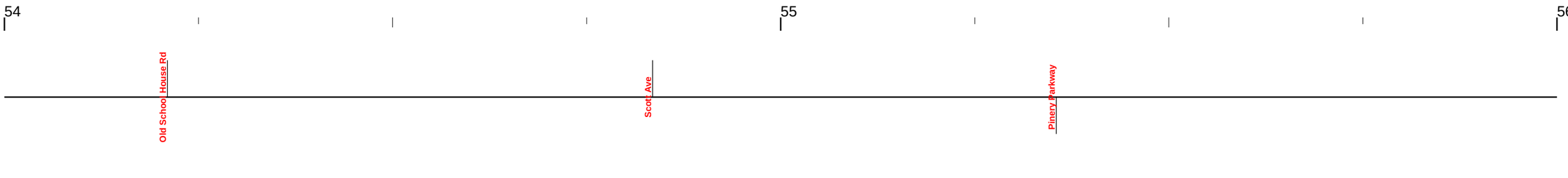
Miles

N W E S

The information contained in this map is based on the most currently available data and has been checked for accuracy. CDOT does not guarantee the accuracy of any information presented, is not liable in any respect for any errors or omissions, and is not responsible for determining "fitness for use".

Route 083A
From 54 To 56

Ramps
Overpass
Underpass
Structures



CLASSIFICATION

Access Control	NR-A: Non-Rural Principal Highway

SAFETY

Primary Speed Limit	55

TRAFFIC

AADT	20000	29000	33000
Design Hour Truck Percentage	0.10		
DHV	9.5	10.0	11.0
Off Peak Truck Percentage	4.60		4.00
Route Capacity	4250	6350	6400
V/C Ratio	0.53	0.50	0.61
V/C Ratio 20	0.67	0.66	0.74
VMT	7280	32596	49764
Year 20 Factor	1.26	1.31	1.22

It may appear that information is missing from the straight line diagram. If so, reduce the number of miles/page and re-submit the request.

COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: HWY 83
E/W STREET: NORTH PINERY PKWY
CITY: PARKER
COUNTY: DOUGLAS

File Name : HWY 83 PINERY NORTH
Site Code : 00000005
Start Date : 2/6/2025
Page No : 1

Groups Printed- Unshifted

	HWY 83 SOUTHBOUND				N. PINERY PKWY WESTBOUND				HWY 83 NORTHBOUND				N. PINERY PKWY EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	10	115	2	0	4	0	62	0	1	229	5	0	2	0	2	0	432
06:45 AM	14	188	6	0	12	0	67	0	2	334	3	0	2	0	1	0	629
Total	24	303	8	0	16	0	129	0	3	563	8	0	4	0	3	0	1061
07:00 AM	16	205	0	0	25	0	73	0	1	409	9	0	3	1	2	0	744
07:15 AM	13	266	1	0	17	2	96	0	1	547	5	0	6	0	1	0	955
07:30 AM	28	190	4	0	11	1	85	0	1	493	12	0	1	1	1	0	828
07:45 AM	41	187	3	0	13	3	82	0	2	346	25	1	6	0	0	0	709
Total	98	848	8	0	66	6	336	0	5	1795	51	1	16	2	4	0	3236
08:00 AM	37	226	7	0	13	0	78	4	0	310	12	0	2	0	0	0	689
08:15 AM	41	185	1	0	8	2	63	0	2	292	14	0	5	0	0	0	613
Total	78	411	8	0	21	2	141	4	2	602	26	0	7	0	0	0	1302
04:00 PM	76	379	2	0	74	1	120	0	1	257	8	0	2	1	0	0	921
04:15 PM	77	376	8	0	14	0	57	0	1	239	5	0	4	2	2	0	785
04:30 PM	66	395	8	0	12	2	58	0	1	245	14	0	5	2	0	0	808
04:45 PM	90	384	3	0	14	1	56	0	0	249	11	0	7	1	1	0	817
Total	309	1534	21	0	114	4	291	0	3	990	38	0	18	6	3	0	3331
05:00 PM	67	385	4	0	22	2	59	0	2	274	17	0	11	5	0	0	848
05:15 PM	83	393	5	0	9	0	50	0	1	249	14	0	1	2	0	0	807
05:30 PM	72	434	8	0	16	0	46	0	0	273	6	0	3	0	0	0	858
05:45 PM	87	354	5	0	15	0	42	0	0	159	13	0	2	2	0	0	679
Total	309	1566	22	0	62	2	197	0	3	955	50	0	17	9	0	0	3192
Grand Total	818	4662	67	0	279	14	1094	4	16	4905	173	1	62	17	10	0	12122
Apprch %	14.7	84	1.2	0	20.1	1	78.6	0.3	0.3	96.3	3.4	0	69.7	19.1	11.2	0	
Total %	6.7	38.5	0.6	0	2.3	0.1	9	0	0.1	40.5	1.4	0	0.5	0.1	0.1	0	

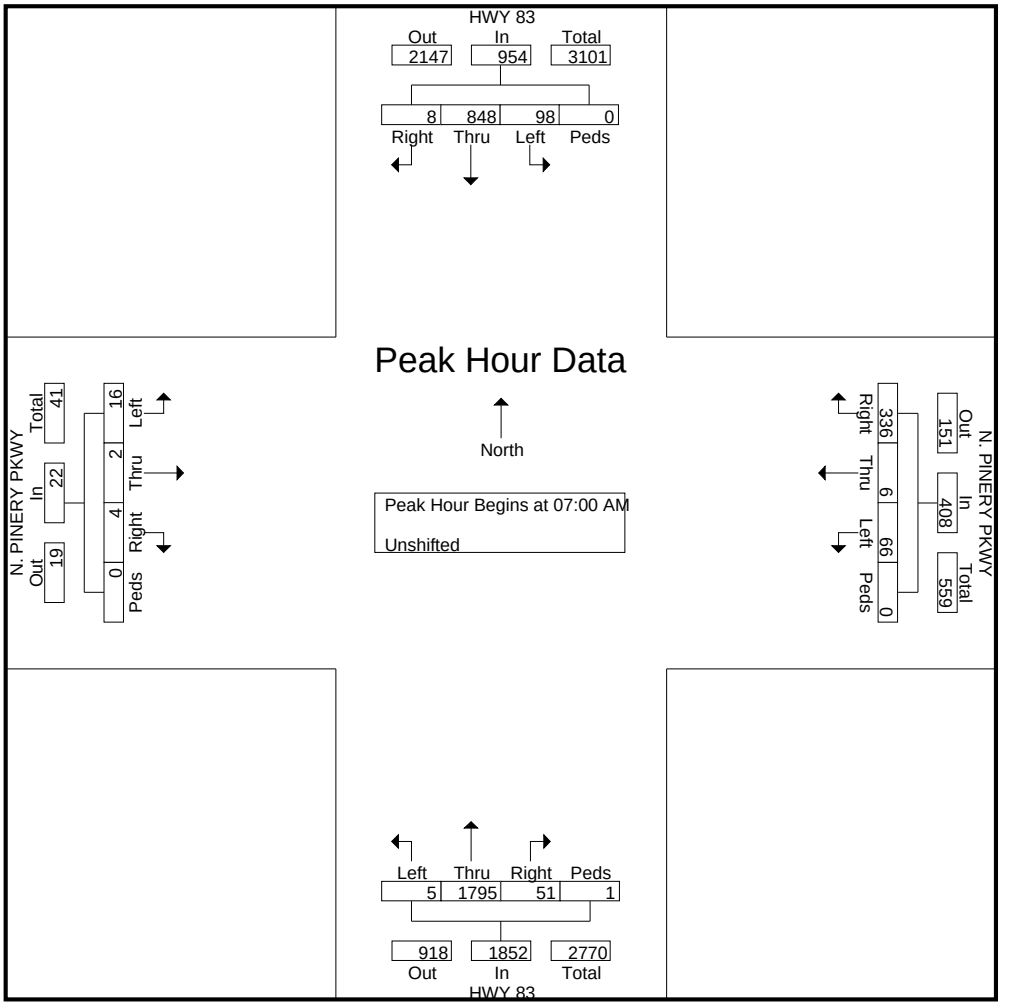
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: HWY 83
E/W STREET: NORTH PINERY PKWY
CITY: PARKER
COUNTY: DOUGLAS

File Name : HWY 83 PINERY NORTH
Site Code : 00000005
Start Date : 2/6/2025
Page No : 2

	HWY 83 SOUTHBOUND					N. PINERY PKWY WESTBOUND					HWY 83 NORTHBOUND					N. PINERY PKWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	16	205	0	0	221	**25**	0	73	0	98	1	409	9	0	419	3	**1**	**2**	0	6	744
07:15 AM	13	**266**	1	0	**280**	17	2	**96**	0	**115**	1	**547**	5	0	**553**	**6**	0	1	0	**7**	**955**
07:30 AM	28	190	**4**	0	222	11	1	85	0	97	1	493	12	0	506	1	1	1	0	3	828
07:45 AM	**41**	187	3	0	231	13	**3**	82	0	98	**2**	346	**25**	**1**	374	6	0	0	0	6	709
Total Volume	98	848	8	0	954	66	6	336	0	408	5	1795	51	1	1852	16	2	4	0	22	3236
% App. Total	10.3	88.9	0.8	0		16.2	1.5	82.4	0		0.3	96.9	2.8	0.1		72.7	9.1	18.2	0		
PHF	.598	.797	.500	.000	.852	.660	.500	.875	.000	.887	.625	.820	.510	.250	.837	.667	.500	.500	.000	.786	.847



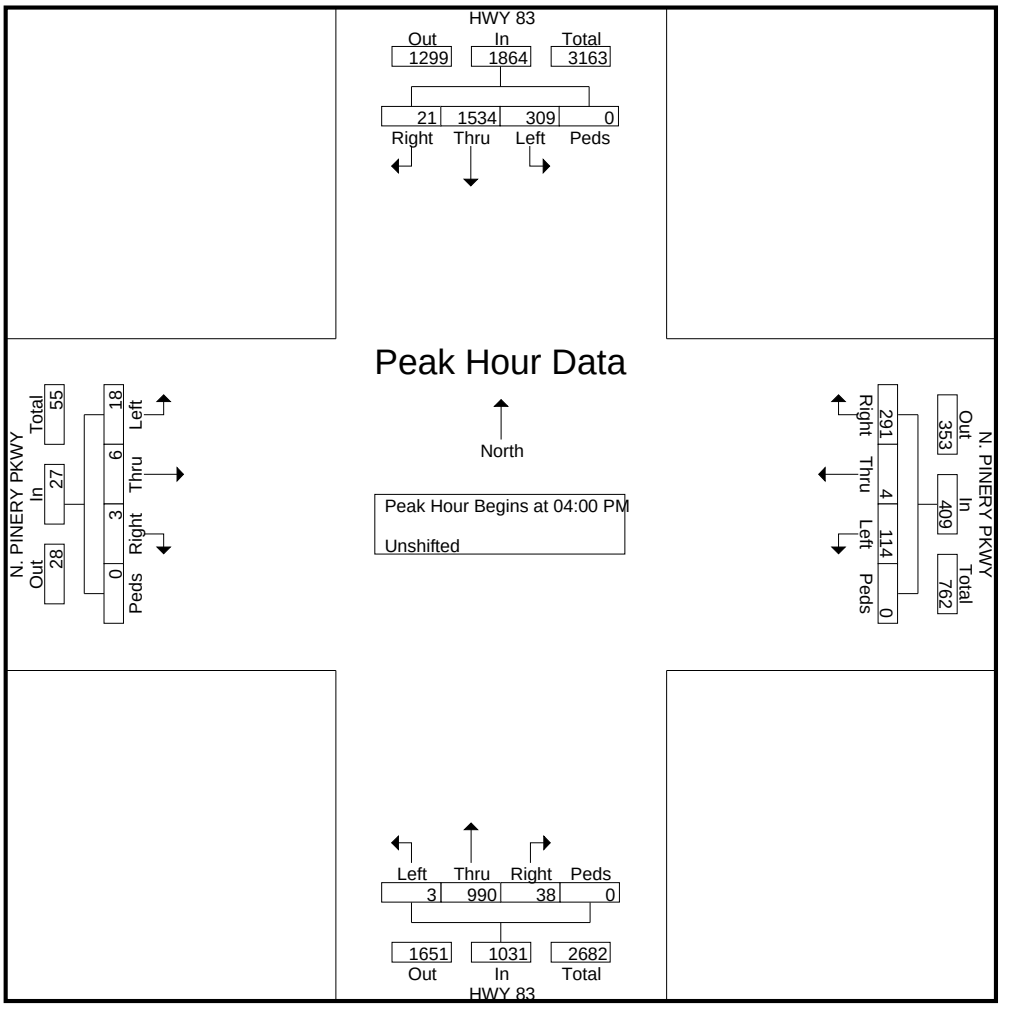
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: HWY 83
E/W STREET: NORTH PINERY PKWY
CITY: PARKER
COUNTY: DOUGLAS

File Name : HWY 83 PINERY NORTH
Site Code : 00000005
Start Date : 2/6/2025
Page No : 3

	HWY 83 SOUTHBOUND					N. PINERY PKWY WESTBOUND					HWY 83 NORTHBOUND					N. PINERY PKWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	76	379	2	0	457	**74**	1	**120**	0	**195**	**1**	**257**	8	0	**266**	2	1	0	0	3	**921**
04:15 PM	77	376	**8**	0	461	14	0	57	0	71	1	239	5	0	245	4	**2**	**2**	0	8	785
04:30 PM	66	**395**	8	0	469	12	**2**	58	0	72	1	245	**14**	0	260	5	2	0	0	7	808
04:45 PM	**90**	384	3	0	**477**	14	1	56	0	71	0	249	11	0	260	**7**	1	1	0	**9**	817
Total Volume	309	1534	21	0	1864	114	4	291	0	409	3	990	38	0	1031	18	6	3	0	27	3331
% App. Total	16.6	82.3	1.1	0		27.9	1	71.1	0		0.3	96	3.7	0		66.7	22.2	11.1	0		
PHF	.858	.971	.656	.000	.977	.385	.500	.606	.000	.524	.750	.963	.679	.000	.969	.643	.750	.375	.000	.750	.904



COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: HWY 83
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : hwy 83 scott ave
Site Code : 00000008
Start Date : 2/6/2025
Page No : 1

Groups Printed- Unshifted

	HWY 83 SOUTHBOUND				NO ACCESS WESTBOUND				HWY 83 NORTHBOUND				SCOTT AVE EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	115	14	1	0	0	0	0	2	225	0	0	22	0	0	0	379
06:45 AM	0	188	23	0	0	0	0	0	0	332	0	0	44	0	12	0	599
Total	0	303	37	1	0	0	0	0	2	557	0	0	66	0	12	0	978
07:00 AM	0	205	28	0	0	0	0	0	7	409	0	0	40	0	12	0	701
07:15 AM	0	266	46	0	0	0	0	0	12	547	0	0	43	0	7	0	921
07:30 AM	0	190	50	0	0	0	0	0	15	493	0	0	64	0	17	1	830
07:45 AM	0	187	60	0	0	0	0	0	17	346	0	0	42	0	8	0	660
Total	0	848	184	0	0	0	0	0	51	1795	0	0	189	0	44	1	3112
08:00 AM	0	226	45	0	0	0	0	0	12	310	0	0	37	0	8	0	638
08:15 AM	0	185	35	0	0	0	0	0	6	292	0	0	32	0	1	0	551
Total	0	411	80	0	0	0	0	0	18	602	0	0	69	0	9	0	1189
04:00 PM	0	386	70	0	0	0	0	0	2	257	0	0	19	0	5	0	739
04:15 PM	0	376	45	0	0	0	0	0	6	239	0	0	27	0	4	0	697
04:30 PM	0	395	40	0	0	0	0	0	2	245	0	0	27	0	4	0	713
04:45 PM	0	384	47	0	0	0	0	0	9	249	0	0	33	0	12	0	734
Total	0	1541	202	0	0	0	0	0	19	990	0	0	106	0	25	0	2883
05:00 PM	0	385	30	0	0	0	0	0	4	274	0	0	32	0	2	0	727
05:15 PM	0	393	46	0	0	0	0	0	4	249	0	0	28	0	6	0	726
05:30 PM	0	434	61	0	0	0	0	0	1	273	0	0	26	0	1	0	796
05:45 PM	0	354	28	0	0	0	0	0	4	159	0	0	35	0	2	0	582
Total	0	1566	165	0	0	0	0	0	13	955	0	0	121	0	11	0	2831
Grand Total	0	4669	668	1	0	0	0	0	103	4899	0	0	551	0	101	1	10993
Apprch %	0	87.5	12.5	0	0	0	0	0	2.1	97.9	0	0	84.4	0	15.5	0.2	
Total %	0	42.5	6.1	0	0	0	0	0	0.9	44.6	0	0	5	0	0.9	0	

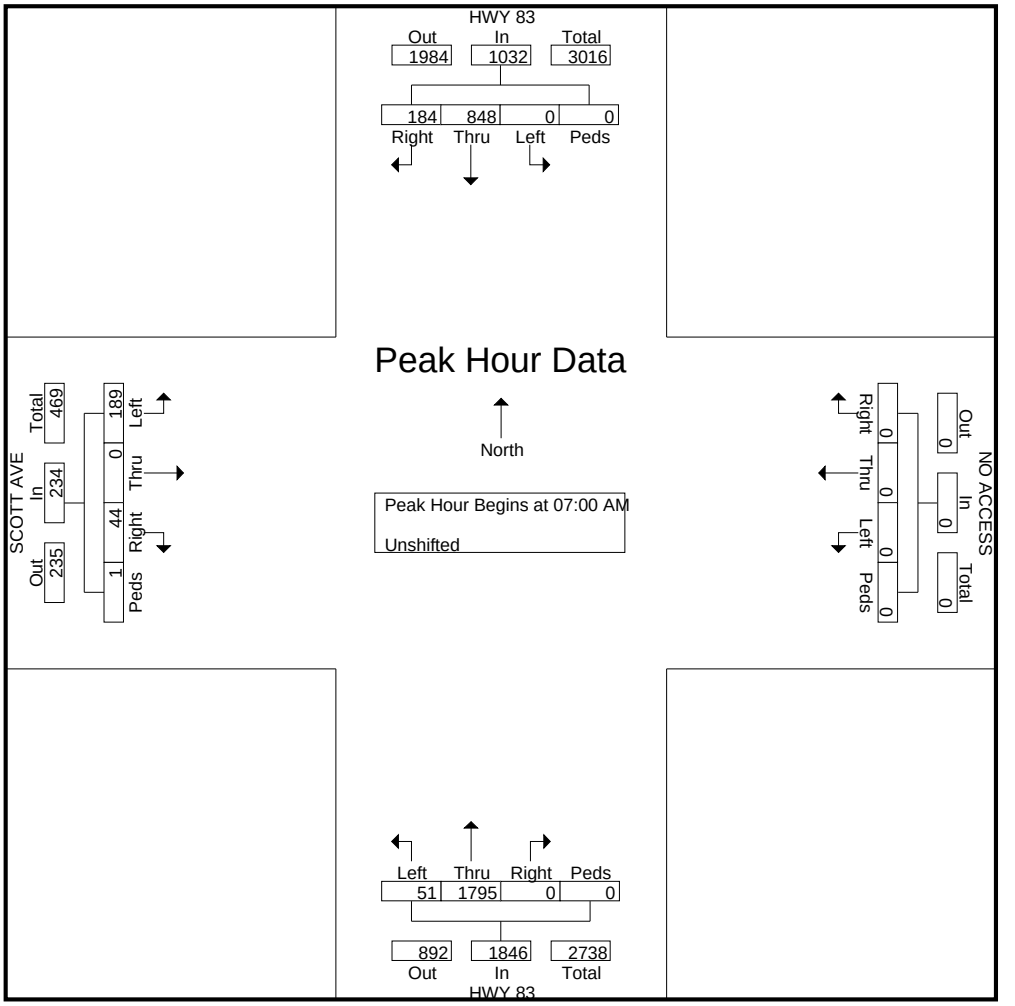
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: HWY 83
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : hwy 83 scott ave
Site Code : 00000008
Start Date : 2/6/2025
Page No : 2

	HWY 83 SOUTHBOUND					NO ACCESS WESTBOUND					HWY 83 NORTHBOUND					SCOTT AVE EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	205	28	0	233	0	0	0	0	0	7	409	0	0	416	40	0	12	0	52	701
07:15 AM	0	**266**	46	0	**312**	0	0	0	0	0	12	**547**	0	0	**559**	43	0	7	0	50	**921**
07:30 AM	0	190	50	0	240	0	0	0	0	0	15	493	0	0	508	**64**	0	**17**	**1**	**82**	830
07:45 AM	0	187	**60**	0	247	0	0	0	0	0	**17**	346	0	0	363	42	0	8	0	50	660
Total Volume	0	848	184	0	1032	0	0	0	0	0	51	1795	0	0	1846	189	0	44	1	234	3112
% App. Total	0	82.2	17.8	0		0	0	0	0		2.8	97.2	0	0		80.8	0	18.8	0.4		
PHF	.000	.797	.767	.000	.827	.000	.000	.000	.000	.000	.750	.820	.000	.000	.826	.738	.000	.647	.250	.713	.845



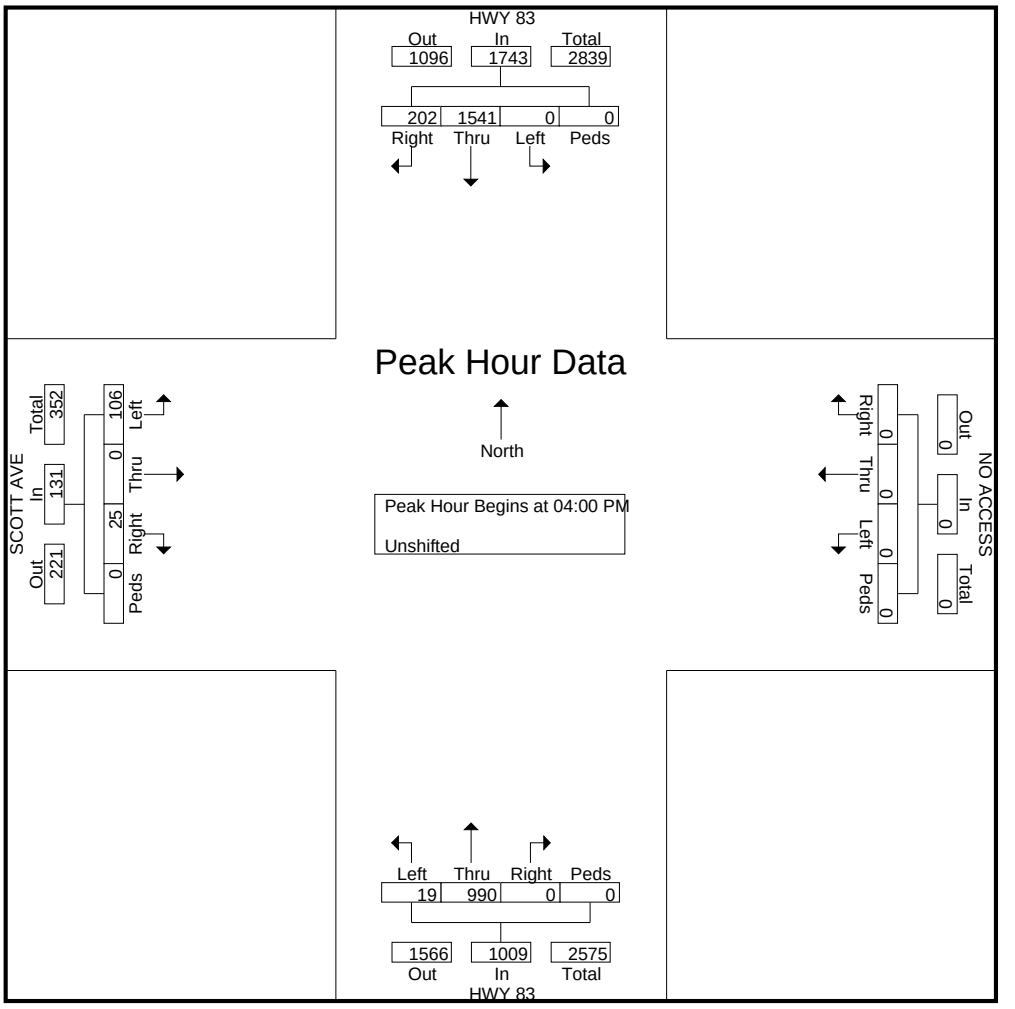
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: HWY 83
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : hwy 83 scott ave
Site Code : 00000008
Start Date : 2/6/2025
Page No : 3

	HWY 83 SOUTHBOUND					NO ACCESS WESTBOUND					HWY 83 NORTHBOUND					SCOTT AVE EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	386	**70**	0	**456**	0	0	0	0	0	2	**257**	0	0	**259**	19	0	5	0	24	**739**
04:15 PM	0	376	45	0	421	0	0	0	0	0	6	239	0	0	245	27	0	4	0	31	697
04:30 PM	0	**395**	40	0	435	0	0	0	0	0	2	245	0	0	247	27	0	4	0	31	713
04:45 PM	0	384	47	0	431	0	0	0	0	0	**9**	249	0	0	258	**33**	0	**12**	0	**45**	734
Total Volume	0	1541	202	0	1743	0	0	0	0	0	19	990	0	0	1009	106	0	25	0	131	2883
% App. Total	0	88.4	11.6	0		0	0	0	0		1.9	98.1	0	0		80.9	0	19.1	0		
PHF	.000	.975	.721	.000	.956	.000	.000	.000	.000	.000	.528	.963	.000	.000	.974	.803	.000	.521	.000	.728	.975



COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: INTERLOCKEN ST
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : INTERLOCKEN ST SCOTT AVE
Site Code : 00000008
Start Date : 2/11/2025
Page No : 1

Groups Printed- Unshifted

	NO ACCESS SOUTHBOUND				SCOTT AVE WESTBOUND				INTERLOCKEN ST NORTHBOUND				SCOTT AVE EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	0	0	0	1	12	0	0	1	0	12	0	0	11	1	0	38
06:45 AM	0	0	0	0	5	25	0	0	1	0	15	0	0	36	9	0	91
Total	0	0	0	0	6	37	0	0	2	0	27	0	0	47	10	0	129
07:00 AM	0	0	0	0	4	25	0	0	3	0	15	0	0	29	0	0	76
07:15 AM	0	0	0	0	3	21	0	0	6	0	14	0	0	36	6	0	86
07:30 AM	0	0	0	0	4	31	0	0	6	0	17	0	0	51	3	0	112
07:45 AM	0	0	0	0	5	19	0	0	3	0	12	0	0	30	0	0	69
Total	0	0	0	0	16	96	0	0	18	0	58	0	0	146	9	0	343
08:00 AM	0	0	0	0	5	31	0	0	1	0	8	0	0	21	1	0	67
08:15 AM	0	0	0	0	2	20	0	0	1	0	10	0	0	17	4	0	54
Total	0	0	0	0	7	51	0	0	2	0	18	0	0	38	5	0	121
04:00 PM	0	0	0	0	15	15	0	0	1	0	4	0	0	9	2	0	46
04:15 PM	0	0	0	0	13	47	0	0	0	0	4	0	0	21	3	0	88
04:30 PM	0	0	0	0	16	34	0	0	2	0	5	0	0	18	1	0	76
04:45 PM	0	0	0	0	14	46	0	0	2	0	4	0	0	22	3	0	91
Total	0	0	0	0	58	142	0	0	5	0	17	0	0	70	9	0	301
05:00 PM	0	0	0	0	17	51	0	0	3	0	3	0	0	23	2	0	99
05:15 PM	0	0	0	0	11	35	0	0	1	0	4	0	0	17	4	0	72
05:30 PM	0	0	0	0	10	31	0	0	0	0	3	0	0	11	3	0	58
05:45 PM	0	0	0	0	10	24	0	0	1	0	2	0	0	9	3	0	49
Total	0	0	0	0	48	141	0	0	5	0	12	0	0	60	12	0	278
Grand Total	0	0	0	0	135	467	0	0	32	0	132	0	0	361	45	0	1172
Apprch %	0	0	0	0	22.4	77.6	0	0	19.5	0	80.5	0	0	88.9	11.1	0	
Total %	0	0	0	0	11.5	39.8	0	0	2.7	0	11.3	0	0	30.8	3.8	0	

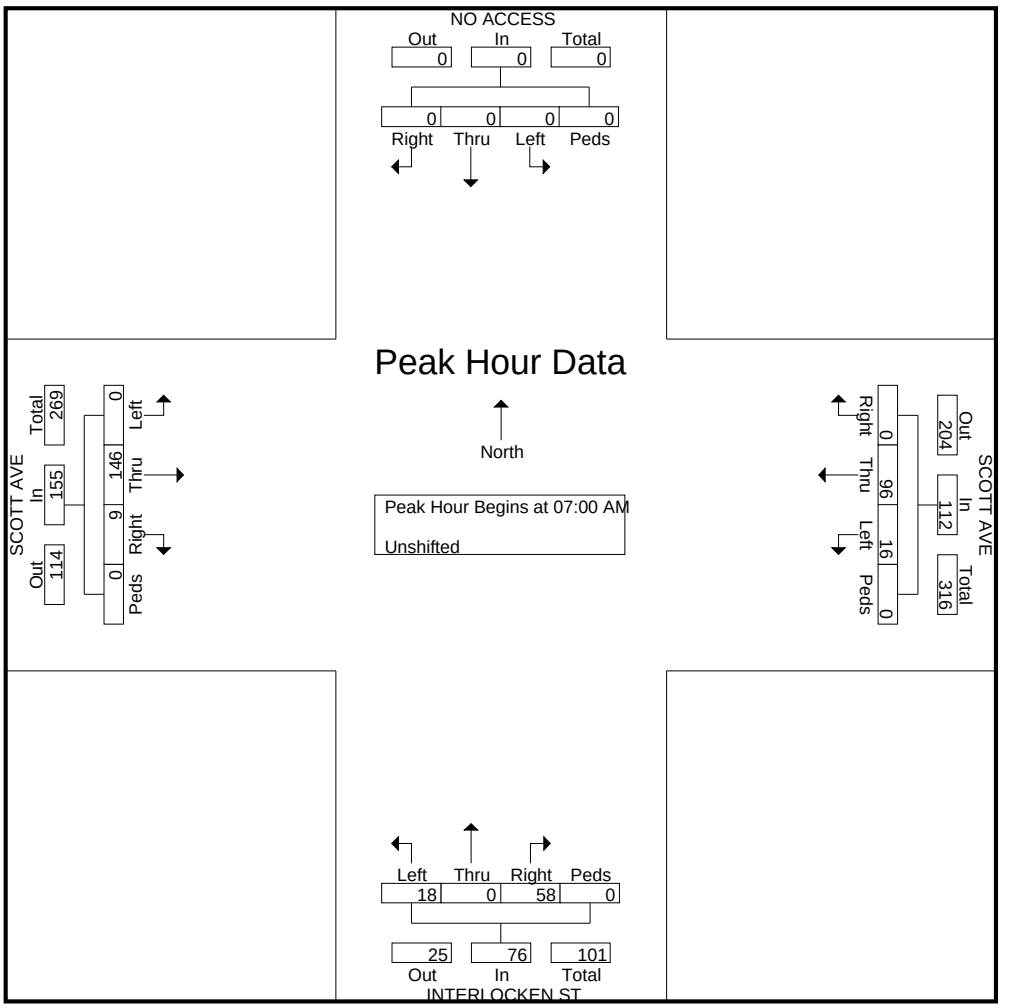
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: INTERLOCKEN ST
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : INTERLOCKEN ST SCOTT AVE
Site Code : 00000008
Start Date : 2/11/2025
Page No : 2

	NO ACCESS SOUTHBOUND					SCOTT AVE WESTBOUND					INTERLOCKEN ST NORTHBOUND					SCOTT AVE EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	4	25	0	0	29	3	0	15	0	18	0	29	0	0	29	76
07:15 AM	0	0	0	0	0	3	21	0	0	24	**6**	0	14	0	20	0	36	**6**	0	42	86
07:30 AM	0	0	0	0	0	4	**31**	0	0	**35**	6	0	**17**	0	**23**	0	**51**	3	0	**54**	**112**
07:45 AM	0	0	0	0	0	**5**	19	0	0	24	3	0	12	0	15	0	30	0	0	30	69
Total Volume	0	0	0	0	0	16	96	0	0	112	18	0	58	0	76	0	146	9	0	155	343
% App. Total	0	0	0	0		14.3	85.7	0	0		23.7	0	76.3	0		0	94.2	5.8	0		
PHF	.000	.000	.000	.000	.000	.800	.774	.000	.000	.800	.750	.000	.853	.000	.826	.000	.716	.375	.000	.718	.766



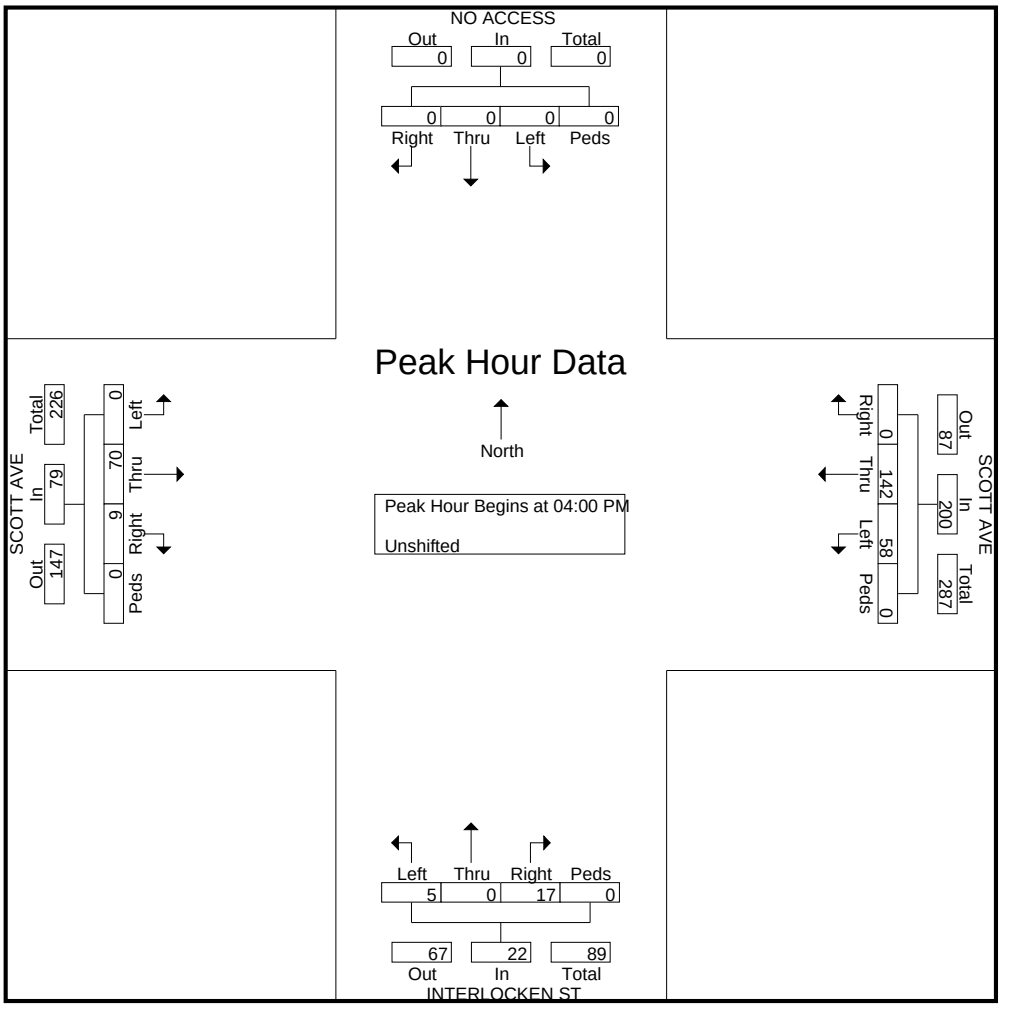
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: INTERLOCKEN ST
E/W STREET: SCOTT AVE
CITY: PARKER
COUNTY: DOUGLAS

File Name : INTERLOCKEN ST SCOTT AVE
Site Code : 00000008
Start Date : 2/11/2025
Page No : 3

	NO ACCESS SOUTHBOUND					SCOTT AVE WESTBOUND					INTERLOCKEN ST NORTHBOUND					SCOTT AVE EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	15	15	0	0	30	1	0	4	0	5	0	9	2	0	11	46
04:15 PM	0	0	0	0	0	13	**47**	0	0	**60**	0	0	4	0	4	0	21	**3**	0	24	88
04:30 PM	0	0	0	0	0	**16**	34	0	0	50	**2**	0	**5**	0	**7**	0	18	1	0	19	76
04:45 PM	0	0	0	0	0	14	46	0	0	60	2	0	4	0	6	0	**22**	3	0	**25**	**91**
Total Volume	0	0	0	0	0	58	142	0	0	200	5	0	17	0	22	0	70	9	0	79	301
% App. Total	0	0	0	0		29	71	0	0		22.7	0	77.3	0		0	88.6	11.4	0		
PHF	.000	.000	.000	.000	.000	.906	.755	.000	.000	.833	.625	.000	.850	.000	.786	.000	.795	.750	.000	.790	.827



COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: REDSTONE BANK
E/W STREET: N. PINERY PKWY
CITY: PARKER
COUNTY: DOUGLAS

File Name : Not Named 1
Site Code : 00000015
Start Date : 2/11/2025
Page No : 1

Groups Printed- Unshifted

	NO ACCESS SOUTHBOUND				N. PINERY PKWY WESTBOUND				REDSTONE BANK LOT NORTHBOUND				N. PINERY PKWY EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:30 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	6	0	0	8
06:45 AM	0	0	0	0	0	5	0	0	0	0	0	0	0	3	0	0	8
Total	0	0	0	0	0	7	0	0	0	0	0	0	0	9	0	0	16
07:00 AM	0	0	0	0	1	5	0	0	0	0	0	0	0	5	0	0	11
07:15 AM	0	0	0	0	1	2	0	0	0	0	0	0	0	5	0	0	8
07:30 AM	0	0	0	0	1	4	0	0	0	0	1	0	0	5	0	0	11
07:45 AM	0	0	0	0	3	3	0	0	0	0	0	0	0	4	0	0	10
Total	0	0	0	0	6	14	0	0	0	0	1	0	0	19	0	0	40
08:00 AM	0	0	0	0	3	3	0	0	0	0	0	0	0	5	0	0	11
08:15 AM	0	0	0	0	2	4	0	0	0	0	0	0	0	3	0	0	9
Total	0	0	0	0	5	7	0	0	0	0	0	0	0	8	0	0	20
04:00 PM	0	0	0	0	2	7	0	0	0	0	1	0	0	3	0	0	13
04:15 PM	0	0	0	0	1	6	0	0	0	0	2	0	0	3	0	0	12
04:30 PM	0	0	0	0	2	8	0	0	0	0	2	0	0	2	0	0	14
04:45 PM	0	0	0	0	3	6	0	0	0	0	3	0	0	3	0	0	15
Total	0	0	0	0	8	27	0	0	0	0	8	0	0	11	0	0	54
05:00 PM	0	0	0	0	2	5	0	0	0	0	2	0	0	2	0	0	11
05:15 PM	0	0	0	0	1	4	0	0	0	0	3	0	0	1	0	0	9
05:30 PM	0	0	0	0	2	6	0	0	0	0	2	0	0	2	0	0	12
05:45 PM	0	0	0	0	1	4	0	0	0	0	1	0	0	3	0	0	9
Total	0	0	0	0	6	19	0	0	0	0	8	0	0	8	0	0	41
Grand Total	0	0	0	0	25	74	0	0	0	0	17	0	0	55	0	0	171
Apprch %	0	0	0	0	25.3	74.7	0	0	0	0	100	0	0	100	0	0	
Total %	0	0	0	0	14.6	43.3	0	0	0	0	9.9	0	0	32.2	0	0	

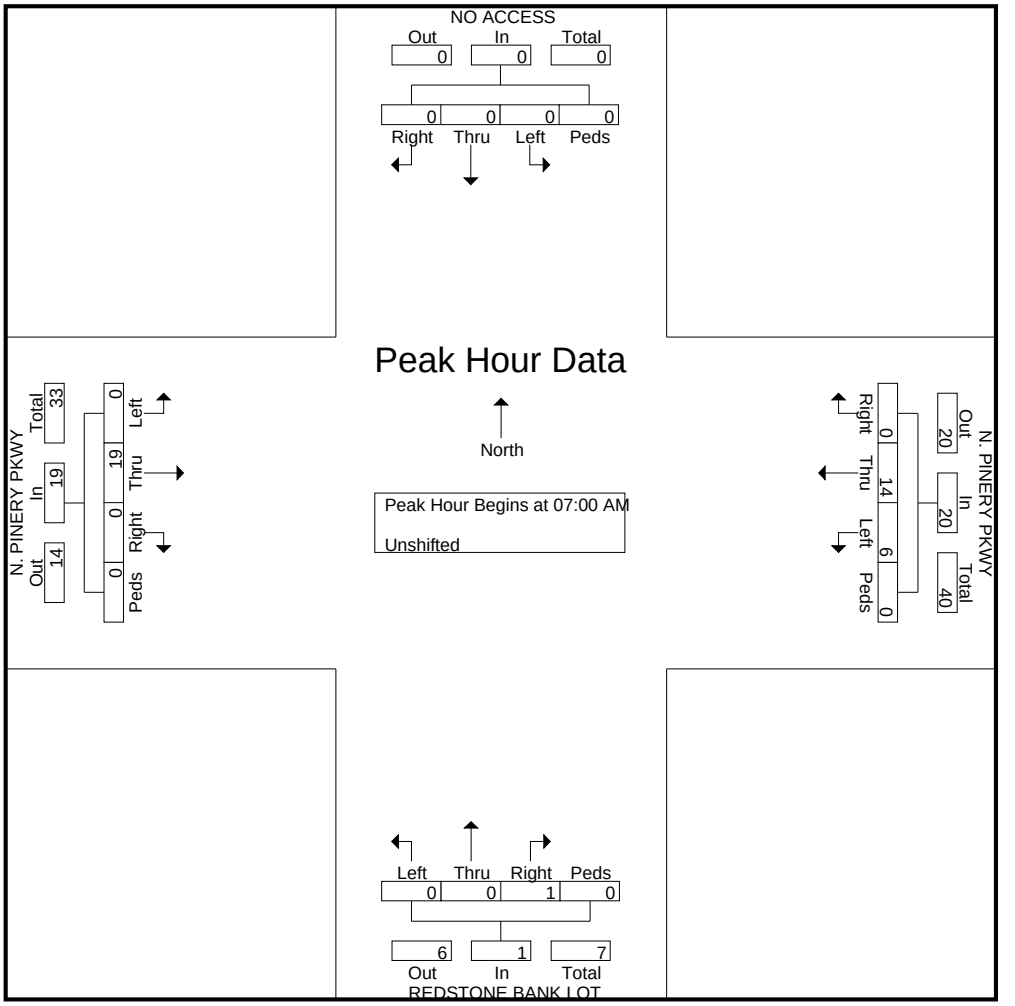
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: REDSTONE BANK
E/W STREET: N. PINERY PKWY
CITY: PARKER
COUNTY: DOUGLAS

File Name : Not Named 1
Site Code : 00000015
Start Date : 2/11/2025
Page No : 2

	NO ACCESS SOUTHBOUND					N. PINERY PKWY WESTBOUND					REDSTONE BANK LOT NORTHBOUND					N. PINERY PKWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	1	**5**	0	0	**6**	0	0	0	0	0	0	**5**	0	0	**5**	**11**
07:15 AM	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	5	0	0	5	8
07:30 AM	0	0	0	0	0	1	4	0	0	5	0	0	**1**	0	**1**	0	5	0	0	5	11
07:45 AM	0	0	0	0	0	**3**	3	0	0	6	0	0	0	0	0	0	4	0	0	4	10
Total Volume	0	0	0	0	0	6	14	0	0	20	0	0	1	0	1	0	19	0	0	19	40
% App. Total	0	0	0	0		30	70	0	0		0	0	100	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.500	.700	.000	.000	.833	.000	.000	.250	.000	.250	.000	.950	.000	.000	.950	.909



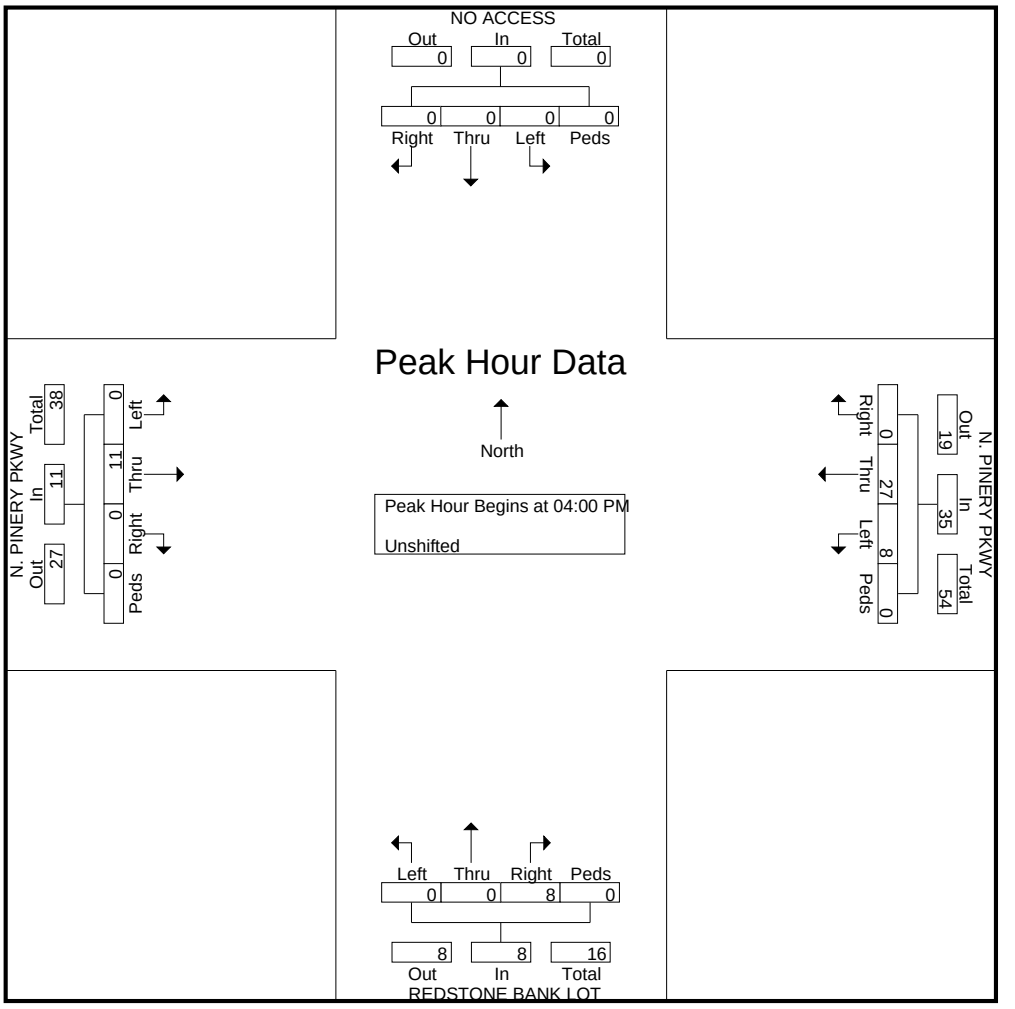
COUNTER MEASURES INC

1889 YORK ST
DENVER COLORADO
303-333-7409

N/S STREET: REDSTONE BANK
E/W STREET: N. PINERY PKWY
CITY: PARKER
COUNTY: DOUGLAS

File Name : Not Named 1
Site Code : 00000015
Start Date : 2/11/2025
Page No : 3

	NO ACCESS SOUTHBOUND					N. PINERY PKWY WESTBOUND					REDSTONE BANK LOT NORTHBOUND					N. PINERY PKWY EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	2	7	0	0	9	0	0	1	0	1	0	**3**	0	0	**3**	13
04:15 PM	0	0	0	0	0	1	6	0	0	7	0	0	2	0	2	0	3	0	0	3	12
04:30 PM	0	0	0	0	0	2	**8**	0	0	**10**	0	0	2	0	2	0	2	0	0	2	14
04:45 PM	0	0	0	0	0	**3**	6	0	0	9	0	0	**3**	0	**3**	0	3	0	0	3	**15**
Total Volume	0	0	0	0	0	8	27	0	0	35	0	0	8	0	8	0	11	0	0	11	54
% App. Total	0	0	0	0		22.9	77.1	0	0		0	0	100	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.667	.844	.000	.000	.875	.000	.000	.667	.000	.667	.000	.917	.000	.000	.917	.900



LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board

SIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

LOS	Average Vehicle Delay sec/vehicle	Operational Characteristics
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

UNSIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

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

LOS	Average Vehicle Control Delay	Operational Characteristics
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. The delay could be up to 15 seconds. 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. 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.
D	25 to 35 seconds	This is the point at which a traffic signal may be warranted for this intersection. 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. There is a high probability that this intersection will meet traffic signal warrants. 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. The only remedy for these long delays is installing a traffic signal or restricting the accesses. 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.

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	21	0	6	13	0	1
Future Vol, veh/h	21	0	6	13	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	85	85	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	0	7	14	0	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	23	0	44	12
Stage 1	-	-	-	-	23	-
Stage 2	-	-	-	-	21	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1591	-	961	1065
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	999	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1591	-	957	1065
Mov Cap-2 Maneuver	-	-	-	-	957	-
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	995	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.3	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1065	-	-	1591	-
HCM Lane V/C Ratio	0.001	-	-	0.004	-
HCM Control Delay (s)	8.4	-	-	7.3	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	2	4	66	6	336	5	1925	51	98	960	8
Future Volume (veh/h)	16	2	4	66	6	336	5	1925	51	98	960	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	19	2	0	78	7	395	6	2265	60	115	1129	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	72	39		274	25	291	43	2884	76	225	3088	
Arrive On Green	0.02	0.02	0.00	0.18	0.17	0.18	0.02	0.56	0.58	0.07	0.60	0.00
Sat Flow, veh/h	3456	1870	1585	1641	147	1585	1781	5115	135	3456	5106	1585
Grp Volume(v), veh/h	19	2	0	85	0	395	6	1505	820	115	1129	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1788	0	1585	1781	1702	1846	1728	1702	1585
Q Serve(g_s), s	0.6	0.1	0.0	4.9	0.0	22.0	0.4	41.5	41.8	3.9	13.5	0.0
Cycle Q Clear(g_c), s	0.6	0.1	0.0	4.9	0.0	22.0	0.4	41.5	41.8	3.9	13.5	0.0
Prop In Lane	1.00		1.00	0.92		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	72	39		298	0	291	43	1919	1041	225	3088	
V/C Ratio(X)	0.26	0.05		0.29	0.00	1.36	0.14	0.78	0.79	0.51	0.37	
Avail Cap(c_a), veh/h	432	234		298	0	291	104	1919	1041	346	3088	
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	57.8	57.6	0.0	42.9	0.0	49.0	57.3	20.5	20.5	54.2	12.0	0.0
Incr Delay (d2), s/veh	1.9	0.5	0.0	0.5	0.0	182.4	1.5	3.3	6.0	1.8	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.1	0.0	2.2	0.0	23.3	0.2	15.1	17.2	1.7	4.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.7	58.1	0.0	43.4	0.0	231.4	58.8	23.8	26.5	56.0	12.4	0.0
LnGrp LOS	E	E		D	A	F	E	C	C	E	B	
Approach Vol, veh/h		21			480			2331			1244	
Approach Delay, s/veh		59.6			198.2			24.8			16.4	
Approach LOS		E			F			C			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.8	74.7		7.5	7.9	79.6		25.0				
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0				
Max Green Setting (Gmax), s	10.0	51.0		15.0	5.0	56.0		20.0				
Max Q Clear Time (g_c+I1), s	5.9	43.8		2.6	2.4	15.5		24.0				
Green Ext Time (p_c), s	0.1	6.2		0.0	0.0	8.4		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		42.8
HCM 6th LOS		D

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	175	9	16	219	0	18	0	58	0	0	0
Future Vol, veh/h	0	175	9	16	219	0	18	0	58	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	227	12	21	284	0	23	0	75	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	284	0	0	239	0	0	553	553	227	597	565	284
Stage 1	-	-	-	-	-	-	227	227	-	326	326	-
Stage 2	-	-	-	-	-	-	326	326	-	271	239	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1278	-	-	1328	-	-	444	441	812	415	434	755
Stage 1	-	-	-	-	-	-	776	716	-	687	648	-
Stage 2	-	-	-	-	-	-	687	648	-	735	708	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1278	-	-	1328	-	-	439	434	812	372	427	755
Mov Cap-2 Maneuver	-	-	-	-	-	-	439	434	-	372	427	-
Stage 1	-	-	-	-	-	-	776	716	-	687	638	-
Stage 2	-	-	-	-	-	-	676	638	-	667	708	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	10.8	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	439	812	1278	-	-	1328	-	-	-	-
HCM Lane V/C Ratio	0.053	0.093	-	-	-	0.016	-	-	-	-
HCM Control Delay (s)	13.7	9.9	0	-	-	7.8	-	-	0	0
HCM Lane LOS	B	A	A	-	-	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.3	0	-	-	0	-	-	-	-



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	189	44	51	1795	848	184
Future Volume (veh/h)	189	44	51	1795	848	184
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	222	52	60	2112	998	216
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	77	3979	3459	1074
Arrive On Green	0.12	0.12	0.04	0.78	0.68	0.68
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	222	52	60	2112	998	216
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	7.2	3.6	4.0	18.7	9.4	6.1
Cycle Q Clear(g_c), s	7.2	3.6	4.0	18.7	9.4	6.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	77	3979	3459	1074
V/C Ratio(X)	0.51	0.26	0.78	0.53	0.29	0.20
Avail Cap(c_a), veh/h	590	271	119	3979	3459	1074
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	49.1	47.5	56.8	5.0	7.8	7.2
Incr Delay (d2), s/veh	0.9	0.7	15.7	0.5	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	3.3	2.1	4.2	2.9	9.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	50.0	48.2	72.6	5.5	8.0	7.6
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	274			2172	1214	
Approach Delay, s/veh	49.7			7.4	7.9	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.5		19.5	12.2	88.3
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		20.7		9.2	6.0	11.4
Green Ext Time (p_c), s		27.0		0.7	0.0	8.4

Intersection Summary	
HCM 6th Ctrl Delay	10.7
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	19	0	8	20	0	8
Future Vol, veh/h	19	0	8	20	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	85	85	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	0	9	22	0	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	21	0	50	11
Stage 1	-	-	-	-	21	-
Stage 2	-	-	-	-	29	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1593	-	953	1067
Stage 1	-	-	-	-	999	-
Stage 2	-	-	-	-	990	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1593	-	947	1067
Mov Cap-2 Maneuver	-	-	-	-	947	-
Stage 1	-	-	-	-	999	-
Stage 2	-	-	-	-	984	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.1	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1067	-	-	1593	-
HCM Lane V/C Ratio	0.008	-	-	0.006	-
HCM Control Delay (s)	8.4	-	-	7.3	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	6	4	114	4	291	3	1050	38	309	1625	21
Future Volume (veh/h)	18	6	4	114	4	291	3	1050	38	309	1625	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	20	7	0	125	4	320	3	1154	42	340	1786	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	170	108		286	9	288	162	2467	90	400	2977	
Arrive On Green	0.05	0.06	0.00	0.18	0.17	0.18	0.00	0.49	0.50	0.12	0.58	0.00
Sat Flow, veh/h	3456	1870	1585	1729	55	1585	1781	5057	184	3456	5106	1585
Grp Volume(v), veh/h	20	7	0	129	0	320	3	777	419	340	1786	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1784	0	1585	1781	1702	1837	1728	1702	1585
Q Serve(g_s), s	0.7	0.4	0.0	7.8	0.0	22.0	0.1	18.3	18.3	11.7	27.1	0.0
Cycle Q Clear(g_c), s	0.7	0.4	0.0	7.8	0.0	22.0	0.1	18.3	18.3	11.7	27.1	0.0
Prop In Lane	1.00		1.00	0.97		1.00	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	170	108		295	0	288	162	1661	896	400	2977	
V/C Ratio(X)	0.12	0.07		0.44	0.00	1.11	0.02	0.47	0.47	0.85	0.60	
Avail Cap(c_a), veh/h	600	340		295	0	288	317	1661	896	400	2977	
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	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	55.0	53.9	0.0	44.5	0.0	49.5	16.7	20.6	20.5	52.5	16.2	0.0
Incr Delay (d2), s/veh	0.3	0.3	0.0	1.0	0.0	86.0	0.0	0.9	1.8	15.8	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.2	0.0	3.5	0.0	15.5	0.0	6.9	7.6	5.7	9.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.3	54.2	0.0	45.6	0.0	135.5	16.7	21.5	22.2	68.3	17.1	0.0
LnGrp LOS	E	D		D	A	F	B	C	C	E	B	
Approach Vol, veh/h		27			449			1199			2126	
Approach Delay, s/veh		55.0			109.6			21.7			25.3	
Approach LOS		E			F			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	19.0	66.0		11.0	7.5	77.6		25.0				
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0				
Max Green Setting (Gmax), s	12.0	44.0		21.0	11.0	45.0		20.0				
Max Q Clear Time (g_c+I1), s	13.7	20.3		2.7	2.1	29.1		24.0				
Green Ext Time (p_c), s	0.0	7.4		0.0	0.0	10.1		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		34.3
HCM 6th LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	114	9	58	163	0	5	0	17	0	0	0
Future Vol, veh/h	0	114	9	58	163	0	5	0	17	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	137	11	70	196	0	6	0	20	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	196	0	0	148	0	0	473	473	137	489	484	196
Stage 1	-	-	-	-	-	-	137	137	-	336	336	-
Stage 2	-	-	-	-	-	-	336	336	-	153	148	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1377	-	-	1434	-	-	501	490	911	489	483	845
Stage 1	-	-	-	-	-	-	866	783	-	678	642	-
Stage 2	-	-	-	-	-	-	678	642	-	849	775	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1377	-	-	1434	-	-	482	466	911	460	459	845
Mov Cap-2 Maneuver	-	-	-	-	-	-	482	466	-	460	459	-
Stage 1	-	-	-	-	-	-	866	783	-	678	611	-
Stage 2	-	-	-	-	-	-	645	611	-	830	775	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2	9.8	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	482	911	1377	-	-	1434	-	-	-	-
HCM Lane V/C Ratio	0.012	0.022	-	-	-	0.049	-	-	-	-
HCM Control Delay (s)	12.6	9	0	-	-	7.6	-	-	0	0
HCM Lane LOS	B	A	A	-	-	A	-	-	A	A
HCM 95th %tile Q(veh)	0	0.1	0	-	-	0.2	-	-	-	-



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	25	19	990	1541	202
Future Volume (veh/h)	106	25	19	990	1541	202
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	108	26	19	1010	1572	206
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	427	196	50	3986	3588	1114
Arrive On Green	0.12	0.12	0.03	0.78	0.70	0.70
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	108	26	19	1010	1572	206
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	3.4	1.8	1.3	6.5	15.9	5.3
Cycle Q Clear(g_c), s	3.4	1.8	1.3	6.5	15.9	5.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	427	196	50	3986	3588	1114
V/C Ratio(X)	0.25	0.13	0.38	0.25	0.44	0.18
Avail Cap(c_a), veh/h	590	271	134	3986	3588	1114
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	47.6	46.9	57.3	3.6	7.7	6.1
Incr Delay (d2), s/veh	0.3	0.3	4.8	0.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.6	0.6	1.4	4.6	9.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	47.9	47.2	62.1	3.8	8.1	6.5
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	134			1029	1778	
Approach Delay, s/veh	47.7			4.8	7.9	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.7		19.3	9.3	91.3
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		8.5		5.4	3.3	17.9
Green Ext Time (p_c), s		7.5		0.3	0.0	16.3

Intersection Summary	
HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

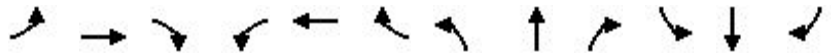
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	90	5	20	45	45	5	3	30	55	3	5
Future Volume (veh/h)	5	90	5	20	45	45	5	3	30	55	3	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	100	6	22	50	50	6	3	33	61	3	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	639	1215	542	646	1283	572	531	34	371	505	140	281
Arrive On Green	0.01	0.34	0.34	0.03	0.36	0.36	0.25	0.25	0.28	0.25	0.25	0.28
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1406	134	1472	1372	557	1113
Grp Volume(v), veh/h	6	100	6	22	50	50	6	0	36	61	0	9
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1406	0	1605	1372	0	1670
Q Serve(g_s), s	0.1	0.8	0.1	0.3	0.4	0.8	0.1	0.0	0.7	1.4	0.0	0.2
Cycle Q Clear(g_c), s	0.1	0.8	0.1	0.3	0.4	0.8	0.3	0.0	0.7	2.1	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.92	1.00		0.67
Lane Grp Cap(c), veh/h	639	1215	542	646	1283	572	531	0	405	505	0	421
V/C Ratio(X)	0.01	0.08	0.01	0.03	0.04	0.09	0.01	0.00	0.09	0.12	0.00	0.02
Avail Cap(c_a), veh/h	939	6996	3120	912	6996	3120	886	0	810	852	0	843
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.4	8.8	8.6	8.0	8.2	8.4	11.2	0.0	11.0	12.1	0.0	10.9
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.0	0.1	0.1	0.2	0.0	0.0	0.2	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	8.9	8.6	8.0	8.2	8.4	11.2	0.0	11.1	12.2	0.0	10.9
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	A	B
Approach Vol, veh/h		112			122			42			70	
Approach Delay, s/veh		8.8			8.3			11.1			12.0	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	18.5		15.0	5.3	19.3		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	2.8		4.1	2.1	2.8		2.7				
Green Ext Time (p_c), s	0.0	0.7		0.1	0.0	0.5		0.1				

Intersection Summary		
HCM 6th Ctrl Delay	9.6	
HCM 6th LOS	A	

Notes

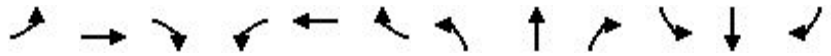
User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	160	15	70	95	80	10	3	45	65	5	4
Future Volume (veh/h)	3	160	15	70	95	80	10	3	45	65	5	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	176	16	77	104	88	11	3	49	71	5	4
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	403	734	327	465	956	427	155	79	515	721	400	320
Arrive On Green	0.00	0.21	0.21	0.07	0.27	0.27	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	163	191	1239	1352	962	770
Grp Volume(v), veh/h	3	176	16	77	104	88	63	0	0	71	0	9
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1594	0	0	1352	0	1732
Q Serve(g_s), s	0.1	2.0	0.4	1.6	1.1	2.1	0.0	0.0	0.0	0.1	0.0	0.1
Cycle Q Clear(g_c), s	0.1	2.0	0.4	1.6	1.1	2.1	1.1	0.0	0.0	1.2	0.0	0.1
Prop In Lane	1.00		1.00	1.00		1.00	0.17		0.78	1.00		0.44
Lane Grp Cap(c), veh/h	403	734	327	465	956	427	750	0	0	721	0	719
V/C Ratio(X)	0.01	0.24	0.05	0.17	0.11	0.21	0.08	0.00	0.00	0.10	0.00	0.01
Avail Cap(c_a), veh/h	654	5756	2567	605	5756	2567	750	0	0	721	0	719
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.0	16.0	15.3	13.3	13.2	13.6	8.6	0.0	0.0	8.6	0.0	8.3
Incr Delay (d2), s/veh	0.0	0.2	0.1	0.2	0.0	0.2	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.7	0.1	0.5	0.4	0.6	0.4	0.0	0.0	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	16.1	15.4	13.5	13.3	13.9	8.8	0.0	0.0	8.8	0.0	8.3
LnGrp LOS	B	B	B	B	B	B	A	A	A	A	A	A
Approach Vol, veh/h		195			269			63			80	
Approach Delay, s/veh		16.0			13.5			8.8			8.8	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.2	14.9		25.0	5.2	18.0		25.0
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0
Max Q Clear Time (g_c+I1), s	3.6	4.0		3.2	2.1	4.1		3.1
Green Ext Time (p_c), s	0.0	1.2		0.2	0.0	1.0		0.2

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	10	60	70	15	350	135	2040	55	120	1010	95
Future Volume (veh/h)	200	10	60	70	15	350	135	2040	55	120	1010	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	230	11	0	80	17	0	155	2345	63	138	1161	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	293	159		119	25		210	2959	79	194	2726	
Arrive On Green	0.08	0.08	0.00	0.10	0.08	0.00	0.12	0.58	0.60	0.06	0.53	0.00
Sat Flow, veh/h	3456	1870	1585	1481	315	1585	1781	5113	137	3456	5106	1585
Grp Volume(v), veh/h	230	11	0	97	0	0	155	1558	850	138	1161	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1796	0	1585	1781	1702	1846	1728	1702	1585
Q Serve(g_s), s	7.8	0.6	0.0	6.3	0.0	0.0	10.1	42.7	43.1	4.7	16.5	0.0
Cycle Q Clear(g_c), s	7.8	0.6	0.0	6.3	0.0	0.0	10.1	42.7	43.1	4.7	16.5	0.0
Prop In Lane	1.00		1.00	0.82		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	293	159		144	0		210	1970	1068	194	2726	
V/C Ratio(X)	0.78	0.07		0.67	0.00		0.74	0.79	0.80	0.71	0.43	
Avail Cap(c_a), veh/h	432	234		299	0		267	1970	1068	288	2726	
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)	0.99	0.99	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.8	50.5	0.0	52.9	0.0	0.0	51.1	19.6	19.7	55.7	16.9	0.0
Incr Delay (d2), s/veh	5.6	0.2	0.0	5.4	0.0	0.0	7.8	3.3	6.1	4.7	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	0.3	0.0	3.0	0.0	0.0	4.8	15.3	17.6	2.1	5.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.4	50.7	0.0	58.3	0.0	0.0	58.9	23.0	25.8	60.4	17.4	0.0
LnGrp LOS	E	D		E	A		E	C	C	E	B	
Approach Vol, veh/h		241			97			2563			1299	
Approach Delay, s/veh		59.0			58.3			26.1			21.9	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	13.7	76.5		15.2	19.1	71.1		14.6
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0
Max Green Setting (Gmax), s	10.0	51.0		15.0	16.0	45.0		20.0
Max Q Clear Time (g_c+I1), s	6.7	45.1		9.8	12.1	18.5		8.3
Green Ext Time (p_c), s	0.1	5.3		0.4	0.1	8.0		0.3

Intersection Summary	
HCM 6th Ctrl Delay	27.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	185	15	20	225	15	25	3	60	45	3	20
Future Vol, veh/h	10	185	15	20	225	15	25	3	60	45	3	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	240	19	26	292	19	32	4	78	58	4	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	311	0	0	259	0	0	635	629	240	661	629	292
Stage 1	-	-	-	-	-	-	266	266	-	344	344	-
Stage 2	-	-	-	-	-	-	369	363	-	317	285	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1249	-	-	1306	-	-	391	399	799	376	399	747
Stage 1	-	-	-	-	-	-	739	689	-	671	637	-
Stage 2	-	-	-	-	-	-	651	625	-	694	676	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1249	-	-	1306	-	-	366	387	799	329	387	747
Mov Cap-2 Maneuver	-	-	-	-	-	-	366	387	-	329	387	-
Stage 1	-	-	-	-	-	-	732	682	-	664	624	-
Stage 2	-	-	-	-	-	-	612	613	-	616	669	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.6	11.9	15.7
HCM LOS			B	C

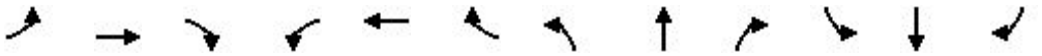
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	366	760	1249	-	-	1306	-	-	329	666
HCM Lane V/C Ratio	0.089	0.108	0.01	-	-	0.02	-	-	0.178	0.045
HCM Control Delay (s)	15.8	10.3	7.9	-	-	7.8	-	-	18.3	10.7
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0.4	0	-	-	0.1	-	-	0.6	0.1



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	235	55	55	1995	935	205
Future Volume (veh/h)	235	55	55	1995	935	205
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	276	65	65	2347	1100	241
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	98	3978	3443	1069
Arrive On Green	0.12	0.12	0.05	0.78	0.67	0.67
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	276	65	65	2347	1100	241
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	9.1	4.5	4.3	22.5	10.7	7.0
Cycle Q Clear(g_c), s	9.1	4.5	4.3	22.5	10.7	7.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	98	3978	3443	1069
V/C Ratio(X)	0.64	0.33	0.66	0.59	0.32	0.23
Avail Cap(c_a), veh/h	590	271	134	3978	3443	1069
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	49.9	47.9	55.6	5.4	8.1	7.5
Incr Delay (d2), s/veh	1.6	1.0	7.5	0.6	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	4.1	2.1	5.1	3.3	10.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	51.5	48.9	63.1	6.1	8.4	8.0
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	341			2412	1341	
Approach Delay, s/veh	51.0			7.6	8.3	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.5		19.5	12.6	87.9
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		24.5		11.1	6.3	12.7
Green Ext Time (p_c), s		32.6		0.8	0.0	9.7

Intersection Summary	
HCM 6th Ctrl Delay	11.4
HCM 6th LOS	B



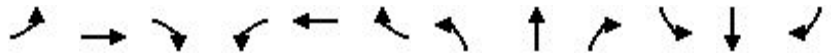
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	100	5	30	35	70	5	5	25	200	5	5
Future Volume (veh/h)	5	100	5	30	35	70	5	5	25	200	5	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	111	6	33	39	78	6	6	28	222	6	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	632	1227	547	659	1334	595	516	71	331	495	212	212
Arrive On Green	0.01	0.35	0.35	0.04	0.38	0.38	0.25	0.25	0.27	0.25	0.25	0.27
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1402	287	1341	1375	858	858
Grp Volume(v), veh/h	6	111	6	33	39	78	6	0	34	222	0	12
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1402	0	1629	1375	0	1716
Q Serve(g_s), s	0.1	0.9	0.1	0.5	0.3	1.3	0.1	0.0	0.6	6.0	0.0	0.2
Cycle Q Clear(g_c), s	0.1	0.9	0.1	0.5	0.3	1.3	0.3	0.0	0.6	6.6	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.82	1.00		0.50
Lane Grp Cap(c), veh/h	632	1227	547	659	1334	595	516	0	402	495	0	423
V/C Ratio(X)	0.01	0.09	0.01	0.05	0.03	0.13	0.01	0.00	0.08	0.45	0.00	0.03
Avail Cap(c_a), veh/h	925	6836	3049	898	6836	3049	862	0	803	834	0	846
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.5	9.0	8.7	7.9	8.0	8.3	11.7	0.0	11.4	14.3	0.0	11.4
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.0	0.1	0.1	0.3	0.0	0.0	0.2	1.6	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.5	9.0	8.7	7.9	8.0	8.4	11.7	0.0	11.5	14.9	0.0	11.4
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	A	B
Approach Vol, veh/h		123			150			40			234	
Approach Delay, s/veh		9.0			8.2			11.5			14.8	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	19.0		15.0	5.3	20.2		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.5	2.9		8.6	2.1	3.3		2.6				
Green Ext Time (p_c), s	0.0	0.8		0.5	0.0	0.5		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		11.4
HCM 6th LOS		B

Notes

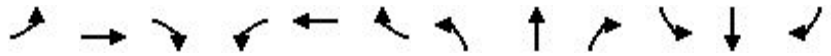
User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	180	10	55	125	140	10	4	55	240	3	3
Future Volume (veh/h)	4	180	10	55	125	140	10	4	55	240	3	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	4	200	11	61	139	156	11	4	61	267	3	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	387	743	331	444	930	415	137	82	538	723	359	359
Arrive On Green	0.01	0.21	0.21	0.06	0.26	0.26	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	121	195	1284	1337	858	858
Grp Volume(v), veh/h	4	200	11	61	139	156	76	0	0	267	0	6
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1600	0	0	1337	0	1716
Q Serve(g_s), s	0.1	2.3	0.3	1.2	1.4	3.8	0.0	0.0	0.0	5.0	0.0	0.1
Cycle Q Clear(g_c), s	0.1	2.3	0.3	1.2	1.4	3.8	1.4	0.0	0.0	6.4	0.0	0.1
Prop In Lane	1.00		1.00	1.00		1.00	0.14		0.80	1.00		0.50
Lane Grp Cap(c), veh/h	387	743	331	444	930	415	756	0	0	723	0	719
V/C Ratio(X)	0.01	0.27	0.03	0.14	0.15	0.38	0.10	0.00	0.00	0.37	0.00	0.01
Avail Cap(c_a), veh/h	639	5803	2589	601	5803	2589	756	0	0	723	0	719
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.8	15.8	15.0	13.3	13.5	14.4	8.5	0.0	0.0	9.8	0.0	8.1
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.1	0.1	0.6	0.3	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.8	0.1	0.4	0.5	1.2	0.4	0.0	0.0	1.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.8	16.0	15.1	13.5	13.6	15.0	8.7	0.0	0.0	11.3	0.0	8.1
LnGrp LOS	B	B	B	B	B	B	A	A	A	B	A	A
Approach Vol, veh/h		215			356			76			273	
Approach Delay, s/veh		15.9			14.2			8.7			11.2	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	15.0		25.0	5.3	17.5		25.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.8	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.2	4.3		8.4	2.1	5.8		3.4				
Green Ext Time (p_c), s	0.0	1.4		0.7	0.0	1.4		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	325	25	125	115	25	300	100	1115	45	325	1725	195
Future Volume (veh/h)	325	25	125	115	25	300	100	1115	45	325	1725	195
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	353	27	0	125	27	0	109	1212	49	353	1875	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	427	231		148	32		135	2409	97	400	2563	
Arrive On Green	0.12	0.12	0.00	0.12	0.10	0.00	0.08	0.48	0.50	0.12	0.50	0.00
Sat Flow, veh/h	3456	1870	1585	1477	319	1585	1781	5034	203	3456	5106	1585
Grp Volume(v), veh/h	353	27	0	152	0	0	109	819	442	353	1875	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1796	0	1585	1781	1702	1834	1728	1702	1585
Q Serve(g_s), s	12.1	1.6	0.0	10.0	0.0	0.0	7.3	20.0	20.0	12.2	35.0	0.0
Cycle Q Clear(g_c), s	12.1	1.6	0.0	10.0	0.0	0.0	7.3	20.0	20.0	12.2	35.0	0.0
Prop In Lane	1.00		1.00	0.82		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	427	231		180	0		135	1629	878	400	2563	
V/C Ratio(X)	0.83	0.12		0.84	0.00		0.81	0.50	0.50	0.88	0.73	
Avail Cap(c_a), veh/h	628	340		223	0		250	1629	878	400	2563	
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)	0.93	0.93	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.8	47.2	0.0	52.7	0.0	0.0	55.0	21.7	21.6	52.7	23.7	0.0
Incr Delay (d2), s/veh	5.5	0.2	0.0	20.8	0.0	0.0	10.7	1.1	2.1	20.1	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.7	0.0	5.5	0.0	0.0	3.5	7.5	8.3	6.2	13.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	47.4	0.0	73.5	0.0	0.0	65.8	22.8	23.6	72.8	25.6	0.0
LnGrp LOS	E	D		E	A		E	C	C	E	C	
Approach Vol, veh/h		380			152			1370			2228	
Approach Delay, s/veh		56.5			73.5			26.5			33.1	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	19.0	64.9		19.9	16.2	67.7		17.1
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0
Max Green Setting (Gmax), s	12.0	48.0		22.0	17.0	43.0		15.0
Max Q Clear Time (g_c+I1), s	14.2	22.0		14.1	9.3	37.0		12.0
Green Ext Time (p_c), s	0.0	8.2		0.9	0.1	4.8		0.2

Intersection Summary	
HCM 6th Ctrl Delay	34.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
Unsignalized Delay for [EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	120	25	60	170	45	10	5	20	20	5	15
Future Vol, veh/h	25	120	25	60	170	45	10	5	20	20	5	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	145	30	72	205	54	12	6	24	24	6	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	259	0	0	175	0	0	593	608	145	584	584	205
Stage 1	-	-	-	-	-	-	205	205	-	349	349	-
Stage 2	-	-	-	-	-	-	388	403	-	235	235	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1306	-	-	1401	-	-	417	410	902	423	423	836
Stage 1	-	-	-	-	-	-	797	732	-	667	633	-
Stage 2	-	-	-	-	-	-	636	600	-	768	710	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1306	-	-	1401	-	-	381	380	902	384	392	836
Mov Cap-2 Maneuver	-	-	-	-	-	-	381	380	-	384	392	-
Stage 1	-	-	-	-	-	-	779	715	-	652	601	-
Stage 2	-	-	-	-	-	-	584	569	-	724	694	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	1.7	11.6	12.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	381	708	1306	-	-	1401	-	-	384	652
HCM Lane V/C Ratio	0.032	0.043	0.023	-	-	0.052	-	-	0.063	0.037
HCM Control Delay (s)	14.8	10.3	7.8	-	-	7.7	-	-	15	10.7
HCM Lane LOS	B	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	0.1	0.1	-	-	0.2	-	-	0.2	0.1



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	130	30	30	1130	1720	245
Future Volume (veh/h)	130	30	30	1130	1720	245
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	133	31	31	1153	1755	250
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	430	197	63	3981	3546	1101
Arrive On Green	0.12	0.12	0.04	0.78	0.69	0.69
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	133	31	31	1153	1755	250
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	4.2	2.1	2.1	7.7	19.2	6.9
Cycle Q Clear(g_c), s	4.2	2.1	2.1	7.7	19.2	6.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	430	197	63	3981	3546	1101
V/C Ratio(X)	0.31	0.16	0.49	0.29	0.49	0.23
Avail Cap(c_a), veh/h	590	271	134	3981	3546	1101
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	47.8	46.9	56.8	3.8	8.5	6.6
Incr Delay (d2), s/veh	0.4	0.4	5.9	0.2	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.0	1.0	1.7	5.7	11.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	48.2	47.3	62.8	3.9	9.0	7.1
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	164			1184	2005	
Approach Delay, s/veh	48.1			5.5	8.8	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.6		19.4	10.2	90.3
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		9.7		6.2	4.1	21.2
Green Ext Time (p_c), s		9.1		0.4	0.0	19.7

Intersection Summary		
HCM 6th Ctrl Delay	9.5	
HCM 6th LOS	A	

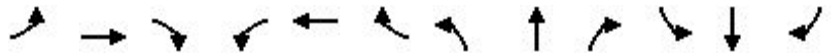
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	90	5	38	45	45	5	3	81	55	3	5
Future Volume (veh/h)	5	90	5	38	45	45	5	3	81	55	3	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	100	6	42	50	50	6	3	90	61	3	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	628	1195	533	669	1332	594	519	13	381	440	137	275
Arrive On Green	0.01	0.34	0.34	0.05	0.37	0.37	0.25	0.25	0.27	0.25	0.25	0.27
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1406	51	1542	1303	557	1113
Grp Volume(v), veh/h	6	100	6	42	50	50	6	0	93	61	0	9
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1406	0	1593	1303	0	1670
Q Serve(g_s), s	0.1	0.8	0.1	0.6	0.4	0.8	0.1	0.0	1.8	1.6	0.0	0.2
Cycle Q Clear(g_c), s	0.1	0.8	0.1	0.6	0.4	0.8	0.3	0.0	1.8	3.4	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.67
Lane Grp Cap(c), veh/h	628	1195	533	669	1332	594	519	0	393	440	0	412
V/C Ratio(X)	0.01	0.08	0.01	0.06	0.04	0.08	0.01	0.00	0.24	0.14	0.00	0.02
Avail Cap(c_a), veh/h	921	6844	3053	894	6844	3053	866	0	787	762	0	825
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.7	9.2	9.0	7.9	8.0	8.2	11.7	0.0	11.8	13.5	0.0	11.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.0	0.2	0.1	0.2	0.0	0.0	0.6	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.7	9.2	9.0	7.9	8.0	8.2	11.7	0.0	12.1	13.7	0.0	11.3
LnGrp LOS	A	A	A	A	A	A	B	A	B	B	A	B
Approach Vol, veh/h		112			142			99			70	
Approach Delay, s/veh		9.2			8.1			12.1			13.4	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	18.6		15.0	5.3	20.2		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.6	2.8		5.4	2.1	2.8		3.8				
Green Ext Time (p_c), s	0.0	0.7		0.1	0.0	0.5		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		10.2
HCM 6th LOS		B

Notes

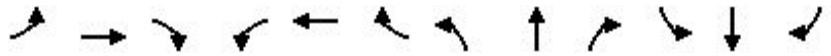
User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	211	15	70	113	80	10	3	45	65	5	4
Future Volume (veh/h)	3	211	15	70	113	80	10	3	45	65	5	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	234	17	78	126	89	11	3	50	72	6	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	398	736	328	440	960	428	153	79	516	720	434	289
Arrive On Green	0.00	0.21	0.21	0.07	0.27	0.27	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	159	190	1245	1351	1047	698
Grp Volume(v), veh/h	3	234	17	78	126	89	64	0	0	72	0	10
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1594	0	0	1351	0	1745
Q Serve(g_s), s	0.1	2.7	0.4	1.6	1.3	2.1	0.0	0.0	0.0	0.1	0.0	0.2
Cycle Q Clear(g_c), s	0.1	2.7	0.4	1.6	1.3	2.1	1.1	0.0	0.0	1.2	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	0.17		0.78	1.00		0.40
Lane Grp Cap(c), veh/h	398	736	328	440	960	428	748	0	0	720	0	724
V/C Ratio(X)	0.01	0.32	0.05	0.18	0.13	0.21	0.09	0.00	0.00	0.10	0.00	0.01
Avail Cap(c_a), veh/h	649	5748	2564	578	5748	2564	748	0	0	720	0	724
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.0	16.2	15.3	13.3	13.3	13.6	8.6	0.0	0.0	8.6	0.0	8.3
Incr Delay (d2), s/veh	0.0	0.2	0.1	0.2	0.1	0.2	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.0	0.1	0.6	0.4	0.7	0.4	0.0	0.0	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	16.5	15.4	13.5	13.4	13.8	8.8	0.0	0.0	8.9	0.0	8.3
LnGrp LOS	B	B	B	B	B	B	A	A	A	A	A	A
Approach Vol, veh/h		254			293			64			82	
Approach Delay, s/veh		16.4			13.6			8.8			8.8	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.2	15.0		25.0	5.2	18.0		25.0
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0
Max Q Clear Time (g_c+I1), s	3.6	4.7		3.2	2.1	4.1		3.1
Green Ext Time (p_c), s	0.0	1.6		0.2	0.0	1.1		0.2

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	251	10	60	70	15	350	135	2040	55	120	1010	113
Future Volume (veh/h)	251	10	60	70	15	350	135	2040	55	120	1010	113
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	289	11	0	80	17	0	155	2345	63	138	1161	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	350	190		119	25		210	2875	77	194	2642	
Arrive On Green	0.10	0.10	0.00	0.10	0.08	0.00	0.12	0.56	0.58	0.06	0.52	0.00
Sat Flow, veh/h	3456	1870	1585	1481	315	1585	1781	5113	137	3456	5106	1585
Grp Volume(v), veh/h	289	11	0	97	0	0	155	1558	850	138	1161	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1796	0	1585	1781	1702	1846	1728	1702	1585
Q Serve(g_s), s	9.8	0.6	0.0	6.3	0.0	0.0	10.1	44.3	44.8	4.7	17.0	0.0
Cycle Q Clear(g_c), s	9.8	0.6	0.0	6.3	0.0	0.0	10.1	44.3	44.8	4.7	17.0	0.0
Prop In Lane	1.00		1.00	0.82		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	350	190		144	0		210	1914	1038	194	2642	
V/C Ratio(X)	0.82	0.06		0.67	0.00		0.74	0.81	0.82	0.71	0.44	
Avail Cap(c_a), veh/h	432	234		299	0		267	1914	1038	288	2642	
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)	0.97	0.97	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	52.9	48.7	0.0	52.9	0.0	0.0	51.1	21.2	21.2	55.7	18.1	0.0
Incr Delay (d2), s/veh	10.0	0.1	0.0	5.4	0.0	0.0	7.8	3.9	7.2	4.7	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.3	0.0	3.0	0.0	0.0	4.8	16.3	18.7	2.1	6.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.9	48.9	0.0	58.3	0.0	0.0	58.9	25.1	28.4	60.4	18.6	0.0
LnGrp LOS	E	D		E	A		E	C	C	E	B	
Approach Vol, veh/h		300			97			2563			1299	
Approach Delay, s/veh		62.4			58.3			28.3			23.1	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.7	74.5		17.2	19.1	69.1		14.6				
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0				
Max Green Setting (Gmax), s	10.0	51.0		15.0	16.0	45.0		20.0				
Max Q Clear Time (g_c+I1), s	6.7	46.8		11.8	12.1	19.0		8.3				
Green Ext Time (p_c), s	0.1	3.8		0.3	0.1	7.9		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	29.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	185	15	20	225	17	25	3	60	52	3	26
Future Vol, veh/h	12	185	15	20	225	17	25	3	60	52	3	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	77	77	77	77	77	77	77	77	77
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	240	19	26	292	22	32	4	78	68	4	34

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	314	0	0	259	0	0	646	638	240	667	635	292
Stage 1	-	-	-	-	-	-	272	272	-	344	344	-
Stage 2	-	-	-	-	-	-	374	366	-	323	291	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1246	-	-	1306	-	-	385	394	799	372	396	747
Stage 1	-	-	-	-	-	-	734	685	-	671	637	-
Stage 2	-	-	-	-	-	-	647	623	-	689	672	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1246	-	-	1306	-	-	356	381	799	325	383	747
Mov Cap-2 Maneuver	-	-	-	-	-	-	356	381	-	325	383	-
Stage 1	-	-	-	-	-	-	724	676	-	662	624	-
Stage 2	-	-	-	-	-	-	602	611	-	610	663	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.6	11.9	16
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	356	759	1246	-	-	1306	-	-	325	680
HCM Lane V/C Ratio	0.091	0.108	0.013	-	-	0.02	-	-	0.208	0.055
HCM Control Delay (s)	16.1	10.3	7.9	-	-	7.8	-	-	19	10.6
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0.4	0	-	-	0.1	-	-	0.8	0.2



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	235	62	57	1995	935	205
Future Volume (veh/h)	235	62	57	1995	935	205
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	276	73	67	2347	1100	241
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	100	3978	3436	1067
Arrive On Green	0.12	0.12	0.06	0.78	0.67	0.67
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	276	73	67	2347	1100	241
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	9.1	5.1	4.4	22.5	10.8	7.0
Cycle Q Clear(g_c), s	9.1	5.1	4.4	22.5	10.8	7.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	100	3978	3436	1067
V/C Ratio(X)	0.64	0.37	0.67	0.59	0.32	0.23
Avail Cap(c_a), veh/h	590	271	134	3978	3436	1067
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	49.9	48.2	55.5	5.4	8.2	7.6
Incr Delay (d2), s/veh	1.6	1.1	7.5	0.6	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	4.6	2.1	5.1	3.3	10.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	51.5	49.3	63.1	6.1	8.4	8.1
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	349			2414	1341	
Approach Delay, s/veh	51.0			7.6	8.4	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.5		19.5	12.8	87.7
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		24.5		11.1	6.4	12.8
Green Ext Time (p_c), s		32.6		0.8	0.0	9.7

Intersection Summary	
HCM 6th Ctrl Delay	11.6
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	27	39	1	10	18
Future Vol, veh/h	2	27	39	1	10	18
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	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	31	44	1	11	20

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	87	45	0	0	45	0
Stage 1	45	-	-	-	-	-
Stage 2	42	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	914	1025	-	-	1563	-
Stage 1	977	-	-	-	-	-
Stage 2	980	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	908	1025	-	-	1563	-
Mov Cap-2 Maneuver	908	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	973	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	2.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1016	1563	-
HCM Lane V/C Ratio	-	-	0.032	0.007	-
HCM Control Delay (s)	-	-	8.7	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

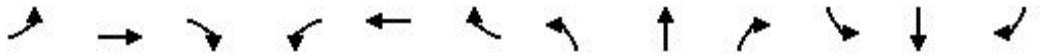
Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	0	4	7	0	19	1	16	2	6	12	2
Future Vol, veh/h	5	0	4	7	0	19	1	16	2	6	12	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	5	8	0	22	1	18	2	7	14	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	61	51	15	53	51	19	16	0	0	20	0	0
Stage 1	29	29	-	21	21	-	-	-	-	-	-	-
Stage 2	32	22	-	32	30	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	934	840	1065	946	840	1059	1602	-	-	1596	-	-
Stage 1	988	871	-	998	878	-	-	-	-	-	-	-
Stage 2	984	877	-	984	870	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	912	836	1065	938	836	1059	1602	-	-	1596	-	-
Mov Cap-2 Maneuver	912	836	-	938	836	-	-	-	-	-	-	-
Stage 1	987	868	-	997	877	-	-	-	-	-	-	-
Stage 2	963	876	-	976	867	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.7	8.6	0.4	2.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1602	-	-	974	1023	1596	-	-
HCM Lane V/C Ratio	0.001	-	-	0.011	0.029	0.004	-	-
HCM Control Delay (s)	7.2	0	-	8.7	8.6	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-



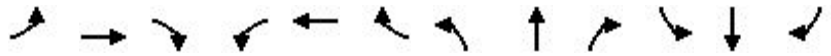
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	100	5	86	35	70	5	5	59	200	5	5
Future Volume (veh/h)	5	100	5	86	35	70	5	5	59	200	5	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	111	6	96	39	78	6	6	66	222	6	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	596	1159	517	695	1411	629	508	33	367	452	214	214
Arrive On Green	0.01	0.33	0.33	0.08	0.40	0.40	0.25	0.25	0.27	0.25	0.25	0.27
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1402	134	1472	1328	858	858
Grp Volume(v), veh/h	6	111	6	96	39	78	6	0	72	222	0	12
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1402	0	1605	1328	0	1716
Q Serve(g_s), s	0.1	0.9	0.1	1.5	0.3	1.4	0.1	0.0	1.5	6.8	0.0	0.2
Cycle Q Clear(g_c), s	0.1	0.9	0.1	1.5	0.3	1.4	0.4	0.0	1.5	8.3	0.0	0.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.92	1.00		0.50
Lane Grp Cap(c), veh/h	596	1159	517	695	1411	629	508	0	401	452	0	428
V/C Ratio(X)	0.01	0.10	0.01	0.14	0.03	0.12	0.01	0.00	0.18	0.49	0.00	0.03
Avail Cap(c_a), veh/h	869	6381	2846	841	6381	2846	804	0	739	732	0	790
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.7	10.2	9.9	8.1	8.0	8.3	12.5	0.0	12.4	16.1	0.0	12.1
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.2	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	0.0	0.4	0.1	0.4	0.0	0.0	0.5	1.9	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.7	10.2	9.9	8.2	8.0	8.4	12.5	0.0	12.6	16.9	0.0	12.2
LnGrp LOS	A	B	A	A	A	A	B	A	B	B	A	B
Approach Vol, veh/h		123			213			78			234	
Approach Delay, s/veh		10.2			8.2			12.6			16.7	
Approach LOS		B			A			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.4	19.2		15.8	5.3	22.3		15.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.5	2.9		10.3	2.1	3.4		3.5				
Green Ext Time (p_c), s	0.1	0.8		0.5	0.0	0.5		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		12.2	
HCM 6th LOS		B	

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	214	10	55	181	140	10	4	55	240	3	3
Future Volume (veh/h)	4	214	10	55	181	140	10	4	55	240	3	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	4	238	11	61	201	156	11	4	61	267	3	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	375	744	332	427	931	415	137	82	538	723	359	359
Arrive On Green	0.01	0.21	0.21	0.06	0.26	0.26	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	121	195	1284	1337	858	858
Grp Volume(v), veh/h	4	238	11	61	201	156	76	0	0	267	0	6
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1600	0	0	1337	0	1716
Q Serve(g_s), s	0.1	2.7	0.3	1.2	2.1	3.8	0.0	0.0	0.0	5.0	0.0	0.1
Cycle Q Clear(g_c), s	0.1	2.7	0.3	1.2	2.1	3.8	1.4	0.0	0.0	6.4	0.0	0.1
Prop In Lane	1.00		1.00	1.00		1.00	0.14		0.80	1.00		0.50
Lane Grp Cap(c), veh/h	375	744	332	427	931	415	756	0	0	723	0	718
V/C Ratio(X)	0.01	0.32	0.03	0.14	0.22	0.38	0.10	0.00	0.00	0.37	0.00	0.01
Avail Cap(c_a), veh/h	626	5802	2588	584	5802	2588	756	0	0	723	0	718
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.8	16.0	15.0	13.4	13.8	14.4	8.5	0.0	0.0	9.8	0.0	8.1
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.2	0.1	0.6	0.3	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.0	0.1	0.4	0.7	1.2	0.4	0.0	0.0	1.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.8	16.3	15.1	13.5	13.9	15.0	8.7	0.0	0.0	11.3	0.0	8.1
LnGrp LOS	B	B	B	B	B	B	A	A	A	B	A	A
Approach Vol, veh/h		253			418			76			273	
Approach Delay, s/veh		16.2			14.3			8.7			11.2	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	15.0		25.0	5.3	17.5		25.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.8	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.2	4.7		8.4	2.1	5.8		3.4				
Green Ext Time (p_c), s	0.0	1.7		0.7	0.0	1.9		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	359	25	125	115	25	300	100	1115	45	325	1725	251
Future Volume (veh/h)	359	25	125	115	25	300	100	1115	45	325	1725	251
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	390	27	0	125	27	0	109	1212	49	353	1875	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	463	251		148	32		135	2357	95	400	2510	
Arrive On Green	0.13	0.13	0.00	0.12	0.10	0.00	0.08	0.47	0.48	0.12	0.49	0.00
Sat Flow, veh/h	3456	1870	1585	1477	319	1585	1781	5034	203	3456	5106	1585
Grp Volume(v), veh/h	390	27	0	152	0	0	109	819	442	353	1875	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1796	0	1585	1781	1702	1834	1728	1702	1585
Q Serve(g_s), s	13.3	1.5	0.0	10.0	0.0	0.0	7.3	20.4	20.4	12.2	35.7	0.0
Cycle Q Clear(g_c), s	13.3	1.5	0.0	10.0	0.0	0.0	7.3	20.4	20.4	12.2	35.7	0.0
Prop In Lane	1.00		1.00	0.82		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	463	251		180	0		135	1593	858	400	2510	
V/C Ratio(X)	0.84	0.11		0.84	0.00		0.81	0.51	0.51	0.88	0.75	
Avail Cap(c_a), veh/h	628	340		223	0		250	1593	858	400	2510	
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)	0.92	0.92	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.1	46.0	0.0	52.7	0.0	0.0	55.0	22.5	22.5	52.7	24.7	0.0
Incr Delay (d2), s/veh	7.0	0.2	0.0	20.8	0.0	0.0	10.7	1.2	2.2	20.1	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.7	0.0	5.5	0.0	0.0	3.5	7.8	8.5	6.2	13.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.2	46.2	0.0	73.5	0.0	0.0	65.8	23.7	24.7	72.8	26.8	0.0
LnGrp LOS	E	D		E	A		E	C	C	E	C	
Approach Vol, veh/h		417			152			1370			2228	
Approach Delay, s/veh		57.4			73.5			27.4			34.1	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	19.0	63.6		21.2	16.2	66.5		17.1
Change Period (Y+Rc), s	7.0	7.0		5.0	7.0	7.0		5.0
Max Green Setting (Gmax), s	12.0	48.0		22.0	17.0	43.0		15.0
Max Q Clear Time (g_c+I1), s	14.3	22.4		15.3	9.3	37.7		12.0
Green Ext Time (p_c), s	0.0	8.1		0.9	0.1	4.3		0.2

Intersection Summary	
HCM 6th Ctrl Delay	35.6
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	120	25	60	170	52	10	5	20	24	5	19
Future Vol, veh/h	32	120	25	60	170	52	10	5	20	24	5	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	39	145	30	72	205	63	12	6	24	29	6	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	268	0	0	175	0	0	618	635	145	602	602	205
Stage 1	-	-	-	-	-	-	223	223	-	349	349	-
Stage 2	-	-	-	-	-	-	395	412	-	253	253	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1296	-	-	1401	-	-	402	396	902	412	414	836
Stage 1	-	-	-	-	-	-	780	719	-	667	633	-
Stage 2	-	-	-	-	-	-	630	594	-	751	698	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1296	-	-	1401	-	-	363	365	902	372	381	836
Mov Cap-2 Maneuver	-	-	-	-	-	-	363	365	-	372	381	-
Stage 1	-	-	-	-	-	-	757	697	-	647	601	-
Stage 2	-	-	-	-	-	-	575	564	-	703	677	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	1.6	11.8	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	363	697	1296	-	-	1401	-	-	372	669
HCM Lane V/C Ratio	0.033	0.043	0.03	-	-	0.052	-	-	0.078	0.043
HCM Control Delay (s)	15.3	10.4	7.9	-	-	7.7	-	-	15.5	10.6
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	0.1	0.1	-	-	0.2	-	-	0.3	0.1



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	130	34	37	1130	1720	245
Future Volume (veh/h)	130	34	37	1130	1720	245
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	133	35	38	1153	1755	250
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	430	197	68	3981	3530	1096
Arrive On Green	0.12	0.12	0.04	0.78	0.69	0.69
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	133	35	38	1153	1755	250
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	4.2	2.4	2.5	7.7	19.4	6.9
Cycle Q Clear(g_c), s	4.2	2.4	2.5	7.7	19.4	6.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	430	197	68	3981	3530	1096
V/C Ratio(X)	0.31	0.18	0.56	0.29	0.50	0.23
Avail Cap(c_a), veh/h	590	271	134	3981	3530	1096
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	47.8	47.0	56.7	3.8	8.7	6.8
Incr Delay (d2), s/veh	0.4	0.4	6.9	0.2	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.2	1.2	1.7	5.8	11.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	48.2	47.4	63.7	3.9	9.2	7.3
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	168			1191	2005	
Approach Delay, s/veh	48.1			5.9	9.0	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.6		19.4	10.6	90.0
Change Period (Y+Rc), s		7.0		4.5	7.0	7.0
Max Green Setting (Gmax), s		88.0		20.5	8.0	73.0
Max Q Clear Time (g_c+I1), s		9.7		6.2	4.5	21.4
Green Ext Time (p_c), s		9.1		0.4	0.0	19.7

Intersection Summary	
HCM 6th Ctrl Delay	9.8
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	18	26	3	30	41
Future Vol, veh/h	2	18	26	3	30	41
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	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	20	30	3	34	47

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	147	32	0	0	33	0
Stage 1	32	-	-	-	-	-
Stage 2	115	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	845	1042	-	-	1579	-
Stage 1	991	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	826	1042	-	-	1579	-
Mov Cap-2 Maneuver	826	-	-	-	-	-
Stage 1	991	-	-	-	-	-
Stage 2	890	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	3.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1015	1579	-
HCM Lane V/C Ratio	-	-	0.022	0.022	-
HCM Control Delay (s)	-	-	8.6	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

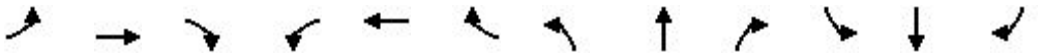
Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	2	4	0	14	4	13	7	19	17	5
Future Vol, veh/h	2	0	2	4	0	14	4	13	7	19	17	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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	2	5	0	16	5	15	8	22	19	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	103	99	22	96	98	19	25	0	0	23	0	0
Stage 1	66	66	-	29	29	-	-	-	-	-	-	-
Stage 2	37	33	-	67	69	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	877	791	1055	887	792	1059	1589	-	-	1592	-	-
Stage 1	945	840	-	988	871	-	-	-	-	-	-	-
Stage 2	978	868	-	943	837	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	852	778	1055	874	779	1059	1589	-	-	1592	-	-
Mov Cap-2 Maneuver	852	778	-	874	779	-	-	-	-	-	-	-
Stage 1	942	828	-	985	868	-	-	-	-	-	-	-
Stage 2	960	865	-	928	825	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	8.6	1.2	3.4
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1589	-	-	943	1011	1592	-	-
HCM Lane V/C Ratio	0.003	-	-	0.005	0.02	0.014	-	-
HCM Control Delay (s)	7.3	0	-	8.8	8.6	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-



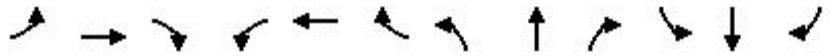
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	230	25	20	515	50	60	25	35	60	25	35
Future Volume (veh/h)	100	230	25	20	515	50	60	25	35	60	25	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	109	250	27	22	560	54	65	27	38	65	27	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	493	1424	635	591	1221	544	430	161	227	430	161	227
Arrive On Green	0.08	0.40	0.40	0.03	0.34	0.34	0.23	0.23	0.25	0.23	0.23	0.25
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1337	703	989	1337	703	989
Grp Volume(v), veh/h	109	250	27	22	560	54	65	0	65	65	0	65
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1337	0	1692	1337	0	1692
Q Serve(g_s), s	1.6	2.0	0.5	0.3	5.4	1.0	1.8	0.0	1.3	1.8	0.0	1.3
Cycle Q Clear(g_c), s	1.6	2.0	0.5	0.3	5.4	1.0	3.1	0.0	1.3	3.1	0.0	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.58	1.00		0.58
Lane Grp Cap(c), veh/h	493	1424	635	591	1221	544	430	0	388	430	0	388
V/C Ratio(X)	0.22	0.18	0.04	0.04	0.46	0.10	0.15	0.00	0.17	0.15	0.00	0.17
Avail Cap(c_a), veh/h	629	6348	2831	829	6348	2831	737	0	775	737	0	775
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.0	8.4	8.0	8.8	11.2	9.7	14.7	0.0	13.3	14.7	0.0	13.3
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.0	0.3	0.1	0.2	0.0	0.2	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.6	0.1	0.1	1.7	0.3	0.5	0.0	0.5	0.5	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.2	8.5	8.0	8.8	11.4	9.8	14.9	0.0	13.5	14.9	0.0	13.5
LnGrp LOS	A	A	A	A	B	A	B	A	B	B	A	B
Approach Vol, veh/h		386			636			130			130	
Approach Delay, s/veh		8.4			11.2			14.2			14.2	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	22.5		15.0	8.7	20.0		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	4.0		5.1	3.6	7.4		5.1				
Green Ext Time (p_c), s	0.0	1.8		0.4	0.1	4.4		0.4				

Intersection Summary		
HCM 6th Ctrl Delay		11.0
HCM 6th LOS		B

Notes

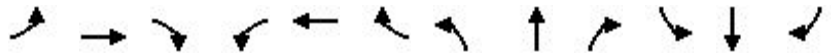
User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	220	55	70	525	90	35	5	50	60	5	25
Future Volume (veh/h)	50	220	55	70	525	90	35	5	50	60	5	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	239	60	76	571	98	38	5	54	65	5	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	332	912	407	474	955	426	291	71	332	677	98	532
Arrive On Green	0.05	0.26	0.26	0.06	0.27	0.27	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	500	182	856	1344	254	1370
Grp Volume(v), veh/h	54	239	60	76	571	98	97	0	0	65	0	32
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1537	0	0	1344	0	1624
Q Serve(g_s), s	1.1	2.8	1.5	1.6	7.2	2.5	0.0	0.0	0.0	0.0	0.0	0.6
Cycle Q Clear(g_c), s	1.1	2.8	1.5	1.6	7.2	2.5	1.9	0.0	0.0	1.2	0.0	0.6
Prop In Lane	1.00		1.00	1.00		1.00	0.39		0.56	1.00		0.84
Lane Grp Cap(c), veh/h	332	912	407	474	955	426	694	0	0	677	0	630
V/C Ratio(X)	0.16	0.26	0.15	0.16	0.60	0.23	0.14	0.00	0.00	0.10	0.00	0.05
Avail Cap(c_a), veh/h	480	5378	2399	601	5378	2399	694	0	0	677	0	630
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.1	15.3	14.8	12.5	16.4	14.7	10.2	0.0	0.0	10.0	0.0	9.8
Incr Delay (d2), s/veh	0.2	0.2	0.2	0.2	0.6	0.3	0.4	0.0	0.0	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.0	0.5	0.5	2.6	0.8	0.7	0.0	0.0	0.5	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.4	15.4	15.0	12.7	17.0	15.0	10.7	0.0	0.0	10.3	0.0	10.0
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	A	A
Approach Vol, veh/h		353			745			97			97	
Approach Delay, s/veh		15.0			16.3			10.7			10.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.3	18.2		25.0	7.7	18.8		25.0
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	7.3	78.0		20.0	7.0	78.0		20.0
Max Q Clear Time (g_c+I1), s	3.6	4.8		3.2	3.1	9.2		3.9
Green Ext Time (p_c), s	0.0	1.8		0.3	0.0	4.6		0.4

Intersection Summary		
HCM 6th Ctrl Delay		15.1
HCM 6th LOS		B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	205	50	75	75	130	375	415	2565	70	150	1270	140
Future Volume (veh/h)	205	50	75	75	130	375	415	2565	70	150	1270	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	216	53	0	79	137	0	437	2700	74	158	1337	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	298	209		277	200		490	2972	81	230	2586	
Arrive On Green	0.09	0.11	0.00	0.06	0.11	0.00	0.14	0.58	0.60	0.07	0.51	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1870	1585	3456	5110	139	3456	5106	1585
Grp Volume(v), veh/h	216	53	0	79	137	0	437	1792	982	158	1337	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	1870	1585	1728	1702	1845	1728	1702	1585
Q Serve(g_s), s	7.3	3.1	0.0	4.7	8.5	0.0	14.9	55.8	57.1	5.4	21.0	0.0
Cycle Q Clear(g_c), s	7.3	3.1	0.0	4.7	8.5	0.0	14.9	55.8	57.1	5.4	21.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	298	209		277	200		490	1979	1073	230	2586	
V/C Ratio(X)	0.72	0.25		0.29	0.68		0.89	0.91	0.92	0.69	0.52	
Avail Cap(c_a), veh/h	317	312		325	343		490	1979	1073	230	2586	
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)	0.98	0.98	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.4	48.7	0.0	45.7	51.6	0.0	50.6	22.2	22.4	54.8	19.8	0.0
Incr Delay (d2), s/veh	7.3	0.6	0.0	0.6	4.1	0.0	18.4	7.4	13.4	8.2	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	1.5	0.0	2.1	4.2	0.0	7.4	20.9	24.8	2.5	7.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.8	49.3	0.0	46.2	55.7	0.0	69.0	29.6	35.8	63.0	20.5	0.0
LnGrp LOS	E	D		D	E		E	C	D	E	C	
Approach Vol, veh/h		269			216			3211			1495	
Approach Delay, s/veh		58.5			52.2			36.9			25.0	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	76.8	11.8	18.4	22.0	67.8	14.4	15.9
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	7.0	7.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	60.0	10.0	20.0	15.0	51.0	10.0	20.0
Max Q Clear Time (g_c+I1), s	11.4	59.1	6.7	5.1	16.9	23.0	9.3	10.5
Green Ext Time (p_c), s	0.0	0.9	0.0	0.1	0.0	9.7	0.1	0.4

Intersection Summary	
HCM 6th Ctrl Delay	35.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	250	20	30	290	20	35	3	75	50	3	25
Future Vol, veh/h	15	250	20	30	290	20	35	3	75	50	3	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	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	16	272	22	33	315	22	38	3	82	54	3	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	337	0	0	294	0	0	711	707	272	739	707	315
Stage 1	-	-	-	-	-	-	304	304	-	381	381	-
Stage 2	-	-	-	-	-	-	407	403	-	358	326	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1222	-	-	1268	-	-	348	360	767	333	360	725
Stage 1	-	-	-	-	-	-	705	663	-	641	613	-
Stage 2	-	-	-	-	-	-	621	600	-	660	648	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1222	-	-	1268	-	-	323	346	767	287	346	725
Mov Cap-2 Maneuver	-	-	-	-	-	-	323	346	-	287	346	-
Stage 1	-	-	-	-	-	-	696	654	-	633	597	-
Stage 2	-	-	-	-	-	-	579	584	-	579	640	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.7	12.8	17
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	323	733	1222	-	-	1268	-	-	287	649
HCM Lane V/C Ratio	0.118	0.116	0.013	-	-	0.026	-	-	0.189	0.047
HCM Control Delay (s)	17.6	10.6	8	-	-	7.9	-	-	20.5	10.8
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.4	0.4	0	-	-	0.1	-	-	0.7	0.1



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	300	75	75	2750	1155	265
Future Volume (veh/h)	300	75	75	2750	1155	265
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	316	79	79	2895	1216	279
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	138	3957	3350	1040
Arrive On Green	0.12	0.12	0.08	0.78	0.66	0.66
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	316	79	79	2895	1216	279
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	10.6	5.5	5.1	35.4	12.9	8.8
Cycle Q Clear(g_c), s	10.6	5.5	5.1	35.4	12.9	8.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	138	3957	3350	1040
V/C Ratio(X)	0.73	0.40	0.57	0.73	0.36	0.27
Avail Cap(c_a), veh/h	576	264	223	3957	3350	1040
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	50.6	48.3	53.4	7.0	9.3	8.6
Incr Delay (d2), s/veh	3.2	1.3	3.7	1.2	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	5.0	2.4	8.2	4.1	12.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	53.8	49.6	57.2	8.2	9.6	9.3
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	395			2974	1495	
Approach Delay, s/veh	53.0			9.5	9.6	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.0		20.0	14.3	85.7
Change Period (Y+Rc), s		7.0		5.0	5.0	7.0
Max Green Setting (Gmax), s		88.0		20.0	15.0	68.0
Max Q Clear Time (g_c+I1), s		37.4		12.6	7.1	14.9
Green Ext Time (p_c), s		39.5		0.8	0.1	11.3

Intersection Summary		
HCM 6th Ctrl Delay		13.1
HCM 6th LOS		B

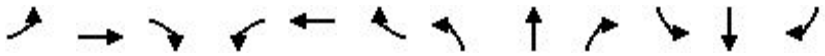
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	475	20	30	410	85	50	50	20	190	50	140
Future Volume (veh/h)	175	475	20	30	410	85	50	50	20	190	50	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	190	516	22	33	446	92	54	54	22	207	54	152
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	535	1382	617	469	1147	512	326	317	129	443	109	306
Arrive On Green	0.10	0.39	0.39	0.04	0.32	0.32	0.25	0.25	0.27	0.25	0.25	0.27
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1176	1263	515	1323	433	1218
Grp Volume(v), veh/h	190	516	22	33	446	92	54	0	76	207	0	206
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1176	0	1778	1323	0	1651
Q Serve(g_s), s	3.2	4.8	0.4	0.6	4.5	1.9	1.9	0.0	1.5	6.7	0.0	4.9
Cycle Q Clear(g_c), s	3.2	4.8	0.4	0.6	4.5	1.9	6.8	0.0	1.5	8.3	0.0	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.29	1.00		0.74
Lane Grp Cap(c), veh/h	535	1382	617	469	1147	512	326	0	446	443	0	414
V/C Ratio(X)	0.36	0.37	0.04	0.07	0.39	0.18	0.17	0.00	0.17	0.47	0.00	0.50
Avail Cap(c_a), veh/h	619	5965	2660	671	5965	2660	537	0	765	681	0	711
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.8	10.1	8.8	9.7	12.2	11.3	17.8	0.0	13.5	16.9	0.0	14.6
Incr Delay (d2), s/veh	0.4	0.2	0.0	0.1	0.2	0.2	0.2	0.0	0.2	0.8	0.0	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 BackOfQ(50%),veh/ln	1.0	1.5	0.1	0.2	1.5	0.6	0.5	0.0	0.6	1.9	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.2	10.3	8.8	9.8	12.4	11.5	18.0	0.0	13.7	17.6	0.0	15.5
LnGrp LOS	A	B	A	A	B	B	B	A	B	B	A	B
Approach Vol, veh/h		728			571			130			413	
Approach Delay, s/veh		10.0			12.1			15.5			16.6	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	23.1		16.7	9.8	20.0		16.7				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.6	6.8		10.3	5.2	6.5		8.8				
Green Ext Time (p_c), s	0.0	3.9		1.4	0.1	3.5		0.4				

Intersection Summary			
HCM 6th Ctrl Delay		12.5	
HCM 6th LOS		B	

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	555	45	55	380	175	45	5	60	220	5	100
Future Volume (veh/h)	85	555	45	55	380	175	45	5	60	220	5	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	92	603	49	60	413	190	49	5	65	239	5	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	397	983	438	337	930	415	293	62	310	666	27	582
Arrive On Green	0.07	0.28	0.28	0.06	0.26	0.26	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	513	162	812	1331	70	1526
Grp Volume(v), veh/h	92	603	49	60	413	190	119	0	0	239	0	114
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1487	0	0	1331	0	1596
Q Serve(g_s), s	1.9	7.7	1.2	1.2	5.1	5.3	0.0	0.0	0.0	3.7	0.0	2.5
Cycle Q Clear(g_c), s	1.9	7.7	1.2	1.2	5.1	5.3	2.4	0.0	0.0	6.1	0.0	2.5
Prop In Lane	1.00		1.00	1.00		1.00	0.41		0.55	1.00		0.96
Lane Grp Cap(c), veh/h	397	983	438	337	930	415	664	0	0	666	0	609
V/C Ratio(X)	0.23	0.61	0.11	0.18	0.44	0.46	0.18	0.00	0.00	0.36	0.00	0.19
Avail Cap(c_a), veh/h	510	5289	2359	476	5289	2359	664	0	0	666	0	609
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	16.5	14.2	13.1	16.2	16.2	10.8	0.0	0.0	11.7	0.0	10.8
Incr Delay (d2), s/veh	0.3	0.6	0.1	0.3	0.3	0.8	0.6	0.0	0.0	1.5	0.0	0.7
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 BackOfQ(50%),veh/ln	0.7	2.8	0.4	0.4	1.8	1.7	0.9	0.0	0.0	2.0	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.9	17.1	14.3	13.4	16.5	17.0	11.4	0.0	0.0	13.2	0.0	11.5
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	A	B
Approach Vol, veh/h		744			663			119			353	
Approach Delay, s/veh		16.4			16.4			11.4			12.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	19.5		25.0	8.7	18.7		25.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.9	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.2	9.7		8.1	3.9	7.3		4.4				
Green Ext Time (p_c), s	0.0	4.7		1.1	0.0	3.6		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	450	175	210	125	100	325	310	1400	60	375	2170	200
Future Volume (veh/h)	450	175	210	125	100	325	310	1400	60	375	2170	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	474	184	0	132	105	0	326	1474	63	395	2284	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	547	279		277	171		431	2301	98	432	2342	
Arrive On Green	0.16	0.15	0.00	0.08	0.09	0.00	0.12	0.46	0.48	0.13	0.46	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1870	1585	3456	5021	215	3456	5106	1585
Grp Volume(v), veh/h	474	184	0	132	105	0	326	999	538	395	2284	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	1870	1585	1728	1702	1832	1728	1702	1585
Q Serve(g_s), s	16.1	11.1	0.0	8.0	6.5	0.0	10.9	27.0	27.0	13.6	52.6	0.0
Cycle Q Clear(g_c), s	16.1	11.1	0.0	8.0	6.5	0.0	10.9	27.0	27.0	13.6	52.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	547	279		277	171		431	1560	840	432	2342	
V/C Ratio(X)	0.87	0.66		0.48	0.61		0.76	0.64	0.64	0.91	0.98	
Avail Cap(c_a), veh/h	547	312		321	249		432	1560	840	432	2342	
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)	0.84	0.84	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.3	48.2	0.0	45.0	52.4	0.0	50.8	24.9	24.8	51.9	31.8	0.0
Incr Delay (d2), s/veh	11.8	3.6	0.0	1.3	3.5	0.0	7.5	2.0	3.7	23.8	13.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	5.4	0.0	3.6	3.2	0.0	5.0	10.4	11.5	7.0	22.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.1	51.8	0.0	46.2	56.0	0.0	58.3	26.9	28.6	75.7	45.4	0.0
LnGrp LOS	E	D		D	E		E	C	C	E	D	
Approach Vol, veh/h		658			237			1863			2679	
Approach Delay, s/veh		58.5			50.5			32.9			49.9	
Approach LOS		E			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.0	62.0	15.1	22.9	19.9	62.1	23.0	15.0
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	7.0	7.0	5.0	5.0
Max Green Setting (Gmax), s	13.0	50.0	13.0	20.0	13.0	50.0	18.0	15.0
Max Q Clear Time (g_c+I1), s	15.6	29.0	10.0	13.1	12.9	54.6	18.1	8.5
Green Ext Time (p_c), s	0.0	9.6	0.1	0.5	0.0	0.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	45.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	150	35	75	230	35	20	5	30	35	5	35
Future Vol, veh/h	35	150	35	75	230	35	20	5	30	35	5	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	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	38	163	38	82	250	38	22	5	33	38	5	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	288	0	0	201	0	0	694	691	163	691	691	250
Stage 1	-	-	-	-	-	-	239	239	-	414	414	-
Stage 2	-	-	-	-	-	-	455	452	-	277	277	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1274	-	-	1371	-	-	357	368	882	359	368	789
Stage 1	-	-	-	-	-	-	764	708	-	616	593	-
Stage 2	-	-	-	-	-	-	585	570	-	729	681	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1274	-	-	1371	-	-	313	336	882	318	336	789
Mov Cap-2 Maneuver	-	-	-	-	-	-	313	336	-	318	336	-
Stage 1	-	-	-	-	-	-	741	687	-	598	557	-
Stage 2	-	-	-	-	-	-	518	536	-	676	661	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	1.7	12.9	14.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	313	716	1274	-	-	1371	-	-	318	675
HCM Lane V/C Ratio	0.069	0.053	0.03	-	-	0.059	-	-	0.12	0.064
HCM Control Delay (s)	17.4	10.3	7.9	-	-	7.8	-	-	17.9	10.7
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0.2	0.1	-	-	0.2	-	-	0.4	0.2



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	170	45	45	1630	2190	315
Future Volume (veh/h)	170	45	45	1630	2190	315
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	179	47	47	1716	2305	332
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	117	3958	3408	1058
Arrive On Green	0.12	0.12	0.07	0.78	0.67	0.67
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	179	47	47	1716	2305	332
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	5.7	3.2	3.0	13.7	32.8	10.6
Cycle Q Clear(g_c), s	5.7	3.2	3.0	13.7	32.8	10.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	117	3958	3408	1058
V/C Ratio(X)	0.41	0.24	0.40	0.43	0.68	0.31
Avail Cap(c_a), veh/h	576	264	223	3958	3408	1058
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	48.5	47.3	53.8	4.6	12.1	8.4
Incr Delay (d2), s/veh	0.6	0.6	2.2	0.3	1.1	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	3.0	1.4	3.1	10.3	15.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	49.1	48.0	56.0	4.9	13.2	9.2
LnGrp LOS	D	D	E	A	B	A
Approach Vol, veh/h	226			1763	2637	
Approach Delay, s/veh	48.9			6.3	12.7	
Approach LOS	D			A	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.0		20.0	12.9	87.1
Change Period (Y+Rc), s		7.0		5.0	5.0	7.0
Max Green Setting (Gmax), s		88.0		20.0	15.0	68.0
Max Q Clear Time (g_c+I1), s		15.7		7.7	5.0	34.8
Green Ext Time (p_c), s		18.0		0.6	0.0	23.6

Intersection Summary	
HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

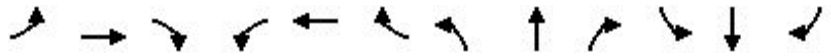
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	230	31	32	515	50	76	25	70	60	25	35
Future Volume (veh/h)	100	230	31	32	515	50	76	25	70	60	25	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	109	250	34	35	560	54	83	27	76	65	27	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	493	1378	615	610	1221	544	430	99	279	396	161	227
Arrive On Green	0.08	0.39	0.39	0.04	0.34	0.34	0.23	0.23	0.25	0.23	0.23	0.25
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1337	433	1218	1291	703	989
Grp Volume(v), veh/h	109	250	34	35	560	54	83	0	103	65	0	65
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1337	0	1651	1291	0	1692
Q Serve(g_s), s	1.6	2.0	0.6	0.5	5.4	1.0	2.3	0.0	2.2	1.9	0.0	1.3
Cycle Q Clear(g_c), s	1.6	2.0	0.6	0.5	5.4	1.0	3.6	0.0	2.2	4.1	0.0	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.74	1.00		0.58
Lane Grp Cap(c), veh/h	493	1378	615	610	1221	544	430	0	378	396	0	388
V/C Ratio(X)	0.22	0.18	0.06	0.06	0.46	0.10	0.19	0.00	0.27	0.16	0.00	0.17
Avail Cap(c_a), veh/h	629	6348	2831	824	6348	2831	737	0	756	691	0	775
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.0	8.8	8.4	8.5	11.2	9.7	14.9	0.0	13.5	15.5	0.0	13.3
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.0	0.3	0.1	0.2	0.0	0.4	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.6	0.2	0.2	1.7	0.3	0.6	0.0	0.7	0.5	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.2	8.9	8.4	8.5	11.4	9.8	15.2	0.0	13.9	15.7	0.0	13.5
LnGrp LOS	A	A	A	A	B	A	B	A	B	B	A	B
Approach Vol, veh/h		393			649			186			130	
Approach Delay, s/veh		8.6			11.1			14.5			14.6	
Approach LOS		A			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	21.9		15.0	8.7	20.0		15.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	2.5	4.0		6.1	3.6	7.4		5.6				
Green Ext Time (p_c), s	0.0	1.8		0.4	0.1	4.4		0.7				

Intersection Summary		
HCM 6th Ctrl Delay		11.2
HCM 6th LOS		B

Notes

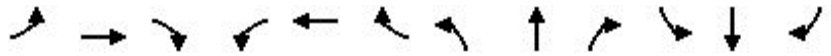
User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	255	55	70	537	90	35	5	50	60	5	25
Future Volume (veh/h)	50	255	55	70	537	90	35	5	50	60	5	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	277	60	76	584	98	38	5	54	65	5	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	330	928	414	460	971	433	289	70	330	673	98	528
Arrive On Green	0.05	0.26	0.26	0.06	0.27	0.27	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	500	182	856	1344	254	1370
Grp Volume(v), veh/h	54	277	60	76	584	98	97	0	0	65	0	32
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1537	0	0	1344	0	1624
Q Serve(g_s), s	1.1	3.2	1.5	1.6	7.4	2.5	0.0	0.0	0.0	0.0	0.0	0.6
Cycle Q Clear(g_c), s	1.1	3.2	1.5	1.6	7.4	2.5	1.9	0.0	0.0	1.2	0.0	0.6
Prop In Lane	1.00		1.00	1.00		1.00	0.39		0.56	1.00		0.84
Lane Grp Cap(c), veh/h	330	928	414	460	971	433	689	0	0	673	0	626
V/C Ratio(X)	0.16	0.30	0.14	0.17	0.60	0.23	0.14	0.00	0.00	0.10	0.00	0.05
Avail Cap(c_a), veh/h	478	5344	2383	586	5344	2383	689	0	0	673	0	626
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.1	15.4	14.7	12.4	16.4	14.6	10.4	0.0	0.0	10.2	0.0	10.0
Incr Delay (d2), s/veh	0.2	0.2	0.2	0.2	0.6	0.3	0.4	0.0	0.0	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.2	0.5	0.5	2.7	0.8	0.7	0.0	0.0	0.5	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	15.5	14.9	12.6	17.0	14.9	10.8	0.0	0.0	10.4	0.0	10.1
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	A	B
Approach Vol, veh/h		391			758			97			97	
Approach Delay, s/veh		15.1			16.3			10.8			10.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.3	18.5		25.0	7.7	19.2		25.0
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	7.3	78.0		20.0	7.0	78.0		20.0
Max Q Clear Time (g_c+I1), s	3.6	5.2		3.2	3.1	9.4		3.9
Green Ext Time (p_c), s	0.0	2.1		0.3	0.0	4.8		0.4

Intersection Summary		
HCM 6th Ctrl Delay		15.1
HCM 6th LOS		B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	50	75	75	130	375	415	2565	70	150	1270	152
Future Volume (veh/h)	240	50	75	75	130	375	415	2565	70	150	1270	152
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	253	53	0	79	137	0	437	2700	74	158	1337	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	317	219		283	200		490	2944	80	230	2559	
Arrive On Green	0.09	0.12	0.00	0.06	0.11	0.00	0.14	0.58	0.59	0.07	0.50	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1870	1585	3456	5110	139	3456	5106	1585
Grp Volume(v), veh/h	253	53	0	79	137	0	437	1792	982	158	1337	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	1870	1585	1728	1702	1845	1728	1702	1585
Q Serve(g_s), s	8.6	3.1	0.0	4.7	8.5	0.0	14.9	56.5	57.8	5.4	21.2	0.0
Cycle Q Clear(g_c), s	8.6	3.1	0.0	4.7	8.5	0.0	14.9	56.5	57.8	5.4	21.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	317	219		283	200		490	1961	1063	230	2559	
V/C Ratio(X)	0.80	0.24		0.28	0.68		0.89	0.91	0.92	0.69	0.52	
Avail Cap(c_a), veh/h	317	312		331	343		490	1961	1063	230	2559	
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)	0.97	0.97	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.4	48.1	0.0	45.7	51.6	0.0	50.6	22.8	23.0	54.8	20.2	0.0
Incr Delay (d2), s/veh	13.1	0.5	0.0	0.5	4.1	0.0	18.4	8.0	14.4	8.2	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	1.5	0.0	2.1	4.2	0.0	7.4	21.3	25.5	2.5	7.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.5	48.7	0.0	46.2	55.7	0.0	69.0	30.8	37.4	63.0	21.0	0.0
LnGrp LOS	E	D		D	E		E	C	D	E	C	
Approach Vol, veh/h		306			216			3211			1495	
Approach Delay, s/veh		63.4			52.2			38.0			25.4	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	76.1	11.8	19.1	22.0	67.1	15.0	15.9
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	7.0	7.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	60.0	10.0	20.0	15.0	51.0	10.0	20.0
Max Q Clear Time (g_c+I1), s	7.4	59.8	6.7	5.1	16.9	23.2	10.6	10.5
Green Ext Time (p_c), s	0.0	0.2	0.0	0.1	0.0	9.7	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	36.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	250	20	30	290	22	35	3	75	57	3	31
Future Vol, veh/h	17	250	20	30	290	22	35	3	75	57	3	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	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	18	272	22	33	315	24	38	3	82	62	3	34

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	339	0	0	294	0	0	720	713	272	743	711	315
Stage 1	-	-	-	-	-	-	308	308	-	381	381	-
Stage 2	-	-	-	-	-	-	412	405	-	362	330	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1220	-	-	1268	-	-	343	357	767	331	358	725
Stage 1	-	-	-	-	-	-	702	660	-	641	613	-
Stage 2	-	-	-	-	-	-	617	598	-	657	646	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1220	-	-	1268	-	-	315	342	767	285	343	725
Mov Cap-2 Maneuver	-	-	-	-	-	-	315	342	-	285	343	-
Stage 1	-	-	-	-	-	-	691	650	-	631	597	-
Stage 2	-	-	-	-	-	-	570	582	-	576	636	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.7	12.9	17.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	315	732	1220	-	-	1268	-	-	285	660
HCM Lane V/C Ratio	0.121	0.116	0.015	-	-	0.026	-	-	0.217	0.056
HCM Control Delay (s)	18	10.6	8	-	-	7.9	-	-	21.1	10.8
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.4	0.4	0	-	-	0.1	-	-	0.8	0.2



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	300	82	77	2750	1155	265
Future Volume (veh/h)	300	82	77	2750	1155	265
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	316	86	81	2895	1216	279
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	138	3957	3348	1039
Arrive On Green	0.12	0.12	0.08	0.78	0.66	0.66
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	316	86	81	2895	1216	279
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	10.6	6.0	5.3	35.4	12.9	8.8
Cycle Q Clear(g_c), s	10.6	6.0	5.3	35.4	12.9	8.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	138	3957	3348	1039
V/C Ratio(X)	0.73	0.43	0.58	0.73	0.36	0.27
Avail Cap(c_a), veh/h	576	264	223	3957	3348	1039
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	50.6	48.6	53.5	7.0	9.3	8.6
Incr Delay (d2), s/veh	3.2	1.5	3.9	1.2	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	5.5	2.4	8.2	4.1	12.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	53.8	50.1	57.3	8.2	9.6	9.3
LnGrp LOS	D	D	E	A	A	A
Approach Vol, veh/h	402			2976	1495	
Approach Delay, s/veh	53.0			9.6	9.6	
Approach LOS	D			A	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.0		20.0	14.3	85.7
Change Period (Y+Rc), s		7.0		5.0	5.0	7.0
Max Green Setting (Gmax), s		88.0		20.0	15.0	68.0
Max Q Clear Time (g_c+I1), s		37.4		12.6	7.3	14.9
Green Ext Time (p_c), s		39.5		0.9	0.1	11.3

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	27	59	1	10	33
Future Vol, veh/h	2	27	59	1	10	33
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	-	-	-	-	-
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	2	29	64	1	11	36

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	123	65	0	0	65	0
Stage 1	65	-	-	-	-	-
Stage 2	58	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	872	999	-	-	1537	-
Stage 1	958	-	-	-	-	-
Stage 2	965	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	866	999	-	-	1537	-
Mov Cap-2 Maneuver	866	-	-	-	-	-
Stage 1	958	-	-	-	-	-
Stage 2	958	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	1.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	989	1537	-
HCM Lane V/C Ratio	-	-	0.032	0.007	-
HCM Control Delay (s)	-	-	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

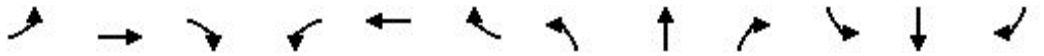
Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	0	4	7	0	19	1	36	2	16	27	2
Future Vol, veh/h	5	0	4	7	0	19	1	36	2	16	27	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	4	8	0	21	1	39	2	17	29	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	117	107	30	108	107	40	31	0	0	41	0	0
Stage 1	64	64	-	42	42	-	-	-	-	-	-	-
Stage 2	53	43	-	66	65	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	859	783	1044	871	783	1031	1582	-	-	1568	-	-
Stage 1	947	842	-	972	860	-	-	-	-	-	-	-
Stage 2	960	859	-	945	841	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	834	774	1044	860	774	1031	1582	-	-	1568	-	-
Mov Cap-2 Maneuver	834	774	-	860	774	-	-	-	-	-	-	-
Stage 1	946	833	-	971	859	-	-	-	-	-	-	-
Stage 2	940	858	-	931	832	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	8.8	0.2	2.6
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1582	-	-	916	979	1568	-	-
HCM Lane V/C Ratio	0.001	-	-	0.011	0.029	0.011	-	-
HCM Control Delay (s)	7.3	0	-	9	8.8	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-



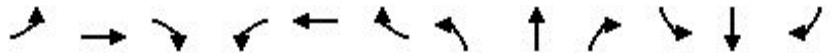
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	475	37	69	410	85	61	50	43	190	50	140
Future Volume (veh/h)	175	475	37	69	410	85	61	50	43	190	50	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	190	516	40	75	446	92	66	54	47	207	54	152
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	526	1258	561	478	1123	501	340	244	212	435	114	322
Arrive On Green	0.10	0.35	0.35	0.07	0.32	0.32	0.26	0.26	0.28	0.26	0.26	0.28
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1176	923	803	1294	433	1218
Grp Volume(v), veh/h	190	516	40	75	446	92	66	0	101	207	0	206
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1176	0	1726	1294	0	1651
Q Serve(g_s), s	3.3	5.2	0.8	1.3	4.7	2.0	2.4	0.0	2.1	7.1	0.0	4.9
Cycle Q Clear(g_c), s	3.3	5.2	0.8	1.3	4.7	2.0	7.3	0.0	2.1	9.2	0.0	4.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.47	1.00		0.74
Lane Grp Cap(c), veh/h	526	1258	561	478	1123	501	340	0	455	435	0	436
V/C Ratio(X)	0.36	0.41	0.07	0.16	0.40	0.18	0.19	0.00	0.22	0.48	0.00	0.47
Avail Cap(c_a), veh/h	603	5841	2605	623	5841	2605	525	0	727	638	0	696
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.2	11.6	10.2	9.6	12.7	11.8	17.7	0.0	13.5	17.2	0.0	14.4
Incr Delay (d2), s/veh	0.4	0.2	0.1	0.2	0.2	0.2	0.3	0.0	0.2	0.8	0.0	0.8
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 BackOfQ(50%),veh/ln	1.0	1.7	0.2	0.4	1.5	0.6	0.6	0.0	0.8	1.9	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.6	11.8	10.2	9.7	12.9	12.0	18.0	0.0	13.7	18.1	0.0	15.2
LnGrp LOS	A	B	B	A	B	B	B	A	B	B	A	B
Approach Vol, veh/h		746			613			167			413	
Approach Delay, s/veh		11.2			12.4			15.4			16.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.1	21.8		17.5	9.9	20.0		17.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.3	7.2		11.2	5.3	6.7		9.3				
Green Ext Time (p_c), s	0.0	3.9		1.3	0.1	3.5		0.5				

Intersection Summary		
HCM 6th Ctrl Delay		13.1
HCM 6th LOS		B

Notes

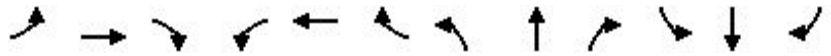
User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	578	45	55	419	175	45	5	60	220	5	100
Future Volume (veh/h)	85	578	45	55	419	175	45	5	60	220	5	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	92	628	49	60	455	190	49	5	65	239	5	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	389	1013	452	335	961	429	289	61	306	658	26	575
Arrive On Green	0.07	0.29	0.29	0.06	0.27	0.27	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	513	162	812	1331	70	1526
Grp Volume(v), veh/h	92	628	49	60	455	190	119	0	0	239	0	114
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1487	0	0	1331	0	1596
Q Serve(g_s), s	1.9	8.1	1.2	1.2	5.7	5.3	0.0	0.0	0.0	3.7	0.0	2.5
Cycle Q Clear(g_c), s	1.9	8.1	1.2	1.2	5.7	5.3	2.5	0.0	0.0	6.2	0.0	2.5
Prop In Lane	1.00		1.00	1.00		1.00	0.41		0.55	1.00		0.96
Lane Grp Cap(c), veh/h	389	1013	452	335	961	429	656	0	0	658	0	601
V/C Ratio(X)	0.24	0.62	0.11	0.18	0.47	0.44	0.18	0.00	0.00	0.36	0.00	0.19
Avail Cap(c_a), veh/h	499	5224	2330	471	5224	2330	656	0	0	658	0	601
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	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.5	16.5	14.0	13.0	16.2	16.0	11.1	0.0	0.0	12.1	0.0	11.1
Incr Delay (d2), s/veh	0.3	0.6	0.1	0.3	0.4	0.7	0.6	0.0	0.0	1.6	0.0	0.7
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 BackOfQ(50%),veh/ln	0.7	2.9	0.4	0.4	2.0	1.7	0.9	0.0	0.0	2.0	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.8	17.1	14.1	13.3	16.6	16.8	11.7	0.0	0.0	13.6	0.0	11.8
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	A	B
Approach Vol, veh/h		769			705			119			353	
Approach Delay, s/veh		16.4			16.3			11.7			13.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	20.1		25.0	8.7	19.4		25.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	78.0		20.0	7.0	78.0		20.0				
Max Q Clear Time (g_c+I1), s	3.2	10.1		8.2	3.9	7.7		4.5				
Green Ext Time (p_c), s	0.0	5.0		1.1	0.0	4.0		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	15.5
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	473	175	210	125	100	325	310	1400	60	375	2170	239
Future Volume (veh/h)	473	175	210	125	100	325	310	1400	60	375	2170	239
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	498	184	0	132	105	0	326	1474	63	395	2284	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	547	279		277	171		431	2301	98	432	2342	
Arrive On Green	0.16	0.15	0.00	0.08	0.09	0.00	0.12	0.46	0.48	0.13	0.46	0.00
Sat Flow, veh/h	3456	1870	1585	1781	1870	1585	3456	5021	215	3456	5106	1585
Grp Volume(v), veh/h	498	184	0	132	105	0	326	999	538	395	2284	0
Grp Sat Flow(s),veh/h/ln	1728	1870	1585	1781	1870	1585	1728	1702	1832	1728	1702	1585
Q Serve(g_s), s	17.0	11.1	0.0	8.0	6.5	0.0	10.9	27.0	27.0	13.6	52.6	0.0
Cycle Q Clear(g_c), s	17.0	11.1	0.0	8.0	6.5	0.0	10.9	27.0	27.0	13.6	52.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	547	279		277	171		431	1560	840	432	2342	
V/C Ratio(X)	0.91	0.66		0.48	0.61		0.76	0.64	0.64	0.91	0.98	
Avail Cap(c_a), veh/h	547	312		321	249		432	1560	840	432	2342	
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)	0.83	0.83	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.7	48.2	0.0	45.0	52.4	0.0	50.8	24.9	24.8	51.9	31.8	0.0
Incr Delay (d2), s/veh	16.8	3.6	0.0	1.3	3.5	0.0	7.5	2.0	3.7	23.8	13.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	5.4	0.0	3.6	3.2	0.0	5.0	10.4	11.5	7.0	22.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.5	51.8	0.0	46.2	56.0	0.0	58.3	26.9	28.6	75.7	45.4	0.0
LnGrp LOS	E	D		D	E		E	C	C	E	D	
Approach Vol, veh/h		682			237			1863			2679	
Approach Delay, s/veh		62.5			50.5			32.9			49.9	
Approach LOS		E			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	62.0	15.1	22.9	19.9	62.1	23.0	15.0
Change Period (Y+Rc), s	7.0	7.0	5.0	5.0	7.0	7.0	5.0	5.0
Max Green Setting (Gmax), s	13.0	50.0	13.0	20.0	13.0	50.0	18.0	15.0
Max Q Clear Time (g_c+I1), s	15.6	29.0	10.0	13.1	12.9	54.6	19.0	8.5
Green Ext Time (p_c), s	0.0	9.6	0.1	0.5	0.0	0.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	45.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	150	35	75	230	42	20	5	30	39	5	39
Future Vol, veh/h	42	150	35	75	230	42	20	5	30	39	5	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	105	-	150	150	-	-	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	46	163	38	82	250	46	22	5	33	42	5	42

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	296	0	0	201	0	0	716	715	163	707	707	250
Stage 1	-	-	-	-	-	-	255	255	-	414	414	-
Stage 2	-	-	-	-	-	-	461	460	-	293	293	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1265	-	-	1371	-	-	345	356	882	350	360	789
Stage 1	-	-	-	-	-	-	749	696	-	616	593	-
Stage 2	-	-	-	-	-	-	581	566	-	715	670	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1265	-	-	1371	-	-	299	323	882	309	326	789
Mov Cap-2 Maneuver	-	-	-	-	-	-	299	323	-	309	326	-
Stage 1	-	-	-	-	-	-	722	671	-	594	557	-
Stage 2	-	-	-	-	-	-	512	532	-	658	646	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	1.7	13.2	14.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	299	707	1265	-	-	1371	-	-	309	679
HCM Lane V/C Ratio	0.073	0.054	0.036	-	-	0.059	-	-	0.137	0.07
HCM Control Delay (s)	18	10.4	8	-	-	7.8	-	-	18.5	10.7
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0.2	0.1	-	-	0.2	-	-	0.5	0.2



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	170	49	52	1630	2190	315
Future Volume (veh/h)	170	49	52	1630	2190	315
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	179	52	55	1716	2305	332
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	432	198	125	3958	3387	1051
Arrive On Green	0.12	0.12	0.07	0.78	0.66	0.66
Sat Flow, veh/h	3456	1585	1781	5274	5274	1585
Grp Volume(v), veh/h	179	52	55	1716	2305	332
Grp Sat Flow(s),veh/h/ln	1728	1585	1781	1702	1702	1585
Q Serve(g_s), s	5.7	3.6	3.6	13.7	33.2	10.7
Cycle Q Clear(g_c), s	5.7	3.6	3.6	13.7	33.2	10.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	432	198	125	3958	3387	1051
V/C Ratio(X)	0.41	0.26	0.44	0.43	0.68	0.32
Avail Cap(c_a), veh/h	576	264	223	3958	3387	1051
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	48.5	47.5	53.5	4.6	12.4	8.6
Incr Delay (d2), s/veh	0.6	0.7	2.4	0.3	1.1	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	3.3	1.6	3.1	10.4	15.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	49.1	48.2	56.0	4.9	13.5	9.4
LnGrp LOS	D	D	E	A	B	A
Approach Vol, veh/h	231			1771	2637	
Approach Delay, s/veh	48.9			6.5	13.0	
Approach LOS	D			A	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.0		20.0	13.4	86.6
Change Period (Y+Rc), s		7.0		5.0	5.0	7.0
Max Green Setting (Gmax), s		88.0		20.0	15.0	68.0
Max Q Clear Time (g_c+I1), s		15.7		7.7	5.6	35.2
Green Ext Time (p_c), s		18.0		0.6	0.1	23.4

Intersection Summary	
HCM 6th Ctrl Delay	12.3
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	18	41	3	30	61
Future Vol, veh/h	2	18	41	3	30	61
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	-	-	-	-	-
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	2	20	45	3	33	66

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	179	47	0	0	48	0
Stage 1	47	-	-	-	-	-
Stage 2	132	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	811	1022	-	-	1559	-
Stage 1	975	-	-	-	-	-
Stage 2	894	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	793	1022	-	-	1559	-
Mov Cap-2 Maneuver	793	-	-	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	874	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	2.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	993	1559	-
HCM Lane V/C Ratio	-	-	0.022	0.021	-
HCM Control Delay (s)	-	-	8.7	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

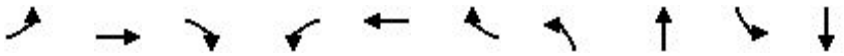
Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	2	4	0	14	4	28	7	19	37	5
Future Vol, veh/h	2	0	2	4	0	14	4	28	7	19	37	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	-	-	-	-	-	-	-	-	-	-	-	-
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	2	0	2	4	0	15	4	30	8	21	40	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	135	131	43	128	129	34	45	0	0	38	0	0
Stage 1	85	85	-	42	42	-	-	-	-	-	-	-
Stage 2	50	46	-	86	87	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	836	760	1027	845	762	1039	1563	-	-	1572	-	-
Stage 1	923	824	-	972	860	-	-	-	-	-	-	-
Stage 2	963	857	-	922	823	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	813	747	1027	832	749	1039	1563	-	-	1572	-	-
Mov Cap-2 Maneuver	813	747	-	832	749	-	-	-	-	-	-	-
Stage 1	920	812	-	969	857	-	-	-	-	-	-	-
Stage 2	946	854	-	907	811	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	8.7	0.7	2.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1563	-	-	908	985	1572	-	-
HCM Lane V/C Ratio	0.003	-	-	0.005	0.02	0.013	-	-
HCM Control Delay (s)	7.3	0	-	9	8.7	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	109	250	27	22	560	54	65	65	65	65
v/c Ratio	0.21	0.14	0.03	0.04	0.45	0.09	0.22	0.16	0.22	0.16
Control Delay	5.6	7.0	1.3	4.8	13.6	3.7	18.3	10.5	18.3	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	7.0	1.3	4.8	13.6	3.7	18.3	10.5	18.3	10.5
Queue Length 50th (ft)	11	13	0	2	63	0	15	6	15	6
Queue Length 95th (ft)	26	44	5	8	98	15	43	31	43	31
Internal Link Dist (ft)		888			561			492		376
Turn Bay Length (ft)	250		250	250		250	250		250	
Base Capacity (vph)	517	3539	1583	623	3539	1583	598	783	598	783
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.07	0.02	0.04	0.16	0.03	0.11	0.08	0.11	0.08

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	54	239	60	76	571	98	97	65	32
v/c Ratio	0.14	0.26	0.13	0.16	0.52	0.18	0.16	0.13	0.05
Control Delay	9.0	16.8	5.3	9.1	18.1	5.0	9.6	14.8	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	16.8	5.3	9.1	18.1	5.0	9.6	14.8	7.4
Queue Length 50th (ft)	9	33	0	13	88	0	11	15	1
Queue Length 95th (ft)	24	57	20	31	132	27	43	42	17
Internal Link Dist (ft)		561			537		350		294
Turn Bay Length (ft)	85		85	85		85		200	
Base Capacity (vph)	404	3539	1583	489	3539	1583	618	492	636
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.07	0.04	0.16	0.16	0.06	0.16	0.13	0.05

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	216	53	79	79	137	395	437	2774	158	1337	147
v/c Ratio	0.70	0.16	0.05	0.24	0.43	0.94	0.88	1.07	0.66	0.60	0.09
Control Delay	65.5	44.1	0.1	34.0	48.6	54.8	68.3	63.5	68.0	27.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.5	44.1	0.1	34.0	48.6	54.8	68.3	63.5	68.0	27.6	0.1
Queue Length 50th (ft)	85	35	0	45	94	150	175	~675	62	290	0
Queue Length 95th (ft)	126	74	0	85	158	#337	#269	#969	#107	340	0
Internal Link Dist (ft)		537			577			788		999	
Turn Bay Length (ft)	220		100	200			310		485		685
Base Capacity (vph)	314	338	1583	354	341	438	497	2586	241	2216	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.16	0.05	0.22	0.40	0.90	0.88	1.07	0.66	0.60	0.09

Intersection Summary

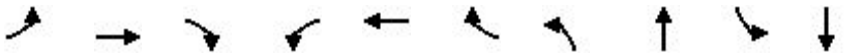
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	316	79	79	2895	1216	279
v/c Ratio	0.66	0.27	0.46	0.75	0.37	0.25
Control Delay	55.5	12.0	59.9	9.9	6.2	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	12.0	59.9	9.9	6.2	0.6
Queue Length 50th (ft)	121	0	59	381	67	0
Queue Length 95th (ft)	164	44	107	501	79	6
Internal Link Dist (ft)	571			838	1675	
Turn Bay Length (ft)	325	325	325			415
Base Capacity (vph)	572	329	221	3861	3286	1121
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.24	0.36	0.75	0.37	0.25

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	190	516	22	33	446	92	54	76	207	206
v/c Ratio	0.40	0.34	0.03	0.07	0.44	0.18	0.15	0.13	0.50	0.35
Control Delay	10.9	13.4	0.6	8.0	17.9	5.3	14.9	12.1	20.4	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	13.4	0.6	8.0	17.9	5.3	14.9	12.1	20.4	9.7
Queue Length 50th (ft)	31	46	0	5	61	0	12	14	53	24
Queue Length 95th (ft)	66	116	2	16	102	27	35	39	112	69
Internal Link Dist (ft)		888			561			492		376
Turn Bay Length (ft)	250		250	250		250	250		250	
Base Capacity (vph)	471	3539	1583	471	3539	1583	424	664	484	672
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.15	0.01	0.07	0.13	0.06	0.13	0.11	0.43	0.31

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	92	603	49	60	413	190	119	239	114
v/c Ratio	0.21	0.54	0.09	0.16	0.44	0.34	0.20	0.50	0.17
Control Delay	9.5	18.1	4.0	9.1	18.4	4.8	11.2	20.4	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	18.1	4.0	9.1	18.4	4.8	11.2	20.4	4.9
Queue Length 50th (ft)	16	94	0	10	61	0	17	63	1
Queue Length 95th (ft)	36	140	15	25	94	37	55	143	31
Internal Link Dist (ft)		561			537		350		294
Turn Bay Length (ft)	85		85	85		85		200	
Base Capacity (vph)	444	3539	1583	396	3539	1583	585	478	669
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.17	0.03	0.15	0.12	0.12	0.20	0.50	0.17

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	474	184	221	132	105	342	326	1537	395	2284	211
v/c Ratio	0.88	0.57	0.14	0.43	0.44	0.95	0.77	0.72	0.89	1.06	0.13
Control Delay	68.0	53.4	0.2	35.8	54.5	59.4	67.0	26.9	74.1	70.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.0	53.4	0.2	35.8	54.5	59.4	67.0	26.9	74.1	70.8	0.2
Queue Length 50th (ft)	187	132	0	75	76	119	127	372	158	~723	0
Queue Length 95th (ft)	#275	211	0	127	133	#302	#186	430	#251	#817	0
Internal Link Dist (ft)		537			577			788		999	
Turn Bay Length (ft)	220		100	200			310		485		685
Base Capacity (vph)	543	323	1583	334	248	368	429	2122	445	2160	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.57	0.14	0.40	0.42	0.93	0.76	0.72	0.89	1.06	0.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

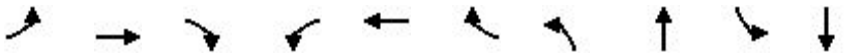
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	179	47	47	1716	2305	332
v/c Ratio	0.42	0.20	0.31	0.44	0.67	0.28
Control Delay	51.8	15.4	57.0	5.0	13.8	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.8	15.4	57.0	5.0	13.8	3.3
Queue Length 50th (ft)	67	0	35	138	238	31
Queue Length 95th (ft)	103	36	74	159	m230	m31
Internal Link Dist (ft)	571			838	1675	
Turn Bay Length (ft)	325	325	325			415
Base Capacity (vph)	572	303	221	3940	3418	1173
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.16	0.21	0.44	0.67	0.28

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	109	250	34	35	560	54	83	103	65	65
v/c Ratio	0.21	0.14	0.04	0.06	0.45	0.09	0.28	0.24	0.22	0.16
Control Delay	5.7	7.2	1.8	4.9	13.6	3.7	19.2	8.8	18.6	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	7.2	1.8	4.9	13.6	3.7	19.2	8.8	18.6	10.5
Queue Length 50th (ft)	11	13	0	4	63	0	19	6	15	6
Queue Length 95th (ft)	27	46	7	12	101	15	52	38	43	31
Internal Link Dist (ft)		888			561			492		376
Turn Bay Length (ft)	250		250	250		250	250		250	
Base Capacity (vph)	517	3539	1583	623	3539	1583	594	780	573	779
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.07	0.02	0.06	0.16	0.03	0.14	0.13	0.11	0.08

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	54	277	60	76	584	98	97	65	32
v/c Ratio	0.14	0.29	0.13	0.16	0.53	0.18	0.16	0.13	0.05
Control Delay	9.0	17.1	5.3	9.1	18.2	4.9	9.6	14.9	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	17.1	5.3	9.1	18.2	4.9	9.6	14.9	7.5
Queue Length 50th (ft)	9	39	0	13	91	0	12	15	1
Queue Length 95th (ft)	24	65	20	31	135	27	43	43	17
Internal Link Dist (ft)		561			537		350		294
Turn Bay Length (ft)	85		85	85		85		200	
Base Capacity (vph)	400	3539	1583	482	3539	1583	617	491	634
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.08	0.04	0.16	0.17	0.06	0.16	0.13	0.05

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	253	53	79	79	137	395	437	2774	158	1337	160
v/c Ratio	0.81	0.16	0.05	0.24	0.43	0.94	0.88	1.08	0.66	0.60	0.10
Control Delay	73.2	44.1	0.1	34.0	48.6	54.8	68.3	64.5	68.0	27.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.2	44.1	0.1	34.0	48.6	54.8	68.3	64.5	68.0	27.7	0.1
Queue Length 50th (ft)	100	35	0	45	94	150	175	~675	62	290	0
Queue Length 95th (ft)	#164	74	0	85	158	#337	#269	#969	#107	340	0
Internal Link Dist (ft)		537			577			788		999	
Turn Bay Length (ft)	220		100	200			310		485		685
Base Capacity (vph)	314	340	1583	354	341	438	497	2580	241	2210	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.16	0.05	0.22	0.40	0.90	0.88	1.08	0.66	0.60	0.10

Intersection Summary

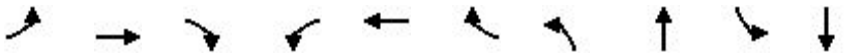
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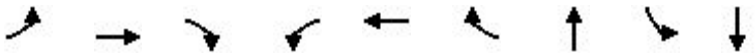
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	316	86	81	2895	1216	279
v/c Ratio	0.66	0.29	0.47	0.75	0.37	0.25
Control Delay	55.5	11.8	60.1	9.9	6.2	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	11.8	60.1	9.9	6.2	0.6
Queue Length 50th (ft)	121	0	61	381	67	0
Queue Length 95th (ft)	164	46	109	501	79	6
Internal Link Dist (ft)	571			838	1675	
Turn Bay Length (ft)	325	325	325			415
Base Capacity (vph)	572	335	221	3861	3283	1120
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.26	0.37	0.75	0.37	0.25

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	190	516	40	75	446	92	66	101	207	206
v/c Ratio	0.43	0.46	0.07	0.18	0.46	0.19	0.16	0.16	0.47	0.32
Control Delay	12.2	18.3	3.0	9.3	19.2	5.4	14.8	10.9	19.2	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	18.3	3.0	9.3	19.2	5.4	14.8	10.9	19.2	9.2
Queue Length 50th (ft)	35	77	0	13	65	0	15	16	53	24
Queue Length 95th (ft)	68	120	12	31	103	27	42	46	114	69
Internal Link Dist (ft)		888			561			492		376
Turn Bay Length (ft)	250		250	250		250	250		250	
Base Capacity (vph)	442	3539	1583	441	3539	1583	408	623	449	642
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.15	0.03	0.17	0.13	0.06	0.16	0.16	0.46	0.32

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	92	628	49	60	455	190	119	239	114
v/c Ratio	0.22	0.55	0.09	0.16	0.46	0.33	0.21	0.51	0.17
Control Delay	9.4	18.1	4.0	9.0	18.5	4.7	11.4	20.9	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	18.1	4.0	9.0	18.5	4.7	11.4	20.9	5.0
Queue Length 50th (ft)	16	98	0	10	68	0	18	64	1
Queue Length 95th (ft)	36	145	15	25	104	37	55	145	31
Internal Link Dist (ft)		561			537		350		294
Turn Bay Length (ft)	85		85	85		85		200	
Base Capacity (vph)	432	3539	1583	392	3539	1583	578	472	663
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.18	0.03	0.15	0.13	0.12	0.21	0.51	0.17

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	498	184	221	132	105	342	326	1537	395	2284	252
v/c Ratio	0.92	0.56	0.14	0.43	0.44	0.95	0.77	0.73	0.89	1.06	0.16
Control Delay	72.8	53.2	0.2	35.8	54.5	59.4	67.0	27.0	74.1	71.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.8	53.2	0.2	35.8	54.5	59.4	67.0	27.0	74.1	71.9	0.2
Queue Length 50th (ft)	197	132	0	75	76	119	127	372	158	~723	0
Queue Length 95th (ft)	#296	211	0	127	133	#302	#186	430	#251	#817	0
Internal Link Dist (ft)		537			577			788		999	
Turn Bay Length (ft)	220		100	200			310		485		685
Base Capacity (vph)	543	326	1583	334	248	368	429	2116	445	2154	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.56	0.14	0.40	0.42	0.93	0.76	0.73	0.89	1.06	0.16

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	179	52	55	1716	2305	332
v/c Ratio	0.42	0.21	0.35	0.44	0.68	0.28
Control Delay	51.8	15.1	57.8	5.0	14.0	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.8	15.1	57.8	5.0	14.0	3.3
Queue Length 50th (ft)	67	0	41	138	238	31
Queue Length 95th (ft)	103	38	83	159	m230	m30
Internal Link Dist (ft)	571			838	1675	
Turn Bay Length (ft)	325	325	325			415
Base Capacity (vph)	572	307	221	3940	3407	1170
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.17	0.25	0.44	0.68	0.28

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

PINERY MEADOWS

PRELIMINARY PLAN

PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 136 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

LINETYPE LEGEND

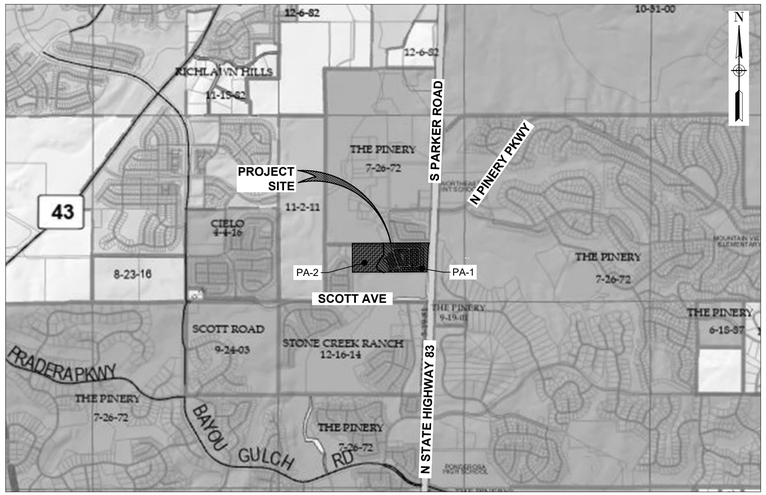
PROPOSED		EXISTING
	AASHTO SIGHT TRIANGLE	
	CENTERLINE OF ROAD	
5280	CONTOUR - MAJOR	5280
5279	CONTOUR - MINOR	5279
	DRAINAGE SWALE	
X X	FENCE - BARBED WIRE	X X
	FENCE - WOOD POST	
	PROPERTY BOUNDARY	
	RETAINING WALL	
	RIGHT-OF-WAY LINE	
	STORM SEWER	

SYMBOLS LEGEND

2.0%	SLOPE
80.00	SPOT ELEVATION
	STORM INLET
D	STORM MANHOLE

HATCHING LEGEND

	CONCRETE PAVING
	RIPRAP / GRAVEL



VICINITY MAP
SCALE 1" = 2000'

SHEET INDEX:

1	COVER SHEET
2	EXISTING CONDITIONS
3	OVERALL PRELIMINARY PLAN
4	PRELIMINARY PLAN
5	OVERALL PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
6	PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
7	PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
8	PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
9	PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN
10	CROSS SECTIONS AND DETAILS

LAND USE TABLE:

GROSS AREA	39.53 AC	
NET AREA (EXCLUDING PUBLIC AND PRIVATE RIGHT-OF-WAY)	34.29 AC	86.74%
TOTAL NUMBER OF LOTS	136	
AREA OF LOTS	9.48 AC	23.97%
TOTAL NUMBER OF TRACTS	11	
AREA OF TRACTS	24.92 AC	63.04%
AREA OF LOCAL STREET DEDICATION	3.40 AC	8.60%
AREA OF PRIVATE ALLEYS (OWNED AND MAINTAINED BY H.O.A / METRO DISTRICT)	0.66 AC	1.67%
SMALLEST RESIDENTIAL LOT	2,378 SF / 0.05 AC	
LARGEST RESIDENTIAL LOT	7,329 SF / 0.17 AC	
AVERAGE RESIDENTIAL LOT	3,202 / 0.07 AC	
DENSITY (GROSS)	3.44 DU / AC	
ZONING/LAND USE	PLANNED DEVELOPMENT (PD) / SINGLE FAMILY (SF) DETACHED RESIDENTIAL / SINGLE FAMILY (SF) ATTACHED RESIDENTIAL	

TRACT AREA TABLE

TRACT	TRACT USE	OWNERSHIP / MAINTENANCE	SQUARE FEET	ACRES
TRACT A	PUBLIC ACCESS, LANDSCAPE, PARK, AMENITIES, AND CLUSTER DRIVEWAY	METRO DISTRICT / H.O.A.	31,890.14	0.73
TRACT B	RETAINING WALL, PUBLIC ACCESS, LANDSCAPE, BUFFER, AND UTILITIES	METRO DISTRICT / H.O.A.	157,279.82	3.61
TRACT C	DETENTION POND, RETAINING WALLS, OPEN SPACE, PUBLIC ACCESS, LANDSCAPE, BUFFER, AND UTILITIES	METRO DISTRICT	837,761.74	19.23
TRACT D	PUBLIC ACCESS, LANDSCAPE, BUFFER, AND UTILITIES	METRO DISTRICT / H.O.A.	4,451.23	0.10
TRACT E	PUBLIC ACCESS, LANDSCAPE, BUFFER, AND UTILITIES	METRO DISTRICT / H.O.A.	11,990.92	0.28
TRACT F	PUBLIC ACCESS, LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	METRO DISTRICT / H.O.A.	8,194.13	0.19
TRACT G	PUBLIC ACCESS, LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	METRO DISTRICT / H.O.A.	8,067.95	0.19
TRACT H	PUBLIC ACCESS, LANDSCAPE, BUFFER, AND UTILITIES	METRO DISTRICT / H.O.A.	1,915.08	0.04
TRACT I	PUBLIC ACCESS, LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	METRO DISTRICT / H.O.A.	8,275.38	0.19
TRACT J	PUBLIC ACCESS, LANDSCAPE, BUFFER, AND UTILITIES	METRO DISTRICT / H.O.A.	1,915.08	0.04
TRACT K	PUBLIC ACCESS, LANDSCAPE, BUFFER, UTILITIES, AND CLUSTER DRIVEWAYS	METRO DISTRICT / H.O.A.	7,572.30	0.17

PRIVATE ALLEY TABLE:

ALLEY LABEL	SQUARE FEET	ACRES	USE	OWNERSHIP / MAINTENANCE
ROAD C	12,497.43	0.29	VEHICULAR LOT ACCESS / GARAGE ACCESS	H.O.A. / METRO DISTRICT
ROAD E	11,180.00	0.26	VEHICULAR LOT ACCESS / GARAGE ACCESS	H.O.A. / METRO DISTRICT
ROAD F	3,216.73	0.07	VEHICULAR LOT ACCESS / GARAGE ACCESS	H.O.A. / METRO DISTRICT

LEGAL:

A TRACT OF LAND SITUATED IN THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, COLORADO, DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF SAID SECTION 10 AND CONSIDERING THE SOUTH LINE OF SAID SECTION 10 TO BEAR N89°44'01"E WITH ALL BEARINGS CONTAINED HEREIN RELATIVE THERETO:
THENCE N89°44'01"E, ON SAID SOUTH LINE A DISTANCE OF 1326.31 FEET, TO THE SOUTHWEST CORNER OF THE EAST 1/2 OF THE SOUTHWEST 1/4 OF SAID SECTION 10;
THENCE N89°43'39"E, ON SAID SOUTH LINE, A DISTANCE OF 805.19 FEET;
THENCE N00°19'54"W, A DISTANCE OF 827.39 FEET, TO THE POINT OF BEGINNING;

THENCE CONTINUING N00°19'54"W, A DISTANCE OF 813.92 FEET, TO THE EXTENSION OF THE SOUTH LINE OF PINERY WEST FILING NO. 2;
THENCE N89°39'49"E, ON SAID SOUTH LINE OF PINERY WEST FILING NO. 2, A DISTANCE OF 2156.25 FEET TO THE WEST RIGHT OF WAY LINE OF STATE HIGHWAY NO. 83 PER THAT DEPARTMENT OF TRANSPORTATION RIGHT OF WAY PLAN, FEDERAL AID PROJECT NO. FR 083-1(39);
THENCE SOUTHERLY ON SAID WEST RIGHT OF WAY LINE THE FOLLOWING (5) FIVE COURSES;
1) S01°46'32"W, A DISTANCE OF 20.22 FEET;
2) S89°43'24"W, A DISTANCE OF 5.60 FEET;
3) S10°56'47"W, A DISTANCE OF 130.03 FEET;
4) S02°44'47"W, A DISTANCE OF 432.60 FEET;
5) S02°50'32"W, A DISTANCE OF 236.80 FEET;
THENCE S89°43'27"W, A DISTANCE OF 2088.14 FEET TO THE POINT OF BEGINNING;

CONTAINING 1,721,739+/- SQUARE FEET (39.536+/- ACRES)

TOGETHER WITH AN EASEMENT FOR ACCESS, SAID EASEMENT BEING 45.00 FEET IN WIDTH WITH THE WEST LINE OF SAID EASEMENT BEING DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWEST CORNER OF THE ABOVE DESCRIBED PARCEL;
THENCE S 0°02'42" E, ALONG THE WEST LINE OF SUBJECT EASEMENT, A DISTANCE OF 827.04 FEET TO THE SOUTH LINE OF SAID SECTION 10 AND TO THE CENTER LINE OF COUNTY ROAD NO. 39, AND TO THE POINT OF TERMINUS OF SUBJECT EASEMENT,

BENCHMARK:

NAVD 1988 BASED ON THE DOUGLAS COUNTY CONTROL MONUMENT 1051038, ELEVATION 6053.87 (NAVD 1988)
CONTOUR INTERVAL = 1.0'

BASIS OF BEARINGS:

THE EAST LINE OF THE SOUTHEAST 1/4 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST, ASSUMED TO BEAR S00°33'39"E, MONUMENTED BY A 3 1/4" ALUMINUM CAP ON THE NORTH AND SOUTH.

NOTES:

1. ALL TRACTS WILL BE OWNED AND MAINTAINED BY THE H.O.A. / METRO DISTRICT, ITS SUCCESSORS AND ASSIGNS. THE H.O.A. / METRO DISTRICT WILL OWN AND HOLD THE MAINTENANCE RESPONSIBILITY FOR ALL LANDSCAPING, DETENTION PONDS, RETAINING WALLS, DRIVEWAYS, OPEN SPACE, AND COMMUNITY AMENITIES CONTAINED WITHIN THESE TRACTS.

2. SECONDARY DRAINAGE EASEMENTS WILL BE GRANTED TO DOUGLAS COUNTY AT THE TIME OF FINAL PLAT TO ACCOMMODATE DRAINAGE INFRASTRUCTURE FOR THE PURPOSES OF ACCESSING, MAINTAINING, AND REPAIRING STORM WATER MANAGEMENT IMPROVEMENTS, INCLUDING, BUT NOT LIMITED TO, INLETS, PIPES, CULVERTS, CHANNELS, DITCHES, HYDRAULIC STRUCTURES, RIPRAP, DETENTION BASINS, FOREBAYS, MICROPOOLS, AND WATER QUALITY FACILITIES (COLLECTIVELY, THE "FACILITIES"). THE MAINTENANCE AND REPAIR OF THE FACILITIES LOCATED IN THE SUBDIVISION WILL BE ACCEPTED BY DOUGLAS COUNTY AT THE TIME OF FINAL PLAT AND WILL BE THE RESPONSIBILITY OF THE SYSTEM OWNER. IN THE EVENT SUCH MAINTENANCE AND REPAIRS ARE NOT PERFORMED BY THE SYSTEM OWNER TO THE SATISFACTION OF DOUGLAS COUNTY, THEN DOUGLAS COUNTY WILL HAVE THE RIGHT, BUT NOT THE OBLIGATION, TO ENTER SAID SUBDIVISION AFTER TEN (10) DAYS PRIOR WRITTEN NOTICE TO THE SYSTEM OWNER, UNLESS THERE IS AN EMERGENCY, IN WHICH CASE DOUGLAS COUNTY WILL GIVE NOTICE AS SOON AS PRACTICABLE, TO PERFORM ALL NECESSARY WORK, THE COST OF WHICH WILL BE PAID BY THE SYSTEM OWNER UPON BILLING. IN THE EVENT THE SYSTEM OWNER FAILS TO REIMBURSE DOUGLAS COUNTY WITHIN THIRTY (30) DAYS AFTER SUBMISSION OF THE BILL FOR THE COSTS INCURRED, DOUGLAS COUNTY WILL HAVE THE RIGHT TO ENFORCE SUCH OBLIGATION BY APPROPRIATE LEGAL ACTION. IT IS THE SYSTEM OWNER'S RESPONSIBILITY TO CONSTRUCT, MAINTAIN AND REPAIR THE FACILITIES IN A MANNER CONSISTENT WITH ALL APPLICABLE PLANS APPROVED OR ACCEPTED BY DOUGLAS COUNTY.

3. NO IMPROVEMENTS THAT CONFLICT WITH OR INTERFERE WITH CONSTRUCTION, MAINTENANCE OR ACCESS TO UTILITIES SHALL BE PLACED WITHIN THE UTILITY EASEMENTS. PROHIBITED IMPROVEMENTS INCLUDE, BUT ARE NOT LIMITED TO, PERMANENT STRUCTURES, BUILDINGS, COUNTER-FORTS, DECKS, ATTACHED PORCHES, ATTACHED STAIRS, WINDOW WELLS, AIR CONDITIONING UNITS, RETAINING WALLS/COMPONENTS AND OTHER OBJECTS THAT MAY INTERFERE WITH THE UTILITY FACILITIES OR ACCESS, USE AND MAINTENANCE THEREOF. PROHIBITED IMPROVEMENTS MAY BE REMOVED BY THE ENTITIES RESPONSIBLE FOR PROVIDING THE UTILITY SERVICES. THE OWNERS OF THE PROPERTY SUBJECT TO OR ADJACENT TO THE UTILITY EASEMENTS SHOWN HEREIN ARE RESPONSIBLE FOR THE MAINTENANCE AND OPERATION OF SUCH AREAS, WHICH DOES NOT INCLUDE UTILITY LINES AND RELATED FACILITIES. WHEN THE OWNER(S) OR ADJACENT OWNERS FAIL TO ADEQUATELY MAINTAIN SUCH UTILITY EASEMENTS, INCLUDING THE REMOVAL OF PROHIBITED IMPROVEMENTS, THE MAINTENANCE, OPERATION, RECONSTRUCTION AND REMOVAL SHALL BE AT THE COST OF THE OWNER(S).

4. EXISTING 30' GAS EASEMENT (BOOK 83, PAGE 131) WILL BE VACATED WITH THIS PROJECT AT THE TIME OF FINAL PLAT. THE GAS LINE WILL BE REALIGNED WITHIN A NEW EASEMENT ALONG PINERY CENTER BOULEVARD.

DEVELOPER/OWNER:

INTEGRITY LAND VENTURES LLC
7200 S. ALTRON WAY, SUITE C400
CENTENNIAL, CO 80112
PH: 303-842-5311
CONTACT: JACKSON GIVENS
EMAIL: JACKSON@INTEGRITYLANDVENTURES.COM

CIVIL ENGINEER:

ROTH LANG ENGINEERING GROUP LLC

6855 S HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PH: 303-841-9365
CONTACT : KURT LANG, P.E.
EMAIL: KLANG@ROTHLANG.COM

SURVEYOR:

GILLIANS LAND CONSULTANTS
P.O. BOX 375
BENNETT, CO 80102
PH: 303-972-6640
CONTACT: ROBERT HARRIS, PLS
EMAIL: RHARRIS@GILLIANSLC.COM

LANDSCAPE ARCHITECT/PLANNER:

NORRIS DESIGN
1101 BANNOCK STREET
DENVER, CO 80204
PH: 303-892-1166
CONTACT: CARL RUNGE
EMAIL: CRUNGE@NORRIS-DESIGN.COM

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

7/15/25

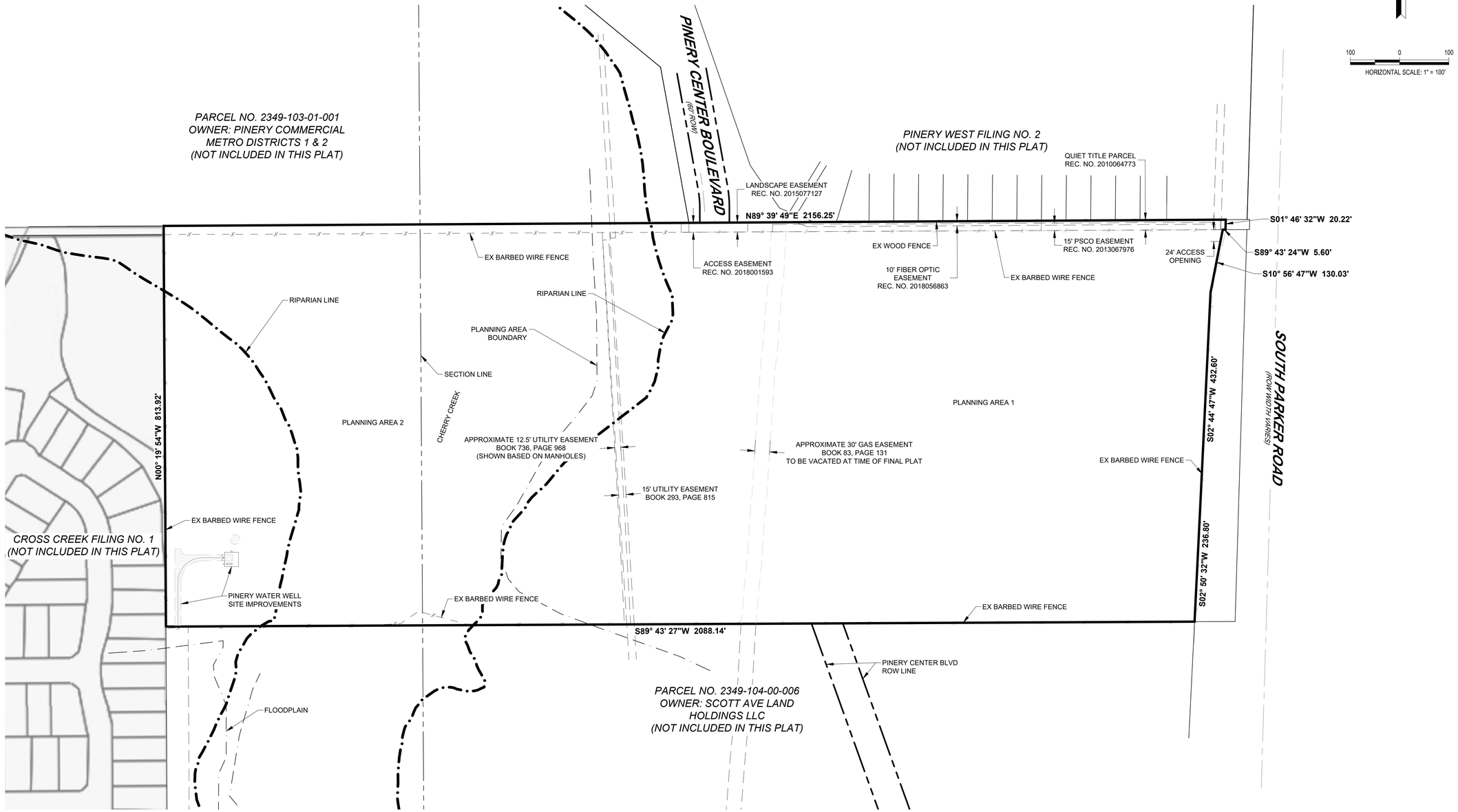
COVER SHEET

SHEET NUMBER:
1
1 of 10

PINERY MEADOWS

PRELIMINARY PLAN

PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 136 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009



NOTE:

ALL EXISTING EASEMENTS ARE TO REMAIN UNLESS OTHERWISE NOTED.

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

7/15/25

EXISTING CONDITIONS

SHEET NUMBER: **2**

2 of 10

PINERY MEADOWS

PRELIMINARY PLAN

PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 136 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

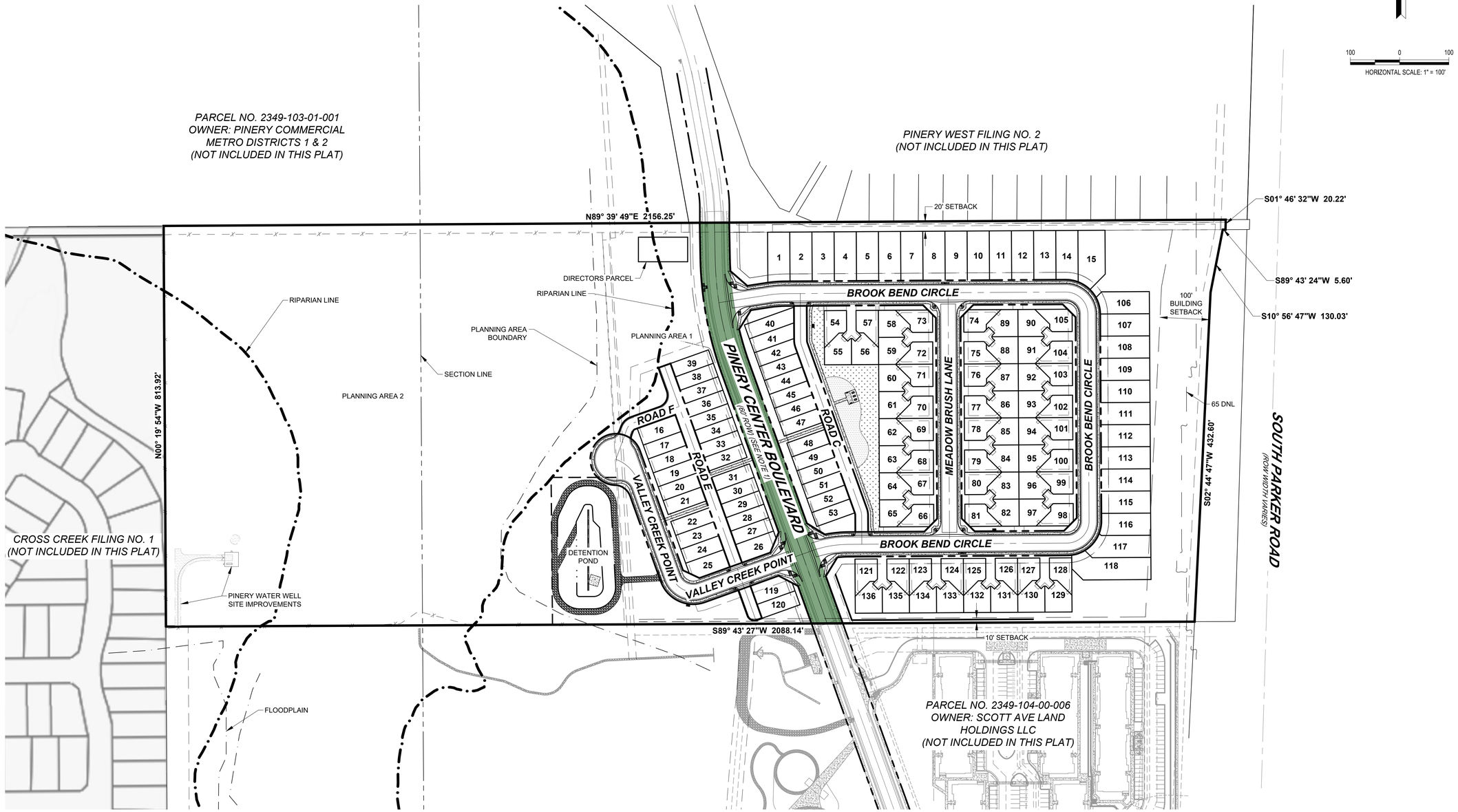
HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.

N

100 0 100
HORIZONTAL SCALE: 1" = 100'



ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

7/15/25

OVERALL PRELIMINARY PLAN

SHEET NUMBER: **3**

3 of 10

PINERY MEADOWS

PRELIMINARY PLAN

PLANNING AREAS 1 AND 2

LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66 WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO

39.53 ACRES, 136 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

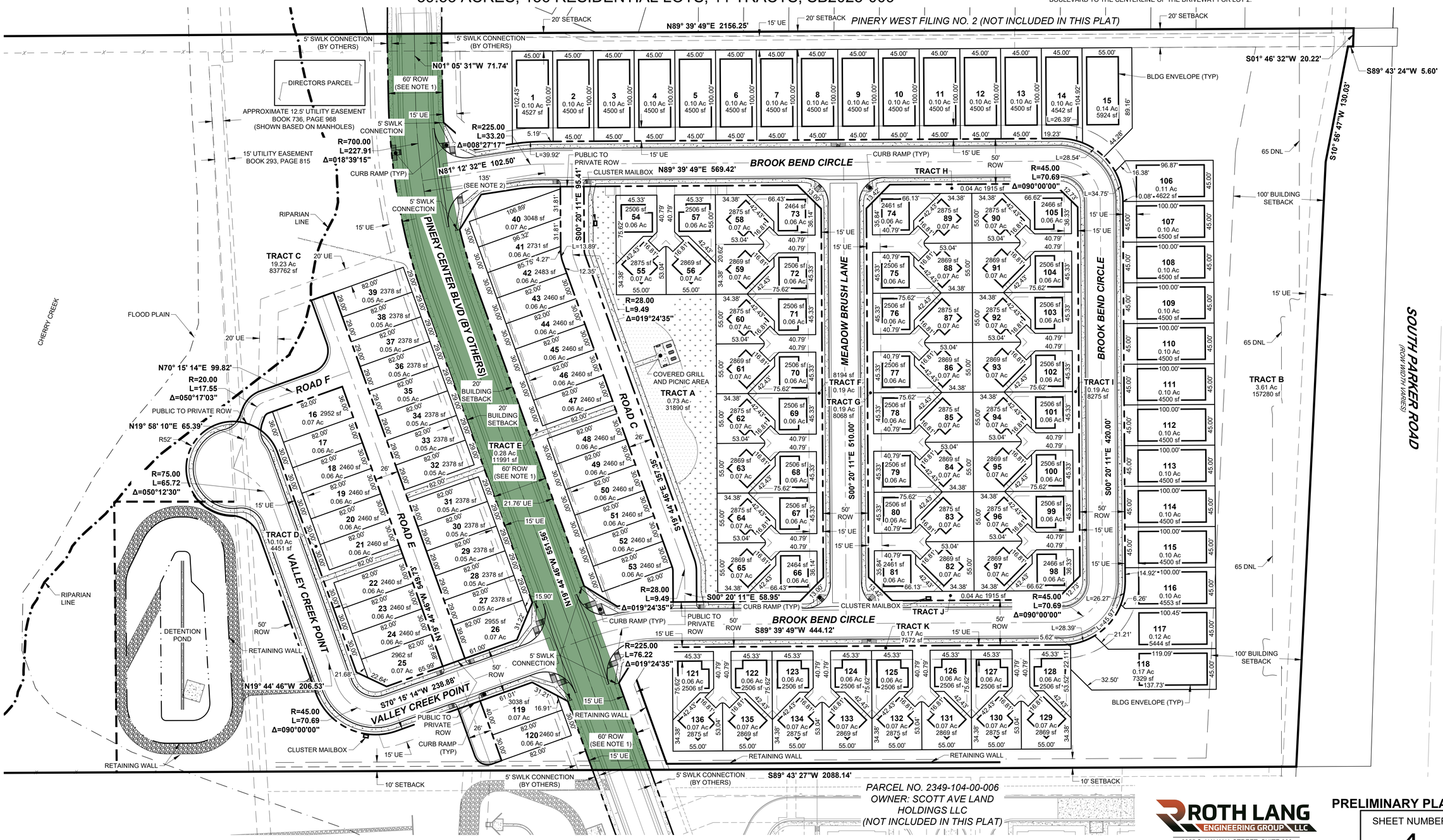
NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.
2. 135' IS THE DIMENSION FROM THE CENTERLINE OF PINERY CENTER BOULEVARD TO THE CENTERLINE OF THE DRIVEWAY FOR LOT 2.

N

50 0 50

HORIZONTAL SCALE: 1" = 50'



PRELIMINARY PLAN

SHEET NUMBER: 4

4 of 10

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

7/15/25

PINERY MEADOWS

PRELIMINARY PLAN

PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 136 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

SLOPE LEGEND	
	15% - 20%
	GREATER THAN 20%

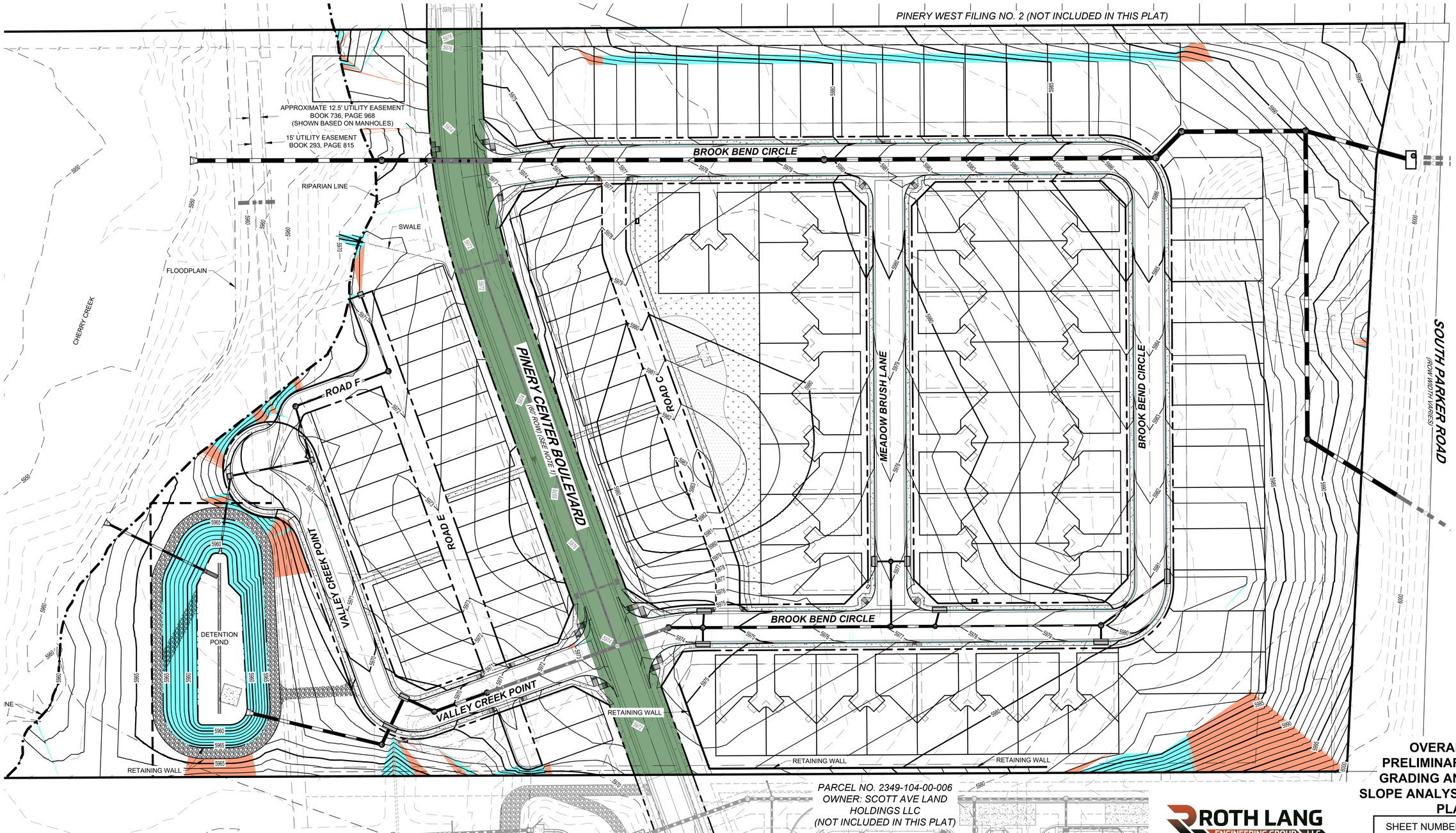
HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

N

50 0 50
HORIZONTAL SCALE: 1" = 50'

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.



OVERALL PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

7/15/25

SHEET NUMBER: 5
5 of 10

PINERY MEADOWS

PRELIMINARY PLAN

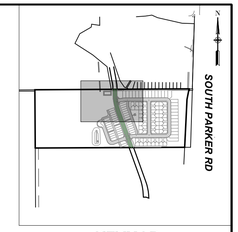
PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 136 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

SLOPE LEGEND	
	15% - 20%
	GREATER THAN 20%

HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

N

30 0 30
HORIZONTAL SCALE: 1" = 30'



KEYMAP
1" = 1000'

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.

PARCEL NO. 2349-103-01-001
OWNER: PINERY COMMERCIAL METRO DISTRICTS 1 & 2
(NOT INCLUDED IN THIS PLAT)

PINERY WEST FILING NO. 2
(NOT INCLUDED IN THIS PLAT)

48" FES
48" RCP
6' DIA MH
73.06 FG
SWALE
69.40 FG/ME
5' TYPE R INLET
18" RCP
ROAD E
71.50 FG
5' DIA MH
ROAD F
5' DIA MH
18" RCP
18" RCP
PINERY CENTER BOULEVARD
(60' ROW) (SEE NOTE 1)
BROOK BEND CIRCLE
48" RCP
ROAD C
MATCHLINE - SEE SHEET 8
MATCHLINE - SEE SHEET 7

PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

7/15/25

SHEET NUMBER:
6
6 of 10

PINERY MEADOWS

PRELIMINARY PLAN

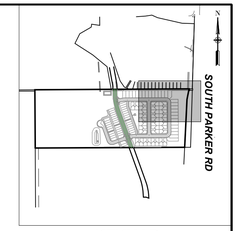
PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 136 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

SLOPE LEGEND	
	15% - 20%
	GREATER THAN 20%

HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

N

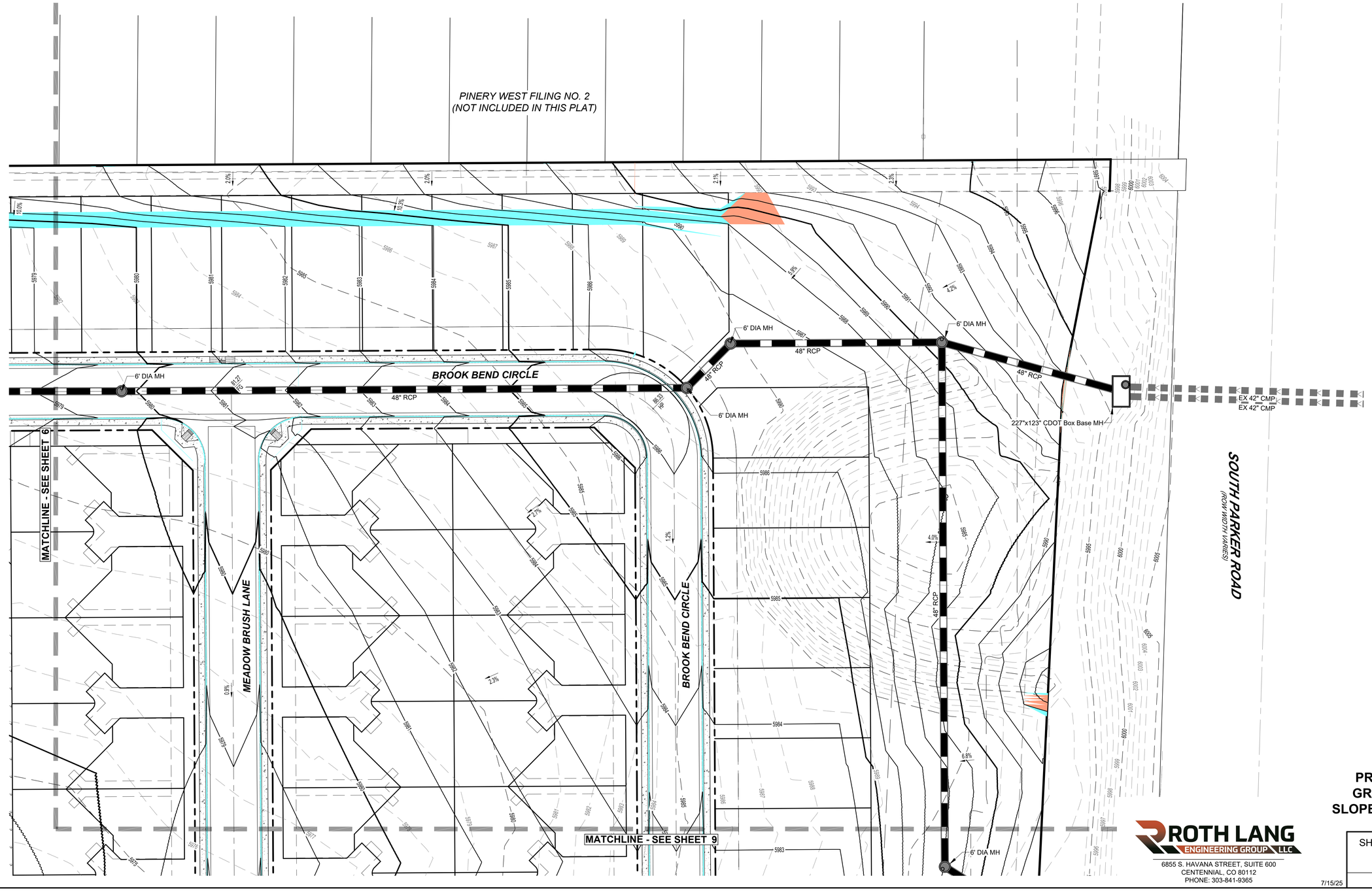
30 0 30
HORIZONTAL SCALE: 1" = 30'



KEYMAP
1" = 1000'

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.



ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN

SHEET NUMBER:
7
7 of 10

7/15/25

PINERY MEADOWS

PRELIMINARY PLAN

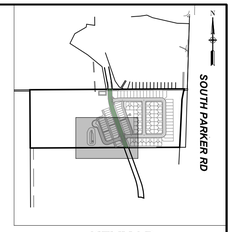
PLANNING AREAS 1 AND 2
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WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 136 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

SLOPE LEGEND	
	15% - 20%
	GREATER THAN 20%

HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

N

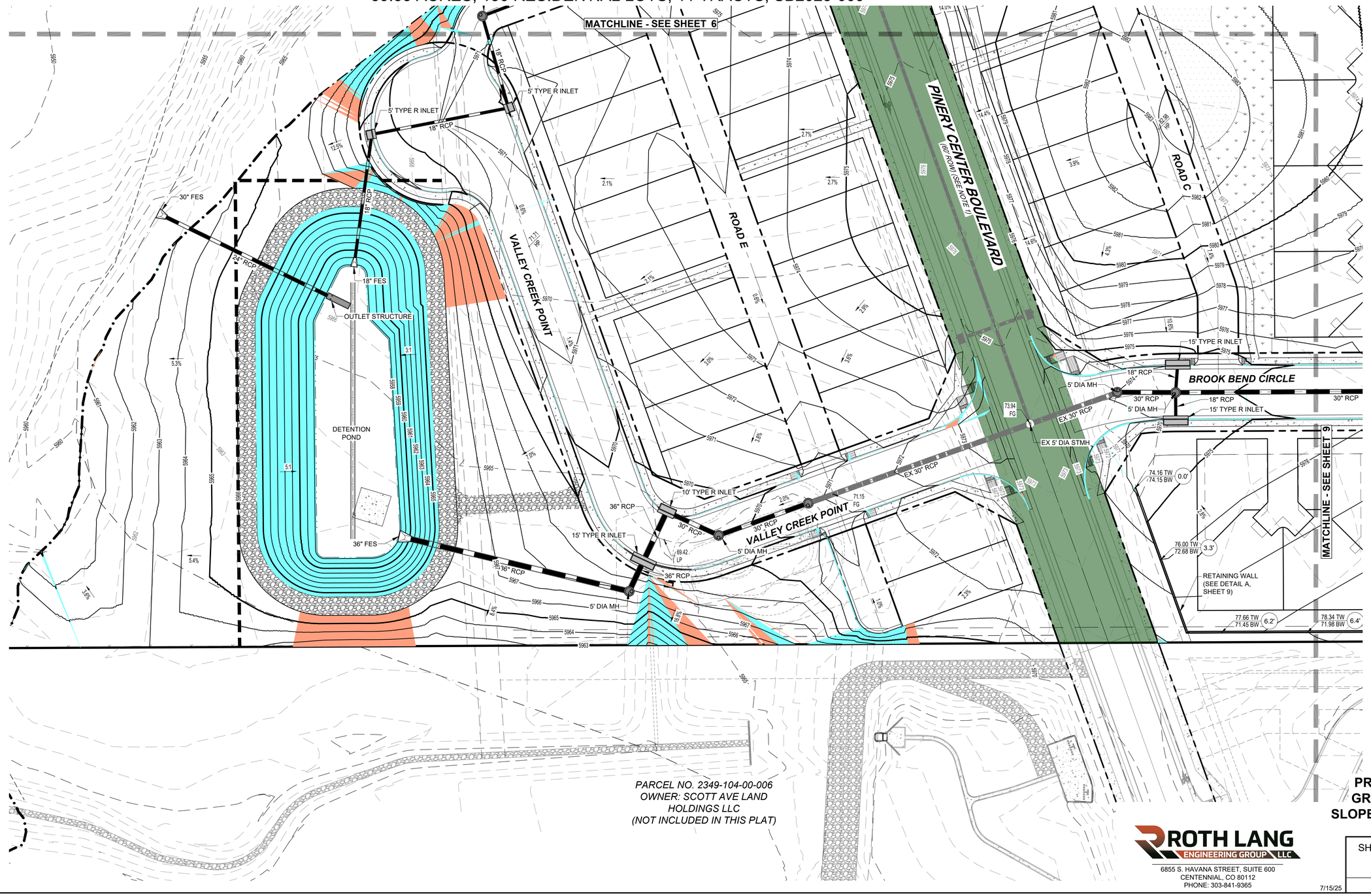
30 0 30
HORIZONTAL SCALE: 1" = 30'



KEYMAP
1" = 1000'

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.



PARCEL NO. 2349-104-00-006
OWNER: SCOTT AVE LAND HOLDINGS LLC
(NOT INCLUDED IN THIS PLAT)

PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
CENTENNIAL, CO 80112
PHONE: 303-841-9365

7/15/25

SHEET NUMBER:
8
8 of 10

PINERY MEADOWS

PRELIMINARY PLAN

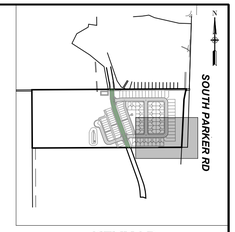
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WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 136 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

SLOPE LEGEND	
	15% - 20%
	GREATER THAN 20%

HATCHING LEGEND	
	PINERY CENTER BLVD ROW CONSTRUCTED BY OTHERS

N

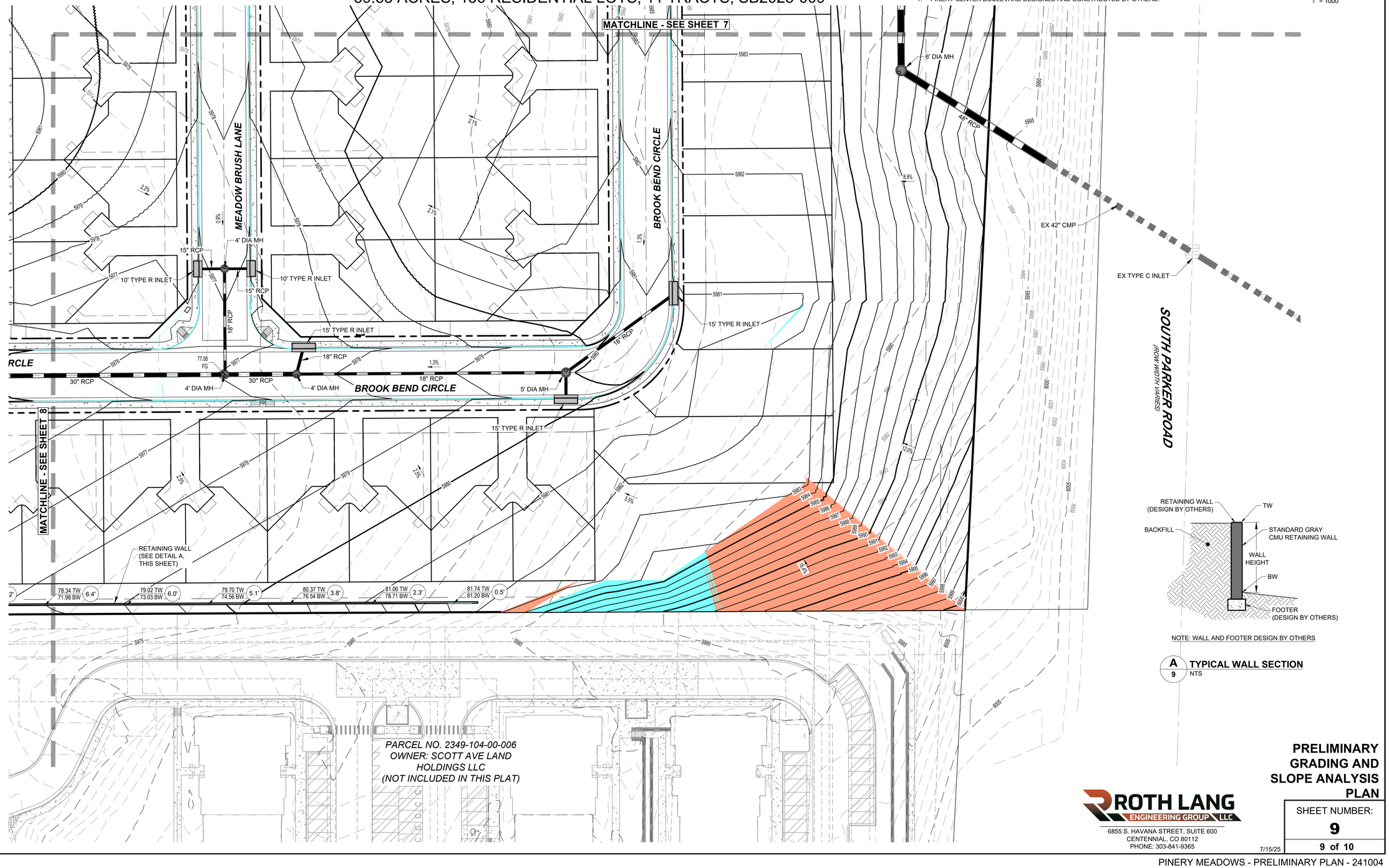
30 0 30
HORIZONTAL SCALE: 1" = 30'



KEYMAP
1" = 1000'

NOTES:

1. PINERY CENTER BOULEVARD DESIGNED AND CONSTRUCTED BY OTHERS.



NOTE: WALL AND FOOTER DESIGN BY OTHERS

A/9 **TYPICAL WALL SECTION**
NTS

PRELIMINARY GRADING AND SLOPE ANALYSIS PLAN

ROTH LANG ENGINEERING GROUP LLC
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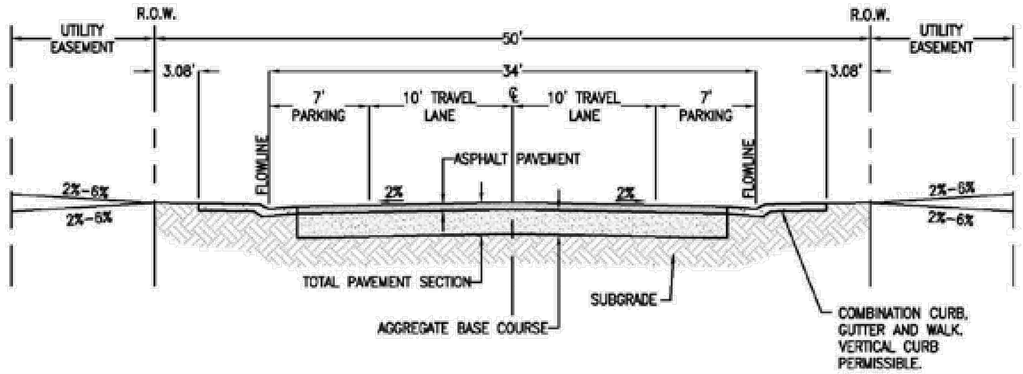
SHEET NUMBER: 9
9 of 10

PINERY MEADOWS

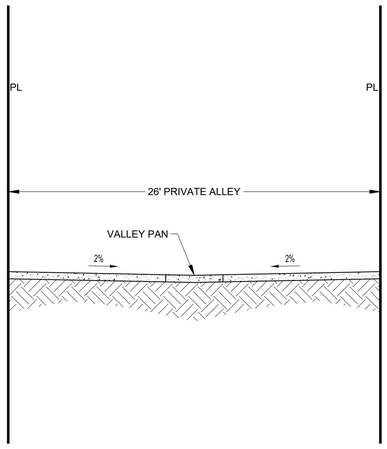
PRELIMINARY PLAN

PLANNING AREAS 1 AND 2
LOCATED IN THE THE SOUTH 1/2 OF SECTION 10, TOWNSHIP 7 SOUTH, RANGE 66
WEST OF THE 6TH PRINCIPAL MERIDIAN, DOUGLAS COUNTY, STATE OF COLORADO
39.53 ACRES, 136 RESIDENTIAL LOTS, 11 TRACTS, SB2025-009

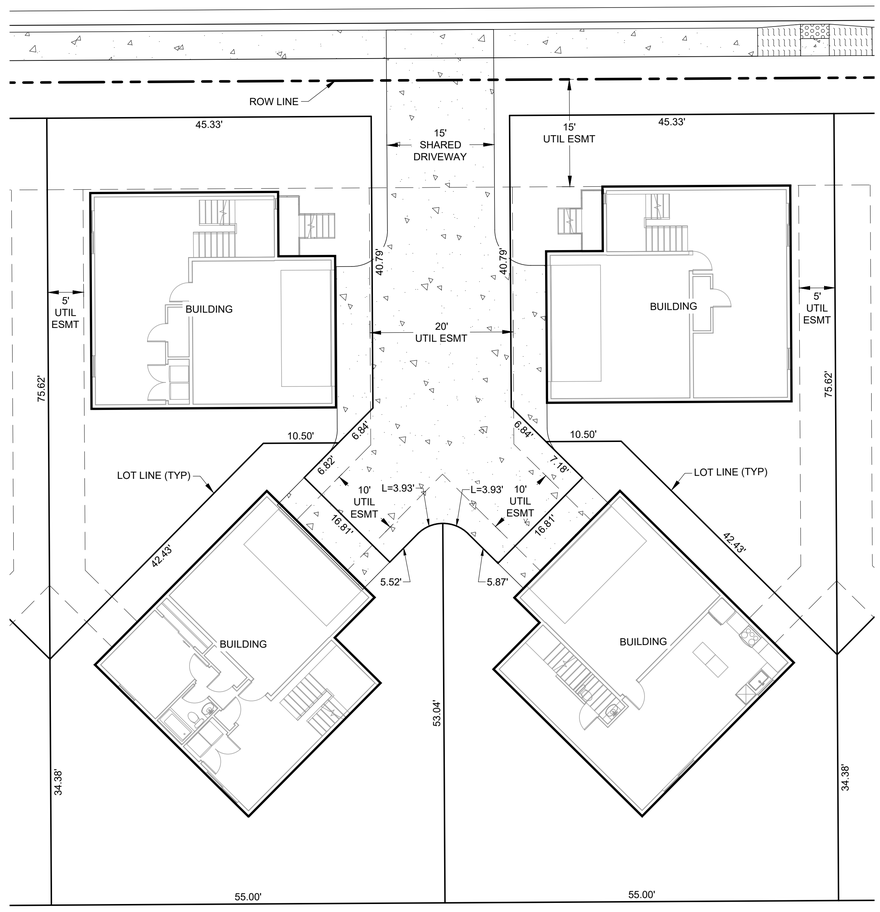
URBAN LOCAL (TYPE I)
STANDARD SECTION SP.1



A - TYPICAL LOCAL STREET SECTION
1" = 5'



B - TYPICAL PRIVATE ALLEY SECTION
1" = 5'



C - TYPICAL CLUSTER PRODUCT LAYOUT
1" = 10'

ROTH LANG ENGINEERING GROUP LLC
6855 S. HAVANA STREET, SUITE 600
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CROSS SECTIONS AND DETAILS

SHEET NUMBER:
10
10 of 10

7/15/25