

PROJECT NAME

HANSEN FARM #PDP170036

STAFF

Pete Wray, Senior City Planner

PROJECT INFORMATION

PROJECT DESCRIPTION: This is a request for a Project Development Plan (P.D.P.) for a portion of the Hansen Farm property located at the West side of S. Timberline Road at Zephyr Road - (parcel # 86071000002). The P.D.P. includes 178 dwelling units (116 single-family detached, and 62 single-family attached), stormwater detention, natural habitat buffer, and future park on a total of 55.2 acres. The proposed P.D.P. represents an initial phase of a multiple phase development as described in the approved Overall Development Plan. Future development phases not part of this P.D.P. include the Medium Density Mixed-Use Neighborhoods (MMN), and Neighborhood Commercial (NC) zone districts and development tracts. Primary access to the site is from S. Timberline Road. The site zoning is Low Density Mixed-Use Neighborhood (LMN).

APPLICANT: Lorson South Land Corp.
c/o The Birdsall Group
444 Mountain Avenue
Berthoud, CO 80513

OWNER: Lorson South Land Corp.
c/o Mr. Jeff Mark
212 N. Wahsatch Avenue, Suite 301
Colorado Springs, CO 80903

RECOMMENDATION: Staff recommends approval of the P.D.P.

EXECUTIVE SUMMARY

- A. The P.D.P. is consistent with related policies in the *Fossil Creek Reservoir Area Plan*, and element of *City Plan*, and *City Plan*.
- B. The P.D.P. complies with the process located in Division 2.2 – Common Development Review Procedures for Development Applications of Article 2 – Administration.
- C. The P.D.P. complies with the applicable standards located in Division 4.5, Low Density Mixed-Use Neighborhood zone district of Article Four - Districts.
- D. The project complies with the applicable standards located in Article 3 - General Development Standards.

COMMENTS:

1. Background:

The surrounding zoning and land uses are as follows:

- N: L-M-N; Willow Springs Subdivision
- S: L-M-N; Rennat Property, existing residence
- E: L-M-N; Timbers Subdivision, Bacon Elementary School
- W: L-M-N, Rennat Property, existing residence

The parcel was annexed on February 5, 2013 included in the Hansen Farm Annexation.

2. Consistent with *Fossil Creek Reservoir Area Plan*, and *City Plan* related Policies:

The *Fossil Creek Reservoir Area Plan* (FCP), an element of *City Plan* was adopted in 1998 and represents a more specific policy plan and general direction for future annexation, zoning, and development in the plan area. The FCP provides key policies relative to the Hansen Farm P.D.P (see attachment Related Policies for more information). Related Policies:

- *FC-LUF-5 Relationships and Transitions at Edges of Neighborhood Development.*
- *FC-LUF-3 Mixed-Use Neighborhoods.*

City Plan, the community's comprehensive plan, last updated in 2011 provides more general city-wide policy direction for future development. The City Structure Plan map identifies the Hansen Farm P.D.P. future land use as Low density Mixed-Use Neighborhoods (LMN) establishing a basis for the same zoning (see attachment Related Policies for more information). Related Policies:

- *Policy ENV 1.2 –Regulate Development along Waterways.*
- *Policy LIV 7.1 – Encourage Variety in Housing Types and Locations.*
- *PRINCIPLE LIV 21: New neighborhoods will be integral parts of the broader community structure, connected through shared facilities such as streets, schools, parks, transit stops, trails, civic facilities, and a Neighborhood Commercial Center or Community Commercial District.*
- *Policy LIV 21.2 – Establish an Interconnected Street and Pedestrian Network.*
- *Policy LIV 23.1 – Provide Neighborhood Parks and Outdoor Spaces.*

- Policy LIV 10.1 – Design Safe, Functional, and Visually Appealing Streets.

The P.D.P. is consistent with the related policies from the *Fossil Creek Reservoir Area Plan* and *City Plan*. The P.D.P. provides LMN land uses, densities, and housing types consistent with current zoning and policies of approved plans. The P.D.P. provides natural habitat buffering, future neighborhood park and passive open space. The P.D.P. provides a network of local streets and access to S. Timberline Road, a future 4-land arterial street, and connections to future regional trail system.

3. Compliance with Article Two, Administration - Common Development Review Procedures for Development Applications:

A. *Section 2.2.2. Step 2: Neighborhood Meetings*

The proposed development is for single-family dwellings, which are permitted uses in the LMN - Low Density Mixed-Use Neighborhood Zoning District, subject to an administrative (Type 1) review and public hearing. The LUC does not require that a neighborhood meeting be held for development proposals that are not subject to a Planning and Zoning Board (Type 2) review. However, two neighborhood meetings were held in 2017 for a combination of information for the O.D.P. and project development plan (see attached Meeting summaries).

4. Compliance with Article Four, Section 4.5, L-M-N Standards:

A. *Section 4.5(B)(2) – Permitted Uses*

The P.D.P. includes two land uses – single-family detached and single-family attached dwellings. Both are permitted in the L-M-N zone subject to Administrative (Type One) Review.

B. *Section 4.5(D)(1) – Density*

The P.D.P. features 178 dwelling units on 55.19 acres for a gross density of 3.3 dwelling units per gross acre. The net density equals 5.5 dwelling units per net acre. In compliance with the standard, the gross density is under the maximum allowed (9.00 d.u./a) and the net density exceeds the required minimum net density (3.00 d.u./a).

C. *Section 4.5(D)(2) – Mix of Housing*

This standard requires that for projects that are 30 acres or larger, four housing types are required. In combination, the LMN tracts (current proposed development) and future MMN tracts (included in the Overall Development Plan) total 69.72 acres. The overall project, including both the LMN and MMN tracts, features four housing types (see Table below).

Table 1 Mix of Housing

Housing Type	Lot Size	Number of Dwelling Units	% of Total
Single-Family Detached	(6,000-8,000 Sf)	73	41.0 %
Small Lot Single-Family Detached	(3,825 SF)	43	24.2 %
Single-Family Attached		62	34.8 %
Multi-Family		TBD on MMN Tracts	NA
Total:		178	100 %

Single Family Attached Dwellings are defined as dwellings that are attached to one or more dwellings or buildings, with each dwelling located on its own separate lot. These units are often referred to as townhomes. In the case of this P.D.P., units are arranged in the following manner: 4-plex (1 Building), 5-plex (6 Buildings), 7-plex (4 Buildings).

D. Section 4.5 (3) (a) – Access to a Neighborhood Center

This standard requires that projects greater than 40 acres shall be located within ¾ mile of either a neighborhood center contained within the project, or an existing neighborhood center located in an adjacent development, or an existing or planned Neighborhood Commercial District commercial project, which distance shall be measured along street frontage, and without crossing an arterial street.

The project complies with this standard, as the Hansen Farm property and ODP include a future tract of Neighborhood Commercial District, with local street access to this future center from the west side of S. Timberline Road.

E. Section 4.5 (D)(6) – Small Neighborhood Parks

This standard requires that for projects 10 acres or larger either a public neighborhood park or a private park, at least one acre in size, be located within one-third of a mile (1,760 feet), as measured along street frontage, of 90% of the dwellings. The location of the park should be highly visible and easily observed from the local streets, consist of multi-use turf areas, pavilions, tables, benches, BBQ or other features for various age groups.

The P.D.P. identifies a future park in Tract B (3 +/- acres) on the site plan, consistent with the approved Overall Development Plan for this location. The City Parks Department has the intent to develop this tract as a future public neighborhood park, contingent on available funding. This potential park location at the corner of Knobby Pine Drive and Burly Tree Drive is visible from street and has direct access from the neighborhood. A potential for a larger size future public neighborhood park will need to be coordinated with the adjacent property owner to serve the surrounding LMN neighborhoods.

In addition, passive open space and a stormwater detention pond is provided on Tract F which contains 7.7 acres. This area includes soft walking paths. All dwellings are within one-third of a mile of both the proposed future public park and the passive open space, in compliance with this standard.

- Tract N and J – Along the south boundary and edge of existing irrigation lateral ditch, an approximate 50-foot natural habitat buffer is established between the single-family lots and ditch corridor. This buffer will include naturalized plantings and tree groupings.

B. Section 3.2.1(F) – Tree Mitigation

This standard requires that existing significant trees be preserved to the extent reasonably feasible. Upon inspecting the site, the City Forester has determined that for the 4 trees to be removed, 24 mitigation trees are required. While the reason for removal of the trees is due to land development, the existing trees are rated as fair, fair minus, poor, mostly dead, dead or hazard. This is due to lack of irrigation and neglect over the decades.

C. Section 3.2.2 – Access, Circulation and Parking – General Standard

This standard requires that development projects accommodate the movement of vehicles, bicycles, pedestrians, and transit throughout the project and to and from surrounding areas safely and conveniently and contribute to the attractiveness of the neighborhood.

As noted, there are five public streets. The extension of Zephyr Drive west of S. Timberline Road intersection will be the primary access point into the site. Twisted Root Drive acts as a second point of access from S. Timberline Road extending west. The local street network serving most of the site includes Burlly Tree Drive, Happy Woodland Drive and Knobby Pine Drive. Fallen Branch Drive will be an internal north-south street and is stubbed to the south property line for future extension (if needed). The other internal street is a private alley and provides access to the rear-loaded garages or guest parking spaces for the 62 single family attached units.

D. Section 3.2.2(C)(6) – Direct On-Site Access to Pedestrian and Bicycle Destinations

The pedestrian and bicycle network will be a combination of public sidewalks and private walkways, and undesignated on-street bicycle circulation. This network will connect to the following:

- Perimeter public sidewalk and on-street bike lane along S. Timberline Road;
- Future multi-use trail along the Mail Creek Ditch corridor along the north boundary, to be built by the City with available funding;
- And future extension of Zephyr Drive to the west (when needed).

E. Section 3.2.2(C)(7) – Off-Site Access to Pedestrian and Bicycle Destinations

There are two potential neighborhood destinations, including neighborhood park and neighborhood commercial center identifies as future tracts. Direct street and sidewalk connections are provided with this P.D.P. to these future destinations. A central stormwater detention pond and passive open space includes sidewalk connections from the local street network and internal paths within this area.

F. Section 3.2.2(K)(1)(a) - Parking

For the 116 single family detached units, there will be a two-car driveway and garage per unit.

For the 62 single family attached units, the standard requires compliance on a per bedroom-per unit basis. The P.D.P. complies in the following table below:

Number of Spaces Required:

8 2-bedroom units x 1.75 spaces	=	14
<u>54 3-bedroom units x 2.00 spaces</u>	=	<u>108</u>
Total:	=	122

The P.D.P. provides the following:

Garage spaces (1-car)	=	22
Garage spaces (2-car)	=	80
<u>Driveway spaces</u>	=	<u>62</u>
Total:	=	164

In addition, the local public streets that surround the single-family attached townhome units allow on-street parking. These on-street parking spaces were not credited toward meeting the minimum requirement.

In summary, the P.D.P. complies with the minimum parking requirements.

G. Section 3.2.3 – Solar Access and Shading

This standard requires 65% of the single family lots be oriented to within 30 degrees of an east-west line to preserve the potential for solar exposure.

The P.D.P. includes 133 solar oriented lots out of a total of 178 lots, comprising 74.7%. This percentage exceeds the minimum requirement of 65%, in compliance with this standard.

H. Section 3.4.1 – Natural Habitats and Features

a. Section 3.4.1(C) - General Standard states:

“To the maximum extent feasible, the development plan shall be designed and arranged to be compatible with and to protect natural habitats and features and the plants and animals that inhabit them and integrate them within the developed landscape of the community by: (1) directing development away from sensitive resources, (2) minimizing impacts and disturbance through the use of buffer zones, (3) enhancing existing conditions, or (4) restoring or replacing the resource value lost to the community (either on-site or off-site) when a development proposal will result in the disturbance of natural habitats or features.”

b. Section 3.4.1(E)(1) - Buffer Zone Performance Standards.

The decision maker (Administrative Hearing Officer) “shall determine the buffer zone for each natural habitat or feature contained in the project site. The buffer zones may be multiple and noncontiguous. The general buffer zone distance is established according to the buffer zone table, but the Hearing Officer shall reduce or enlarge any portion of the general buffer zone distance, if necessary, in order to ensure that the performance standards set forth are achieved.”

The development project is approximately 55.0 acres in size. An updated Ecological Characterization (ECS) study was provided in February 2018. The project’s north side is bound by Mail Creek Ditch; the west and south sides are bound by an unnamed ditch lateral. Pocket wetlands (<0.33 ac) and large mature eastern cottonwood trees exist along the ditches. One small (0.23 ac) isolated wetland exists in the southern portion of the property; this wetland has decreased by 0.06 acres in size since the 2012 ECS report. As these wetlands do not provide significant use by waterfowl and/or shorebirds, buffer standards are applied by the size of the wetland. According to the Land Use Code (Section 3.4.1(E)), for wetlands less than one-third acre (<0.33 ac) in size, and for ditches serving as wildlife corridors, a 50 ft buffer zone standard is applied. The 50 ft buffer extends from the “top of bank” of ditches and

edge of wetlands. A United States Army Corps of Engineers (USACE) letter confirms the 0.23 ac wetland is not considered jurisdictional (e.g. federal waters) and no impacts to jurisdictional wetlands are anticipated with this project.

The proposed Natural Habitat Buffer Zone (NHBZ) includes creation of a 0.253 ac isolated wetland north of the existing 0.23 ac wetland, addition of native wetland seed mix in the new wetland area and addition of native upland plants along ditch corridors. In the proposal, there is slight encroachment of 10 lots into 50-ft ditch setbacks resulting in 45 ft setbacks; this is compensated elsewhere with setbacks greater than 50 ft. When averaged, the wetland and ditch buffer setbacks meet the 50 ft minimum requirements.

Overall, the applicant is providing 10.53 acres of NHBZ, an amount 1.28 ac greater than would have been provided given a straight application of the quantitative buffer zone standards. The extensive landscaping and addition of different types of native plants (increased biodiversity) will increase the habitat value of the wetlands and ditches by providing enhanced opportunities for species' nesting, breeding, and where needed, screening to buffer adjacent areas visually and from noise. Addition of trails and pedestrian walkways ensures appropriate access to nature on the site including nature-viewing opportunities, aligning with the Nature in the City Strategic Plan. A NHBZ monitoring plan will be created and approved by City staff prior to Final Plan approval; the plan ensures successful installation, weed management and ultimate establishment of the NHBZ.

Staff has determined this proposal satisfies the applicable standards set forth in this section of the LUC.

I. Section 3.5.1(H) – Building and Project Compatibility – Land Use Transition

The Hansen Farm P.D.P. is adjacent to the existing Willow Springs PUD subdivision located along the entire northern edge of the project. This subdivision was initially approved in 1995 with subsequent Filings through 1998, prior to City Plan. While most of the lots along the south edge of Willow Springs are larger single-family lots (10,000-14,000 SF), other tracts within the PUD range from 3,000-8,000SF in size. The north tracts included multi-family residential.

Based on feedback at two neighborhood meetings, the applicant has adjusted the P.D.P. single-family detached lot sizes along the north boundary of the project adjacent to Willow Springs to be more compatible. The proposed lot sizes range from 6,000-9,000 SF in size. Smaller lot single-family attached lots are located further to the south and separated by a street and other larger lots to the north. The P.D.P. is required to meet the LMN density standards and variety of housing types for this size of the project. Future phases not part of this P.D.P. include multi-family residential and neighborhood commercial center uses, both located further to the south and separated by LMN adjacent to Willow Springs.

This P.D.P. is compatible with the existing Willow Springs subdivision by providing single-family detached lots adjacent to the existing single-family detached lots in Willow Springs. While the lot sizes are not the same, the uses are similar. The transition and buffer are further strengthened by the Mail Creek Ditch drainage corridor that is between Hansen Farm and Willow Springs. Including the P.D.P. 50-foot landscape buffer on the south side of the ditch, the overall ditch corridor separates both properties ranging from 60-120 feet.

J. Section 3.5.2(C)(2) – Housing Model Variety and Variation Among Buildings

This standard requires that single family attached projects that consist of more than five buildings must feature three distinctly different building designs. Buildings are considered similar unless they vary significantly in footprint size and shape (architectural style). Further, no similar buildings can be placed next to each other. With 11 single family attached buildings, the P.D.P. provides the following three building footprints and their architectural building designs in Table below:

Trails Master Plan and is expected to serve most areas along the City's south eastern edge between Fossil Creek Reservoir on the south and Poudre River on the north.

Section 3.6.3(C) requires that the arterial streets be intersected with a full-turning collector or local street at a maximum interval one-quarter mile, or 1,320 feet. The P.D.P. has approximately 1,300 linear feet of frontage along S. Timberline Road. A full-movement intersection is located at S. Timberline Road/Zephyr Road. There is no segment of arterial roadway that exceeds 1,320 feet without a full-turning intersection. Section 3.6.3. (D) requires that the arterial streets be intersected with limited-turning collector or local street at a maximum interval of 660 feet. As noted above, a full-movement intersection is located at S. Timberline Road/Zephyr Road.

The proposed P.D.P. shows another access point approximately 700 feet north of Zephyr Road. This access will act as an emergency access only until the Timberline widening project can install center medians at this location. At that time, the access can be opened to neighborhood traffic and will function as a right-in right-out access location.

Section 3.6.3. (E) requires that all development plans contribute to developing a local street system that will allow access to and from the proposed development, as well as access to all existing and future development within the same square mile section from at least three arterial streets. It is notable that this square-mile section in south east Fort Collins does not have access to three arterial streets. The existing rail corridor to the west combined with existing development limits connections to arterial streets in the area. South Timberline Road is a 4-lane arterial and Kechter Road is a Minor Arterial on the Master Street Plan near this P.D.P. Additional local-street connections to the south are shown on the P.D.P. This standard acknowledges that such constraints may exist and allows for flexibility in that such street connections to three arterials would be rendered infeasible by unusual topographic features, existing development or a natural area or feature. Therefore, the P.D.P. meets this standard to the extent reasonably feasible.

Section 3.6.3. (F) requires that the P.D.P. incorporate and continue all sub-arterial streets stubbed to the boundary or provide for future public street connections along each boundary that abuts potentially developable land at maximum intervals of 660 feet. The proposed P.D.P provides local-street connections to the south, where future development can occur. As mentioned above, connections to existing streets to the west and north are precluded due to existing development pattern. As an alternative to providing two additional local street connections to the south and west, the P.D.P. provides pedestrian trail connections meeting Alternative Compliance criteria for equal to or better than a plan that meets the standard. This plan will reduce the number of ditch bridge crossings and impacts to natural resource buffer along this corridor. The plan fosters nonvehicular access and enhances neighborhood connectivity.

O. Section 3.6.4 – Transportation Level of Service Requirements

A Transportation Impact Study was provided, reviewed, and required to be updated following City staff comments. City staff also completed additional analysis as needed to confirm the conclusions. The updated study is attached, and the following conclusions are noted:

- Current roadway function in the area of the Hansen Farm PDP site meets technical standards for operations, although several areas are seeing challenging peak hour congestion.
- Site traffic associated with build out of Hansen is expected to be 304 morning peak hour trips, 476 afternoon peak hour trips, and 5,698 trips per day.
- The following improvements are required to be constructed with the development:
 - Zephyr Road will be extended to the west to provide connectivity to both the Hansen Farm development as well as other future development to the south and create a 4-legged intersection at Timberline.

- Addition of southbound right turn and northbound left turn lanes, and appropriate east- and westbound lanes at the Timberline - Zephyr intersection
 - Signalization of the Timberline – Zephyr intersection
 - Addition of southbound right turn lane at the site access north of Zephyr
 - Widening of Timberline along the property frontage, including appropriate lanes for a 4-lane arterial section, bike lane, and sidewalk.
- The remaining portion of Timberline that still needs to be widened to a 4-lane arterial section is funded and is in process to be completed by the City within a similar timeframe to the Hansen Farm development: Upon completion of both Hansen development and the City project, Timberline will be a full 4-lanes to Trilby Road, including the Kechter intersection.
 - City required pedestrian and bicycle facilities will be provided with this development, especially the completion of missing sidewalks along the western side of Timberline. Acceptable levels of service are met to area schools, churches, and neighborhoods.

In summary, the increase in traffic due to the proposed development will be managed by a series of improvements, including new lanes, a traffic signal and roadway widening. Pedestrian facilities are being improved, especially with the completion of a sidewalk along the current gap on Timberline. Upon completion, the Transportation Level of Service requirements will be met.

6. Neighborhood Meetings:

Two neighborhood meetings were held in June and December of 2017, and summaries are attached. Briefly, the main issues, and their resolution, are as follows:

- Compatibility and transitions with existing neighborhoods
- Timing of future tracts of MMN and NC
- Project traffic impacts on S. Timberline Road and general area
- Street access to adjacent development
- Development review process
- Timing of project phases

7. Conclusion and Findings of Fact:

In evaluating the request for Hansen Farm P.D.P., Staff makes the following findings of fact:

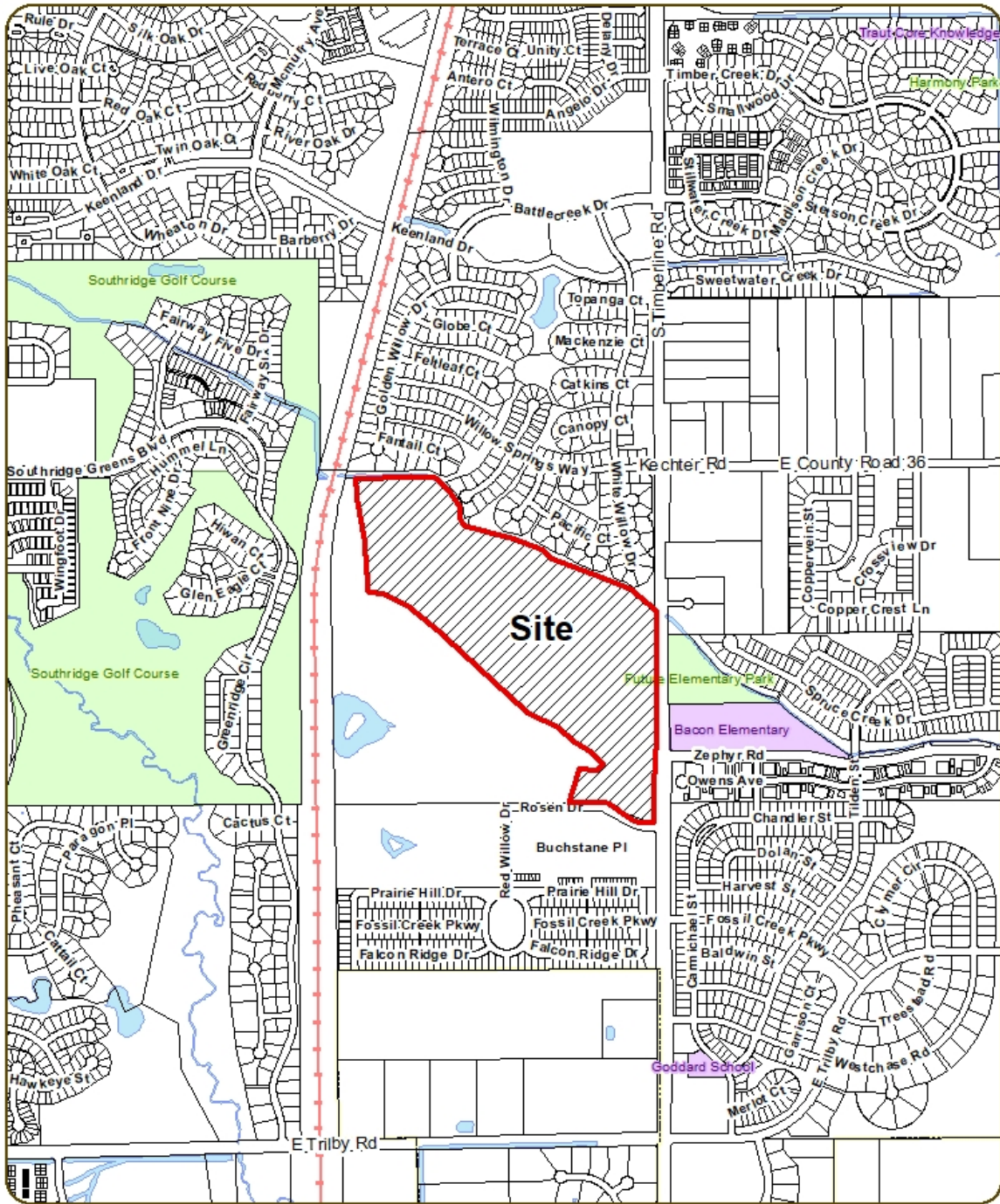
- E. The P.D.P. is consistent with related policies in the *Fossil Creek Reservoir Area Plan*, and element of *City Plan*, and *City Plan*.
- F. The P.D.P. complies with the process located in Division 2.2 – Common Development Review Procedures for Development Applications of Article 2 – Administration.
- G. The P.D.P. complies with the applicable standards located in Division 4.5, Low Density Mixed-Use Neighborhood zone district of Article Four - Districts.
- H. The project complies with the applicable standards located in Article 3 - General Development Standards of Article Three.

RECOMMENDATION:

- A. Staff recommends approval of the Hansen Farm #PDP170036.

ATTACHMENTS

1. Vicinity Map
2. Related Plan Policies
3. Site Plan
4. Landscape Plan
5. Utility Plan
6. Building Elevations
7. Plat
8. Lighting Plan
9. Overall Development Plan
10. Traffic Impact Study (Aug. 28, 2017)
11. Traffic Impact Study (Nov 24, 2017)
12. Ecological Characterization Study
13. Neighborhood Meeting No. 1 Summary
14. Second Neighborhood Meeting No. 2 Summary
15. Rendered Site Plan



1 inch = 1,000 feet

Hansen Farm Vicinity Map



Hansen Farm PDP – Applicable Policy Direction Staff Review/Response

Fossil Creek Reservoir Area Plan – Related Policies

FCP Objectives. Although the densities allowed by current County zoning form the framework for land development outlined in the Plan, there is a clear distinction between the northern and southern portions of the area regarding assumed future densities and development type; these assumptions shaped the application of County and City policies to this Plan. Close to Fort Collins, where the land is designated for urban residential densities, the City's policies and standards acted as the basis for the Fossil Creek Reservoir Area Plan provisions.

New urban residential neighborhoods abutting existing County large lot subdivisions, presently exist throughout the City, and, establish a range of densities that reflect the character of Fort Collins. As development occurs next to existing large lot developments, the County and City staff will work with the property owners to maintain adequate compatibility between existing and future uses.

FC-LUF-3 *Mixed-Use Neighborhoods.*

These neighborhoods will consist of a mix of housing types near parks, schools, and a neighborhood center. The density will be a minimum overall average of either 3 or 5 units per acre, with an overall maximum of 8 dwelling units per acre, and maximum of 12 units per acre for any single phase. This residential classification will require design and development standards agreed upon by both Larimer County and the City of Fort Collins.

The FC-LUF-3 pertains to development reviewed by the County prior to annexation. The Hansen Farm P.D.P. is required to meet LMN zoning, based on the policy framework direction from the FCP. The P.D.P. needs to comply with the LMN zoning density, building types, lot size and design standards for this size of project. While the Willow Springs PUD was approved prior to City Plan, the proposed LMN project located adjacent to existing neighborhoods is consistent with City Plan and the FCP.

FC-LUF-5 *Relationships and Transitions at Edges of Neighborhood Development.*

Where a new neighborhood develops next to existing lower-density residential development, the neighborhood design and layout should complement the established patterns of buildings and outdoor spaces along the edge, with no drastic and abrupt increase in the size of buildings or intensity of building coverage.

The intent of FC-LUF-5 relates to coordination of new urban development locating adjacent to existing County large-lot subdivisions in the FCP area. Although the densities allowed by current County zoning form the framework for land development outlined in the Plan, there is a clear distinction between the northern and southern portions of the area regarding assumed future densities and development type. Close to Fort Collins, where the land is designated for

urban residential densities, the City's policies and standards acted as the basis for the Fossil Creek Reservoir Area Plan provisions.

The P.D.P. provides LMN single-family detached residential lots along the north boundary adjacent to the existing Willow Springs neighborhood. The interpretation of the word “complement” does not mean “the same as”. The Willow Springs lots adjacent to this project are larger in size, including the size of homes on these lots. The P.D.P. does complement the established pattern on single-family detached lots. In addition, the P.D.P. provides a fifty-foot natural habitat buffer along the south edge of the Mail Creek Ditch, increasing separation and landscape buffering between developments. The potential new building size and building lot coverage with the proposed single-family detached lots with this P.D.P. are not significantly increased in comparison to the existing pattern in Willow Springs.

FC-I-2 – Plan Implementation

Areas north of County Road 36 (Kechter Road) and west of County Road 11 (Timberline Road) are designated for a density of between 5 to 12 units per acre and are required to annex prior to development.

The P.D.P. is consistent with LMN density standards of between 4 to 9 dwelling units per acre.

City Plan – Related Policies

Policy ENV 1.2 –Regulate Development along Waterways.

Required setbacks from the Mail Creek Ditch and lateral irrigation ditch to the south will be used to help ensure the protection of these waterways.

Policy LIV 7.1 – Encourage Variety in Housing Types and Locations.

A variety of housing types and densities shall be provided within the development. This could include single-family housing, attached single-family housing and multi-family.

PRINCIPLE LIV 21: New neighborhoods will be integral parts of the broader community structure, connected through shared facilities such as streets, schools, parks, transit stops, trails, civic facilities, and a Neighborhood Commercial Center or Community Commercial District.

This P.D.P. represents the first phase of the Overall Development Plan including LMN zoning. The future phases not part of this P.D.P. include the Medium Density Mixed-Use Neighborhoods (MMN), and Neighborhood Commercial (NC) zone areas. A future public park is being coordinated with this P.D.P. (3 acres) and additional park land on adjacent property with future development.

Policy LIV 21.2 – Establish an Interconnected Street and Pedestrian Network.

The street system will provide an interconnected network with transportation options to cars, bicycles and pedestrians while providing direct access to community amenities, employment areas and commercial development.

Policy LIV 23.1 – Provide Neighborhood Parks and Outdoor Spaces.

A variety of open spaces and parks are envisioned for this development. These could include neighborhood park, passive open space areas and trails.

Policy LIV 10.1 – Design Safe, Functional, and Visually Appealing Streets.

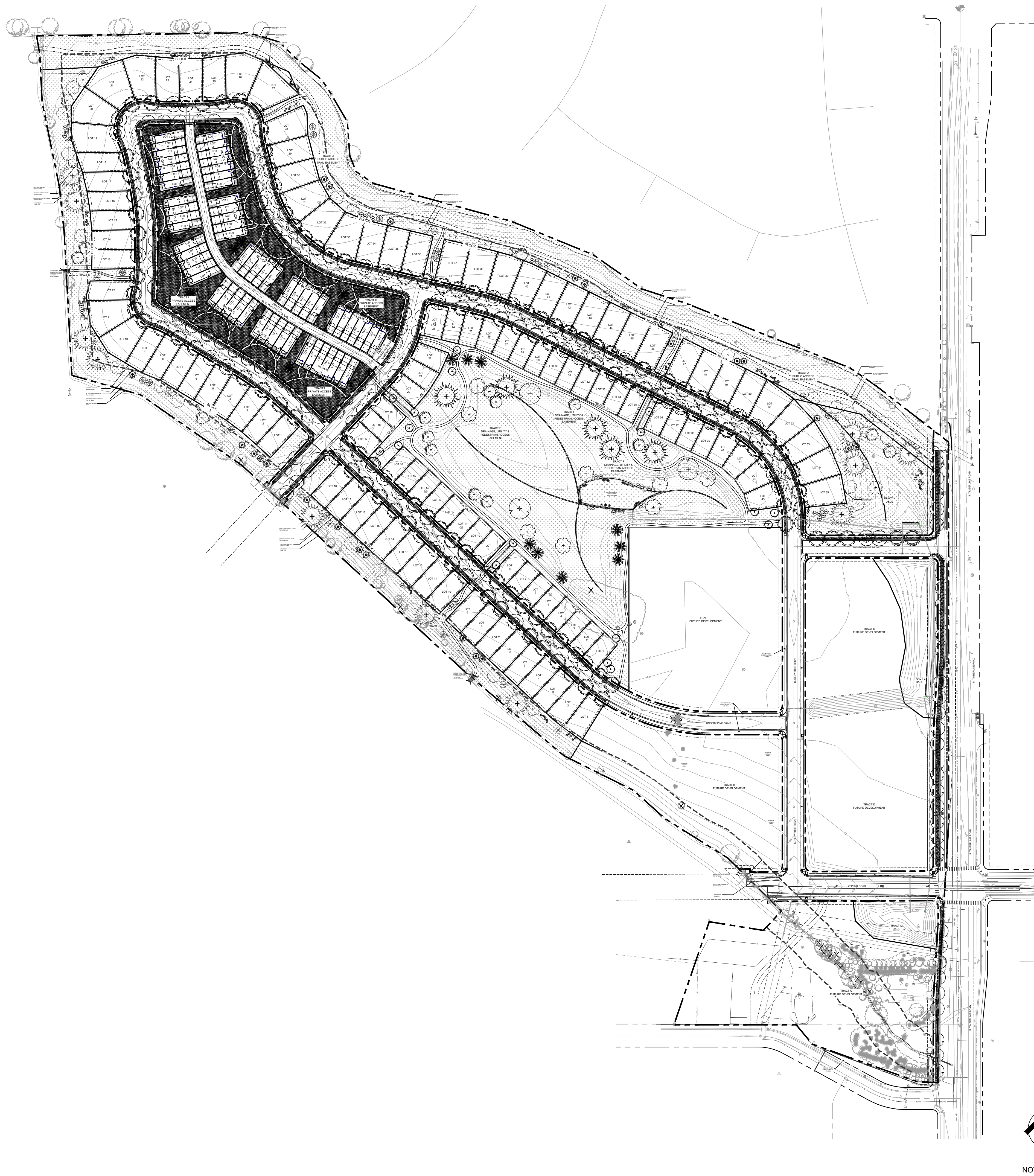
All new streets will be designed to meet City street standards. The intention is to provide a safe, functional and visually appealing street network. Shade trees and landscaping will be included throughout the project street network.

The P.D.P. is consistent with the related *Fossil Creek Reservoir Area Plan* and *City Plan* policies.



LOT ANALYSIS

45' X 85' LOTS - 43 UNITS
50' X 110' LOTS - 36 UNITS
60' X 110' LOTS - 37 UNITS
TOWNHOMES - 62 UNITS
178 TOTAL UNITS



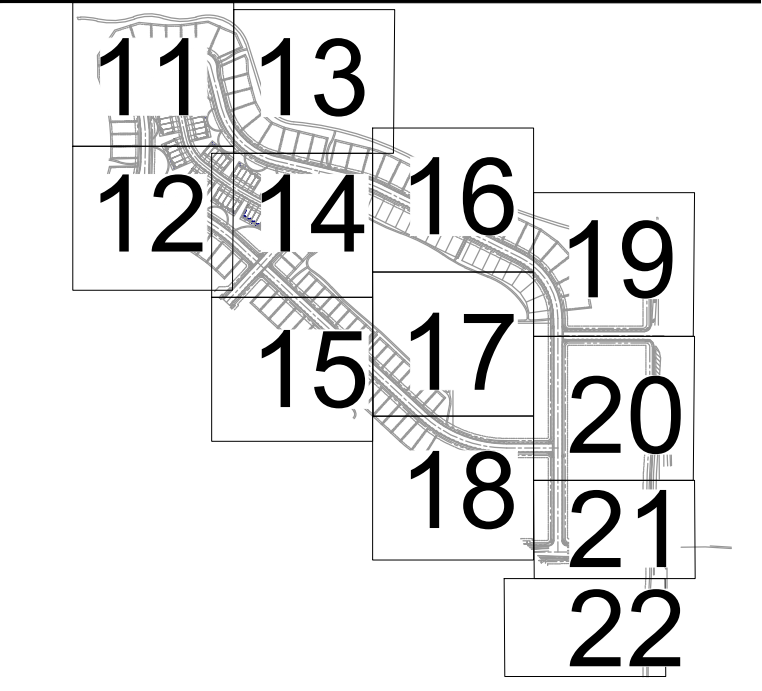
Natural Habitat Buffer Zone Plant List

KEY	QTY	RATIO	SCIENTIFIC/Common NAME	HEIGHT	WIDTH	SIZE	NOTES
SHADE/CANOPY TREES -							
+	23	11.6%	Celtis occidentalis HACKBERRY, WESTERN (mitigation tree)	60'	50'	2.0' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
△	8	2.1%	Gleditsia triacanthos inermis 'Skyline' HONEYLOCUST, SKYLINE	50'	40'	2.0' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
○	8	8.2%	Gymnocladus dioica 'Espresso' KENTUCKY COFFEETREE, ESPRESSO (mitigation tree)	60'	50'	2.0' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	23			60'	50'	3.0' cal. BB	
+	8	2.1%	Populus deltoides ssp. monilifera COTTONWOOD, PLAINS	80'	60'	2.0' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	10	7.9%	Quercus buckleyi OAK, TEXAS RED (mitigation tree)	50'	50'	2.0' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	20			50'	50'	3.0' cal. BB	
+	9	2.4%	Quercus macrocarpa OAK, BUR	80'	60'	2.0' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	23	11.9%	Tilia americana 'Redmond' LINDEN, REDMOND (mitigation tree)	50'	40'	2.0' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	22			50'	40'	3.0' cal. BB	
+	11	8.7%	Ulmus Accolade ELM, ACCOLADE (mitigation tree)	50'	40'	2.0' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	22			50'	40'	3.0' cal. BB	
EVERGREEN TREES -							
+	5	1.3%	Pinus ponderosa PINE, PONDEROSA	80'	40'	6' BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
+	10	2.6%	Picea pungens SPRUCE, COLORADO	60'	30'	6' BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
+	16	4.2%	Pinus strobus PINE, SOUTHWESTERN WHITE	50'	30'	6' BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
+	13	3.4%	Picea abies 'Cupressina' SPRUCE, FASTIGIATE NORWAY	20'	6'	6' BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
+	18	4.7%	Pinus mugo 'Tammenbaum' PINE, TANNENBAUM MUGO	15'	8'	6' BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
ORNAMENTAL TREES -							
+	17	4.5%	Acer tataricum 'Hot Wings' MAPLE, HOT WINGS	20'	20'	1.5' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	10	3.2%	Aamelanchier x grandiflora 'Autumn Brilliance' SERVICEBERRY, AUTUMN BRILLIANCE (mitigation tree)	25'	20'	1.5' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	2			25'	20'	2' cal. BB	
+	9		Crataegus macrocarpa occidentalis HAWTHORN, WESTERN (mitigation tree)	20'	20'	1.5' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	12	7.1%	Malus 'Spring Snow' CRABAPPLE, SPRING SNOW (mitigation tree)	25'	25'	1.5' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	15		Pyrus calleryana Chanticleer PEAR, CHANTICLEER (mitigation tree)	25'	25'	2' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	12			30'	20'	1.5' cal. BB	
+	7	5.0%	Syringa reticulata LILAC, JAPANESE TREE	30'	20'	2' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	13	3.4%	Lilac, Japanese Tree	25'	20'	1.5' cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
DECIDUOUS SHRUBS -							
○	X		Aronia arbutifolia 'Brilliantissima' CHOKEBERRY, BRILLIANT RED	8'	5'	5 Gallon	WELL ROOTED
○	X		Caryopteris x clandonensis 'Blue Mist' SPIREA, BLUE MIST	4'	4'	5 Gallon	WELL ROOTED
○	X		Cornus sericea 'Arctic Fire' DOGWOOD, ARCTIC FIRE	4'	4'	5 Gallon	WELL ROOTED
○	X		Euonymus alatus 'Compactus' BURNING BUSH, DWARF	8'	8'	5 Gallon	WELL ROOTED
○	X		Philadelphus x 'Snowbelle' MOCKORANGE, SNOWBELLE	4'	4'	5 Gallon	WELL ROOTED
○	X		Rhus trilobata SUMAC, THREE-LEAF	5'	5'	5 Gallon	WELL ROOTED
○	X		Ribes aurum CURRANT, GOLDEN	5'	5'	5 Gallon	WELL ROOTED
○	X		Syringa meyeri 'Palibin' LILAC, DWARF KOREAN	4'	4'	5 Gallon	WELL ROOTED
PERENNIAL GRASSES -							
*	X		Bouteloua gracilis 'Blonde Ambition' GRASS, BLONDE AMBITION GRAMA	3'	2'	1 Gallon	WELL ROOTED
*	X		Calamagrostis acutiflora 'Karl Foerster' GRASS, FEATHER REED	5'	2'	1 Gallon	WELL ROOTED
*	X		Helictotrichon sempervirens GRASS, BLUE AVENA	3'	3'	1 Gallon	WELL ROOTED
*	X		Hemerocallis 'red' DAYLILY, RED	3'	3'	1 Gallon	WELL ROOTED
*	X		Panicum virgatum 'Heavy Metal' GRASS, HEAVY METAL BLUE SWITCH	4'	1.5'	1 Gallon	WELL ROOTED
MITIGATION TREES							
Mitigation Trees See Note #2 for sizing requirements							

Legend

- 786 871 S.F. NON-IRRIGATED NATIVE FOOTHILLS GRASS MIX ARKANSAS VALLEY SEED MIX (OR APPROVED EQUAL)
- 24 461 S.F. SHREDED CEDAR MULCH ALL SHRUB SEEDS TO RECEIVE A MINIMUM 4" DEPTH SHREDED CEDAR WOOD MULCH
- 50' DITCH BUFFER FROM TOP OF BANK
- EXISTING TREES
- NATURAL HABITAT BUFFER ZONE AREA (NHBS) WETLAND AREA
- STREET LIGHT
- 154 243 S.F. IRRIGATED TURF DURA TURF SOO
- NATURAL HABITAT BUFFER ZONE AREA (NHBS)
- NATURAL HABITAT BUFFER ZONE BOUNDARY
- MITIGATION TREE DECIDUOUS - 3" CAL. BAB EVERGREEN - 8" BAB ORNAMENTAL - 2" CAL. BAB
- TREE TO BE REMOVED
- STOP SIGN
- STEEL EDGER, ROUNDED TOP

LANDSCAPE KEY MAP



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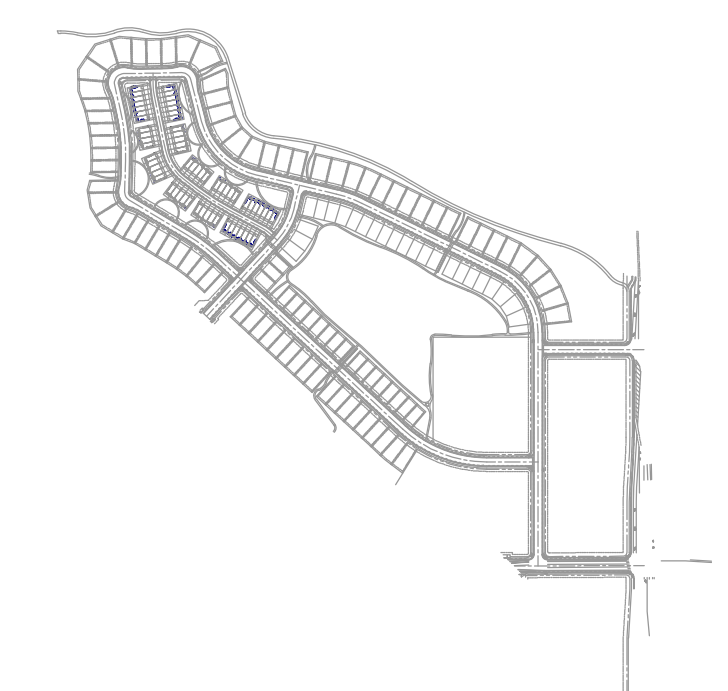
DATE
SEPTEMBER 19, 2017

SHEET TITLE
Overall Landscape Plan

SHEET INFORMATION
SHEET 7

Tree Inventory Enlargement

Overall Site Plan



Overall Tree Mitigation Summary Per Zone District

# OF TREES IMPACTED	92
# TREE GROVES IMPACTED	93
TOTAL MITIGATION TREES REQUIRED	
LMN	24
MMN	7
NC	154
# MITIGATION TREES PROVIDED (LMN)	24
# MITIGATION TREES PROVIDED (MMN)	7
# MITIGATION TREES PROVIDED (NC)	114

Existing Tree Schedule: LMN Zone District

COMMON NAME	SIZE	CONDITION	TO BE REMOVED	MITIGATION REQUIRED	REASON FOR REMOVAL
L1. PEACH LEAF WILLOW	10'-24" 3-4 STEM	FAIR	NO	NO - 3.5	N/A
L2. PLUM THICKET	1'-2' MULTI-STEM	XXX	NO	NO - 1	N/A
L3. PLUM THICKET	4'-3' STEM	FAIR	NO	NO - 1.5	N/A
L4. PLAINS COTTONWOOD	5'-6'	FAIR	NO	NO - 6	N/A
L5. PLAINS COTTONWOOD	20'-26" 3 STEM	HAZARDOUS	YES	NO - 0	HAZARDOUS
L6. PLAINS COTTONWOOD	29'	FAIR	NO	NO - 2.5	N/A
L7. PLAINS COTTONWOOD	36"	HAZARDOUS	YES	NO - 0	HAZARDOUS
L8. PLAINS COTTONWOOD	65"	FAIR PLUS/HAZARD	NO	NO - 6	N/A
L9. RUSSIAN OLIVE	12"	FAIR	NO	NO - 1.5	N/A
L10. PEACH LEAF WILLOW	8'-18" 3 STEM	FAIR	NO	NO - 2.5	N/A
L11. PEACH LEAF WILLOW	12'-18" 6 STEM	FAIR	NO	NO - 3	N/A
L12. PEACH LEAF WILLOW	15'-18" 2 STEM	GOOD	NO	NO - 2.5	N/A
L13. SIBERIAN ELM	XXX"	DEAD	YES	NO - 0	HAZARDOUS
L14. MULBERRY	4'-12" 5 STEM	POOR PLUS	NO	NO - 1.5	N/A
L15. PLAINS COTTONWOOD	15"	FAIR	NO	NO - 2	N/A
L16. PLAINS COTTONWOOD	83"	FAIR	NO	NO - 6	N/A
L17. PLAINS COTTONWOOD	103"	FAIR MINUS	YES	YES - 6	CONFLICT WITH DEVELOPMENT
L18. PEACH LEAF WILLOW	8'-10" 2 STEM	FAIR MINUS	NO	NO - 2	N/A
L19. PLAINS COTTONWOOD	84"	FAIR MINUS	NO	NO - 3.5	N/A
L20. PEACH LEAF WILLOW	7'-18" 11 STEM	FAIR	NO	NO - 3.5	N/A
L21. PLAINS COTTONWOOD	16"	GOOD	NO	NO - 3	N/A
L22. PLAINS COTTONWOOD	1'-5" 40 STEM	FAIR/GOOD	YES	YES - 18	CONFLICT WITH DEVELOPMENT
L23. PEACH LEAF WILLOW	2'-12" 100 STEM	XXX	NO	NO - 0	N/A
L24. RUSSIAN OLIVE	16"-18" 3 STEM	FAIR MINUS	NO	NO - 2.5	N/A

TOTAL MITIGATION 24 TREES

NOTE - ALL REQUIRED MITIGATION TREES REQUIRED FOR THE LMN DEVELOPMENT TRACTS HAVE BEEN INCLUDED AS PART OF THIS PDP/FDP.

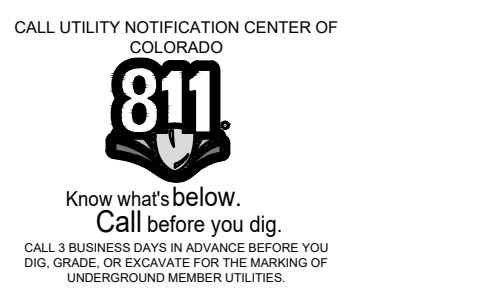
Existing Tree Schedule: MMN Zone District

COMMON NAME	SIZE	CONDITION	TO BE REMOVED	MITIGATION REQUIRED	REASON FOR REMOVAL
M1. BLUE SPRUCE	11"	FAIR	NO	YES - 2	N/A
M2. BLUE SPRUCE		DEAD	YES	NO - 0	DEAD
M3. RUSSIAN OLIVE	4"	POOR PLUS	NO	YES - 0	N/A
M4. PLAINS COTTONWOOD	75"	FAIR PLUS	NO	YES - 6	N/A
M5. BLUE SPRUCE	3'-10" 14 STEM	FAIR MINUS	YES	YES - 5	CONFLICT WITH DEVELOPMENT
M6. BLUE SPRUCE	5"	GOOD MINUS	YES	NO - 0	CONFLICT WITH DEVELOPMENT
M7. BLUE SPRUCE	9'-14" 3 STEM	FAIR	YES	YES - 2	N/A
M8. BLUE SPRUCE	7"	FAIR PLUS	NO	YES - 1	N/A
M9. BLUE SPRUCE	10"	FAIR	NO	YES - 1.5	N/A
M10. BLUE SPRUCE	16"	FAIR MINUS	NO	YES - 1.5	N/A

TOTAL MITIGATION 7 TREES

NOTE - ALL REQUIRED MITIGATION TREES REQUIRED FOR THE MMN FUTURE DEVELOPMENT TRACTS HAVE BEEN INCLUDED AS PART OF THIS PDP/FDP AND WILL NOT BE REQUIRED AT THE TIME OF THE MMN PDP/FDP.

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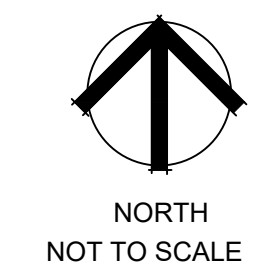


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Staff Comments	9.28.18

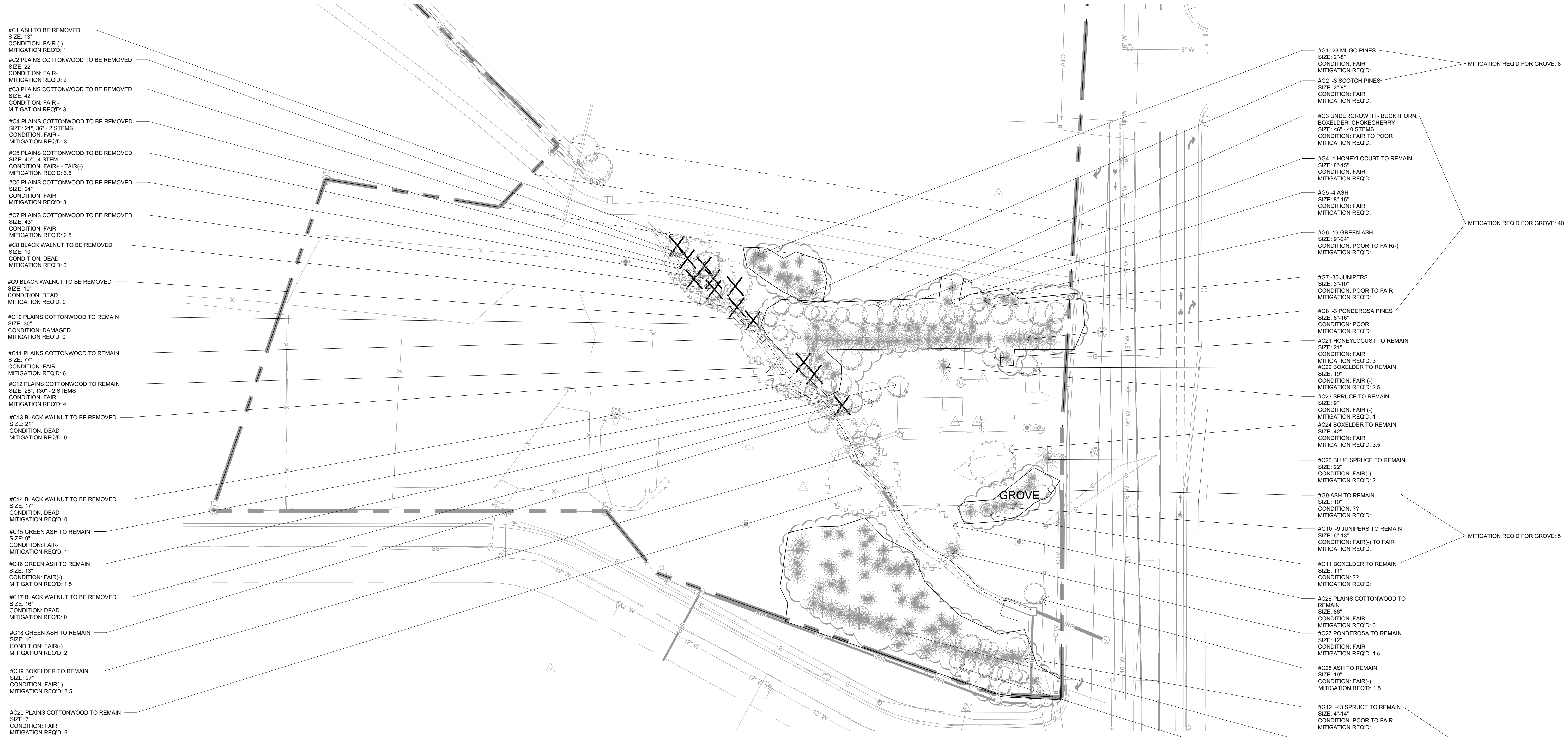
DATE
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SHEET TITLE
Existing Tree Inventory & Mitigation Plan

SHEET INFORMATION
SHEET 8



Tree Inventory Enlargement



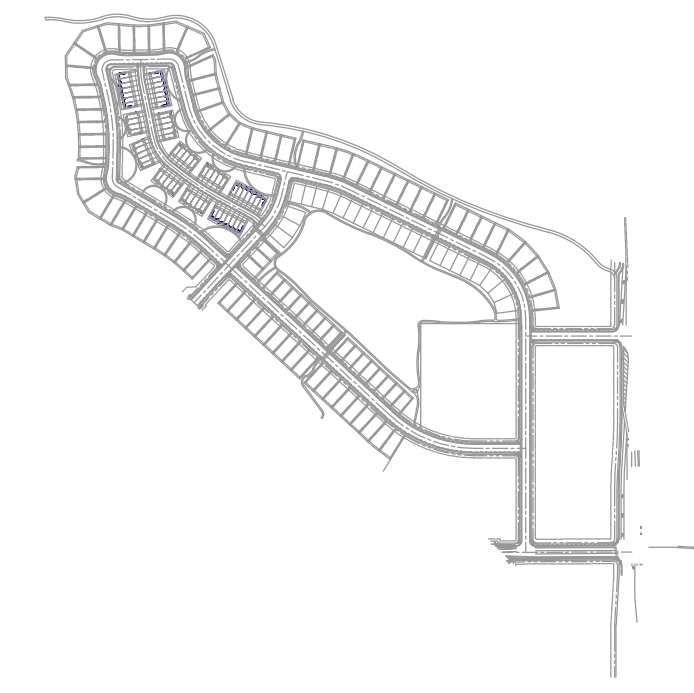
Existing Tree Schedule: NC Zone District

COMMON NAME	SIZE	CONDITION	TO BE REMOVED	MITIGATION REQUIRED	REASON FOR REMOVAL
C1. ASH	13"	FAIR MINUS	YES	YES - 1	CONFLICT WITH STREET
C2. PLAINS COTTONWOOD	22"	FAIR MINUS	YES	YES - 2	CONFLICT WITH STREET
C3. PLAINS COTTONWOOD	42"	FAIR MINUS	YES	YES - 3	CONFLICT WITH STREET
C4. PLAINS COTTONWOOD	21'-36" 2 STEM	FAIR MINUS	YES	YES - 3	CONFLICT WITH STREET
C5. PLAINS COTTONWOOD	40' 4 STEM	FAIR PLUS/MINUS	YES	YES - 3.5	CONFLICT WITH STREET
C6. PLAINS COTTONWOOD	24"	FAIR	YES	YES - 3	CONFLICT WITH STREET
C7. PLAINS COTTONWOOD	43"	FAIR	YES	YES - 2.5	CONFLICT WITH STREET
C8. BLACK WALNUT	10"	DEAD	YES	NO - 0	HAZARD
C9. BLACK WALNUT	10"	DEAD	YES	NO - 0	HAZARD
C10. PLAINS COTTONWOOD	30"	FAIR	TBD	TBD - 0	---
C11. PLAINS COTTONWOOD	77"	FAIR	TBD	TBD - 6	---
C12. PLAINS COTTONWOOD	28'-130" 2 STEM	FAIR	TBD	TBD - 3	---
C13. BLACK WALNUT	21"	DEAD	YES	NO - 0	---
C14. BLACK WALNUT	17"	DEAD	YES	NO - 0	---
C15. GREEN ASH	9"	FAIR MINUS	TBD	TBD - 1	---
C16. GREEN ASH	13"	FAIR MINUS	TBD	TBD - 1.5	---
C17. BLACK WALNUT	16"	DEAD	YES	TBD - 0	HAZARD
C18. GREEN ASH	16"	FAIR MINUS	TBD	TBD - 2	---
C19. BOXELDER	27"	FAIR MINUS	TBD	TBD - 2.5	---
C20. PLAINS COTTONWOOD	84"	FAIR	TBD	TBD - 6	---
C21. HONEYLOCUST	21"	FAIR	TBD	TBD - 3	---
C22. BOXELDER	19"	FAIR MINUS	TBD	TBD - 2.5	---
C23. BLUE SPRUCE	9"	FAIR MINUS	TBD	TBD - 1	---
C24. BOXELDER	42"	FAIR	TBD	TBD - 3.5	---
C25. BLUE SPRUCE	22"	FAIR MINUS	TBD	TBD - 2	---
C26. PLAINS COTTONWOOD	88"	FAIR	TBD	TBD - 6	---
C27. PONDEROSA PINE	12"	FAIR	TBD	TBD - 1.5	---
C28. ASH	19"	FAIR MINUS	TBD	TBD - 1.5	---
TOTAL MITIGATION			61 POTENTIAL MITIGATION TREES		

Existing Tree Schedule: NC Zone District

COMMON NAME	SIZE	CONDITION	TO BE REMOVED	MITIGATION REQUIRED	REASON FOR REMOVAL
G1. MUJO PINE	2'-8" 23 TOTAL	FAIR	TBD	---	---
G2. SCOTCH PINE	2'-8" 3 TOTAL	FAIR	TBD	---	---
MITIGATION REQUIRED FOR GROVE: 8					
G3. BUCKTHORN/BOXELDER/CHOCHECHERRY	6'-40 STEM	FAIR TO POOR	TBD	---	---
G4. HONEYLOCUST	8'-15" 8 TOTAL	FAIR	TBD	---	---
G5. ASH	8'-15" 4 TOTAL	FAIR	TBD	---	---
G6. GREEN ASH	9'-24" 19 TOTAL	POOR TO FAIR MINUS	TBD	---	---
G7. JUNIPER	3'-10" 35 TOTAL	POOR TO FAIR	TBD	---	---
G8. PONDEROSA PINE	8'-16" 3 TOTAL	POOR	TBD	---	---
MITIGATION REQUIRED FOR GROVE: 40					
G9. ASH	10" 1 TOTAL	---	TBD	---	---
G10. JUNIPER	6'-13" 9 TOTAL	FAIR MINUS/FAIR	TBD	---	---
G11. BOXELDER	11" 1 TOTAL	---	TBD	---	---
MITIGATION REQUIRED FOR GROVE: 5					
G12. BLUE SPRUCE	4'-14" 43 TOTAL	POOR TO FAIR	TBD	---	---
G13. BOXELDER	3'-11" 13 TOTAL	POOR TO FAIR	TBD	---	---
G14. JUNIPER	8'-17" 22 TOTAL	FAIR/FAIR MINUS	TBD	---	---
MITIGATION REQUIRED FOR GROVE: 40					
TOTAL MITIGATION FOR ALL GROVES				93 POTENTIAL MITIGATION TREES	
NC FUTURE DEVELOPMENT TRACT TOTAL				154 POTENTIAL MITIGATION TREES	

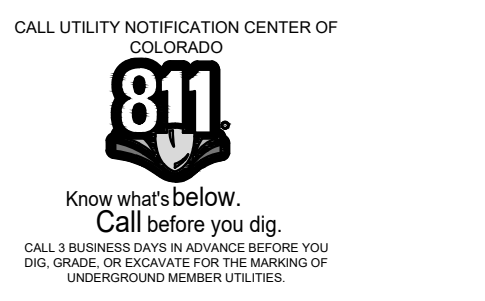
Overall Site Plan



NOTE - TREES TO BE REMOVED WILL BE DETERMINED WHEN A SITE DESIGN HAS BEEN ESTABLISHED FOR THE NC ZONE. 70 PERCENT OF THE NC TREES ARE BEING "BANKED"/MITIGATED AS PART OF THIS PDP/FDP, WITH THE ASSUMPTION THAT A LARGE NUMBER OF TREES WILL NEED TO BE REMOVED WITH ANY DESIGN LAYOUT.

NOTE - A PORTION OF THE POTENTIAL REQUIRED MITIGATION FOR THE FUTURE NC TRACT IS PROVIDED AS PART OF THIS PDP/FDP APPROVAL. THESE TREES HAVE BEEN "BANKED" IN ORDER TO OFFSET FUTURE MITIGATION REQUIREMENTS AT SUCH TIME THAT THE NC TRACT MOVES FORWARD WITH PDP/FDP APPROVAL.

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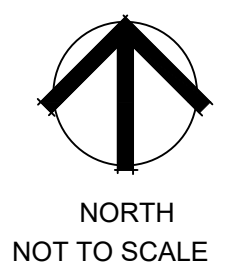
REVISIONS	DATE
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DATE
SEPTEMBER 19, 2017

SHEET TITLE
Tree Inventory & Mitigation Plan

SHEET INFORMATION

SHEET **9**



Natural Habitat Buffer Zone Statistics

WETLAND (CENTER OF PROPERTY)	9,851 SF	0.228 AC
WETLAND (ALONG S. IRRIGATION LATERAL)	1,035 SF	0.024 AC
WETLAND SUBTOTAL	10,886 SF	0.250 AC
IRRIGATION DITCH (LMN ZONE) 50' OFFSET =	297,258 SF	6.82 AC
IRRIGATION DITCH (LMN/PARK PARCEL) 50' OFFSET =	38,646 SF	0.88 AC
IRRIGATION DITCH (NC ZONE) 50' OFFSET =	56,692 SF	1.30 AC
IRRIGATION DITCH SUBTOTAL	392,596 SF	9.0 AC
TOTAL NHBZ	403,482 SF	9.250 AC

THE 50' OFFSET IS THE AREA THAT WOULD TYPICALLY BE THE REQUIRED BUFFER FROM THE EDGE OF WETLANDS.

PROPOSED WETLAND MITIGATION (1:1 REQUIREMENT)	11,050 SF	0.253 AC
PROPOSED HABITAT BUFFER (INCLUDING WETLANDS MITIGATION) =	458,580 SF	10.527 AC

MINIMUM WIDTH OF BUFFER FROM WETLANDS = APPROXIMATELY 45'
MAXIMUM WIDTH OF BUFFER FROM WETLANDS = APPROXIMATELY 121'
AVERAGE WIDTH OF BUFFER FROM WETLANDS = APPROXIMATELY 83'

THE HABITAT BUFFER IS INTENDED TO REPLACE THE AREA DEFINED BY THE 50' OFFSET. THE PROPOSED BUFFER AREA WILL BE EVALUATED BASED ON PERFORMANCE STANDARDS.

NOTES:

1. PROPOSED WETLANDS BUFFER EXCLUDES ALL AREAS OF ENCROACHMENT INCLUDING BUILDINGS, TRASH ENCLOSURES AND PARKING LOTS.
2. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONE.

Natural Habitat Buffer Zone Notes

1. SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE BUFFER ZONE.
2. CONSTRUCTION SHALL BE ORGANIZED AND TIMED TO MINIMIZE THE DISTURBANCE OF SENSITIVE SPECIES OCCUPYING OR USING ON-SITE AND ADJACENT NATURAL HABITATS OR FEATURES.
3. THE FOLLOWING LOTS HAVE BEEN APPROVED TO ENCROACH SLIGHTLY INTO PORTIONS OF THE 50' BUFFER OFFSET. THIS AREA HAS BEEN ACCOUNTED FOR WITH ADDITIONAL NATURAL HABITAT BUFFER ZONE AREA PROVIDED. BLOCK 1 LOTS 8,9,10,11; BLOCK 2 LOTS 11, 12, 19.

Native Grass Seed Mix

WETLAND MITIGATION SEED MIX

1. SEED SHALL BE A MIXTURE THAT MATCHES THE FOLLOWING:

NON-IRRIGATED UPLAND MIX COMMON NAME	SCIENTIFIC NAME	SEEDING RATE (PLS LBS/ACRE-DRILL RATE)
THREE-SQUARE	SCHOENOPLECTUS PUNGENS	3.0
INDIANGRASS	SORGHASTRUM VITATUS	3.0
BIG BLUESTEM	ANDROPOGON GERARDII	3.0
SWITCHGRASS	PANICUM VIRGATUM	2.0
SPIKERUSH	ELEOCHARIS PALUSTRIS	1.0
PRAIRIE CORDGRASS	SPARTINA PECTINATA	1.0
SOFT-STEM BULRUSH	SCHOENOPLECTUS TEMERNAEMONTANI	0.5
NEBRASKA SEDGE	CAREX NEBRASCENSIS	0.5
BALTIC RUSH	JUNCUS BALTICUS	0.1
TOTAL LBS/ACRE		14.1

NOTE: CONTRACTOR IS RESPONSIBLE FOR PROVIDED SEED TAGS TO APPROPRIATE CITY STAFF. PLEASE NOTE THAT THE POUNDS PER ACRE ARE IN PLS (PURE LIVE SEED) AND MUST BE ORDERED THAT WAY. ALL MATERIALS FURNISHED SHALL BE FREE OF COLORADO STATE NOXIOUS WEEDS AS DEFINED IN ARTICLE III, SECTION 21-40 OF THE CODE OF CITY OF FORT COLLINS.

NATIVE GRASS - UPLAND CITY OF FORT COLLINS MIX:

1. SEED SHALL BE AS MANUFACTURED BY ARKANSAS VALLEY SEED SOLUTIONS, 4625 COLORADO BOULEVARD, DENVER, CO 80216, (877) 957-3337.
2. SEED SHALL BE A MIXTURE THAT MATCHES THE FOLLOWING:

NON-IRRIGATED UPLAND MIX COMMON NAME	SCIENTIFIC NAME	SEEDING RATE (PLS LBS/ACRE-DRILL RATE)
BEEPLANT	CLEOME SEEULATA	1.08
HARRY GOLDENASTER	HETEROTHECA VILLOSA	0.36
PURPLE PRAIRIE CLOVER	DALEA PURPUREA	0.41
WALLFLOWER	ERYSIMUM ASPERUM	0.11
ANNUAL SUNFLOWER	HELIANTHUS ANNUUS	2.07
DOTTED GAYFEATHER	LIATRIS PUNCTATA	0.73
BLUE FLAX	LINUM LEWISII	0.41
PRAIRIE ASTER	MACHAERANTHERA TANACETIFLIA	0.25
MEXICAN HAT	RATIBIDA COLUMNIFERA	0.10
AMERICAN VETCH	VICIA AMERICANA	6.10
SIDEOTS GRAMA	BOUTELOUA CURTIPENDULA	0.96
BUFFALOGRASS	BOUTELOUA DACTYLOIDES	3.27
BLUE GRAMA	BOUTELOUA GRAEGLIS	0.22
PRAIRIE SANDREED	CALAMOVILFA LONGIFOLIA	0.67
PRAIRIE JUNEGRASS	KOELERIA MACRANTHA	0.08
NEEDLE AND THREAD	HESPEROSTIPA COMATA	1.59
SWITCH GRASS	PANICUM VIRGATUM	0.47
WESTERN WHEATGRASS	PASCOPYRUM SMITHII	1.66
SAND DROPSIDE	SPOROBOLUS CRYPTANDRUS	0.04
SIX WEEKS FESCUE	VULPIA OCTOFLORA	0.19
TOTAL LBS/ACRE		20.77

3. NATIVE SEED AREAS: ADEQUATE TEMPORARY IRRIGATION WILL BE PROVIDED FOR THE ESTABLISHMENT AND MAINTENANCE FOR THESE SEEDED AREAS, AND THAT NATIVE GRASSES SHALL BE MAINTAINED IN A CONDITION OF ACCEPTABLE HEIGHT, FREE OF WEEDS, TRASH AND DEBRIS, AND SHALL NOT REPRESENT A FIRE HAZARD NOR BECOME A NAVIGABLE SITE FOR WATER OR WIND EROSION.
4. PREPARE SOIL AS NECESSARY AND APPROPRIATE FOR NATIVE SEED MIX SPECIES THROUGH AERATION AND ADDITION OF AMENDMENTS IF NECESSARY THEN SEED IN TWO DIRECTIONS TO DISTRIBUTE SEED EVENLY OVER ENTIRE AREA.
5. IF CHANGES ARE TO BE MADE TO SEED MIX BASED ON SITE CONDITIONS THEN APPROVAL MUST BE PROVIDED BY CITY ENVIRONMENTAL PLANNER.
6. APPROPRIATE NATIVE SEEDING EQUIPMENT WILL BE USED (STANDARD TURF SEEDING EQUIPMENT OR AGRICULTURE EQUIPMENT SHALL NOT BE USED).
7. DRILL SEED APPLICATION RECOMMENDED PER SPECIFIED APPLICATION RATE TO NO MORE THAN 1/4 INCH DEPTH. FOR BROADCAST SEEDING INSTEAD OF DRILL SEEDING METHOD - DOUBLE SPECIFIED APPLICATION REFER TO NATIVE SEED MIX TABLE FOR SPECIES, PERCENTAGES AND APPLICATION RATES.
8. TREAT NATIVE SEED MIX AREA PRIOR TO INSTALLATION OF SEED WITH APPROPRIATE HERBICIDE TO PROACTIVELY MITIGATE HERBACEOUS WEED SPECIES GROWTH DURING ESTABLISHMENT PERIOD THEN AFTER APPROPRIATE TIME PERIOD APPLY NATIVE SEED AS CALLED FOR ON APPROVED PLANS.
9. AFTER SEEDING THE AREA SHALL BE COVERED WITH CRIMPED STRAW OR OTHER APPROPRIATE METHODS AND PROVIDED TEMPORARY IRRIGATION UNTIL SEED IS ESTABLISHED.
10. CONTRACTOR SHALL MONITOR SEEDED AREA FOR PROPER IRRIGATION, EROSION CONTROL, GERMINATION AND RESEEDING AS NEEDED TO ESTABLISH COVER.
11. THE APPROVED SEED MIX AREA IS INTENDED TO BE MAINTAINED IN A NATURAL-LIKE LANDSCAPE AESTHETIC. IF AND WHEN MOWING OCCURS IN NATIVE GRASS SEED MIX AREAS DO NOT MOW LOWER THAN 6-8 INCHES IN HEIGHT TO AVOID INHIBITING NATIVE PLANT GROWTH.
12. NATIVE SEED AREA WILL BE CONSIDERED ESTABLISHED WHEN SEVENTY-PERCENT TOTAL COVER IS REACHED WITH NO LARGER THAN ONE FOOT SQUARE BARE SPOTS AND/OR UNTIL DEEMED ESTABLISHED BY CITY PLANNING SERVICES.

MULCH IN ALL NATIVE SEED AREAS:

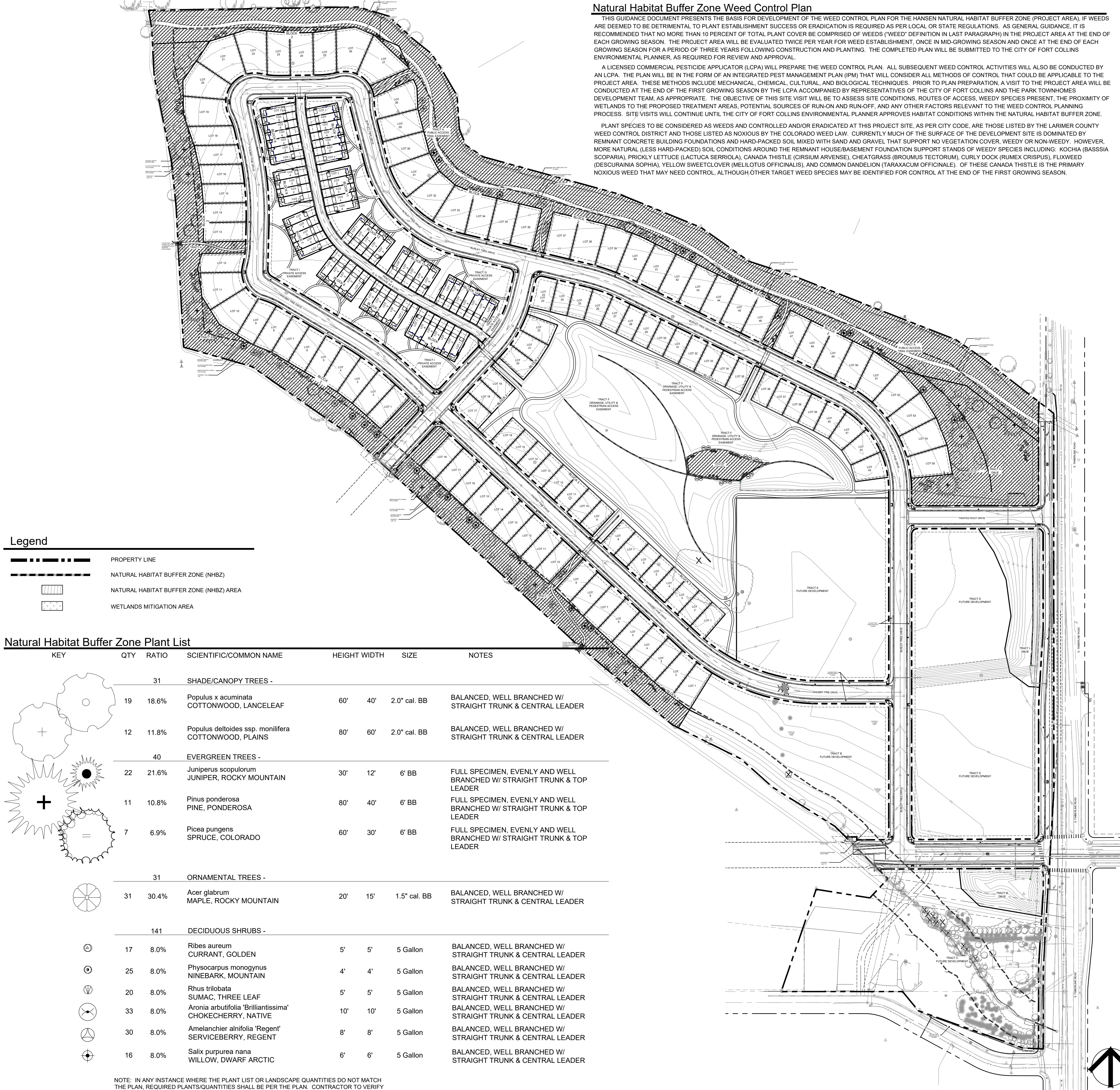
1. IMMEDIATELY FOLLOWING THE RAKING OPERATION, ADD STRAW MULCH TO THE SEEDED AREAS.
2. APPLY STRAW MULCH AT A MINIMUM OF 1.5 TONS PER ACRE OF AIR DRY MATERIAL. SPREAD STRAW MULCH UNIFORMLY OVER THE AREA WITH MECHANICAL MULCH SPREADER / CRIMPER. DO NOT MULCH WHEN WIND VELOCITY EXCEEDS 10 MPH.
3. WHEREVER THE USE OF CRIMPING EQUIPMENT IS PRACTICAL, PLACE MULCH IN THE MANNER NOTED ABOVE AND ANCHOR IT INTO THE SOIL. USE A DISC SUCH AS A MULCH TILER, WITH A FLAT SERRATED DISC AT LEAST 1/2 INCH IN THICKNESS, HAVING DULL EDGES, AND SPACE NO MORE THAN 9 INCHES APART, WITH DISCS OF SUFFICIENT DIAMETER TO PREVENT THE FRAME OF THE EQUIPMENT FROM DRAGGING THE MULCH. ANCHOR MULCH A MINIMUM DEPTH OF 2 INCHES AND ACROSS THE SLOPE WHERE PRACTICAL WITH NO MORE THAN TWO PASSES OF THE ANCHORING EQUIPMENT.
4. IMMEDIATELY UPON COMPLETION OF THE MULCHING AND BINDING OPERATION, THE SEEDED AREAS SHALL BE IRRIGATED, KEEPING THE TOP 2 INCHES OF SOIL EVENLY MOIST UNTIL SEED HAS UNIFORMLY GERMINATED AND GROWN TO A HEIGHT OF 2-INCHES.
5. WATERING APPLICATION SHALL BE DONE IN A MANNER WHICH WILL PROVIDE UNIFORM COVERAGE BUT WHICH WILL NOT CAUSE EROSION, MOVEMENT, OR DAMAGE TO THE FINISHED SURFACE.

Natural Habitat Buffer Zone Weed Control Plan

THIS GUIDANCE DOCUMENT PRESENTS THE BASIS FOR DEVELOPMENT OF THE WEED CONTROL PLAN FOR THE HANSEN NATURAL HABITAT BUFFER ZONE (PROJECT AREA). IF WEEDS ARE DEEMED TO BE DETRIMENTAL TO PLANT ESTABLISHMENT SUCCESS OR ERADICATION IS REQUIRED AS PER LOCAL OR STATE REGULATIONS, AS GENERAL GUIDANCE, IT IS RECOMMENDED THAT NO MORE THAN 10 PERCENT OF TOTAL PLANT COVER BE COMPRISED OF WEEDS ("WEED" DEFINITION IN LAST PARAGRAPH) IN THE PROJECT AREA AT THE END OF EACH GROWING SEASON. THE PROJECT AREA WILL BE EVALUATED TWICE PER YEAR FOR WEED ESTABLISHMENT, ONCE IN MID-GROWING SEASON AND ONCE AT THE END OF EACH GROWING SEASON FOR A PERIOD OF THREE YEARS FOLLOWING CONSTRUCTION AND RUN-OFF, AND ANY OTHER FACTORS RELEVANT TO THE WEED CONTROL PLANNING ENVIRONMENTAL PLANNER, AS REQUIRED FOR REVIEW AND APPROVAL.

A LICENSED COMMERCIAL PESTICIDE APPLICATOR (LCPA) WILL PREPARE THE WEED CONTROL PLAN. ALL SUBSEQUENT WEED CONTROL ACTIVITIES WILL ALSO BE CONDUCTED BY AN LCPA. THE PLAN WILL BE IN THE FORM OF AN INTEGRATED PEST MANAGEMENT PLAN (IPM) THAT WILL CONSIDER ALL METHODS OF CONTROL THAT COULD BE APPLICABLE TO THE PROJECT AREA. THESE METHODS INCLUDE MECHANICAL, CHEMICAL, CULTURAL, AND BIOLOGICAL TECHNIQUES. PRIOR TO PLAN PREPARATION, A VISIT TO THE PROJECT AREA WILL BE CONDUCTED AT THE END OF THE FIRST GROWING SEASON BY THE LCPA ACCOMPANIED BY REPRESENTATIVES OF THE CITY OF FORT COLLINS AND THE PARK TOWNHOMES DEVELOPMENT TEAM, AS APPROPRIATE. THE OBJECTIVE OF THIS SITE VISIT WILL BE TO ASSESS SITE CONDITIONS, ROUTES OF ACCESS, WEEDY SPECIES PRESENT, THE PROXIMITY OF WETLANDS TO THE PROPOSED TREATMENT AREAS, POTENTIAL SOURCES OF RUN-OFF, AND ANY OTHER FACTORS RELEVANT TO THE WEED CONTROL PLANNING PROCESS. SITE VISITS WILL CONTINUE UNTIL THE CITY OF FORT COLLINS ENVIRONMENTAL PLANNER APPROVES HABITAT BUFFER CONDITIONS WITHIN THE NATURAL HABITAT BUFFER ZONE.

PLANT SPECIES TO BE CONSIDERED AS WEEDS AND CONTROLLED AND/OR ERADICATED AT THIS PROJECT SITE, AS PER CITY CODE, ARE THOSE LISTED BY THE LARIMER COUNTY WEED CONTROL DISTRICT AND THOSE LISTED AS NOXIOUS BY THE COLORADO WEED LAW. CURRENTLY MUCH OF THE SURFACE OF THE DEVELOPMENT SITE IS DOMINATED BY REMNANT CONCRETE BUILDING FOUNDATIONS AND HARD-PACKED SOIL MIXED WITH SAND AND GRAVEL THAT SUPPORT NO VEGETATION COVER, WEEDY OR NON-WEEDY. HOWEVER, MORE NATURAL (LESS HARD-PACKED) SOIL CONDITIONS AROUND THE REMNANT HOUSE/BASEMENT FOUNDATION SUPPORT STANDS OF WEEDY SPECIES INCLUDING: KOCHIA (BASSISIA SCOPARIA), PRICKLY LETTUCE (LACTUCA SERRIOLA), CANADA THISTLE (CIRSIMUM ARVENSE), CHEATGRASS (BROMIUM TECTORUM), CURLY DOCK (RUMEX CRISPUS), FLUXWEED (DESCURAINIA SOPHIA), YELLOW SWEETCLOVER (MELILLOTUS OFFICINALIS), AND COMMON DANDELION (TARAXACUM OFFICINALE). OF THESE CANADA THISTLE IS THE PRIMARY NOXIOUS WEED THAT MAY NEED CONTROL, ALTHOUGH OTHER TARGET WEED SPECIES MAY BE IDENTIFIED FOR CONTROL AT THE END OF THE FIRST GROWING SEASON.



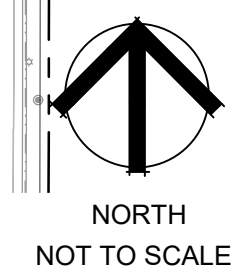
Legend

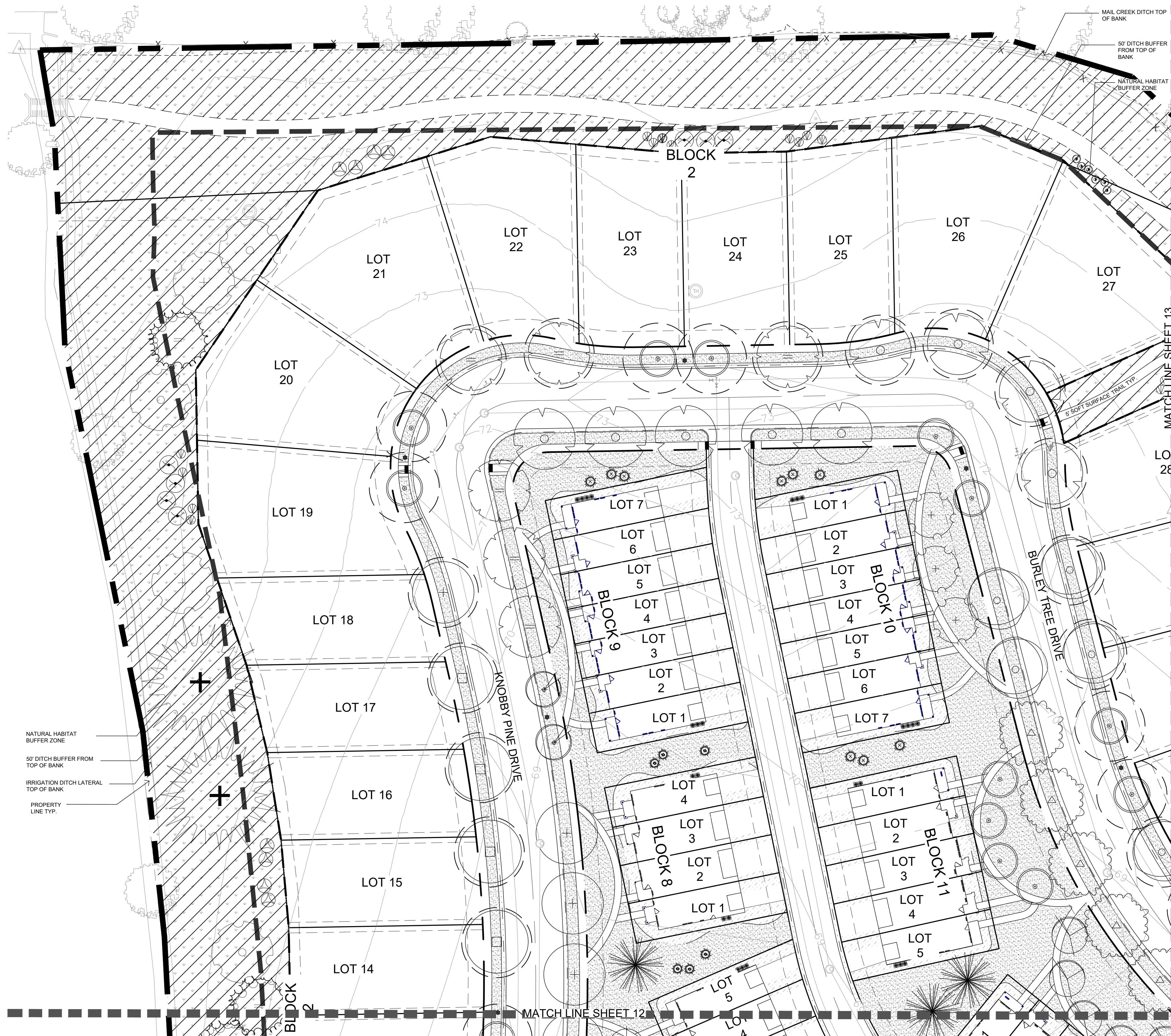
	PROPERTY LINE
	NATURAL HABITAT BUFFER ZONE (NHBZ)
	NATURAL HABITAT BUFFER ZONE (NHBZ) AREA
	WETLANDS MITIGATION AREA

Natural Habitat Buffer Zone Plant List

KEY	QTY	RATIO	SCIENTIFIC/COMMON NAME	HEIGHT	WIDTH	SIZE	NOTES
	31		SHADE/CANOPY TREES -				
	19	18.6%	Populus x acuminata COTTONWOOD, LANCELEAF	60'	40'	2.0" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	12	11.8%	Populus deltoides ssp. monilifera COTTONWOOD, PLAINS	80'	60'	2.0" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	40		EVERGREEN TREES -				
	22	21.6%	Juniperus scopulorum JUNIPER, ROCKY MOUNTAIN	30'	12'	6" BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
	11	10.8%	Pinus ponderosa PINE, PONDEROSA	80'	40'	6" BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
	7	6.9%	Picea pungens SPRUCE, COLORADO	60'	30'	6" BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
	31		ORNAMENTAL TREES -				
	31	30.4%	Acer glabrum MAPLE, ROCKY MOUNTAIN	20'	15'	1.5" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	141		DECIDUOUS SHRUBS -				
	17	8.0%	Ribes aureum CURRANT, GOLDEN	5'	5'	5 Gallon	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	25	8.0%	Physocarpus monogynus NINEBARK, MOUNTAIN	4'	4'	5 Gallon	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	20	8.0%	Rhus trilobata SUMAC, THREE LEAF	5'	5'	5 Gallon	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	33	8.0%	Aronia arbutifolia 'Brilliantissima' CHOCHECHERRY, NATIVE	10'	10'	5 Gallon	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	30	8.0%	Amelanchier alnifolia 'Regent' SERVICEBERRY, REGENT	8'	8'	5 Gallon	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	16	8.0%	Salix purpurea nana WILLOW, DWARF ARCTIC	6'	6'	5 Gallon	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER

NOTE: IN ANY INSTANCE WHERE THE PLANT LIST OR LANDSCAPE QUANTITIES DO NOT MATCH THE PLAN, REQUIRED PLANTS/QUANTITIES SHALL BE PER THE PLAN. CONTRACTOR TO VERIFY QUANTITIES.



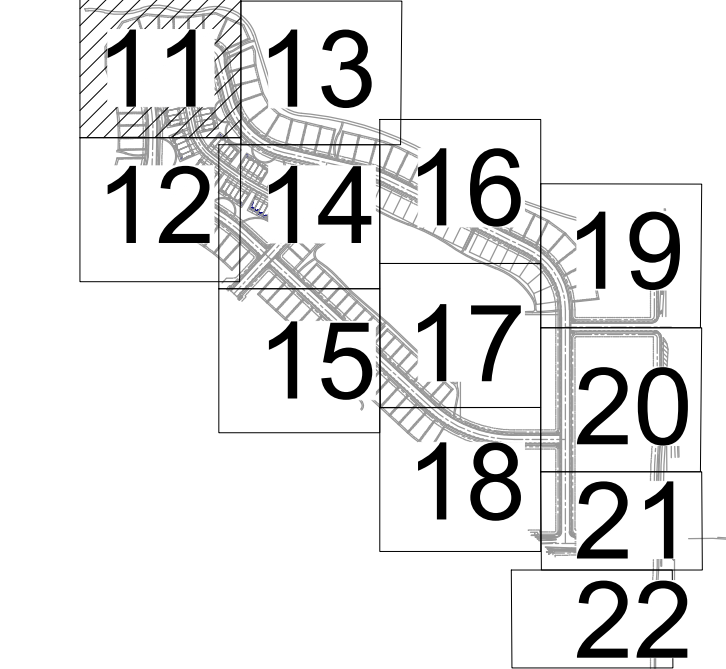


PLANT LIST

KEY	QTY	RATIO	SCIENTIFIC/COMMON NAME	HEIGHT
208 SHADE/CANOPY TREES -				
+	23	11.6%	Celtis occidentalis HACKBERRY, WESTERN (mitigation tree)	60'
△	8	2.1%	Gleditsia triacanthos inermis 'Skyline' HONEYLOCUST, SKYLINE	50'
○	8	8.2%	Gymnocladus dioica 'Espresso' KENTUCKY COFFEETREE, ESPRESSO (mitigation tree)	60'
+	8	2.1%	Populus deltoides ssp. monilifera COTTONWOOD, PLAINS	80'
+	10	7.9%	Quercus buckleyi OAK, TEXAS RED (mitigation tree)	50'
+	20		Quercus macrocarpa OAK, BUR	80'
+	9	2.4%	Tilia americana 'Redmond' LINDEN, REDMOND (mitigation tree)	50'
+	23	11.9%	Ulmus Accolade ELM, ACCOLADE (mitigation tree)	50'
+	22	8.7%	Ulmus Accolade ELM, ACCOLADE (mitigation tree)	50'
62 EVERGREEN TREES -				
+	5	1.3%	Pinus ponderosa PINE, PONDEROSA	80'
+	10	2.6%	Picea pungens SPRUCE, COLORADO	60'
+	16	4.2%	Pinus strobus PINE, SOUTHWESTERN WHITE	50'
+	13	3.4%	Picea abies 'Cupressina' SPRUCE, FASTIGIATE NORWAY	20'
+	18	4.7%	Pinus mugo 'Tannenbaum' PINE, TANNENBAUM MUGO	15'
109 ORNAMENTAL TREES -				
+	17	4.5%	Acer tataricum Hot Wings MAPLE, HOT WINGS	20'
+	10		Amelanchier x grandiflora 'Autumn Brilliance' SERVICEBERRY, AUTUMN BRILLIANCE (mitigation tree)	25'
+	2	3.2%	Amelanchier x grandiflora 'Autumn Brilliance' SERVICEBERRY, AUTUMN BRILLIANCE (mitigation tree)	25'
+	9	5.5%	Crataegus macracantha occidentalis HAWTHORN, WESTERN (mitigation tree)	20'
+	12		Malus 'Spring Snow' CRABAPPLE, SPRING SNOW (mitigation tree)	20'
+	15	7.1%	Malus 'Spring Snow' CRABAPPLE, SPRING SNOW (mitigation tree)	25'
+	12		Pyrus calleryana Chanticleer PEAR, CHANTICLEER	25'
+	7	5.0%	Pyrus calleryana Chanticleer PEAR, CHANTICLEER (mitigation tree)	30'
+	13	3.4%	Syringa reticulata LILAC, JAPANESE TREE	25'
DECIDUOUS SHRUBS -				
X	---		Aronia arbutifolia 'Brilliantissima' CHOKEBERRY, BRILLIANT RED	8'
X	---		Caryopteris x clandonensis 'Blue Mist' SPIREA, BLUE MIST	4'
X	---		Cornus sericea 'Arctic Fire' DOGWOOD, ARCTIC FIRE	4'
X	---		Euonymus alatus 'Compactus' BURNING BUSH, DWARF	8'
X	---		Philadelphus x 'Snowbelle' MOCKORANGE, SNOWBELLE	4'
X	---		Rhus trilobata SUMAC, THREE-LEAF	5'
X	---		Ribes aureum CURRANT, GOLDEN	5'
X	---		Syringa meyeri 'Palibin' LILAC, DWARF KOREAN	4'
PERENNIALS/GRASSES -				
*	X	---	Bouteloua gracilis 'Blonde Ambition' GRASS, BLONDE AMBITION GRAMA	3'
*	X	---	Calamagrostis acutiflora 'Karl Foerster' GRASS, FEATHER REED	5'
*	X	---	Helictotrichon sempervirens GRASS, BLUE AVENA	3'
*	X	---	Hemerocallis 'red' DAYLILY, RED	3'
*	X	---	Panicum virgatum 'Heavy Metal' GRASS, HEAVY METAL BLUE SWITCH	4'
MITIGATION TREES				
145			Mitigation Trees See Note #2 for sizing requirements	

A PERMIT MUST BE OBTAINED FROM THE CITY FORESTER BEFORE ANY TREES OR SHRUBS AS NOTED ON THIS PLAN ARE PLANTED, PRUNED OR REMOVED IN THE PUBLIC RIGHT-OF-WAY. THIS INCLUDES ZONES BETWEEN THE SIDEWALK AND CURB, MEDIANS, AND OTHER CITY PROPERTY. THIS PERMIT SHALL APPROVE THE LOCATION AND SPECIES TO BE PLANTED. FAILURE TO OBTAIN THIS PERMIT IS A VIOLATION OF THE CITY OF FORT COLLINS CODE SUBJECT TO CITATION (SECTION 27-31) AND MAY ALSO RESULT IN REPLACING OR RELOCATING TREES AND A HOLD ON CERTIFICATE OF OCCUPANCY.

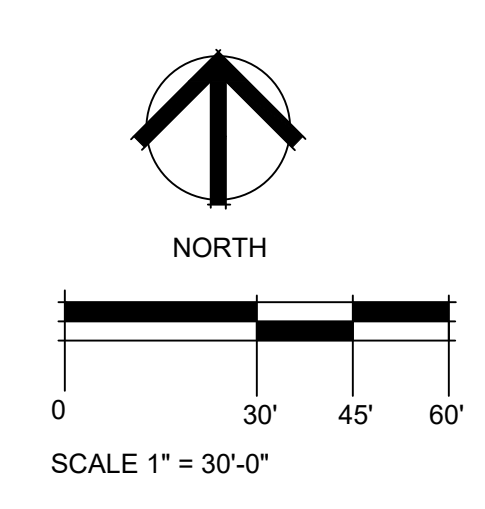
LANDSCAPE KEY MAP



LANDSCAPE LEGEND

764,871 S.F.	NON-IRRIGATED NATIVE FOOTHILLS GRASS MIX ARKANSAS VALLEY SEED MIX (OR APPROVED EQUAL)	154,243 S.F.	IRRIGATED TURF DURA TURF SOD	EXISTING TREES	MITIGATION TREE DECIDUOUS - 3" CAL. B&B EVERGREEN - 8" B&B ORNAMENTAL - 2" CAL. B&B
24,161 S.F.	SHREDDED CEDAR MULCH ALL SHRUB BEDS TO RECEIVE A MINIMUM 4"-6" DEPTH SHREDDED CEDAR WOOD MULCH		NATURAL HABITAT BUFFER ZONE AREA (NHZ)	NATURAL HABITAT BUFFER ZONE AREA (NHZ) WETLAND AREA	TREE TO BE REMOVED
	50' DITCH BUFFER FROM TOP OF BANK		NATURAL HABITAT BUFFER ZONE BOUNDARY	STREET LIGHT	STOP SIGN
					STEEL EDGER, ROUNDED TOP

NOTE: THE NATURAL HABITAT BUFFER ZONE IS INTENDED TO BE MAINTAINED IN A NATIVE LANDSCAPE. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONE.



PROJECT TITLE
HANSEN
Preliminary Development Plan

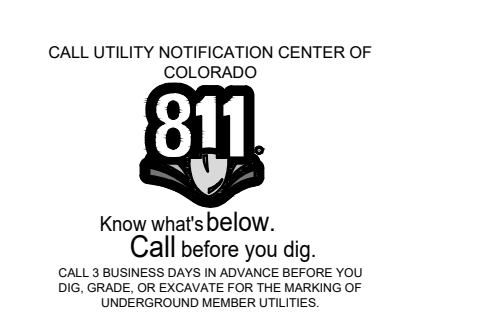
6029 S. Timberline Road
Ft Collins, Colorado

PREPARED FOR
LORSON NORTH DEVELOPMENT CORP., LLC.

212 N. WAHSATCH AVE.
SUITE 301
COLORADO SPRINGS, CO 80903

CONTACT: JEFF MARK

NOT FOR CONSTRUCTION FOR REVIEW ONLY

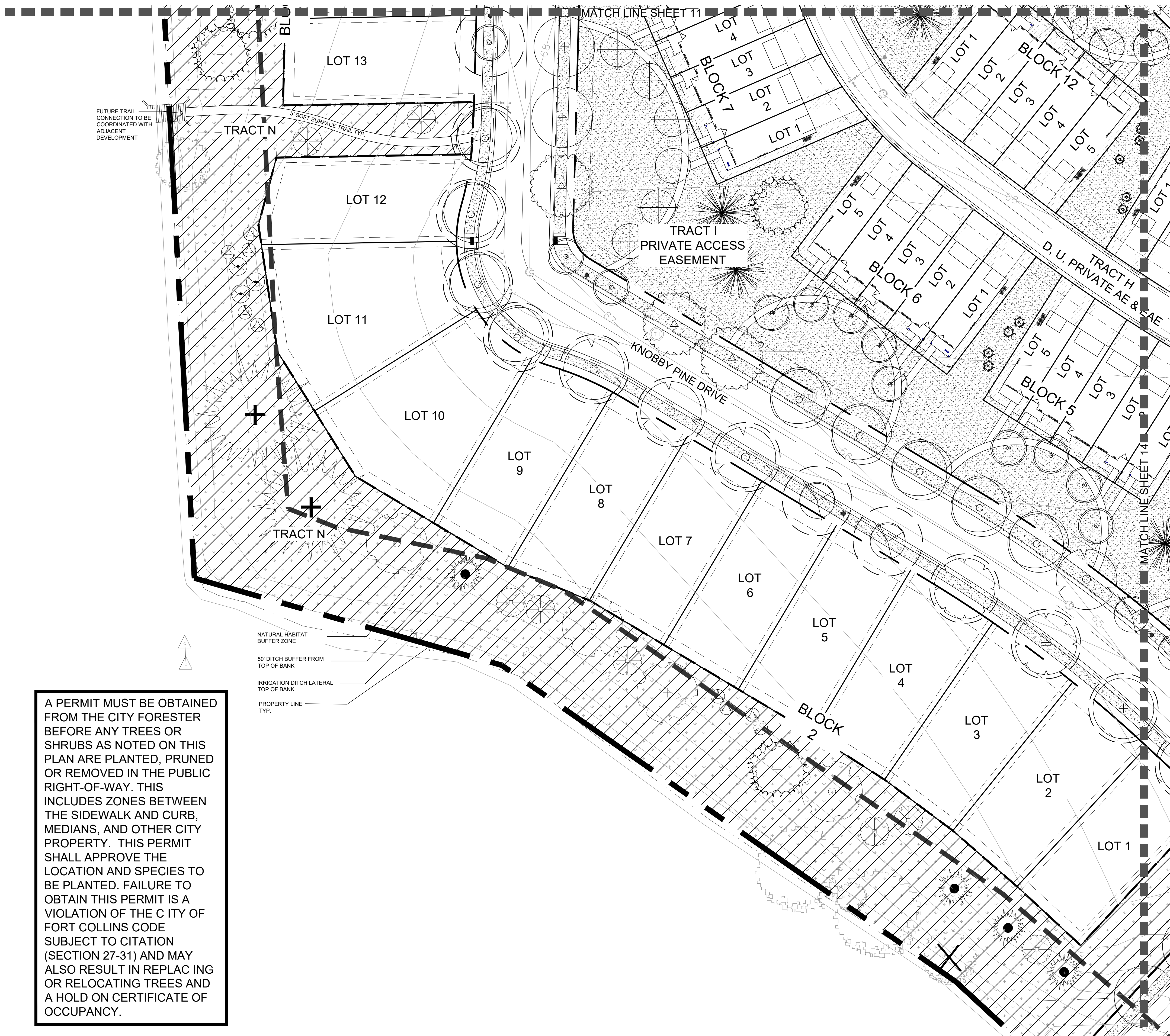


REVISIONS	DATE
Staff Comments	4.2.18
Staff Comments	6.25.18
Staff Comments	9.28.18

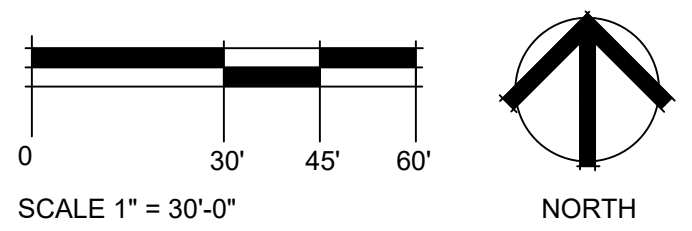
DATE
SEPTEMBER 19, 2017

SHEET TITLE
Landscape Plan

SHEET INFORMATION
SHEET 11



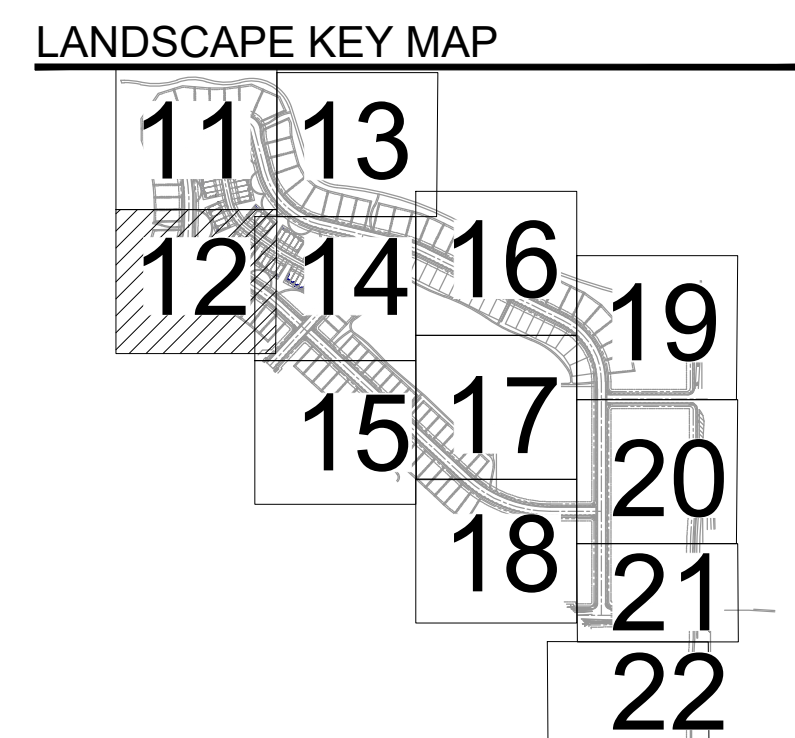
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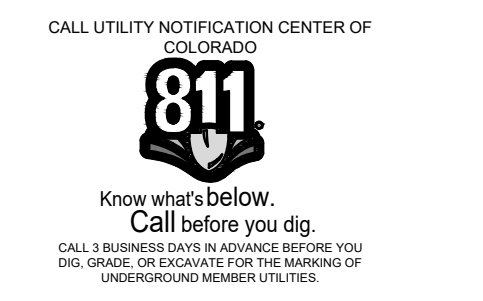
LANDSCAPE LEGEND	
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24,161 S.F.	SHREDDED CEDAR MULCH ALL SHRUB BEDS TO RECEIVE A MINIMUM 4"-6" DEPTH SHREDDED CEDAR WOOD MULCH
154,243 S.F.	IRRIGATED TURF DURA TURF SOD
(Symbol)	NATURAL HABITAT BUFFER ZONE AREA (NHBZ)
(Symbol)	50' DITCH BUFFER FROM TOP OF BANK
(Symbol)	NATURAL HABITAT BUFFER ZONE BOUNDARY
(Symbol)	EXISTING TREES
(Symbol)	NATURAL HABITAT BUFFER ZONE AREA (NHBZ) WETLAND AREA
(Symbol)	STREET LIGHT
(Symbol)	MITIGATION TREE DECIDUOUS - 3" CAL. B&B EVERGREEN - 8" B&B ORNAMENTAL - 2" CAL. B&B
(Symbol)	TREE TO BE REMOVED
(Symbol)	STOP SIGN
(Symbol)	STEEL EDGER, ROUNDED TOP

NOTE: THE NATURAL HABITAT BUFFER ZONE IS INTENDED TO BE MAINTAINED IN A NATIVE LANDSCAPE. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONE.

PLANT LIST	QTY	RATIO	SCIENTIFIC/Common NAME	HEIGHT
SHADE/CANOPY TREES -				
(Symbol)	23	11.6%	<i>Celtis occidentalis</i> HACKBERRY, WESTERN (mitigation tree)	60'
(Symbol)	21	10.5%	<i>Gleditsia triacanthos inermis</i> 'Skyline' HONEYLOCUST, SKYLINE	50'
(Symbol)	8	2.1%	<i>Gymnocladus dioica</i> 'Espresso' KENTUCKY COFFEETREE, ESPRESSO (mitigation tree)	60'
(Symbol)	23	11.6%	<i>Populus deltoides ssp. monilifera</i> COTTONWOOD, PLAINS	80'
(Symbol)	8	2.1%	<i>Quercus buckleyi</i> OAK, TEXAS RED (mitigation tree)	50'
(Symbol)	20	9.9%	<i>Quercus macrocarpa</i> OAK, BUR	80'
(Symbol)	9	2.4%	<i>Tilia americana</i> 'Redmond' LINDEN, REDMOND (mitigation tree)	50'
(Symbol)	23	11.9%	<i>Ulmus acclade</i> ELM, ACCOLADE (mitigation tree)	50'
(Symbol)	22	11.1%	<i>Ulmus americana</i> ELM, AMERICAN (mitigation tree)	50'
EVERGREEN TREES -				
(Symbol)	5	1.3%	<i>Pinus ponderosa</i> PINE, PONDEROSA	80'
(Symbol)	10	2.6%	<i>Picea pungens</i> SPRUCE, COLORADO	60'
(Symbol)	16	4.2%	<i>Pinus strobus</i> PINE, SOUTHWESTERN WHITE	50'
(Symbol)	13	3.4%	<i>Picea abies</i> 'Cupressina' SPRUCE, FASTIGIATE NORWAY	20'
(Symbol)	18	4.7%	<i>Pinus mugo</i> 'Tannenbaum' PINE, TANNENBAUM MUGO	15'
ORNAMENTAL TREES -				
(Symbol)	17	4.5%	<i>Acer tataricum</i> Hot Wings MAPLE, HOT WINGS	20'
(Symbol)	10	3.2%	<i>Amelanchier x grandiflora</i> 'Autumn Brilliance' SERVICEBERRY, AUTUMN BRILLIANCE (mitigation tree)	25'
(Symbol)	2	0.5%	<i>Crataegus macracantha occidentalis</i> HAWTHORN, WESTERN (mitigation tree)	20'
(Symbol)	12	5.5%	<i>Malus 'Spring Snow'</i> CRABAPPLE, SPRING SNOW (mitigation tree)	25'
(Symbol)	15	7.1%	<i>Pyrus calleryana</i> Chanticleer PEAR, CHANTICLEER (mitigation tree)	30'
(Symbol)	12	5.0%	<i>Syringa reticulata</i> LILAC, JAPANESE TREE	25'
DECIDUOUS SHRUBS -				
(Symbol)	X	---	<i>Aronia arbutifolia</i> 'Brilliantissima' CHOKEBERRY, BRILLIANT RED	8'
(Symbol)	X	---	<i>Caryopteris x cianodensis</i> 'Blue Mist' SPIREA, BLUE MIST	4'
(Symbol)	X	---	<i>Cornus sericea</i> 'Arctic Fire' DOGWOOD, ARCTIC FIRE	4'
(Symbol)	X	---	<i>Euonymus alatus</i> 'Compactus' BURNING BUSH, DWARF	8'
(Symbol)	X	---	<i>Philadelphus x 'Snowbelle'</i> MOCKORANGE, SNOWBELLE	4'
(Symbol)	X	---	<i>Rhus trilobata</i> SUMAC, THREE-LEAF	5'
(Symbol)	X	---	<i>Ribes aureum</i> CURRRANT, GOLDEN	5'
(Symbol)	X	---	<i>Syringa meyeri</i> 'Palibin' LILAC, DWARF KOREAN	4'
PERENNIALS/GRASSES -				
(Symbol)	X	---	<i>Bouteloua gracilis</i> 'Blonde Ambition' GRASS, BLONDE AMBITION GRAMA	3'
(Symbol)	X	---	<i>Calamagrostis acutiflora</i> 'Karl Foerster' GRASS, FEATHER REED	5'
(Symbol)	X	---	<i>Helictotrichon sempervirens</i> GRASS, BLUE AVENA	3'
(Symbol)	X	---	<i>Hemerocallis 'red'</i> DAYLILY, RED	3'
(Symbol)	X	---	<i>Panicum virgatum</i> 'Heavy Metal' GRASS, HEAVY METAL BLUE SWITCH	4'
MITIGATION TREES				
(Symbol)	145	---	Mitigation Trees See Note #2 for sizing requirements	---



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REVISIONS	DATE
Staff Comments	4.2.18
Staff Comments	6.25.18
Staff Comments	9.28.18

DATE

SEPTEMBER 19, 2017

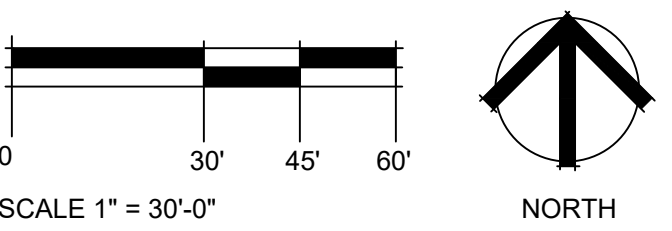
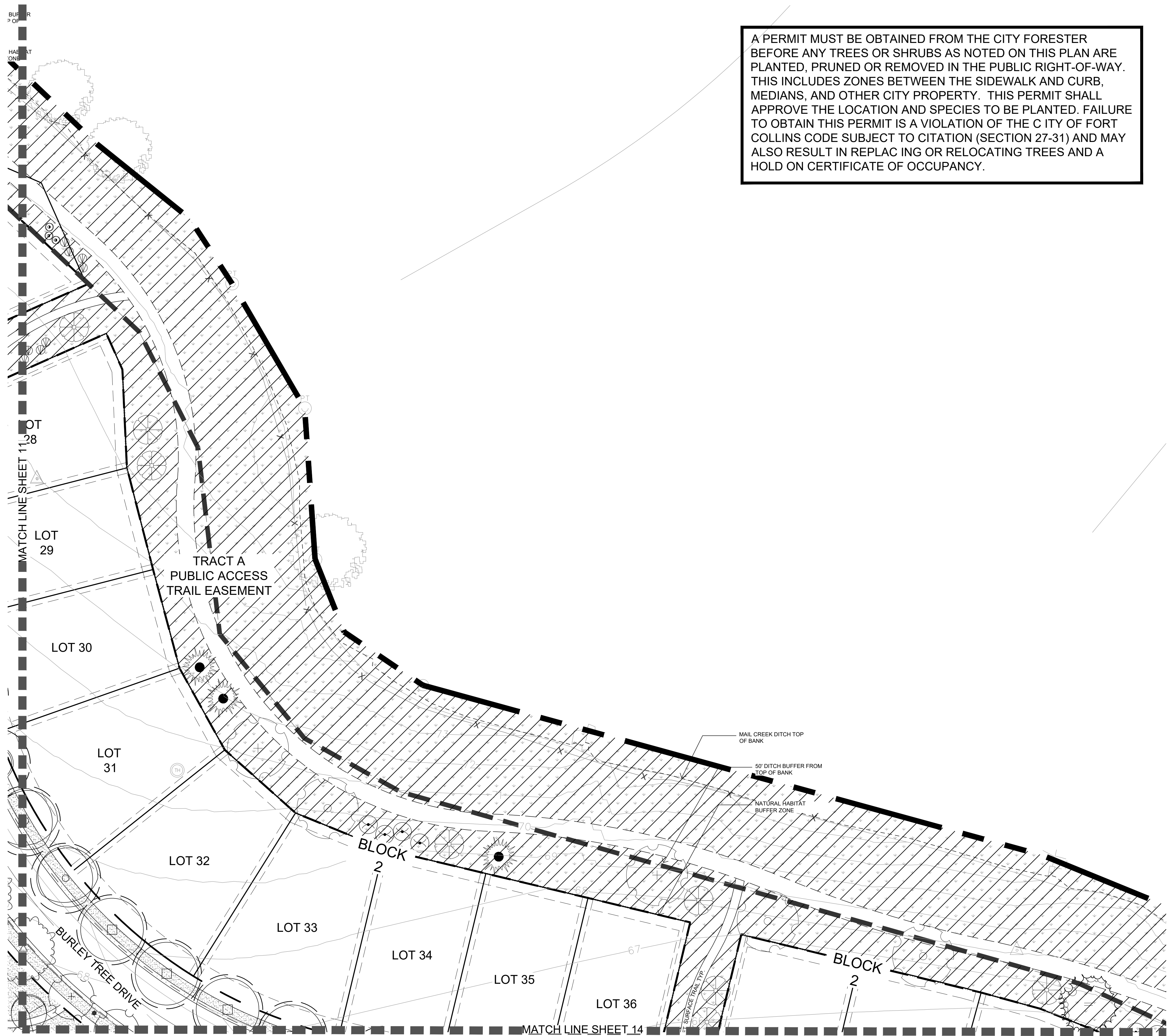
SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

SHEET 12

A PERMIT MUST BE OBTAINED FROM THE CITY FORESTER BEFORE ANY TREES OR SHRUBS AS NOTED ON THIS PLAN ARE PLANTED, PRUNED OR REMOVED IN THE PUBLIC RIGHT-OF-WAY. THIS INCLUDES ZONES BETWEEN THE SIDEWALK AND CURB, MEDIANS, AND OTHER CITY PROPERTY. THIS PERMIT SHALL APPROVE THE LOCATION AND SPECIES TO BE PLANTED. FAILURE TO OBTAIN THIS PERMIT IS A VIOLATION OF THE CITY OF FORT COLLINS CODE SUBJECT TO CITATION (SECTION 27-31) AND MAY ALSO RESULT IN REPLACING OR RELOCATING TREES AND A HOLD ON CERTIFICATE OF OCCUPANCY.



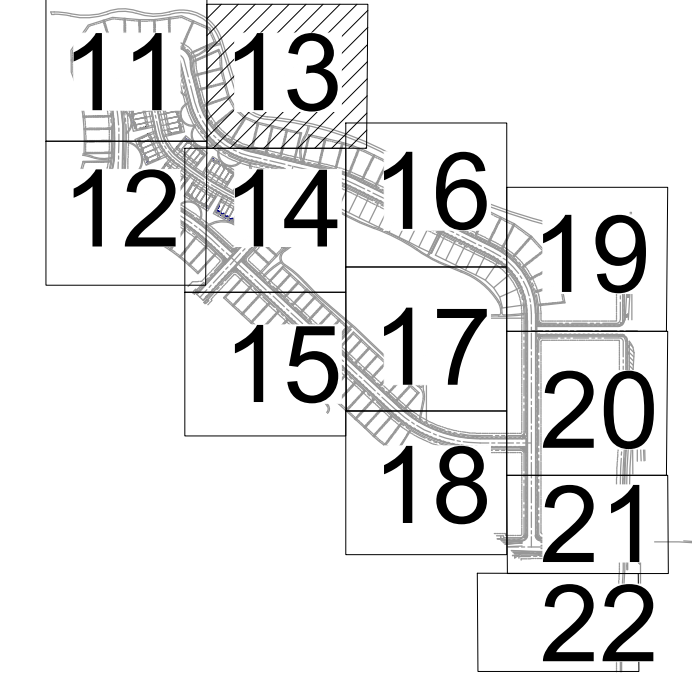
LANDSCAPE LEGEND

- 764,871 S.F. NON-IRRIGATED NATIVE FOOTHILLS GRASS MIX ARKANSAS VALLEY SEED MIX (OR APPROVED EQUAL)
- 154,243 S.F. IRRIGATED TURF DURA TURF SOD
- 24,161 S.F. SHREDDED CEDAR MULCH ALL SHRUB BEDS TO RECEIVE A MINIMUM 4"-6" DEPTH SHREDDED CEDAR WOOD MULCH
- NATURAL HABITAT BUFFER ZONE AREA (NHBZ)
- 50' DITCH BUFFER FROM TOP OF BANK
- NATURAL HABITAT BUFFER ZONE AREA (NHBZ) WETLAND AREA
- EXISTING TREES
- TREE TO BE REMOVED
- STREET LIGHT
- STOP SIGN

PLANT LIST

KEY	QTY	RATIO	SCIENTIFIC/COMMON NAME	HEIGHT
SHADE/CANOPY TREES -				
+	23	208	Celtis occidentalis HACKBERRY, WESTERN (mitigation tree)	60'
△	21	11.6%	Gleditsia triacanthos inermis 'Skyline' HONEYLOCUST, SKYLINE	50'
○	8	2.1%	Gymnocladus dioica 'Espresso' KENTUCKY COFFEETREE, ESPRESSO (mitigation tree)	60'
+	23	8.2%	Populus deltoides ssp. monilifera COTTONWOOD, PLAINS	60'
+	8	2.1%	Quercus buckleyi OAK, TEXAS RED (mitigation tree)	80'
=	10	7.9%	Quercus macrocarpa OAK, BUR	50'
+	20	2.4%	Tilia americana 'Redmond' LINDEN, REDMOND (mitigation tree)	50'
+	9	11.9%	Ulmus Accolade ELM, ACCOLADE (mitigation tree)	50'
+	23	8.7%	Pinus ponderosa PINE, PONDEROSA	80'
+	5	1.3%	Picea pungens SPRUCE, COLORADO	60'
+	10	2.6%	Pinus strobifera PINE, SOUTHWESTERN WHITE	50'
+	16	4.2%	Picea abies 'Cupressina' SPRUCE, FASTIGIATE NORWAY	20'
+	13	3.4%	Pinus mugo 'Tannenbaum' PINE, TANNENBAUM MUGO	15'
+	18	4.7%	ORNAMENTAL TREES -	
+	17	4.5%	Acer tataricum Hot Wings MAPLE, HOT WINGS	20'
+	10	3.2%	Amelanchier x grandiflora 'Autumn Brilliance' SERVICEBERRY, AUTUMN BRILLIANCE (mitigation tree)	25'
+	2	2.5%	Crataegus macracantha occidentalis HAWTHORN, WESTERN (mitigation tree)	20'
+	9	5.5%	Malus 'Spring Snow' CRABAPPLE, SPRING SNOW (mitigation tree)	25'
+	12	7.1%	Pyrus calleryana Chanticleer PEAR, CHANTICLEER (mitigation tree)	25'
+	15	5.0%	Syringa reticulata LILAC, JAPANESE TREE	30'
+	7	3.4%	DECIDUOUS SHRUBS -	25'
+	X	---	Aronia arbutifolia 'Brilliantissima' CHOKEBERRY, BRILLIANT RED	8'
+	X	---	Caryopteris x clandonensis 'Blue Mist' SPIREA, BLUE MIST	4'
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+	X	---	PERENNIALS/GRASSES -	
+	X	---	Bouteloua gracilis 'Blonde Ambition' GRASS, BLONDE AMBITION GRAMA	3'
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+	X	---	Panicum virgatum 'Heavy Metal' GRASS, HEAVY METAL BLUE SWITCH	4'
+	145	---	MITIGATION TREES Mitigation Trees See Note #2 for sizing requirements	

LANDSCAPE KEY MAP



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PROJECT TITLE
HANSEN
Preliminary Development Plan
6029 S. Timberline Road
Ft Collins, Colorado
PREPARED FOR
LORSON NORTH DEVELOPMENT CORP., LLC.
212 N. WAHSATCH AVE.
SUITE 301
COLORADO SPRINGS, CO 80903
CONTACT: JEFF MARK

NOT FOR CONSTRUCTION FOR REVIEW ONLY

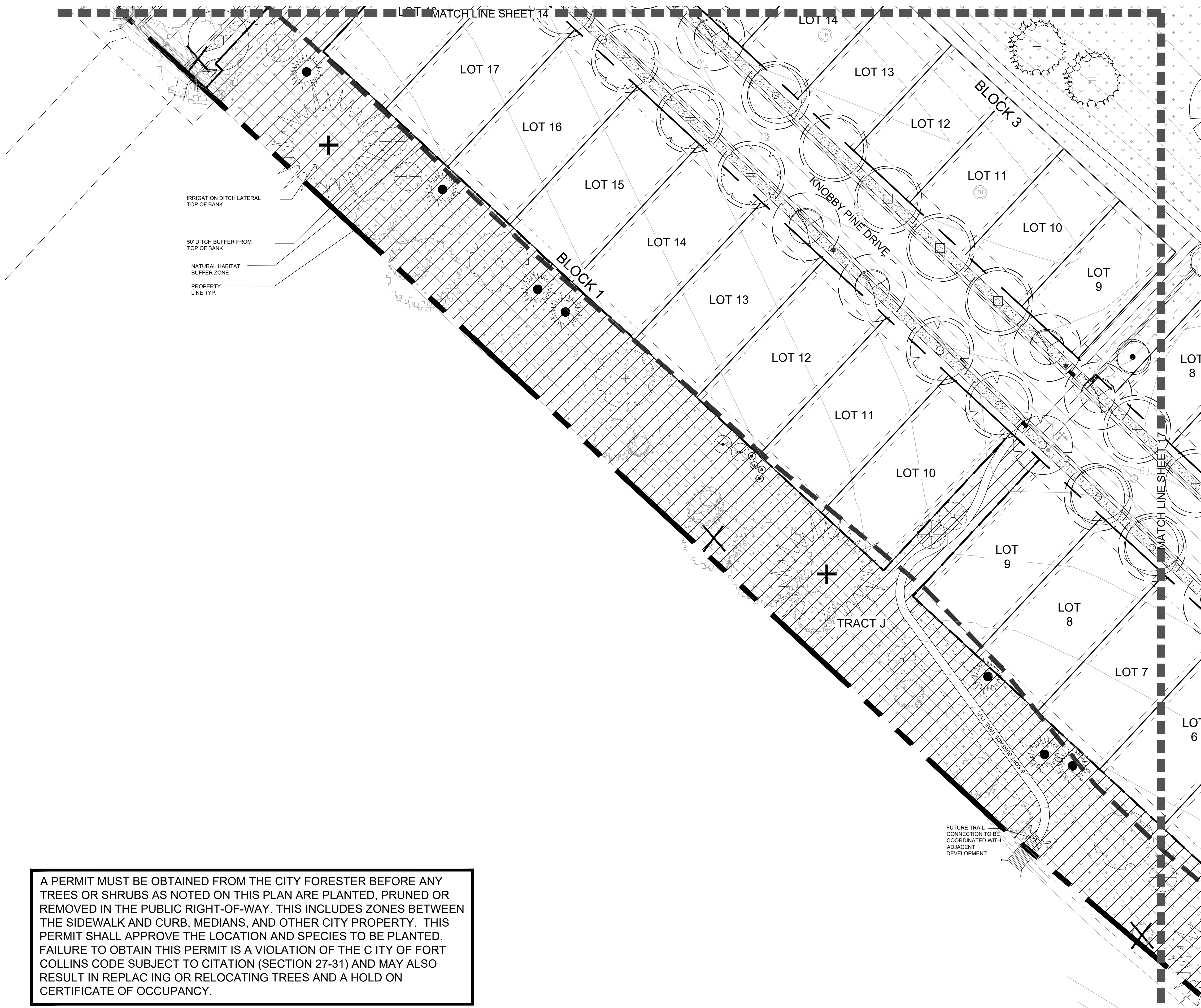


REVISIONS	DATE
Staff Comments	4.2.18
Staff Comments	6.25.18
Staff Comments	9.28.18

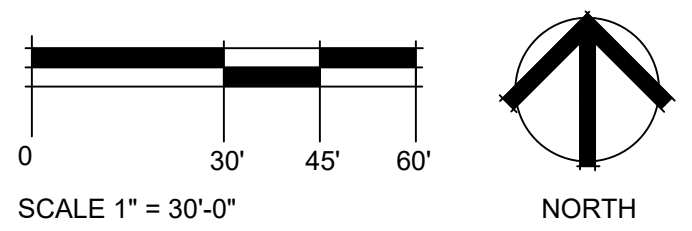
DATE
SEPTEMBER 19, 2017

SHEET TITLE
Landscape Plan

SHEET INFORMATION
SHEET 13



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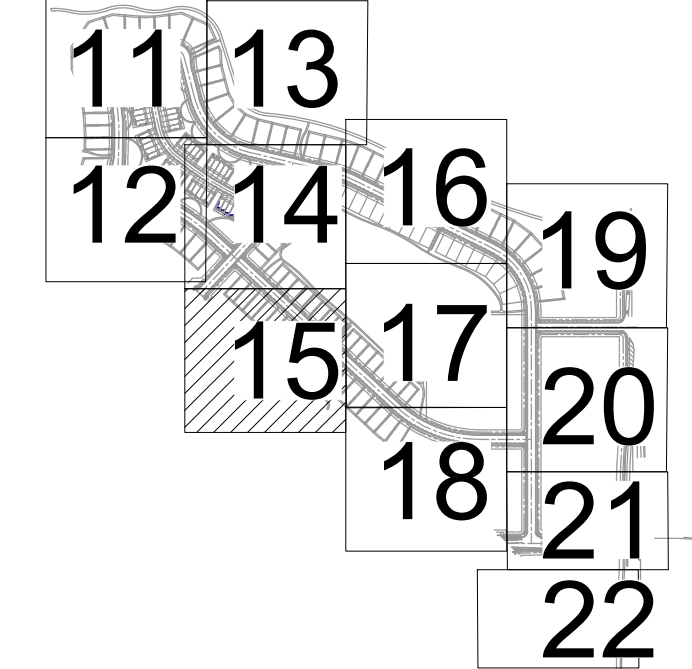


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SHADE/CANOPY TREES -				
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○	22	11.9%	Tilia americana 'Redmond' LINDEN, REDMOND (mitigation tree)	50'
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○	22	11.9%	Tilia americana 'Redmond' LINDEN, REDMOND (mitigation tree)	50'
EVERGREEN TREES -				
+	5	1.3%	Pinus ponderosa PINE, PONDEROSA	80'
=	10	2.6%	Picea pungens SPRUCE, COLORADO	60'
+	16	4.2%	Pinus strobiforus PINE, SOUTHWESTERN WHITE	50'
+	13	3.4%	Picea abies 'Cupressina' SPRUCE, FASTIGIATE NORWAY	20'
+	18	4.7%	Pinus mugo 'Tannenbaum' PINE, TANNENBAUM MUGO	15'
ORNAMENTAL TREES -				
○	17	4.5%	Acer tataricum Hot Wings MAPLE, HOT WINGS	20'
○	10	3.2%	Amelanchier x grandiflora 'Autumn Brilliance' SERVICEBERRY, AUTUMN BRILLIANCE (mitigation tree)	25'
○	2	3.2%	Amelanchier x grandiflora 'Autumn Brilliance' SERVICEBERRY, AUTUMN BRILLIANCE (mitigation tree)	25'
○	9	5.5%	Crataegus macracantha occidentalis HAWTHORN, WESTERN (mitigation tree)	20'
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PERENNIALS/GRASSES -				
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MITIGATION TREES				
○	145		Mitigation Trees See Note #2 for sizing requirements	

LANDSCAPE KEY MAP



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444 Mountain Ave. | TEL: 970.532.5891
Berthoud CO 80513 | WEB: TBGroup.us

PROJECT TITLE

HANSEN
Preliminary Development Plan

6029 S. Timberline Road
Ft Collins, Colorado

PREPARED FOR

LORSON NORTH DEVELOPMENT CORP, LLC.

212 N. WAHSATCH AVE.
SUITE 301
COLORADO SPRINGS, CO 80903

CONTACT: JEFF MARK

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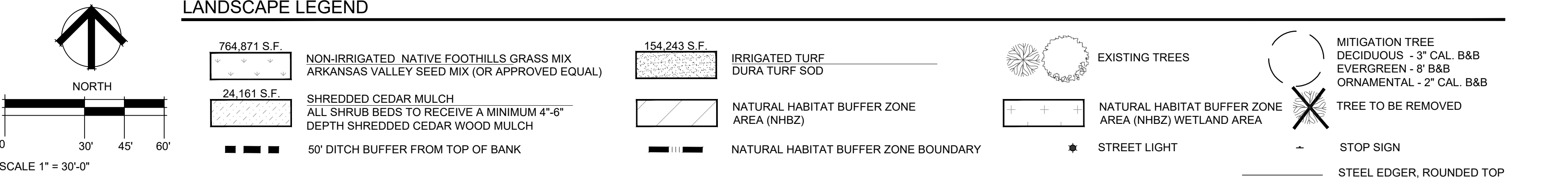
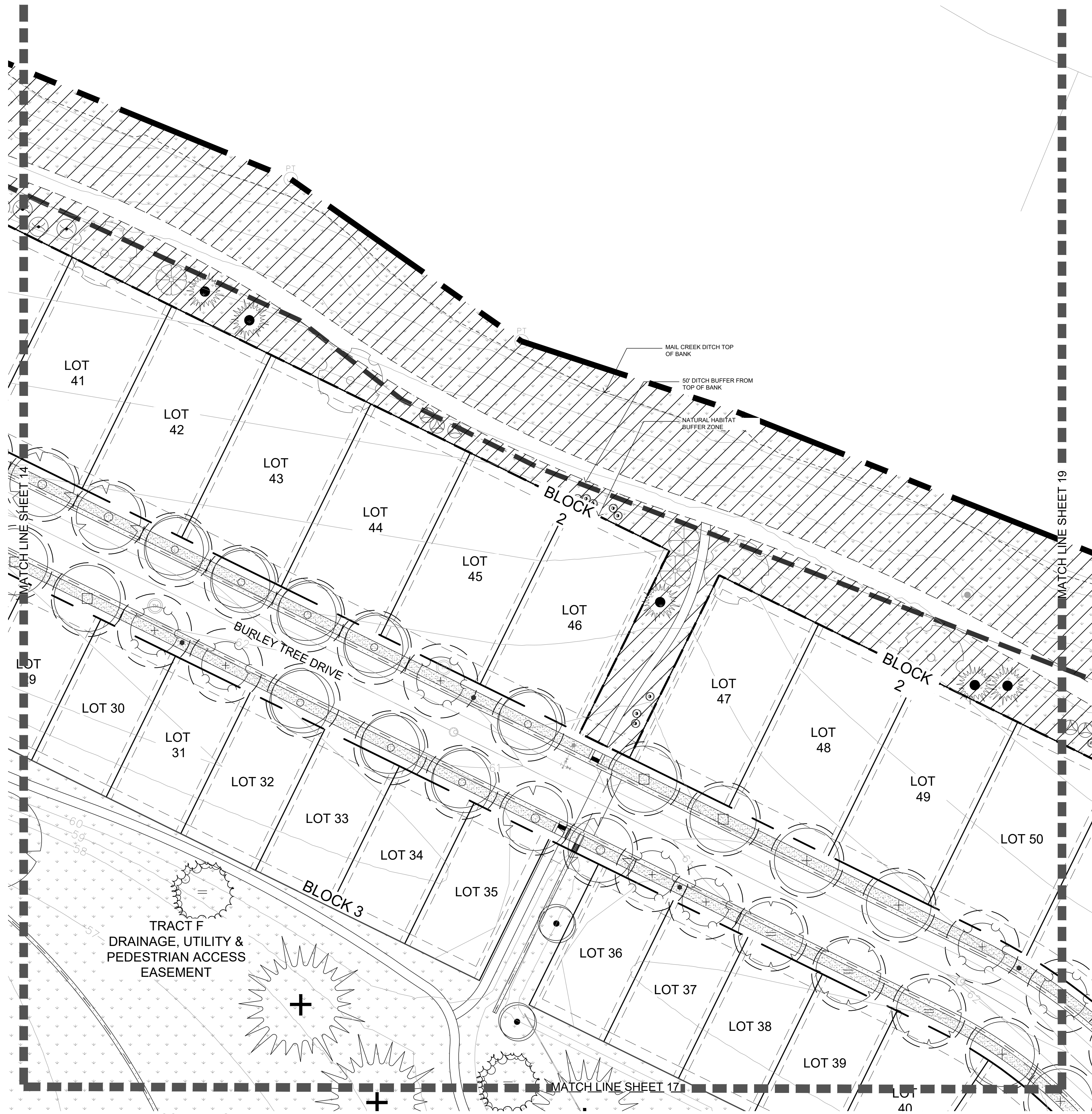
SEPTEMBER 19, 2017

SHEET TITLE

Landscape Plan

SHEET INFORMATION

SHEET 15

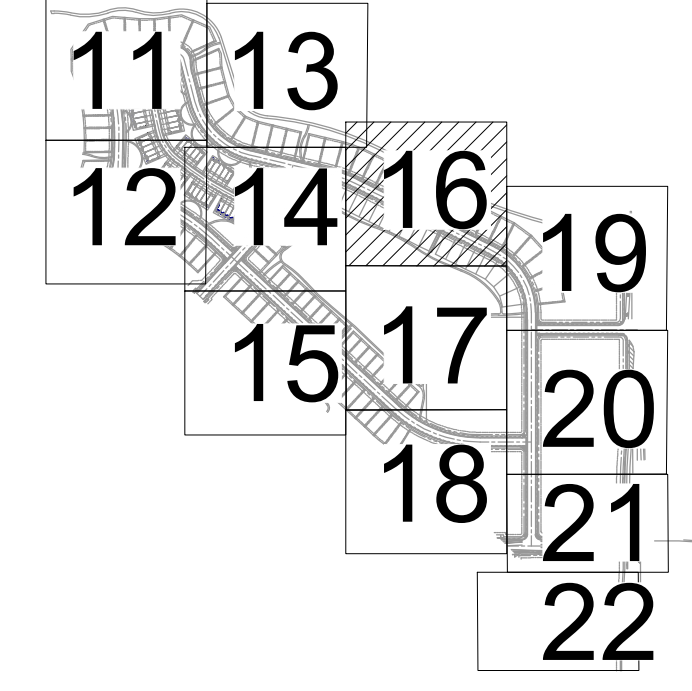


SCALE 1" = 30'-0"

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○	12	5.5%	Pyrus calleryana Chanticleer PEAR, CHANTICLEER (mitigation tree)	30'
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MITIGATION TREES				
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LANDSCAPE KEY MAP



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landscape architecture | planning | illustration

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PROJECT TITLE

HANSEN

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PREPARED FOR

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CONTACT: JEFF MARK

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CALL UTILITY NOTIFICATION CENTER OF COLORADO

Know what's below. Call before you dig. CALL A BUSINESS CENTER IN ADVANCE BEFORE YOU DIG. GRACE OR ENLIGHTEN FOR THE MARKING OF UNRECORDED MEMBER UTILITIES.

REVISIONS	DATE
Staff Comments	4.2.18
Staff Comments	6.25.18
Staff Comments	9.28.18

DATE

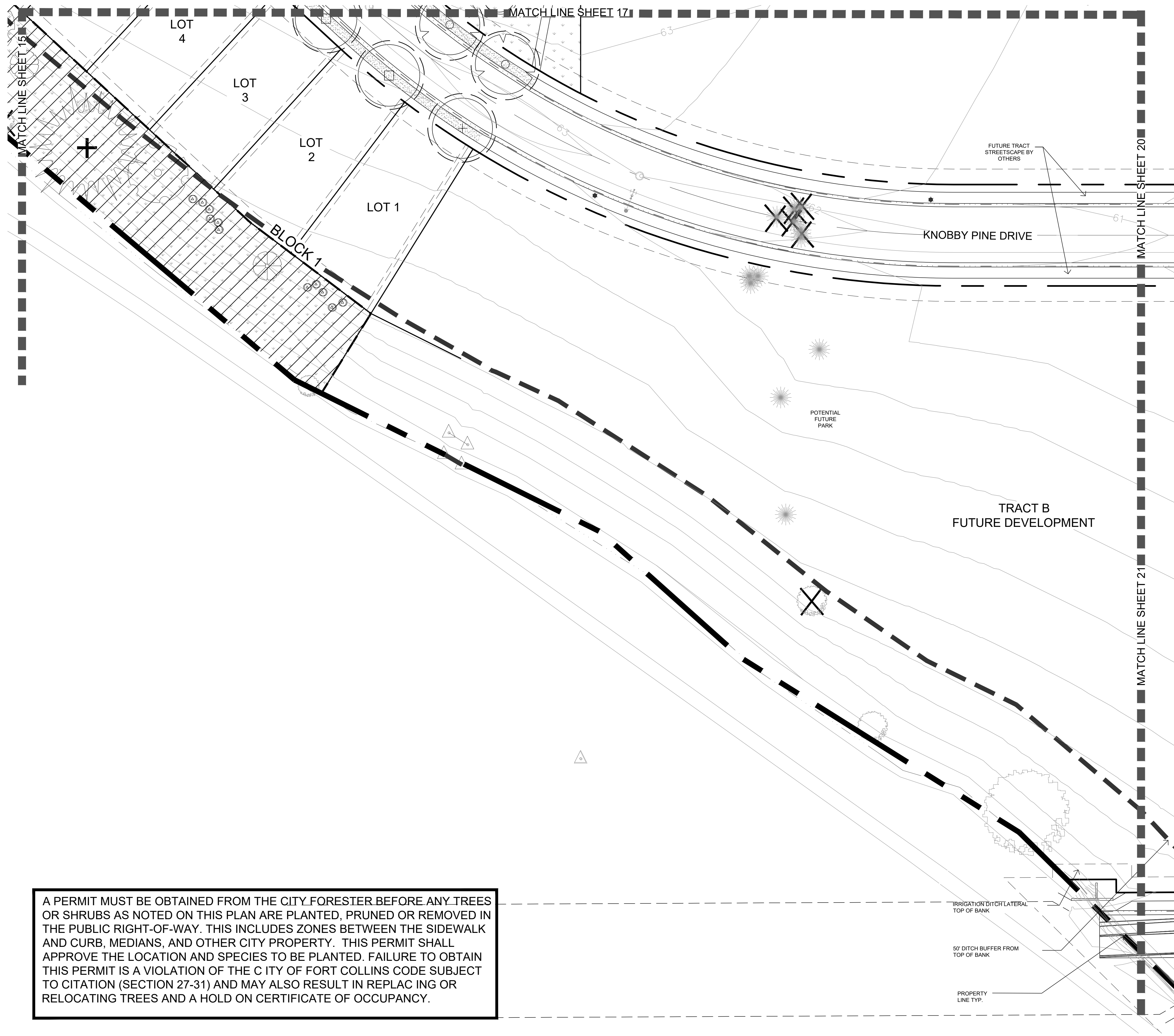
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SHEET TITLE

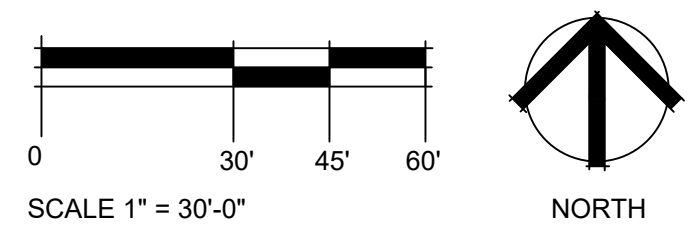
Landscape Plan

SHEET INFORMATION

SHEET 16



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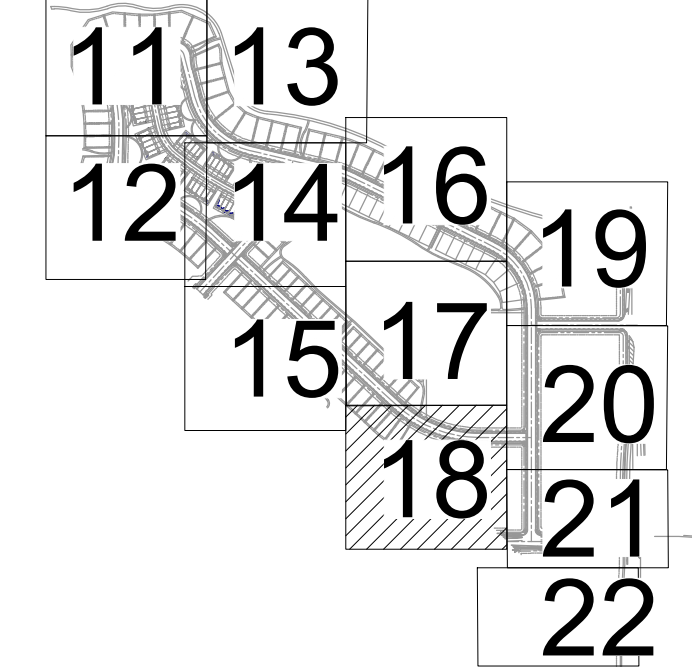
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PLANT LIST

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○	15	7.1%	Malus 'Spring Snow' CRABAPPLE, SPRING SNOW (mitigation tree)	25'
○	12	5.0%	Pyrus calleryana Chanticleer PEAR, CHANTICLEER (mitigation tree)	30'
○	7	5.0%	Pyrus calleryana Chanticleer PEAR, CHANTICLEER (mitigation tree)	30'
○	13	3.4%	Syringa reticulata LILAC, JAPANESE TREE	25'
DECIDUOUS SHRUBS -				
○	X	---	Aronia arbutifolia 'Brilliantissima' CHOKEBERRY, BRILLIANT RED	8'
○	X	---	Caryopteris x clandonensis 'Blue Mist' SPIREA, BLUE MIST	4'
○	X	---	Cornus sericea 'Arctic Fire' DOGWOOD, ARCTIC FIRE	4'
○	X	---	Euonymus alatus 'Compactus' BURNING BUSH, DWARF	8'
○	X	---	Philadelphus x 'Snowbelle' MOCKORANGE, SNOWBELLE	4'
○	X	---	Rhus trilobata SUMAC, THREE-LEAF	5'
○	X	---	Ribes aureum CURRANT, GOLDEN	5'
○	X	---	Syringa meyeri 'Palibin' LILAC, DWARF KOREAN	4'
PERENNIALS/GRASSES -				
*	X	---	Bouteloua gracilis 'Blonde Ambition' GRASS, BLONDE AMBITION GRAMA	3'
⊗	X	---	Calamagrostis acutiflora 'Karl Foerster' GRASS, FEATHER REED	5'
⊗	X	---	Helictotrichon sempervirens GRASS, BLUE AVENA	3'
⊗	X	---	Hemerocallis 'red' DAYLILY, RED	3'
⊗	X	---	Panicum virgatum 'Heavy Metal' GRASS, HEAVY METAL BLUE SWITCH	4'
MITIGATION TREES				
○	145	---	Mitigation Trees See Note #2 for sizing requirements	

LANDSCAPE KEY MAP



NOTE: THE NATURAL HABITAT BUFFER ZONE IS INTENDED TO BE MAINTAINED IN A NATIVE LANDSCAPE. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONE.



PROJECT TITLE

HANSEN
Preliminary Development Plan

PREPARED FOR

LORSON NORTH DEVELOPMENT CORP., LLC.

6029 S. Timberline Road Ft Collins, Colorado

212 N. WAHSATCH AVE. SUITE 301 COLORADO SPRINGS, CO 80903
CONTACT: JEFF MARK

NOT FOR CONSTRUCTION FOR REVIEW ONLY

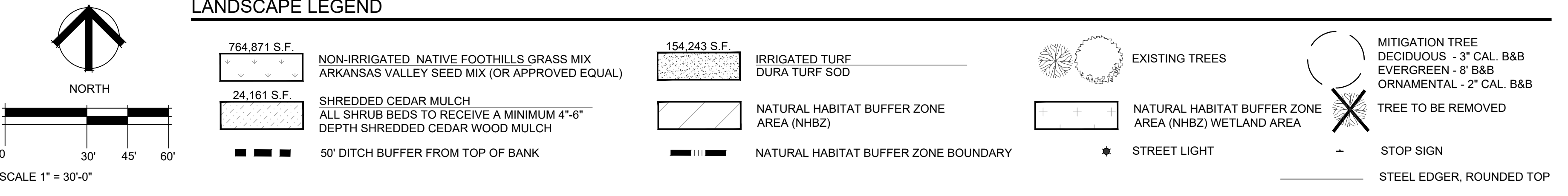
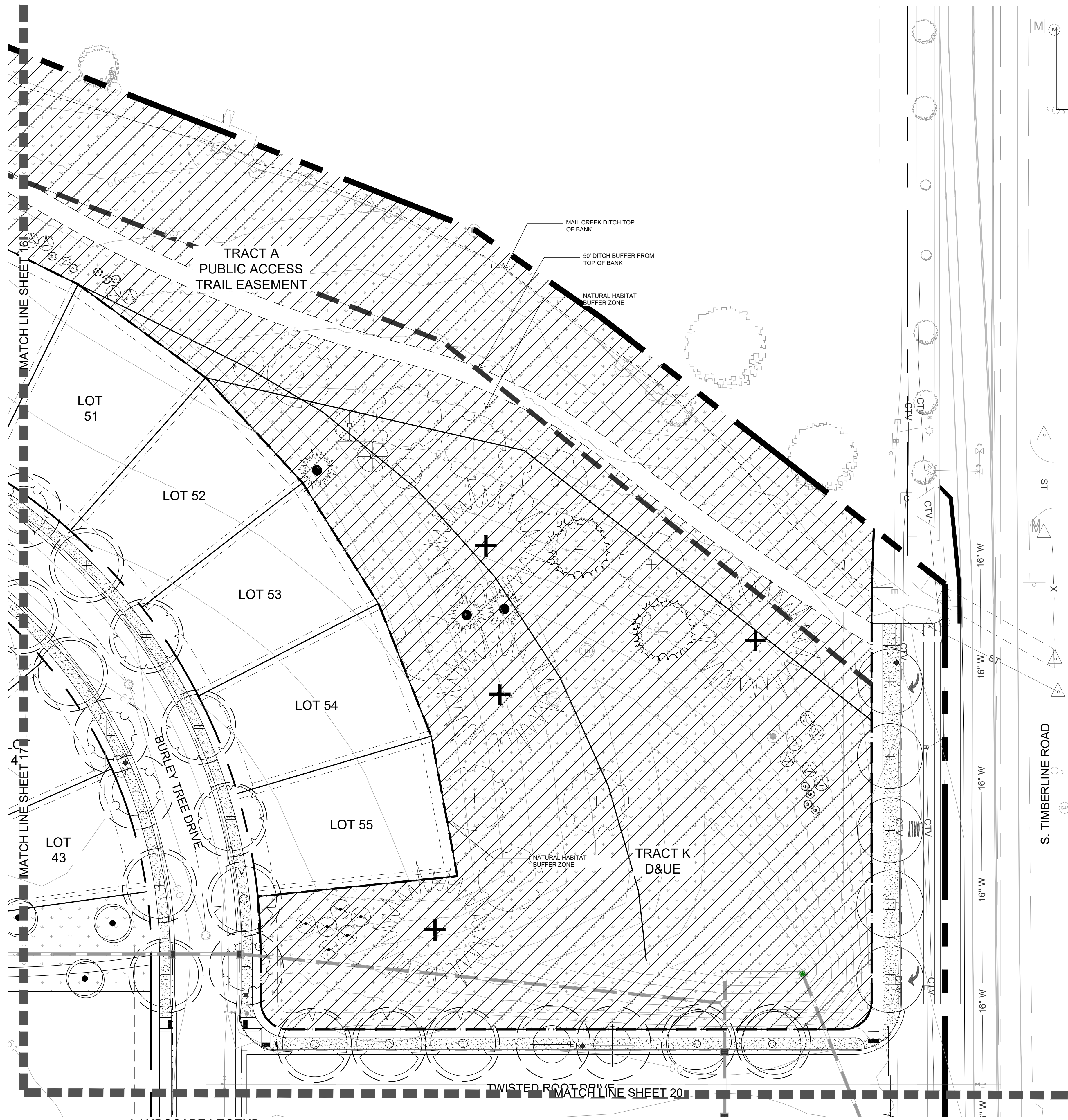


REVISIONS	DATE
Staff Comments	4.2.18
Staff Comments	6.25.18
Staff Comments	9.28.18

DATE
SEPTEMBER 19, 2017

SHEET TITLE
Landscape Plan

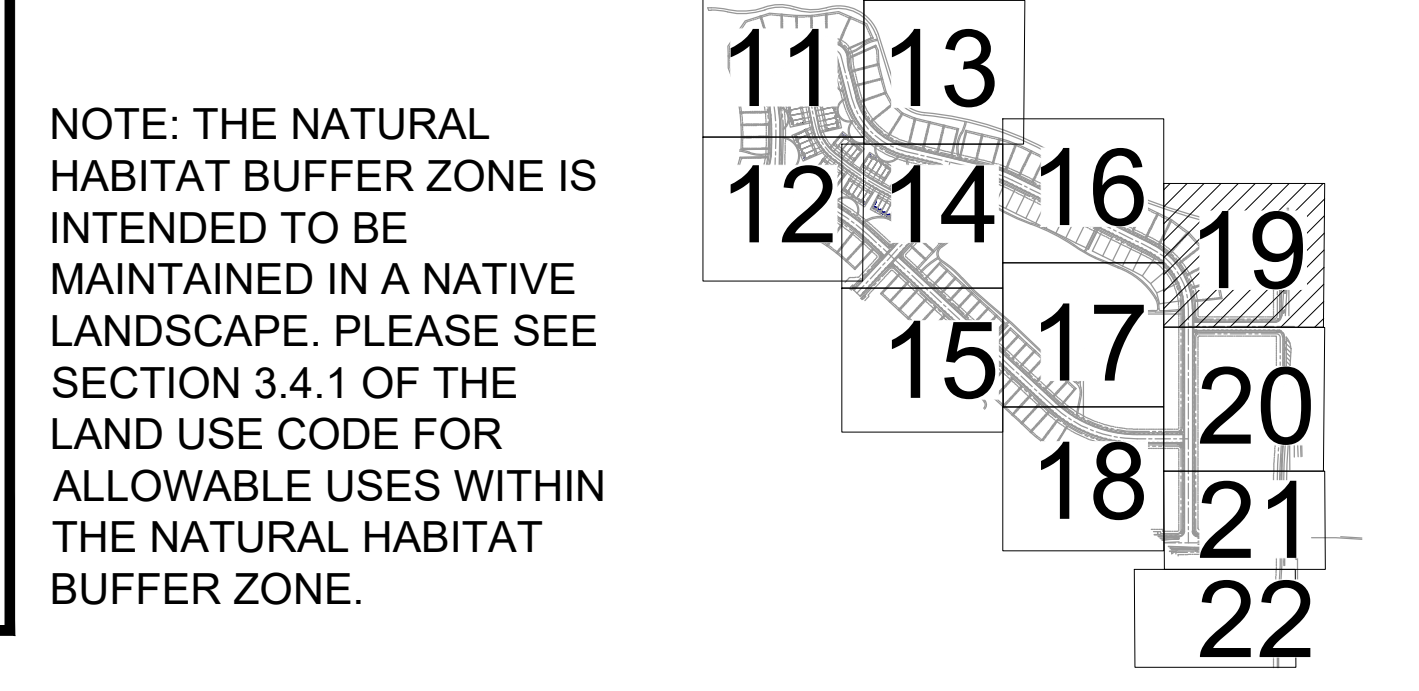
SHEET INFORMATION
SHEET 18



SCALE 1" = 30'-0"

A PERMIT MUST BE OBTAINED FROM THE CITY FORESTER BEFORE ANY TREES OR SHRUBS AS NOTED ON THIS PLAN ARE PLANTED, PRUNED OR REMOVED IN THE PUBLIC RIGHT-OF-WAY. THIS INCLUDES ZONES BETWEEN THE SIDEWALK AND CURB, MEDIANS, AND OTHER CITY PROPERTY. THIS PERMIT SHALL APPROVE THE LOCATION AND SPECIES TO BE PLANTED. FAILURE TO OBTAIN THIS PERMIT IS A VIOLATION OF THE CITY OF FORT COLLINS CODE SUBJECT TO CITATION (SECTION 27-31) AND MAY ALSO RESULT IN REPLACING OR RELOCATING TREES AND A HOLD ON CERTIFICATE OF OCCUPANCY.

KEY	QTY	RATIO	SCIENTIFIC/COMMON NAME	HEIGHT
SHADE/CANOPY TREES -				
+	23	208	<i>Celtis occidentalis</i> HACKBERRY, WESTERN (mitigation tree)	60'
△	21	11.6%	<i>Gleditsia triacanthos inermis</i> 'Skyline' HONEYLOCUST, SKYLINE	50'
○	8	2.1%	<i>Gymnocladus dioica</i> 'Espresso' KENTUCKY COFFEETREE, ESPRESSO (mitigation tree)	60'
+	23	8.2%	<i>Populus deltoides ssp. monilifera</i> COTTONWOOD, PLAINS	60'
+	8	2.1%	<i>Quercus buckleyi</i> OAK, TEXAS RED (mitigation tree)	80'
=	10	7.9%	<i>Quercus macrocarpa</i> OAK, BUR	50'
+	20	2.4%	<i>Tilia americana</i> 'Redmond' LINDEN, REDMOND (mitigation tree)	50'
○	23	11.9%	<i>Ulmus accolade</i> ELM, ACCOLADE (mitigation tree)	50'
○	22	8.7%	<i>Ulmus accolade</i> ELM, ACCOLADE (mitigation tree)	50'
EVERGREEN TREES -				
+	5	62	<i>Pinus ponderosa</i> PINE, PONDEROSA	80'
=	10	1.3%	<i>Picea pungens</i> SPRUCE, COLORADO	60'
+	16	2.6%	<i>Pinus strobus</i> PINE, SOUTHWESTERN WHITE	50'
+	13	4.2%	<i>Picea abies</i> 'Cupressina' SPRUCE, FASTIGIATE NORWAY	20'
+	18	3.4%	<i>Pinus mugo</i> 'Tannenbaum' PINE, TANNENBAUM MUGO	15'
ORNAMENTAL TREES -				
○	17	109	<i>Acer tataricum</i> Hot Wings MAPLE, HOT WINGS	20'
○	10	4.5%	<i>Amelanchier x grandiflora</i> 'Autumn Brilliance' SERVICEBERRY, AUTUMN BRILLIANCE (mitigation tree)	25'
○	2	3.2%	<i>Amelanchier x grandiflora</i> 'Autumn Brilliance' SERVICEBERRY, AUTUMN BRILLIANCE (mitigation tree)	25'
○	9	5.5%	<i>Crataegus macracantha occidentalis</i> HAWTHORN, WESTERN (mitigation tree)	20'
○	12	7.1%	<i>Malus</i> 'Spring Snow' CRABAPPLE, SPRING SNOW (mitigation tree)	25'
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○	X	---	<i>Aronia arbutifolia</i> 'Brilliantissima' CHOKEBERRY, BRILLIANT RED	8'
○	X	---	<i>Caryopteris x glaucomensis</i> 'Blue Mist' SPIREA, BLUE MIST	4'
○	X	---	<i>Cornus sericea</i> 'Arctic Fire' DOGWOOD, ARCTIC FIRE	4'
○	X	---	<i>Euonymus alatus</i> 'Compactus' BURNING BUSH, DWARF	8'
○	X	---	<i>Philadelphus</i> x 'Snowbelle' MOCKORANGE, SNOWBELLE	4'
○	X	---	<i>Rhus trilobata</i> SUMAC, THREE-LEAF	5'
○	X	---	<i>Ribes aureum</i> CURRANT, GOLDEN	5'
○	X	---	<i>Syringa meyeri</i> 'Palibin' LILAC, DWARF KOREAN	4'
PERENNIALS/GRASSES -				
*	X	---	<i>Bouteloua gracilis</i> 'Blonde Ambition' GRASS, BLONDE AMBITION GRAMA	3'
○	X	---	<i>Calamagrostis acutiflora</i> 'Karl Foerster' GRASS, FEATHER REED	5'
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MITIGATION TREES				
○	145	---	Mitigation Trees See Note #2 for sizing requirements	---



NOTE: THE NATURAL HABITAT BUFFER ZONE IS INTENDED TO BE MAINTAINED IN A NATIVE LANDSCAPE. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONE.

landscape architecture | planning | illustration

444 Mountain Ave. | Ft. Collins, CO 80513 | TEL: 970.532.5891 | WEB: TBGroup.us

PROJECT TITLE

HANSEN

Preliminary Development Plan

6029 S. Timberline Road
Ft Collins, Colorado

PREPARED FOR

LORSON NORTH DEVELOPMENT CORP., LLC.

212 N. WAHSATCH AVE.
SUITE 301
COLORADO SPRINGS, CO 80903

CONTACT: JEFF MARK

NOT FOR CONSTRUCTION FOR REVIEW ONLY

CALL UTILITY NOTIFICATION CENTER OF COLORADO

Know what's below. Call before you dig. CALL A BUSINESS CENTER IN ADVANCE BEFORE YOU DIG. GRACE OR EXCAVATE FOR THE MARKING OF UNDETECTED MEMBER UTILITIES.

REVISIONS	DATE
Staff Comments	4.2.18
Staff Comments	6.25.18
Staff Comments	9.28.18

DATE

SEPTEMBER 19, 2017

SHEET TITLE

Landscape Plan

SHEET INFORMATION

SHEET 19

General Landscape Notes

- PLANT QUALITY:** ALL PLANT MATERIAL SHALL BE A-GRADE OR NO. 1 GRADE - FREE OF ANY DEFECTS, OF NORMAL HEALTH, HEIGHT, LEAF DENSITY AND SPREAD APPROPRIATE TO THE SPECIES AS DEFINED BY THE AMERICAN ASSOCIATION OF NURSERYMEN (AA) STANDARDS. ALL TREES SHALL BE BALL AND BURLAP OR EQUIVALENT.
- IRRIGATION:** ALL LANDSCAPE AREAS WITHIN THE SITE INCLUDING TURF, SHRUB BEDS AND TREE AREAS SHALL BE IRRIGATED WITH AN AUTOMATIC IRRIGATION SYSTEM. THE IRRIGATION PLAN MUST BE REVIEWED AND APPROVED BY THE CITY OF FORT COLLINS WATER UTILITIES DEPARTMENT PRIOR TO THE ISSUANCE OF A BUILDING PERMIT. ALL TURF AREAS SHALL BE IRRIGATED WITH AN AUTOMATIC POP-UP IRRIGATION SYSTEM. ALL SHRUB BEDS AND TREES, INCLUDING NATIVE SEED AREAS, SHALL BE IRRIGATED WITH AN AUTOMATIC DRIP (TRICKLE) IRRIGATION SYSTEM, OR WITH AN ACCEPTABLE ALTERNATIVE APPROVED BY THE CITY WITH THE IRRIGATION PLANS. THE IRRIGATION SYSTEM SHALL BE ADJUSTED TO MEET THE WATER REQUIREMENTS OF THE INDIVIDUAL PLANT MATERIAL.
- TOPSOIL:** TO THE MAXIMUM EXTENT FEASIBLE, TOPSOIL THAT IS REMOVED DURING CONSTRUCTION ACTIVITY SHALL BE CONSERVED FOR LATER USE ON AREAS REQUIRING REVEGETATION AND LANDSCAPING.
- SOIL AMENDMENTS:** SOIL AMENDMENTS SHALL BE PROVIDED AND DOCUMENTED IN ACCORDANCE WITH CITY CODE SECTION 12-132. THE SOIL IN ALL LANDSCAPE AREAS, INCLUDING PARKWAYS AND MEDIANS, SHALL BE THOROUGHLY LOOSENED TO A DEPTH OF 12" TO 18" AND SOIL AMENDMENT SHALL BE THOROUGHLY INCORPORATED INTO THE SOIL OF ALL LANDSCAPE AREAS TO A DEPTH OF AT LEAST 8" (8") INCHES BY TILING, DISCING OR OTHER SUITABLE METHOD, AT A RATE OF AT LEAST THREE (3) CUBIC YARDS OF SOIL AMENDMENT PER ONE THOUSAND (1,000) SQUARE FEET OF LANDSCAPE AREA. PRIOR TO THE ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY, A WRITTEN CERTIFICATION MUST BE SUBMITTED TO THE CITY THAT ALL PLANTED AREAS, OR AREAS TO BE PLANTED, HAVE BEEN THOROUGHLY LOOSENED AND THE SOIL AMENDED, CONSISTENT WITH THE REQUIREMENTS SET FORTH IN SECTION 12-132.
- INSTALLATION AND GUARANTEE:** ALL LANDSCAPING SHALL BE INSTALLED ACCORDING TO SOUND HORTICULTURAL PRACTICES IN A MANNER DESIGNED TO ENCOURAGE QUICK ESTABLISHMENT AND HEALTHY GROWTH. ALL LANDSCAPING FOR EACH PHASE MUST BE EITHER INSTALLED OR THE INSTALLATION MUST BE SECURED WITH AN IRREVOCABLE LETTER OR CREDIT, PERFORMANCE BOND, OR ESCROW ACCOUNT FOR 125% OF THE VALUATION OF THE MATERIALS AND LABOR PRIOR TO ISSUANCE OF A CERTIFICATE OF OCCUPANCY FOR ANY BUILDING IN SUCH PHASE.
- MAINTENANCE:** TREES AND VEGETATION, IRRIGATION SYSTEMS, FENCES, WALLS AND OTHER LANDSCAPE ELEMENTS WITH THESE FINAL PLANS SHALL BE CONSIDERED AS ELEMENTS OF THE PROJECT IN THE SAME MANNER AS PARKING, BUILDING MATERIALS AND OTHER SITE DETAILS. THE APPLICANT, LANDOWNER OR SUCCESSORS IN INTEREST SHALL BE JOINTLY AND SEVERALLY RESPONSIBLE FOR THE REGULAR MAINTENANCE OF ALL LANDSCAPING ELEMENTS IN GOOD CONDITION. ALL LANDSCAPING SHALL BE MAINTAINED FREE FROM DISEASE, PESTS, WEEDS AND LITTER, AND ALL LANDSCAPE STRUCTURES SUCH AS FENCES AND WALLS SHALL BE REPAIRED AND REPLACED PERIODICALLY TO MAINTAIN A STRUCTURALLY SOUND CONDITION.
- REPLACEMENT:** ANY LANDSCAPE ELEMENT THAT DIES, OR IS OTHERWISE REMOVED, SHALL BE PROMPTLY REPLACED IN ACCORDANCE WITH THE REQUIREMENTS OF THESE PLANS.
- THE FOLLOWING SEPARATIONS SHALL BE PROVIDED BETWEEN TREES/SHRUBS AND UTILITIES:
 - 40 FEET BETWEEN CANOPY TREES AND STREET LIGHTS
 - 15 FEET BETWEEN ORNAMENTAL TREES AND STREET LIGHTS
 - 10 FEET BETWEEN TREES AND PUBLIC WATER, SANITARY AND STORM SEWER MAIN LINES
 - 6 FEET BETWEEN TREES AND PUBLIC WATER, SANITARY AND STORM SEWER SERVICE LINES
 - 4 FEET BETWEEN SHRUBS AND PUBLIC WATER AND SANITARY AND STORM SEWER LINES
 - 1 FEET BETWEEN TREES AND GAS LINES
- ALL STREET TREES SHALL BE PLACED A MINIMUM EIGHT (8) FEET AWAY FROM THE EDGES OF DRIVEWAYS AND ALLEYS PER LUC 3.02.1(0)(9)(a).
10. PLACEMENT OF ALL LANDSCAPING SHALL BE IN ACCORDANCE WITH THE SIGHT DISTANCE CRITERIA AS SPECIFIED BY THE CITY OF FORT COLLINS. NO STRUCTURES OR LANDSCAPE ELEMENTS GREATER THAN 24" SHALL BE ALLOWED WITHIN THE SIGHT DISTANCE TRIANGLE OR EASEMENTS WITH THE EXCEPTION OF DECIDUOUS TREES PROVIDED THAT THE LOWEST BRANCH IS AT LEAST 6' FROM GRADE. ANY FENCES WITHIN THE SIGHT DISTANCE TRIANGLE OR EASEMENT MUST BE NOT MORE THAN 42" IN HEIGHT AND OF AN OPEN DESIGN.
11. THE FINAL LANDSCAPE PLAN SHALL BE COORDINATED WITH ALL OTHER FINAL PLAN ELEMENTS SO THAT THE PROPOSED GRADING, STORM DRAINAGE, AND OTHER DEVELOPMENT IMPROVEMENTS DO NOT CONFLICT WITH NOR PRECLUDE INSTALLATION AND MAINTENANCE OF LANDSCAPE ELEMENTS ON THIS PLAN.
12. MINOR CHANGES IN SPECIES AND PLANT LOCATIONS MAY BE MADE DURING CONSTRUCTION - AS REQUIRED BY SITE CONDITIONS OR PLANT AVAILABILITY. OVERALL QUANTITY, QUALITY, AND DESIGN CONCEPT MUST BE CONSISTENT WITH THE APPROVED PLANS. IN THE EVENT OF CONFLICT WITH THE QUANTITIES INCLUDED IN THE PLANT LIST, SPECIES AND QUANTITIES ILLUSTRATED SHALL BE PROVIDED. ALL CHANGES OF PLANT SPECIES AND LOCATION MUST HAVE WRITTEN APPROVAL BY THE CITY PRIOR TO INSTALLATION.
13. ALL PLANTING BEDS SHALL BE MULCHED TO A MINIMUM DEPTH OF THREE INCHES.

Tree Protection Notes

- ALL EXISTING TREES WITHIN THE LIMITS OF THE DEVELOPMENT AND WITHIN ANY NATURAL AREA BUFFER ZONES SHALL REMAIN AND BE PROTECTED UNLESS NOTED ON THESE PLANS FOR REMOVAL.
 - WITHIN THE DRIP LINE OF ANY PROTECTED EXISTING TREE, THERE SHALL BE NO CUT OR FILL OVER A FOUR-INCH DEPTH UNLESS A QUALIFIED ARBORIST OR FORESTER HAS EVALUATED AND APPROVED THE DISTURBANCE.
 - ALL PROTECTED EXISTING TREES SHALL BE PRUNED TO THE CITY OF FORT COLLINS FORESTRY STANDARDS. TREE PRUNING AND REMOVAL SHALL BE PERFORMED BY A BUSINESS THAT HOLDS A CURRENT CITY OF FORT COLLINS ARBORIST LICENSE WHERE REQUIRED BY CODE.
 - PRIOR TO AND DURING CONSTRUCTION, BARRIERS SHALL BE ERRECTED AROUND ALL PROTECTED EXISTING TREES WITH SUCH BARRIERS TO BE OF ORANGE FENCING A MINIMUM OF FOUR (4) FEET IN HEIGHT, SECURED WITH METAL T-POSTS, NO CLOSER THAN SIX (6) FEET FROM THE TRUNK OR ONE-HALF (1/2) OF THE DRIP LINE, WHICHEVER IS GREATER. THERE SHALL BE NO STORAGE OR MOVEMENT OF EQUIPMENT, MATERIAL, DEBRIS OR FILL WITHIN THE FENCED TREE PROTECTION ZONE.
 - DURING THE CONSTRUCTION STAGE OF DEVELOPMENT, THE APPLICANT SHALL PREVENT THE CLEANING OF EQUIPMENT OR MATERIAL, OR THE STORAGE AND DISPOSAL OF WASTE MATERIAL SUCH AS PAINTS, OILS, SOLVENTS, ASPHALT, CONCRETE, MOTOR OIL OR ANY OTHER MATERIAL HARMFUL TO THE LIFE OF A TREE WITHIN THE DRIP LINE OF ANY PROTECTED TREE OR GROUP OF TREES.
 - NO DAMAGING ATTACHMENT, WIRES, SIGNS OR PERMITS MAY BE FASTENED TO ANY PROTECTED TREE.
 - LARGE PROPERTY AREAS CONTAINING PROTECTED TREES AND SEPARATED FROM CONSTRUCTION OR LAND CLEARING AREAS, ROAD RIGHTS-OF-WAY AND UTILITY EASEMENTS MAY BE "RIBBONED OFF" RATHER THAN ERRECTING PROTECTIVE FENCING AS REQUIRED IN SUBSECTION (3)(3) ABOVE. THIS MAY BE ACCOMPLISHED BY PLACING METAL T-POST STAKES A MAXIMUM OF FIFTY (50) FEET APART AND TYING RIBBON OR ROPE FROM STAKE-TO-STAKE ALONG THE OUTSIDE PERIMETERS OF SUCH AREAS BEING CLEARED.
 - THE INSTALLATION OF UTILITIES, IRRIGATION LINES OR ANY UNDERGROUND FUTURE REQUIRING EXCAVATION DEEPER THAN SIX (6) INCHES SHALL BE ACCOMPLISHED BY BORING UNDER THE ROOT SYSTEM OF PROTECTED EXISTING TREES AT A MINIMUM DEPTH OF TWENTY-FOUR (24) INCHES. THE AUGER DISTANCE IS ESTABLISHED FROM THE FACE OF THE TREE (OUTER BARK) AND IS SCALED FROM TREE DIAMETER AT BREAST HEIGHT AS DESCRIBED IN THE CHART BELOW.
- | TREE DIAMETER AT BREAST HEIGHT (INCHES) | AUGER DISTANCE FROM FACE OF TREE (FEET) |
|---|---|
| 0-2 | 1 |
| 3-4 | 2 |
| 5-9 | 5 |
| 10-14 | 10 |
| 15-19 | 12 |
| OVER 19 | 15 |

- NO TREES SHALL BE REMOVED DURING THE SONGBIRD NESTING SEASON (FEBRUARY 1 TO JULY 31) WITHOUT FIRST HAVING A PROFESSIONAL ECOLOGIST OR WILDLIFE BIOLOGIST COMPLETE A NESTING SURVEY TO IDENTIFY ANY ACTIVE NESTS EXISTING ON THE PROJECT SITE. THE SURVEY SHALL BE SENT TO THE CITY ENVIRONMENTAL PLANNER. IF ACTIVE NESTS ARE FOUND, THE CITY WILL COORDINATE WITH RELEVANT STATE AND FEDERAL AGENCIES TO DETERMINE WHETHER ADDITIONAL RESTRICTIONS ON TREE REMOVAL AND CONSTRUCTION APPLY.

Native Grass Seed Mix

NATIVE GRASS - UPLAND CITY OF FORT COLLINS MIX

- SEED SHALL BE AS MANUFACTURED BY ARKANSAS VALLEY SEED SOLUTIONS, 4625 COLORADO BOULEVARD, DENVER, CO 80216, (877) 957-3337.
- SEED SHALL BE A MIXTURE THAT MATCHES THE FOLLOWING:

NON-IRRIGATED UPLAND MIX COMMON NAME	SCIENTIFIC NAME	SEEDING RATE (PLS LBS/ACRE-DRILL RATE)
BEEPLANT	CLOME SEELULATA	1.08
HAIRY GOLDENASTER	HETEROTHECA VILLOSA	0.36
PURPLE PRAIRIE CLOVER	DALEA PURPUREA	0.41
WALLFLOWER	ERYSIMUM ASPERUM	0.11
ANNUAL SUNFLOWER	HELIANTHUS ANNUUS	2.07
DOTTED GAYFEATHER	LIASTRIS PUNGITATA	0.73
BLUE FLAX	LINUM LEVEISS	0.41
PRAIRIE ASTER	MACHAERANTHERA TANACETIFLIA	0.25
MEXICAN HAT	RATIBIDA COLUMBINIFERA	0.10
AMERICAN WETCH	VICIA AMERICANA	6.10
SIDE-OATS GRAMA	BOUTELOUA CURTIPENDULA	0.96
BUFFALOGRASS	BOUTELOUA DACTYLOIDES	3.27
BLUE GRAMA	BOUTELOUA GRACILIS	0.22
PRAIRIE SANDREED	CALAMAGROSTIS LONGIFOLIA	0.87
PRAIRIE JUNGGRASS	KOELERIA MACRANTHA	0.08
NEEDLE AND THREAD	HESPEROSTIPA COMATA	1.59
SWITCH GRASS	PANICUM VIRGATUM	0.47
WESTERN WHEATGRASS	PASCOPYRUM SMITHII	1.66
SAND DROPSSEED	SPOROBOLUS CRYPTANDRUS	0.04
SIX WEEKS FESCUE	VULPIA OCTOFLORA	0.19
	TOTAL LBS/ACRE	20.77

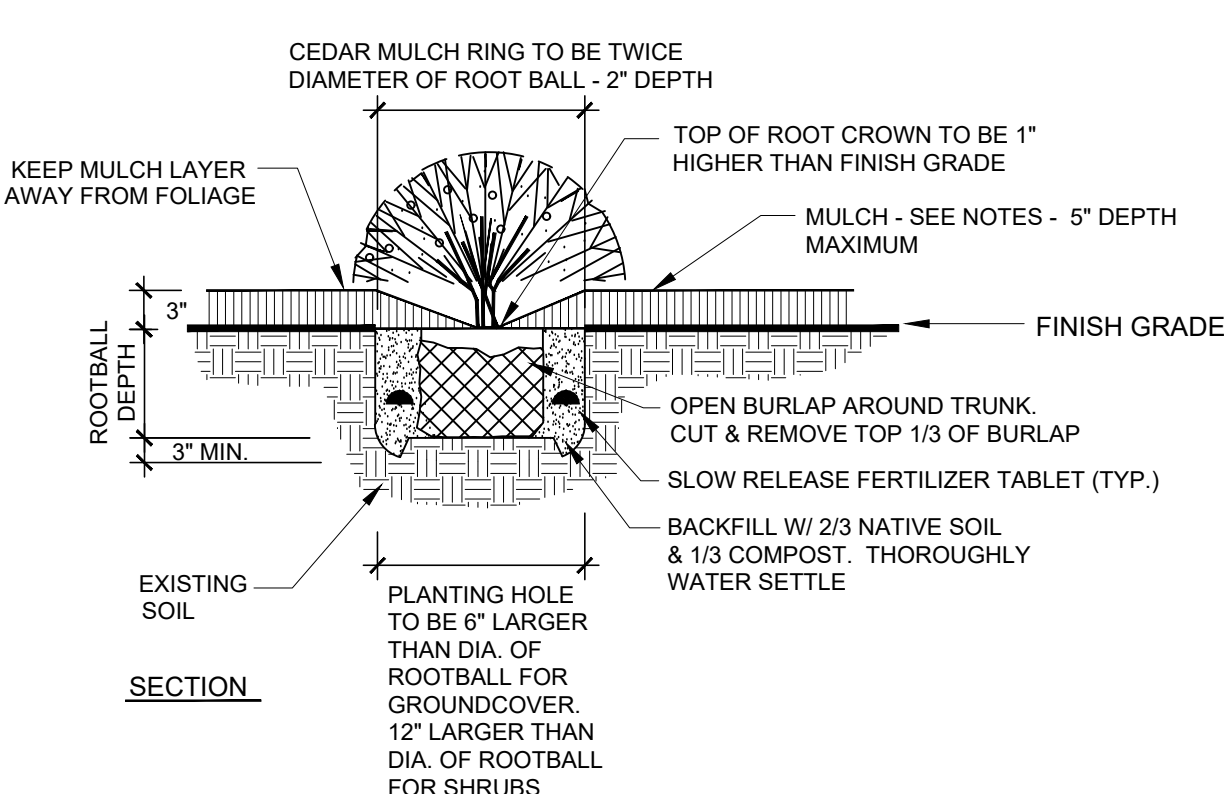
- NATIVE SEED AREAS: ADEQUATE TEMPORARY IRRIGATION WILL BE PROVIDED FOR THE ESTABLISHMENT AND MAINTENANCE FOR THESE SEEDED AREAS, AND THAT NATIVE GRASSES SHALL BE MAINTAINED IN A CONDITION OF ACCEPTABLE HEIGHT, FREE OF WEEDS, TRASH AND DEBRIS, AND SHALL NOT REPRESENT A FIRE HAZARD NOR BECOME A NUISANCE SITE FOR WATER OR WIND EROSION.
- PREPARE SOIL AS NECESSARY AND APPROPRIATE FOR NATIVE SEED MIX SPECIES THROUGH AERATION AND ADDITION OF AMENDMENTS IF NECESSARY THEN SEED IN TWO DIRECTIONS TO DISTRIBUTE SEED EVENLY OVER ENTIRE AREA.
- IF CHANGES ARE TO BE MADE TO SEED MIX BASED ON SITE CONDITIONS THEN APPROVAL MUST BE PROVIDED BY CITY ENVIRONMENTAL PLANNER.
- APPROPRIATE NATIVE SEEDING EQUIPMENT WILL BE USED (STANDARD TURF SEEDING EQUIPMENT OR AGRICULTURE EQUIPMENT SHALL NOT BE USED).
- DRILL SEED APPLICATION RECOMMENDED PER SPECIFIED APPLICATION RATE TO NO MORE THAN 1/2 INCH DEPTH. FOR BROADCAST SEEDING INSTEAD OF DRILL SEEDING METHOD - DOUBLE SPECIFIED APPLICATION REFER TO NATIVE SEED MIX TABLE FOR SPECIES, PERCENTAGES AND APPLICATION RATES.
- TREAT NATIVE SEED MIX AREA PRIOR TO INSTALLATION OF SEED WITH APPROPRIATE HERBICIDE TO PROACTIVELY MITIGATE HERBACEOUS WEED SPECIES GROWTH DURING ESTABLISHMENT PERIOD THEN AFTER APPROPRIATE TIME PERIOD APPLY NATIVE SEED AS CALLED FOR ON APPROVED PLANS.
- AFTER SEEDING THE AREA SHALL BE COVERED WITH CRIMPED STRAW OR OTHER APPROPRIATE METHODS AND PROVIDED TEMPORARY IRRIGATION UNTIL SEED IS ESTABLISHED.
- CONTRACTOR SHALL MONITOR SEEDED AREA FOR PROPER IRRIGATION, EROSION CONTROL, GERMINATION AND RESEEDING AS NEEDED TO ESTABLISH COVER.
- THE APPROVED SEED MIX AREA IS INTENDED TO BE MAINTAINED IN A NATURAL-LIKE LANDSCAPE AESTHETIC. IF AND WHEN MOWING OCCURS IN NATIVE GRASS SEED MIX AREAS DO NOT MOW LOWER THAN 6-8 INCHES IN HEIGHT TO AVOID INHIBITING NATIVE PLANT GROWTH.
- NATIVE SEED AREA WILL BE CONSIDERED ESTABLISHED WHEN SEVENTY-PERCENT TOTAL COVER IS REACHED WITH NO LARGER THAN ONE FOOT SQUARE BARE SPOTS AND/OR UNTIL DEEMED ESTABLISHED BY CITY PLANNING SERVICES.

MULCH IN ALL NATIVE SEED AREAS:

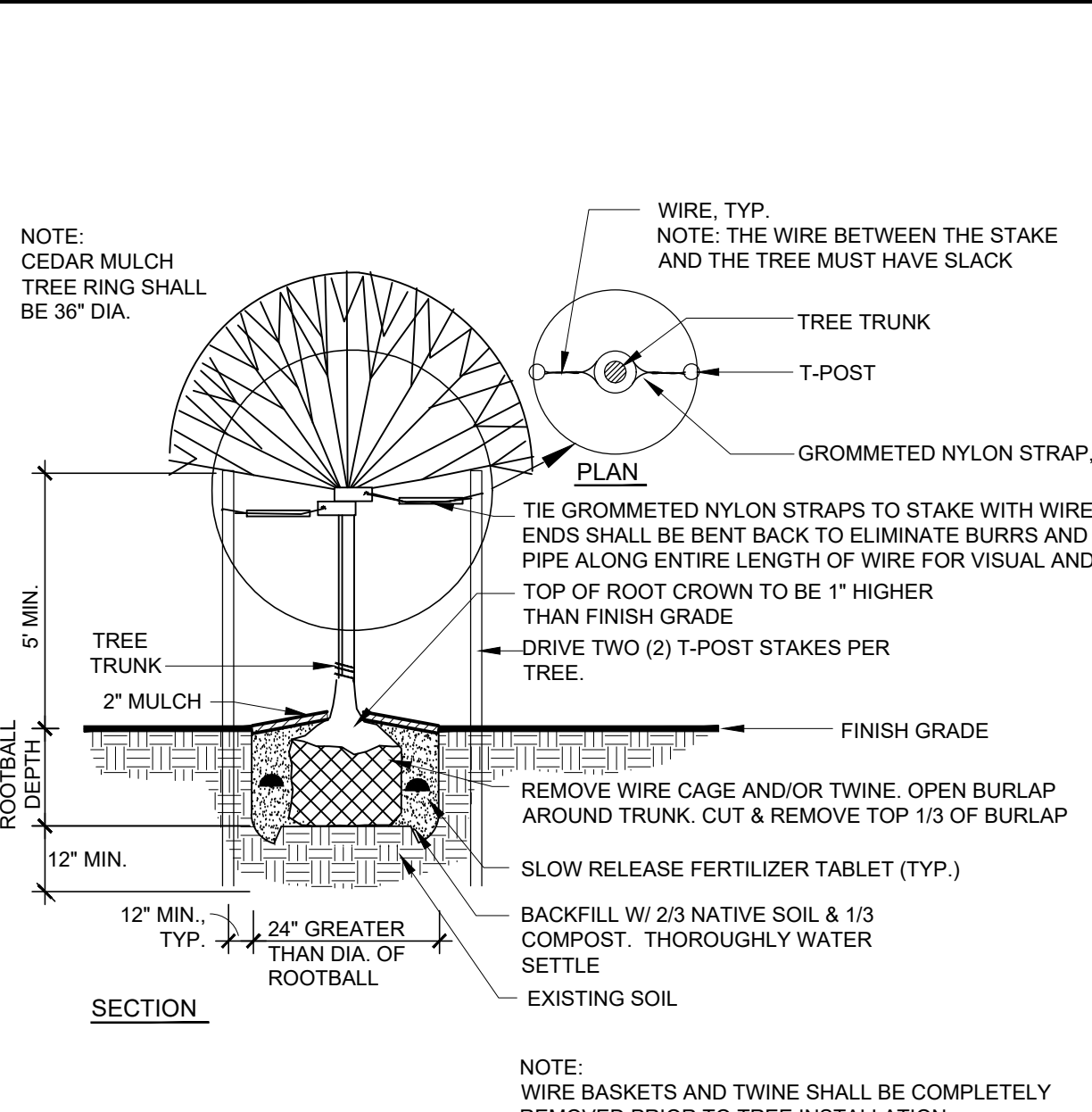
- IMMEDIATELY FOLLOWING THE RAKING OPERATION, ADD STRAW MULCH TO THE SEEDED AREAS.
- APPLY STRAW MULCH AT A MINIMUM OF 1.5 TONS PER ACRE OF AIR DRY MATERIAL. SPREAD STRAW MULCH UNIFORMLY OVER THE AREA WITH MECHANICAL MULCH SPREADER / CRIMPER. DO NOT MULCH WHEN WIND VELOCITY EXCEEDS 10 MPH.
- WHEREVER THE USE OF CRIMPING EQUIPMENT IS PRACTICAL, PLACE MULCH IN THE MANNER NOTED ABOVE AND ANCHOR IT INTO THE SOIL. USE A DISC SUCH AS A MULCH TILLER, WITH A FLAT SERRATED DISC AT LEAS 1/2 INCH IN THICKNESS, HAVING DULL EDGES, AND SPACE NO MORE THAN 9 INCHES APART, WITH DISCS OF SUFFICIENT DIAMETER TO PREVENT THE FRAME OF THE EQUIPMENT FROM DRAGGING THE MULCH. ANCHOR MULCH A MINIMUM DEPTH OF 2 INCHES AND ACROSS THE SLOPE WHERE PRACTICAL WITH NO MORE THAN TWO PASSES OF THE ANCHORING EQUIPMENT.
- IMMEDIATELY UPON COMPLETION OF THE MULCHING AND BINDING OPERATION, THE SEEDED AREAS SHALL BE IRRIGATED, KEEPING THE TOP 2 INCHES OF SOIL EVENLY MOIST UNTIL SEED HAS UNIFORMLY GERMINATED AND GROWN TO A HEIGHT OF 2-INCHES.
- WATERING APPLICATION SHALL BE DONE IN A MANNER WHICH WILL PROVIDE UNIFORM COVERAGE BUT WHICH WILL NOT CAUSE EROSION, MOVEMENT, OR DAMAGE TO THE FINISHED SURFACE.

Street Tree Notes

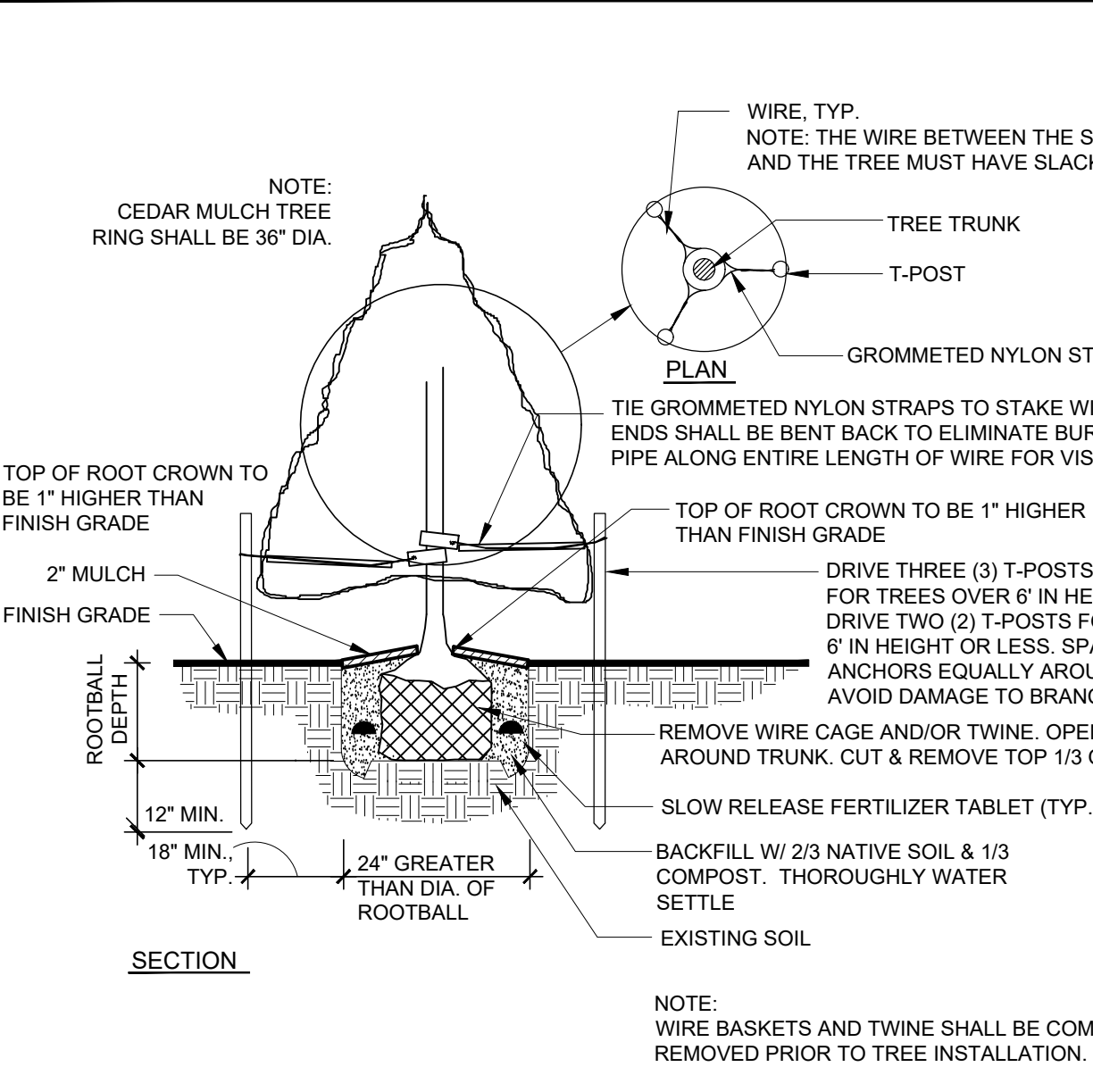
- A PERMIT MUST BE OBTAINED FROM THE CITY FORESTER BEFORE ANY TREES OR SHRUBS AS NOTED ON THIS PLAN ARE PLANTED, PRUNED OR REMOVED IN THE PUBLIC RIGHT-OF-WAY. THIS INCLUDES ZONES BETWEEN THE SIDEWALK AND CURB, MEDIANS AND OTHER CITY PROPERTY. THIS PERMIT SHALL APPROVE THE LOCATION AND SPECIES TO BE PLANTED. FAILURE TO OBTAIN THIS PERMIT IS A VIOLATION OF THE CITY OF FORT COLLINS CODE SUBJECT TO CITATION (SECTION 27-31) AND MAY ALSO RESULT IN REPLACING OR RELOCATING TREES AND A HOLD ON CERTIFICATE OF OCCUPANCY.
- CONTACT THE CITY FORESTER TO INSPECT ALL STREET TREE PLANTINGS AT THE COMPLETION OF EACH PHASE OF THE DEVELOPMENT. ALL MUST BE INSTALLED AS SHOWN ON THE LANDSCAPE PLAN. APPROVAL OF STREET TREE PLANTING IS REQUIRED BEFORE FINAL APPROVAL OF EACH PHASE.
- STREET LANDSCAPING, INCLUDING STREET TREES, SHALL BE SELECTED IN ACCORDANCE WITH ALL CITY CODES AND POLICIES. ALL TREE PRUNING AND REMOVAL WORKS SHALL BE PERFORMED BY A CITY OF FORT COLLINS LICENSED ARBORIST WHERE REQUIRED BY CODE. STREET TREES SHALL BE SUPPLIED AND PLANTED BY THE DEVELOPER USING A QUALIFIED LANDSCAPE CONTRACTOR.
- THE DEVELOPER SHALL REPLACE DEAD OR DYING STREET TREES AFTER PLANTING UNTIL FINAL MAINTENANCE INSPECTION AND ACCEPTANCE BY THE CITY OF FORT COLLINS FORESTRY DIVISION. ALL STREET TREES IN THE PROJECT MUST BE ESTABLISHED, WITH AN APPROVED SPECIES AND OF ACCEPTABLE HEALTH AND CONDITION PRIOR TO ACCEPTANCE.
- SUBJECT TO APPROVAL BY THE CITY FORESTER - STREET TREE LOCATIONS MAY BE ADJUSTED TO ACCOMMODATE DRIVEWAY LOCATIONS, UTILITY SEPARATIONS BETWEEN TREES, STREET SIGNS AND STREET LIGHTS. STREET TREES TO BE CENTERED IN THE MIDDLE OF THE LOT TO THE EXTENT FEASIBLE. QUANTITIES SHOWN ON PLAN MUST BE INSTALLED UNLESS A REDUCTION IS APPROVED BY THE CITY TO MEET SEPARATION STANDARDS.



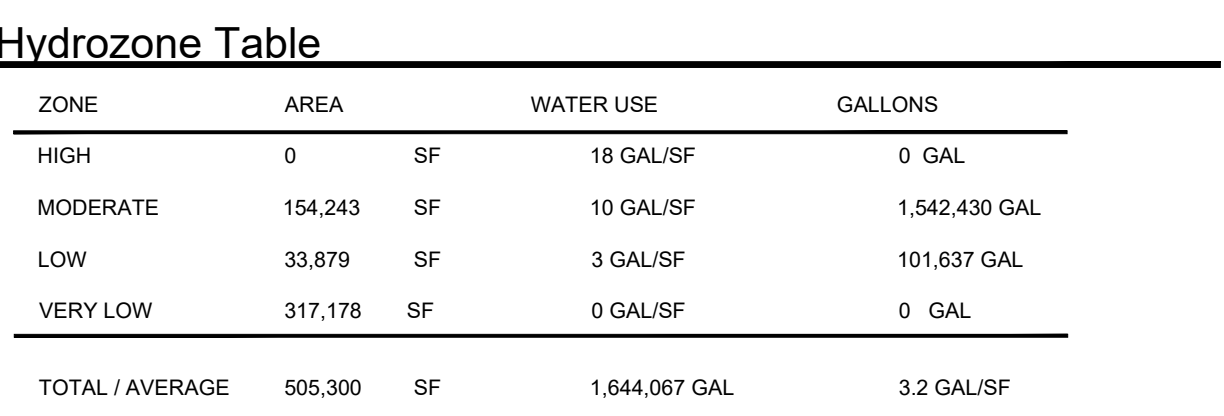
GROUND COVER & SHRUB PLANTING DETAIL



DECIDUOUS TREE PLANTING DETAIL



CONIFER TREE PLANTING DETAIL



Hydrozone Table

ZONE	AREA	WATER USE	GALLONS
HIGH	0	SF 18 GAL/SF	0 GAL
MODERATE	154,243	SF 10 GAL/SF	1,542,430 GAL
LOW	33,879	SF 3 GAL/SF	101,637 GAL
VERY LOW	317,178	SF 0 GAL/SF	0 GAL
TOTAL / AVERAGE	505,300	SF 1,644,067 GAL	3.2 GAL/SF

A PERMIT MUST BE OBTAINED FROM THE CITY FORESTER BEFORE ANY TREES OR SHRUBS AS NOTED ON THIS PLAN ARE PLANTED, PRUNED OR REMOVED IN THE PUBLIC RIGHT-OF-WAY. THIS INCLUDES ZONES BETWEEN THE SIDEWALK AND CURB, MEDIANS AND OTHER CITY PROPERTY. THIS PERMIT SHALL APPROVE THE LOCATION AND SPECIES TO BE PLANTED. FAILURE TO OBTAIN THIS PERMIT IS A VIOLATION OF THE CITY OF FORT COLLINS CODE SUBJECT TO CITATION (SECTION 27-31) AND MAY ALSO RESULT IN REPLACING OR RELOCATING TREES AND A HOLD ON CERTIFICATE OF OCCUPANCY.

Plant List

KEY	QTY	RATIO	SCIENTIFIC/Common NAME	HEIGHT	WIDTH	SIZE	NOTES
		208	SHADE/CANOPY TREES -				
+	23	11.6%	Celtis occidentalis HACKBERRY, WESTERN (mitigation tree)	60'	50'	2.0" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
△	21	10.6%	Gleditsia triacanthos inermis 'Skyline' HONEYLOCUST, SKYLINE	60'	50'	3.0" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
○	8	2.1%	Gymnocladus dioica 'Espresso' KENTUCKY COFFEETREE, ESPRESSO (mitigation tree)	60'	50'	2.0" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
○	23	8.2%	Populus deltoides ssp. monilifera COTTONWOOD, PLAINS	60'	50'	3.0" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	8	2.1%	Quercus buckleyi OAK, TEXAS RED (mitigation tree)	80'	60'	2.0" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
=	10	7.9%	Quercus macrocarpa OAK, BUR	50'	50'	2.0" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	20	9.9%	Tilia americana 'Redmond' LINDEN, REDMOND (mitigation tree)	50'	50'	3.0" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	22	11.9%	Ulmus Accolade ELM, ACCOLADE (mitigation tree)	50'	40'	2.0" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	11	8.7%	Pinus ponderosa PINE, PONDEROSA	50'	40'	3.0" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	22	11.9%	Picea pungens SPRUCE, COLORADO	80'	40'	6" BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
+	5	1.3%	Picea abies 'Fastigiata' NORWAY SPRUCE, CUPRESSINE NORWAY	60'	30'	6" BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
+	10	2.6%	Pinus strobus PINE, SOUTHWESTERN WHITE	50'	30'	6" BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
+	16	4.2%	Pinus mugo 'Tannenbaum' PINE, TANNENBAUM MUGO	20'	6'	6" BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
+	13	3.4%	Pinus mugo 'Tannenbaum' PINE, TANNENBAUM MUGO	15'	8'	6" BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED W/ STRAIGHT TRUNK & TOP LEADER
+	18	4.7%	ORNAMENTAL TREES -				
+	109		Acer tataricum Hot Wings MAPLE, HOT WINGS	20'	20'	1.5" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	17	4.5%	Amelanchier x grandiflora 'Autumn Brilliance' SERVICEBERRY, AUTUMN BRILLIANCE (mitigation tree)	25'	20'	1.5" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	2	3.2%	Crataegus macracantha occidentalis HAWTHORN, WESTERN (mitigation tree)	25'	20'	2" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	9	5.5%	Malus 'Spring Snow' CRABAPPLE, SPRING SNOW (mitigation tree)	20'	20'	1.5" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	12	7.1%	Malus 'Spring Snow' CRABAPPLE, SPRING SNOW (mitigation tree)	25'	25'	1.5" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	15	25%	Pyrus calleryana Chanticleer PEAR, CHANTICLEER (mitigation tree)	25'	25'	2" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	12	5.0%	Syringa reticulata LILAC, JAPANESE TREE	30'	20'	1.5" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	7	5.0%	Syringa reticulata LILAC, JAPANESE TREE	30'	20'	2" cal. BB	BALANCED, WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
+	13	3.4%	DECIDUOUS SHRUBS -				
+	X	---	Aronia arbutifolia 'Brilliantissima' CHOKEBERRY, BRILLIANT RED	8'	5'	5 Gallon	WELL ROOTED
+	X	---	Caryopteris x grandiflora 'Blue Mist' SPIREA, BLUE MIST	4'	4'	5 Gallon	WELL ROOTED
+	X	---	Cornus sericea 'Arctic Fire' DOGWOOD, ARCTIC FIRE	4'	4'	5 Gallon	WELL ROOTED
+	X	---	Euonymus alatus 'Compactus' BURNING BUSH, DWARF	8'	8'	5 Gallon	WELL ROOTED
+	X	---	Philadelphus x 'Snowbelle' MOCKORANGE, SNOWBELLE	4'	4'	5 Gallon	WELL ROOTED
+	X	---	Rhus trilobata SUMAC, THREE-LEAF	5'	5'	5 Gallon	WELL ROOTED
+	X	---	Ribes aureum CURRANT, GOLDEN	5'	5'	5 Gallon	WELL ROOTED
+	X	---	Syringa meyeri 'Palibin' LILAC, DWARF KOREAN	4'	4'	5 Gallon	WELL ROOTED
+	X	---	PERENNIALS/GRASSES -				
+	X	---	Bouteloua gracilis 'Blonde Ambition' GRASS, BLONDE AMBITION GRAMA	3'	2'	1 Gallon	WELL ROOTED
+	X	---	Calamagrostis acutiflora 'Karl Foerster' GRASS, FEATHER REED	5'	2'	1 Gallon	WELL ROOTED
+	X	---	Helictotrichon sempervirens GRASS, BLUE AVENA	3'	3'	1 Gallon	WELL ROOTED
+	X	---	Hemerocallis 'red' DAYLILY, RED	3'	3'	1 Gallon	WELL ROOTED
+	X	---	Panicum virgatum 'Heavy Metal' GRASS, HEAVY METAL BLUE SWITCH	4'	1.5'	1 Gallon	WELL ROOTED
+	145		MITIGATION TREES Mitigation Trees See Note #2 for sizing requirements				

- NOTES:
- IN ANY INSTANCE WHERE THE PLANT LIST OR LANDSCAPE QUANTITIES DO NOT MATCH THE PLAN, REQUIRED PLANTS/QUANTITIES SHALL BE PER THE PLAN. CONTRACTOR TO VERIFY QUANTITIES.
 - TREES MARKED AS MITIGATION TREES REQUIRE THE FOLLOWING UPSIZING: DECIDUOUS TREES-3" CALIPER B&B; EVERGREEN TREES-6" B&B; ORNAMENTAL TREES-2" CALIPER B&B

TB GROUP
landscape architecture | planning | illustration

444 Mountain Ave. | TEL 970.532.5891
Berthoud CO 80513 | WEB TBGroup.us

SEAL

PROJECT TITLE

HANSEN

Preliminary Development Plan

6029 S. Timberline Road Ft Collins, Colorado

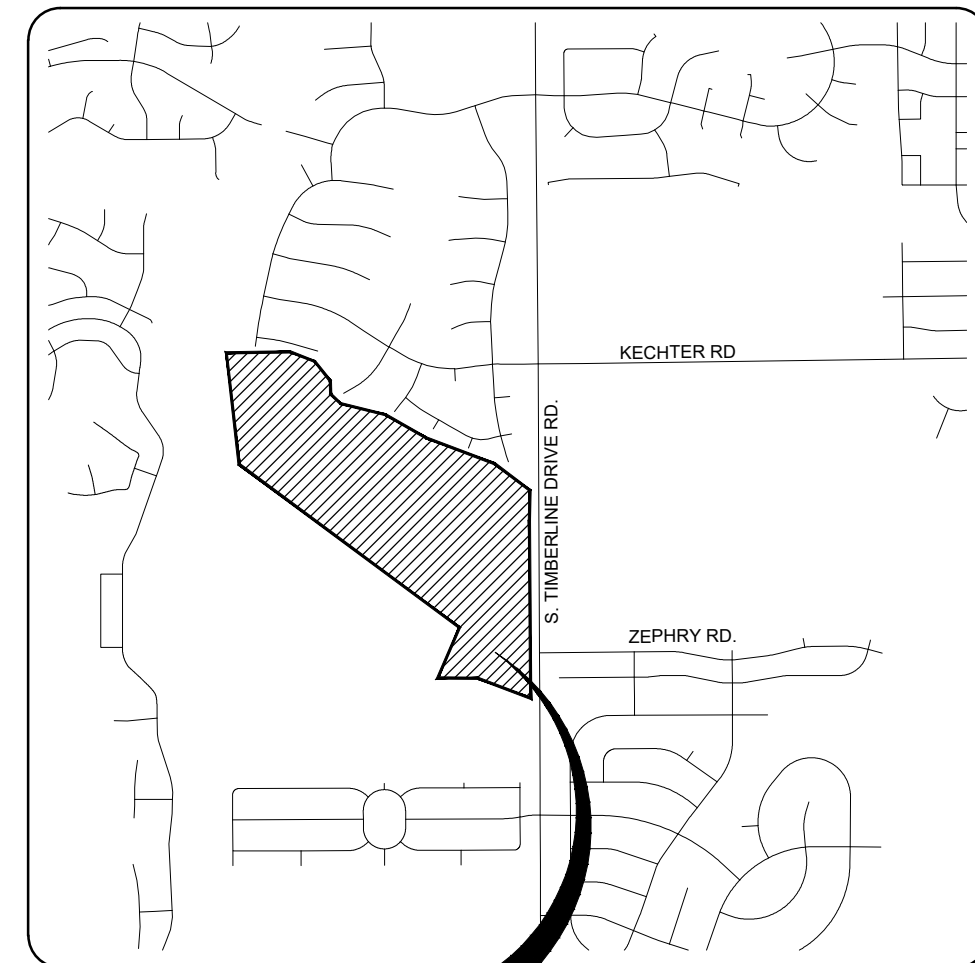
PREPARED FOR

LORSON NORTH DEVELOPMENT CORP., LLC.</

PRELIMINARY UTILITY PLANS FOR HANSEN SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO

SEPTEMBER 2018



PROJECT BENCHMARKS:

PROJECT DATUM: NAVD88

City of Fort Collins Benchmark 2-02: East side of Timberland Road, 1/2 mile north of Tribby Road, on the middle concrete pad to an electric box. Elevation: 4964.37

City of Fort Collins Benchmark 16-01: South side of Willow Springs Way approx. 50 ft. west of the intersection of Willow Springs Way and Timberline Road on the southwest corner of a storm inlet. Elevation: 4956.98

Please note: This plan set is using NAVD88 for a vertical datum. Surrounding developments have used NGVD29 Unadjusted for their vertical datum.

If NGVD29 Unadjusted datum is required for any purpose, the following equation should be used: NGVD29 Unadjusted = NAVD88 - 3.19

Basis of Bearings
The Basis of Bearings is the East line of the Northeast Quarter of Section 7, as bearing South 00°00'53" East (assumed bearing) as monumented on drawing.

ORIGINAL FIELD SURVEY BY:

Northern Engineering Services, Inc.
Project No. HNP
Date: March 1, 2004

Additional Field Survey:
Project No. 911-015
Date: May 10, 2017

DISCLAIMER STATEMENT:

These plans have been reviewed by the City of Fort Collins for concept only. The review does not imply responsibility by the reviewing department, the City of Fort Collins Engineer, or the City of Fort Collins for accuracy and correctness of the calculations. Furthermore, the review does not imply that quantities of items on the plans are the final quantities required. The review shall not be construed for any reason as acceptance of financial responsibility by the City of Fort Collins for additional quantities of items shown that may be required during the construction phase.

CERTIFICATION STATEMENT:

I hereby affirm that these final construction plans were prepared under my direct supervision, in accordance with all applicable City of Fort Collins and State of Colorado standards and statutes, respectively, and that I am fully responsible for the accuracy of all design, revisions, and record conditions that I have noted on these plans.

CONTACT INFORMATION

PROJECT TEAM:

OWNER/APPLICANT

Jeff Mark
Lorson South Land Corp
212 N. Wahsatch Ave., Suite 301
Colorado Springs, Colorado 80903
(719) 635-3200



**PLANNER/
LANDSCAPE ARCHITECT**

Kristin Turner
TB Group
444 Mountain Avenue
Berthoud, Colorado 80513
(970) 532-5891



SITE ENGINEER

Danny Weber, PE
Northern Engineering Services, Inc.
301 North Howes Street, Suite 100
Fort Collins, Colorado 80521
(970) 221-4158



SURVEYOR

Bob Tessely, PLS
Northern Engineering Services, Inc.
301 North Howes Street, Suite 100
Fort Collins, Colorado 80521
(970) 221-4158

UTILITY CONTACT LIST: *

UTILITY COMPANY	PHONE NUMBER
GAS-----Xcel Energy-----Stephanie Rich	(970) 225-7857
ELECTRIC-----City of Fort Collins Light & Power-----Luke Unruh	(970) 416-2724
CABLE-----Comcast-----Don Kapperman	(970) 567-0245
TELECOM-----CenturyLink Local Network-----William Johnson	(970) 377-6401
WATER-----Fort Collins-Loveland Water District-----Terry Farrill	(970) 226-3104
WASTEWATER-----South Fort Collins Sanitation District-----Terry Farrill	(970) 226-3104
STORMWATER-----City of Fort Collins Utilities-----Heather McDowell	(970) 224-6065

* This list is provided as a courtesy reference only. Northern Engineering Services assumes no responsibility for the accuracy or completeness of this list. In no way shall this list relinquish the Contractor's responsibility for locating all utilities prior to commencing any construction activity. Please contact the Utility Notification Center of Colorado (UNCC) at 811 for additional information.

SHEET INDEX

1	CS1	COVER SHEET
2	CS2	GENERAL AND CONSTRUCTION NOTES
3	CS3	STREET CROSS-SECTIONS
4	EX1	EXISTING CONDITIONS AND DEMOLITION PLAN
5	OU1	OVERALL UTILITY PLAN
6-10	U1-U5	UTILITY PLAN
11	OG1	OVERALL GRADING PLAN
12-16	G1-G5	GRADING PLAN
17-20	R1-R4	HAPPY WOODLAND DR AND BURLY TREE DR PLAN AND PROFILE
21-23	R5-R7	HAPPY WOODLAND DR AND KNOBBY PINE DR PLAN AND PROFILE
24-25	R8-R9	FALLEN BRANCH DR & TWISTED ROOT DR PLAN AND PROFILE
26	R10	ZEPHYR ROAD PLAN AND PROFILE
27-29	R11-R13	TIMBERLINE ROAD PLAN AND PROFILE
30-33	R14-R17	STRIPING PLAN
34	DR1	OVERALL DRAINAGE EXHIBIT



NEW MERCER IRRIGATION CANAL COMPANY
APPROVAL

SECRETARY _____ DATE _____

**FORT COLLINS - LOVELAND
WATER DISTRICT
SOUTH FORT COLLINS
SANITATION DISTRICT**

Mr. Terry Farrill, P.E., District Engineer _____ Date _____

All changes, addendums, additions, deletions and modifications to these drawings must be approved, in writing, by the Fort Collins-Loveland Water District and the South Fort Collins Sanitation District.

City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED: _____ City Engineer _____ Date _____

CHECKED BY: _____ Water & Wastewater Utility _____ Date _____

CHECKED BY: _____ Stormwater Utility _____ Date _____

CHECKED BY: _____ Parks & Recreation _____ Date _____

CHECKED BY: _____ Traffic Engineer _____ Date _____

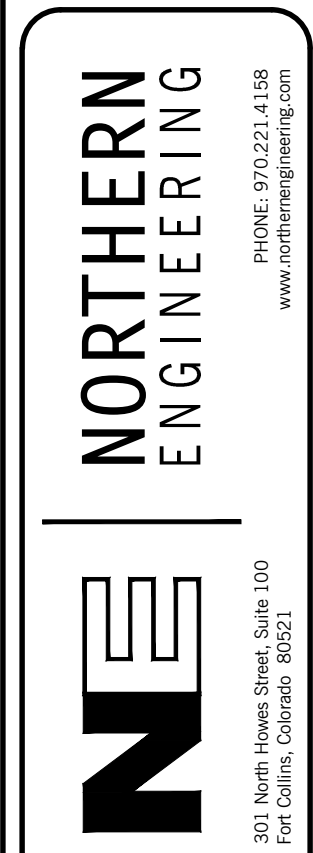
CHECKED BY: _____ Environmental Planner _____ Date _____

Revisions:
NO. _____ DATE _____

**REVIEW SET
NOT FOR CONSTRUCTION**

09/28/18

These drawings are instruments of service provided by Northern Engineering Services, Inc. and are not to be used for any type of construction without the approval of a Professional Engineer in the employ of Northern Engineering Services, Inc.

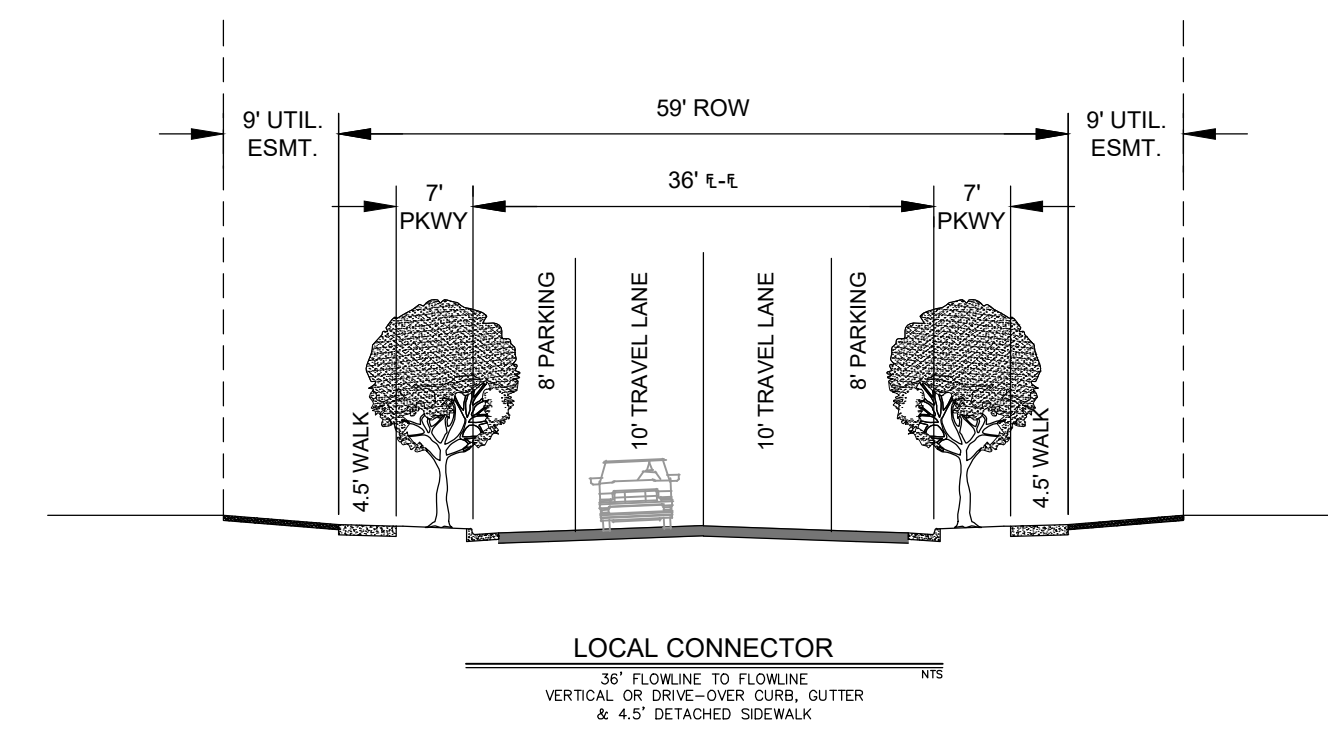
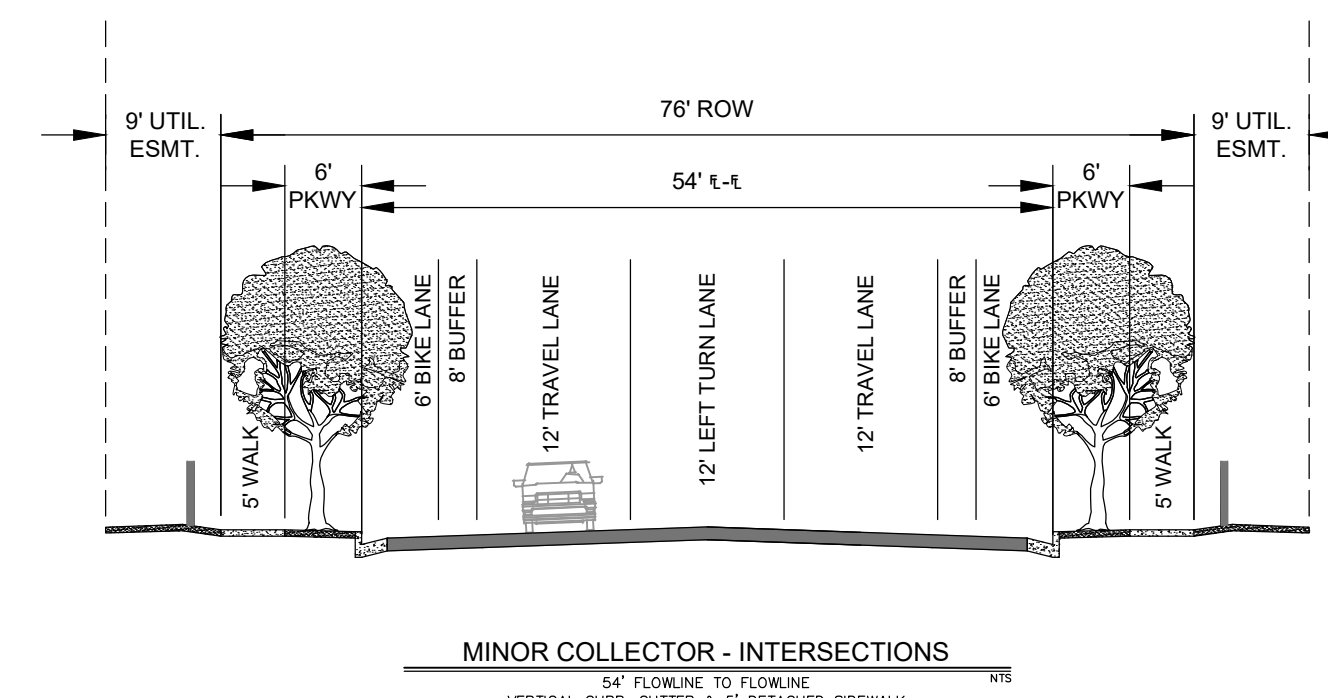
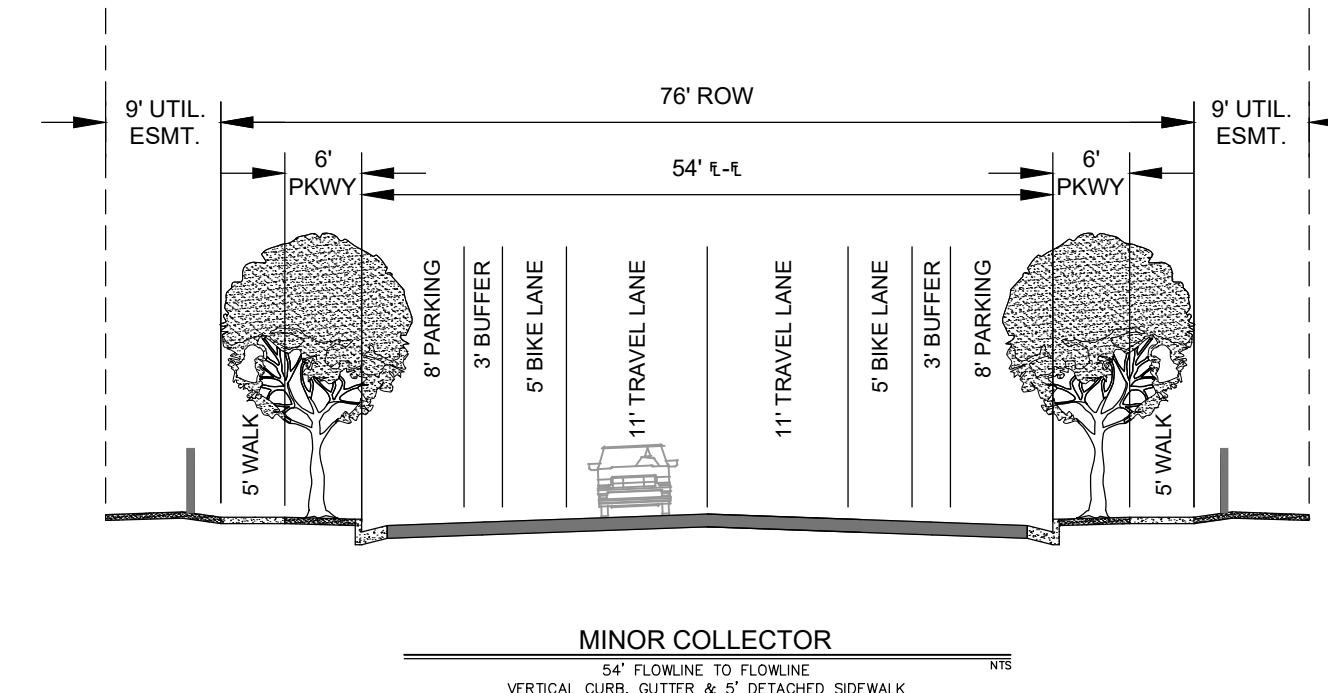
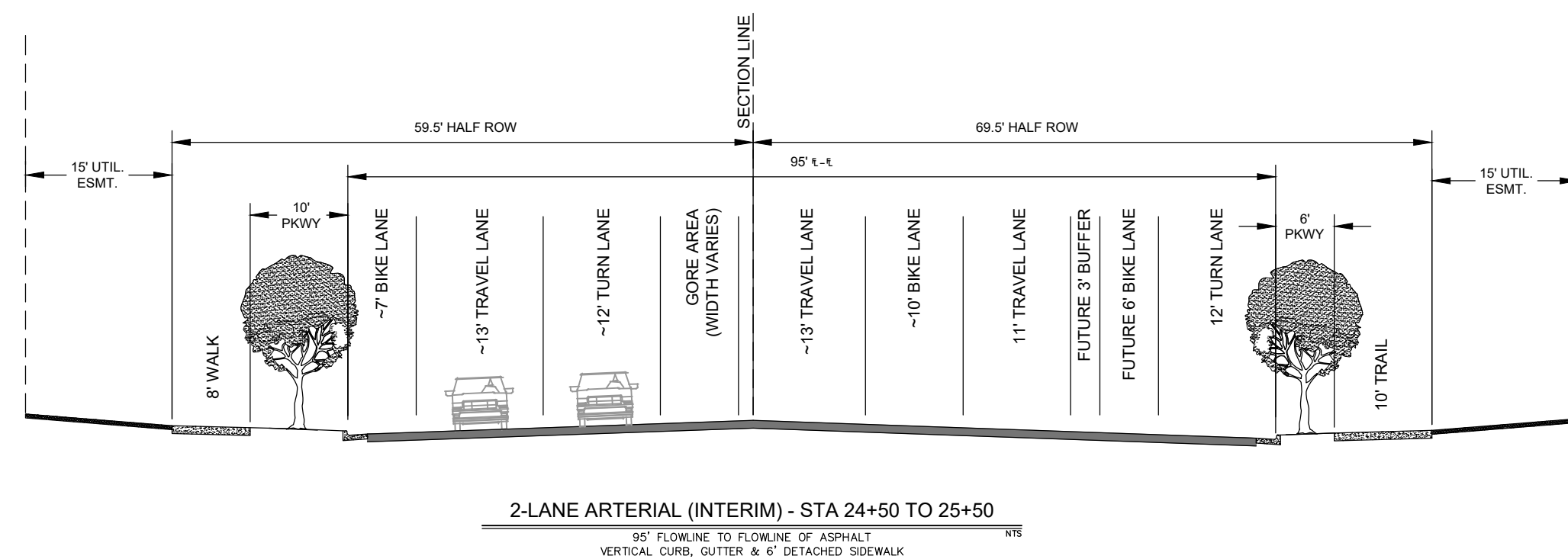
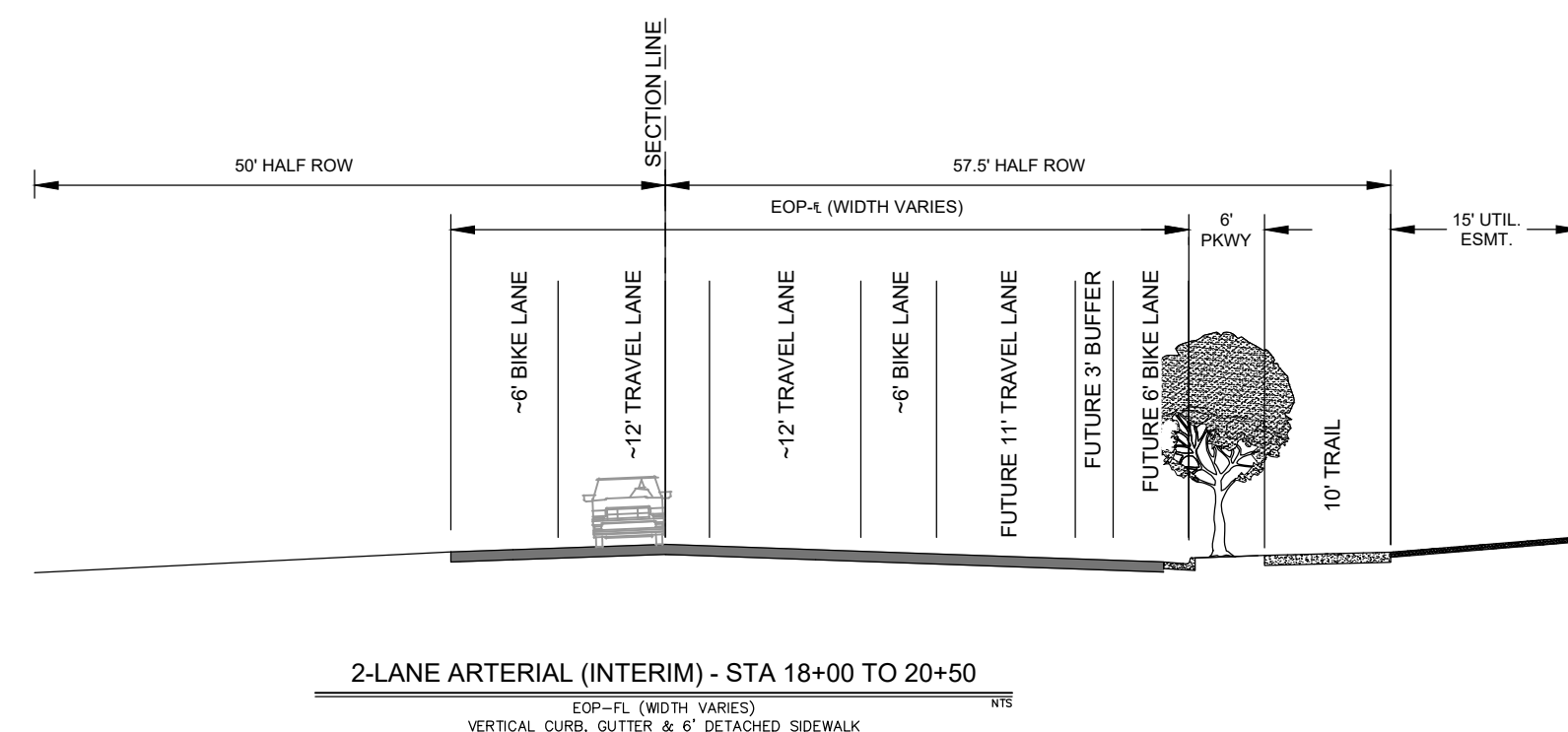
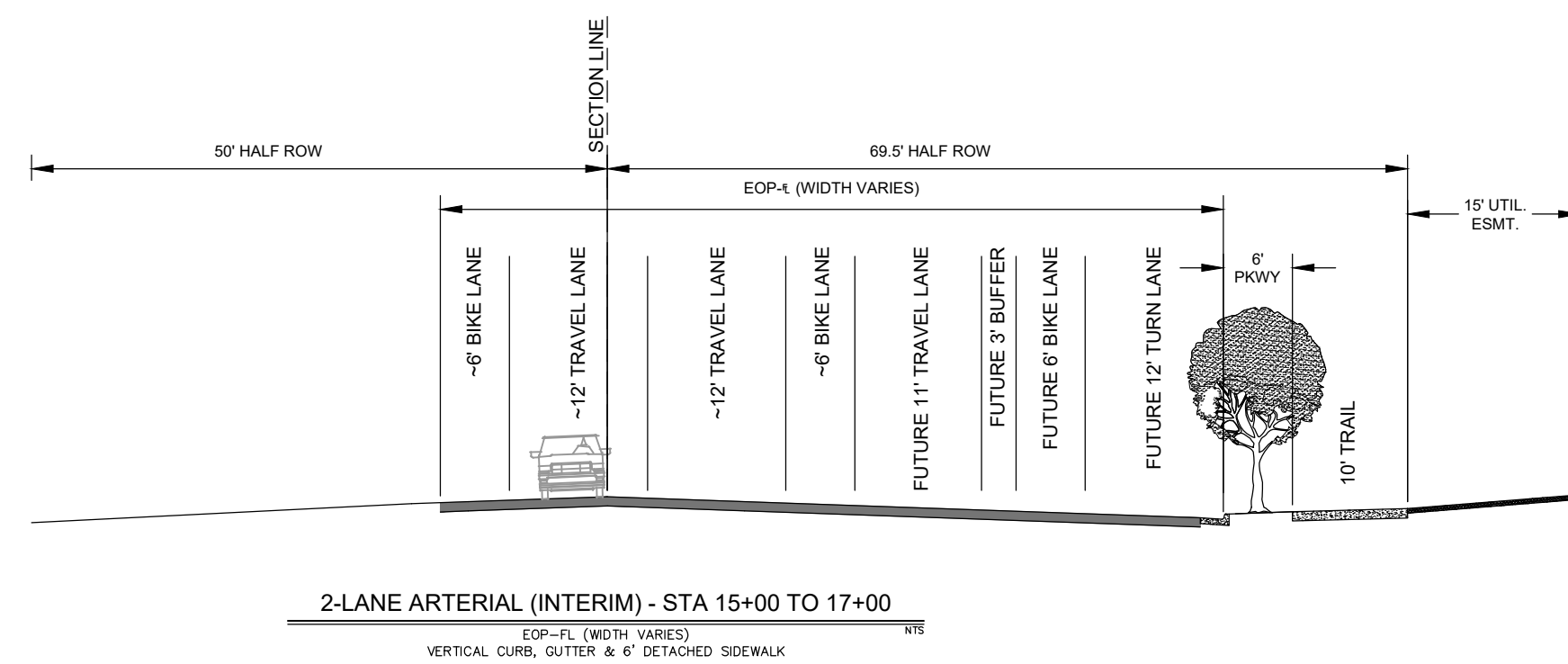
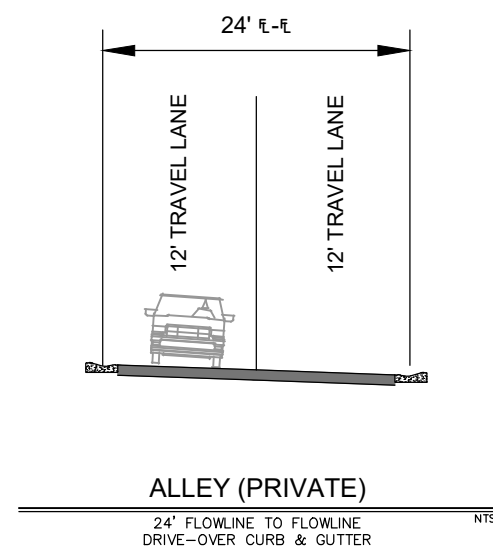
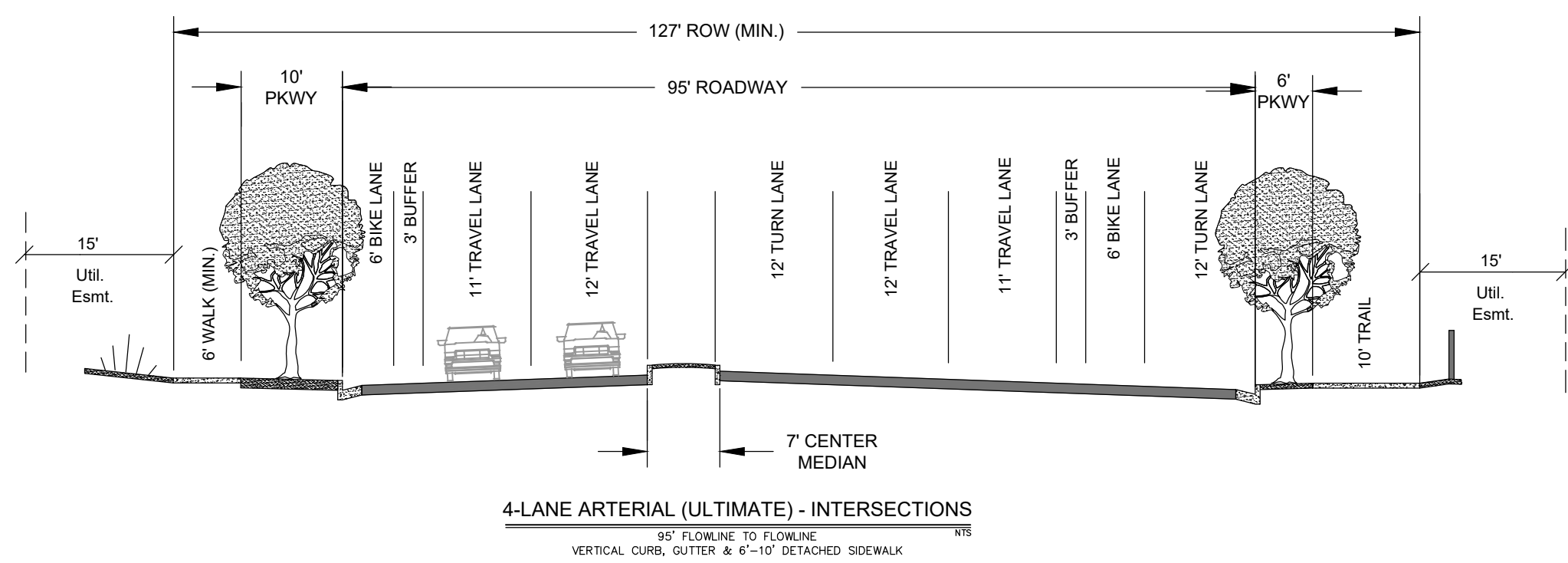
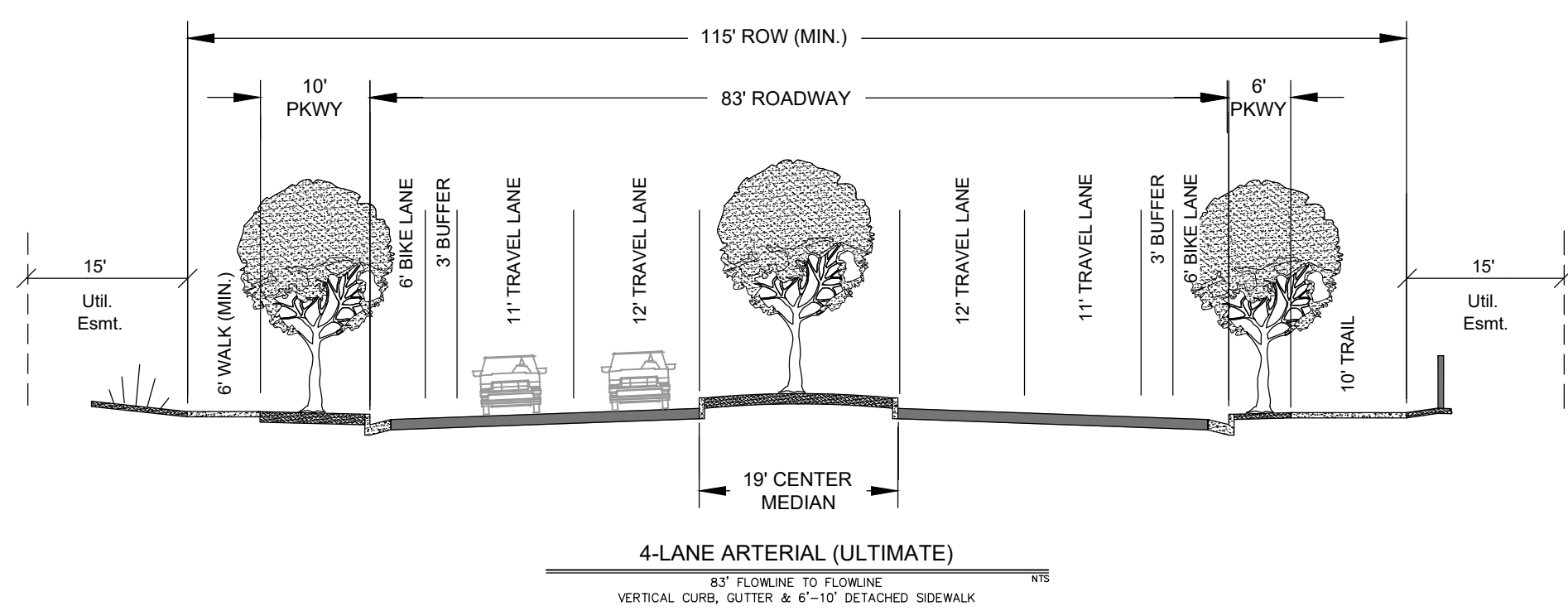


PROJECT: 911-015	DATE: 09/28/18	DESIGNED BY: D. Weber	SCALE: NTS	DRAWN BY: D. Weber	REVIEWED BY: D. Weber
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HANSEN SUBDIVISION

COVER SHEET

DRAWING: F:\Projects\911-015\911-015-001.dwg DATE: Sep 28, 2018 9:45am CAD OPERATOR: amw
User: amw [11-10-2018] [11-10-2018] [11-10-2018]



CALL UTILITY NOTIFICATION CENTER OF COLORADO



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.

City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED:	_____	_____	Date
CHECKED BY:	Water & Wastewater Utility	_____	Date
CHECKED BY:	Stormwater Utility	_____	Date
CHECKED BY:	Parks & Recreation	_____	Date
CHECKED BY:	Traffic Engineer	_____	Date
CHECKED BY:	Environmental Planner	_____	Date

HANSEN SUBDIVISION
STREET
CROSS-SECTIONS

Sheet
CS3

3 of 34

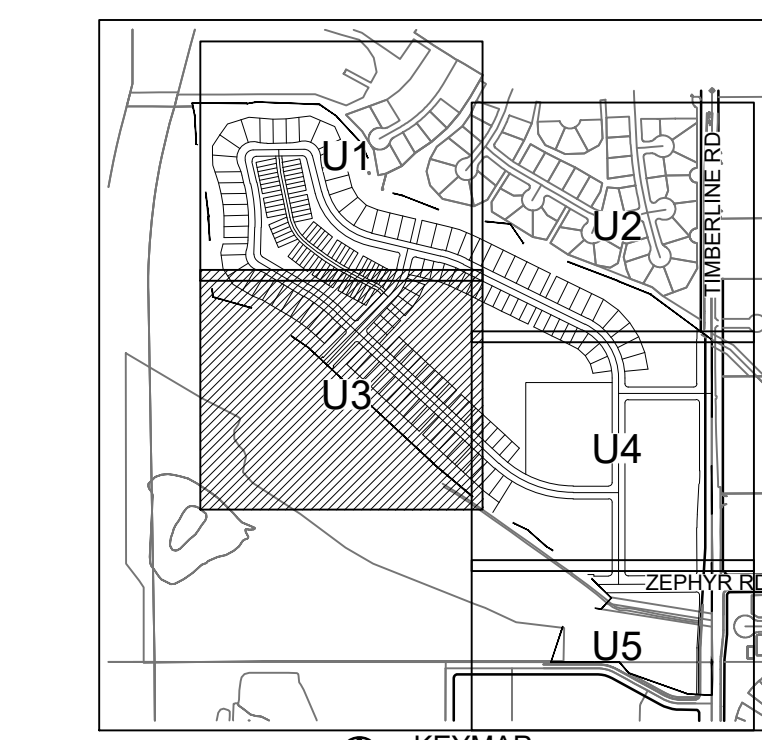
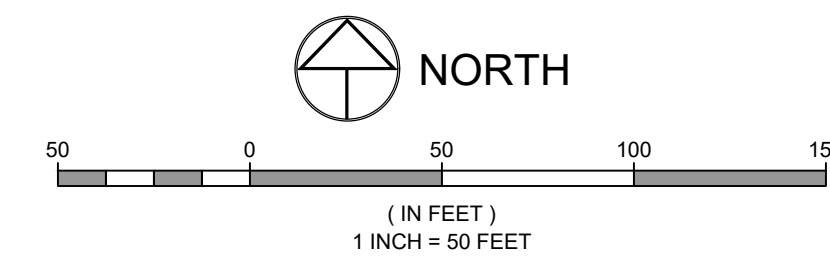
Revisions:
NO. _____ DATE _____
REVIEW SET
NOT FOR CONSTRUCTION
09/28/18

These drawings are instruments of service provided by Northern Engineering and are not to be used for any type of construction without the approval of a Professional Engineer in the employ of Northern Engineering Services, Inc.

NORTHERN ENGINEERING
NE
303 North Innes Street, Suite 100
Fort Collins, Colorado 80521
PHONE: 970.221.4188
www.northernengineering.com

PROJECT: 911-015
DATE: 09/28/18
DESIGNED BY: D. Weber
SCALE: NTS
DRAWN BY: D. Weber
REVIEWED BY: D. Weber

MATCHLINE-SEE SHEET U1



Revisions: NO. DATE DESCRIPTION

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NORTHERN ENGINEERING
303 North Innes Street, Suite 100
Fort Collins, Colorado 80521
PHONE: 970.221.4188
www.northernengineering.com

Table with columns: PROJECT, DATE, DESIGNED BY, DRAWN BY, REVIEWED BY. Values include 911-015, 09/28/18, D. Weber, J. Rudeger, D. Weber.

HANSEN SUBDIVISION
UTILITY PLAN
Sheet U3
8 of 34

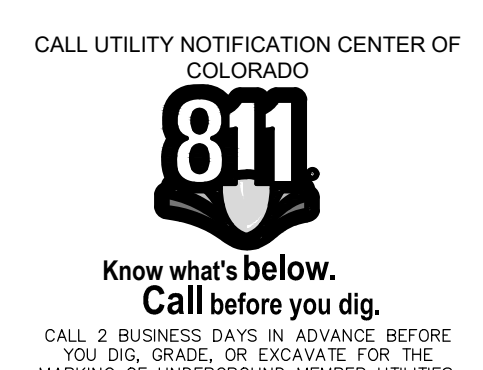
LEGEND: Symbols for PROPOSED WATER MAIN, EXISTING WATER MAIN, PROPOSED SANITARY SEWER, EXISTING SANITARY SEWER, PROPOSED SEWER SERVICE, PROPOSED RESIDENTIAL WATER SERVICE, PROPOSED UNDERDRAIN, PROPOSED SUBDRAIN, PROPOSED FIRE HYDRANT, EXISTING FIRE HYDRANT, PROPOSED STORMLINE, EXISTING STORMLINE, EXISTING STORM SEWER, PROPOSED ELECTRIC, EXISTING TELEPHONE, EXISTING GAS, PROPOSED CURB & GUTTER, PROPERTY BOUNDARY, PROPOSED LOTLINE, EASEMENT LINE, RIGHT OF WAY, LIMITS OF DEVELOPMENT.

NATURAL HABITAT BUFFER ZONES

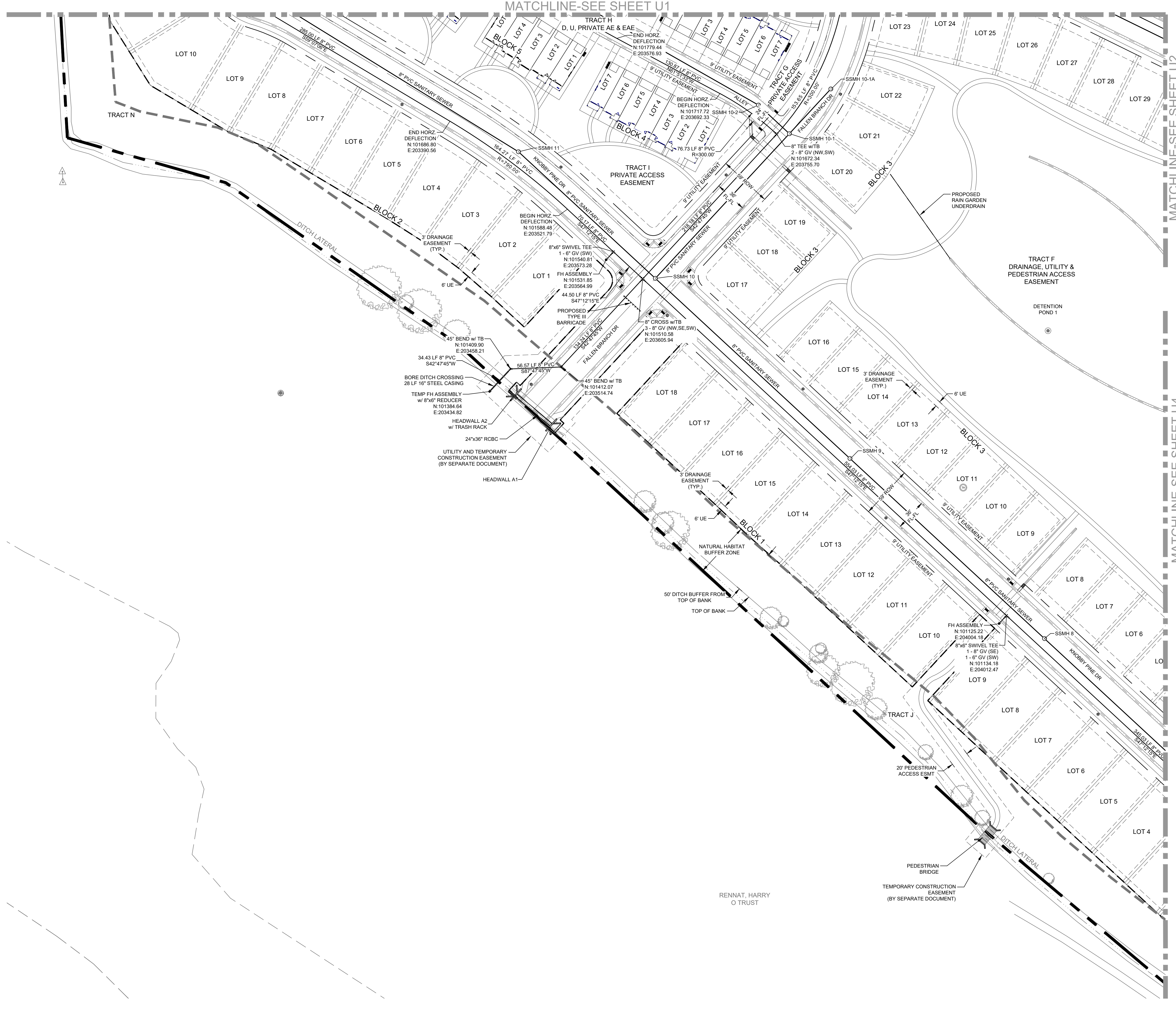
1. THE NATURAL HABITAT BUFFER ZONES ARE INTENDED TO BE MAINTAINED IN A NATIVE LANDSCAPE. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONES.

NOTES:

- 1. ALL WATERLINE CONSTRUCTION SHALL CONFORM TO THE FORT COLLINS-LEVELAND WATER DISTRICT STANDARD CONSTRUCTION SPECIFICATIONS CURRENT AT THE DATE OF CONSTRUCTION.
2. ALL SANITARY SEWER CONSTRUCTION SHALL CONFORM TO THE SOUTH FORT COLLINS SANITATION DISTRICT STANDARD CONSTRUCTION SPECIFICATIONS CURRENT AT THE DATE OF CONSTRUCTION.
3. THE CONTRACTOR SHALL MAINTAIN A MINIMUM OF 10 FEET OF HORIZONTAL SEPARATION AND 18 INCHES OF VERTICAL SEPARATION BETWEEN ALL SEWER AND WATER LINES.
4. MINIMUM DEPTH OF COVER OVER WATER MAINS SHALL BE 5.0 FEET AND MAXIMUM COVER SHALL BE 6.0 FEET.
5. MANHOLE RIM ELEVATIONS ARE TO BE ADJUSTED TO 1/4" BELOW FINISHED GRADE. IF NECESSARY, CONE SECTIONS SHALL BE ROTATED TO PREVENT LIDS BEING LOCATED WITHIN BICYCLE OR VEHICLE WHEEL PATHS.
6. THE SIZE, TYPE AND LOCATION OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THESE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE OF ALL UNDERGROUND UTILITIES IN THE AREA OF THE WORK. BEFORE COMMENCING NEW CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR ALL UNKNOWN UNDERGROUND UTILITIES.
7. ALL WATER FITTINGS AND VALVES ARE ONLY GRAPHICALLY REPRESENTED AND ARE NOT TO SCALE.
8. CONSTRUCTION ON DITCH LATERAL WILL BE LIMITED FROM OCTOBER 1 TO MAY 1 WHEN NOT IN USE.

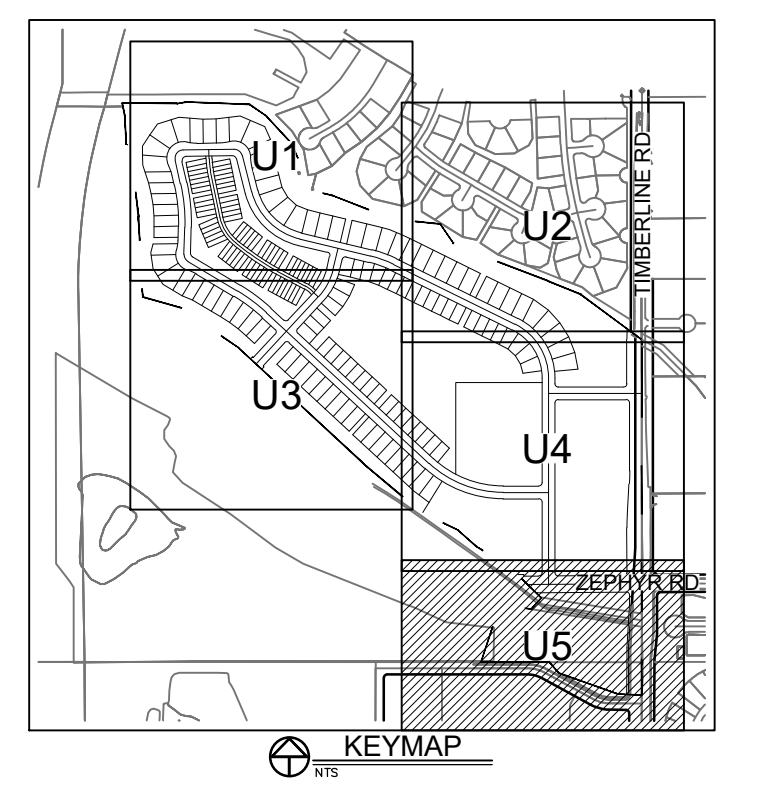
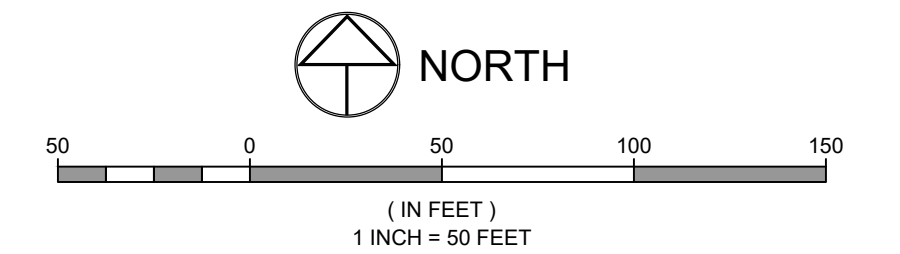
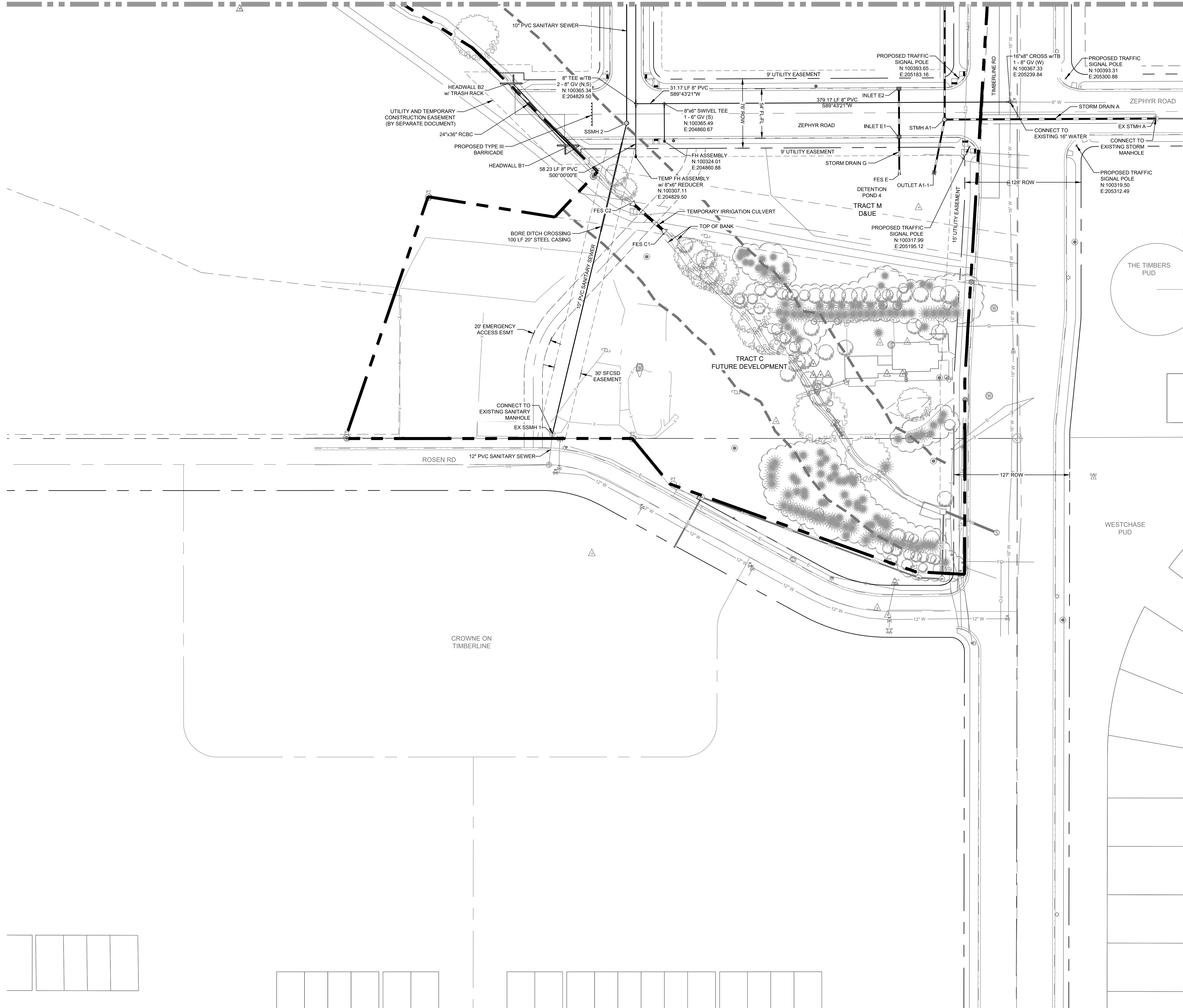


City of Fort Collins, Colorado UTILITY PLAN APPROVAL. Table with columns: APPROVED, CHECKED BY, City Engineer, Water Utility, Stormwater Utility, Parks & Recreation, Traffic Engineer, Environmental Planner, Date.

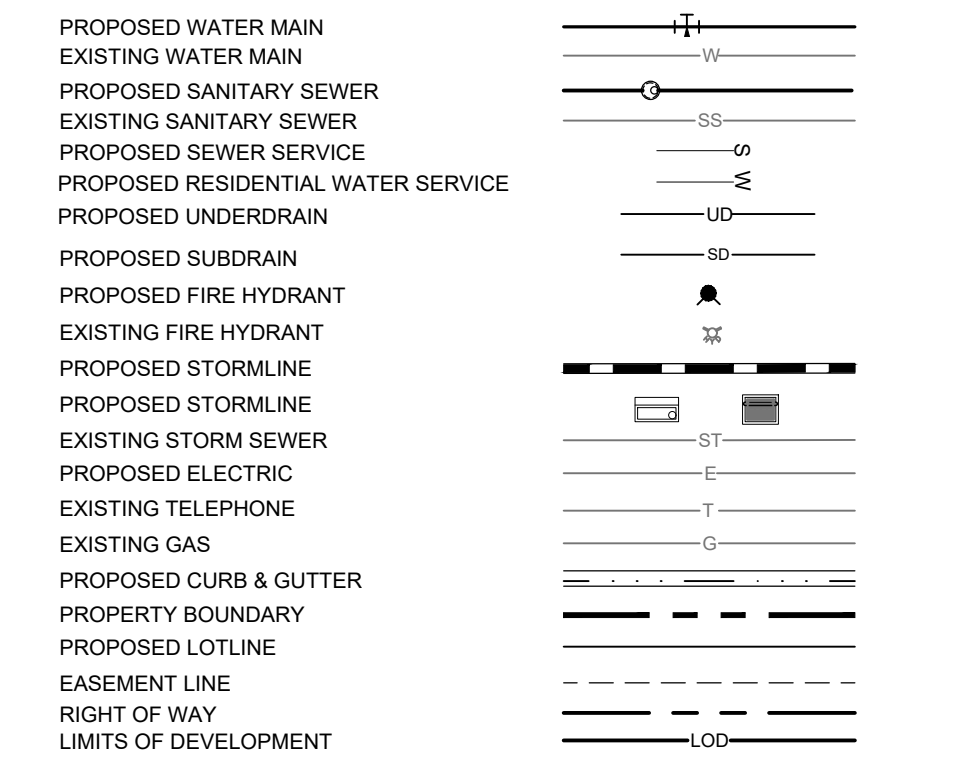


Drawn: JRM/MLC, Checked: JRM/MLC, Date: 09/28/18, Scale: 1"=50', Project: 911-015, Title: UTILITY PLAN, Client: HANSEN SUBDIVISION

MATCHLINE-SEE SHEET U4



LEGEND:



NATURAL HABITAT BUFFER ZONES

1. THE NATURAL HABITAT BUFFER ZONES ARE INTENDED TO BE MAINTAINED IN A NATIVE LANDSCAPE. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONES.

NOTES:

- ALL WATERLINE CONSTRUCTION SHALL CONFORM TO THE FORT COLLINS-LOVELAND WATER DISTRICT STANDARD CONSTRUCTION SPECIFICATIONS CURRENT AT THE DATE OF CONSTRUCTION.
- ALL SANITARY SEWER CONSTRUCTION SHALL CONFORM TO THE SOUTH FORT COLLINS SANITATION DISTRICT STANDARD CONSTRUCTION SPECIFICATIONS CURRENT AT THE DATE OF CONSTRUCTION.
- THE CONTRACTOR SHALL MAINTAIN A MINIMUM OF 10 FEET OF HORIZONTAL SEPARATION AND 18 INCHES OF VERTICAL SEPARATION BETWEEN ALL SEWER AND WATER LINES.
- MINIMUM DEPTH OF COVER OVER WATER MAINS SHALL BE 5.0 FEET AND MAXIMUM COVER SHALL BE 6.0 FEET.
- MANHOLE RIM ELEVATIONS ARE TO BE ADJUSTED TO 1/4" BELOW FINISHED GRADE. IF NECESSARY, CONE SECTIONS SHALL BE ROTATED TO PREVENT LIDS BEING LOCATED WITHIN BICYCLE OR VEHICLE WHEEL PATHS.
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- ALL WATER FITTINGS AND VALVES ARE ONLY GRAPHICALLY REPRESENTED AND ARE NOT TO SCALE.
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City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED:	City Engineer	Date
CHECKED BY:	Water Utility	Date
CHECKED BY:	Stormwater Utility	Date
CHECKED BY:	Parks & Recreation	Date
CHECKED BY:	Traffic Engineer	Date
CHECKED BY:	Environmental Planner	Date

Revisions:
NO. DATE BY

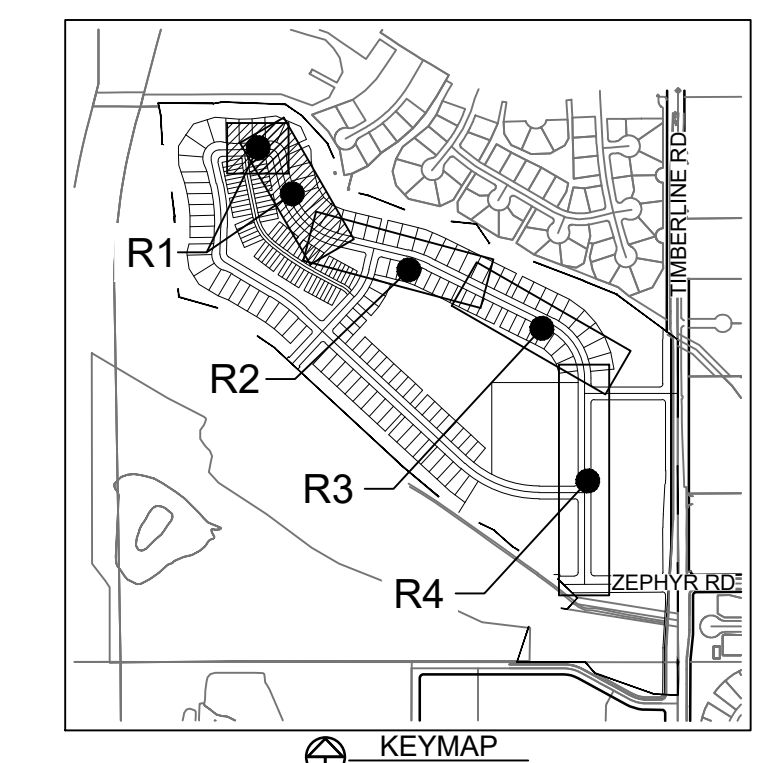
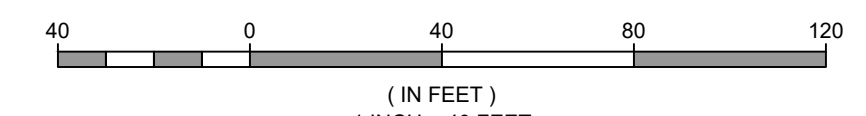
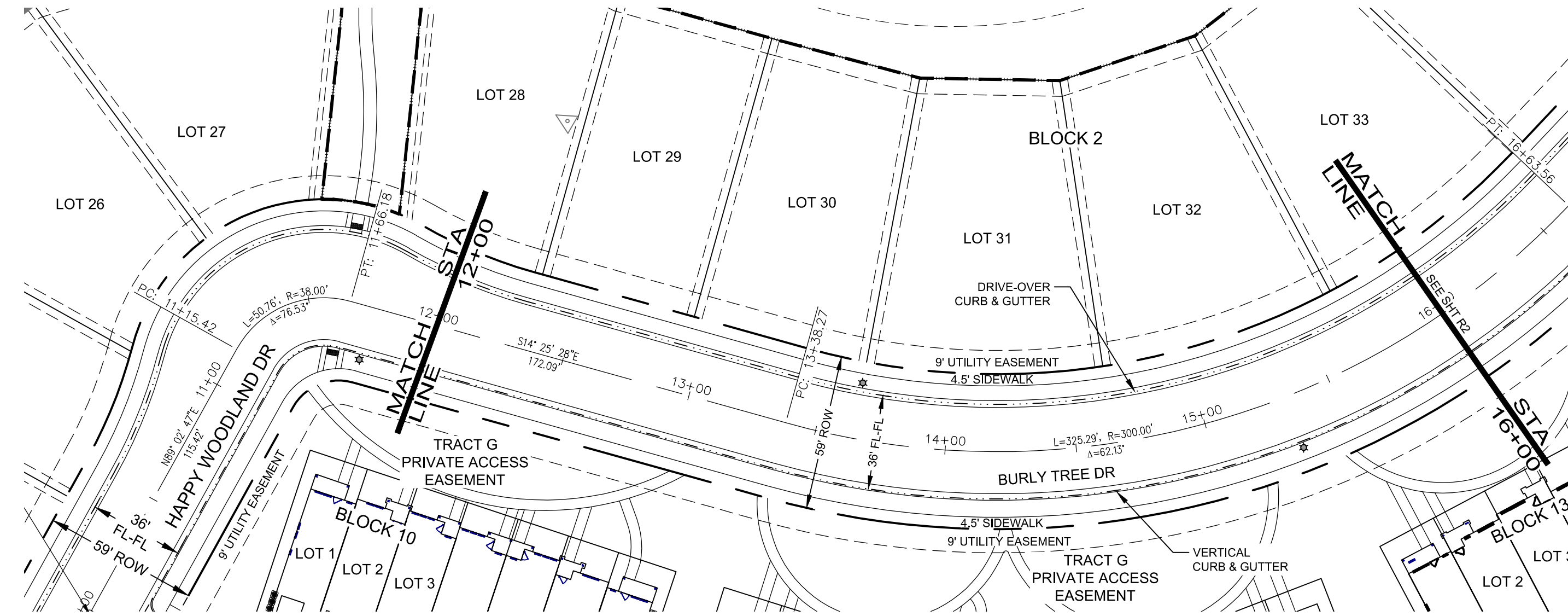
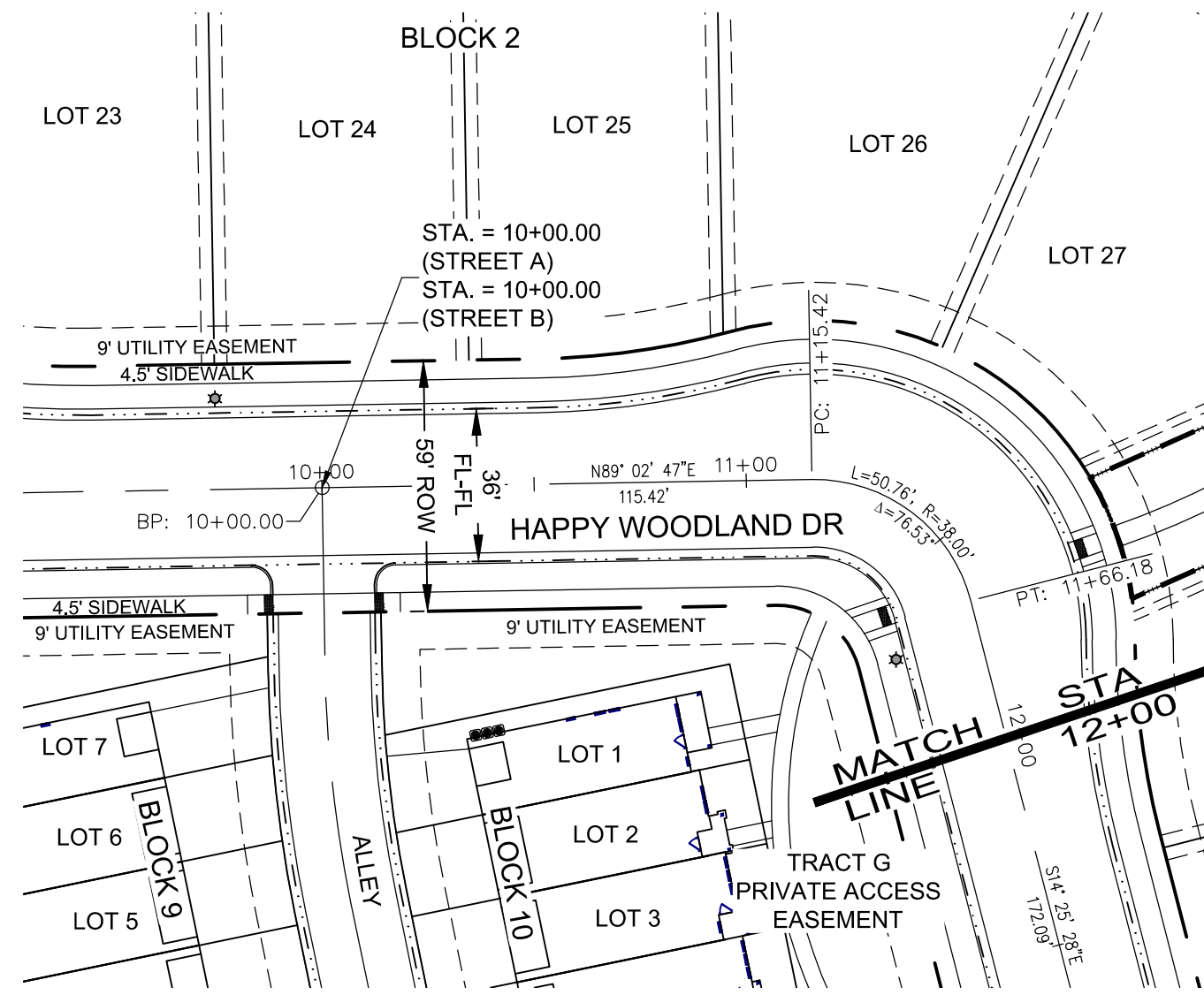
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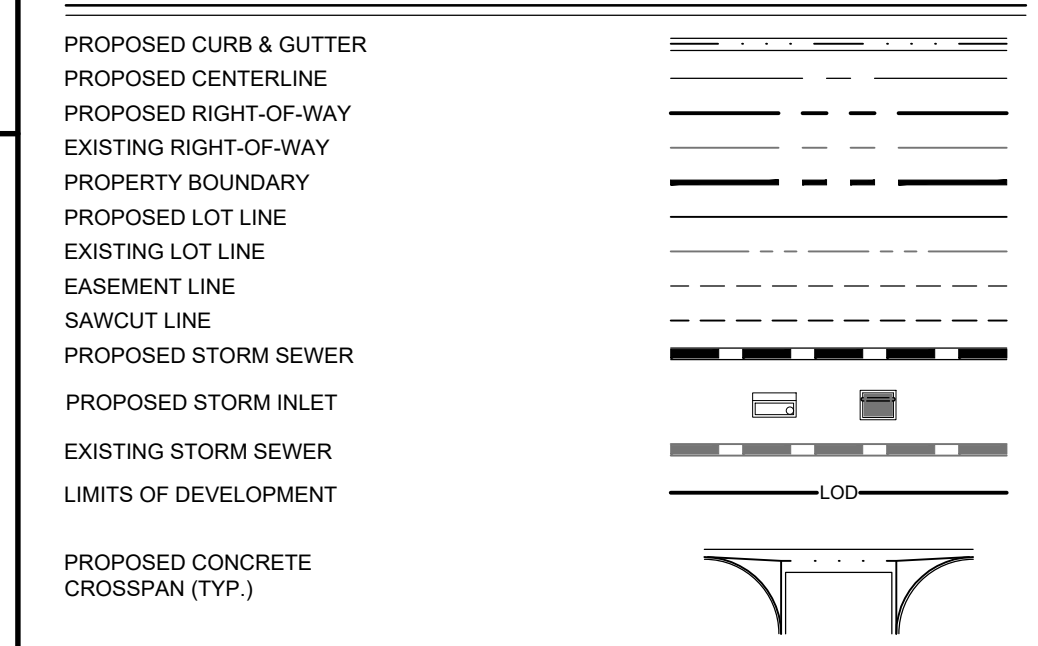
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HANSEN SUBDIVISION
UTILITY PLAN

Drawings furnished by [redacted] are the property of [redacted] and are not to be used for any other project without the written consent of [redacted].

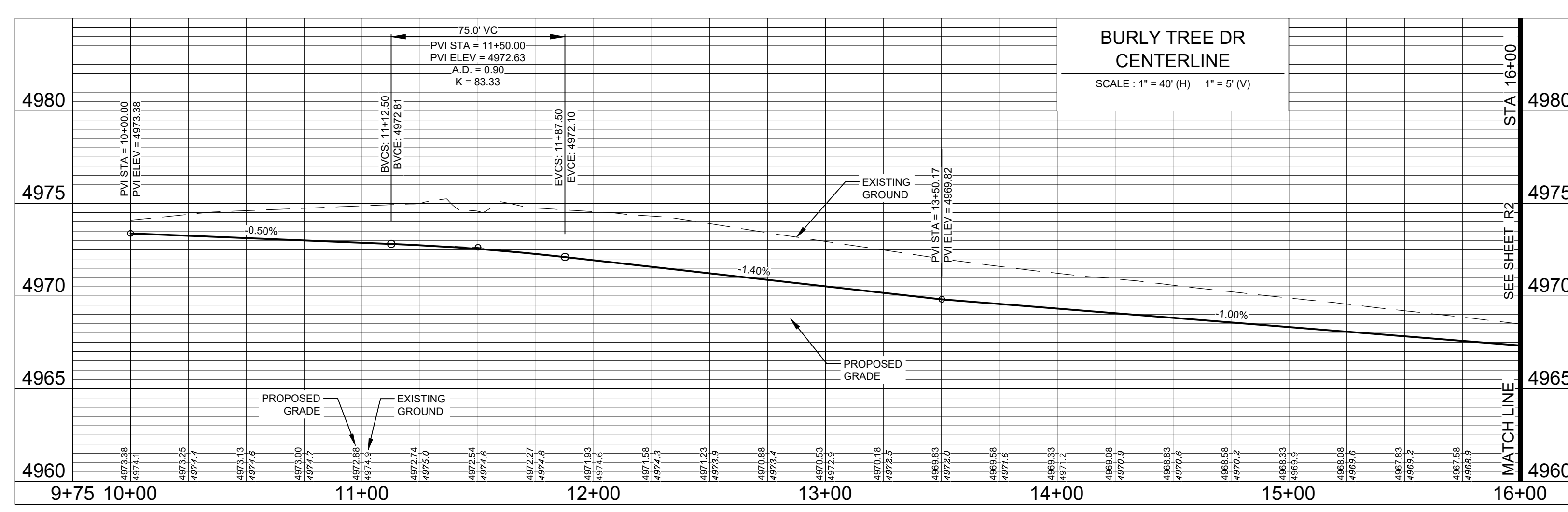


LEGEND:



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City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED:	_____	City Engineer	_____	Date
CHECKED BY:	_____	Water Utility	_____	Date
CHECKED BY:	_____	Stormwater Utility	_____	Date
CHECKED BY:	_____	Parks & Recreation	_____	Date
CHECKED BY:	_____	Traffic Engineer	_____	Date
CHECKED BY:	_____	Environmental Planner	_____	Date

Revisions:
No. _____ Date: _____
REVIEW SET
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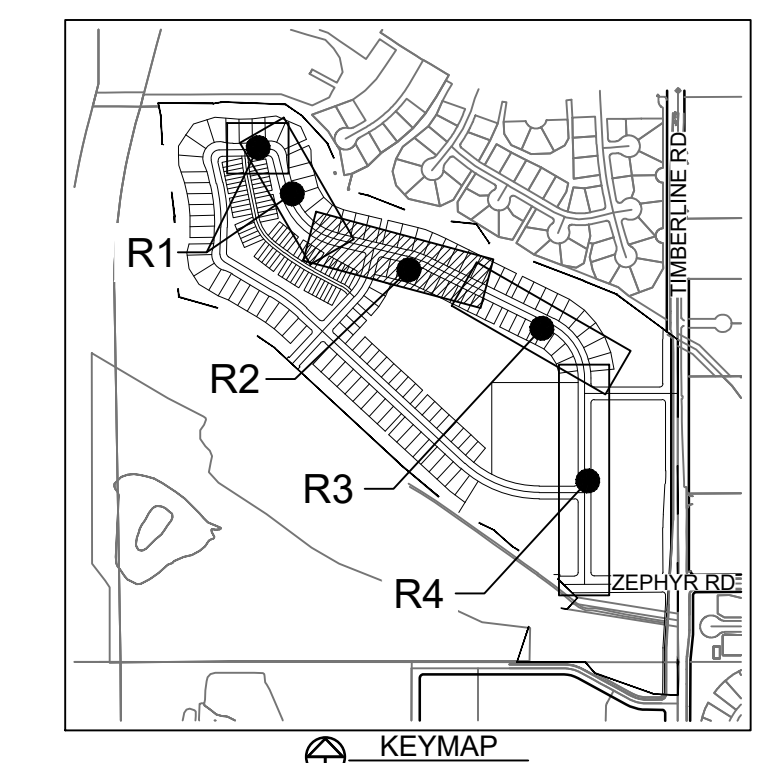
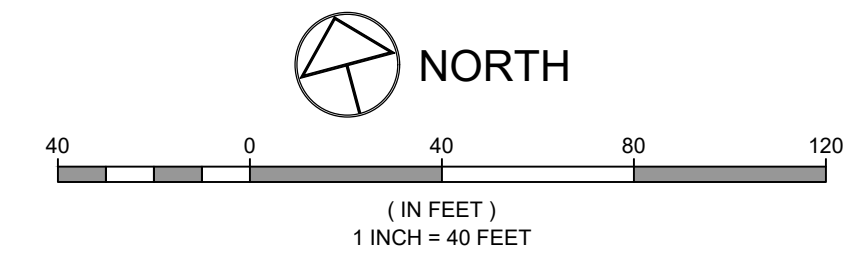
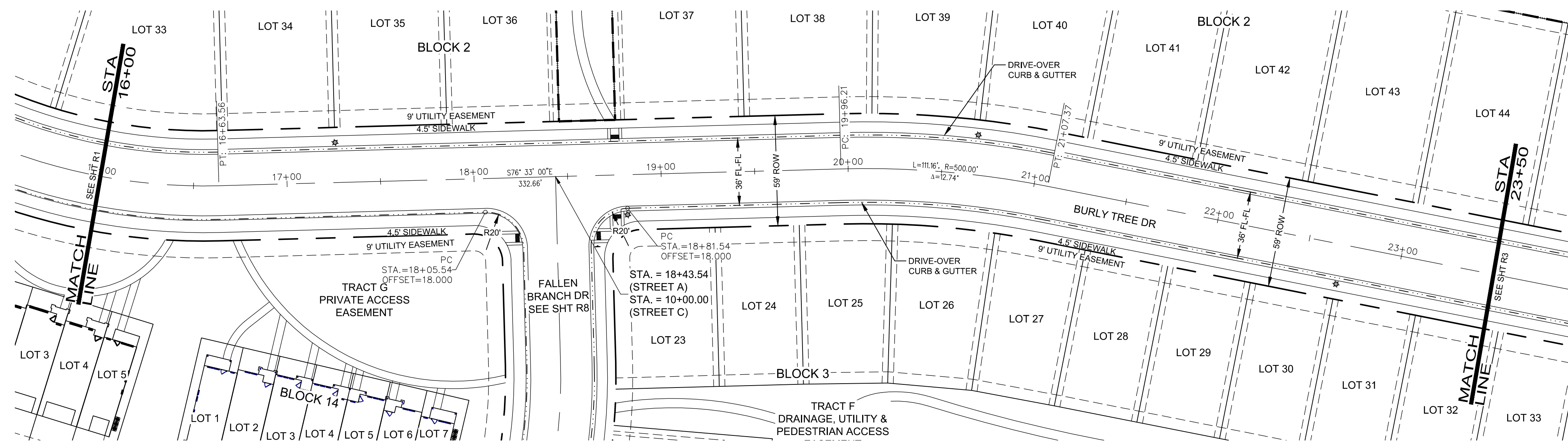
NE
303 North Innes Street, Suite 100
Fort Collins, Colorado 80521

PROJECT: 911-015
DATE: 09/28/18
DESIGNED BY: D. Weber
SCALE: 1"=40'
DRAWN BY: D. Weber
REVIEWED BY: D. Weber

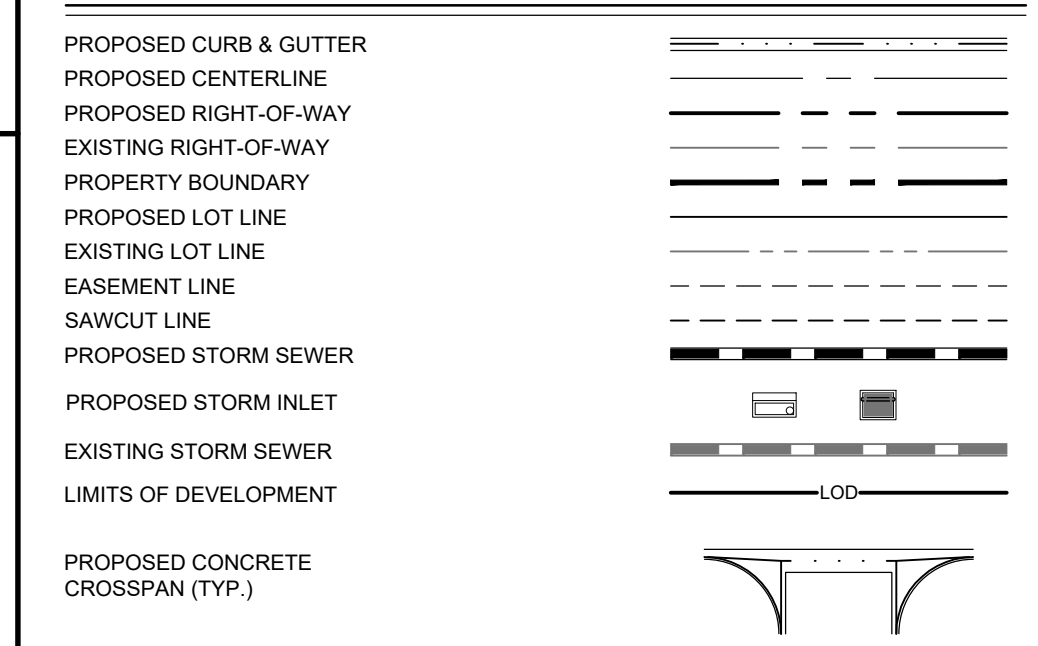
HANSEN SUBDIVISION
HAPPY WOODLAND DR AND BURLY TREE DR PLAN AND PROFILE

Sheet
R1
17 of 34

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CHECKED BY: D. Weber
DESIGNED BY: D. Weber
SCALE: 1"=40'
PROJECT: 911-015
DATE: 09/28/2018

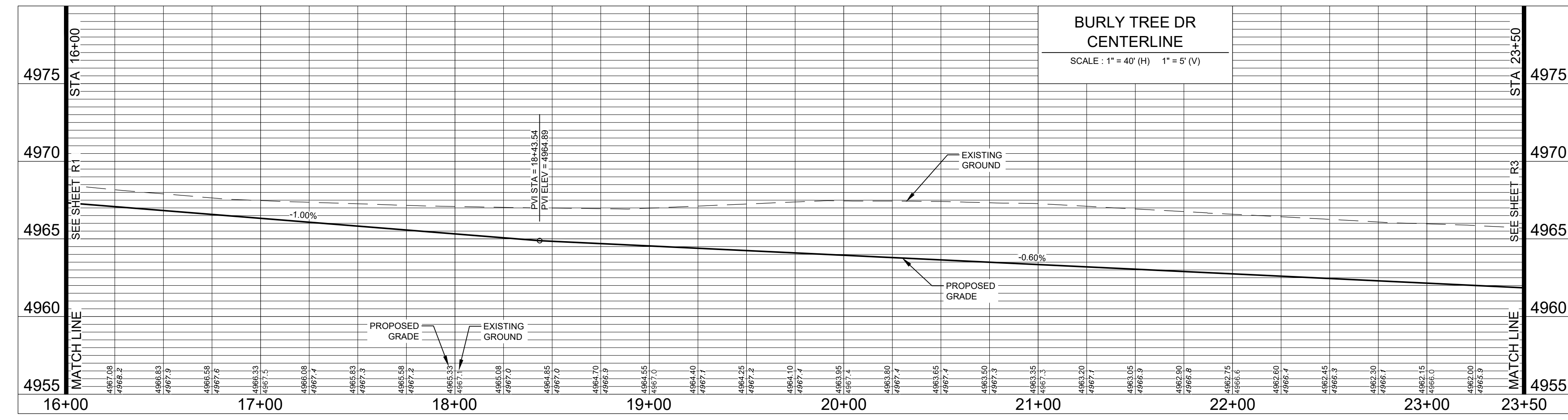


LEGEND:



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UTILITY PLAN APPROVAL

APPROVED:	_____	City Engineer	_____	Date
CHECKED BY:	_____	Water Utility	_____	Date
CHECKED BY:	_____	Stormwater Utility	_____	Date
CHECKED BY:	_____	Parks & Recreation	_____	Date
CHECKED BY:	_____	Traffic Engineer	_____	Date
CHECKED BY:	_____	Environmental Planner	_____	Date

Revisions:
 NO. _____
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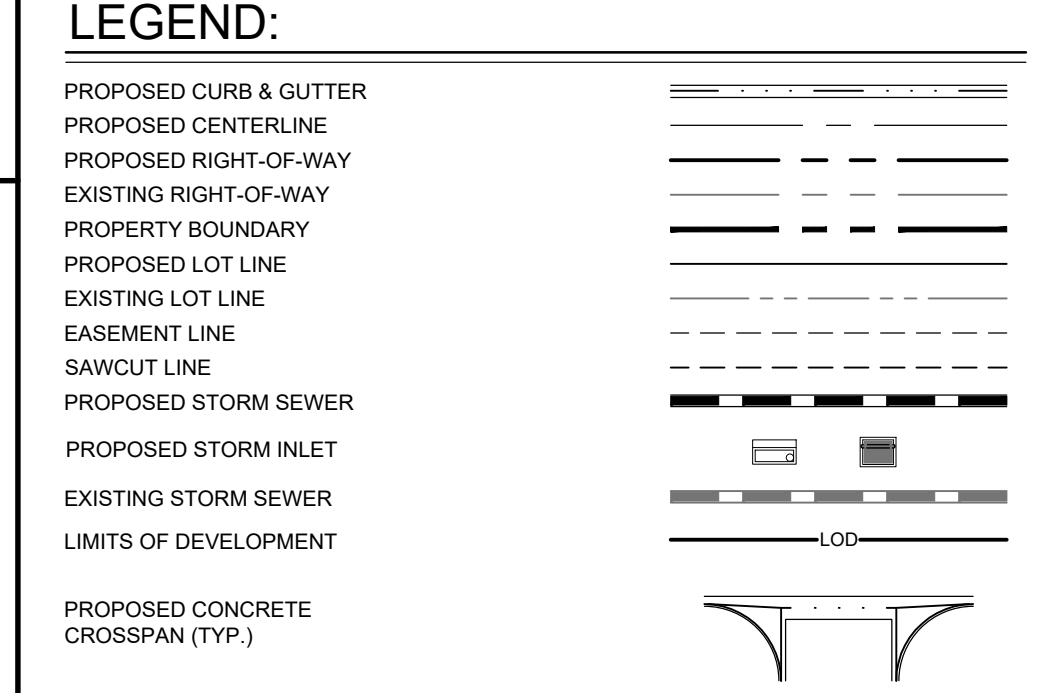
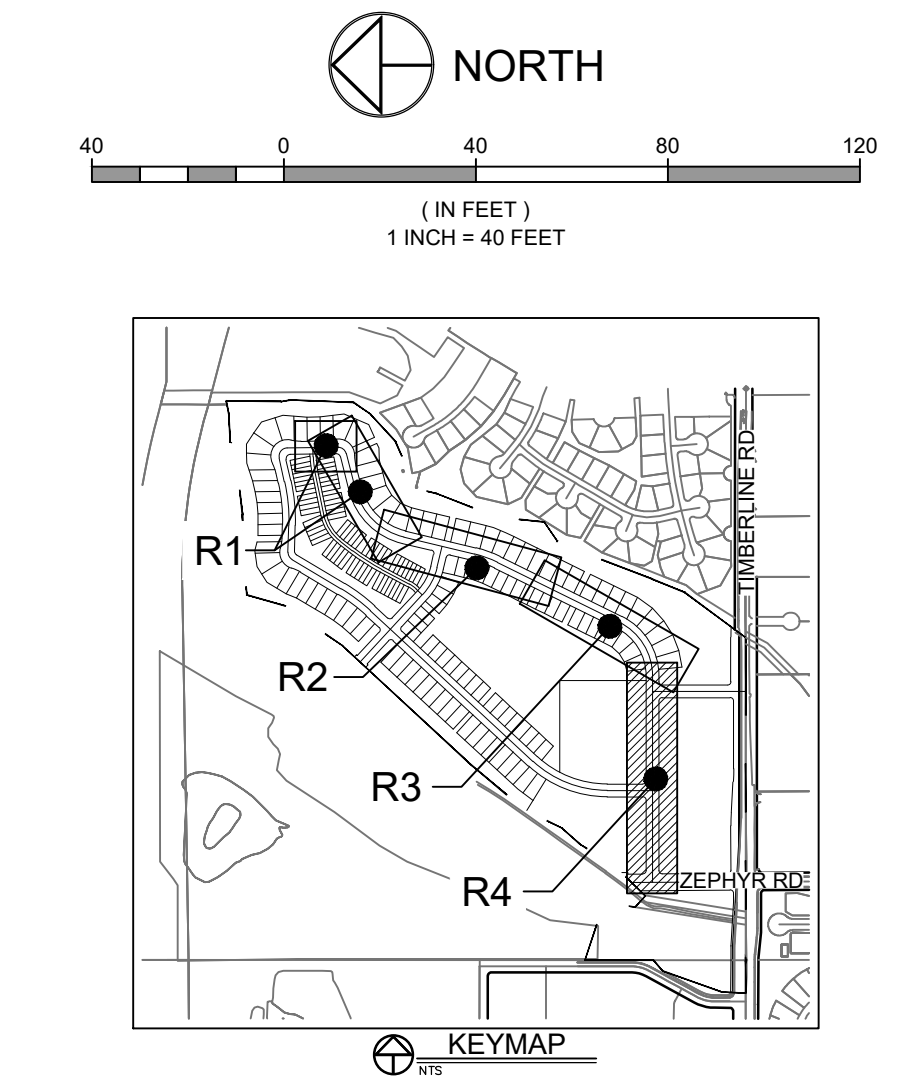
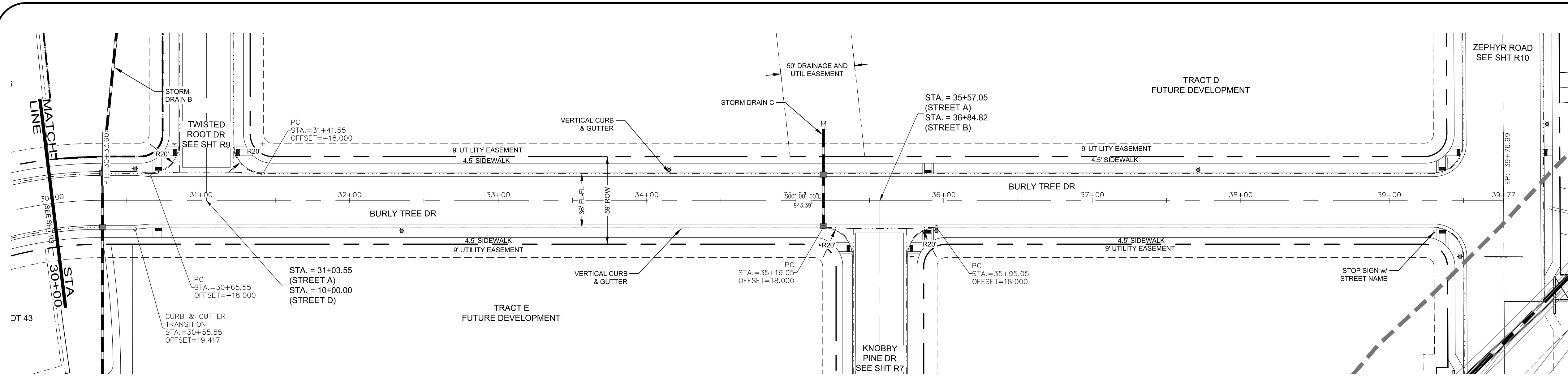
NE
 301 North Innes Street, Suite 100
 Fort Collins, Colorado 80521

PROJECT: 911-015
 DATE: 09/28/18
 DESIGNED BY: D. Weber
 SCALE: 1"=40'
 DRAWN BY: D. Weber
 REVIEWED BY: D. Weber

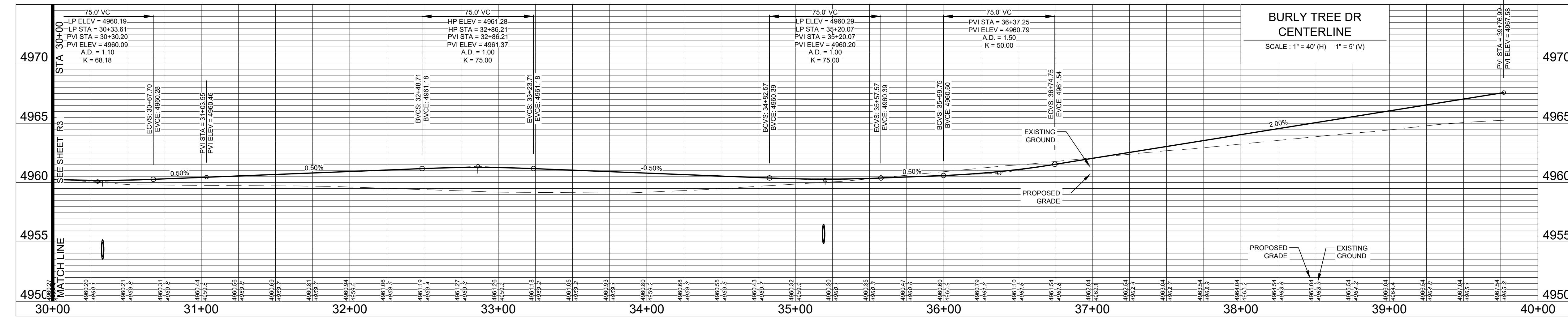
HANSEN SUBDIVISION
BURLY TREE DR
PLAN AND PROFILE

Sheet
R2
 18 of 34

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- NOTES:**
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UTILITY PLAN APPROVAL

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CHECKED BY:	Parks & Recreation	Date
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Revisions:
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REVIEW SET
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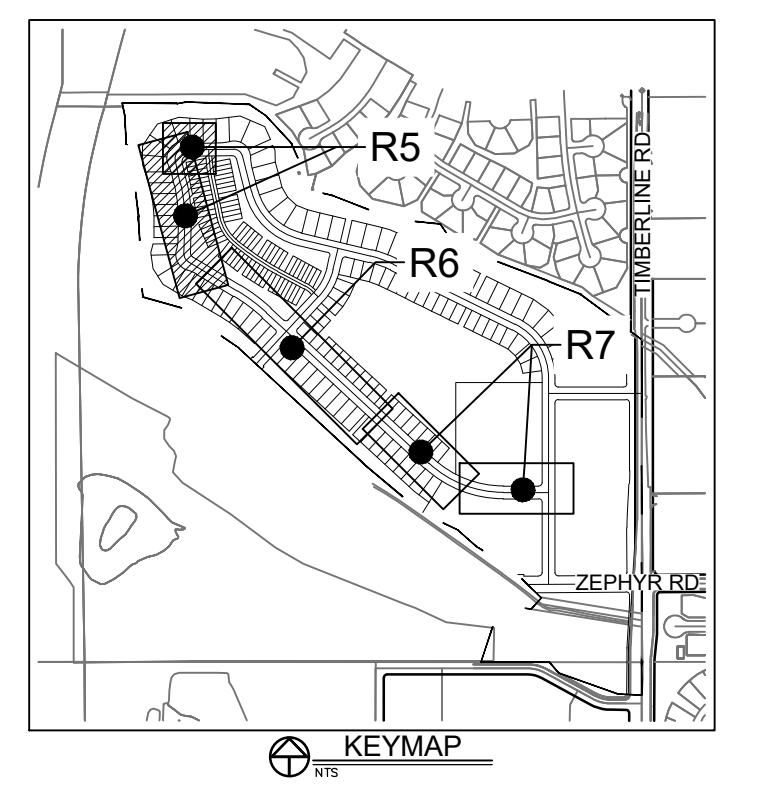
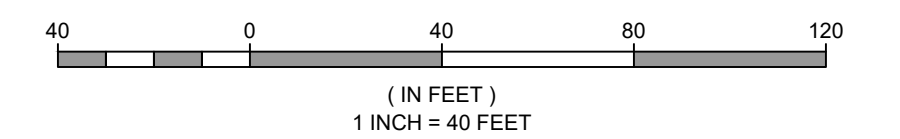
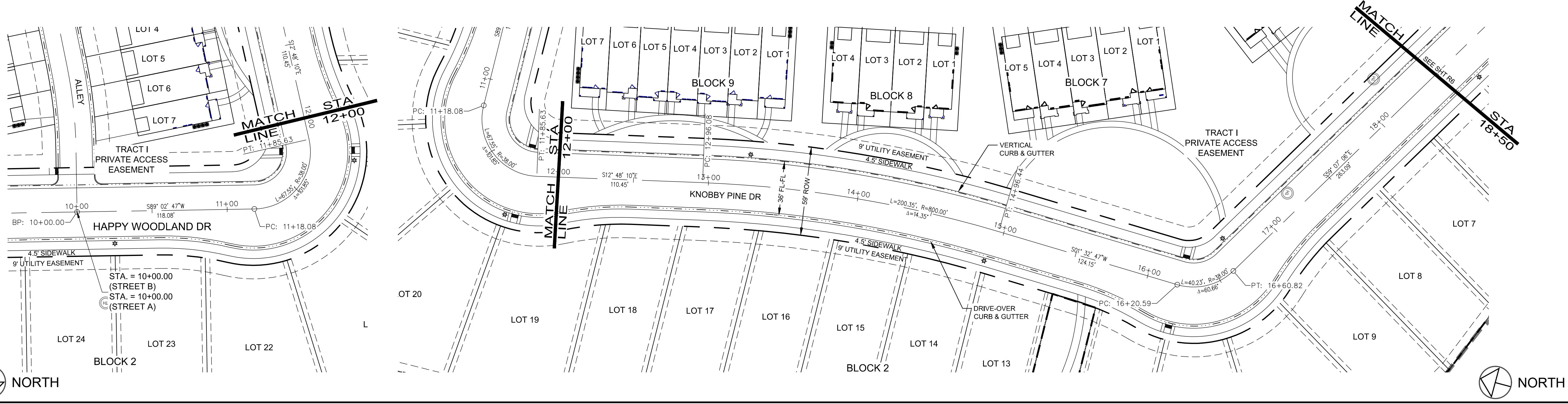
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PROJECT: 911-015
 DATE: 09/28/18
 DESIGNED BY: D. Weber
 SCALE: 1" = 40'
 DRAWN BY: D. Weber
 REVIEWED BY: D. Weber

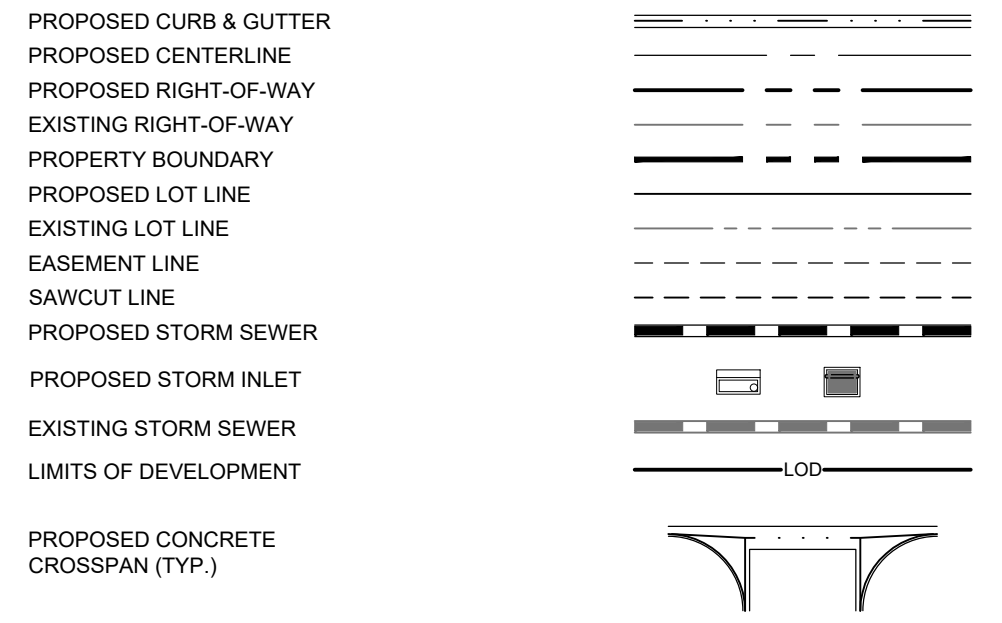
HANSEN SUBDIVISION
BURLY TREE DR
PLAN AND PROFILE

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R4
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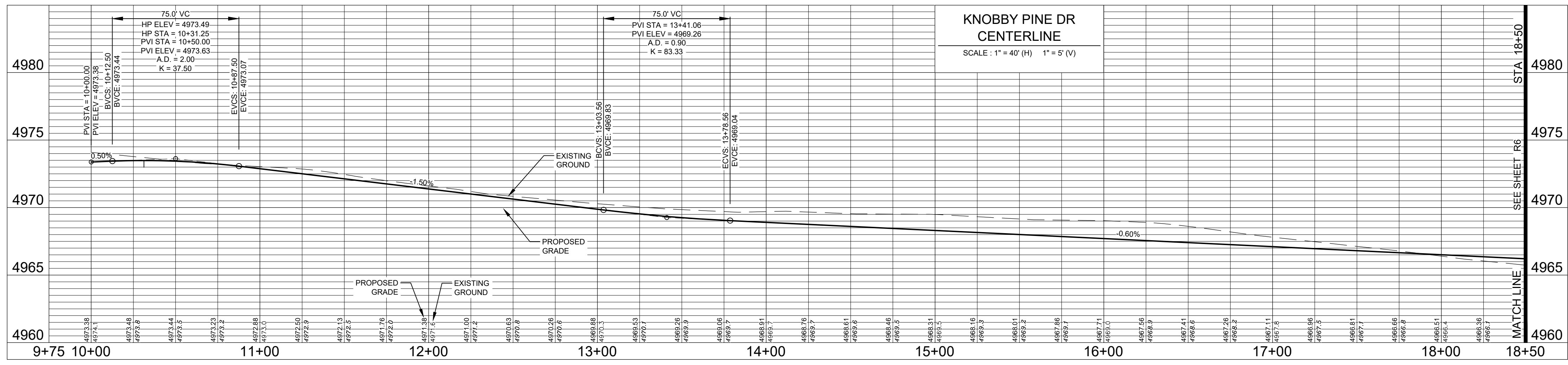


LEGEND:



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Revisions:
REVIEW SET
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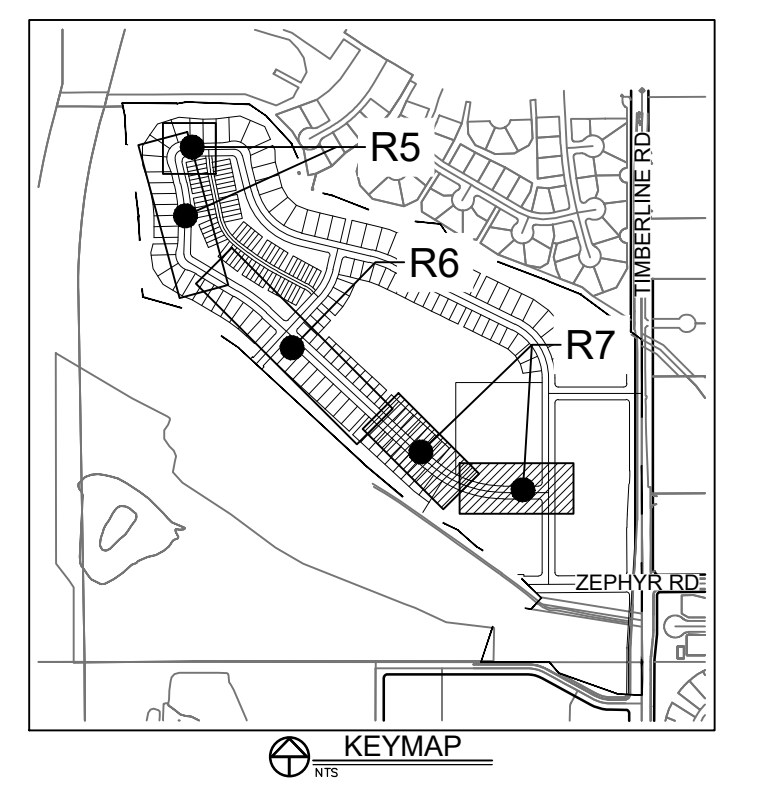
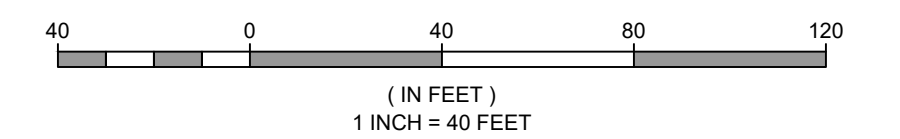
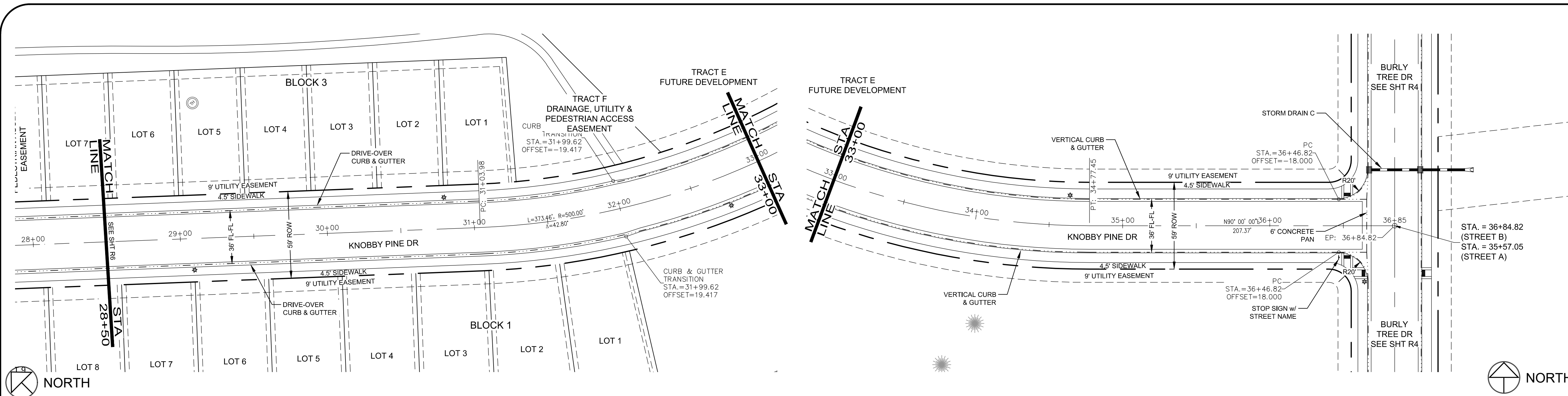
NORTHERN ENGINEERING
303 North Innes Street, Suite 100
Fort Collins, Colorado 80521
PHONE: 970.221.4188
www.northernengineering.com

PROJECT:	911-015	DATE:	09/28/18
DESIGNED BY:	D. Weber	SCALE:	1" = 40'
DRAWN BY:	D. Weber	REVIEWED BY:	D. Weber

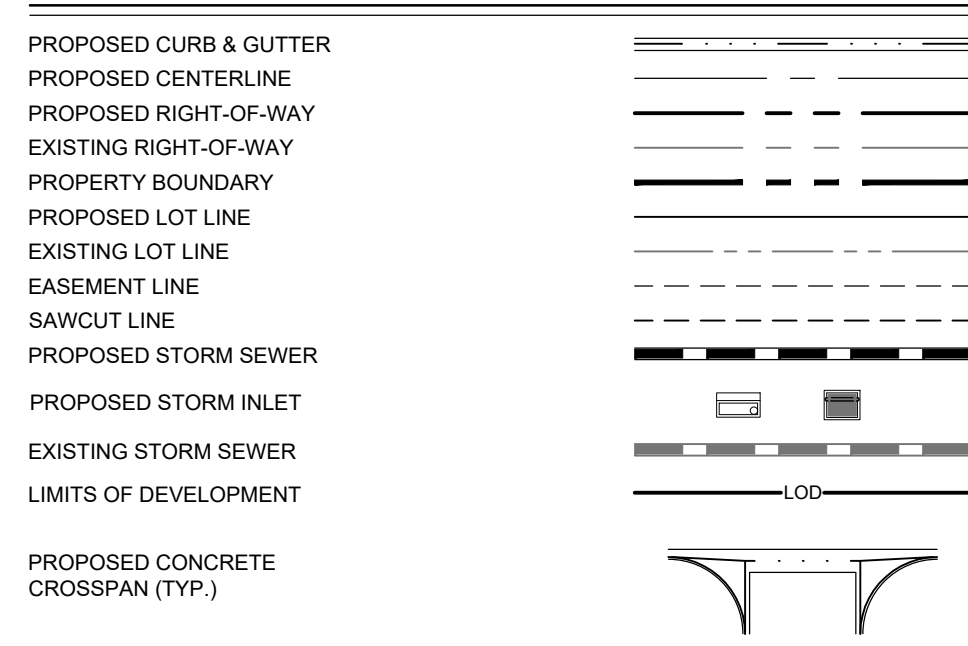
HANSEN SUBDIVISION
HAPPY WOODLAND DR AND
KNOBBY PINE DR PLAN AND PROFILE

Sheet
R5

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User: [unreadable]



LEGEND:



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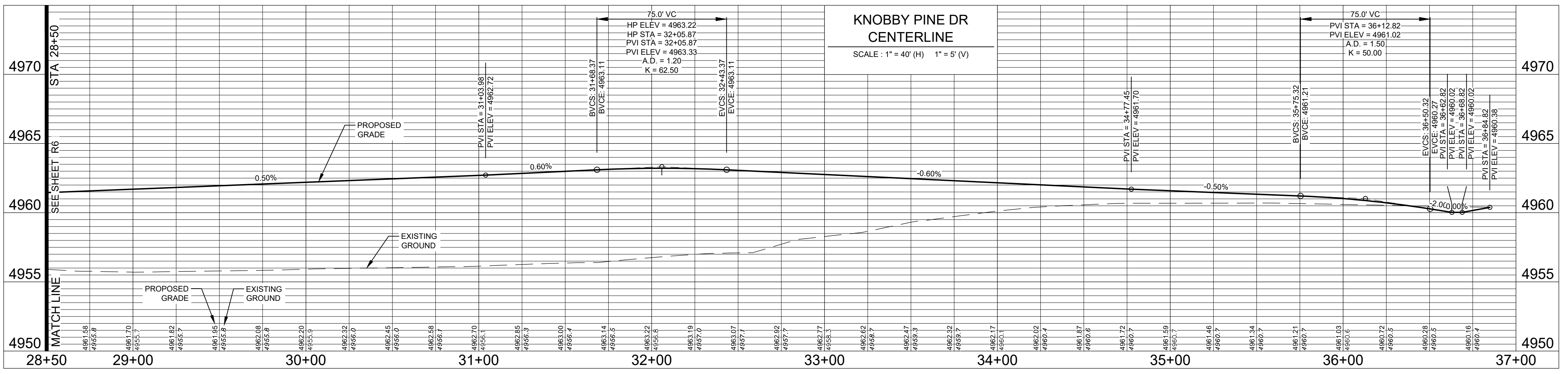
Revisions:
 NO. _____
 DATE _____
 BY _____
REVIEW SET
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PROJECT: 911-015
 DATE: 09/28/18
 DESIGNED BY: D. Weber
 SCALE: 1" = 40'
 DRAWN BY: D. Weber
 REVIEWED BY: D. Weber

HANSEN SUBDIVISION
KNOBBY PINE DR
PLAN AND PROFILE

Sheet
R7
 23 of 34



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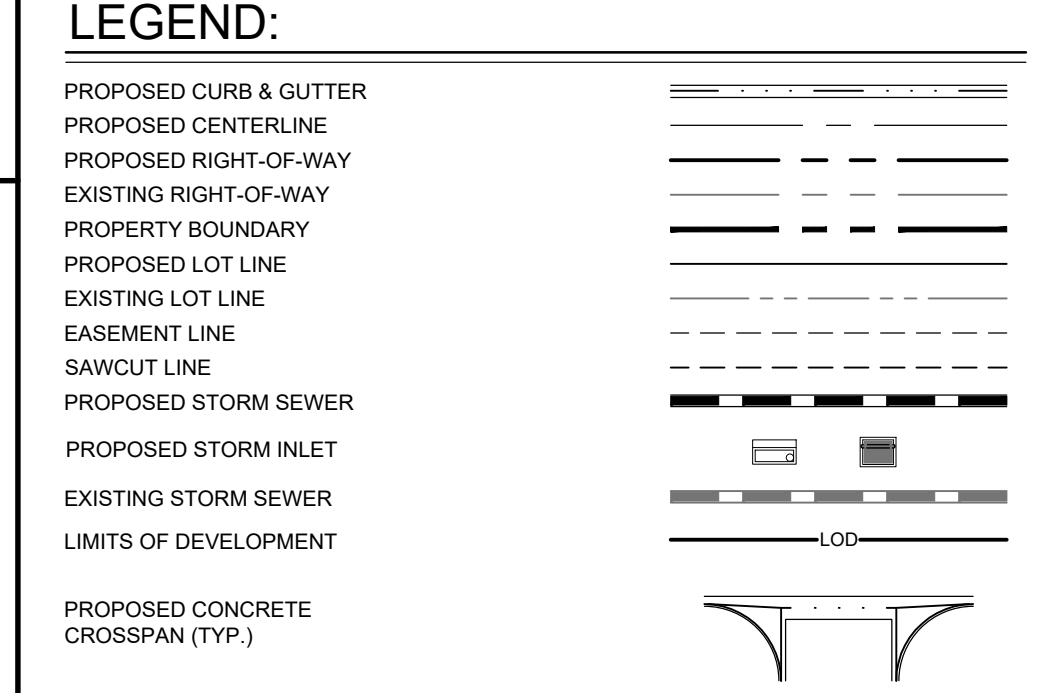
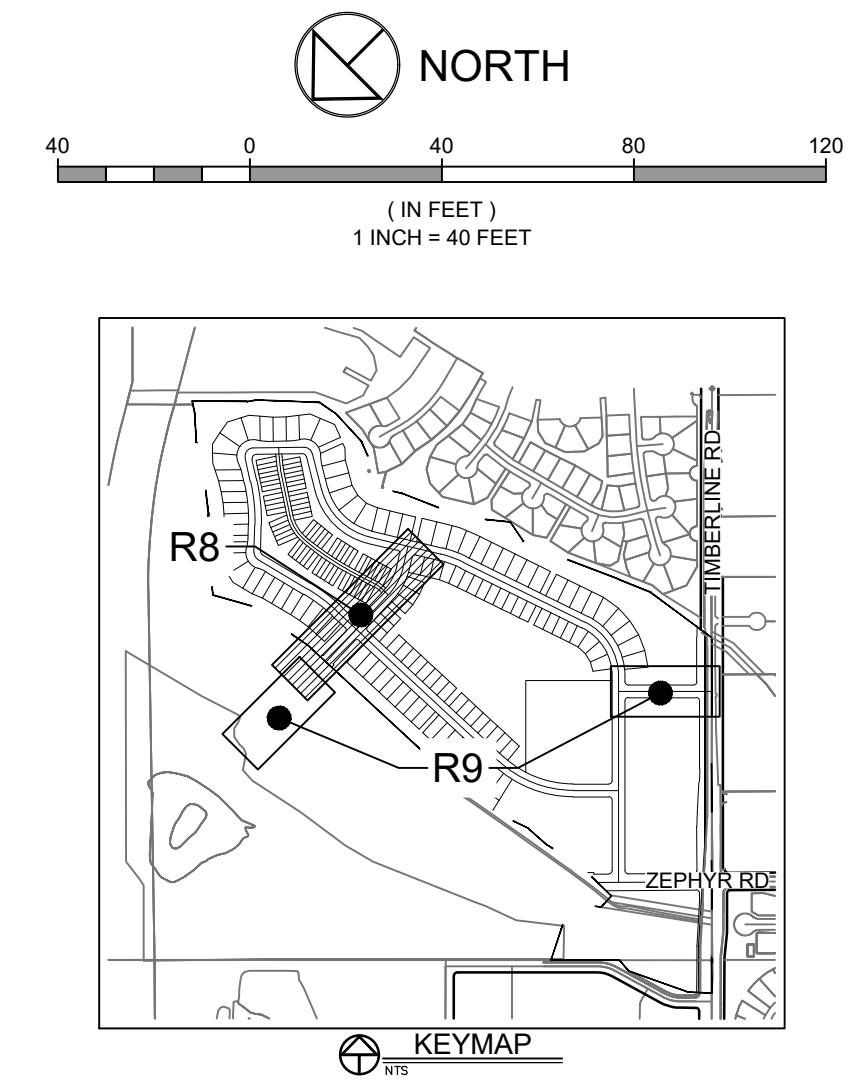
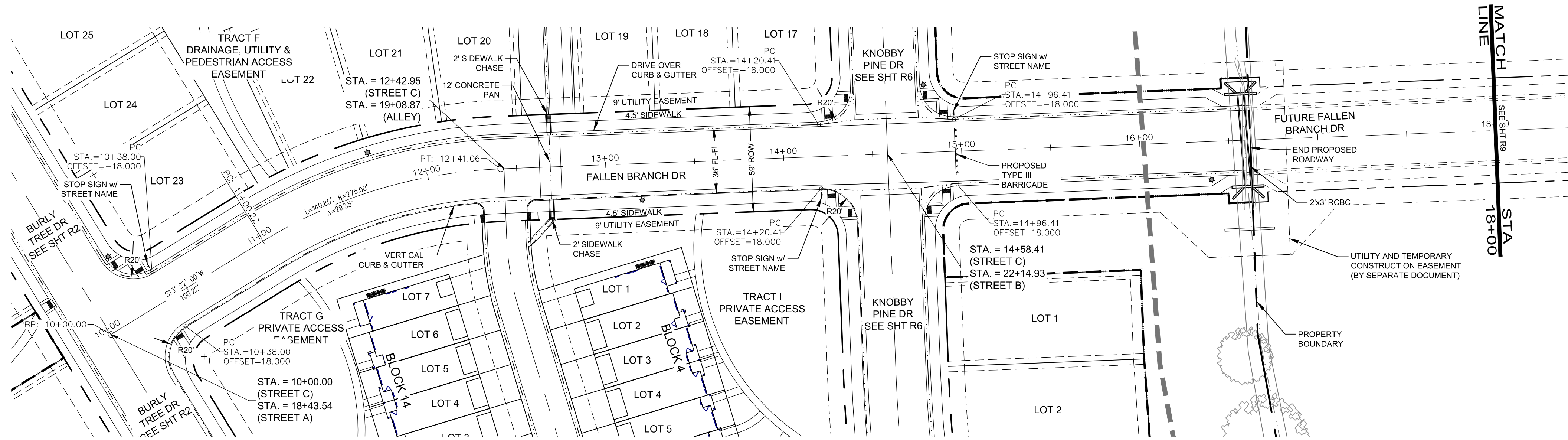
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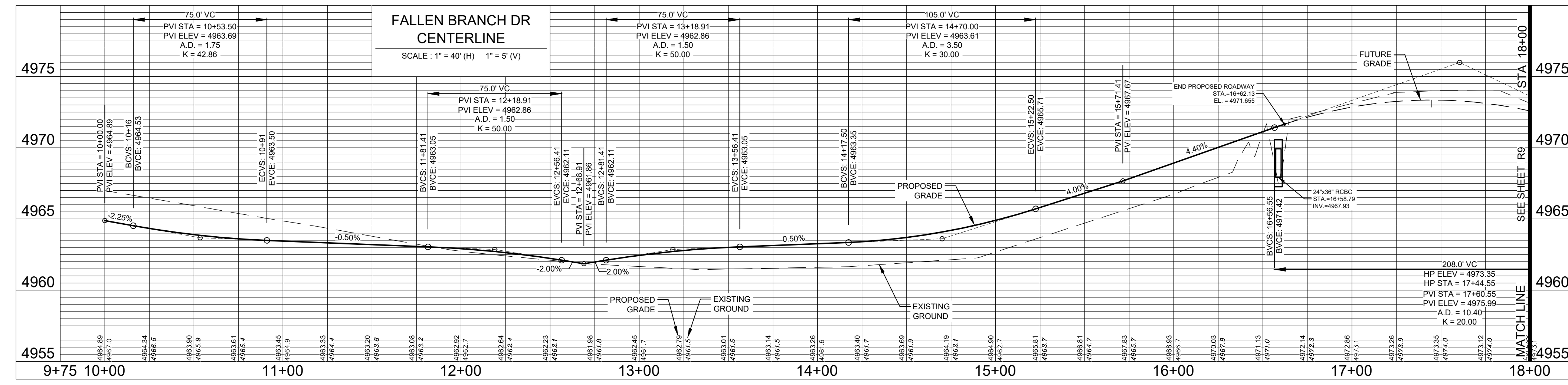
City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED:	_____	City Engineer	_____	Date
CHECKED BY:	_____	Water Utility	_____	Date
CHECKED BY:	_____	Stormwater Utility	_____	Date
CHECKED BY:	_____	Parks & Recreation	_____	Date
CHECKED BY:	_____	Traffic Engineer	_____	Date
CHECKED BY:	_____	Environmental Planner	_____	Date

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- NOTES:**
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CALL UTILITY NOTIFICATION CENTER OF COLORADO
811
 Know what's below. Call before you dig.
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City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED:	_____	City Engineer	_____	Date
CHECKED BY:	_____	Water Utility	_____	Date
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CHECKED BY:	_____	Traffic Engineer	_____	Date
CHECKED BY:	_____	Environmental Planner	_____	Date

NO. _____

Revisions:
REVIEW SET
NOT FOR CONSTRUCTION
 09/28/18

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 PHONE: 970.221.4188
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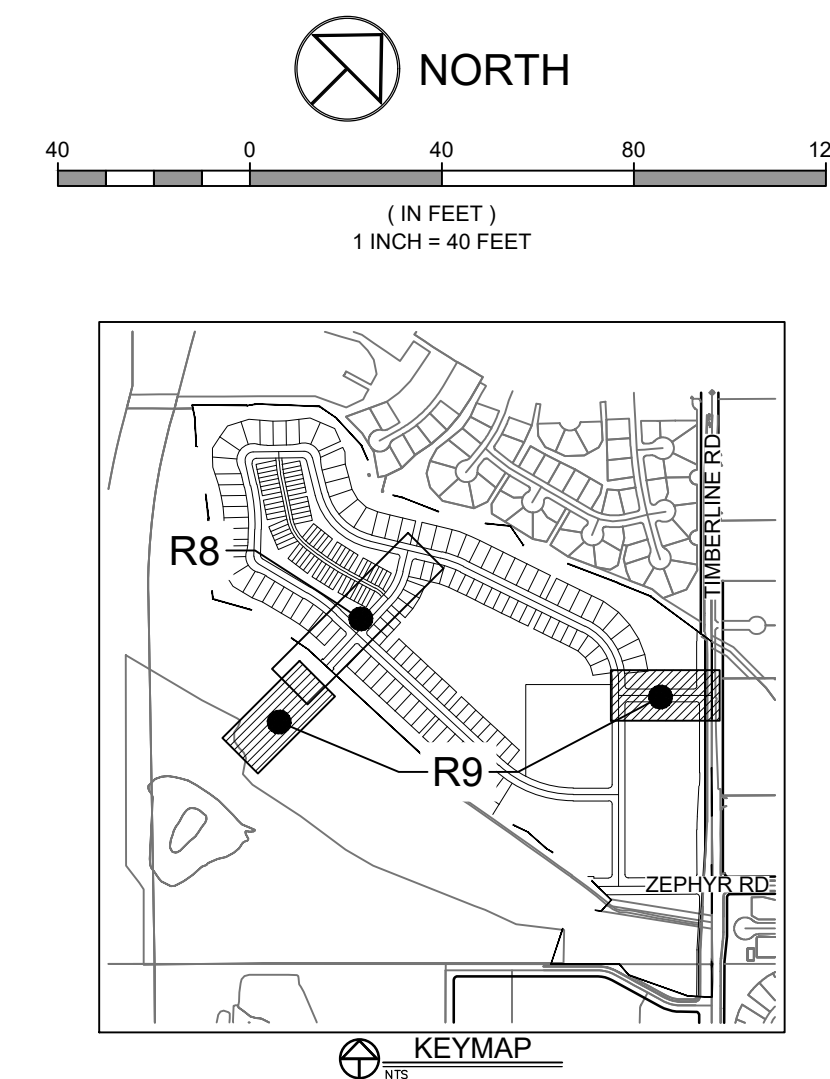
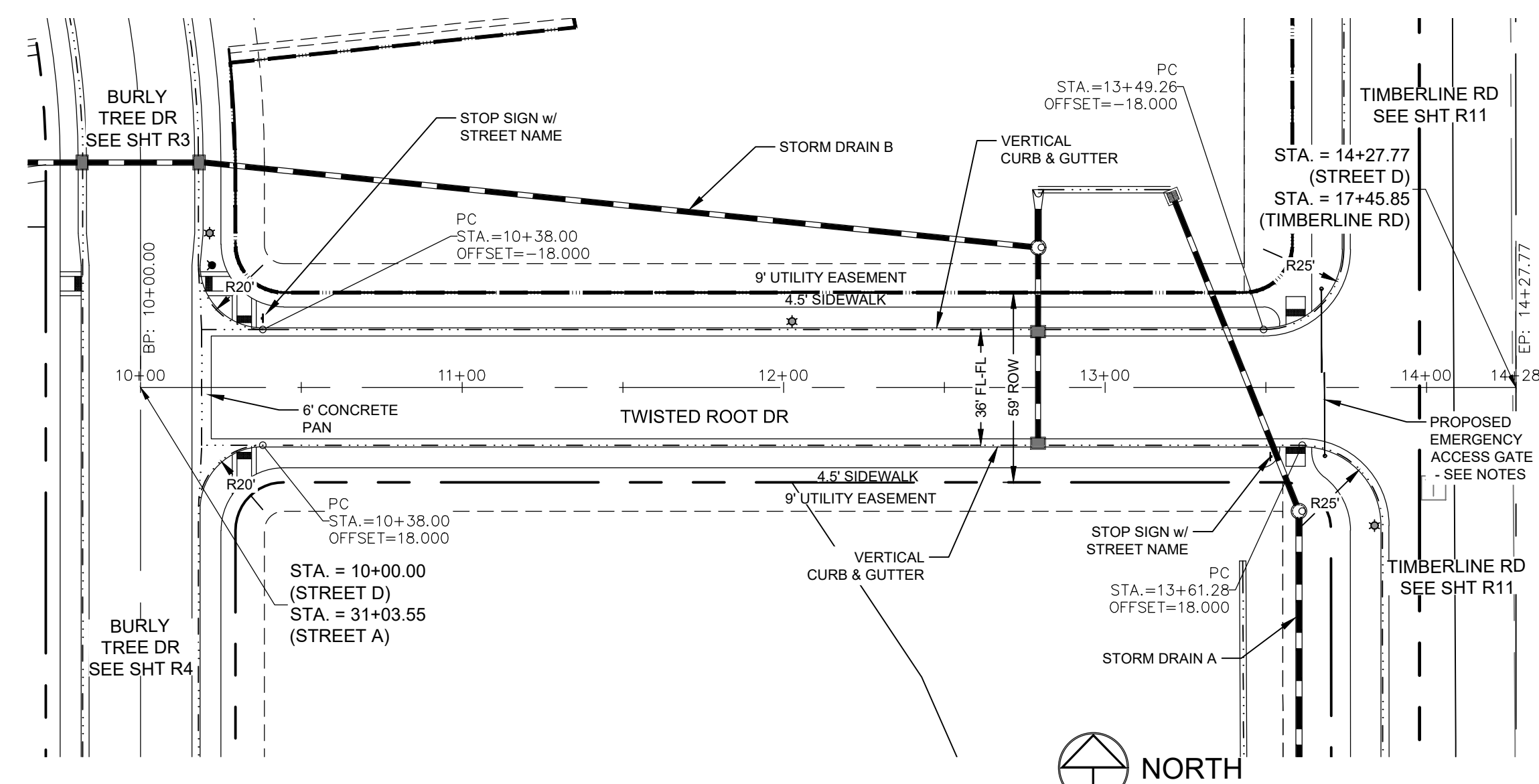
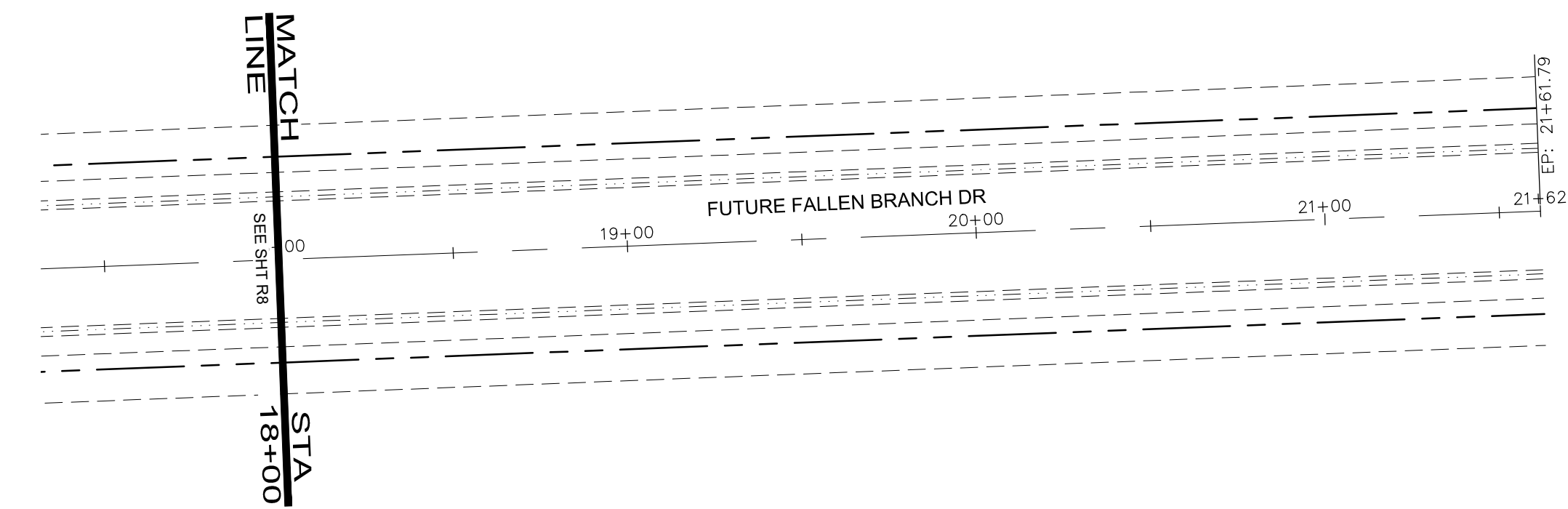
NE
 301 North Innes Street, Suite 100
 Fort Collins, Colorado 80521

DATE: 09/28/18
 PROJECT: 911-015
 DESIGNED BY: D. Weber
 SCALE: 1" = 40'
 REVIEWED BY: D. Weber

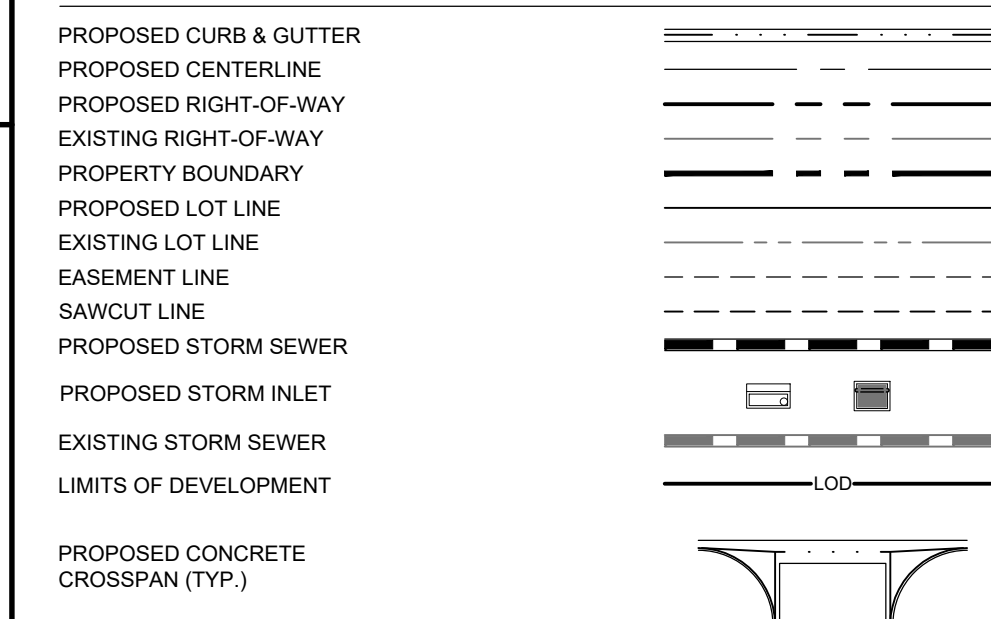
HANSEN SUBDIVISION
FALLEN BRANCH DR
PLAN AND PROFILE

Sheet **R8**
 24 of 34

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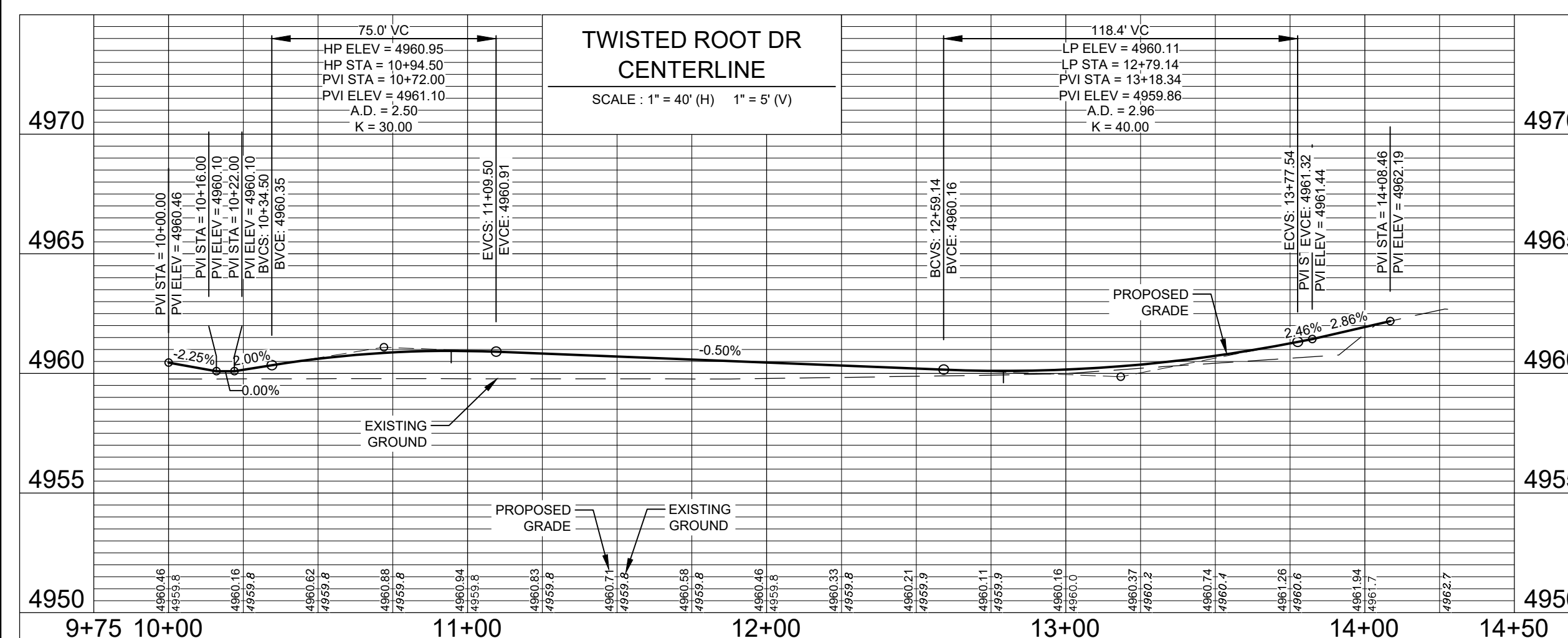
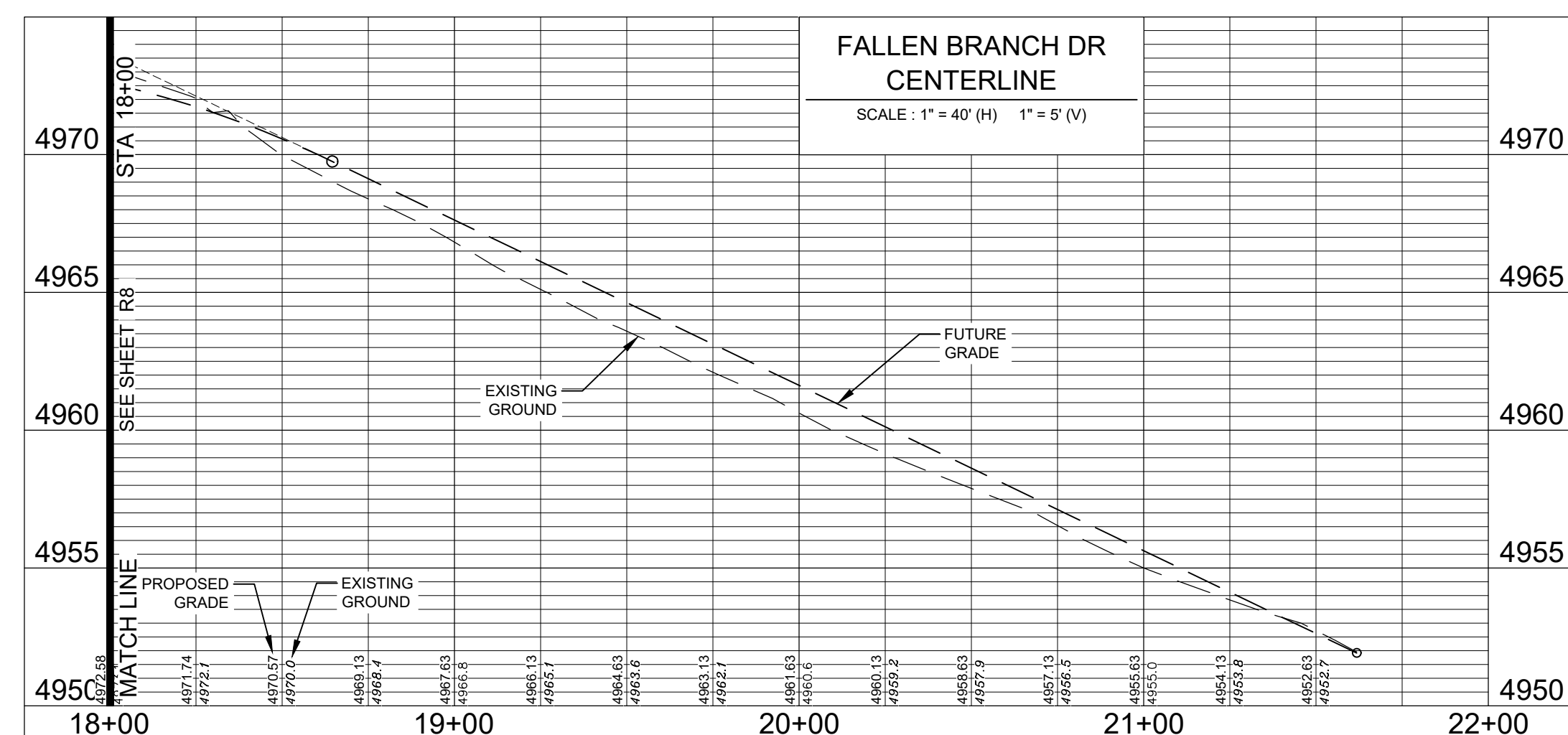


LEGEND:



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CHECKED BY:	Stormwater Utility	Date
CHECKED BY:	Parks & Recreation	Date
CHECKED BY:	Traffic Engineer	Date
CHECKED BY:	Environmental Planner	Date

Revisions:
NO. DATE DESCRIPTION

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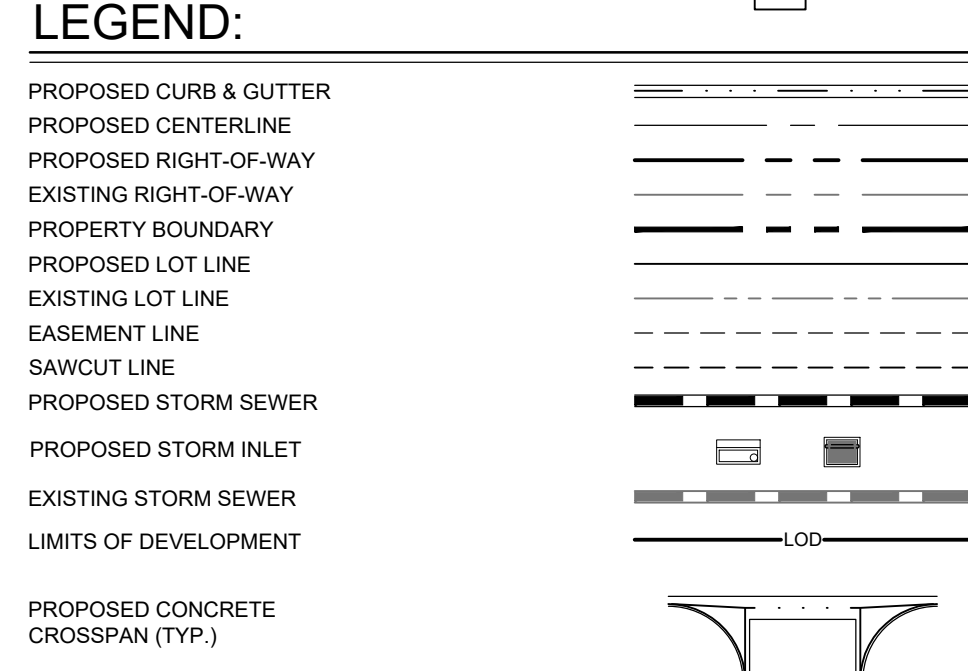
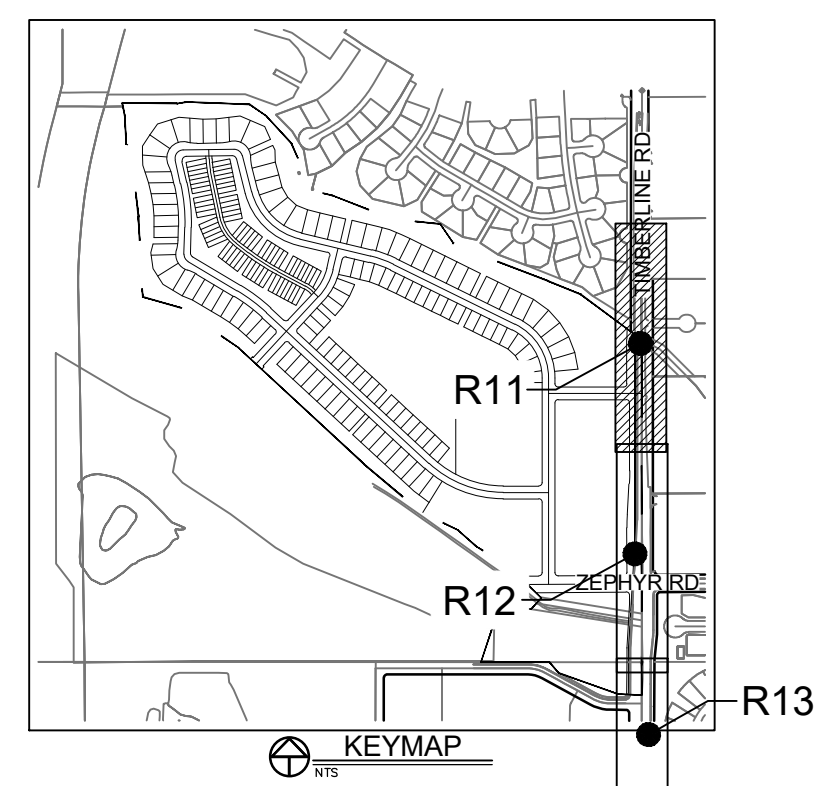
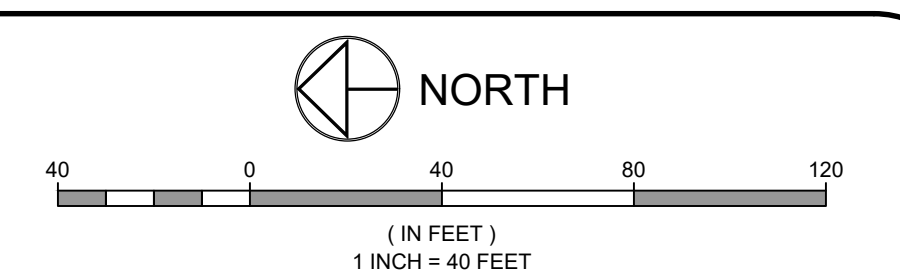
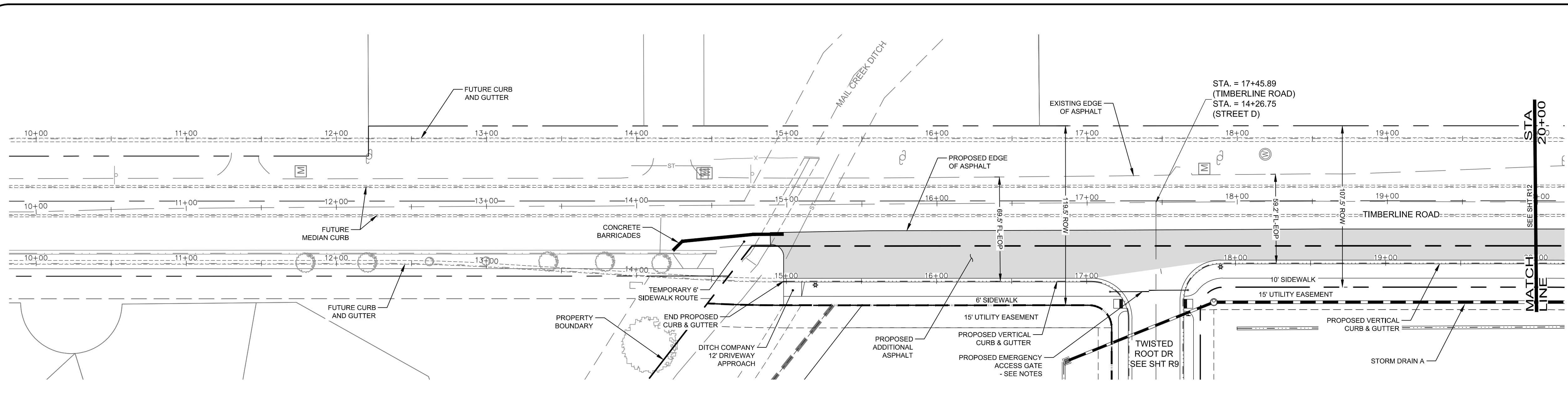
NORTHERN ENGINEERING
PHONE: 970.221.4188
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NE
301 North Innes Street, Suite 100
Fort Collins, Colorado 80521

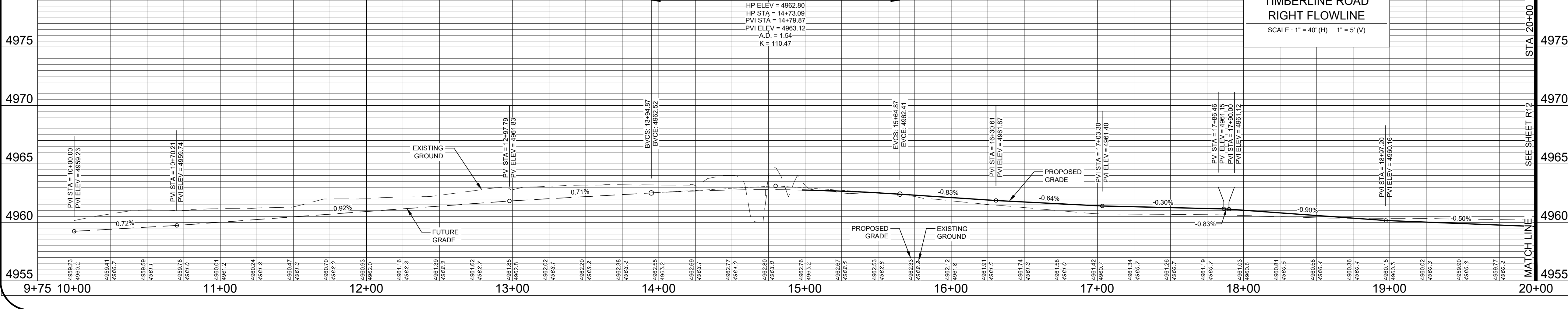
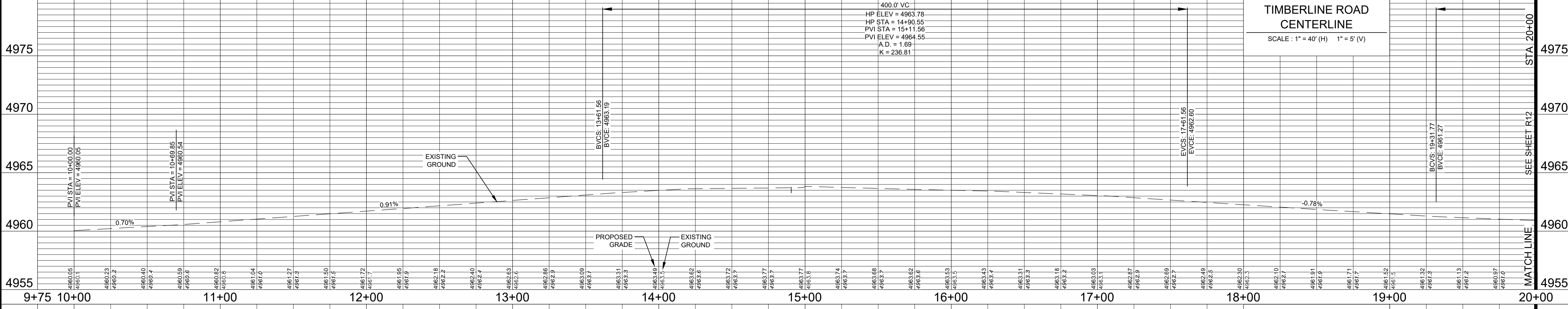
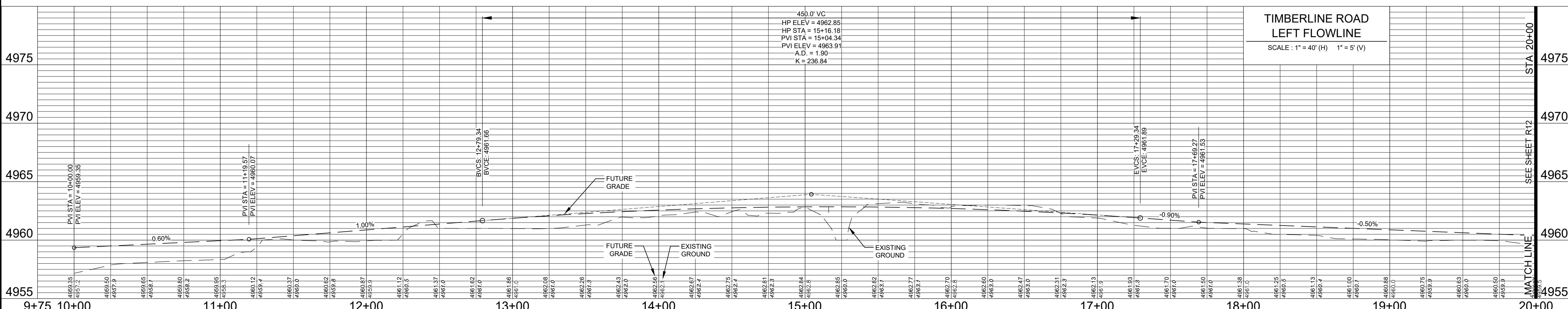
PROJECT: 911-015
DATE: 09/28/18
DESIGNED BY: D. Weber
SCALE: 1"=40'
DRAWN BY: D. Weber
REVIEWED BY:

HANSEN SUBDIVISION
FALLEN BRANCH DR &
TWISTED ROOT DR PLAN AND PROFILE

Sheet
R9
25 of 34



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APPROVED:	City Engineer	Date
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CHECKED BY:	Stormwater Utility	Date
CHECKED BY:	Parks & Recreation	Date
CHECKED BY:	Traffic Engineer	Date
CHECKED BY:	Environmental Planner	Date

Revisions:

No.	Date	Description

REVIEW SET
NOT FOR CONSTRUCTION

09/28/18

NORTHERN ENGINEERING

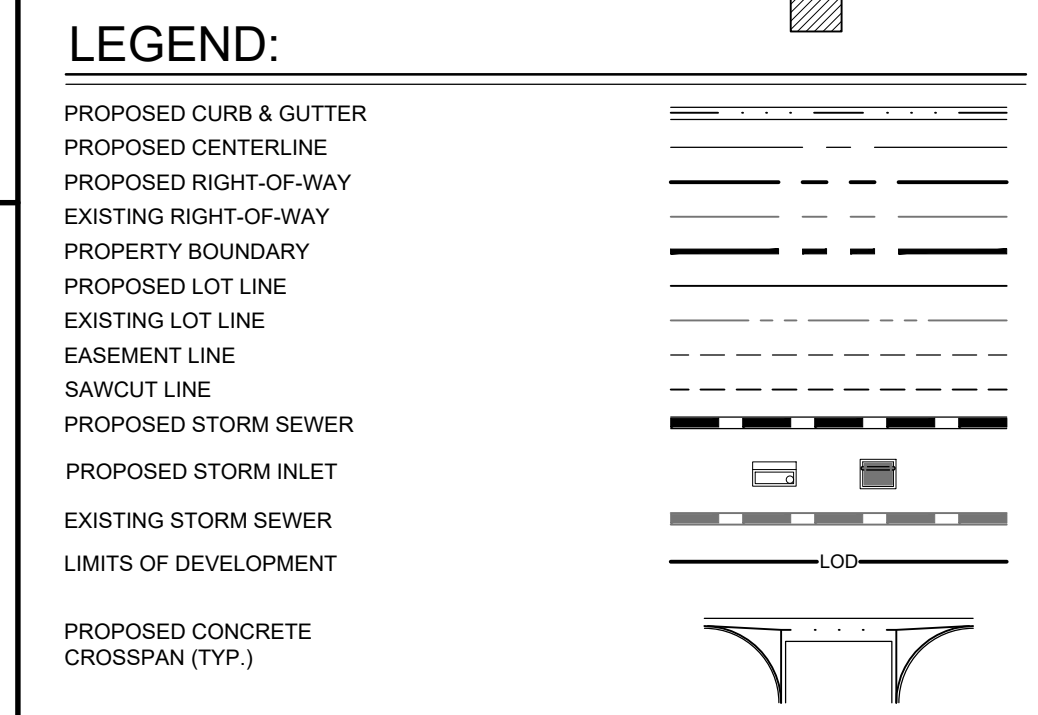
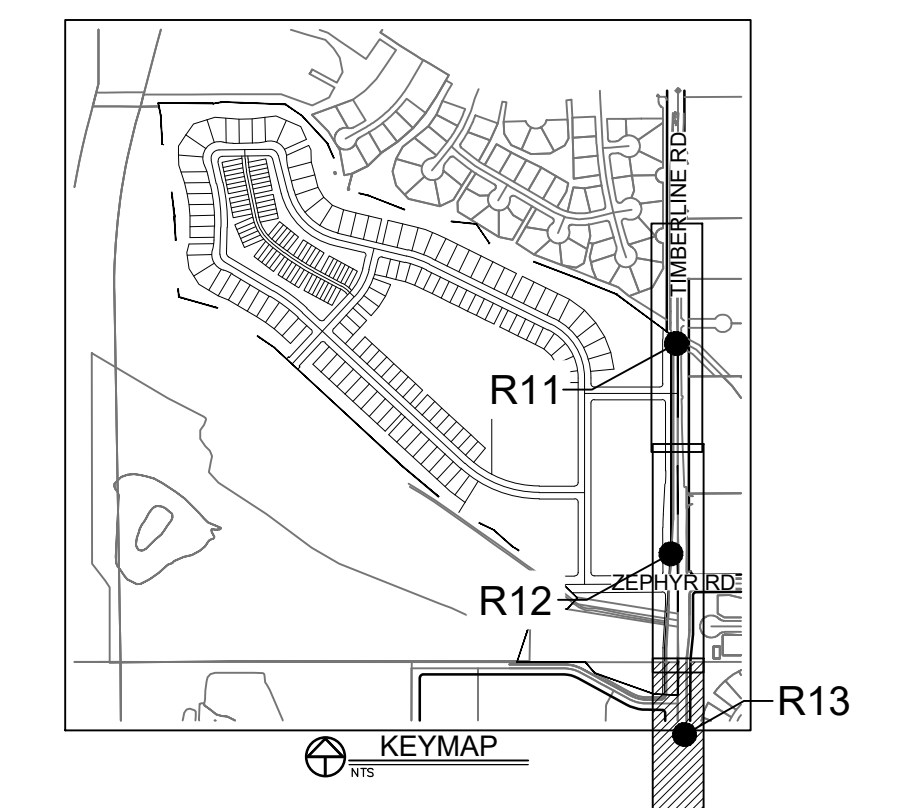
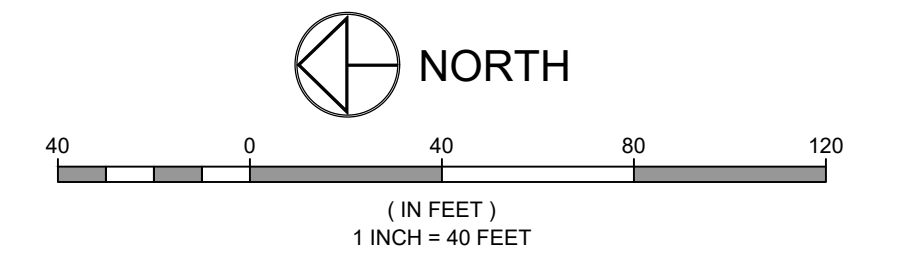
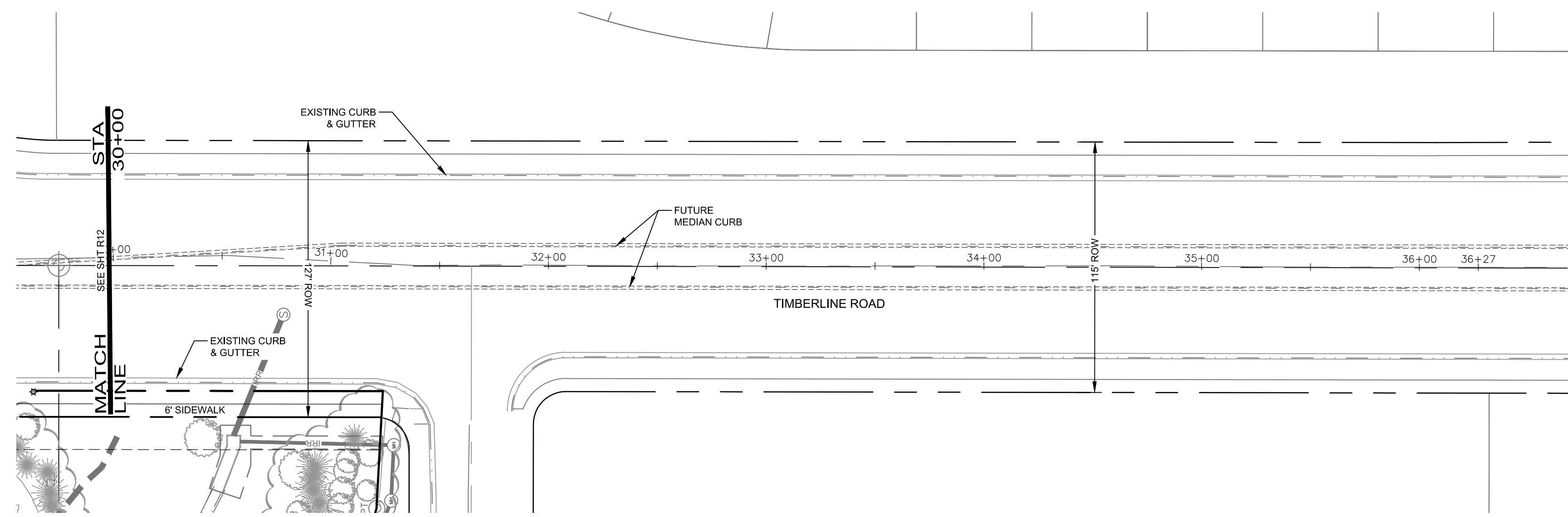
301 North Innes Street, Suite 100
Fort Collins, Colorado 80521

PROJECT: 911-015
DATE: 09/28/18
DESIGNED BY: D. Weber
SCALE: 1"=40'
DRAWN BY: D. Weber
REVIEWED BY: St. Weber

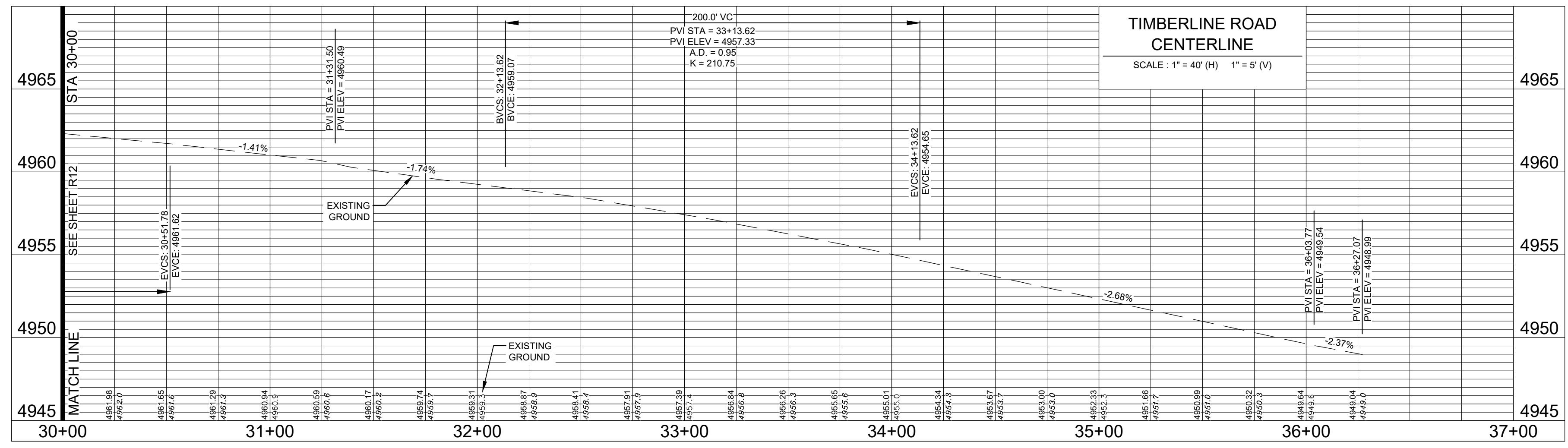
HANSEN SUBDIVISION
TIMBERLINE ROAD
PLAN AND PROFILE

Sheet **R11**
27 of 34

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City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED: _____ Date _____
City Engineer

CHECKED BY: _____ Date _____
Water Utility

CHECKED BY: _____ Date _____
Stormwater Utility

CHECKED BY: _____ Date _____
Parks & Recreation

CHECKED BY: _____ Date _____
Traffic Engineer

CHECKED BY: _____ Date _____
Environmental Planner

HANSEN SUBDIVISION
TIMBERLINE ROAD
PLAN AND PROFILE

Sheet
R13

29 of 34

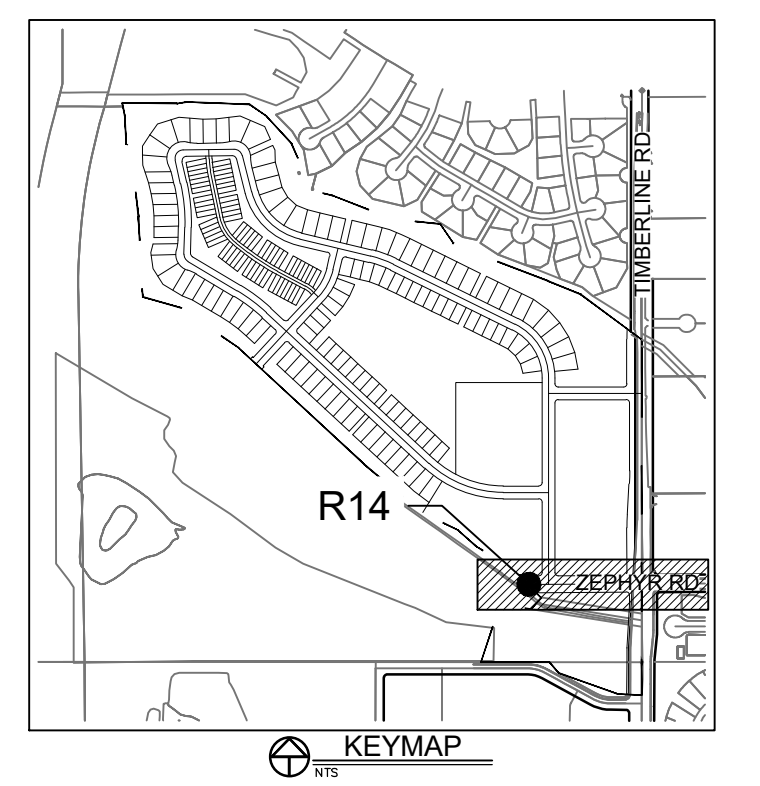
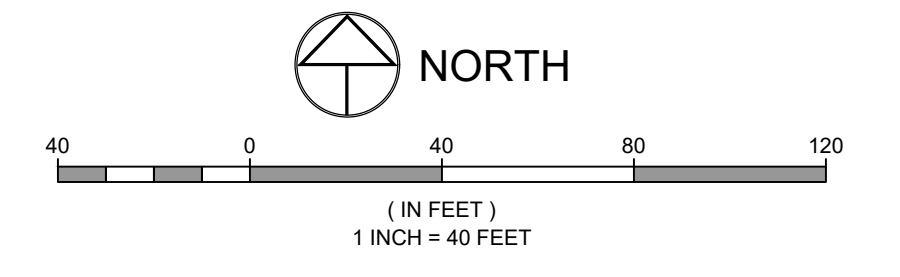
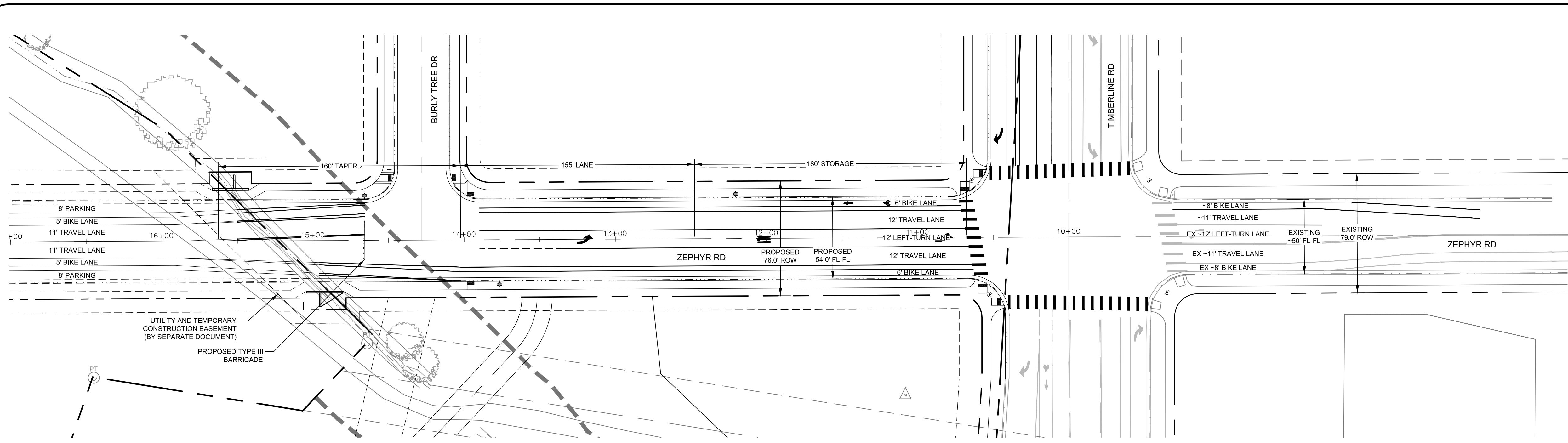
Revisions:
NO. _____ DATE _____ BY _____

REVIEW SET
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09/28/18

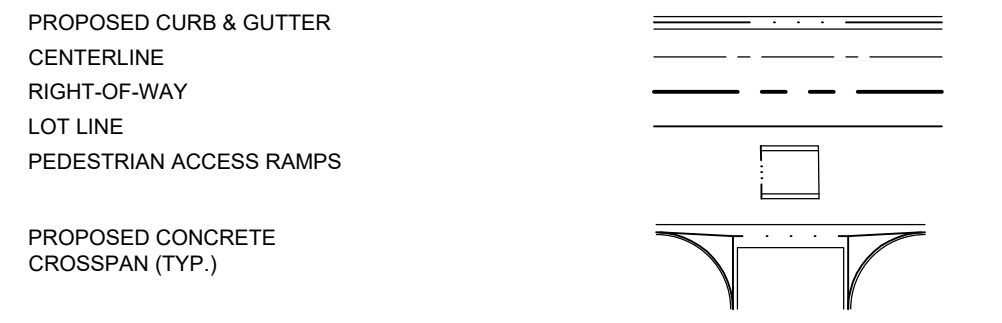
NORTHERN ENGINEERING
303 North Innes Street, Suite 100
Fort Collins, Colorado 80521
PHONE: 970.221.4188
www.northernengineering.com

PROJECT: 911-015
DATE: 09/28/18
DESIGNED BY: D. Weber
SCALE: 1" = 40'
DRAWN BY: D. Weber
REVIEWED BY: D. Weber

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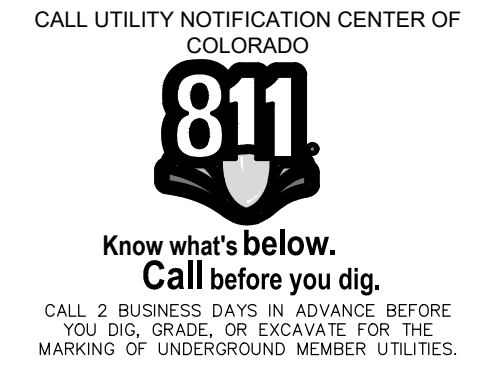


SIGNAGE NOTES:

1. ALL SIGN POSTS SHALL UTILIZE BREAK-AWAY ASSEMBLIES AND FASTENERS PER THE LCUASS STANDARDS.
2. STREET NAME SIGNS AT INTERSECTIONS SHALL BE INSTALLED ABOVE STOP SIGNS ON SAME POLE, PER LCUASS DRAWING 1401.
3. A FIELD INSPECTION OF LOCATION AND INSTALLATION OF ALL SIGNS SHALL BE PERFORMED BY THE TOWN OF TIMMATH TRAFFIC ENGINEER. ALL DISCREPANCIES IDENTIFIED DURING THE FIELD INSPECTION MUST BE CORRECTED BEFORE THE 2-YEAR WARRANTY PERIOD WILL BEGIN.
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STRIPING LEGEND:

- PAVEMENT STRIPING AND MARKINGS:
- ① 8" SOLID WHITE LINE
 - ② 8" DASHED WHITE EXTENSION LINE OF SEGMENTS, 4' APART
 - ③ DOUBLE YELLOW LINE
 - ④ DOUBLE YELLOW LINE (2) 4" SOLID LINES, 4' APART
 - ⑤ 4" SOLID WHITE LINE
 - ⑥ 4" SOLID YELLOW LINE
 - ⑦ 4" BROKEN WHITE LINE 10' SEGMENTS, 30' GAPS
 - ⑧ 4" SOLID YELLOW LINE
 - Ⓐ PREFORMED PLASTIC PAVEMENT MARKING BICYCLIST AND ARROW
 - Ⓑ PREFORMED PLASTIC PAVEMENT MARKING LEFT TURN ARROW (15.5 S.F. EA.)
 - Ⓒ PREFORMED PLASTIC PAVEMENT MARKING RIGHT TURN ARROW (15.5 S.F. EA.)
 - Ⓓ PREFORMED PLASTIC PAVEMENT MARKING "ONLY" (22.5 S.F. EA.)
 - Ⓔ PREFORMED PLASTIC PAVEMENT MARKING 24" WIDE STOP BAR
 - Ⓕ 18" x 9" CROSS-WALK



**City of Fort Collins, Colorado
UTILITY PLAN APPROVAL**

APPROVED:	_____	_____	_____
	City Engineer		Date
CHECKED BY:	_____	_____	_____
	Water Utility		Date
CHECKED BY:	_____	_____	_____
	Stormwater Utility		Date
CHECKED BY:	_____	_____	_____
	Parks & Recreation		Date
CHECKED BY:	_____	_____	_____
	Traffic Engineer		Date
CHECKED BY:	_____	_____	_____
	Environmental Planner		Date

Revisions:
REVIEW SET
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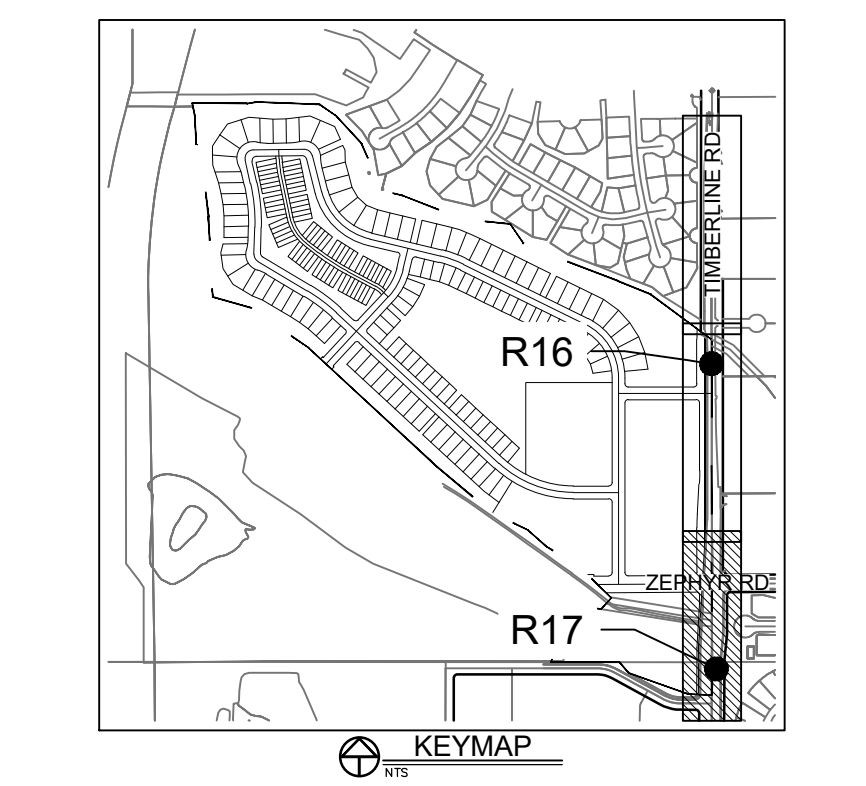
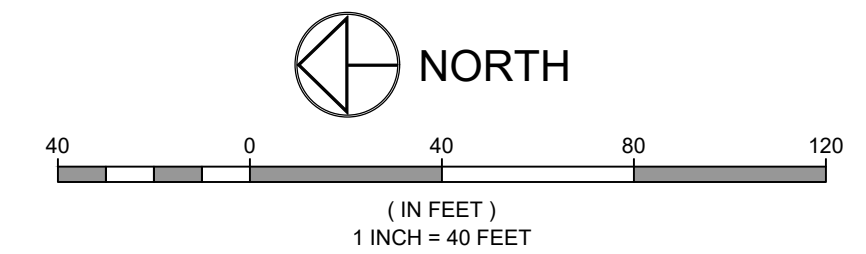
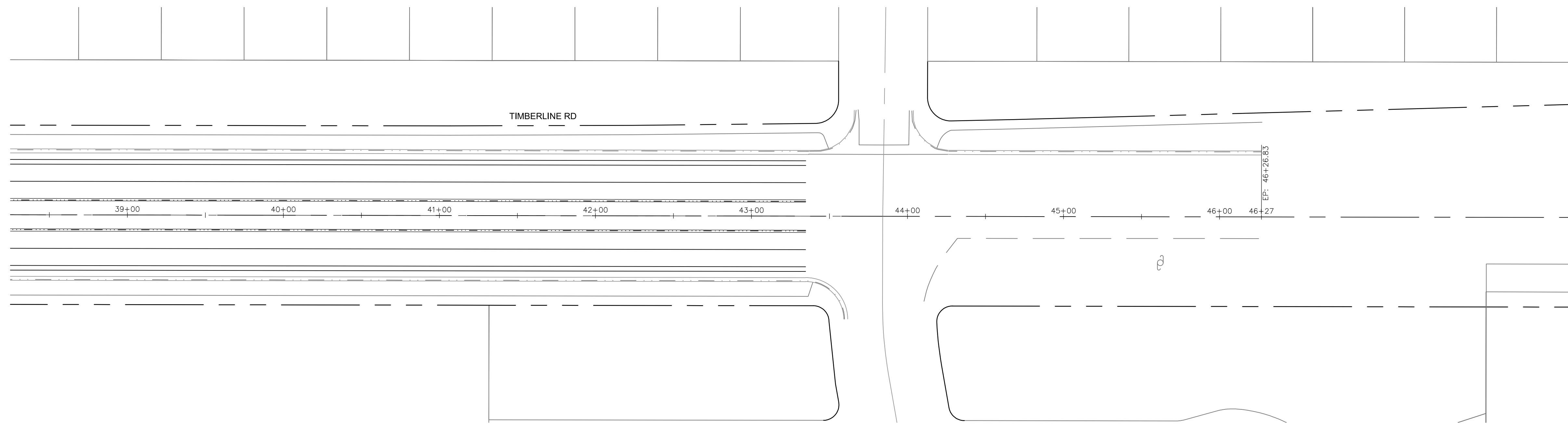
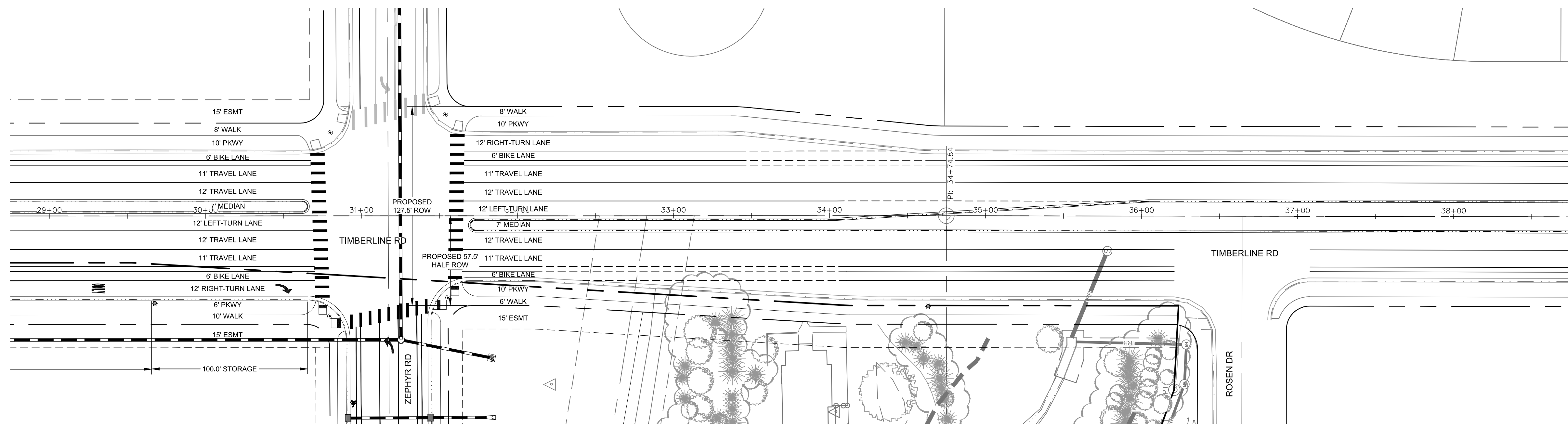
NORTHERN ENGINEERING

 303 North Innes Street, Suite 100
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 PHONE: 970.221.4188
 www.northernengineering.com

PROJECT:	911-015	DATE:	09/28/18
DESIGNED BY:	D. Weber	SCALE:	1" = 40'
DRAWN BY:	D. Weber	REVIEWED BY:	D. Weber

HANSEN SUBDIVISION
ZEPHYR ROAD
STRIPING PLAN

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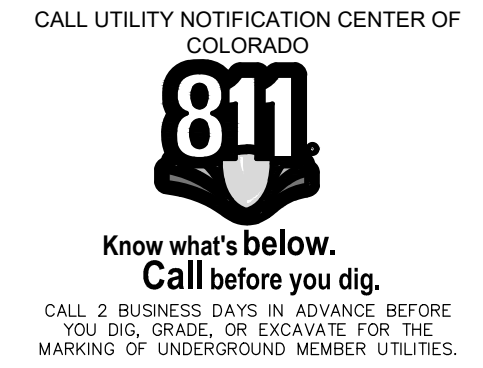
- PROPOSED CURB & GUTTER
- CENTERLINE
- RIGHT-OF-WAY
- LOT LINE
- PEDESTRIAN ACCESS RAMPS
- PROPOSED CONCRETE CROSSSPAN (TYP.)

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 - ⑦ 4" BROKEN WHITE LINE (10' SEGMENTS, 30' GAPS)
 - ⑧ 4" SOLID YELLOW LINE
 - ⑨ PREFORMED PLASTIC PAVEMENT MARKING BICYCLIST AND ARROW
 - ⑩ PREFORMED PLASTIC PAVEMENT MARKING LEFT TURN ARROW (15.5 S.F. EA.)
 - ⑪ PREFORMED PLASTIC PAVEMENT MARKING RIGHT TURN ARROW (15.5 S.F. EA.)
 - ⑫ PREFORMED PLASTIC PAVEMENT MARKING "ONLY" (22.5 S.F. EA.)
 - ⑬ PREFORMED PLASTIC PAVEMENT MARKING 24" WIDE STOP BAR
 - ⑭ 18" x 9" CROSS-WALK



City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED: _____ Date _____
City Engineer

CHECKED BY: _____ Date _____
Water Utility

CHECKED BY: _____ Date _____
Stormwater Utility

CHECKED BY: _____ Date _____
Parks & Recreation

CHECKED BY: _____ Date _____
Traffic Engineer

CHECKED BY: _____ Date _____
Environmental Planner

Revisions:
 NO. _____
 DATE: _____
 BY: _____
REVIEW SET
NOT FOR CONSTRUCTION
 09/28/18

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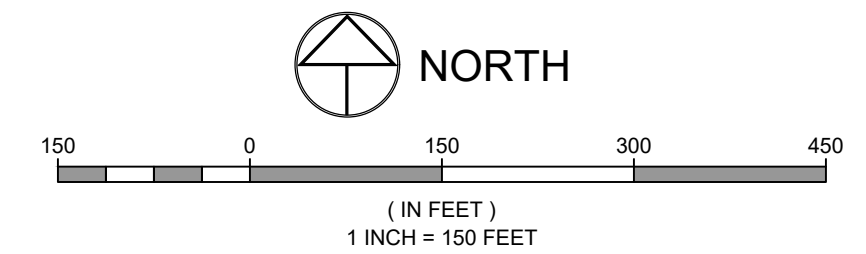
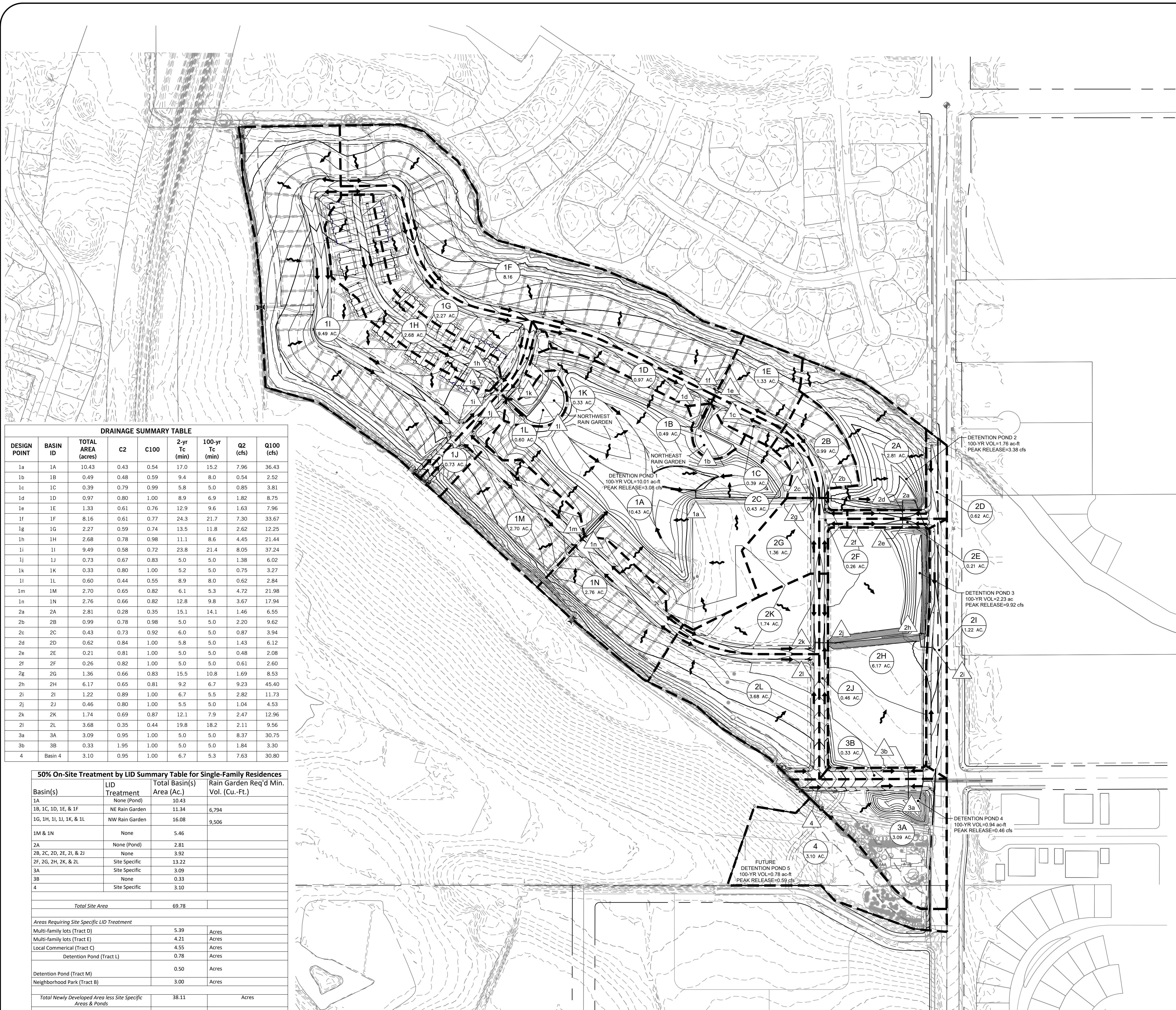
NORTHERN ENGINEERING

 303 North Innes Street, Suite 100
 Fort Collins, Colorado 80521
 PHONE: 970.221.4188
 www.northernengineering.com

PROJECT:	911-015	DATE:	09/28/18
DESIGNED BY:	D. Weber	SCALE:	1" = 40'
DRAWN BY:	D. Weber	REVIEWED BY:	D. Weber

HANSEN SUBDIVISION
TIMBERLINE ROAD - ULTIMATE STRIPING PLAN

DRAWING: HANSEN, C:\projects\911-015\911-015_2018_09_28_18_18_00_00.dwg
 USER: DWEBER
 DATE: 09/28/18 10:00:00 AM
 PLOT: 09/28/18 10:00:00 AM
 PLOTNAME: 911-015_2018_09_28_18_18_00_00.dwg
 PLOTSCALE: 1.0000
 PLOTORIENT: 0
 PLOTUNIT: 1/8"=1'-0"



LEGEND:

- EXISTING STORM SEWER
 - PROPOSED STORM SEWER
 - PROPOSED STORM INLET
 - PROPOSED CONTOUR
 - EXISTING CONTOUR
 - PROPOSED SWALE
 - PROPOSED CURB AND GUTTER
 - PROPERTY BOUNDARY
 - PROPOSED LOT LINE
 - EXISTING RIGHT OF WAY
 - PROPOSED RIGHT OF WAY
 - PROPOSED EASEMENT
-
- DESIGN POINT
 - FLOW ARROWS
 - DRAINAGE BASIN LABEL
 - DRAINAGE BASIN BOUNDARY

DRAINAGE SUMMARY TABLE

DESIGN POINT	BASIN ID	TOTAL AREA (acres)	C2	C100	2-yr Tc (min)	100-yr Tc (min)	Q2 (cfs)	Q100 (cfs)
1a	1A	10.43	0.43	0.54	17.0	15.2	7.96	36.43
1b	1B	0.49	0.48	0.59	9.4	8.0	0.54	2.52
1c	1C	0.39	0.79	0.99	5.8	5.0	0.85	3.81
1d	1D	0.97	0.80	1.00	8.9	6.9	1.82	8.75
1e	1E	1.33	0.61	0.76	12.9	9.6	1.63	7.96
1f	1F	8.16	0.61	0.77	24.3	21.7	7.30	33.67
1g	1G	2.27	0.59	0.74	13.5	11.8	2.62	12.25
1h	1H	2.68	0.78	0.98	11.1	8.6	4.45	21.44
1i	1I	9.49	0.58	0.72	23.8	21.4	8.05	37.24
1j	1J	0.73	0.67	0.83	5.0	5.0	1.38	6.02
1k	1K	0.33	0.80	1.00	5.2	5.0	0.75	3.27
1l	1L	0.60	0.44	0.55	8.9	8.0	0.62	2.84
1m	1M	2.70	0.65	0.82	6.1	5.3	4.72	21.98
1n	1N	2.76	0.66	0.82	12.8	9.8	3.67	17.94
2a	2A	2.81	0.28	0.35	15.1	14.1	1.46	6.55
2b	2B	0.99	0.78	0.98	5.0	5.0	2.20	9.62
2c	2C	0.43	0.73	0.92	6.0	5.0	0.87	3.94
2d	2D	0.62	0.84	1.00	5.8	5.0	1.43	6.12
2e	2E	0.21	0.81	1.00	5.0	5.0	0.48	2.08
2f	2F	0.26	0.82	1.00	5.0	5.0	0.61	2.60
2g	2G	1.36	0.66	0.83	15.5	10.8	1.69	8.53
2h	2H	6.17	0.65	0.81	9.2	6.7	9.23	45.40
2i	2I	1.22	0.89	1.00	6.7	5.5	2.82	11.73
2j	2J	0.46	0.80	1.00	5.5	5.0	1.04	4.53
2k	2K	1.74	0.69	0.87	12.1	7.9	2.47	12.96
2l	2L	3.68	0.35	0.44	19.8	18.2	2.11	9.56
3a	3A	3.09	0.95	1.00	5.0	5.0	8.37	30.75
3b	3B	0.33	1.95	1.00	5.0	5.0	1.84	3.30
4	Basin 4	3.10	0.95	1.00	6.7	5.3	7.63	30.80

50% On-Site Treatment by LID Summary Table for Single-Family Residences

Basin(s)	LID Treatment	Total Basin(s) Area (Ac.)	Rain Garden Req'd Min. Vol. (Cu.-Ft.)
1A	None (Pond)	10.43	
1B, 1C, 1D, 1E, & 1F	NE Rain Garden	11.34	6,794
1G, 1H, 1I, 1J, 1K, & 1L	NW Rain Garden	16.08	9,506
1M & 1N	None	5.46	
2A	None (Pond)	2.81	
2B, 2C, 2D, 2E, 2I, & 2J	None	3.92	
2F, 2G, 2H, 2K, & 2L	Site Specific	13.22	
3A	Site Specific	3.09	
3B	None	0.33	
4	Site Specific	3.10	

Area	Acres
Total Site Area	69.78
Areas Requiring Site Specific LID Treatment	
Multi-family lots (Tract D)	5.39
Multi-family lots (Tract E)	4.21
Local Commercial (Tract C)	4.55
Detention Pond (Tract L)	0.78
Detention Pond (Tract M)	0.50
Neighborhood Park (Tract B)	3.00
Total Newly Developed Area less Site Specific Areas & Ponds	38.11
Total Newly Developed Area Treated	27.42
Percent of Newly Developed Area Treated	71.9%

NOTES:

- EXISTING UNDERGROUND AND OVERHEAD PUBLIC AND PRIVATE UTILITIES AS SHOWN ARE INDICATED ACCORDING TO THE BEST INFORMATION AVAILABLE TO THE ENGINEER. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF SUCH INFORMATION. EXISTING UTILITY MAINS AND SERVICES MAY NOT BE STRAIGHT LINES OR AS INDICATED ON THESE DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE TO CALL ALL UTILITY COMPANIES (PUBLIC AND PRIVATE) PRIOR TO ANY CONSTRUCTION TO VERIFY EXACT UTILITY LOCATIONS.
- REFER TO THE "PRELIMINARY DRAINAGE AND EROSION CONTROL REPORT FOR HANSEN PROPERTY" BY NORTHERN ENGINEERING, DATED SEPTEMBER 7, 2019 FOR ADDITIONAL INFORMATION.
- ALL PROJECT DATA IS ON THE CITY OF FORT COLLINS VERTICAL DATUM; NAVD88. SEE COVER SHEET FOR BENCHMARK REFERENCES.
- REFER TO THE PLAN FOR LOT AREAS, TRACT SIZES, EASEMENTS, LOT DIMENSIONS, UTILITY EASEMENTS, OTHER EASEMENTS, AND OTHER SURVEY INFORMATION.

Pond Summary Table

Pond ID	100-Yr Detention Vol. (Ac.-Ft.)	Peak Release (cfs)
1	10.01	3.08
2	1.76	3.38
3	2.23	9.92
4	0.94	0.46
5	0.81	0.60

CALL UTILITY NOTIFICATION CENTER OF COLORADO

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.

**City of Fort Collins, Colorado
UTILITY PLAN APPROVAL**

APPROVED: _____ City Engineer _____ Date

CHECKED BY: _____ Water Utility _____ Date

CHECKED BY: _____ Stormwater Utility _____ Date

CHECKED BY: _____ Parks & Recreation _____ Date

CHECKED BY: _____ Traffic Engineer _____ Date

CHECKED BY: _____ Environmental Planner _____ Date

Revisions:
REVIEW SET
NOT FOR CONSTRUCTION
 09/28/18

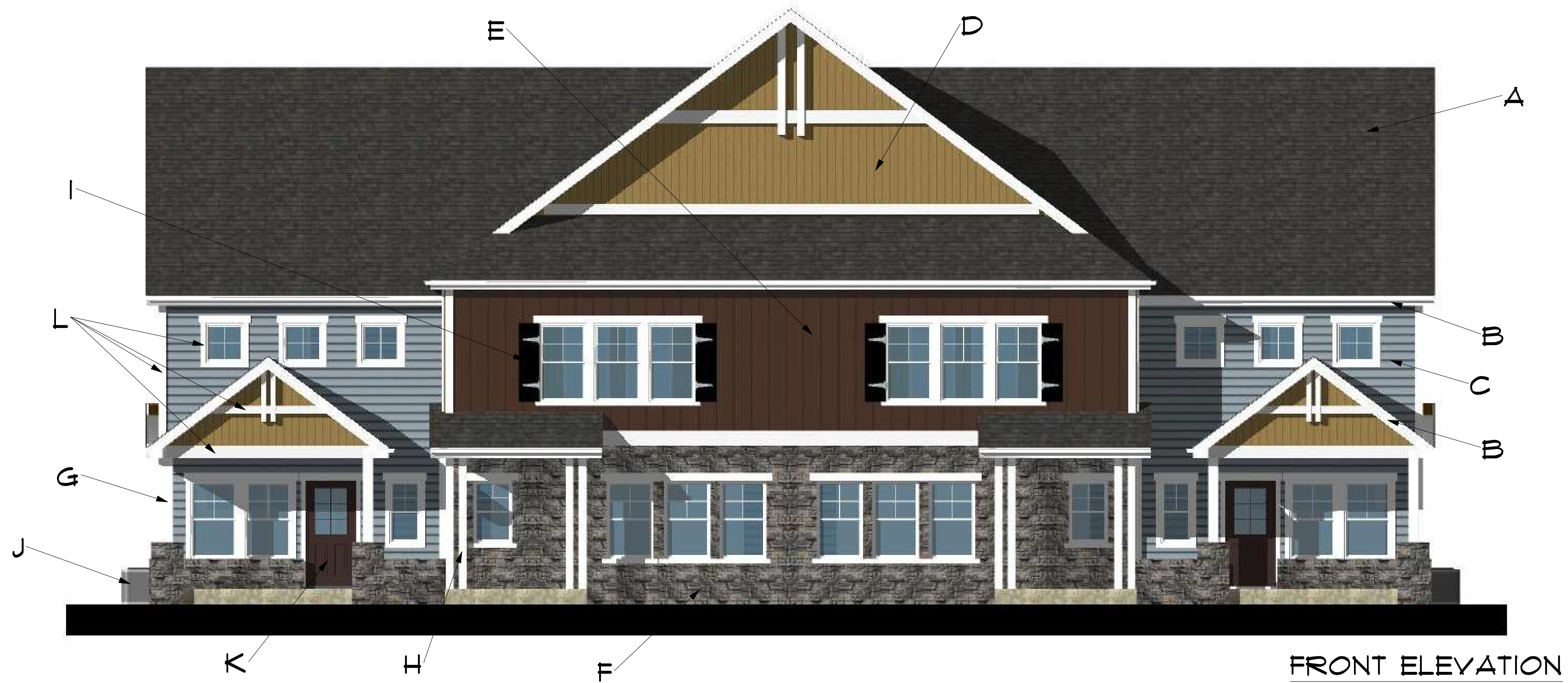
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NORTHERN ENGINEERING
 303 North Innes Street, Suite 100
 Fort Collins, Colorado 80521
 www.northernengineering.com
 PHONE: 970.221.4188

PROJECT: 911-015
 DATE: 09/28/18
 DESIGNED BY: D. Weber
 SCALE: 1"=150'
 DRAWN BY: J. Rodege
 REVIEWED BY: St. Weber

**HANSEN SUBDIVISION
OVERALL
DRAINAGE EXHIBIT**

DRAWING: 911-015-DR1-01 (Rev. 09/28/18) DATE: Sep 28, 2018 10:48 AM C:\Users\jweber\OneDrive\Documents\911-015-DR1-01.dwg
 USER: jweber
 PLOT: 911-015-DR1-01.dwg
 PLOT DATE: 9/28/18 10:48 AM
 PLOT SCALE: 1"=150'
 PLOT SHEET: 1 OF 1



FRONT ELEVATION

- A Asphalt Shingles
- B 8" Painted Fascia
- C 6" Exposed Painted Lap Siding
- D 1x2 Battens @ 16" OC (Painted)
- E Vertical Painted Siding
- F Synthetic Stone
- G 8"sq. Painted Posts
- H 2ea 6"sq. Painted Posts
- I Painted Shutters
- J A/C Unit(s)
- K Painted Entry Door
- L Painted Trim
- M Painted OHD



BACK ELEVATION



SIDE ELEVATION

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Revisions: 9/19/17

AI **BD**

Hansen Farm Preliminary Development Plan

Submittal One

200 Naresz 3/25

Jon R. Rentflow

RENTFLOW Design, LLC

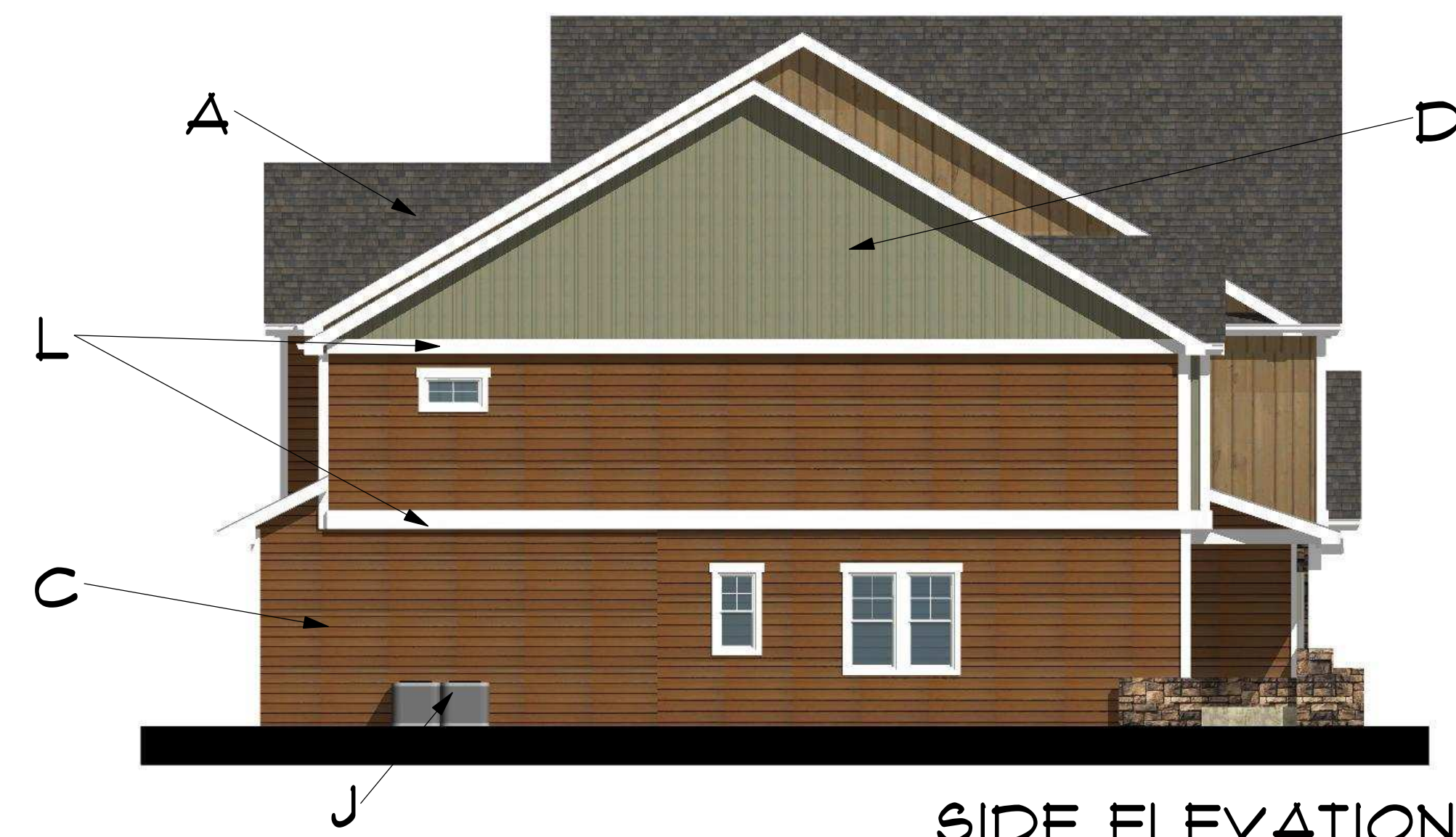
200 Allen Street
 Ft. Collins, CO 80525
 (970) 412-3400
 RentflowDesign.com



FRONT ELEVATION



BACK ELEVATION



SIDE ELEVATION

- A Asphalt Shingles
- B 8" Painted Fascia
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- H Tapered Painted Posts
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Revisions: 9-19-17

AI
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Hansen Farm Preliminary Development Plan

Submittal One

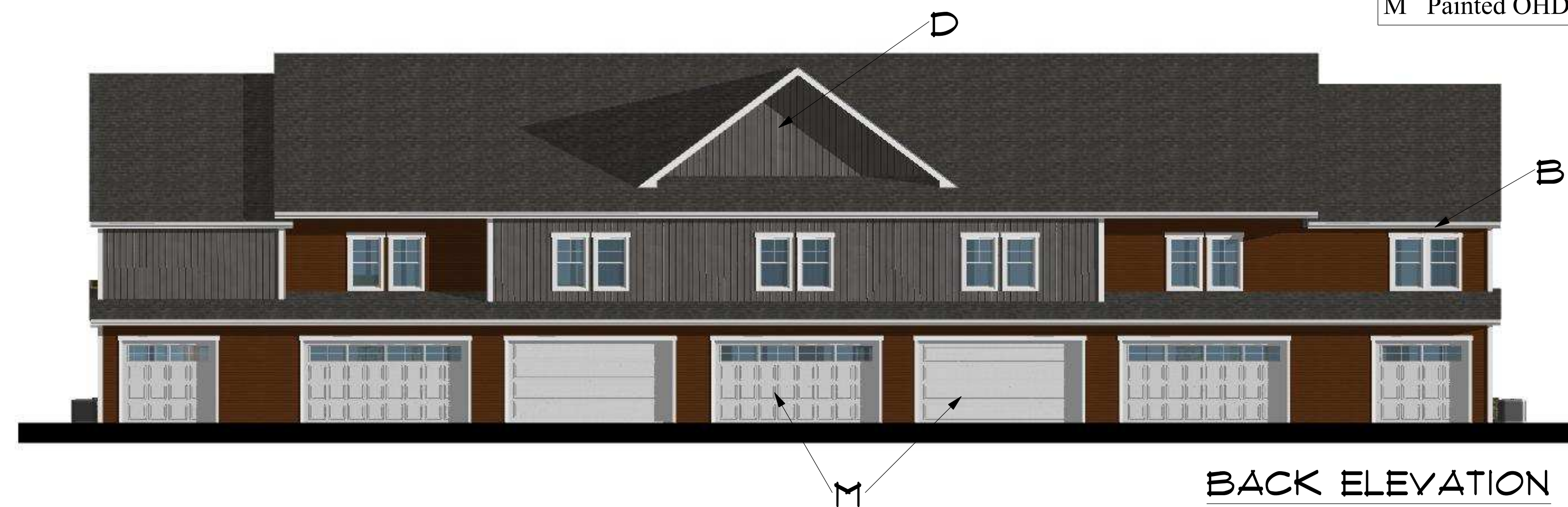
Job Number: 3125

Jon R. Rentfrow
 Rentfrow Design, LLC
 205 Allen Street
 Ft. Collins, CO 80525
 (970) 412-3400
 RentfrowDesign.com



FRONT ELEVATION

- A Asphalt Shingles
- B 8" Painted Fascia
- C 6" Exposed Painted Lap Siding
- D 1x2 Battens @ 16" OC (Painted)
- E NOT USED
- F Synthetic Stone
- G 8"sq. Painted Posts
- H 2ea 6"sq. Painted Posts
- I Painted Shutters
- J A/C Unit(s)
- K Painted Entry Door
- L Painted Trim
- M Painted OHD



BACK ELEVATION



SIDE ELEVATION

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Revisions: 9-15-11

Hansen Farm Preliminary Development Plan

Submittal One

Typical T-Plex

Job Number: 3125

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FRONT ELEVATION

- A Asphalt Shingles
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BACK ELEVATION



SIDE ELEVATION

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Revisions: 11-13-18

A1
BD

Hansen Farm Preliminary Development Plan

Job Number: 3/25

Optional 5-Flex

Jon R. Rentfrow

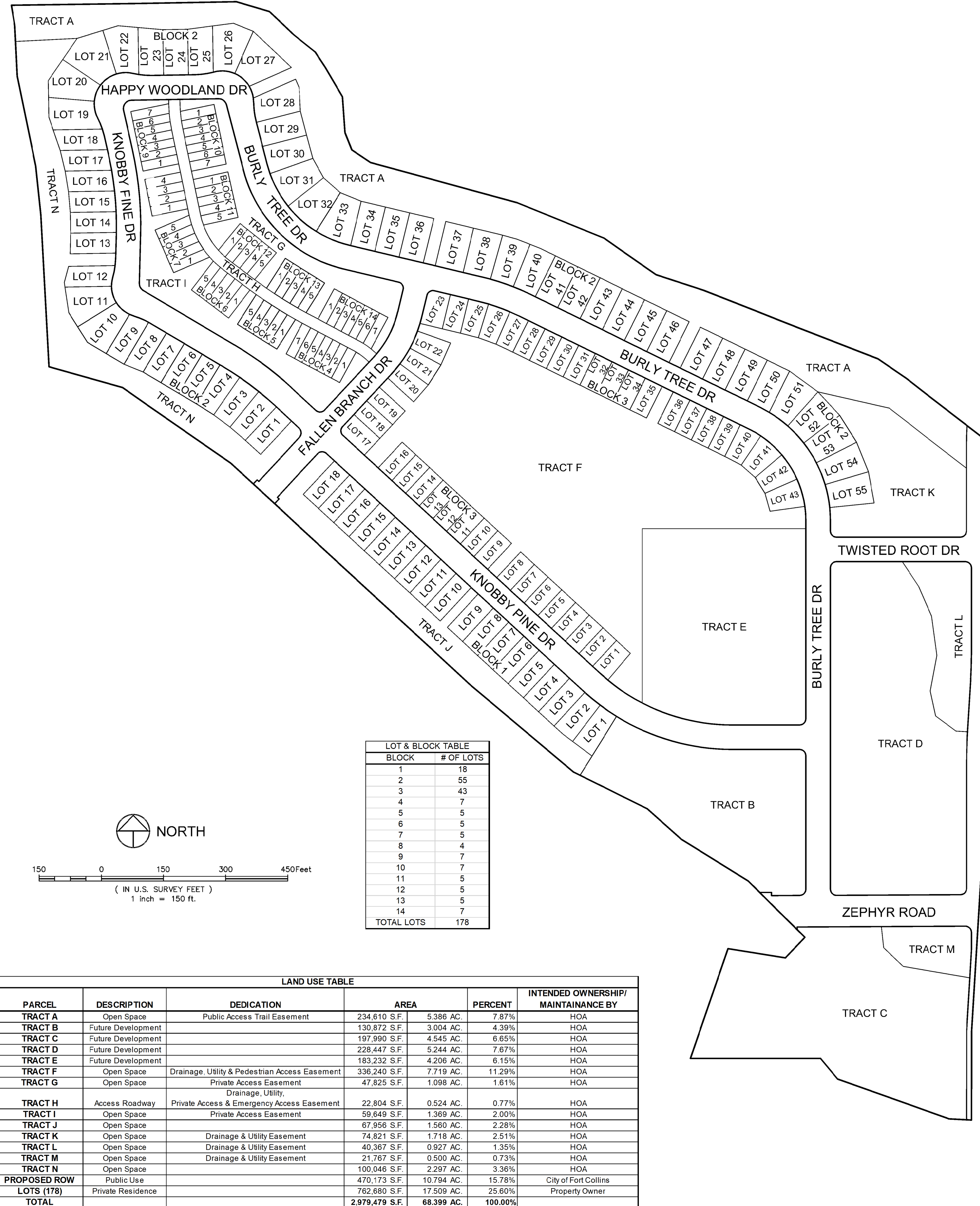
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205 Allen Street
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HANSEN SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO



BLOCK	# OF LOTS
1	18
2	55
3	43
4	7
5	5
6	5
7	5
8	4
9	7
10	7
11	5
12	5
13	5
14	7
TOTAL LOTS	178

PARCEL	DESCRIPTION	DEDICATION	AREA	PERCENT	INTENDED OWNERSHIP/ MAINTENANCE BY
TRACT A	Open Space	Public Access Trail Easement	234,610 S.F. 5.386 AC.	7.87%	HOA
TRACT B	Future Development		130,872 S.F. 3.004 AC.	4.39%	HOA
TRACT C	Future Development		197,990 S.F. 4.545 AC.	6.65%	HOA
TRACT D	Future Development		228,447 S.F. 5.244 AC.	7.67%	HOA
TRACT E	Future Development		183,232 S.F. 4.206 AC.	6.15%	HOA
TRACT F	Open Space	Drainage, Utility & Pedestrian Access Easement	336,240 S.F. 7.719 AC.	11.29%	HOA
TRACT G	Open Space	Private Access Easement	47,825 S.F. 1.098 AC.	1.61%	HOA
TRACT H	Access Roadway	Private Access & Emergency Access Easement	22,804 S.F. 0.524 AC.	0.77%	HOA
TRACT I	Open Space	Private Access Easement	59,649 S.F. 1.369 AC.	2.00%	HOA
TRACT J	Open Space		67,956 S.F. 1.560 AC.	2.28%	HOA
TRACT K	Open Space	Drainage & Utility Easement	74,821 S.F. 1.718 AC.	2.51%	HOA
TRACT L	Open Space	Drainage & Utility Easement	40,367 S.F. 0.927 AC.	1.35%	HOA
TRACT M	Open Space	Drainage & Utility Easement	21,767 S.F. 0.500 AC.	0.73%	HOA
TRACT N	Open Space		100,046 S.F. 2.297 AC.	3.36%	HOA
PROPOSED ROW	Public Use		470,173 S.F. 10.794 AC.	15.78%	City of Fort Collins
LOTS (178)	Private Residence		762,680 S.F. 17.509 AC.	25.60%	Property Owner
TOTAL			2,979,479 S.F. 68.399 AC.	100.00%	

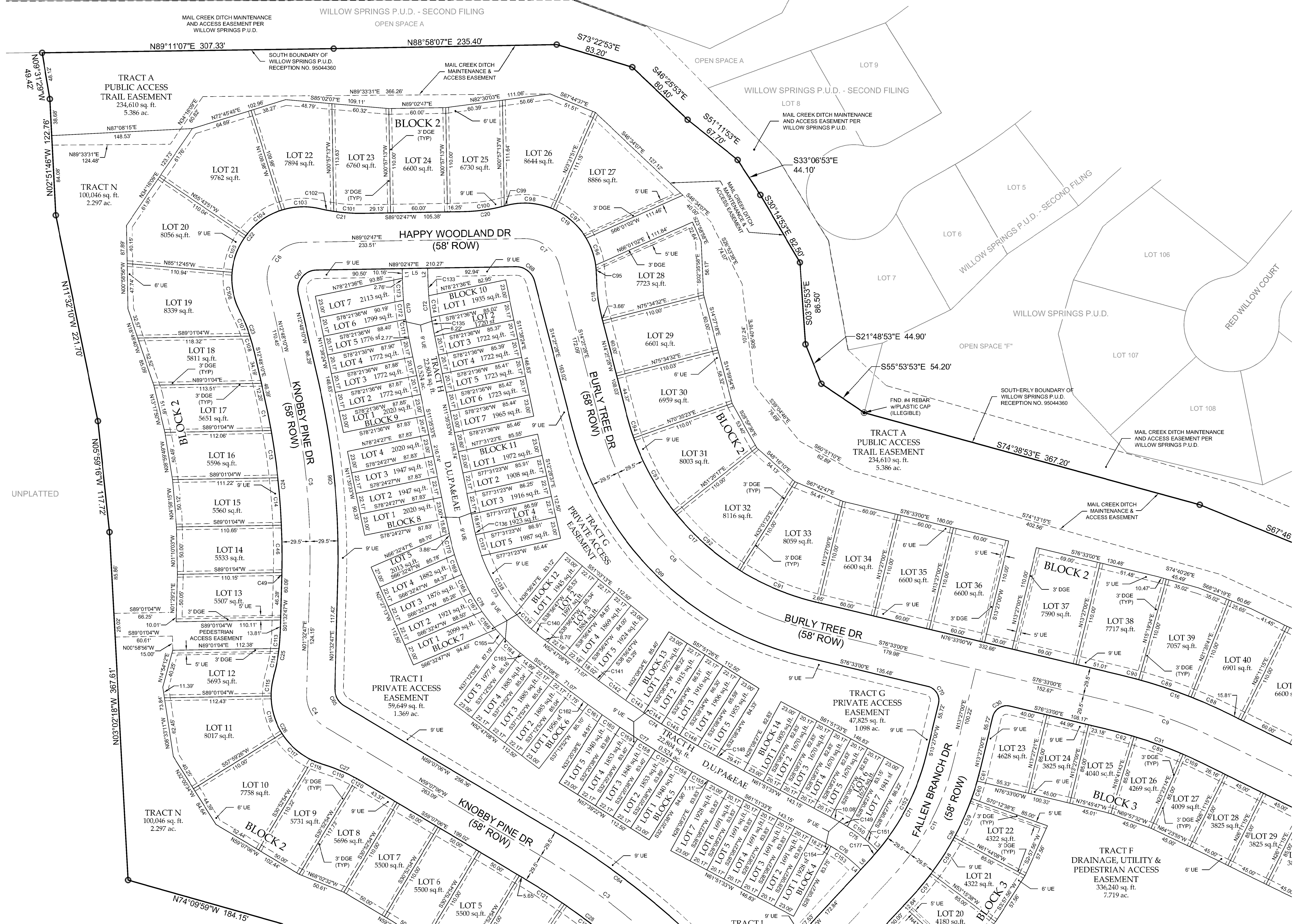
CURVE	DELTA	RADIUS	LENGTH	BEARING	CHORD
C1	2°52'40"	770.57	38.70	S11°21'50"E	38.69
C2	42°47'45"	500.07	373.48	N88°36'08"W	364.84
C3	11°54'51"	800.07	166.35	N53°09'41"W	166.05
C4	60°39'53"	38.00	40.23	N28°47'10"W	38.38
C5	14°20'57"	800.07	200.35	N05°37'42"W	199.83
C6	101°50'57"	38.00	67.55	N38°07'18"E	58.00
C7	76°31'45"	38.00	50.76	S52°41'20"E	47.07
C8	62°07'32"	300.07	325.29	S45°29'14"E	309.59
C9	12°44'15"	500.07	111.16	S70°10'52"E	110.93
C10	63°48'45"	275.07	306.28	S31°54'22"E	290.69
C11	29°20'45"	275.07	140.85	N28°07'22"E	139.32
C12	3°44'50"	770.57	50.39	S08°03'06"E	50.38
C13	3°43'37"	770.57	50.09	S04°18'56"E	50.08
C14	63°48'45"	304.57	339.13	N31°54'22"W	321.88
C15	12°44'15"	529.57	117.71	N70°10'52"W	117.47
C16	62°07'32"	270.57	293.30	N45°29'14"W	279.14
C17	14°14'11"	185.07	45.97	N07°18'23"W	45.85
C18	105°00'00"	75.50	138.36	N52°41'20"W	119.80
C19	14°14'11"	185.07	45.97	S81°55'42"W	45.85
C20	14°14'11"	185.07	45.97	N83°50'08"W	45.85
C21	130°19'19"	75.50	171.73	S38°07'18"W	137.03
C22	14°14'11"	185.07	45.97	S19°55'16"E	45.85
C23	14°14'11"	185.07	45.97	S05°37'42"E	45.85
C24	14°14'11"	185.07	45.97	S08°39'52"W	45.85
C25	89°08'15"	75.50	117.46	S28°47'10"E	105.97
C26	14°14'11"	185.07	45.97	S86°14'12"E	45.85
C27	14°14'11"	185.07	45.97	S66°14'12"E	45.85
C28	11°54'51"	770.57	160.22	S53°09'41"E	159.93
C29	90°00'00"	15.00	23.56	S02°12'15"E	21.21
C30	90°00'00"	15.00	23.56	N58°27'00"E	21.21
C31	12°44'15"	470.57	104.60	S70°10'52"E	104.38
C32	63°48'45"	245.57	273.42	S31°54'22"E	259.51
C33	90°00'00"	15.00	23.56	S45°00'00"W	21.21
C34	39°40'55"	470.57	325.88	N70°09'32"W	319.39
C35	90°00'00"	15.00	23.56	N02°12'15"W	21.21
C36	29°20'45"	304.57	155.96	N28°07'22"E	154.26
C37	90°00'00"	15.00	23.56	S87°47'45"W	21.21
C38	90°15'47"	15.00	23.63	S45°08'46"E	21.26
C39	3°26'02"	66.00	3.96	S01°42'08"W	3.96
C40	42°47'45"	529.57	395.50	S68°36'08"E	386.37
C41	90°00'00"	15.00	23.56	S45°00'00"E	21.21
C42	89°43'21"	15.00	23.49	S44°51'41"W	21.16
C43	5°13'14"	529.57	48.25	S55°33'12"E	48.23
C44	5°13'12"	529.57	48.24	S50°15'59"E	48.22
C45	0°31'07"	529.57	4.79	S47°27'49"E	4.79
C46	3°43'08"	770.57	50.01	S00°35'37"E	50.00
C47	89°44'13"	15.00	23.49	S44°51'14"W	21.16
C48	90°16'39"	15.00	23.63	N45°08'19"W	21.26
C49	0°16'50"	770.57	3.77	S01°24'22"W	3.77
C50	90°00'00"	15.00	23.56	N45°00'00"W	21.21
C51	90°00'53"	15.00	23.57	S44°59'33"W	21.22
C52	90°00'00"	15.00	23.56	N45°00'00"E	21.21
C53	89°59'07"	15.00	23.56	S45°00'27"E	21.21
C54	3°26'01"	984.07	58.97	S01°42'07"W	58.96
C55	3°26'01"	1016.00	60.89	S01°42'07"W	60.88
C56	2°51'50"	1016.00	50.78	S01°26'02"W	50.78
C57	8°03'23"	304.57	32.19	N39°48'03"E	32.17
C58	8°28'30"	304.57	45.04	N32°30'07"E	45.00
C59	8°28'30"	304.57	45.04	N24°01'37"E	45.00
C60	3°39'02"	304.57	19.40	N17°57'51"E	19.40
C61	2°41'20"	304.57	14.29	N14°47'40"E	14.29
C62	3°14'43"	470.57	26.65	S74°55'39"E	26.65
C63	89°59'58"	15.00	23.56	S87°47'44"W	21.21
C64	11°54'51"	829.57	172.49	N53°09'41"W	172.18
C65	60°39'53"	20.00	21.18	N28°47'10"W	20.20
C66	14°20'57"	829.57	207.74	N05°37'42"W	207.20
C67	101°50'57"	20.00	35.55	N38°07'18"E	31.05
C68	76°31'45"	20.00	26.71	S52°41'20"E	24.77
C69	62°07'32"	329.57	357.28	S45°29'14"E	340.03
C70	90°00'00"	15.00	23.56	S31°33'00"E	21.21
C71	29°20'45"	245.57	125.74	S28°07'22"W	124.37

CURVE	DELTA	RADIUS	LENGTH	BEARING	CHORD
C72	10°38'21"	286.58	53.21	N06°16'23"W	53.14
C73	41°11'34"	196.58	134.14	N32°11'21"W	131.27
C74	9°04'25"	986.58	156.24	N57°19'23"W	156.08
C75	14°39'17"	153.42	41.80	N54°31'54"W	41.68
C76	14°39'17"	136.58	34.93	S54°31'54"E	34.84
C77	9°04'25"	1013.42	160.49	S57°19'20"E	160.32
C78	41°11'34"	213.42	153.44	S32°11'21"E	150.15
C79	10°38'21"	313.42	58.20	S06°16'23"E	58.11
C80	6°41'31"	470.57	54.95	S69°57'32"E	54.92
C81	5°50'57"	304.50	31.08	N02°55'29"W	31.07
C82	10°39'19"	304.50	56.63	N11°10'36"W	56.55
C83	10°39'19"	304.50	56.63	N21°49'55"W	56.55
C84	10°39'19"	304.50	56.63	N32°29'14"W	56.55
C85	10°39'19"	304.50	56.63	N43°08'33"W	56.55
C86	10°28'15"	304.50	55.55	N53°42'21"W	55.57
C87	4°52'17"	304.50	25.89	N61°22'37"W	25.88
C88	4°39'34"	529.50	42.45	N66°06'32"W	42.43
C89	6°16'07"	529.50	57.93	N71°32'23"W	57.90
C90	1°52'34"	529.50	17.34	N75°36'43"W	17.34
C91	18°34'23"	270.50	87.69	N67°15'48"W	87.30
C92	15°24'54"	270.50	91.66	N48°16'10"W	91.22
C93	15°09'05"	270.50	90.42	N28°59'10"W	90.00
C94	4°59'09"	270.50	23.54	N16°55'03"W	23.53
C95	7°24'00"	75.50	9.75	N03°53'18"W	9.74
C96	23°00'14"	75.50	30.31	N19°05'25"W	30.11
C97	35°52'37"	75.50	47.28	N48°31'50"W	46.51
C98	38°43'15"	75.50	51.02	N85°48'45"W	50.06
C99	0°33'27"	185.00	1.80	S75°05'22"W	1.80
C100	13°40'44"	185.00	44.17	S82°12'25"W	44.06
C101	9°36'21"	185.00	31.02	N86°09'02"W	30.69
C102	4°37'49"	185.00	14.95	N79°01'57"W	14.95
C103	30°32'22"	75.50	40.24	S88°00'47"W	39.77
C104	36°11'49"	75.50	47.70	S54°38'42"W	46.51
C105	31°45'32"	75.50	41.85	S20°40'01"W	41.32
C106	31°49'35"	75.50	41.94	S11°07'33"E	41.40
C107	8°56'49"	185.00	28.89	S22°33'56"E	28.86
C108	5°17'21"	185.00	17.08	S15°26'51"E	17.07
C109	2°48'01"	470.50	23.00	S65°12'45"E	22.99
C110	7°35'16"	245.50	32.51	S60°10'07"E	32.49
C111	16°07'02"	245.50	69.06	S48°09'58"E	68.83
C112	16°07'02"	245.50	69.06	S32°02'55"E	68.83
C113	5°02'22"	185.00	16.27	S04°03'58"W	16.27
C114	9°11'49"	185.00	29.70	S11°11'03"W	29.66
C115	16°10'36"	75.50	21.32	S07°41'39"W	21.25
C116	31°36'55"	75.50	41.66	S16°12'06"E	41.13
C117	32°45'25"	75.50	43.16	S48°23'18"E	42.58
C118	8°35'18"	75.50	11.32	S69°03'38"E	11.31
C119	12°10'55"	185.00	39.33	S67°15'50"E	39.26
C120	2°03'16"	185.00	6.63	S60°08'44"E	6.63
C121	3°45'51"	770.50	50.62	S57°14'11"E	50.61
C122	4°15'52"	770.50	57.35	S53°13'19"E	57.34
C123	3°53'08"	770.50	52.25	S49°08'49"E	52.24
C124	16°07'02"	245.50	69.06	S15°55'53"E	68.83
C125	7°52'22"	245.50	33.73	S03°56'11"E	33.71
C126	27°25'57"	470.50	225.27	N76°17'02"W	223.12
C127	12°14'59"	470.50	100.59	N56°26'34"W	100.40
C128	3°06'50"	470.50	25.57	N48°45'40"W	25.57
C129	31°50'11"	529.50	294.22	S74°04'54"E	290.45
C130	43°05'49"	110.00	82.74	N21°33'54"E	80.80
C131	3°13'50"	286.58	15.16	N02°34'09"W	15.16
C132	4°37'05"	286.58	23.10	N06°29'35"W	23.09
C133	2°47'25"	286.58	13.96	N10°11'51"W	13.95
C134	1°00'00"	196.58	3.26	N12°05'34"W	3.26
C135	7°04'54"	196.58	23.06	N16°08'01"W	23.05
C136	21°51'59"	196.58	71.21	N30°36'27"W	70.78
C137	7°06'21"	196.58	23.14	N45°05'37"W	23.12
C138	4°08'20"	196.58	13.48	N50°42'59"W	13.48
C139	0°17'24"	986.58	4.99	N52°55'50"W	4.99
C140	2°03'32"	986.58	35.45	N54°06'18"W	35.45
C141	1°20'12"	986.58	23.02	N55°48'10"W	23.01

CURVE	DELTA	RADIUS	LENGTH	BEARING	CHORD
C142	1°17'15"	986.58	22.17	N57°06'53"W	22.17
C143	1°17'15"	986.58	22.17	N58°24'08"W	22.17
C144	1°17'15"	986.58	22.17	N59°41'24"W	22.18
C145	1°20'16"	986.58	23.04	N61°00'10"W	23.03
C146	0°11'15"	986.58	3.23</		

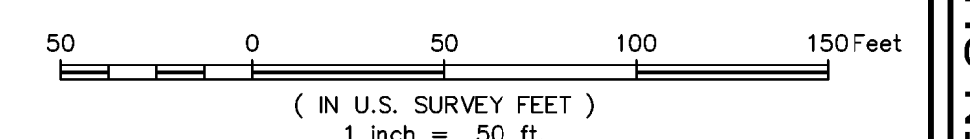
HANSEN SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO



LEGEND	
	EASEMENT LINE
	EXISTING RIGHT-OF-WAY
	BOUNDARY LINE
	LOT LINE
	SECTION LINE
	FOUND PROPERTY CORNER AS DESCRIBED
	SET 18" #4 REBAR WITH BLUE PLASTIC CAP, LS 38470
	FOUND SECTION CORNER AS DESCRIBED
	UTILITY EASEMENT
	DRAINAGE & GRADING EASEMENT
	DRAINAGE & UTILITY EASEMENT
	DRAINAGE, UTILITY, PRIVATE ACCESS & EMERGENCY ACCESS EASEMENT

SEE SHEET 4



NOTICE:
According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years after the date of the certificate shown herein.

SECTION: 7
TOWNSHIP: 6N
RANGE: 68W of the 6th PM

NORTHERN ENGINEERING
FORT COLLINS, CO 80501
970.221.4188
nortneng.com

DATE: 9/28/18
PROJECT: 911-015
DESIGNED BY: L. Smith
DRAWN BY: R. Tressy

SCALE: 1"=50'
REVIEWED BY:

HANSEN SUBDIVISION
CITY OF FORT COLLINS
STATE OF COLORADO

Sheet
3
Of 7 Sheets

PRELIMINARY
Robert C. Tressy
Registered Professional Land Surveyor
Colorado Registration No. 38470
For and on behalf of Northern Engineering Services, Inc.

SEE SHEET 5

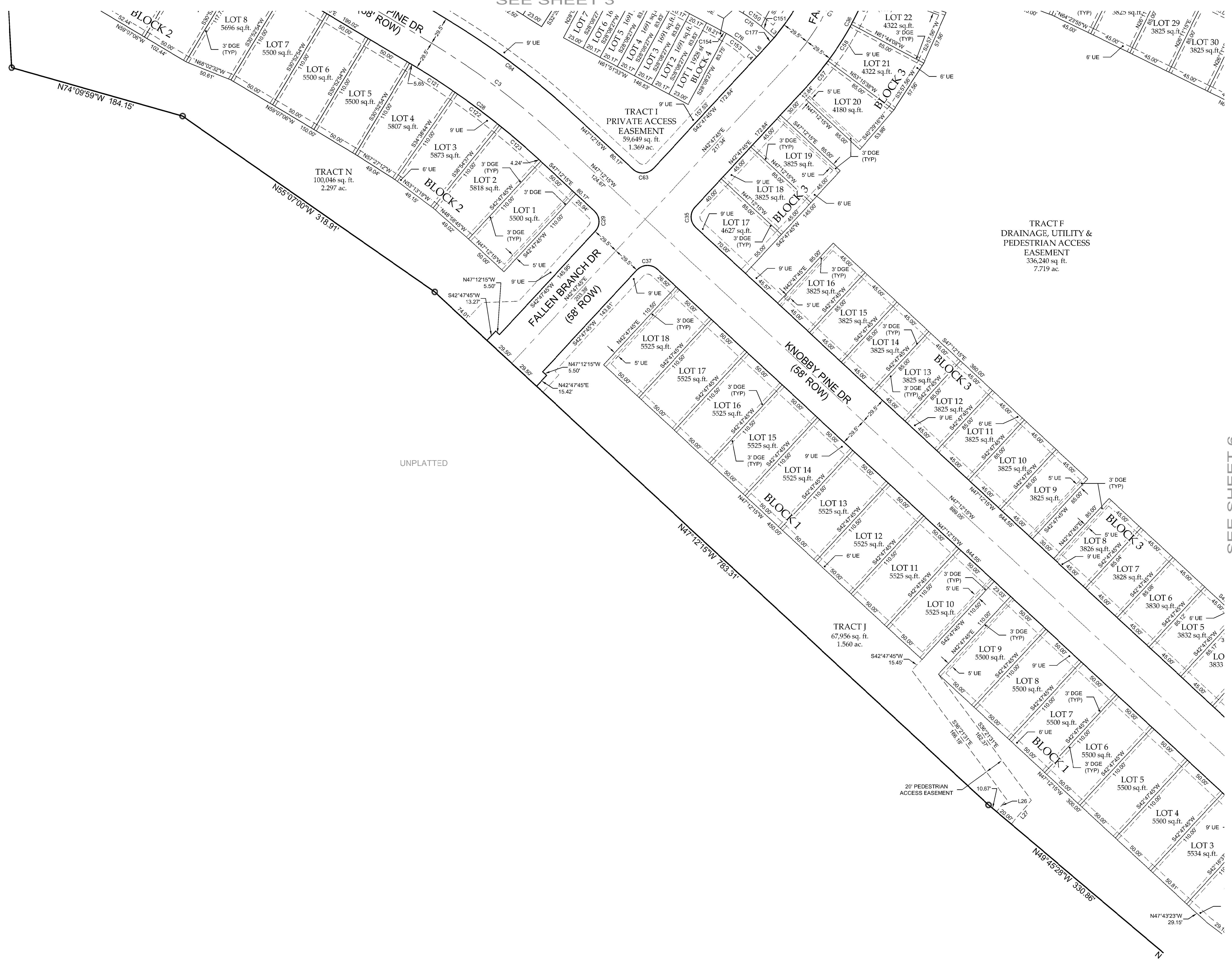
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HANSEN SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO

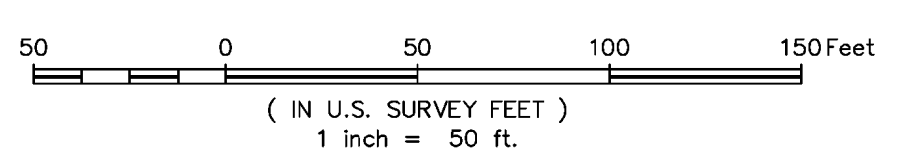
SEE SHEET 3

SEE SHEET 6



LEGEND

- EASEMENT LINE
- - - EXISTING RIGHT-OF-WAY
- BOUNDARY LINE
- LOT LINE
- SECTION LINE
- FOUND PROPERTY CORNER AS DESCRIBED
- SET 18" #4 REBAR WITH BLUE PLASTIC CAP, LS 38470
- ⊕ FOUND SECTION CORNER AS DESCRIBED
- UE UTILITY EASEMENT
- DGE DRAINAGE & GRADING EASEMENT
- D&UE DRAINAGE & UTILITY EASEMENT
- D.U.PA&EAE DRAINAGE, UTILITY, PRIVATE ACCESS & EMERGENCY ACCESS EASEMENT



NOTICE:
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SECTION: 7
TOWNSHIP: 6N
RANGE: 68 W of the 6th PM

NORTHERN ENGINEERING
FORT COLLINS, CO | 970.221.4188
GRIFFITH, CEO | SMITH, ENGINEER

DATE: 9/28/18
PROJECT: 911-015
DESIGNED BY: L. Smith
DRAWN BY: R. Tressley
REVIEWED BY: R. Tressley

HANSEN SUBDIVISION
CITY OF FORT COLLINS
STATE OF COLORADO

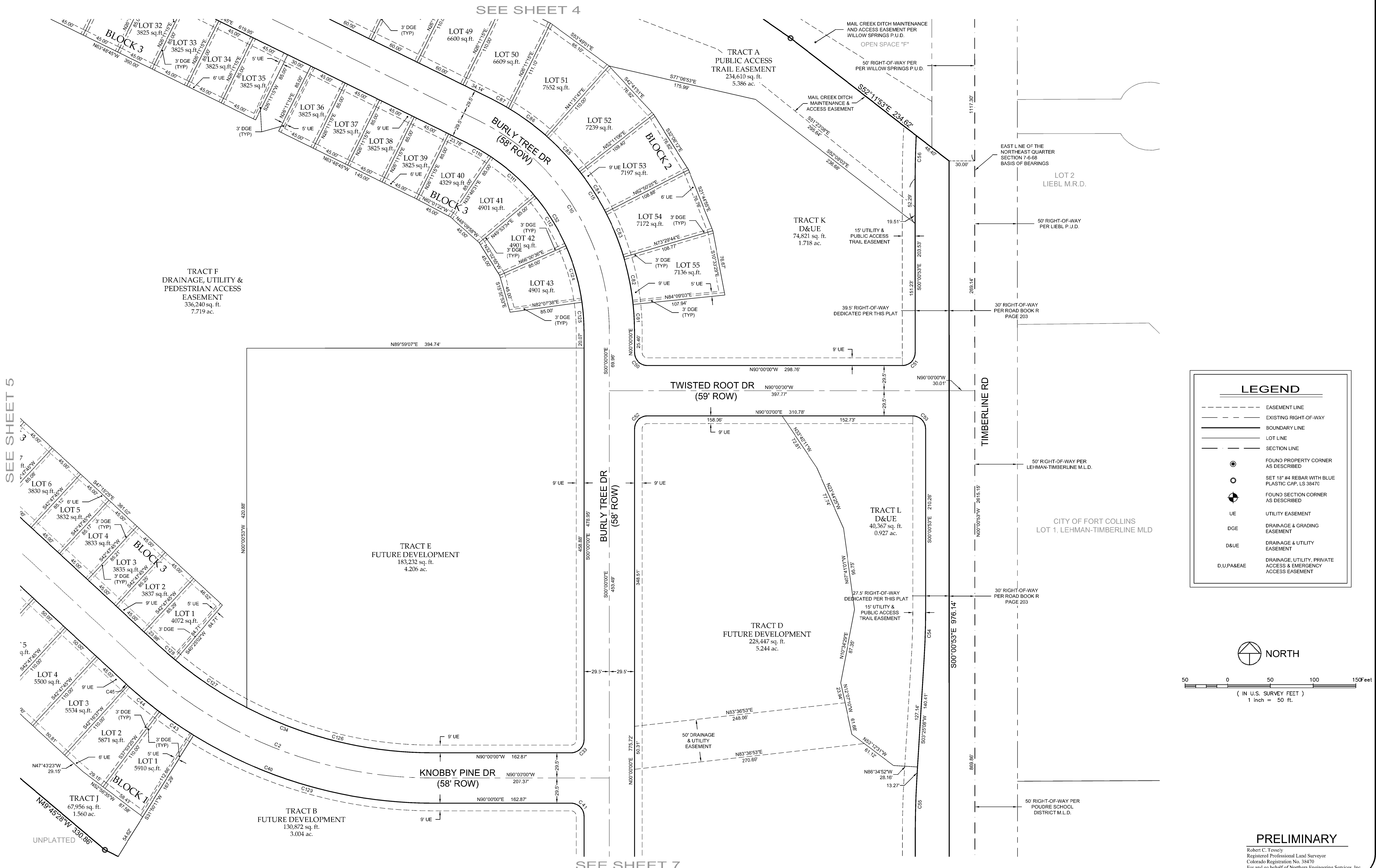
PRELIMINARY
Robert C. Tressley
Registered Professional Land Surveyor
Colorado Registration No. 38470
For and on behalf of Northern Engineering Services, Inc.

Sheet
5
Of 7 Sheets

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HANSEN SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO



SEE SHEET 5

SEE SHEET 4

SEE SHEET 7

LEGEND

- EASEMENT LINE
- EXISTING RIGHT-OF-WAY
- BOUNDARY LINE
- LOT LINE
- SECTION LINE
- FOUND PROPERTY CORNER AS DESCRIBED
- SET 1" #4 REBAR WITH BLUE PLASTIC CAP, LS 3847C
- FOUND SECTION CORNER AS DESCRIBED
- UE UTILITY EASEMENT
- DGE DRAINAGE & GRADING EASEMENT
- D&UE DRAINAGE & UTILITY EASEMENT
- D,U,P&EAE DRAINAGE, UTILITY, PRIVATE ACCESS & EMERGENCY ACCESS EASEMENT

NORTH

(IN U.S. SURVEY FEET)
1 inch = 50 ft.

NOTICE:
According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years after the date of the certificate shown herein.

SECTION: 7
TOWNSHIP: 6N
RANGE: 68 W of the 6th PM

NORTHERN ENGINEERING

FORT COLLINS: 301 North Hovell Street, Suite 100, 80521
GREELEY: 520 8th Street, 80631
970.221.4188
nortnerengineering.com

DATE: 9/28/18
PROJECT: 911-015
DESIGNED BY: L. Smith
DRAWN BY: R. Tereby
REVIEWED BY: R. Tereby

HANSEN SUBDIVISION
CITY OF FORT COLLINS
STATE OF COLORADO

PRELIMINARY
Robert C. Tessey
Registered Professional Land Surveyor
Colorado Registration No. 38470
For and on behalf of Northern Engineering Services, Inc.

Sheet
6
Of 7 Sheets

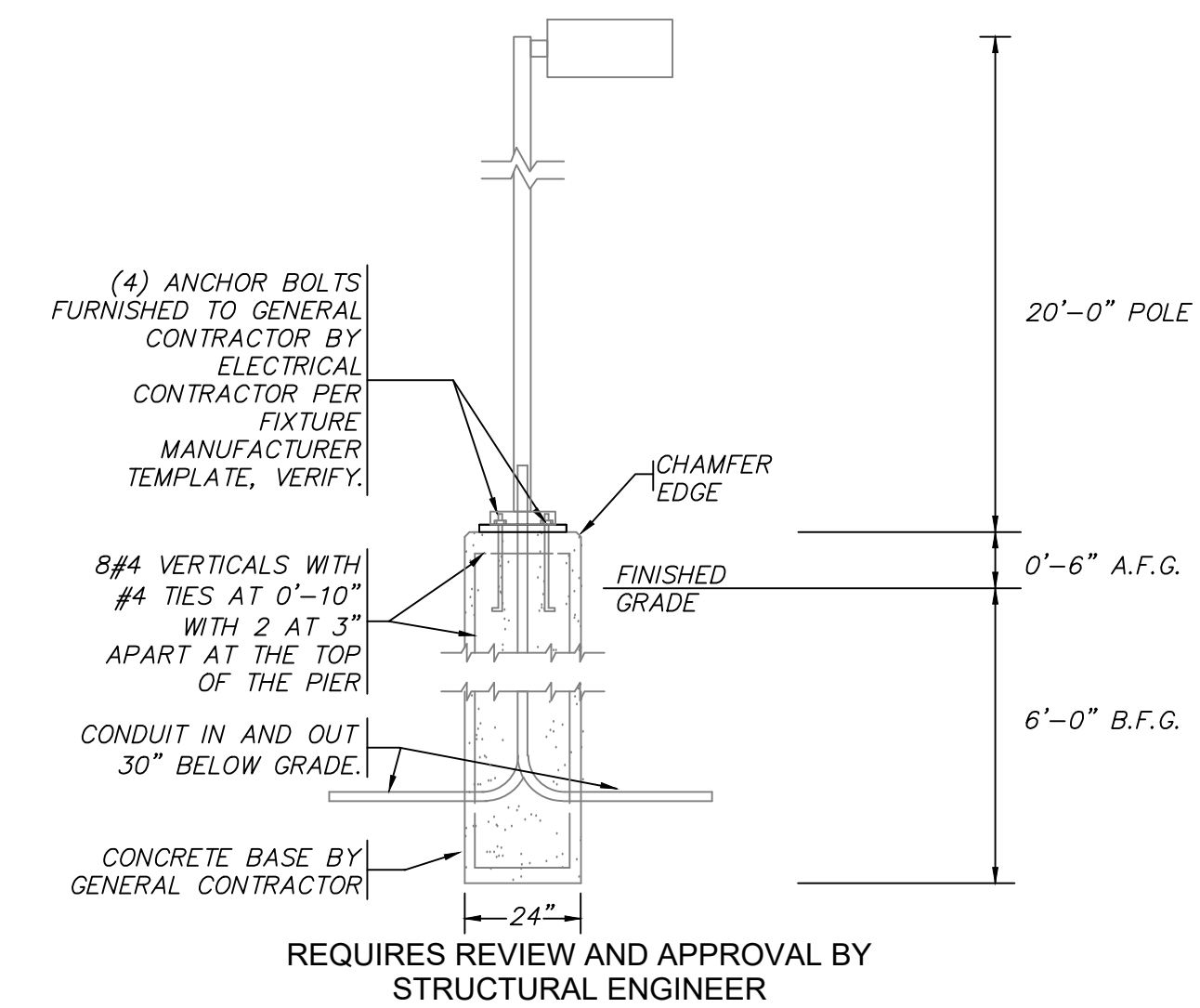
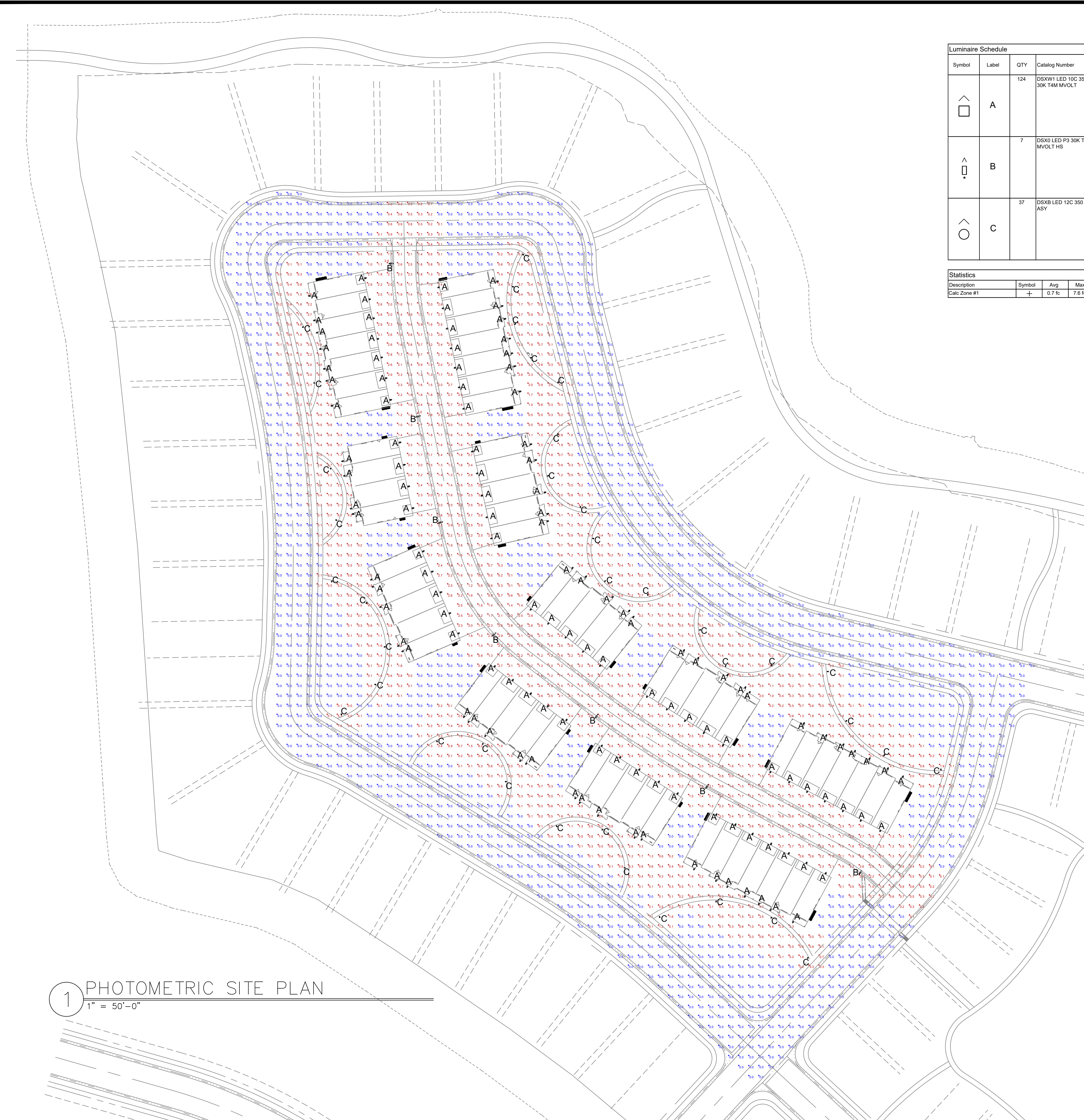
HANSEN FARM
PRELIMINARY
DEVELOPMENT
PLAN

SITE PHOTOMETRIC

PREPARED BY:

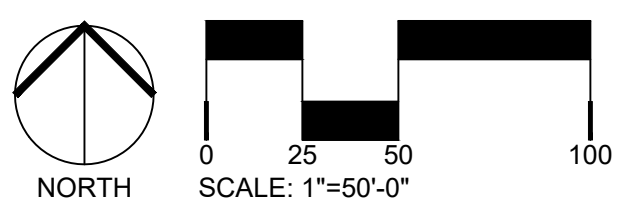
Symbol	Label	QTY	Catalog Number	Description	Lamp	Number Lamps	Lumens per Lamp	LLF	Wattage	
	A	124	DSXW1 LED 10C 350 30K T4M MVOLT	DSXW1 LED WITH (1) 10 LED LIGHT ENGINES, TYPE T4M OPTIC, 3000K, @ 350mA.	LED	1	1457.665	1	13.3	
	B	7	DSX0 LED P3 30K T2M MVOLT HS	DSX0 LED P3 30K T2M MVOLT with houseside shield	LED	1	6411.291	1	71	
	C	37	DSXB LED 12C 350 30K ASY	D-SERIES BOLLARD WITH 12 3000K LEDS OPERATED AT 350mA AND ASYMMETRIC DISTRIBUTION	LED	1	1194.123	1	16	

Statistics							
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
Calc. Zone #1	±	0.7 fc	7.6 fc	0.0 fc	N/A	N/A	0.1:1



1 PHOTOMETRIC SITE PLAN
1" = 50'-0"

2 POLE BASE DETAIL
N.T.S.



ORIGINAL SIZE 24X36

ISSUED

No.	DESCRIPTION	DATE
01	PDP	9/19/2017

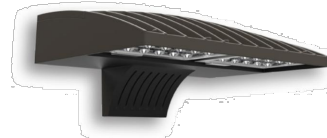
REVISIONS

No.	DESCRIPTION	DATE

Photometric
Plan

SEAL:

PROJECT No.:	236-17
DRAWN BY:	CMP
REVIEWED BY:	CMP
DRAWING NUMBER:	



D-Series Size 1 LED Wall Luminaire

Catalog Number _____
 Notes _____
 Type _____

Hit the Tab key or mouse over the page to see all interactive elements.

d^{series}

Specifications Luminaire

Width: 13-3/4" (34.9 cm)
Depth: 10" (25.4 cm)
Height: 6-3/8" (16.2 cm)

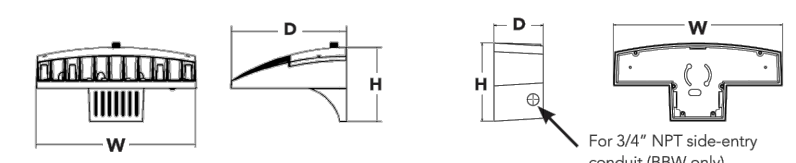
Back Box (BBW, ELCW)

Width: 13-3/4" (34.9 cm)
Depth: 4" (10.2 cm)
Height: 6-3/8" (16.2 cm)

Introduction

The D-Series Wall luminaire is a stylish, fully integrated LED solution for building-mount applications. It features a sleek, modern design and is carefully engineered to provide long-lasting, energy-efficient lighting with a variety of optical and control options for customized performance.

With an expected service life of over 20 years of nighttime use and up to 74% in energy savings over comparable 250W metal halide luminaires, the D-Series Wall is a reliable, low-maintenance lighting solution that produces sites that are exceptionally illuminated.



Ordering Information

EXAMPLE: DSXW1 LED 20C 1000 40K T3M MVOLT DDBTXD

Series	LEDs	Drive Current	Color Temperature	Distribution	Voltage	Mounting	Control Options
DSXW1 LED	10C 10 LEDs (one engine)	350 350 mA	30K 3000 K	T2S Type I Short	MVOLT ¹	Shipped included (back)	Shipped installed PE Photoelectric cell, button-type ¹
	20C 20 LEDs (two engines)	530 530 mA	40K 4000 K	T2M Type II Medium	120 ¹	Surface mounting bracket	DMG 0-10V dimming driver (no controls)
		700 700 mA	50K 5000 K	T3S Type III Short	208 ¹	Surface-mounted back box (for conduit entry) ¹	PIR 180° motion/ambient light sensor, <15° mg/ft ²
		1000 1000 mA (1 A)	AMBC Amber phosphor converted	T3M Type III Medium	240 ¹		PIR1 180° motion/ambient light sensor, 15-30° mg/ft ²
				T4M Type IV Medium	277 ¹		PIR1FCV Motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 16'
				TTM Forward Throw Medium	347 ¹		PIR1FCV Motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 16'
				ASYDF Asymmetric diffuse	480 ¹		ELCW Emergency battery backup (includes external component enclosure) ¹

Other Options	Finish (options)
Shipped installed SF Single face (120, 277 or 347V) ¹	DOBK Dark bronze
DF Double face (208, 240 or 480V) ¹	DLBK Black
HS House-side shield ¹	DNAXD Natural aluminum
SPO Separate surge protection ¹	DNWHD White
	DSSXD Sandstone
	DOBKX Textured dark bronze
	DSSTX Textured sandstone
	DNBKX Textured black
	DNATX Textured natural aluminum
	DWHGX Textured white

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1 TYPE A NTS



D-Series Size 0 LED Area Luminaire

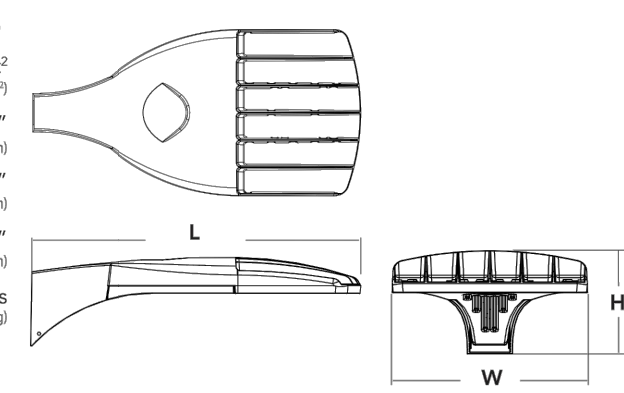
Catalog Number _____
 Notes _____
 Type _____

Hit the Tab key or mouse over the page to see all interactive elements.

d^{series}

Specifications

EPA: 0.95 ft² (0.09 m²)
Length: 26" (66.0 cm)
Width: 13" (33.0 cm)
Height: 7" (17.8 cm)
Weight (max): 16 lbs (7.2 kg)



Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and system-level interoperability.

All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency

This luminaire is A+ Certified when ordered with DTL[®] controls marked by a shaded background. DTL DLL equipped luminaires meet the A+ specification for luminaire to photocentral interoperability¹

This luminaire is part of an A+ Certified solution for ROAM[®] or XPaint[™] Wireless control networks, providing out-of-the-box control compatibility with simple commissioning, when ordered with drivers and control options marked by a shaded background¹

To learn more about A+, visit www.acuitybrands.com/aplus.

1. See ordering tree for details.

2. A+ Certified Solutions for ROAM require the order of one ROAM node per luminaire. Sold Separately. Link to Roam; Link to DTL DLL

A+ Capable options indicated by this color background.

Ordering Information

EXAMPLE: DSX0 LED P6 40K T3M MVOLT SPA DDBXB

Series	LEDs	Color Temperature	Distribution	Voltage	Mounting
DSX0 LED	Forward optics P1 P4 P7	30K 3000 K	T1S Type I short	MVOLT ¹	Shipped included SPA Square pole mounting
	P2 P5	40K 4000 K	T2S Type II short	120 ¹	Round pole mounting
	P3 P6	50K 5000 K	T3S Type III short	208 ¹	WBA Wall bracket
	Rotated optics P10 ¹ P12 ¹ P13 ¹	AMBC Amber phosphor converted ²	T3M Type III medium	240 ¹	SPUMBA Square pole universal mounting adaptor ¹
			T4M Type IV medium	277 ¹	RPUMBA Round pole universal mounting adaptor ¹
			TTM Forward throw medium	347 ¹	Shipped separately KMAX DDBXD U Max arm mounting bracket adaptor (specify finish) ¹
			TSVS Type V very short	480 ¹	

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2 TYPE B NTS



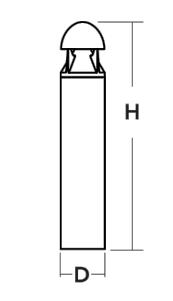
D-Series LED Bollard

Catalog Number _____
 Notes _____
 Type _____

Hit the Tab key or mouse over the page to see all interactive elements.

d^{series}

Diameter: 8" Round (20.3 cm)
Height: 42" (106.7 cm)
Weight (max): 27 lbs (12.25 kg)



Introduction

The D-Series LED Bollard is a stylish, energy-saving, long-life solution designed to perform the way a bollard should—with zero uplift. An optical leap forward, this full cut-off luminaire will meet the most stringent of lighting codes. The D-Series LED Bollard's rugged construction, durable finish and long-lasting LEDs will provide years of maintenance-free service.

Ordering Information

EXAMPLE: DSXB LED 16C 700 40K SYM MVOLT DDBXB

Series	LEDs	Drive current	Color temperature	Distribution	Voltage	Control options	Other options	Finish (options)
DSXB LED	Asymmetric 12C 12 LEDs ²	350 350 mA	30K 3000 K	ASY Asymmetric ¹	MVOLT ¹	PE Photoelectric cell, bottom type ¹	Shipped installed SF Single face (120, 277, 347V) ¹	DWHD White
	Symmetric 16C 16 LEDs ²	450 450 mA ^{1A}	40K 4000 K	SYM Symmetric ¹	120 ¹	DMG 0-10V dimming driver (no controls)	DF Double face (208, 240) ¹	DNAXD Natural aluminum
		530 530 mA	50K 5000 K		208 ¹	ELCW Emergency battery backup ²	DOBK Dark bronze	DOBKX Textured dark bronze
		700 700 mA	AMBC Amber phosphor converted ²		240 ¹		H30 30" overall height	DLBKX Textured black
			AMBLW Amber limited wavelength ^{1A}		277 ¹		H36 36" overall height	DNATX Textured natural aluminum
					347 ¹		H42 42" overall height	DWHGX Textured white

Accessories

Series	Options
MBAU	Anchor bolts for DSM ¹

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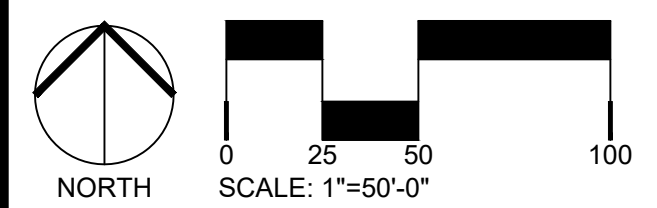
3 TYPE C NTS

Symbol	Label	QTY	Catalog Number	Description	Lamp	Number Lamps	Lumens per Lamp	LLF	Wattage	Max: cd
⌆	A	124	DSXW1 LED 10C 350 30K T4M MVOLT	DSXW1 LED WITH (1) 10 LED LIGHT ENGINES, TYPE T4M OPTIC, 3000K, @ 350mA.	LED	1	1457.665	1	13.3	971cd
⌆	B	7	DSX0 LED P3 30K T2M MVOLT HS	DSX0 LED P3 30K T2M MVOLT with house-side shield	LED	1	6411.291	1	71	5000cd
⌆	C	37	DSXB LED 12C 350 30K ASY	D-SERIES BOLLARD WITH 12 3000K LEDES OPERATED AT 350mA AND ASYMMETRIC DISTRIBUTION	LED	1	1194.123	1	16	618cd

HANSEN FARM PRELIMINARY DEVELOPMENT PLAN

SITE PHOTOMETRIC

PREPARED BY:



ORIGINAL SIZE 24X36

ISSUED

No.	DESCRIPTION	DATE
01	PDP	9/19/2017

REVISIONS

No.	DESCRIPTION	DATE
-----	-------------	------

Lighting Cut Sheets

SEAL:

PROJECT No.:	236-17
DRAWN BY:	CMP
REVIEWED BY:	CMP
DRAWING NUMBER:	

FUTURE CONNECTION TO POWER TRAIL BY OTHERS

WILLOW SPRINGS SECOND FILING ZONED RL/LMN

IRRIGATION DITCH LATERAL

WILLOW SPRINGS SECOND FILING ZONED RL/LMN

MAIL CREEK DITCH

50' DITCH BUFFER FROM TOP OF BANK

A
LMN

PRIMARY USES
139 TO 417 DU
+/- 46.40 ACRES

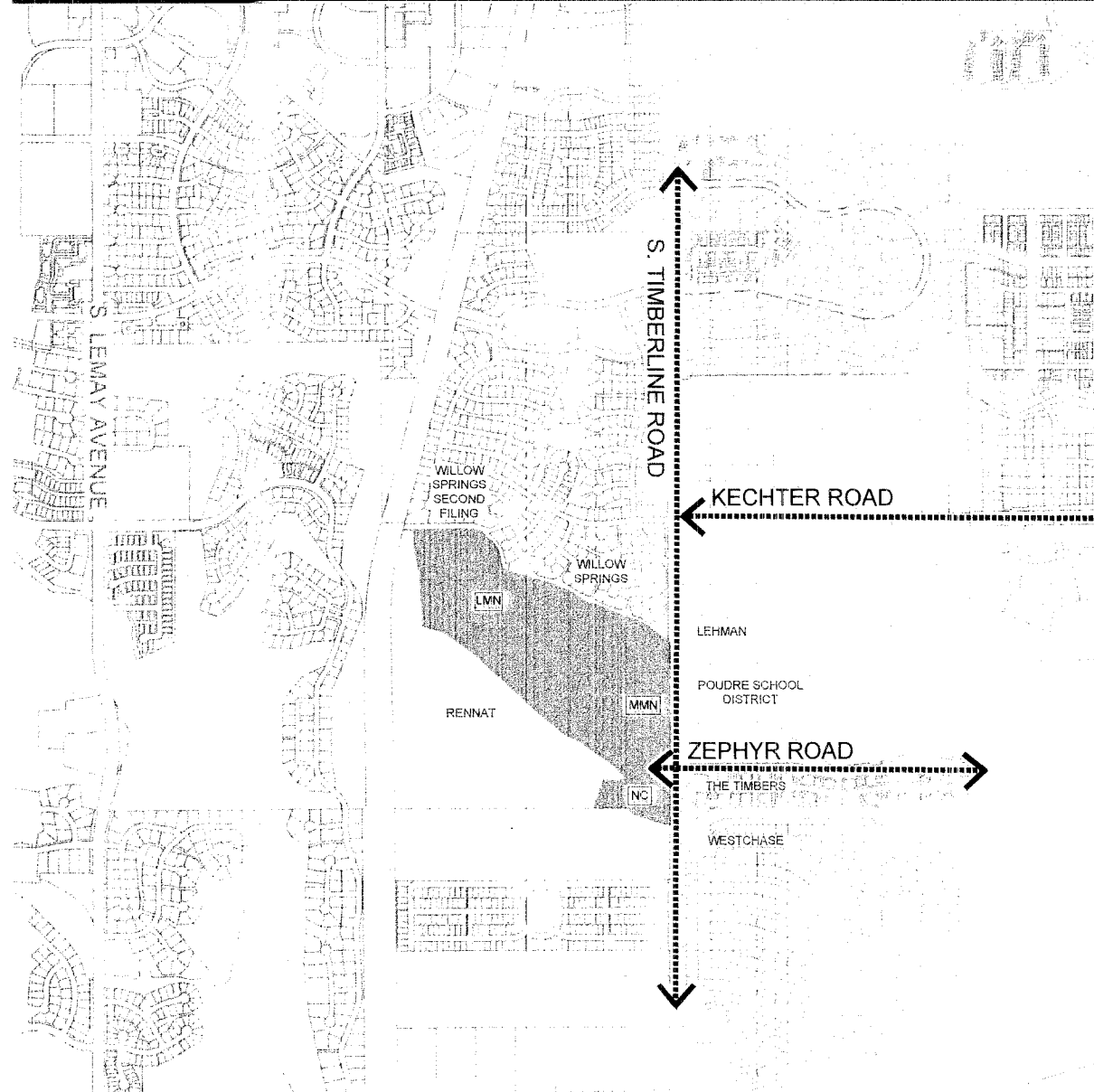
RENNAT PROPERTY ZONED LMN

IRRIGATION DITCH LATERAL

WETLAND
50' WETLAND BUFFER

MATCHLINE SHEET 2

Vicinity Map :



SITE LEGEND

- PROPERTY BOUNDARY
- ZONE DISTRICT BOUNDARY
- DEVELOPMENT PARCEL BUBBLES (FOR GRAPHICAL PURPOSES ONLY)
- RIGHT OF WAY
- ○ ○ ○ ○ PEDESTRIAN/BIKE ROUTE
- ○ ○ ○ ○ PEDESTRIAN/BIKE ROUTE - FORT COLLINS MASTER PLAN TRAILS
- DITCH/WETLAND BUFFER
- TOP OF BANK
- ← POTENTIAL VEHICULAR & BIKE/PEDESTRIAN ACCESS POINT
- ← POTENTIAL VEHICULAR & BIKE/PEDESTRIAN ACCESS POINT

Legal Description:

THE FOLLOWING DESCRIBED PROPERTY, SITUATE IN THE COUNTY OF LARIMER, STATE OF COLORADO, TO WIT: COMMENCING AT THE EAST QUARTER CORNER OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 88 WEST OF THE 9TH P.M.,

THENCE NORTH 00°00'00" WEST 1474.84 FEET TO THE CENTER OF MAIL CREEK DITCH; THENCE NORTH 53°22'52" WEST 347.45 FEET; THENCE NORTH 67°30'07" WEST 160.74 FEET; THENCE NORTH 69°07'30" WEST 293.89 FEET; THENCE NORTH 76°31'56" WEST 87.51 FEET; THENCE NORTH 57°33'14" WEST 91.35 FEET; THENCE NORTH 33°46'18" WEST 103.06 FEET; THENCE NORTH 83°01'54" WEST 238.40 FEET; THENCE NORTH 68°18'49" WEST 278.28 FEET; THENCE NORTH 76°25'10" WEST 68.91 FEET; THENCE NORTH 62°52'25" WEST 52.69 FEET; THENCE NORTH 42°27'46" WEST 53.83 FEET; THENCE NORTH 08°28'49" WEST 92.68 FEET; THENCE NORTH 23°06'09" WEST 71.16 FEET; THENCE NORTH 42°24'28" WEST 170.42 FEET; THENCE NORTH 54°50'14" WEST 93.12 FEET; THENCE NORTH 87°48'10" WEST 284.22 FEET; THENCE SOUTH 82°16'44" WEST 49.35 FEET; THENCE NORTH 89°20'30" WEST 249.81 FEET; THENCE SOUTH 09°30'36" EAST 65.31 FEET; THENCE SOUTH 02°50'53" EAST 122.76 FEET; THENCE SOUTH 11°11'17" EAST 221.70 FEET; THENCE SOUTH 05°58'23" EAST 117.72 FEET; THENCE SOUTH 03°01'25" EAST 367.61 FEET; THENCE SOUTH 74°09'09" EAST 184.15 FEET; THENCE SOUTH 55°06'07" EAST 318.91 FEET; THENCE SOUTH 47°11'22" EAST 783.31 FEET; THENCE SOUTH 49°44'35" EAST 330.86 FEET; THENCE SOUTH 63°33'59" EAST 198.72 FEET; THENCE SOUTH 48°05'35" EAST 109.43 FEET; THENCE SOUTH 57°51'56" EAST 191.24 FEET; THENCE SOUTH 45°20'01" EAST 193.08 FEET; THENCE SOUTH 43°25'25" WEST 68.46 FEET; THENCE NORTH 80°51'54" WEST 140.96 FEET; THENCE SOUTH 18°54'22" WEST 280.05 FEET; THENCE SOUTH 89°58'09" EAST 736.44 FEET TO THE POINT OF BEGINNING.

ALSO A PART OF THE NE 1/4 OF THE SE 1/4 OF SAID SECTION 7 DESCRIBED AS FOLLOWS:
BEGINNING AT THE EAST QUARTER CORNER OF SAID SECTION 7; THENCE SOUTH 00°00'00" WEST 152.00 FEET; THENCE NORTH 89°53'00" WEST 112 FEET; THENCE NORTH 70°18'00" WEST 286.00 FEET; THENCE NORTH 39°27'26" WEST 84.42 FEET; THENCE SOUTH 89°58'09" EAST 422.03 FEET TO THE POINT OF BEGINNING.

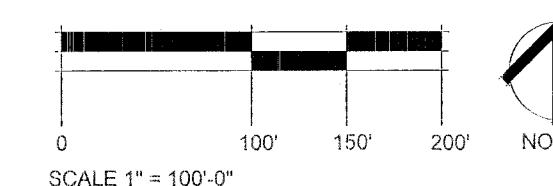
Parcel Index

PARCEL	ZONING	ACREAGE	ANTICIPATED USES
PARCEL A	LMN	+/- 46.40 AC	PRIMARY USES
PARCEL B	MMN	+/- 16.66 AC	PRIMARY USES, POTENTIAL NEIGHBORHOOD PARK
PARCEL C	NC	+/- 6.33 AC	PRIMARY USES, RETAIL

Land-Use Statistics

ZONE DISTRICT TYPE	GROSS ACREAGE	RESIDENTIAL CODE DENSITY	ESTIMATED UNITS	MAX. BLDG HT.	HOUSING TYPE	BUSINESS TYPE
LMN (PARCEL A)	+/- 46.40 AC	4-9 DU/AC	157 - 417 *	40'	SF/MF	-----
MMN (PARCEL B)	+/- 16.66 AC	12 DU/AC MIN	170-255 *	MF	ALLOWED USES	-----
NC (PARCEL C)	+/- 6.33 AC	PER NC ZONING	-----	80'	PER NC ZONING	ALLOWED USES
TOTAL	+/- 69.42 AC			MAX. OF 40'		

* LOW END ESTIMATED UNITS BASED ON NET ACREAGE (10% OF GROSS ACREAGE). HIGH END ESTIMATED UNITS BASED ON GROSS ACREAGE.



Owner's Certification of Approval:

THE UNDERSIGNED DOES/DO HEREBY CERTIFY THAT I/WE ARE THE LAWFUL OWNERS OF REAL PROPERTY DESCRIBED ON THIS SITE PLAN AND DO HEREBY CERTIFY THAT I/WE ACCEPT THE CONDITIONS AND RESTRICTIONS SET FORTH ON SAID SITE PLAN.

IN WITNESS WHEREOF, WE HAVE HERETO SET OUR HANDS AND SEALS THIS 17th DAY OF November 2017

LORSON NORTH DEVELOPMENT CORP. A COLORADO Corporation

Jeff Mark
Vice President

NOTARIAL CERTIFICATE

STATE OF COLORADO

COUNTY OF El Paso

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME BY *Jeff Mark* THIS 17th DAY OF November 2017.

MY COMMISSION EXPIRES 3-22-21 *Susan L. Gonzales*
NOTARY PUBLIC

(SEAL)
SUSAN L. GONZALES
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20044004607
MY COMMISSION EXPIRES MARCH 22, 2021

Planning Approval:

BY THE DIRECTOR OF COMMUNITY DEVELOPMENT AND NEIGHBORHOOD SERVICES OF THE CITY OF FORT COLLINS, COLORADO THIS 17th DAY OF December 2017.

[Signature]
DIRECTOR OF COMMUNITY DEVELOPMENT AND NEIGHBORHOOD SERVICES

General Notes:

- HANSEN FARM OVERALL DEVELOPMENT PLAN WILL BE A MIXED-USE DEVELOPMENT COMPRISING THREE ZONING DISTRICTS: LMN - LOW DENSITY MIXED USE NEIGHBORHOOD, MMN - MEDIUM DENSITY MIXED USE NEIGHBORHOOD AND NC - NEIGHBORHOOD COMMERCIAL. THE PROPOSED DEVELOPMENT WILL HAVE A MIX OF HOUSING TYPES AS REQUIRED/ALLOWED PER THE UNDERLYING ZONE DISTRICT.
- TWO POINTS OF FIRE ACCESS HAVE BEEN PLANNED TO SERVE ALL AREAS OF THE PROJECT. FIRE HYDRANTS WILL BE PROVIDED AS REQUIRED BY Poudre FIRE AUTHORITY.
- ALL EXISTING TREES ON THE SITE WILL BE PRESERVED TO THE EXTENT PRACTICAL.
- ALL PUBLIC STREETS WILL BE DESIGNED TO THE FORT COLLINS LARIMER COUNTY URBAN STREET STANDARDS. THE INTERNAL ACCESS POINTS SHOWN ON THIS ODP ARE APPROXIMATE LOCATIONS ONLY. PRECISE LOCATIONS OF ACCESS POINTS WILL BE IDENTIFIED AT THE TIME OF PROJECT DEVELOPMENT PLANS (PDP).
- THE PROPOSED LAND USES AND DENSITIES SHOWN ON THIS ODP ARE APPROXIMATE. ANY ADDITIONAL LAND USES NOT ALLOWED IN THE APPLICABLE ZONE DISTRICTS MUST BE APPROVED ACCORDING TO THE CRITERIA AS SET FORTH BY THE CITY OF FORT COLLINS.
- CITY OF FORT COLLINS PROPOSED TRAIL SYSTEMS HAVE BEEN IDENTIFIED ON THE ODP. SEPARATE, SECONDARY INTERNAL TRAIL SYSTEMS HAVE BEEN INDICATED ON THE ODP BUT ARE SUBJECT TO CHANGE WITH MORE DETAILED DESIGN.
- MASTER UTILITY AND DRAINAGE PLANS HAVE BEEN SUBMITTED WITH THIS ODP.
- A NEIGHBORHOOD CENTER SHALL BE LOCATED WITHIN THREE-QUARTER OF ONE MILE OF 90% OF THE HOMES IN THE LMN ZONE DISTRICT PER THE LAND USE CODE.
- THE ACTUAL ANGLE OF THE ROAD CONNECTION FROM HANSEN FARM TO THE RENNAT PROPERTY TO BE DETERMINED AT THE TIME OF PROJECT DEVELOPMENT PLANS (PDP).
- THE HANSEN FARM PROPERTY IS LIMITED TO A MAXIMUM OF 440 RESIDENTIAL UNITS BY AGREEMENT WITH SFCDSD/CLWD AND SANITARY SEWER CAPACITY.
- THIS OVERALL DEVELOPMENT PLAN SHOWS THE GENERAL LOCATION AND APPROXIMATE SIZE OF ALL NATURAL AREAS, HABITATS, AND FEATURES WITHIN ITS BOUNDARIES AND THE PROPOSED ROUGH ESTIMATE OF THE NATURAL AREA BUFFER ZONES AS REQUIRED BY LAND USE CODE SECTION 3.4.1(E). DETAILED MAPPING OF THE SITE'S NATURAL AREAS, HABITATS, AND FEATURES WILL BE PROVIDED AT THE TIME OF INDIVIDUAL PDP SUBMITTALS. GENERAL BUFFER ZONES SHOWN ON THIS ODP MAY BE REDUCED OR ENLARGED BY THE DECISION MAKER DURING THE PDP PROCESS.
- PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONES.
- THE CAPACITY FOR THE SITE IS DETERMINED BY THE CURRENT CAPACITY OF THE SANITARY SEWER LINE, DETERMINED BY SFCDSD AND FLOWD. THIS CAPACITY IS SUBJECT TO CHANGE WITH FUTURE INFRASTRUCTURE IMPROVEMENTS. POTENTIAL FUTURE CAPACITY CHANGES SHALL BE COORDINATED WITH SFCDSD/CLWD.
- ACCESS POINTS SHOWN ON THIS ODP ARE APPROXIMATE. EXACT LOCATIONS TO BE DETERMINED DURING THE PDP PROCESS.
- A MINIMUM OF FOUR (4) HOUSING TYPES WILL BE APPLIED OVER THE ENTIRE ODP, AND FINALIZED AT THE PROJECT DEVELOPMENT PLAN PHASE.

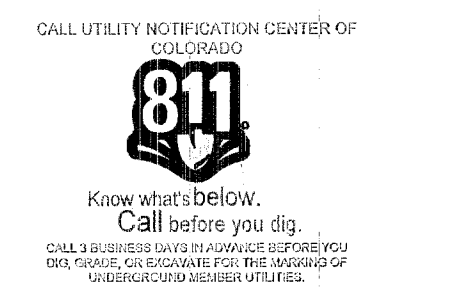
HANSEN FARM
Overall Development Plan

6029 S. Timberline Road
Fort Collins, Colorado

LORSON NORTH DEVELOPMENT CORP., LLC.

212 N. WAHSATCH AVE.
SUITE 301
COLORADO SPRINGS, CO 80903
CONTACT: JEFF MARK

NOT FOR CONSTRUCTION FOR REVIEW ONLY



Staff Comments	8.29.17
Revisions	10.3.17
P&Z Approval	10.19.17

JULY 18, 2017

Overall Development Plan

Traffic Impact Study

HANSEN

Fort Collins, Colorado

Eugene G. Coppola, P.E.

P.O. Box 630027

Littleton, CO 80163

303-792-2450

Transportation Impact Study

HANSEN

Fort Collins, Colorado

Prepared For:
The Landhuis Company
212 N. Wahsatch Ave., Suite 301
Colorado Springs, CO 80903

Prepared By:
Eugene G. Coppola, P.E.
P. O. Box 630027
Littleton, CO 80163
303-792-2450

August 28, 2017



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I. INTRODUCTION

Hansen is a mixed use development located along the south side of Timberline Road across from Zephyr Road in Fort Collins, Colorado. As currently planned, it will have 152 single family homes, 64 townhouses, 250 multi-family units, and about 5 acres of commercial development. A vicinity map is presented on Figure 1.

This traffic impact study follows the established guidelines for such studies as are applicable and appropriate to the proposed project. It is consistent with the scoping sheets submitted to the City and provided in Appendix A. The following key steps were undertaken as part of this study.

- Obtain current traffic and roadway data in the immediate area of the site.
- Evaluate current operations to establish base conditions.
- Determine site generated traffic and distribute this traffic to the nearby street system.
- Estimate roadway traffic for future conditions.
- Evaluate operations with Hansen fully operational.
- Identify deficiencies and recommend measures to minimize or mitigate the impact of site generated traffic.

Key areas of investigation are documented in the following sections of this traffic impact study.

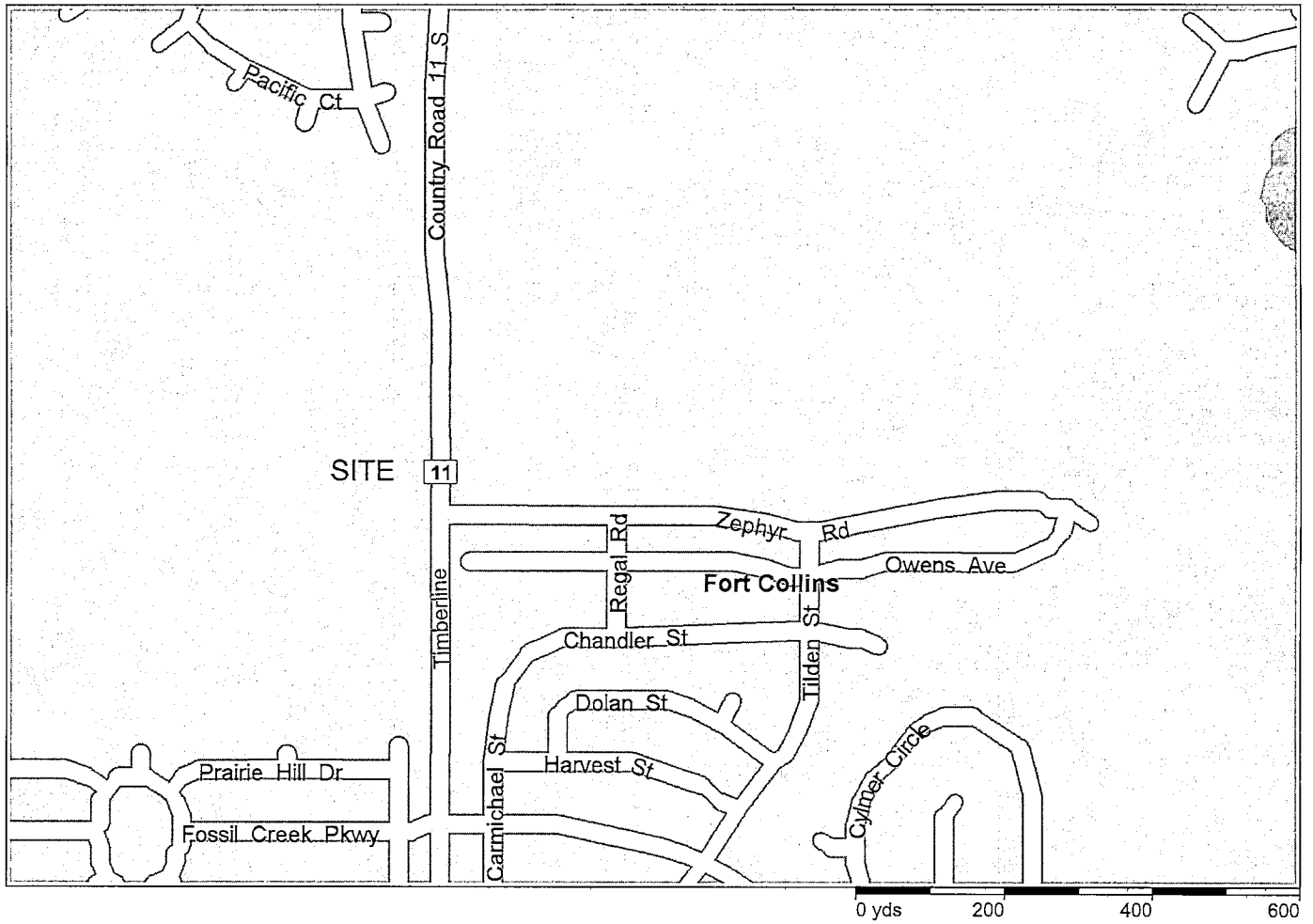


Figure 1
VICINITY MAP

II. CURRENT CONDITIONS

A. Current Road Network

The site is bordered on the east by Timberline Road (Timberline). Zephyr Road (Zephyr) currently extends east of Timberline. Timberline is classified as a major (4 lane) arterial street with Zephyr Road being a two lane collector street. The posted speed limit on Timberline is 40 MPH with Zephyr posted at 25 MPH. Bicycle lanes currently exist on Timberline and Zephyr with sidewalks available adjacent to development.

Zephyr extends east of Timberline for about one mile and ends at Ziegler Road. It mostly serves the local residential areas.

Timberline Road is currently planned for widening in the near term. The existing roadway system is shown on Figure 2.

B. Current Traffic

Peak hour traffic counts were conducted as part of this study at key intersections. Counts were undertaken from 7:00 – 9:00 AM and 4:00 – 6:00 PM representing typical morning and afternoon peak hours. Current peak hour traffic is shown on Figure 3. It should be noted that traffic associated with Bacon Elementary School should be included in the morning peak hour counts with a limited amount of school traffic included in the afternoon peak hour counts. School bell times are 9:00 AM and 3:43 PM based on the school's website. Count tabulations are available in Appendix B.

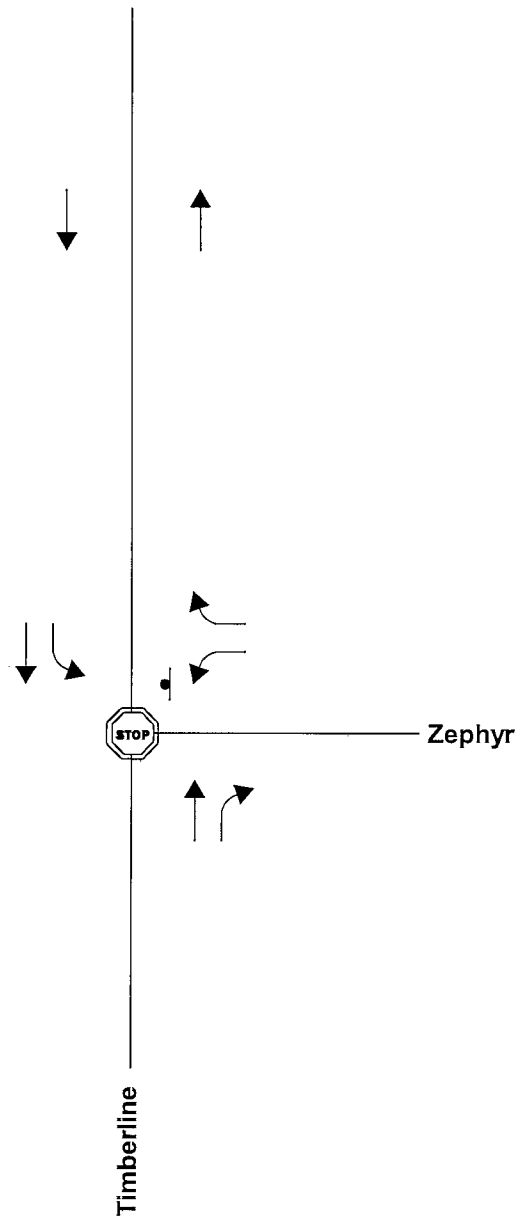
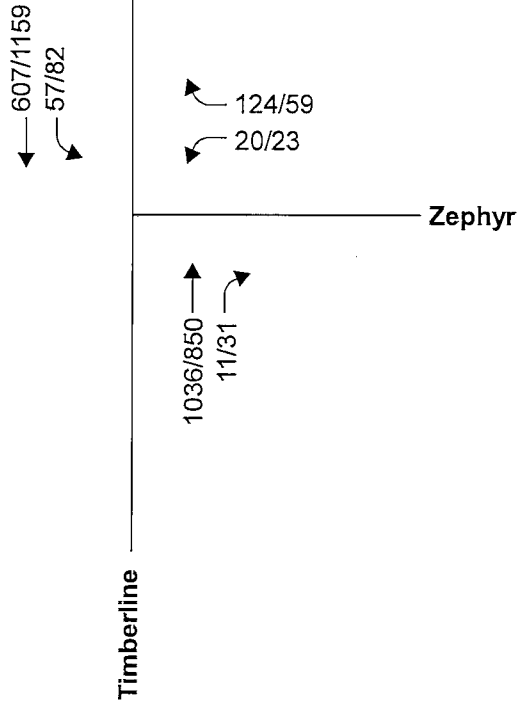


Figure 2
CURRENT ROADWAY GEOMETRY



LEGEND: AM/PM Peak Hour

Figure 3
CURRENT TRAFFIC

C. Surrounding Land Uses

The area surrounding Hansen is primarily composed of residential land uses. Bacon Elementary School is located on the east side of Timberline along the north side of Zephyr.

D. Current Operating Conditions

Highway Capacity Manual procedures, based on the 2010 Highway Capacity Manual, were used to quantify current intersection operations. Resultant levels of service (LOS) are indicated below for morning and afternoon peak hour conditions. Analyses were undertaken for the Timberline – Zephyr intersection. Traffic from Figure 3 was loaded onto the current roadway geometry, which is shown on Figure 2. For definition purposes, at arterial street intersections with local and collector streets, the individual stop sign controlled traffic movements are allowed to operate at LOS F. This is typical of urban peak hour conditions.

CURRENT OPERATING CONDITIONS				
Intersection	Control	Movement/ Direction	Level of Service	
			AM Pk Hr.	PM Pk Hr.
Timberline – Zephyr	Stop	WB L	D	F
		WB R	E	C
		SB L	B	B

As shown above, the individual traffic movements at this intersection operate acceptably during peak hours. Capacity work sheets are provided in Appendix B.

III. DEVELOPMENT ISSUES

A. Project Description

Hansen is primarily a residential development having, 152 single family homes, 64 townhouses, 250 multi-family units, and 5 acres of commercial development. Construction will start as soon as practical with build out expected in 5 – 7 years.

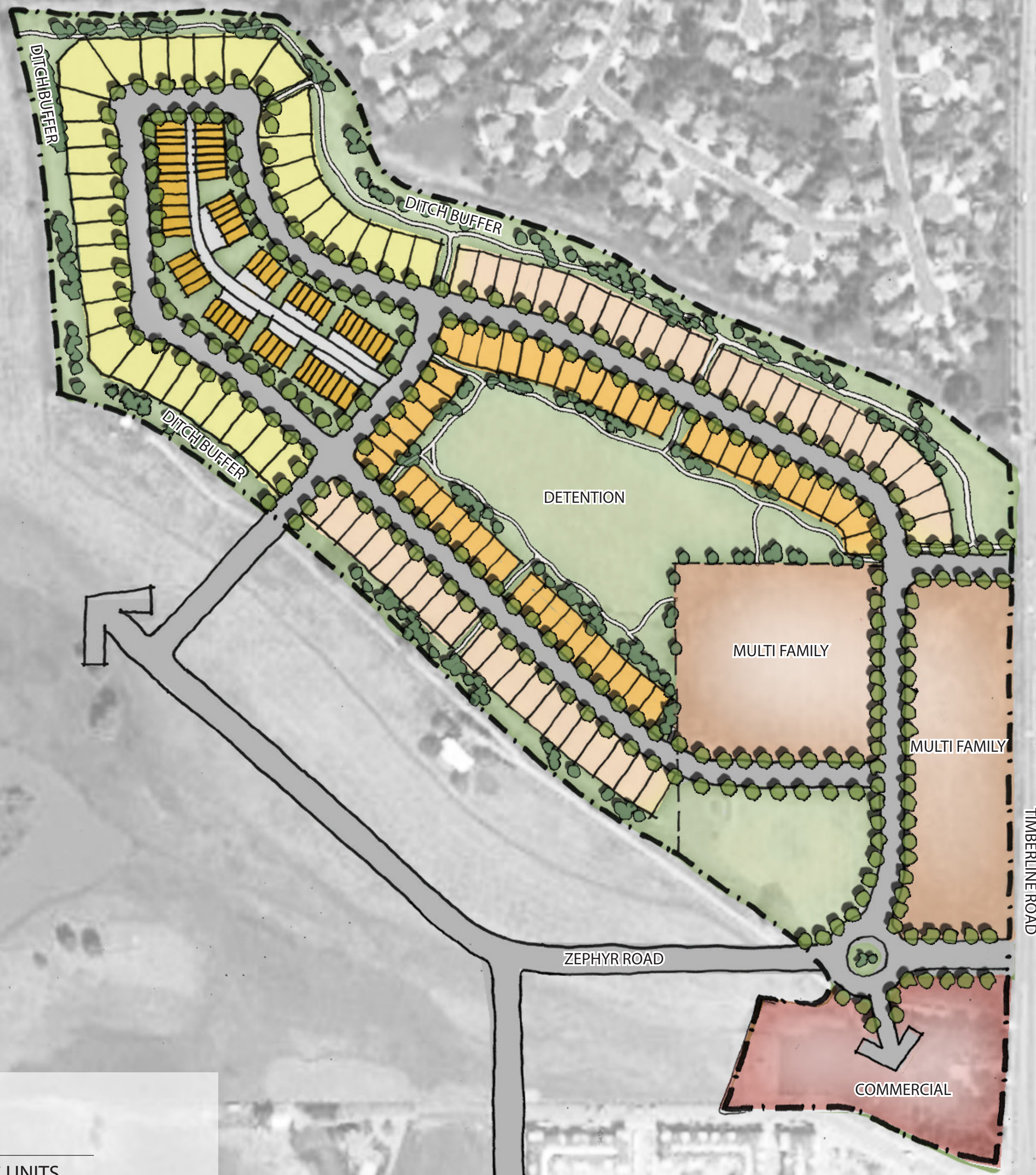
Site access will be provided two full movement street connections to Timberline. The south intersection will align with Zephyr Road on the east side of Timberline. The north intersection will not meet City access spacing requirements; however, this intersection will maintain acceptable operations. This access is consistent with other subdivisions along the Timberline corridor. A concept plan is presented on Figure 4.

B. Site Traffic

Site traffic was estimated using Institute of Transportation Engineers (ITE) publication, "Trip Generation, 9th Edition", a nationally recognized reference. Trips associated with Hansen are indicated in the following table.

Land Use	Size	Daily		AM Peak Hour			PM Peak Hour		
		Rate	Trips	Rate	In	Out	Rate	In	Out
Single Family	152 D.U.	9.52	1,447	0.75	28	86	1.00	96	56
Townhouses	64 D.U.	5.81	372	0.44	5	23	0.52	22	11
Multi-Family	250 D.U.	6.65	1,663	0.51	26	102	0.62	101	54
Commercial	50,000' SF	44.32	2,216	0.68	19	15	2.71	60	76
TOTAL			5,698		78	226		279	197

As shown above, Hansen is expected to generate 304 morning peak hour trips, 476 afternoon peak hour trips, and 5,698 trips per day. These trips are considered manageable.



LOT ANALYSIS

- 45' X 85' LOTS - 47 UNITS
- 50' X 110' LOTS - 45 LOTS
- 60' X 110' LOTS - 34 UNITS
- TOWNHOMES - 60 UNITS
 - (4) 7-UNIT
 - (4) 5-UNIT
 - (3) 4-UNIT

186 TOTAL UNITS
(4 DU/ACRE)

Figure 4
CONCEPT PLAN

C. Trip Distribution

Trip distribution is a function of the origin and destination of site users and the available roadway system. In this case, all traffic must use either Timberline or Zephyr to arrive at and depart the site. Site traffic distributions shown on Figure 5 are based on the current roadway network and current traffic in the area of this site. Resultant peak hour site traffic is shown on Figure 6 for both the morning and afternoon peak hours.

IV. AGENCY DISCUSSIONS

Prior to commencing with this traffic impact study, key traffic engineering elements and key assumptions were discussed with Nicole Hahn, representing the City of Fort Collins. Agreed upon items are identified below:

1. Traffic growth is estimated at 1½ - 2% per year on streets serving this area.
2. Given the planned uses, weekday morning and afternoon peak hours were determined worthy of investigation.
3. A full traffic impact study is appropriate for this development. The study should be based on the Scoping Sheet in Appendix A which was submitted to the City.

The above items are fully considered in the following sections of this study.

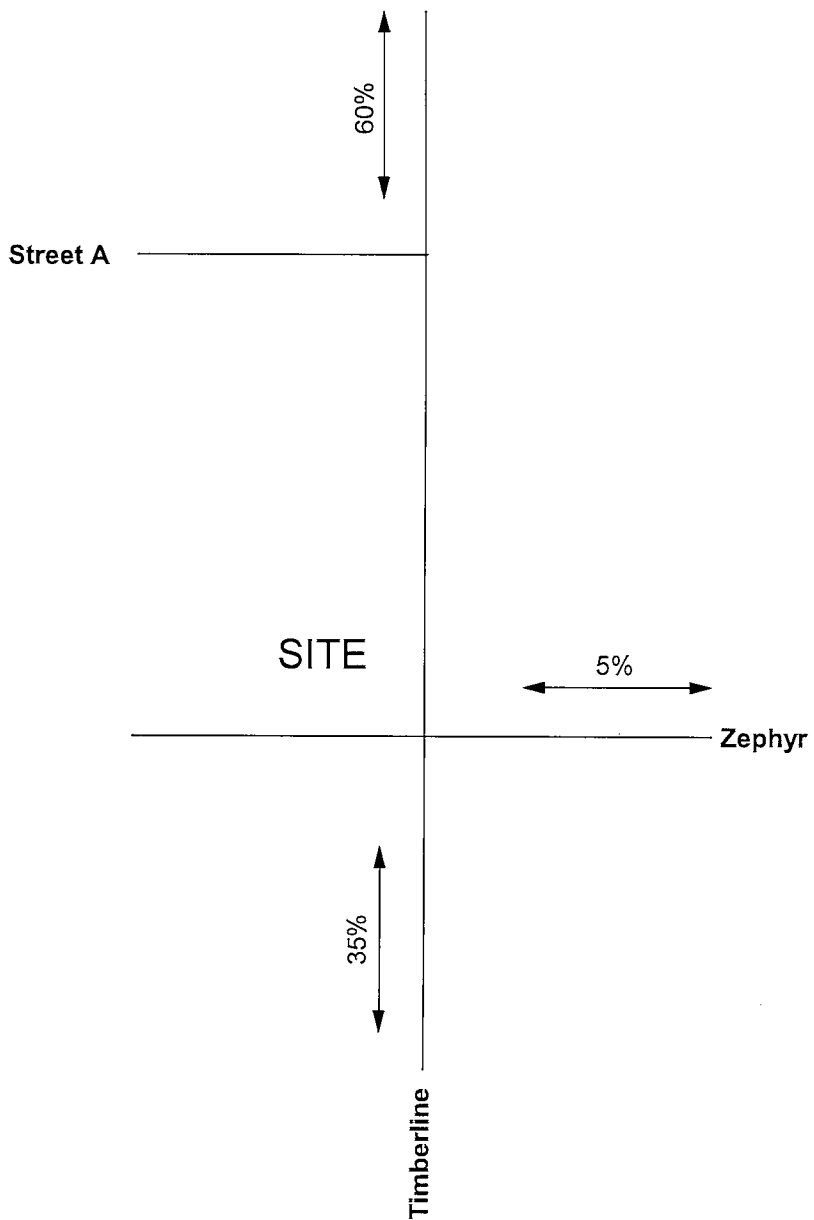
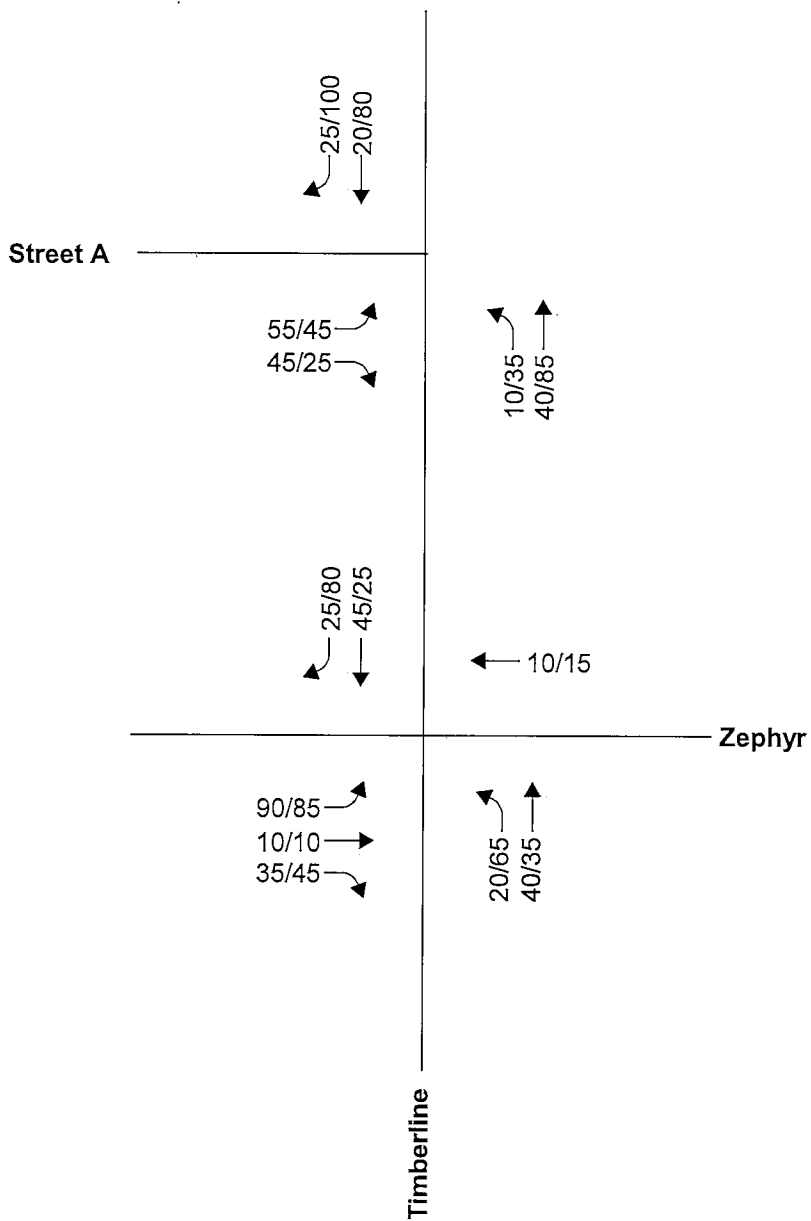


Figure 5
SITE TRAFFIC DISTRIBUTION



LEGEND: AM/PM Peak Hour

NOTE: Rounded to nearest 5 vehicles.

Figure 6
SITE TRAFFIC

V. FUTURE CONDITIONS

A. Roadway Improvements

Fort Collins plans to improve Timberline to a five lane roadway in the near term. This improvement will result in two lanes in each direction with a center left turn lane in the area of the site. This improvement is currently planned and funded by the City for 20201 and is assumed available in the short term time frame.

B. Future Background Traffic

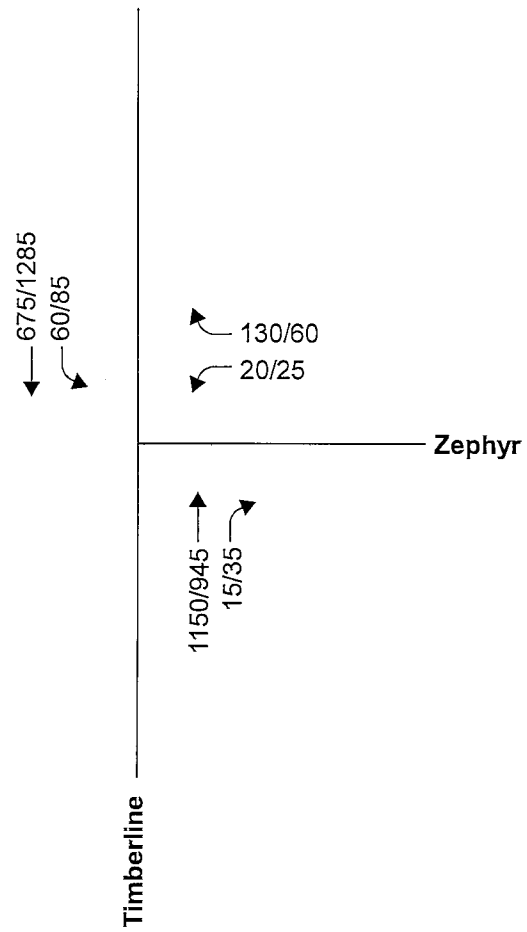
Short term (2022) and long term traffic was estimated using the above agreed upon growth. Background traffic is present on Figures 7 and 8 for the short and long term time frames, respectively.

C. Future Total Traffic

Short term and long term total traffic was developed by combining site traffic and background traffic for those time frames. Total traffic is shown on Figures 9 and 10 for the short term and long term, respectively.

VI. TRAFFIC IMPACTS

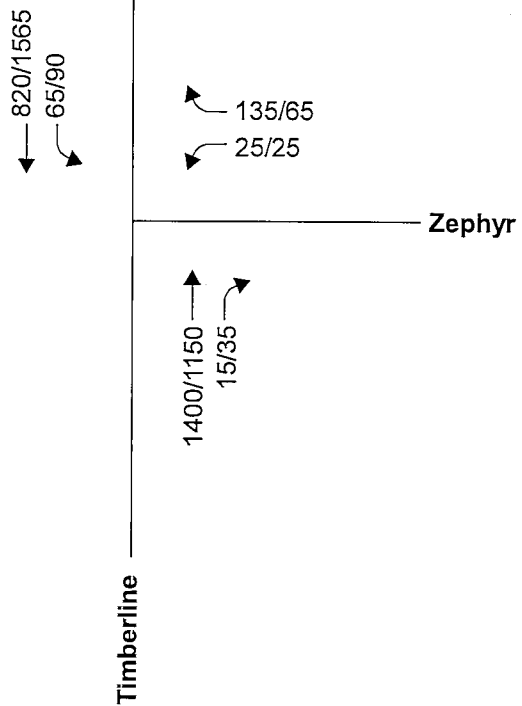
In order to assess operating conditions with Hansen fully operational, capacity analyses were conducted at the Timberline – Zephyr and site access intersections. Total traffic (the combination of background traffic and site traffic) was used in this effort.



LEGEND: AM/PM Peak Hour

NOTE: Rounded to nearest 5 vehicles.

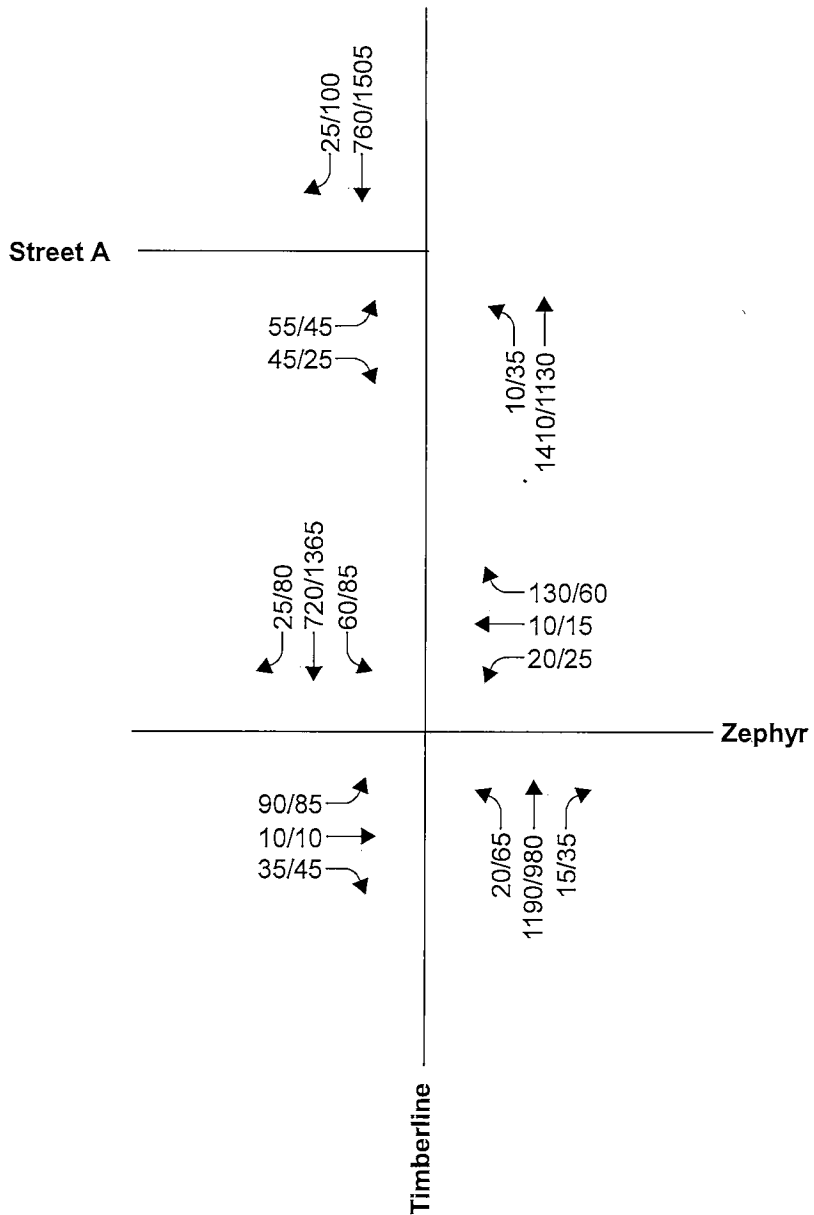
Figure 7
SHORT TERM BACKGROUND TRAFFIC



LEGEND: AM/PM Peak Hour

NOTE: Rounded to nearest 5 vehicles.

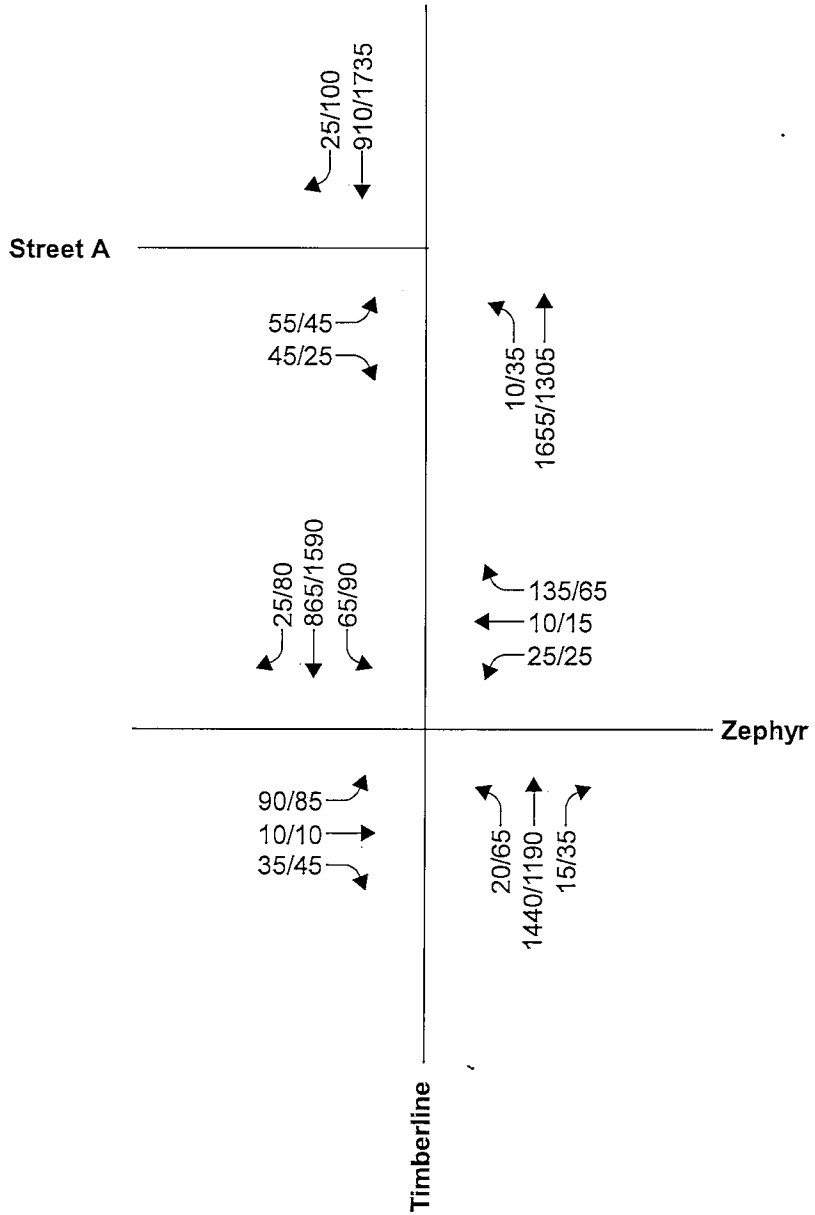
Figure 8
LONG TERM BACKGROUND TRAFFIC



LEGEND: AM/PM Peak Hour

NOTE: Rounded to nearest 5 vehicles.

Figure 9
SHORT TERM TOTAL TRAFFIC



LEGEND: AM/PM Peak Hour

NOTE: Rounded to nearest 5 vehicles.

Figure 10
LONG TERM TOTAL TRAFFIC

Short term total traffic and long term total traffic was reviewed to determine the need for future auxiliary lanes. The results of this review are discussed in the following section.

A. Auxiliary Lane Requirements

Traffic movements at the above noted intersections were reviewed. This effort focused on the need for right turn and left turn lanes to accommodate site traffic in the short- and long term time frames. LCUASS turn lane warrants were used in this effort. It was determined that right and left turn lanes will be warranted along Timberline at both site access points in the short term. Given the planned widening of Timberline, an additional through lane in each direction and a center left turn lane were assumed built with that project. No additional site related improvements will be needed in the long term.

B. Auxiliary Lane Design

Northbound left turn lanes will also be needed on Timberline at Zephyr and the north site access. Site related left turn lanes at the site access points should be planned as indicated below assuming retention of the existing 40 mile per hour speed limit and a 12-foot wide turn lane. The anticipated northbound left turn storage needed at Zephyr is 100 feet with 50 feet of storage needed at Street A. These parameters are subject to adjustment based upon findings and area wide investigations conducted during preliminary design. The left turn lanes are assumed available in the short term given the planned improvements to Timberline.

C. Short Term Operating Conditions

Short term operating conditions with Hansen fully built were evaluated using total traffic. This investigation used the peak hour traffic shown on Figure 9 and the short term roadway geometry shown on Figure 11 and resulted in the future operating conditions shown below.

SHORT TERM OPERATING CONDITIONS WITH HANSEN				
Intersection	Control	Movement/ Direction	Level of Service	
			AM Pk Hr.	PM Pk Hr.
Timberline – Zephyr	Stop	EB L	F	F
		EB TR	E	F
		WB L	F	F
		WB TR	E	F
		NB L	A	C
		SB L	B	B
Timberline – Zephyr	Signal	EB L	C	C
		EB TR	C	C
		WB L	C	C
		WB TR	C	C
		NB L	A	B
		NB T	B	B
		NB R	A	B
		SB L	B	A
		SB T	B	C
		SB R	B	B
		Overall	B	C
Timberline – Street A	Stop	EB LR	C	F
		NB L	B	D

Site traffic is not expected to significantly impact other intersections along Timberline Road. This is due to the expectation that site traffic will primarily increase through traffic movements at those intersections.

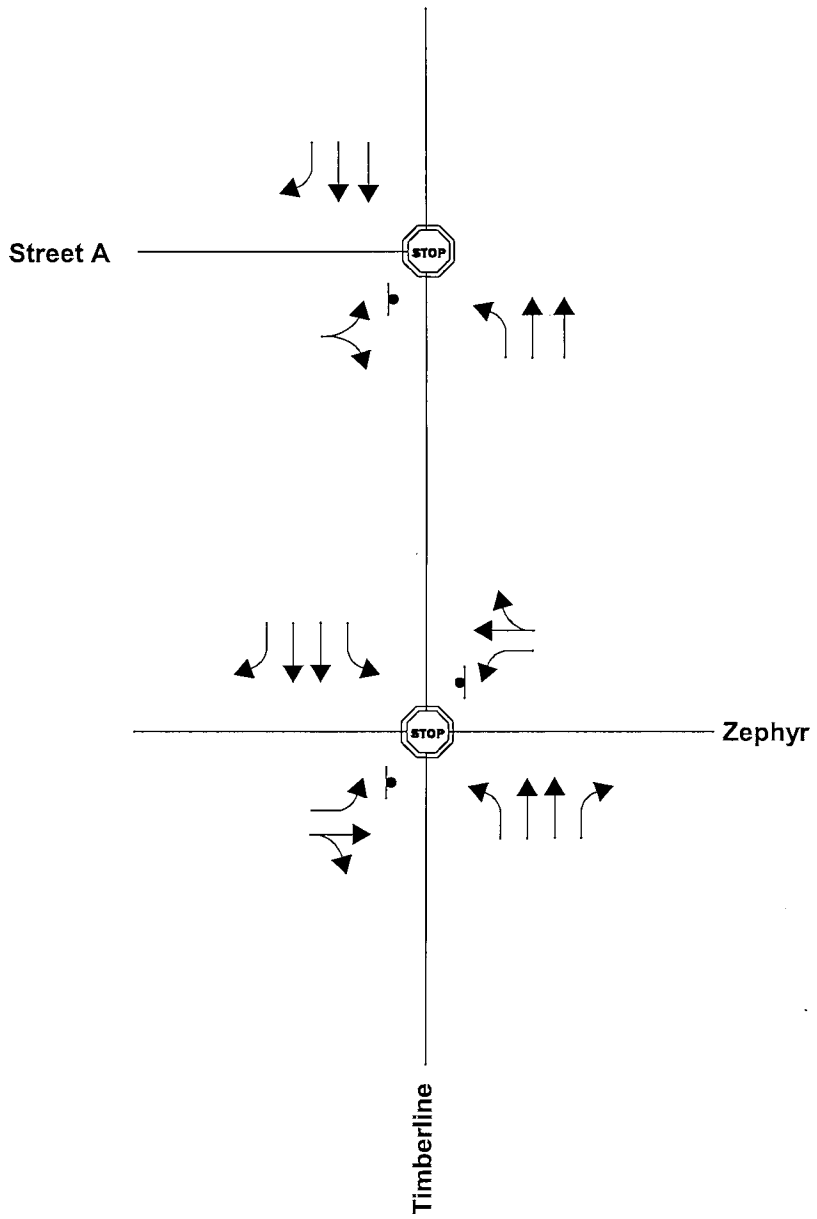


Figure 11

SHORT TERM ROADWAY GEOMETRY

As shown, significant side street delay can be expected with Hansen fully built in the short term. This is typical of conditions when traffic levels are approaching those associated with traffic signals. Traffic signals are assumed installed when warranted. Capacity work sheets are available in Appendix D.

D. Long Term Operating Conditions

Long term conditions were evaluated with Hansen fully built. This reflects the roadway geometry and traffic controls shown on Figure 12. Future levels of service were calculated using the long term total traffic shown on Figure 10.

LONG TERM OPERATING CONDITIONS WITH HANSEN				
Intersection	Control	Movement/ Direction	Level of Service	
			AM Pk Hr.	PM Pk Hr.
Timberline – Zephyr	Signal	EB L	D	C
		EB TR	C	C
		WB L	C	C
		WB TR	C	C
		NB L	A	B
		NB T	B	B
		NB R	A	A
		SB L	B	B
		SB T	B	C
		SB R	A	A
		Overall	B	C
Timberline – Street A	Stop	EB LR	C	F
		NB L	B	C

As indicated, acceptable long term operating conditions are expected. Capacity worksheets are presented in Appendix E.

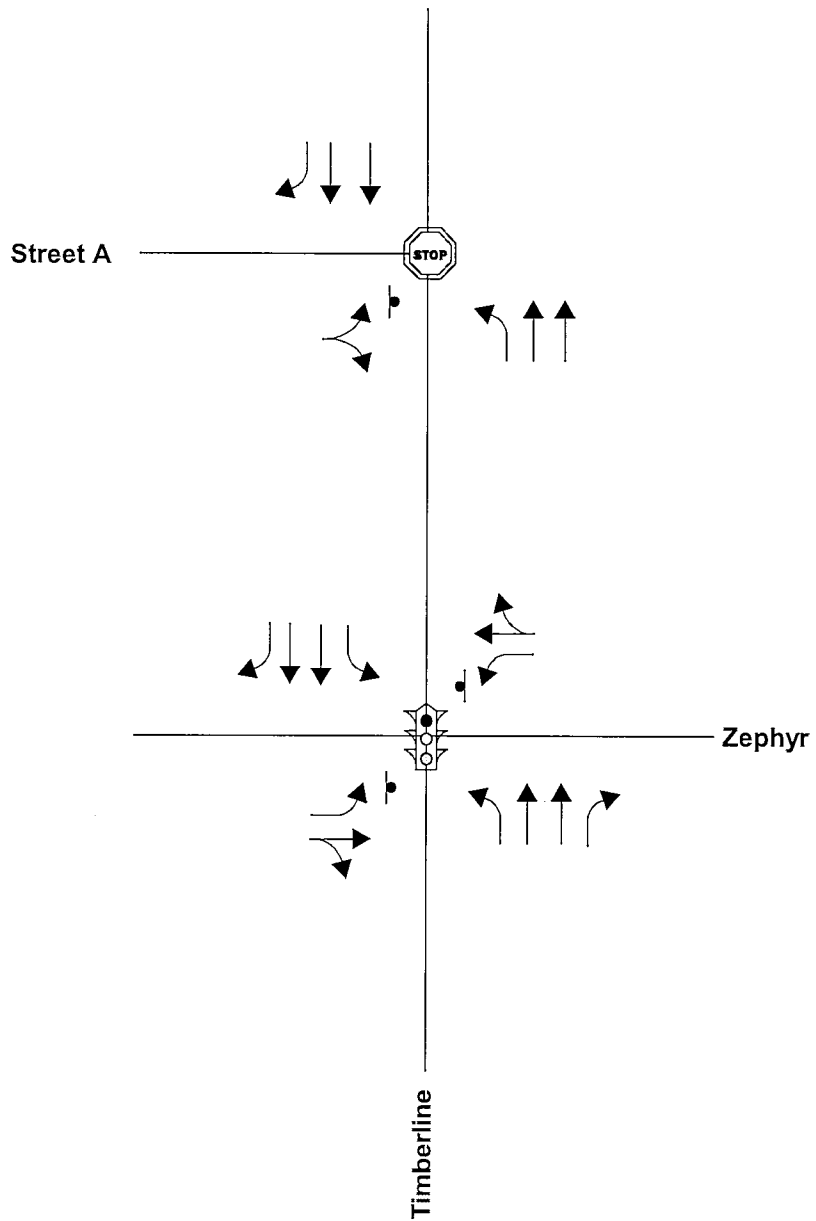


Figure 12

LONG TERM ROADWAY GEOMETRY

E. Pedestrian Facilities

Sidewalks currently exist along the west side of Timberline to the north and south of the site. With this development, sidewalks will be constructed both internally and along the west side of Timberline adjacent to the site. This will provide improved continuity of the sidewalk system along Timberline.

Bacon Elementary school was contacted to determine school access from this site. It was stated that busing will be available for students from the Hansen development.

F. Bicycle Facilities

Timberline currently has bicycle lanes along both sides of the road adjacent to the site and for significant distances to the north and south. These bicycle lanes connect to the east-west bicycle lanes on major cross streets. These lanes provide excellent connectivity to area destinations.

VII. CONCLUSIONS

Based on the analyses, investigations, and findings documented in earlier sections of this report, the following can be concluded:

- Current roadway operations in the area of the Hansen site are acceptable during all peak hour periods.
- Site traffic associated with build out of Hansen is expected to be 304 morning peak hour trips, 476 afternoon peak hour trips, and 5,698 trips per day. These trips are considered manageable.

- Southbound right turn and northbound left turn lanes are needed at the Timberline – Zephyr and site access intersections in the short term. Northbound left turn lanes at both site access locations are anticipated with the planned widening of Timberline.
- Short term traffic will be approaching levels normally associated with traffic signal installation. Consequently, the City should monitor traffic at the Timberline – Zephyr intersection as the short term horizon approaches.
- City required pedestrian and bicycle facilities will be provided with this development resulting in excellent connectivity to area attractions. Additionally, students attending Bacon Elementary School will be bused.
- Traffic operating conditions will be acceptable with the proposed development in both the short- and long term time frames.
- Hansen is viable from a traffic engineering perspective.

In summary, the traffic demands associated with Hansen can be easily managed. This is documented by the determination that acceptable operating conditions are anticipated in the vicinity of this development for the foreseeable future.

APPENDIX A

Attachment A Transportation Impact Study Base Assumptions

Project Information		
Project Name	<i>Hansen - 215 SF Homes, 250 condos, & 5AC commercial</i>	
Project Location	<i>NWE Timberline & Zephyr</i>	
TIS Assumptions		
Type of Study	Full: <input checked="" type="checkbox"/>	Intermediate: <input type="checkbox"/>
Study Area Boundaries	North: <i>Site</i>	South: <i>Site</i>
	East: <i>Timberline</i>	West: <i>Site</i>
Study Years	Short Range: <i>2022</i>	Long Range: <i>2035</i>
Future Traffic Growth Rate	<i>1 1/2% Timberline 1/2% Zephyr</i>	
Study Intersections	1. All access drives	5.
	2. <i>Timberline-Zephyr</i>	6.
	3.	7.
	4.	8.
Time Period for Study	<input checked="" type="checkbox"/> AM 7:00-9:00	<input checked="" type="checkbox"/> PM 4:00-6:00 Sat Noon: <i>No</i>
Trip Generation Rates	<i>ITE</i>	
Trip Adjustment Factors	Passby: <input type="checkbox"/>	Captive Market: <input type="checkbox"/>
Overall Trip Distribution	<i>SEE ATTACHED SKETCH Current patterns on adjacent street</i>	
Mode Split Assumptions	<input type="checkbox"/>	
Committed Roadway Improvements	<i>Timberline widening</i>	
Other Traffic Studies		
Areas Requiring Special Study	<i>Signal warrant analysis</i>	

Date: 7-17-17

Traffic Engineer: *Gene Coppola*

Local Entity Engineer: _____

APPENDIX B

TABULAR SUMMARY OF VEHICLE COUNTS

EUGENE G. COPPOLA, P.E.
 P.O. Box 630027
 Littleton, CO 80163
 Phone: (303) 792-2450

Intersection: Timberline & Zephyr

Date: 5/12/2017 **Observer:** Vickie
Day: Thursday **City:** Fort Collins, CO

Time Begins	Northbound:			Southbound:			Eastbound:			Westbound:			Total east/west	Total All
	L	S	R	L	S	R	L	S	R	L	S	R		
07:00	0	229	2	9	123	0	0	0	0	0	0	13	23	386
07:15	0	279	3	16	141	0	0	0	0	0	0	19	21	460
07:30	0	278	2	14	185	0	0	0	0	0	0	42	43	522
07:45	0	250	4	18	158	0	0	0	0	0	0	50	57	487
08:00	0	206	6	15	130	0	0	0	0	0	0	23	28	385
08:15	0	183	5	12	140	0	0	0	0	0	0	14	19	359
08:30	0	204	26	29	140	0	0	0	0	0	0	42	56	455
08:45	0	189	32	26	117	0	0	0	0	0	0	54	70	434
7:00-8:00	0	1036	11	57	607	0	0	0	0	0	0	124	144	1855
PHF	0.93												0.63	

04:00	0	191	5	11	253	0	0	0	0	0	0	17	21	481
04:15	0	191	6	12	282	0	0	0	0	0	0	13	18	509
04:30	0	210	9	24	271	0	0	0	0	0	0	17	24	538
04:45	0	213	5	12	279	0	0	0	0	0	0	15	19	528
05:00	0	197	7	16	313	0	0	0	0	0	0	16	21	554
05:15	0	230	10	30	296	0	0	0	0	0	0	11	18	584
05:30	0	215	14	7	277	0	0	0	0	0	0	14	23	536
05:45	0	195	2	15	230	0	0	0	0	0	0	21	26	468
4:30-5:30	0	850	31	82	1159	0	0	0	0	0	0	59	82	2204
PHF	0.92												0.85	

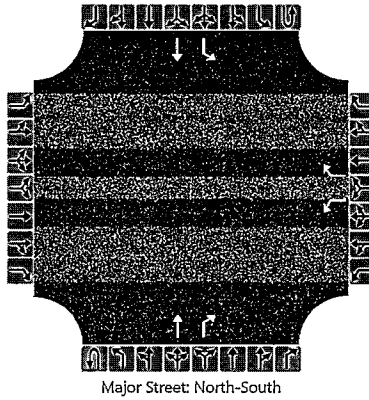
L = left turn S = straight R = right turn

APPENDIX C

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst		Intersection	TIMBERLINE & ZEPHYR
Agency/Co.		Jurisdiction	
Date Performed	7/30/2017	East/West Street	
Analysis Year	2017	North/South Street	TIMBERLINE
Time Analyzed	EX ST LT AM PM	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1		0	1	1		0	1	0
Configuration						L		R			T	R		L	T	
Volume (veh/h)						20		124			1036	11		57	607	
Percent Heavy Vehicles						3		3						3		
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

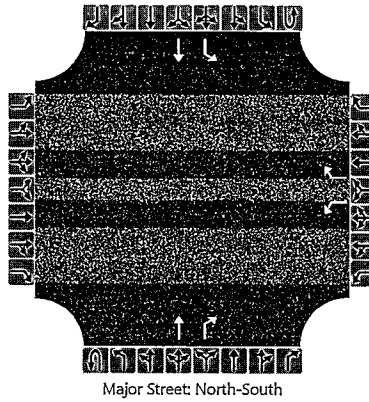
Delay, Queue Length, and Level of Service

Flow Rate (veh/h)					22		135						62			
Capacity					177		248						610			
v/c Ratio					0.12		0.54						0.10			
95% Queue Length					0.4		3.0						0.3			
Control Delay (s/veh)					28.3		35.6						11.6			
Level of Service (LOS)					D		E						B			
Approach Delay (s/veh)					34.6								1.0			
Approach LOS					D											

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst		Intersection	TIMBERLINE & ZEPHYR
Agency/Co.		Jurisdiction	
Date Performed	7/30/2017	East/West Street	
Analysis Year	2017	North/South Street	TIMBERLINE
Time Analyzed	(EX) ST LT AM (PM)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

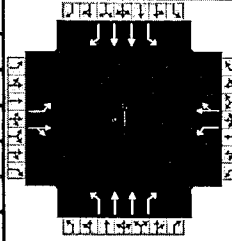
Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	0	0		1	0	1	0	0	1	1	0	1	1	0	
Configuration						L		R			T	R		L	T		
Volume (veh/h)						23		59			850	31		82	1159		
Percent Heavy Vehicles						3		3						3			
Proportion Time Blocked																	
Right Turn Channelized	No				No				No				No				
Median Type	Left Only																
Median Storage	1																

Delay, Queue Length, and Level of Service

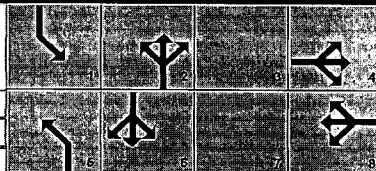
Flow Rate (veh/h)					25		64							89			
Capacity					97		325							713			
v/c Ratio					0.26		0.20							0.12			
95% Queue Length					0.9		0.7							0.4			
Control Delay (s/veh)					54.7		18.8							10.8			
Level of Service (LOS)					F		C							B			
Approach Delay (s/veh)					28.9								0.7				
Approach LOS					D												

APPENDIX D

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information									
Agency				Duration, h		0.25							
Analyst		Analysis Date		7/30/2017		Area Type					Other		
Jurisdiction		Time Period				PHF					0.92		
Urban Street		Analysis Year		2022		Analysis Period					1 > 7:00		
Intersection		TIMBERLINE - ZEPHYR		File Name		Streets1.xus							
Project Description		ST LT AM PM											

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	90	10	35	20	10	130	20	1190	15	60	720	25

Signal Information												
Cycle, s	66.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

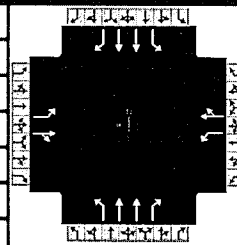
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		18.0		18.0	14.0	34.0	14.0	34.0
Change Period, (Y+R _c), s		3.0		3.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g _s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g _e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	0
Queue Service Time (g _s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g _c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.23	0.23		0.23	0.23		0.61	0.45	0.45	0.61	0.45	0.45
Capacity (c), veh/h	294	379		390	370		575	1644	732	436	1644	732
Volume-to-Capacity Ratio (X)	0.332	0.129		0.056	0.411		0.038	0.787	0.022	0.150	0.476	0.037
Back of Queue (Q), ft/ln (50 th percentile)	38.8	15.5		7	54		2.6	189.7	3	8.7	88.8	5.1
Back of Queue (Q), veh/ln (50 th percentile)	1.6	0.6		0.3	2.2		0.1	7.6	0.1	0.3	3.6	0.2
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	26.0	20.3		21.2	21.7		6.3	15.3	9.9	9.6	12.5	10.0
Incremental Delay (d ₂), s/veh	3.0	0.7		0.3	3.4		0.1	3.9	0.1	0.7	1.0	0.1
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	29.0	21.0		21.5	25.1		6.4	19.2	10.0	10.4	13.5	10.1
Level of Service (LOS)	C	C		C	C		A	B	A	B	B	B
Approach Delay, s/veh / LOS	26.4	C		24.6	C		18.8	B		13.2	B	
Intersection Delay, s/veh / LOS	17.7						B					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency				Duration, h	0.25		
Analyst		Analysis Date	7/30/2017	Area Type	Other		
Jurisdiction		Time Period		PHF	0.92		
Urban Street		Analysis Year	2022	Analysis Period	1 > 7:00		
Intersection	TIMBERLINE - ZEPHYR			File Name	Streets1.xus		
Project Description	(S) LT AM (PM)						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	85	10	45	25	15	60	65	980	35	85	1365	80

Signal Information														
Cycle, s	66.0	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0				
				Red	0.0	0.0	0.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		18.0		18.0	14.0	34.0	14.0	34.0
Change Period, (Y+R _c), s		3.0		3.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g _s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g _e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

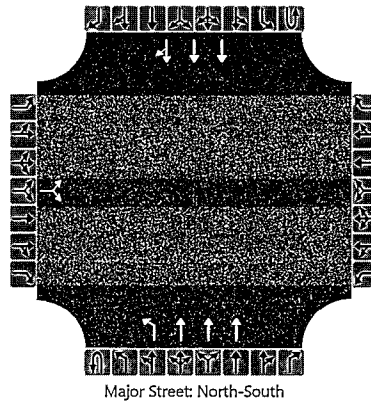
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	0
Queue Service Time (g _s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g _c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.23	0.23		0.23	0.23		0.61	0.45	0.45	0.61	0.45	0.45
Capacity (c), veh/h	360	376		380	377		400	1644	732	489	1644	732
Volume-to-Capacity Ratio (X)	0.257	0.159		0.072	0.216		0.177	0.648	0.052	0.189	0.902	0.119
Back of Queue (Q), ft/ln (50 th percentile)	32.9	19.2		8.8	26.6		11.5	137.1	7.1	12.3	257	17
Back of Queue (Q), veh/ln (50 th percentile)	1.3	0.8		0.4	1.1		0.5	5.5	0.3	0.5	10.3	0.7
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	23.4	20.4		21.6	20.7		11.8	13.9	10.1	8.0	16.6	10.4
Incremental Delay (d ₂), s/veh	1.7	0.9		0.4	1.3		1.0	2.0	0.1	0.9	8.5	0.3
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	25.1	21.3		22.0	22.0		12.8	15.9	10.2	8.9	25.1	10.7
Level of Service (LOS)	C	C		C	C		B	B	B	A	C	B
Approach Delay, s/veh / LOS	23.6	C		22.0	C		15.5	B		23.5	C	
Intersection Delay, s/veh / LOS	20.4			20.4			15.5			23.5		

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst		Intersection	TIMBERLINE - STREET A
Agency/Co.		Jurisdiction	
Date Performed	7/30/2017	East/West Street	
Analysis Year	2037	North/South Street	
Time Analyzed	ST LT AM PM	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	0	0		0	0	0	0	1	3	0	0	0	3	0	
Configuration			LR							L	T				T	TR	
Volume (veh/h)		55		45						10	1410				760	25	
Percent Heavy Vehicles		3		3						3							
Proportion Time Blocked																	
Right Turn Channelized	No				No				No				No				
Median Type	Left Only																
Median Storage	1																

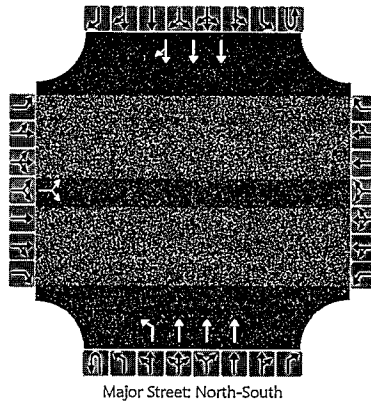
Delay, Queue Length, and Level of Service

Flow Rate (veh/h)			109										11				
Capacity			422										458				
v/c Ratio			0.26										0.02				
95% Queue Length			1.0										0.1				
Control Delay (s/veh)			16.5										13.1				
Level of Service (LOS)			C										B				
Approach Delay (s/veh)	16.5								0.1								
Approach LOS	C																

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst		Intersection	TIMBERLINE - STREET A
Agency/Co.		Jurisdiction	
Date Performed	7/30/2017	East/West Street	
Analysis Year	2037	North/South Street	
Time Analyzed	(S) LT AM (PM)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	0	0		0	0	0	0	1	3	0	0	0	3	0	
Configuration			LR							L	T				T	TR	
Volume (veh/h)		45		25						35	1130				1505	100	
Percent Heavy Vehicles		3		3						3							
Proportion Time Blocked																	
Right Turn Channelized	No				No				No				No				
Median Type	Left Only																
Median Storage	1																

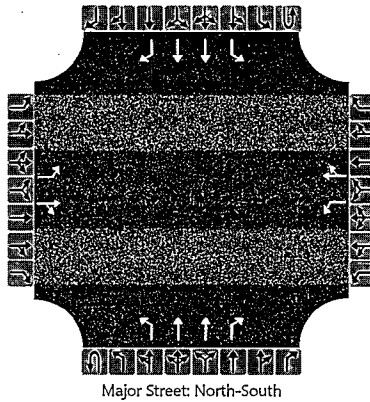
Delay, Queue Length, and Level of Service

Flow Rate (veh/h)			76							38							
Capacity			88							166							
v/c Ratio			0.86							0.23							
95% Queue Length			4.6							0.8							
Control Delay (s/veh)			143.4							32.9							
Level of Service (LOS)			F							D							
Approach Delay (s/veh)	143.4								1.0								
Approach LOS	F																

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst		Intersection	TIMBERLINE & ZEPHYR
Agency/Co.		Jurisdiction	
Date Performed	7/30/2017	East/West Street	
Analysis Year	2017	North/South Street	TIMBERLINE
Time Analyzed	EX ST LT AM PM	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	0		1	1	0	0	1	2	1	0	1	2	1
Configuration		L		TR		L		TR		L	T	R		L	T	R
Volume (veh/h)		90	10	35		20	10	130		020	1190	15		60	720	25
Percent Heavy Vehicles		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

Delay, Queue Length, and Level of Service

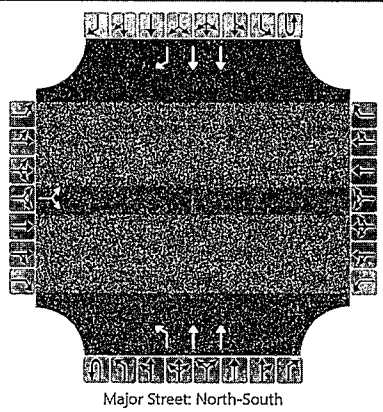
Flow Rate (veh/h)		98	49	22		152		22						65			
Capacity		80	128	100		230		805						519			
v/c Ratio		1.22	0.38	0.22		0.66		0.03						0.13			
95% Queue Length		7.3	1.6	0.8		4.1		0.1						0.4			
Control Delay (s/veh)		264.0	49.4	50.6		46.7		9.6						12.9			
Level of Service (LOS)		F	E	F		E		A						B			
Approach Delay (s/veh)		192.5				47.2				0.2				1.0			
Approach LOS		F				E				A				B			

APPENDIX E

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst		Intersection	TIMBERLINE - STREET A
Agency/Co.		Jurisdiction	
Date Performed	8/28/2017	East/West Street	
Analysis Year	2037	North/South Street	
Time Analyzed	ST (LT) (AM) PM	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	1	2	0	0	0	2	1
Configuration			LR							L	T				T	R
Volume (veh/h)		55		45						10	1655				910	25
Percent Heavy Vehicles		3		3						3						
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

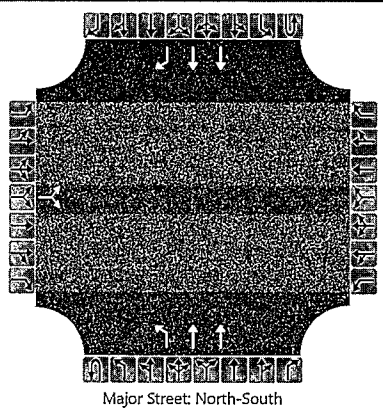
Delay, Queue Length, and Level of Service

Flow Rate (veh/h)			109							11						
Capacity			316							673						
v/c Ratio			0.34							0.02						
95% Queue Length			1.5							0.0						
Control Delay (s/veh)			22.2							10.4						
Level of Service (LOS)			C							B						
Approach Delay (s/veh)	22.2								0.1							
Approach LOS	C															

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst		Intersection	TIMBERLINE - STREET A
Agency/Co.		Jurisdiction	
Date Performed	8/28/2017	East/West Street	
Analysis Year	2037	North/South Street	
Time Analyzed	ST (LT) AM (PM)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

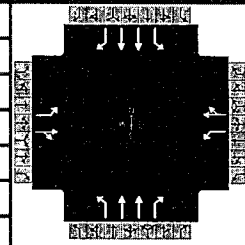
Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0		1	2	0		0	2	1
Configuration			LR							L	T				T	R
Volume (veh/h)		45		25						35	1305				1735	100
Percent Heavy Vehicles		3		3						3						
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left-Only															
Median Storage	1															

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)			76							38						
Capacity			104							281						
v/c Ratio			0.73							0.14						
95% Queue Length			3.9							0.5						
Control Delay (s/veh)			101.3							19.8						
Level of Service (LOS)			F							C						
Approach Delay (s/veh)	101.3								0.5							
Approach LOS	F															

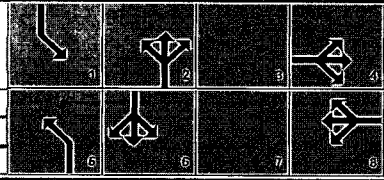
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency		Duration, h	0.25			
Analyst		Analysis Date	7/30/2017		Area Type	Other
Jurisdiction		Time Period	PHF			0.92
Urban Street		Analysis Year	Analysis Period			1> 7:00
Intersection	TIMBERLINE - ZEPHYR		File Name	TIMBERLINE-ZEPHYR.xus		
Project Description	ST (LT) (AM) PM					



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	90	10	35	25	10	135	20	1440	15	65	865	25

Signal Information													
Cycle, s	76.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	0.0	0.0	0.0	0.0	0.0	0.0			
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0			



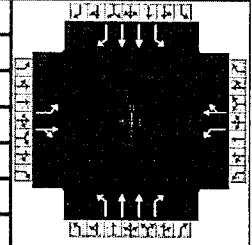
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		18.0		18.0	14.0	44.0	14.0	44.0
Change Period, (Y+R _c), s		3.0		3.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g _s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g _e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	0
Queue Service Time (g _s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g _c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.20	0.20		0.20	0.20		0.66	0.53	0.53	0.66	0.53	0.53
Capacity (c), veh/h	234	329		333	321		535	1904	847	379	1904	847
Volume-to-Capacity Ratio (X)	0.419	0.149		0.082	0.491		0.041	0.822	0.019	0.186	0.494	0.032
Back of Queue (Q), ft/ln (50 th percentile)	49.8	19.3		10.9	71.1		2.6	257.3	3	13.7	111.8	5
Back of Queue (Q), veh/ln (50 th percentile)	2.0	0.8		0.4	2.8		0.1	10.3	0.1	0.5	4.5	0.2
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	32.6	25.2		26.5	27.1		6.0	15.0	8.6	11.9	11.5	8.7
Incremental Delay (d ₂), s/veh	5.4	1.0		0.5	5.3		0.1	4.2	0.0	1.1	0.9	0.1
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	38.0	26.2		27.0	32.4		6.1	19.2	8.7	13.0	12.4	8.7
Level of Service (LOS)	D	C		C	C		A	B	A	B	B	A
Approach Delay, s/veh / LOS	34.1		C	31.6		C	18.9		B	12.4		B
Intersection Delay, s/veh / LOS	18.2			18.2			B			B		

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/30/2017	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street		Analysis Year		Analysis Period	1> 7:00
Intersection	TIMBERLINE - ZEPHYR		File Name	TIMBERLINE-ZEPHYR.xus	
Project Description	ST (LT) AM (PM)				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	85	10	45	25	15	65	65	1190	35	90	1590	80

Signal Information													
Cycle, s	76.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0			
				Red	0.0	0.0	0.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		18.0		18.0	14.0	44.0	14.0	44.0
Change Period, (Y+R _c), s		3.0		3.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g _s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g _e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	0
Queue Service Time (g _s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g _c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.20	0.20		0.20	0.20		0.66	0.53	0.53	0.66	0.53	0.53
Capacity (c), veh/h	298	327		323	327		352	1904	847	435	1904	847
Volume-to-Capacity Ratio (X)	0.310	0.183		0.084	0.266		0.201	0.679	0.045	0.225	0.908	0.103
Back of Queue (Q), ft/ln (50 th percentile)	41.6	23.9		11	35.7		16.9	180.6	7	13.5	327.2	16.7
Back of Queue (Q), veh/ln (50 th percentile)	1.7	1.0		0.4	1.4		0.7	7.2	0.3	0.5	13.1	0.7
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	29.3	25.4		26.9	25.8		14.5	13.3	8.7	8.8	16.3	9.0
Incremental Delay (d ₂), s/veh	2.7	1.2		0.5	2.0		1.3	2.0	0.1	1.2	7.8	0.2
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	32.0	26.6		27.4	27.8		15.8	15.2	8.8	10.0	24.1	9.3
Level of Service (LOS)	C	C		C	C		B	B	A	B	C	A
Approach Delay, s/veh / LOS	29.9	C		27.7	C		15.1	B		22.7	C	
Intersection Delay, s/veh / LOS	20.2			20.2			C			C		

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

Traffic Impact Study

HANSEN

Fort Collins, Colorado

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Transportation Impact Study

HANSEN

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November 24, 2017



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I. INTRODUCTION

Hansen is a mixed use development located along the west side of Timberline Road (Timberline) across from Zephyr Road (Zephyr) in Fort Collins, Colorado. As currently planned, it will have 152 single family homes, 64 townhouses, 250 multi-family units, and about 5 acres of commercial development. This study updates the August 29, 2017 traffic study for this development. It assesses reduced access and changes related to the City's plan to widen Timberline. A vicinity map is presented on Figure 1.

This traffic impact study updates the earlier study for this development. It addresses City comments on the previous study and follow-on discussions. It is consistent with the scoping sheets submitted to the City and provided in Appendix A. The following key steps were undertaken as part of this study.

- Obtain current traffic and roadway data in the immediate area of the site.
- Evaluate current operations to establish base conditions.
- Determine site generated traffic and distribute this traffic to the nearby street system.
- Estimate roadway traffic for future conditions.
- Evaluate operations with Hansen fully operational.
- Identify deficiencies and recommend measures to minimize or mitigate the impact of site generated traffic.

Key areas of investigation are documented in the following sections of this traffic impact study.

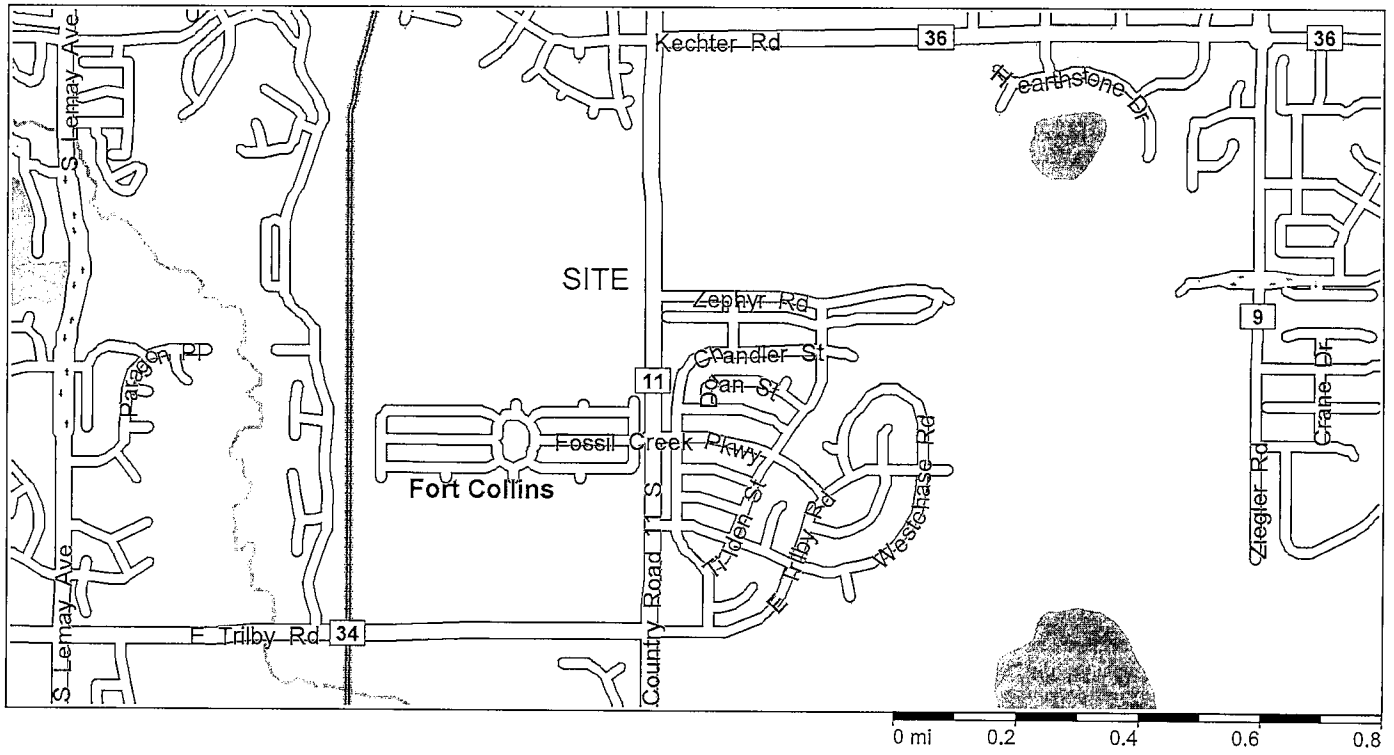


Figure 1
VICINITY MAP

II. CURRENT CONDITIONS

A. Current Road Network

The site is bordered on the east by Timberline Road. Zephyr Road currently extends east of Timberline. Timberline is classified as a major (4 lane) arterial street with Zephyr Road being a two lane collector street. The posted speed limit on Timberline is 40 MPH with Zephyr posted at 25 MPH. Bicycle lanes currently exist on Timberline and Zephyr. Sidewalks are generally available adjacent to development.

Zephyr extends east of Timberline for about one mile and ends at Ziegler Road. It mostly serves the local residential areas.

The existing roadway system is shown on Figure 2.

B. Current Traffic

Peak hour traffic counts were conducted as part of this study at key intersections. Counts were undertaken from 7:00 – 9:00 AM and 4:00 – 6:00 PM representing typical morning and afternoon peak hours. Current peak hour traffic is shown on Figure 3. It should be noted that traffic associated with Bacon Elementary School should be included in the morning peak hour counts with a limited amount of school traffic included in the afternoon peak hour counts. School bell times are 9:00 AM and 3:43 PM based on the school's website. Count tabulations are available in Appendix B.

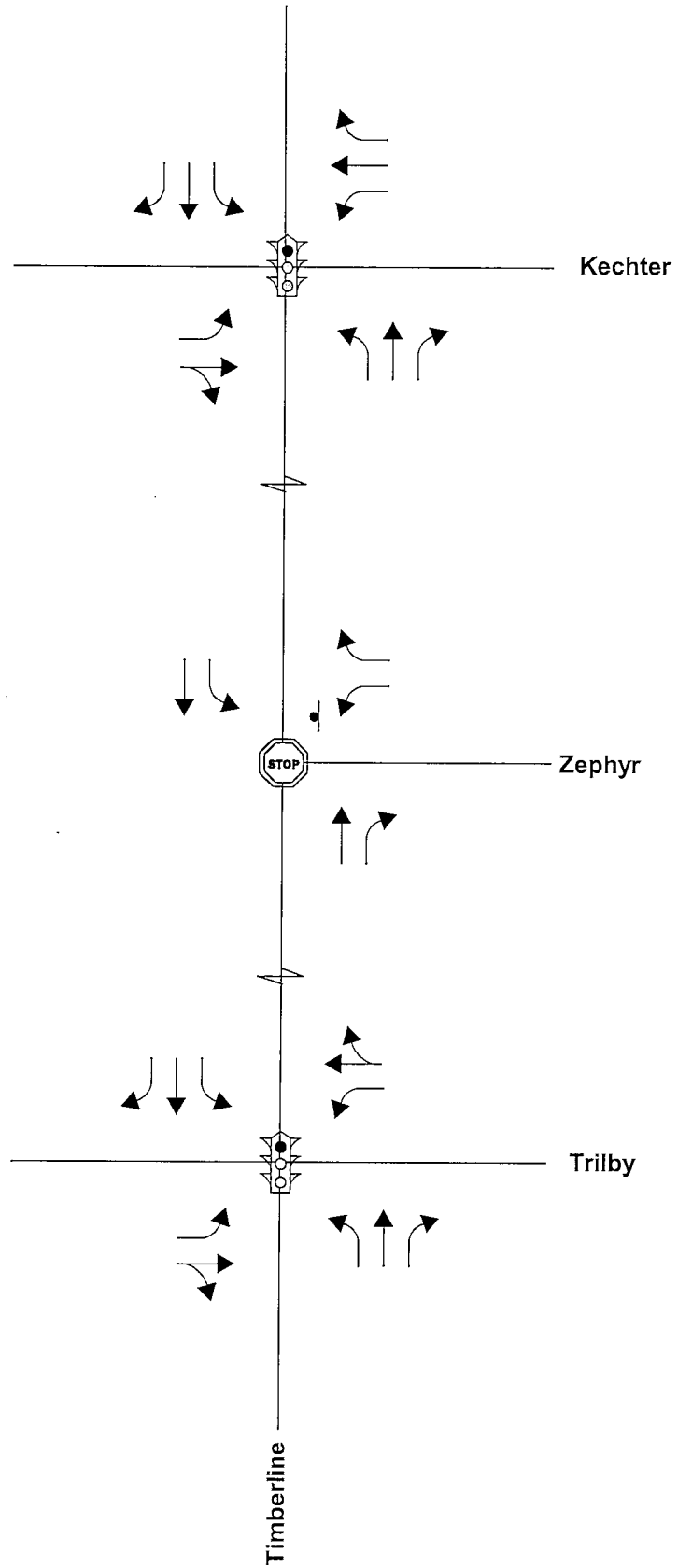
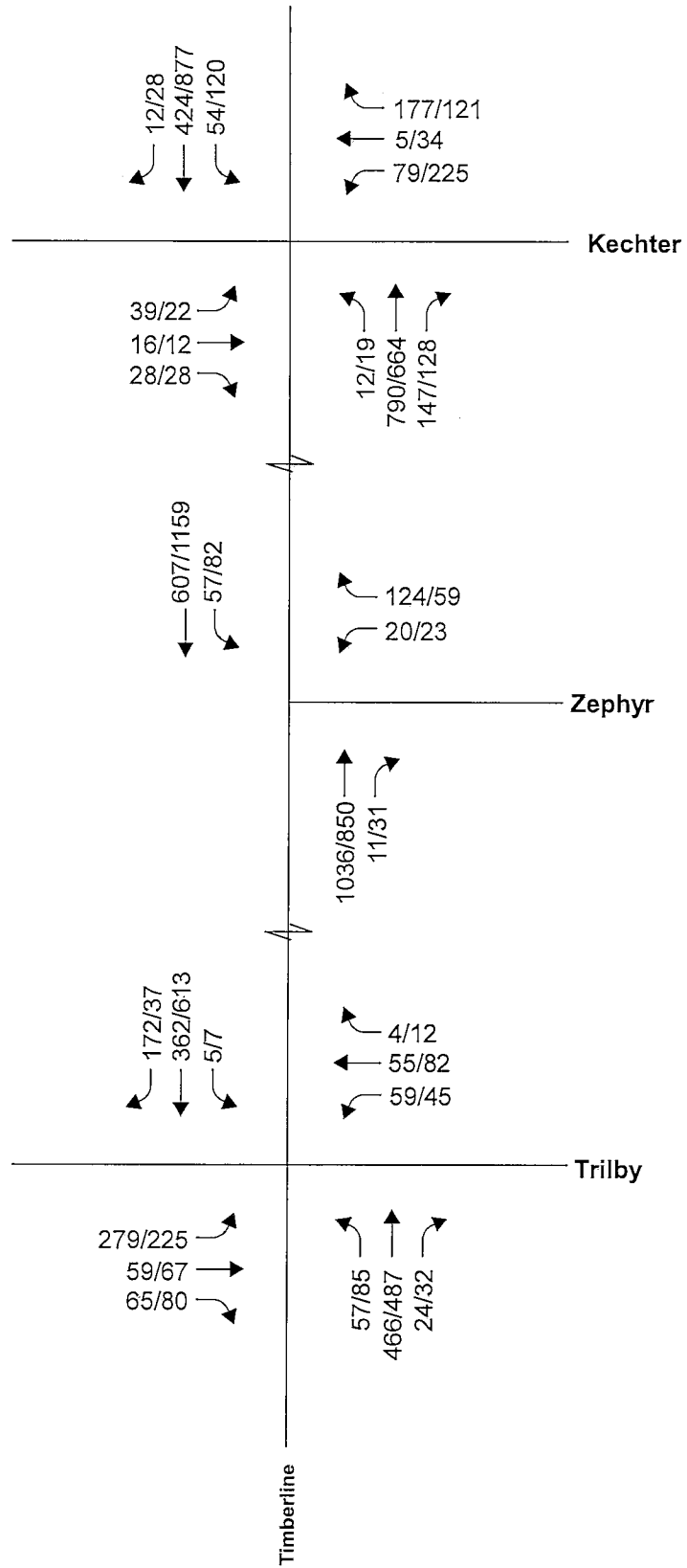


Figure 2
CURRENT ROADWAY GEOMETRY



LEGEND: AM/PM Peak Hour

Figure 3
CURRENT TRAFFIC

C. Surrounding Land Uses

The area surrounding Hansen is primarily composed of residential land uses. Bacon Elementary School is located on the east side of Timberline along the north side of Zephyr.

D. Current Operating Conditions

Highway Capacity Manual procedures, based on the 2010 Highway Capacity Manual, were used to evaluate current intersection operations. Resultant levels of service (LOS) are indicated below for morning and afternoon peak hour conditions. Analyses were undertaken for the Timberline – Zephyr, Timberline – Kechter, and Timberline – Trilby intersections. Traffic from Figure 3 was loaded onto the current roadway geometry, which is shown on Figure 2. Per City standards, at arterial street intersections with local and collector streets, the individual stop sign controlled traffic movements are allowed to operate at LOS F. This level of service is typical of urban peak hour conditions.

CURRENT OPERATING CONDITIONS				
Intersection	Control	Movement/ Direction	Level of Service	
			AM Pk Hr.	PM Pk Hr.
Timberline – Zephyr	Stop	WB L	D	F
		WB R	E	C
		SB L	B	B
Timberline – Kechter	Signal	EB L	C	C
		EB TR	C	C
		WB L	C	D
		WB TR	C	C
		NB L	A	B
		NB T	B	B
		NB R	B	B
		SB L	B	B
		SB T	B	C
		SB R	B	A
		Overall	B	C
Timberline – Trilby	Signal	EB L	C	C
		EB TR	C	C
		WB L	C	C
		WB TR	B	B
		NB L	B	B
		NB T	C	C
		NB R	B	B
		SB L	B	B
		SB T	C	C
		SB R	B	B
		Overall	C	C

As shown above, the individual traffic movements at all intersections operate acceptably based on City level of service (LOS) standards. Capacity work sheets are provided in Appendix C.

III. DEVELOPMENT ISSUES

A. Project Description

Hansen is primarily a residential development having, 152 single family homes, 64 townhouses, 250 multi-family units, and 5 acres of commercial development. Construction will start as soon as practical with build out expected in about five years.

Site access will be provided by a full movement street connection to Timberline. This will align with Zephyr Road on the east side of Timberline. Additionally, an emergency access is planned to the north of Zephyr. A concept plan is presented on Figure 4.

B. Site Traffic

Site traffic was estimated using Institute of Transportation Engineers (ITE) publication, "Trip Generation, 9th Edition", a nationally recognized reference. Site traffic associated with Hansen is indicated in the following table.

Land Use	Size	Daily		AM Peak Hour			PM Peak Hour		
		Rate	Trips	Rate	In	Out	Rate	In	Out
Single Family	152 D.U.	9.52	1,447	0.75	28	86	1.00	96	56
Townhouses	64 D.U.	5.81	372	0.44	5	23	0.52	22	11
Multi-Family	250 D.U.	6.65	1,663	0.51	26	102	0.62	101	54
Commercial	50 KSF	44.32	2,216	0.68	19	15	2.71	60	76
TOTAL			5,698		78	226		279	197

As shown above, Hansen is expected to generate 304 morning peak hour trips, 476 afternoon peak hour trips, and 5,698 trips per day. These trips are considered manageable.

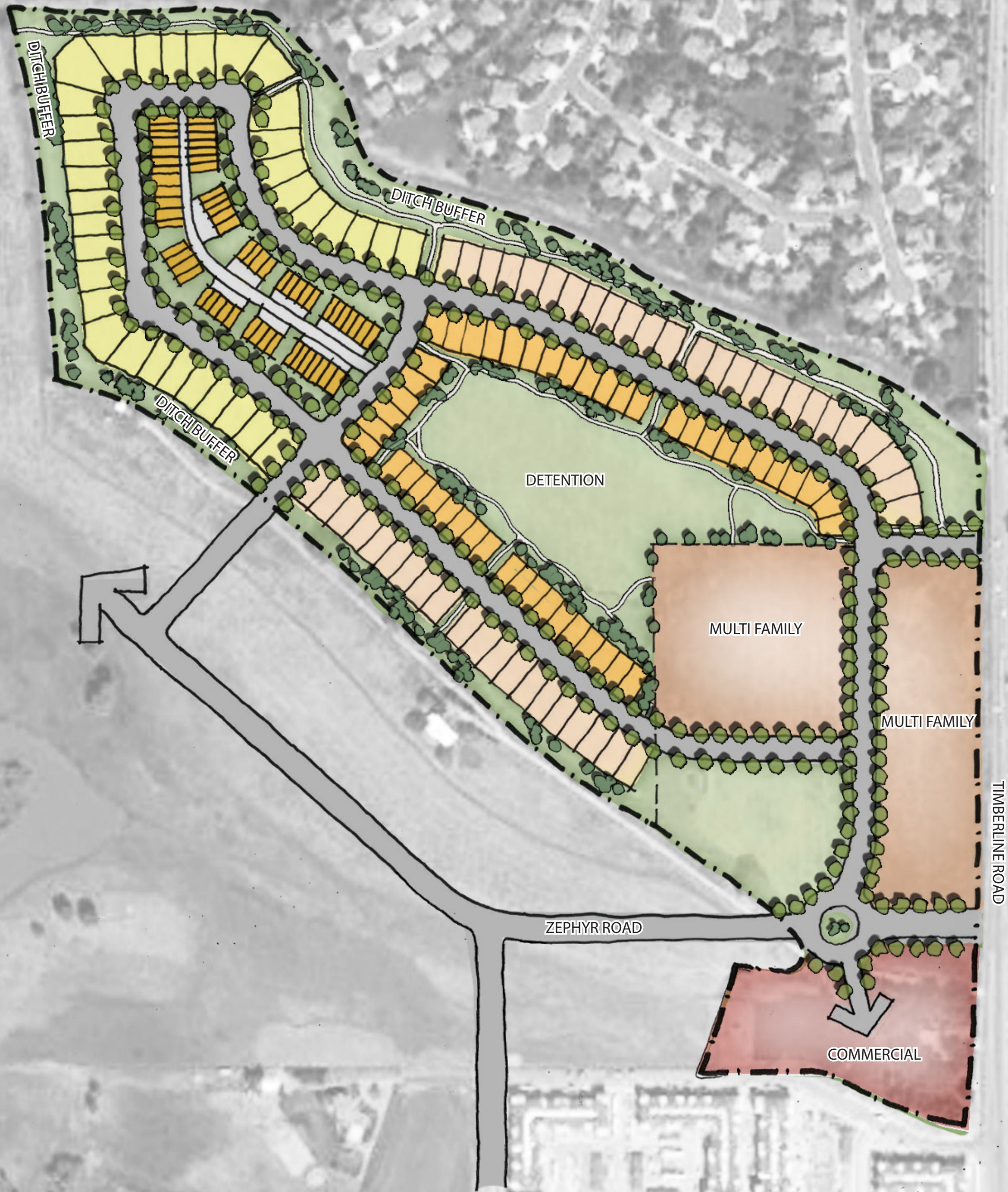


Figure 4
CONCEPT PLAN

C. Trip Distribution

Trip distribution is a function of the origin and destination of site users and the available roadway system. In this case, all traffic must use either Timberline or Zephyr to arrive at and depart the site. Site traffic distributions shown on Figure 5 are based on the current roadway network and current traffic in the area of this site. Resultant peak hour site traffic is shown on Figure 6 for both the morning and afternoon peak hours.

IV. AGENCY DISCUSSIONS

Prior to commencing with this traffic impact study, key traffic engineering elements and key assumptions were discussed with Nicole Hahn and Martina Wilkinson, representing the City of Fort Collins. Agreed upon items are identified below:

1. Traffic growth is estimated at 1½ - 2% per year on streets serving this area.
2. Given the planned uses, weekday morning and afternoon peak hours were determined worthy of investigation.
3. A full traffic impact study is appropriate for this development. The study should be based on the Scoping Sheet in Appendix A which was submitted to the City.

The above items are fully considered in the following sections of this study.

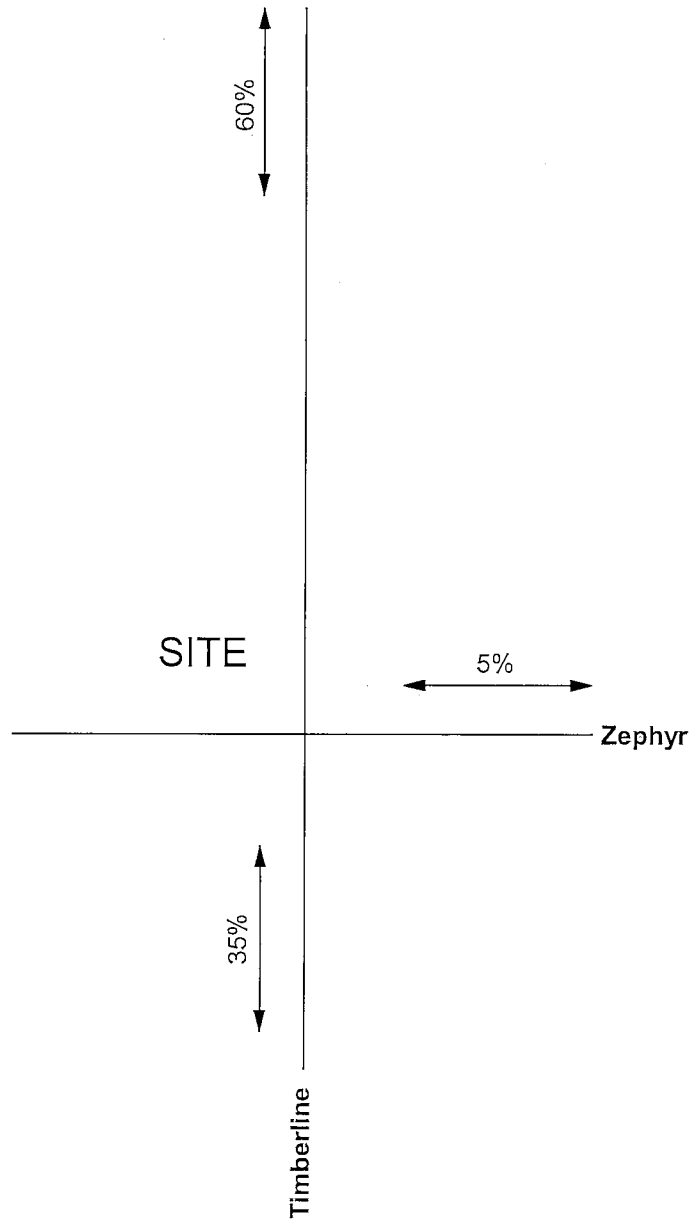
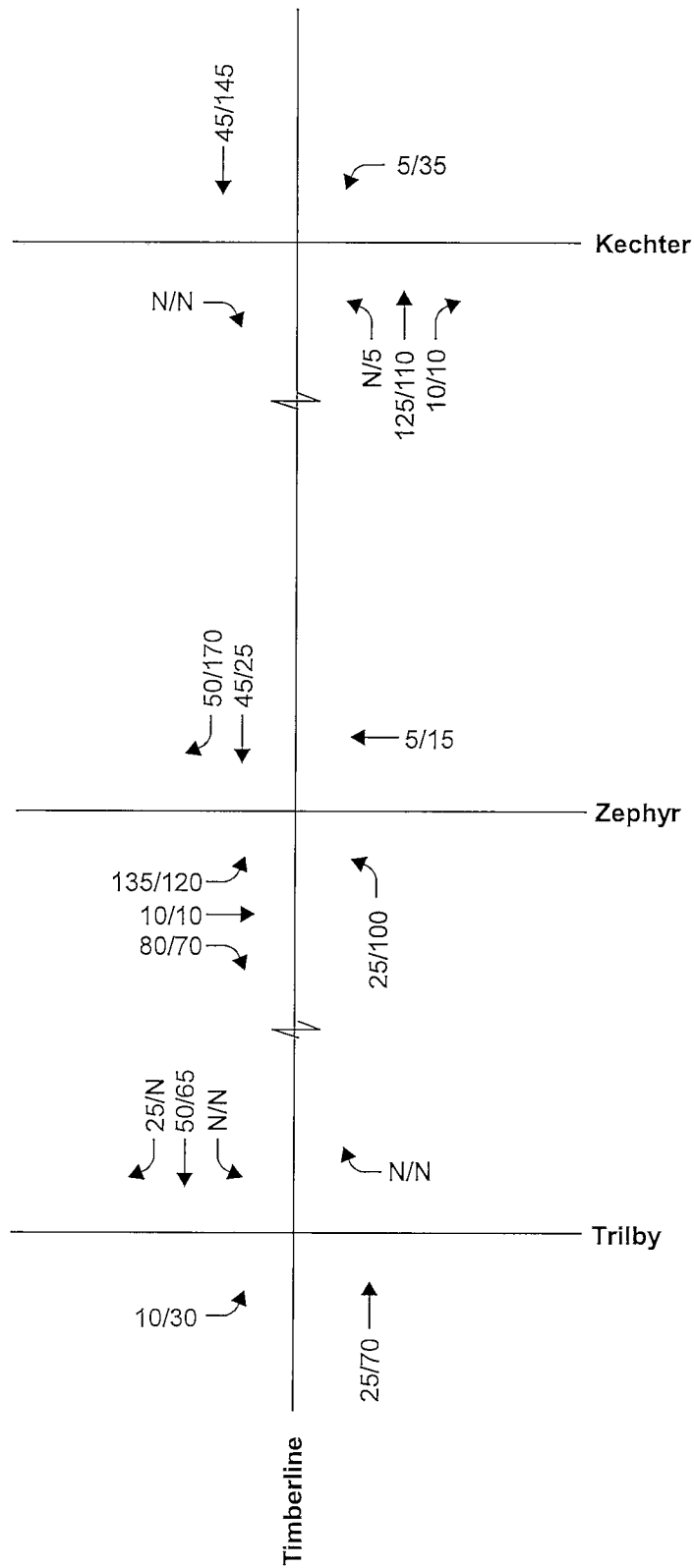


Figure 5
SITE TRAFFIC DISTRIBUTION



LEGEND: AM/PM Peak Hour

N = Nominal

NOTE: Rounded to nearest 5 vehicles.

Figure 6
SITE TRAFFIC

V. FUTURE CONDITIONS

A. Roadway Improvements

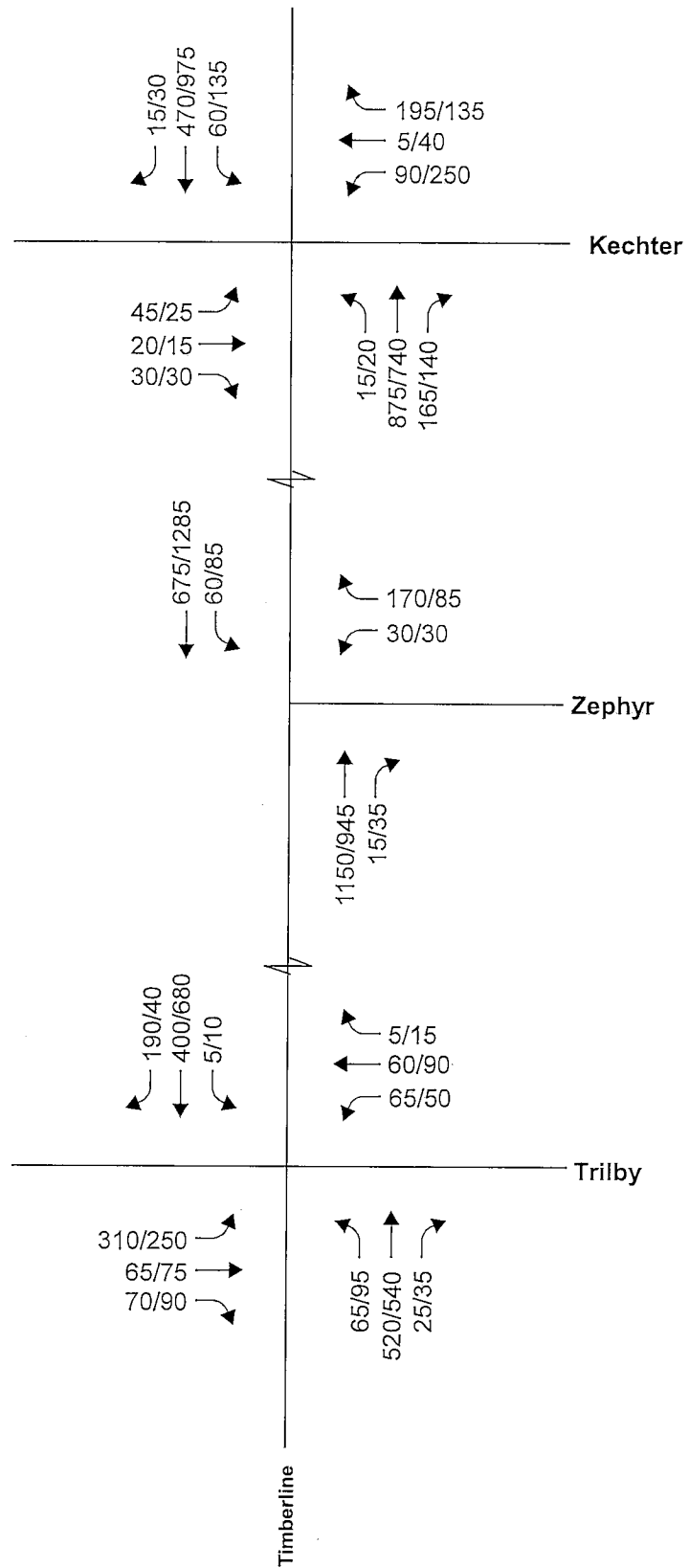
Fort Collins plans to improve Timberline to a five lane roadway in the near term. This improvement will result in two lanes in each direction with a center left turn lane in the area of the site. This improvement is currently planned and funded by the City for 2022 and is assumed available in the short term time frame which represents site build out.

B. Future Background Traffic

Short term (2022) and long term traffic was estimated using the above agreed upon growth. In addition, traffic from the Kechter Farm Phase 2 development was added at the Timberline – Kechter intersection. In the long term, traffic expected from the Rennat property with 154 dwelling units was assigned to all intersections. This assignment used the distribution contained in this study. Background traffic is presented on Figures 7 and 8 for the short and long term time frames, respectively.

C. Future Total Traffic

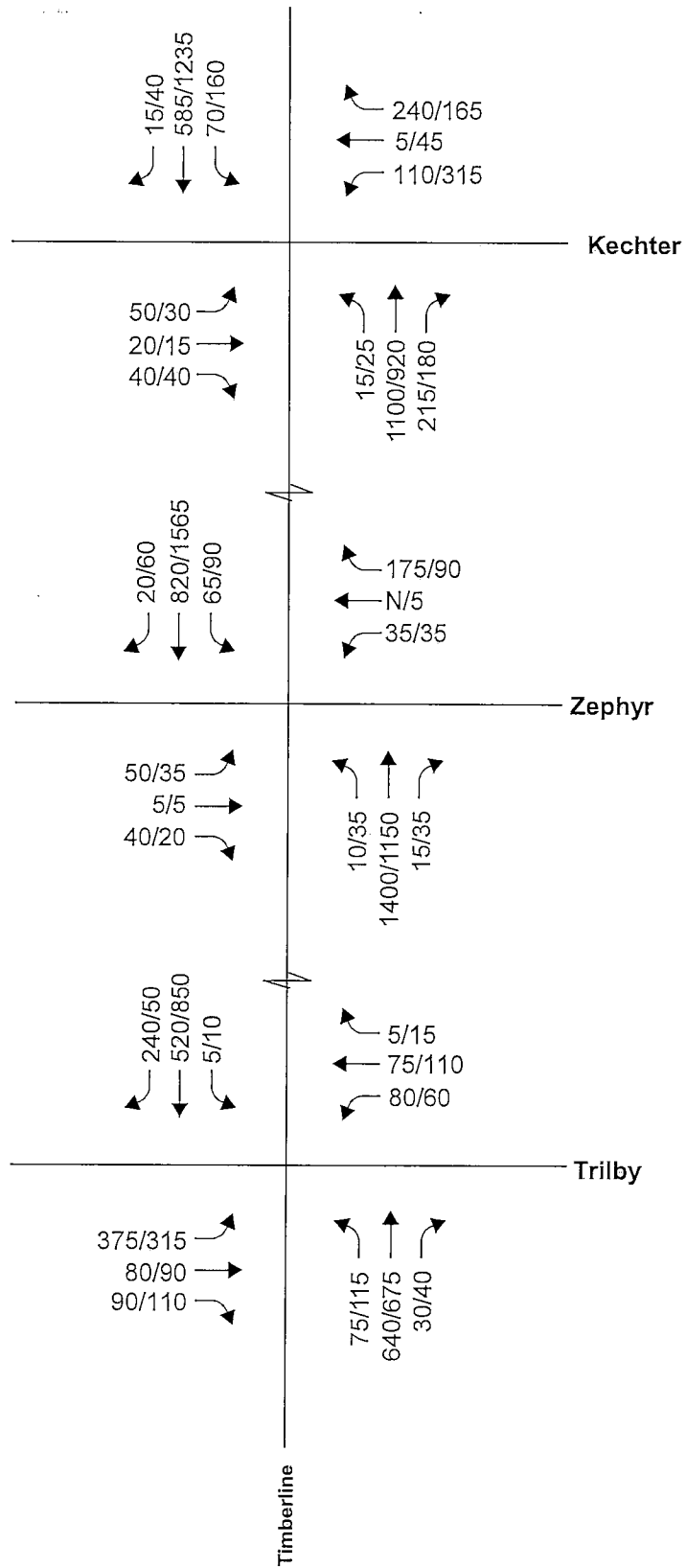
Short term and long term total traffic was developed by combining site traffic and background traffic for those time frames. Total traffic is shown on Figures 9 and 10 for the short term and long term, respectively.



LEGEND: AM/PM Peak Hour

NOTE: Rounded to nearest 5 vehicles.

Figure 7
SHORT TERM BACKGROUND TRAFFIC

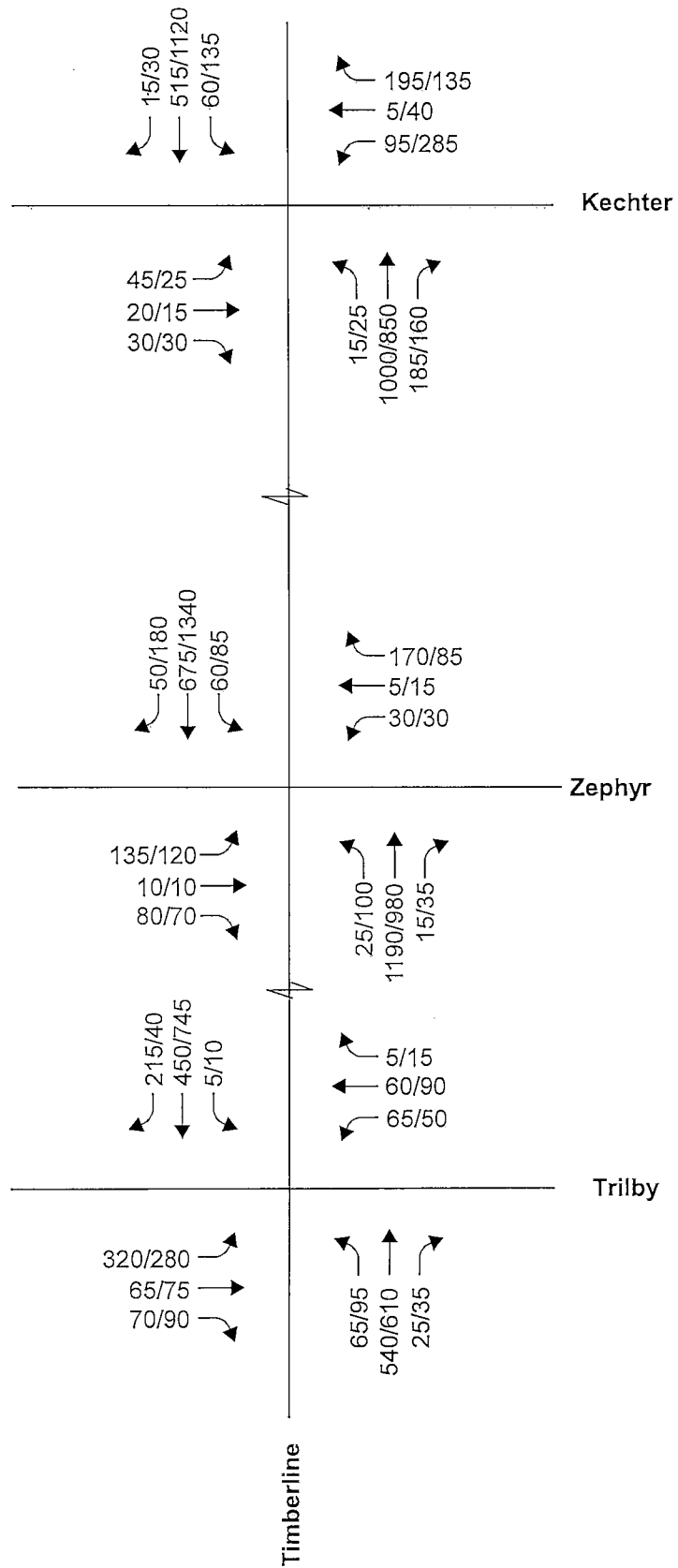


LEGEND: AM/PM Peak Hour

N = Nominal

NOTE: Rounded to nearest 5 vehicles.

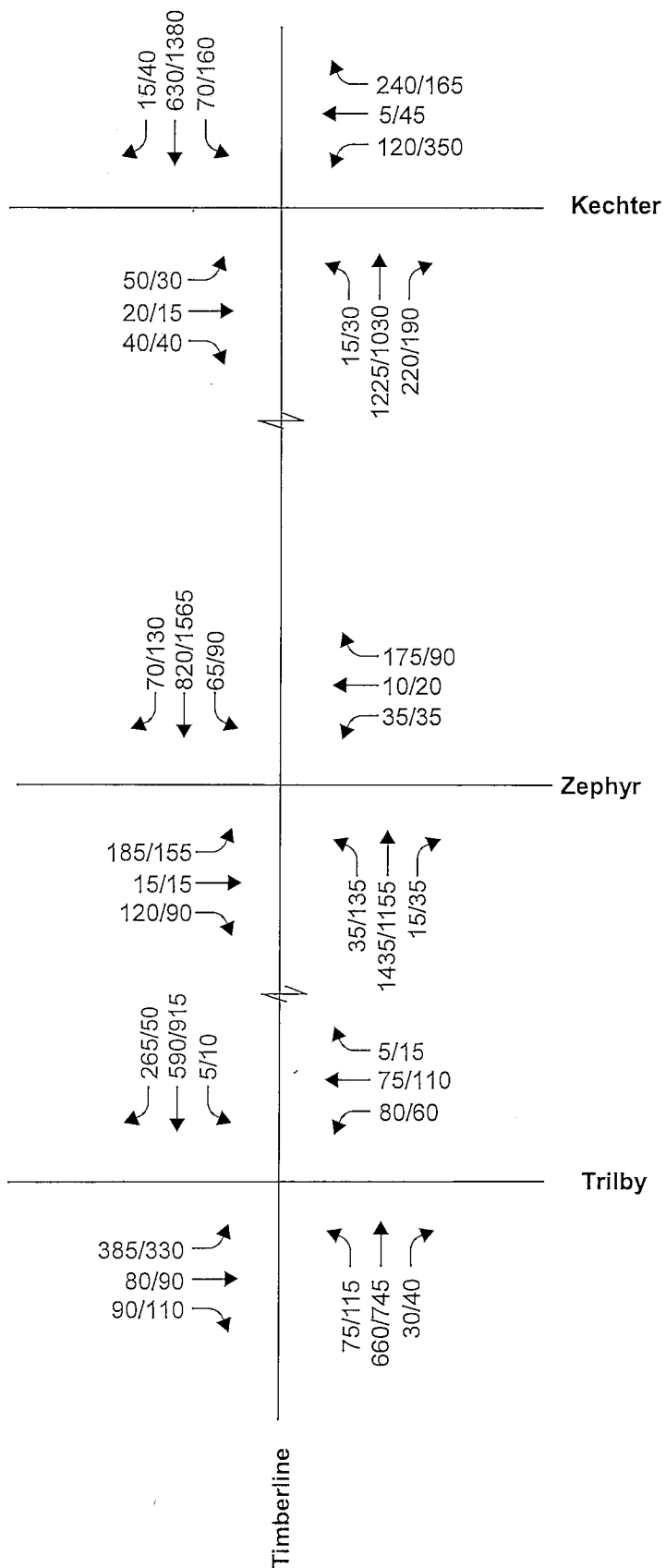
Figure 8
LONG TERM BACKGROUND TRAFFIC



LEGEND: AM/PM Peak Hour

NOTE: Rounded to nearest 5 vehicles.

Figure 9
SHORT TERM TOTAL TRAFFIC



LEGEND: AM/PM Peak Hour

NOTE: Rounded to nearest 5 vehicles.

Figure 10
LONG TERM TOTAL TRAFFIC

VI. TRAFFIC IMPACTS

In order to assess operating conditions with Hansen fully operational, capacity analyses were conducted at the Timberline – Zephyr, Timberline – Kechter, and Timberline – Trilby and site access intersections. Total traffic (the combination of background traffic and site traffic) was used in this effort.

Short term total traffic and long term total traffic was reviewed to determine the need for future auxiliary lanes and traffic signals at the Timberline – Zephyr intersection. The results of this review are discussed in the following section.

A. Auxiliary Lane Requirements

Traffic movements at the above noted intersections were reviewed. This effort focused on the need for right turn and left turn lanes to accommodate site traffic in the short- and long term time frames. LCUASS turn lane warrants were used in this effort. It was determined that right and left turn deceleration lanes will be warranted along Timberline at the site access point in the short term. These auxiliary lanes should be installed; however given the planned 2020 – 2021 widening of Timberline, an additional through lane in each direction and a center left turn lane were assumed built with that project. If the planned improvements do not occur, the identified turn lanes should be provided. The left turn lane should be available when Zephyr is built to the west of Timberline with the right turn lane provided when 21 homes are built and occupied or the commercial area is built, whichever occurs first. No additional site related auxiliary lane improvements will be needed in the long term.

B. Auxiliary Lane Design

Northbound left turn lanes will be needed on Timberline at Zephyr. Site related left turn lanes at the site access points should be planned as indicated below assuming

retention of the existing 40 mile per hour speed limit and a 12-foot wide turn lane. The estimated northbound left turn storage needed at Zephyr is 100 feet. These parameters are subject to adjustment based upon findings and area wide investigations conducted during preliminary design. The left turn lane is assumed available in the short term given the planned improvements to Timberline. Site related improvements should be coordinated with roadway improvements at this intersection. The inside separation between Timberline and the first intersection to the west is about 350 feet.

C. Traffic Signals

The need for future traffic signals at the Timberline – Zephyr intersection was investigated. The peak hour and four hour traffic signal warrants were considered in this effort. Per the Manual on Uniform Traffic Control Devices (MUTCD), the peak hour warrant is intended for unusual cases such as large office complexes and similar cases. The four hour volume warrant was applied for short term total traffic conditions. Excluding right turns, side street traffic is estimated to peak at up to 145 vehicles per hour. This is above the 115 vehicle per hour requirement indicating traffic signals should be considered. Consequently, traffic signals are anticipated and should be installed when warranted.

D. Short Term Operating Conditions

Short term operating conditions with Hansen fully built were evaluated using total traffic. This investigation used the peak hour traffic shown on Figure 9 and the short term roadway geometry shown on Figure 11 and resulted in the future operating conditions shown below. It should be noted that levels of service at signalized intersections were only conducted to the level necessary to demonstrate acceptable operations. Additional “tweaking” is expected to result in improved operations. This approach is consistent throughout this study.

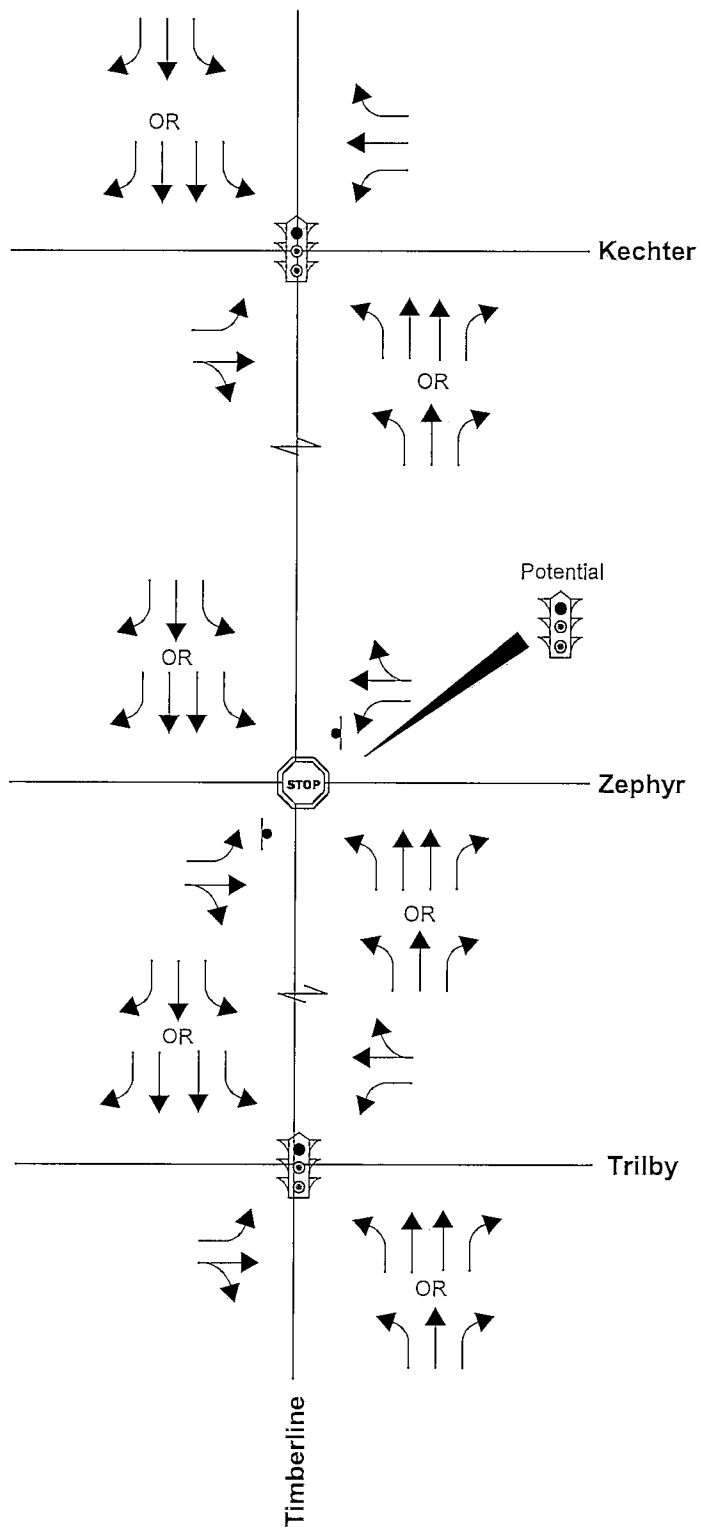


Figure 11

SHORT TERM OPERATING CONDITIONS WITH HANSEN				
Intersection	Control	Movement/ Direction	Level of Service	
			AM Pk Hr.	PM Pk Hr.
Timberline – Zephyr With 4 lanes on Timberline	Stop	EB L	F	F
		EB TR	F	D
		WB L	F	F
		WB TR	E	D
		NB L	B	A
		SB L	B	B
Timberline – Zephyr With 2 lanes on Timberline	Signal	EB L	D	D
		EB TR	C	D
		WB L	C	D
		WB TR	C	D
		NB L	B	C
		NB T	F	C
		NB R	A	A
		SB L	C	C
		SB T	B	F
		SB R	A	A
		Overall	E	E
Timberline – Zephyr With 4 lanes on Timberline	Signal	EB L	D	C
		EB TR	C	C
		WB L	C	C
		WB TR	C	C
		NB L	B	C
		NB T	C	B
		NB R	B	B
		SB L	B	B
		SB T	B	C
		SB R	B	B
		Overall	C	C

SHORT TERM OPERATING CONDITIONS WITH HANSEN (continued)

Intersection	Control	Movement/ Direction	Level of Service	
			AM Pk Hr.	PM Pk Hr.
Timberline – Kechter	Signal	EB L	C	C
		EB TR	C	C
		WB L	C	D
		WB TR	C	C
		NB L	A	B
		NB T	B	B
		NB R	B	B
		SB L	B	B
		SB T	B	B
		SB R	B	B
		Overall	B	C
Timberline – Trilby	Signal	EB L	C	C
		EB TR	C	C
		WB L	C	C
		WB TR	B	C
		NB L	B	B
		NB T	B	B
		NB R	B	B
		SB L	B	B
		SB T	B	B
		SB R	B	B
		Overall	C	C

As shown, significant side street delay can be expected at the Timberline – Kechter intersection with Hansen fully built in the short term. This is typical of conditions when traffic levels are approaching those associated with traffic signals. Traffic signals are assumed installed when warranted. With traffic signals, operating levels of service will meet Fort Collins' standards. Capacity work sheets are available in Appendix D.

E. Long Term Operating Conditions

Long term conditions were evaluated with Hansen fully built. This reflects the roadway geometry and traffic controls shown on Figure 12. Future levels of service were calculated using the long term total traffic shown on Figure 10.

LONG TERM OPERATING CONDITIONS WITH HANSEN				
Intersection	Control	Movement/ Direction	Level of Service	
			AM Pk Hr.	PM Pk Hr.
Timberline – Zephyr	Signal	EB L	D	C
		EB TR	C	C
		WB L	C	C
		WB TR	C	C
		NB L	B	D
		NB T	C	C
		NB R	B	B
		SB L	C	B
		SB T	B	D
		SB R	B	B
		Overall	C	C

LONG TERM OPERATING CONDITIONS WITH HANSEN (continued)				
Intersection	Control	Movement/ Direction	Level of Service	
			AM Pk Hr.	PM Pk Hr.
Timberline – Kechter	Signal	EB L	D	C
		EB TR	C	C
		WB L	C	D
		WB TR	C	C
		NB L	A	B
		NB T	C	B
		NB R	B	B
		SB L	B	C
		SB T	B	C
		SB R	B	B
		Overall	C	C
Timberline – Trilby	Signal	EB L	C	C
		EB TR	B	C
		WB L	C	C
		WB TR	B	B
		NB L	B	B
		NB T	C	B
		NB R	B	B
		SB L	B	B
		SB T	C	C
		SB R	B	B
		Overall	C	C

As indicated, acceptable long term operating conditions are expected. Capacity worksheets are presented in Appendix E. Based on the capacity worksheet, the anticipated queuing on Zephyr, west of Timberline, will not result in any blockages given the planned 350 feet of inside spacing between the first intersection and Timberline.

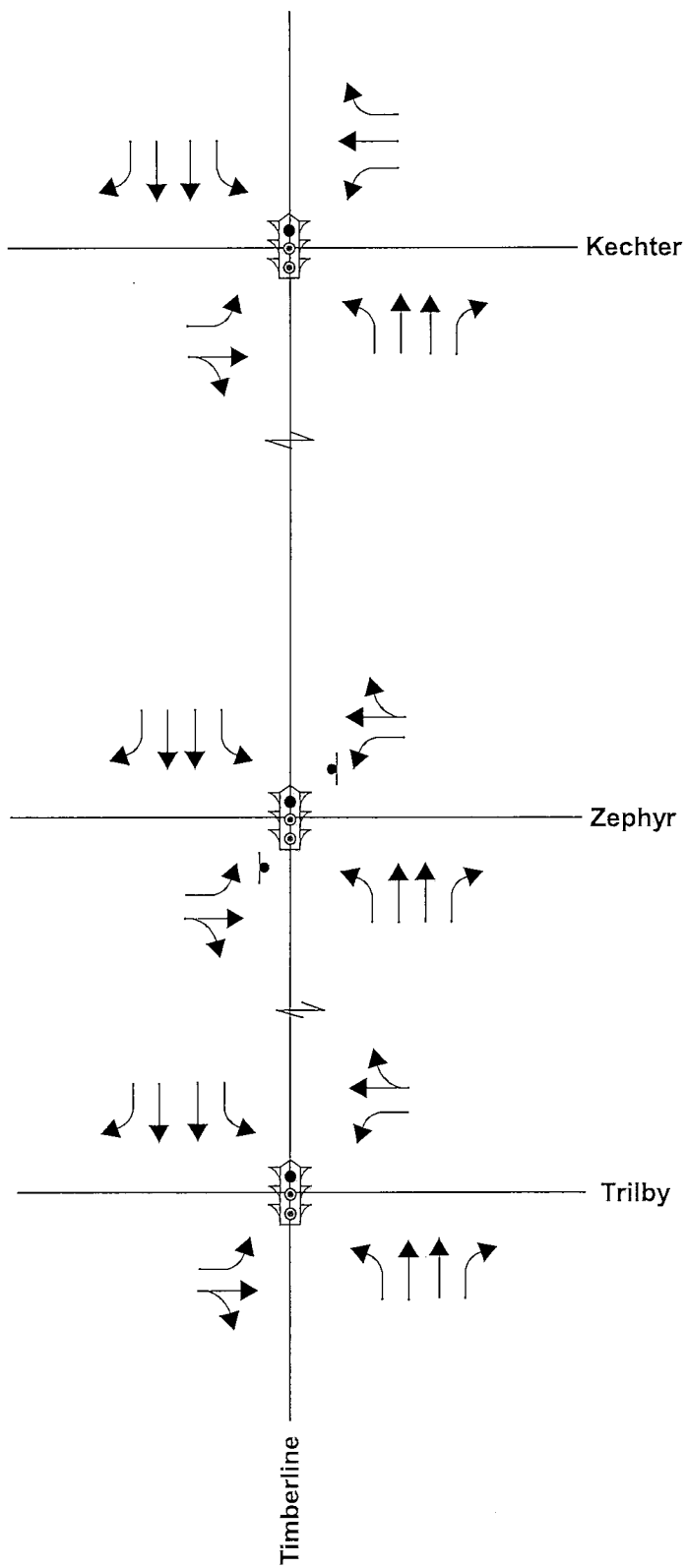


Figure 12

LONG TERM ROADWAY GEOMETRY

F. Pedestrian Facilities

Sidewalks currently exist along the west side of Timberline to the north and south of the site. With this development, sidewalks will be constructed both internally and along the west side of Timberline adjacent to the site. This will provide improved continuity of the sidewalk system along Timberline.

A review of the area surrounding the site was conducted to identify pedestrian destinations within 1,320 feet. Two destinations were found, one being the Kingdom Hall of Jehovah's Witnesses located in the northeast corner of Timberline and Kechter and the second being Bacon Elementary School directly east of the site. These destinations can be accessed by travelling north using the existing and planned sidewalk system along the west side of Timberline and crossing Timberline under traffic signal protection at Kechter. Pedestrian signals are available at this intersection.

With signalization of the Timberline – Zephyr intersection including pedestrian signals access to Bacon Elementary School will be safe and efficient. A pedestrian level of service worksheet follows.

Pedestrian LOS Worksheet

project location classification: <u>School Walking Area</u>		level of service (minimum based on project location classification)					
	description of applicable destination area within 1,320' including address	destination area classification	directness	continuity	street crossings	visual interest & amenities	security
1	Bacon Elementary	School	B	B	B	C	B
			A	B	C	D	C
			A	B	B	B	B
2	Kingdom Hall of Jehovah's Witnesses	Institution	C	C	C	C	C
			B	B	B	B	B
			B	B	B	B	B
3							
4							

As indicated on the worksheet, pedestrian level of service 'B' or better is expected with this development. Accordingly, the City's pedestrian criteria will be satisfied.

G. Bicycle Facilities

Timberline currently has bicycle lanes along both sides of the road adjacent to the site and for significant distances to the north and south. These bicycle lanes connect to east-west bicycle lanes on major cross streets such as Zephyr, Kechter and Trilby and provide excellent access to the greater network of bicycle routes. They provide easy connections to numerous destinations such as institutions, neighborhoods, shopping and recreational areas.

H. Transit

Transit currently serves this area with weekday service from about 6:00 AM to 10:30 PM. Primary stops and transfer points are the South Transit Center and the Harmony Transfer Center. Route 16 is the primary east-west route serving this area. It uses Kechter and provides connections to north-south routes including the MAX route providing service to the College Avenue area and downtown.

VII. CONCLUSIONS

Based on the analyses, investigations, and findings documented in earlier sections of this report, the following can be concluded:

- Current roadway operations in the area of the Hansen site are acceptable during all peak hour periods.

- Site traffic associated with build out of Hansen is expected to be 304 morning peak hour trips, 476 afternoon peak hour trips, and 5,698 trips per day. These trips are considered manageable.
- Southbound right turn and northbound left turn lanes are needed at the Timberline – Zephyr intersection in the short term. The northbound left turn lane and an additional through lane in each direction are planned with the widening of Timberline. This widening has been funded by the City and is scheduled for 2021.
- Short term traffic will be approaching levels normally associated with traffic signal installation at the Timberline – Zephyr intersection. Consequently, the City should monitor traffic levels at the Timberline – Zephyr intersection as the short term horizon approaches.
- City required pedestrian and bicycle facilities will be enhanced with this development resulting in excellent access to area attractions.
- Traffic operating conditions will be acceptable with the proposed development in both the short- and long term time frames. City level of service standards will be met at all intersections.
- Hansen is viable from a traffic engineering perspective.

In summary, the transportation demands associated with Hansen can be easily managed with the identified improvements. This is documented by the determination that acceptable operating conditions are anticipated in the vicinity of this development for the foreseeable future.

APPENDIX A

**Attachment A
Transportation Impact Study
Base Assumptions**

Project Information		
Project Name <i>Hansen (215 SF, 250 Condos and SAC commercial)</i>		
Project Location <i>West side of Timberline at Zephyr</i>		
TIS Assumptions		
Type of Study	Full: <input checked="" type="checkbox"/>	Intermediate:
Study Area Boundaries	North: <i>Kechter</i>	South: <i>Trilby</i>
	East: <i>Zephyr</i>	West: <i>site PL</i>
Study Years	Short Range: <i>2022</i>	Long Range: <i>2035</i>
Future Traffic Growth Rate	<i>Timberline-1 1/2% Zephyr-1/2%</i>	
Study Intersections	1. All access drives	5. <i>internal intersection (Roundabout)</i>
	2. <i>Timberline - Kechter</i>	6.
	3. <i>T-line Zephyr</i>	7.
	4. <i>T-line Trilby</i>	8.
Time Period for Study	<i>(AM) 7:00-9:00 (PM) 4:00-6:00</i>	Sat Noon: <i>No</i>
Trip Generation Rates	<i>ITE</i>	
Trip Adjustment Factors	Passby: <i>0</i>	Captive Market: <i>0</i>
Overall Trip Distribution	<i>SEE ATTACHED SKETCH CURRENT PATTERNS - see attached</i>	
Mode Split Assumptions		
Committed Roadway Improvements	<i>Timberline Widening in 2020</i>	
Other Traffic Studies	<i>Kechter Farm</i>	
Areas Requiring Special Study	<i>signal analysis at Zephyr-Timberline Movement type @ Northern ACCESS</i>	

Date: *10/31/17* *Internal Roundabout / intersection*

Traffic Engineer: *Gene Coppel* *Project Phasing*

Local Entity Engineer: *Miller* *Timing between phasing and Road improvements*

11.13.17

Attachment A Transportation Impact Study Base Assumptions

Project Information		
Project Name	<i>Hansen - 215 SF Homes, 250 condos, & 5AC commercial</i>	
Project Location	<i>NWE Timberline & Zephyr</i>	
TIS Assumptions		
Type of Study	Full: <input checked="" type="checkbox"/>	Intermediate: <input type="checkbox"/>
Study Area Boundaries	North: <i>Site</i>	South: <i>Site</i>
	East: <i>Timberline</i>	West: <i>Site</i>
Study Years	Short Range: <i>2022</i>	Long Range: <i>2035</i>
Future Traffic Growth Rate	<i>1 1/2% Timberline 1/2% Zephyr</i>	
Study Intersections	1. All access drives	5.
	2. <i>Timberline-Zephyr</i>	6.
	3.	7.
	4.	8.
Time Period for Study	<input checked="" type="checkbox"/> (AM) 7:00-9:00	<input checked="" type="checkbox"/> (PM) 4:00-6:00
	Sat Noon: <i>No</i>	
Trip Generation Rates	<i>ITE</i>	
Trip Adjustment Factors	Passby: <input type="checkbox"/>	Captive Market: <input type="checkbox"/>
Overall Trip Distribution	<i>SEE ATTACHED SKETCH Current patterns on adjacent street</i>	
Mode Split Assumptions	<input type="checkbox"/>	
Committed Roadway Improvements	<i>Timberline widening</i>	
Other Traffic Studies		
Areas Requiring Special Study	<i>Signal warrant analysis</i>	

Date: 7-17-17

Traffic Engineer: *Gene Coppell*

Local Entity Engineer: _____

APPENDIX B

TABULAR SUMMARY OF VEHICLE COUNTS

EUGENE G. COPPOLA, P.E.
 P.O. Box 630027
 Littleton, CO 80163
 Phone: (303) 792-2450

Intersection: Timberline & Zephyr

Date: 5/12/2017 **Observer:** Vickie

Day: Thursday **City:** Fort Collins, CO

Time Begins	Northbound:			Southbound:			Total north/south			Eastbound:			Westbound:			Total east/west	Total All	
	L	S	R	L	S	R	Total	L	S	R	L	S	R	Total				
07:00	0	229	2	9	123	0	132	0	0	0	0	0	0	10	0	13	23	386
07:15	0	279	3	16	141	0	157	439	0	0	0	0	0	2	0	19	21	460
07:30	0	278	2	14	185	0	199	479	0	0	0	0	0	1	0	42	43	522
07:45	0	250	4	18	158	0	176	430	0	0	0	0	0	7	0	50	57	487
08:00	0	206	6	15	130	0	145	357	0	0	0	0	0	5	0	23	28	385
08:15	0	183	5	12	140	0	152	340	0	0	0	0	0	5	0	14	19	359
08:30	0	204	26	29	140	0	169	399	0	0	0	0	0	14	0	42	56	455
08:45	0	189	32	26	117	0	143	364	0	0	0	0	0	16	0	54	70	434
7:00-8:00	0	1036	11	57	607	0	664	1711	0	0	0	0	0	20	0	124	144	1855
PHF							0.93							0.63				

04:00	0	191	5	11	253	0	264	460	0	0	0	0	0	4	0	17	21	481
04:15	0	191	6	12	282	0	294	491	0	0	0	0	0	5	0	13	18	509
04:30	0	210	9	24	271	0	295	514	0	0	0	0	0	7	0	17	24	538
04:45	0	213	5	12	279	0	291	509	0	0	0	0	0	4	0	15	19	528
05:00	0	197	7	16	313	0	329	533	0	0	0	0	0	5	0	16	21	554
05:15	0	230	10	30	296	0	326	566	0	0	0	0	0	7	0	11	18	584
05:30	0	215	14	7	277	0	284	513	0	0	0	0	0	9	0	14	23	536
05:45	0	195	2	15	230	0	245	442	0	0	0	0	0	5	0	21	26	468
4:30-5:30	0	850	31	82	1159	0	1241	2122	0	0	0	0	0	23	0	59	82	2204
PHF							0.92							0.85				

L = left turn

S = straight

R = right turn

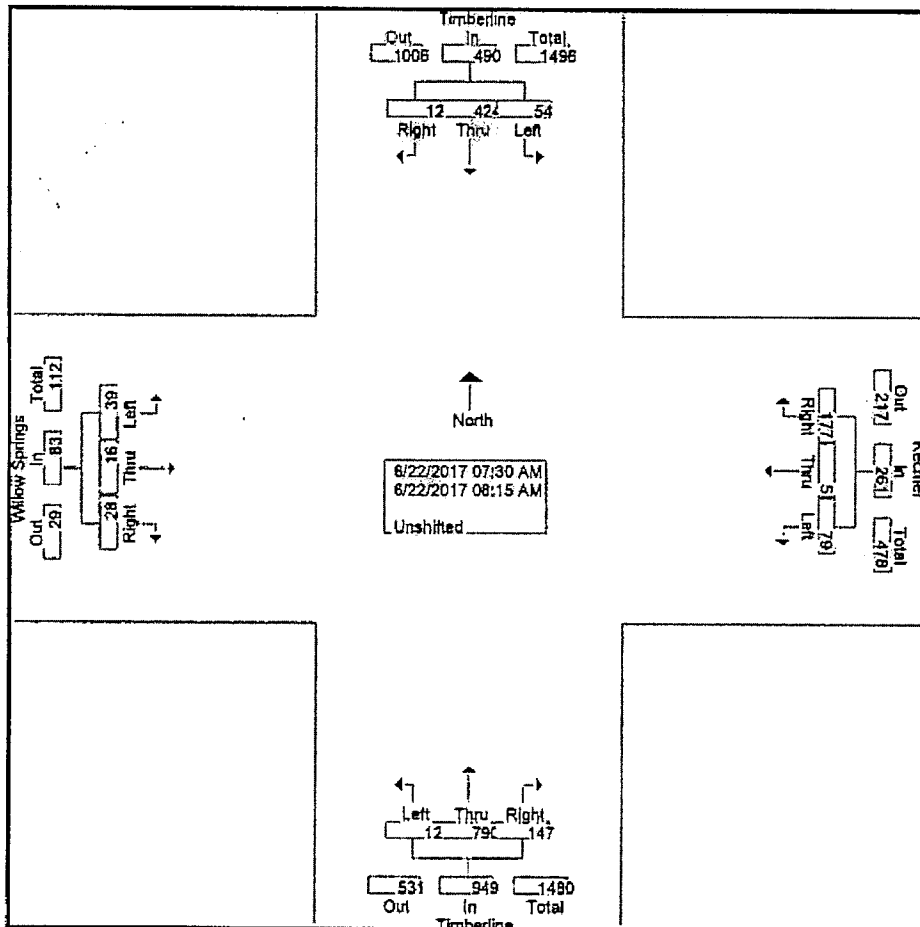
City of Fort Collins Traffic Operations
 626 Linden Street, PO Box 580
 Fort Collins, CO 80522-0580
Peak Hour Turning Movement Study

North/South Street: Timberline
 East/West Street: Willow Springs/Kechter
 Time: AM
 ICU Number: 162

File Name : Timberline & Kechter 6-22-17
 Site Code : 00000162
 Start Date : 6/22/2017
 Page No : 1

Groups Printed- Unshifted

Start Time	Timberline Southbound				Kechter Westbound				Timberline Northbound				Willow Springs Eastbound				Incl. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
07:30 AM	3	122	18	143	33	1	16	50	24	193	3	220	11	3	9	23	436
07:45 AM	3	109	13	125	60	3	27	90	42	246	3	291	9	6	18	33	539
Total	6	231	31	268	93	4	43	140	66	439	6	511	20	9	27	56	975
08:00 AM	4	103	8	115	31	0	13	44	41	178	3	222	3	4	4	11	392
08:15 AM	2	90	15	107	53	1	23	77	40	173	3	216	5	3	8	16	416
Grand Total	12	424	54	490	177	5	79	261	147	790	12	949	28	16	39	83	1783
Approch %	2.4	86.5	11		67.8	1.9	30.3		15.5	83.2	1.3		33.7	19.3	47		
Total %	0.7	23.8	3	27.5	9.9	0.3	4.4	14.6	8.2	44.3	0.7	53.2	1.6	0.9	2.2	4.7	



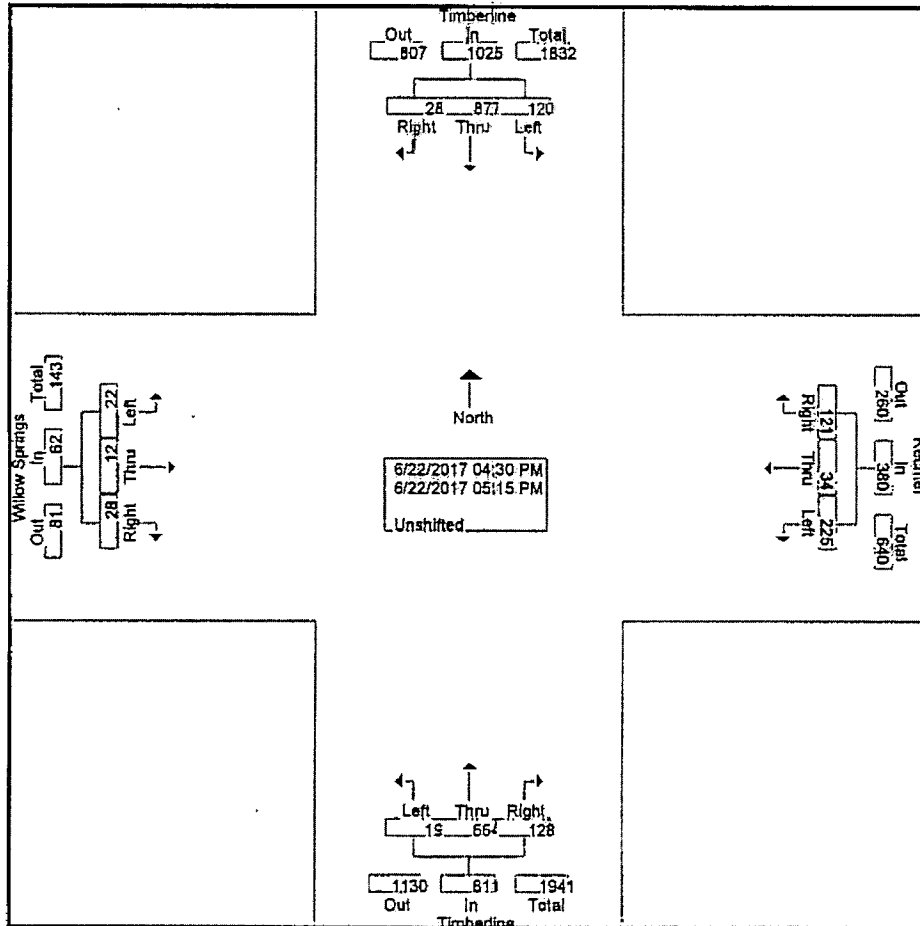
City of Fort Collins Traffic Operations
 626 Linden Street, PO. Box 580
 Fort Collins, CO 80522-0580
Peak Hour Turning Movement Study

North/South Street: Timberline
 East/West Street: Willow Springs/Kechter
 Time: PM
 ICU Number: 162

File Name : Timberline & Kechter 6-22-17
 Site Code : 00000162
 Start Date : 6/22/2017
 Page No : 1

Groups Printed- Unshifted

Start Time	Timberline Southbound				Kechter Westbound				Timberline Northbound				Willow Springs Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
04:30 PM	8	208	30	246	33	9	44	86	20	147	3	170	4	3	7	14	516
04:45 PM	5	223	22	250	31	7	52	90	29	161	5	195	11	3	6	20	555
Total	13	431	52	496	64	16	96	176	49	308	8	365	15	6	13	34	1071
05:00 PM	10	237	33	280	24	7	57	88	42	177	6	225	8	4	6	18	611
05:15 PM	5	209	35	249	33	11	72	116	37	179	5	221	5	2	3	10	596
Grand Total	28	877	120	1025	121	34	225	380	128	664	19	811	28	12	22	62	2278
Approch %	2.7	85.6	11.7		31.8	8.9	59.2		15.8	81.9	2.3		45.2	19.4	35.5		
Total %	1.2	38.5	5.3	45	5.3	1.5	9.9	16.7	5.6	29.1	0.8	35.6	1.2	0.5	1	2.7	



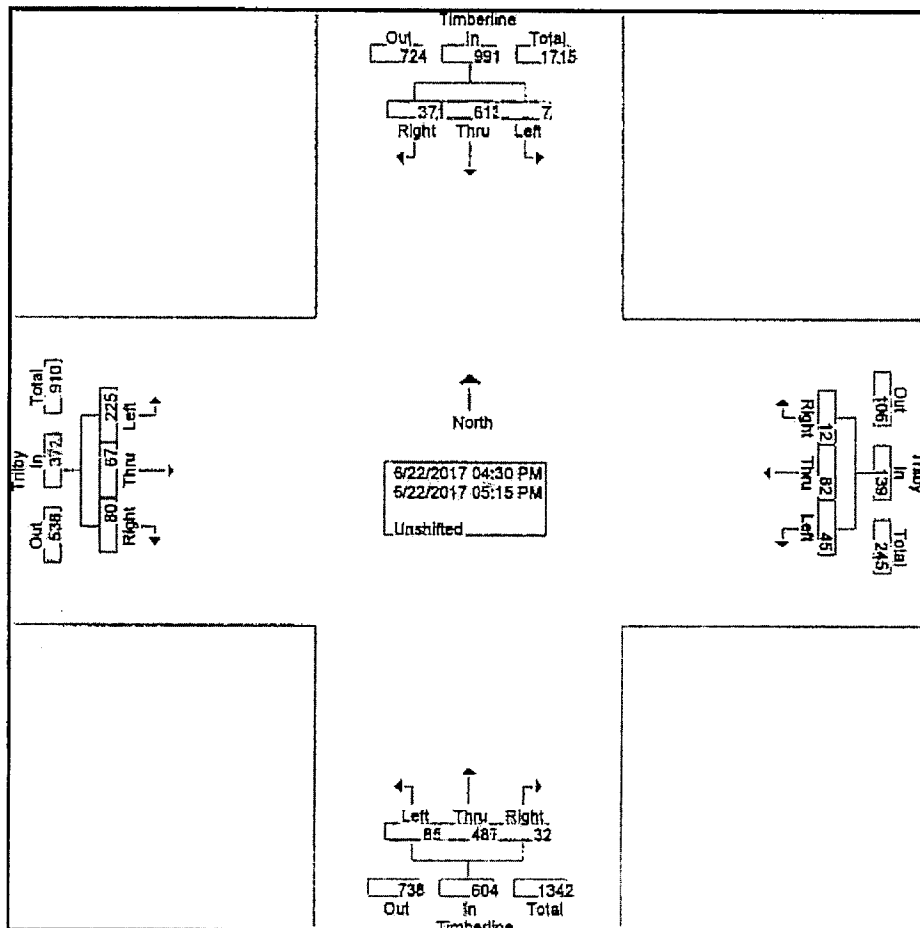
City of Fort Collins Traffic Operations
 626 Linden Street, PO Box 580
 Fort Collins, CO 80522-0580
Peak Hour Turning Movement Study

North/South Street: Timberline
 East/West Street: Trilby
 Time: PM
 ICU Number: 163

File Name : Timberline & Trilby 6-22-17
 Site Code : 00000163
 Start Date : 6/22/2017
 Page No : 1

Groups Printed- Unshifted

Start Time	Timberline Southbound				Trilby Westbound				Timberline Northbound				Trilby Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
04:30 PM	84	149	1	234	5	18	9	32	6	107	15	128	22	16	40	78	472
04:45 PM	92	157	0	249	3	18	13	34	4	117	21	142	14	19	61	94	519
Total	176	306	1	483	8	36	22	66	10	224	36	270	36	35	101	172	991
05:00 PM	88	173	3	264	3	21	12	36	13	127	24	164	22	16	52	90	554
05:15 PM	107	134	3	244	1	25	11	37	9	136	25	170	22	16	72	110	561
Grand Total	371	613	7	991	12	82	45	139	32	487	85	604	80	67	225	372	2106
Apprch %	37.4	61.9	0.7		8.5	59	32.4		5.3	80.6	14.1		21.5	18	60.5		
Total %	17.6	29.1	0.3	47.1	0.6	3.9	2.1	6.6	1.5	23.1	4	28.7	3.8	3.2	10.7	17.7	



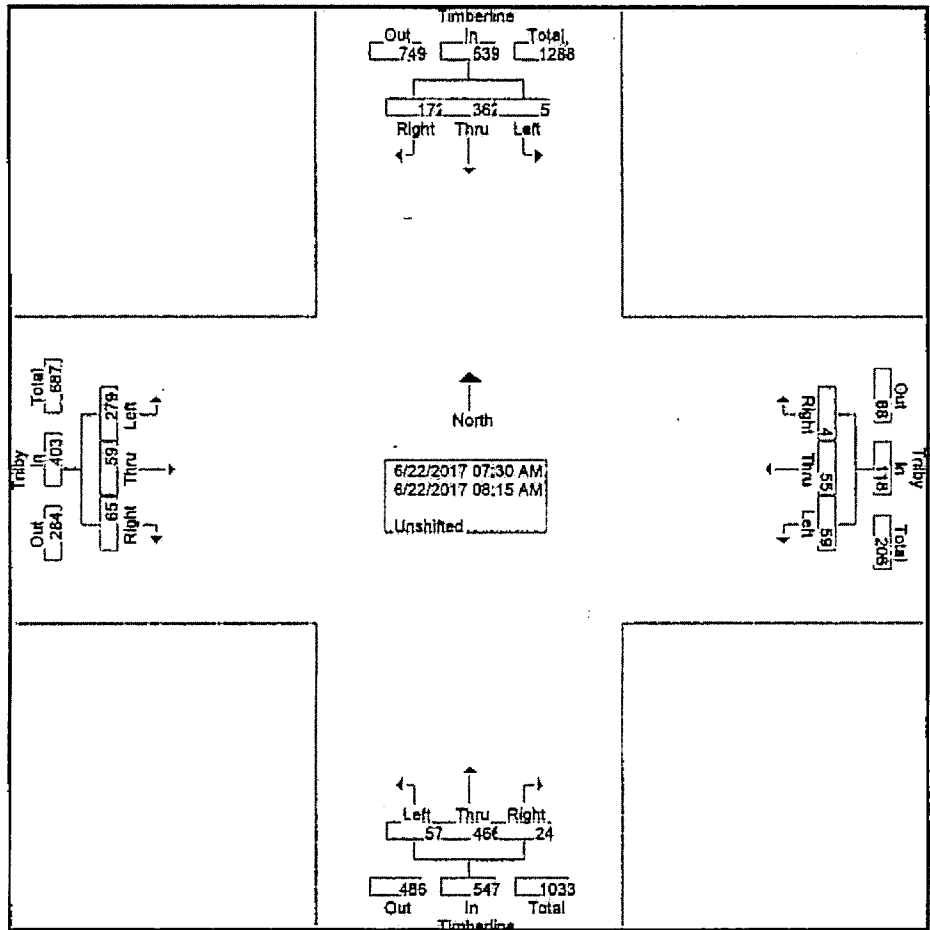
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 Peak Hour Turning Movement Study

North/South Street: Timberline
 East/West Street: Trilby
 Time: AM
 ICU Number: 163

File Name : Timberline & Trilby 6-22-17
 Site Code : 00000163
 Start Date : 6/22/2017
 Page No : 1

Groups Printed- Unshifted

Start Time	Timberline Southbound				Trilby Westbound				Timberline Northbound				Trilby Eastbound				Incl. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
07:30 AM	45	100	2	147	1	11	16	28	4	113	15	132	18	10	64	90	397
07:45 AM	55	105	0	160	1	15	21	37	4	136	16	155	21	17	89	127	480
Total	100	205	2	307	2	26	37	65	8	249	31	288	37	27	153	217	877
08:00 AM	33	83	2	118	1	15	10	26	5	106	8	119	10	10	61	81	344
08:15 AM	39	74	1	114	1	14	12	27	11	111	18	140	18	22	65	105	388
Grand Total	172	362	5	539	4	55	59	118	24	466	57	547	65	59	279	403	1607
Approch %	31.9	67.2	0.9		3.4	46.6	50		4.4	85.2	10.4		16.1	14.6	69.2		
Total %	10.7	22.5	0.3	33.5	0.2	3.4	3.7	7.3	1.5	29	3.6	34	4	3.7	17.4	25.1	

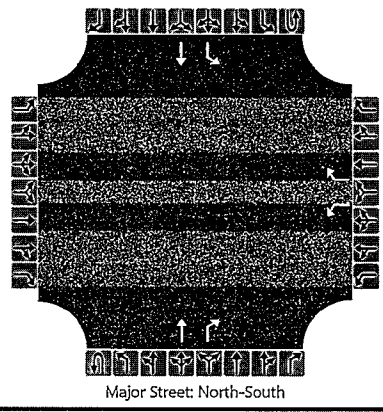


APPENDIX C

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst		Intersection	TIMBERLINE & ZEPHYR
Agency/Co.		Jurisdiction	
Date Performed	7/30/2017	East/West Street	
Analysis Year	2017	North/South Street	TIMBERLINE
Time Analyzed	EX ST LT AM PM	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound				
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Movement																	
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6	
Number of Lanes		0	0	0		1	0	1	0	0	1	1	0	1	1	0	
Configuration						L		R			T	R		L	T		
Volume (veh/h)						20		124			1036	11		57	607		
Percent Heavy Vehicles						3		3						3			
Proportion Time Blocked																	
Right Turn Channelized	No				No				No				No				
Median Type	Left Only																
Median Storage	1																

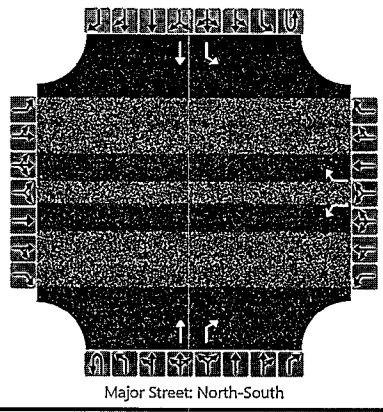
Delay, Queue Length, and Level of Service

Flow Rate (veh/h)					22		135							62			
Capacity					177		248							610			
v/c Ratio					0.12		0.54							0.10			
95% Queue Length					0.4		3.0							0.3			
Control Delay (s/veh)					28.3		35.6							11.6			
Level of Service (LOS)					D		E							B			
Approach Delay (s/veh)					34.6								1.0				
Approach LOS					D												

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst		Intersection	TIMBERLINE & ZEPHYR
Agency/Co.		Jurisdiction	
Date Performed	7/30/2017	East/West Street	
Analysis Year	2017	North/South Street	TIMBERLINE
Time Analyzed	EX ST LT AM (PM)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Vehicle Volumes and Adjustments

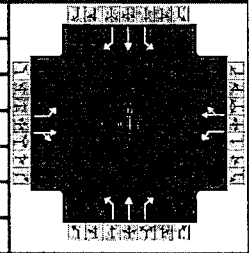
Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	1	0	1	1	0
Configuration						L		R			T	R		L	T	
Volume (veh/h)						23		59			850	31		82	1159	
Percent Heavy Vehicles						3		3						3		
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)					25		64									89		
Capacity					97		325									713		
v/c Ratio					0.26		0.20									0.12		
95% Queue Length					0.9		0.7									0.4		
Control Delay (s/veh)					54.7		18.8									10.8		
Level of Service (LOS)					F		C									B		
Approach Delay (s/veh)					28.9								0.7					
Approach LOS					D													

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency		Duration, h	0.25			
Analyst		Analysis Date	7/30/2017		Area Type	Other
Jurisdiction		Time Period			PHF	0.92
Urban Street		Analysis Year			Analysis Period	1> 7:00
Intersection	TIMBERLINE - TRILBY		File Name	TIMBERLINE-TRILBY.xus		
Project Description	(EX) ST LT (AM) PM					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	279	59	65	59	55	4	57	466	24	5	362	172

Signal Information													
Cycle, s	87.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0			
				Red	0.0	0.0	0.0	0.0	0.0	0.0			

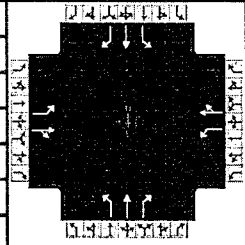
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		35.0		35.0	10.0	42.0	10.0	42.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g _s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g _e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	0
Queue Service Time (g _s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g _c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.34	0.34		0.34	0.34		0.49	0.43	0.43	0.49	0.43	0.43
Capacity (c), veh/h	520	599		452	647		461	808	685	383	808	685
Volume-to-Capacity Ratio (X)	0.583	0.225		0.142	0.099		0.134	0.627	0.038	0.014	0.487	0.273
Back of Queue (Q), ft/ln (50 th percentile)	144.7	49.2		25.4	22.1		16.1	202.8	7.5	1.4	142.9	60.6
Back of Queue (Q), veh/ln (50 th percentile)	5.8	2.0		1.0	0.9		0.6	8.1	0.3	0.1	5.7	2.4
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	25.8	20.2		23.1	19.3		12.9	19.6	14.6	13.5	18.1	16.3
Incremental Delay (d ₂), s/veh	4.7	0.9		0.7	0.3		0.6	3.7	0.1	0.1	2.1	1.0
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	30.5	21.1		23.8	19.6		13.5	23.3	14.7	13.6	20.2	17.2
Level of Service (LOS)	C	C		C	B		B	C	B	B	C	B
Approach Delay, s/veh / LOS	27.6	C		21.7	C		21.9	C			19.2	B
Intersection Delay, s/veh / LOS	22.4 C											

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency				Duration, h	0.25		
Analyst		Analysis Date	7/30/2017	Area Type	Other		
Jurisdiction		Time Period		PHF	0.92		
Urban Street		Analysis Year		Analysis Period	1> 7:00		
Intersection	TIMBERLINE - TRILBY			File Name	TIMBERLINE-TRILBY.xus		
Project Description	(EX) ST LT AM (PM)						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	225	67	80	45	82	12	85	487	32	7	613	37

Signal Information													
Cycle, s	87.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

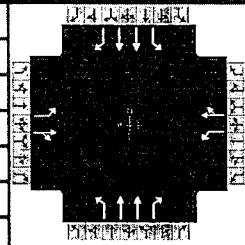
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		35.0		35.0	10.0	42.0	10.0	42.0
Change Period, (Y+R _a), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		0.0		0.0	0.0	0.0	0.0	0.0
Queue Clearance Time (g _s), s		0.0		0.0	0.0	0.0	0.0	0.0
Green Extension Time (g _e), s		0.0		0.0	0.0	0.0	0.0	0.0
Phase Call Probability		0.00		0.00	0.00	0.00	0.00	0.00
Max Out Probability		0.00		0.00	0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	0	0		0	0		0	0	0	0	0	0
Adjusted Saturation Flow Rate (s), veh/h/ln	0	0		0	0		0	0	0	0	0	0
Queue Service Time (g _s), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clearance Time (g _c), s	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Green Ratio (g/C)	0.34	0.34		0.34	0.34		0.49	0.43	0.43	0.49	0.43	0.43
Capacity (c), veh/h	520	599		452	647		461	808	685	383	808	685
Volume-to-Capacity Ratio (X)	0.583	0.225		0.142	0.099		0.134	0.627	0.038	0.014	0.487	0.273
Back of Queue (Q), ft/ln (50 th percentile)	144.7	49.2		25.4	22.1		16.1	202.8	7.5	1.4	142.9	60.6
Back of Queue (Q), veh/ln (50 th percentile)	5.8	2.0		1.0	0.9		0.6	8.1	0.3	0.1	5.7	2.4
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	25.8	20.2		23.1	19.3		12.9	19.6	14.6	13.5	18.1	16.3
Incremental Delay (d ₂), s/veh	4.7	0.9		0.7	0.3		0.6	3.7	0.1	0.1	2.1	1.0
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	30.5	21.1		23.8	19.6		13.5	23.3	14.7	13.6	20.2	17.2
Level of Service (LOS)	C	C		C	B		B	C	B	B	C	B
Approach Delay, s/veh / LOS	27.6	C		21.7	C		21.9	C		19.2	B	
Intersection Delay, s/veh / LOS	22.4						C					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/30/2017	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street		Analysis Year		Analysis Period	1> 7:00
Intersection	TIMBERLINE - KECHTER	File Name	TIMBERLINE-KECHTER.xus		
Project Description	EX ST LT (AM) PM				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	39	16	28	79	5	177	12	790	147	54	424	12

Signal Information				Signal Timing (s)								Signal Phases						
Cycle, s	87.0	Reference Phase	2	Green	6.0	43.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Offset, s	0	Reference Point	End	Yellow	3.0	3.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uncoordinated	Yes	Simult. Gap EW	On	Red	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On															

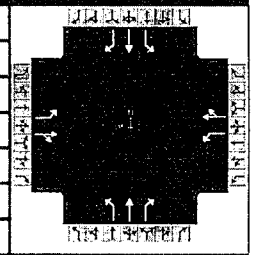
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		30.0		30.0	10.0	47.0	10.0	47.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.3		3.3	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		13.2		10.6	2.3	16.0	3.3	8.6
Green Extension Time (g _e), s		0.6		0.7	0.0	3.7	0.0	3.8
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.00	0.22	0.00	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	42	48		86	198		13	859	160	59	461	13
Adjusted Saturation Flow Rate (s), veh/h/ln	1204	1705		1379	1617		1810	1809	1610	1810	1809	1610
Queue Service Time (g _s), s	2.6	1.8		4.2	8.6		0.3	14.0	5.0	1.3	6.6	0.4
Cycle Queue Clearance Time (g _c), s	11.2	1.8		6.0	8.6		0.3	14.0	5.0	1.3	6.6	0.4
Green Ratio (g/C)	0.29	0.29		0.29	0.29		0.55	0.48	0.48	0.55	0.48	0.48
Capacity (c), veh/h	309	490		451	465		571	1746	777	403	1746	777
Volume-to-Capacity Ratio (X)	0.137	0.098		0.191	0.426		0.023	0.492	0.206	0.146	0.264	0.017
Back of Queue (Q), ft/ln (50 th percentile)	19.9	18.4		35.8	87.2		2.7	135.1	44	13.4	62.6	3.2
Back of Queue (Q), veh/ln (50 th percentile)	0.8	0.7		1.4	3.5		0.1	5.4	1.8	0.5	2.5	0.1
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	29.7	22.7		24.9	25.2		9.2	15.3	12.9	10.7	13.3	11.7
Incremental Delay (d ₂), s/veh	0.9	0.4		0.9	2.8		0.1	1.0	0.6	0.8	0.4	0.0
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	30.7	23.1		25.9	28.0		9.3	16.3	13.5	11.4	13.7	11.8
Level of Service (LOS)	C	C		C	C		A	B	B	B	B	B
Approach Delay, s/veh / LOS	26.7	C		27.4	C		15.7	B		13.4	B	
Intersection Delay, s/veh / LOS	17.3						B					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency		Duration, h	0.25			
Analyst		Analysis Date	7/30/2017		Area Type	Other
Jurisdiction		Time Period	PHF			0.92
Urban Street		Analysis Year	Analysis Period			1> 7:00
Intersection	TIMBERLINE - KECHTER		File Name	TIMBERLINE-KECHTER.xus		
Project Description	(EX) ST LT AM (PM)					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	22	12	28	225	34	121	19	664	128	120	877	28

Signal Information				Signal Timing (s)								Signal Phases							
Cycle, s	87.0	Reference Phase	2	Green	6.0	48.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Offset, s	0	Reference Point	End	Yellow	3.0	3.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Uncoordinated	Yes	Simult. Gap E/W	On	Red	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On																

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		25.0		25.0	10.0	52.0	10.0	52.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		11.0		18.5	2.4	26.5	4.6	42.3
Green Extension Time (g _e), s		0.7		0.2	0.0	4.3	0.0	0.0
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.03		1.00	0.32	0.07	1.00	1.00

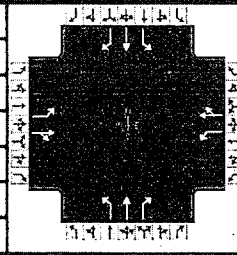
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	24	43		245	168		21	722	139	130	953	30
Adjusted Saturation Flow Rate (s), veh/h/ln	1236	1687		1385	1666		1810	1900	1610	1810	1900	1610
Queue Service Time (g _s), s	1.5	1.8		14.8	7.5		0.4	24.5	3.8	2.6	40.3	0.8
Cycle Queue Clearance Time (g _c), s	9.0	1.8		16.5	7.5		0.4	24.5	3.8	2.6	40.3	0.8
Green Ratio (g/C)	0.23	0.23		0.23	0.23		0.61	0.54	0.54	0.61	0.54	0.54
Capacity (c), veh/h	260	388		373	383		240	1026	870	383	1026	870
Volume-to-Capacity Ratio (X)	0.092	0.112		0.656	0.440		0.086	0.703	0.160	0.341	0.929	0.035
Back of Queue (Q), ft/ln (50 th percentile)	11.9	18.6		139.6	81.2		5.7	254.8	31.9	27.8	482.7	6.5
Back of Queue (Q), veh/ln (50 th percentile)	0.5	0.7		5.6	3.2		0.2	10.2	1.3	1.1	19.3	0.3
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	32.6	26.5		33.0	28.7		17.4	14.8	10.1	12.1	18.5	9.4
Incremental Delay (d ₂), s/veh	0.7	0.6		8.7	3.6		0.7	4.0	0.4	2.4	15.4	0.1
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	33.3	27.1		41.7	32.3		18.1	18.9	10.5	14.5	33.9	9.4
Level of Service (LOS)	C	C		D	C		B	B	B	B	C	A
Approach Delay, s/veh / LOS	29.3	C		37.9	D		17.5	B		30.9	C	
Intersection Delay, s/veh / LOS	27.3			C			C			C		

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

APPENDIX D

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency				Duration, h	0.25		
Analyst		Analysis Date	7/30/2017	Area Type	Other		
Jurisdiction		Time Period		PHF	0.92		
Urban Street		Analysis Year		Analysis Period	1> 7:00		
Intersection	TIMBERLINE - ZEPHYR			File Name			
Project Description	ST	LT	AM	PM	1 lane each direction on Timberline		



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	135	10	80	20	5	130	25	1190	15	60	675	50

Signal Information				Signal Timing (s)									
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	6.0	51.0	20.0	0.0	0.0	0.0	0.0		
Uncoordinated	Yes	Simult. Gap EW	On	Yellow	3.0	3.0	4.0	0.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.0	0.0	0.0	0.0	0.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		25.0		25.0	10.0	55.0	10.0	55.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.3		3.3	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		19.1		9.0	2.5	52.0	3.3	27.2
Green Extension Time (g _e), s		0.1		0.7	0.0	0.0	0.0	6.2
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		1.00		0.01	0.44	1.00	1.00	0.12

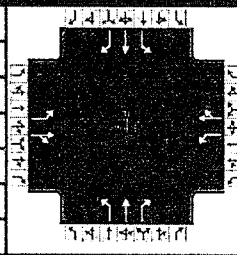
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	147	98		22	147		27	1293	16	65	734	54
Adjusted Saturation Flow Rate (s), veh/h/ln	1261	1638		1318	1619		1810	1900	1610	1810	1900	1610
Queue Service Time (g _s), s	10.1	4.4		1.2	7.0		0.5	50.0	0.4	1.3	25.2	1.4
Cycle Queue Clearance Time (g _c), s	17.1	4.4		5.7	7.0		0.5	50.0	0.4	1.3	25.2	1.4
Green Ratio (g/C)	0.22	0.22		0.22	0.22		0.62	0.56	0.56	0.62	0.56	0.56
Capacity (c), veh/h	262	364		308	360		387	1056	895	201	1056	895
Volume-to-Capacity Ratio (X)	0.559	0.269		0.071	0.408		0.070	1.225	0.018	0.325	0.695	0.061
Back of Queue (Q), ft/ln (50 th percentile)	90.1	46.4		10.5	73.4		5.1	1269.5	3.4	23.1	260.1	11.7
Back of Queue (Q), veh/ln (50 th percentile)	3.6	1.9		0.4	2.9		0.2	50.8	0.1	0.9	10.4	0.5
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	37.3	29.0		31.3	29.9		10.8	20.0	9.0	20.6	14.5	9.2
Incremental Delay (d ₂), s/veh	8.3	1.8		0.4	3.4		0.4	110.0	0.0	4.3	3.8	0.1
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	45.6	30.8		31.8	33.3		11.1	130.0	9.0	24.8	18.3	9.3
Level of Service (LOS)	D	C		C	C		B	F	A	C	B	A
Approach Delay, s/veh / LOS	39.7		D	33.1		C	126.1		F	18.2		B
Intersection Delay, s/veh / LOS	76.6						E					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

Need 4 lanes on Timberline

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency		Duration, h	0.25		
Analyst		Analysis Date	7/30/2017		
Jurisdiction		Time Period	PHF		
Urban Street		Analysis Year	Analysis Period		
Intersection	TIMBERLINE - ZEPHYR...	File Name	TIMBERLINE-ZEPHYR 1 LANE.xus		
Project Description	(ST) LT AM (PM)				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	120	10	70	25	15	60	100	980	35	85	1340	180

Signal Information				Signal Phases								
Cycle, s	90.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
Green	6.0	56.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.0	3.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		20.0		20.0	10.0	60.0	10.0	60.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		14.4		7.8	3.9	46.7	3.6	57.0
Green Extension Time (g _e), s		0.1		0.4	0.0	5.6	0.0	0.0
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		1.00		0.05	1.00	0.76	1.00	1.00

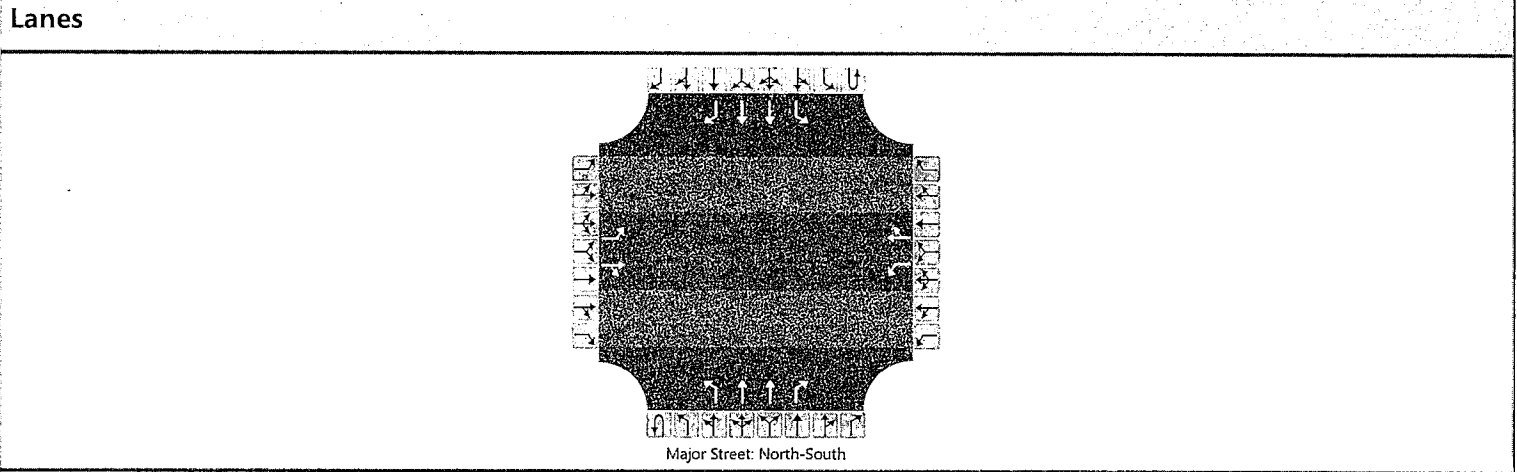
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	130	87		27	82		109	1065	38	92	1457	196
Adjusted Saturation Flow Rate (s), veh/h/ln	1338	1641		1331	1661		1810	1900	1610	1810	1900	1610
Queue Service Time (g _s), s	8.5	4.2		1.7	3.9		1.9	44.7	0.8	1.6	55.0	4.8
Cycle Queue Clearance Time (g _c), s	12.4	4.2		5.8	3.9		1.9	44.7	0.8	1.6	55.0	4.8
Green Ratio (g/C)	0.17	0.17		0.17	0.17		0.68	0.61	0.61	0.68	0.61	0.61
Capacity (c), veh/h	245	274		240	277		201	1161	984	250	1161	984
Volume-to-Capacity Ratio (X)	0.532	0.318		0.113	0.294		0.542	0.917	0.039	0.369	1.254	0.199
Back of Queue (Q), ft/ln (50 th percentile)	80.7	45.9		14.5	42.7		46.5	491.6	6.7	34	1457.7	38.4
Back of Queue (Q), veh/ln (50 th percentile)	3.2	1.8		0.6	1.7		1.9	19.7	0.3	1.4	58.3	1.5
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	38.3	33.0		35.6	32.9		21.8	15.5	7.0	19.5	17.5	7.7
Incremental Delay (d ₂), s/veh	8.0	3.0		1.0	2.7		10.1	12.8	0.1	4.1	121.7	0.5
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	46.3	36.0		36.5	35.6		31.9	28.3	7.0	23.6	139.2	8.2
Level of Service (LOS)	D	D		D	D		C	C	A	C	(F)	A
Approach Delay, s/veh / LOS	42.2		D	35.8		D	28.0		C	118.4		F
Intersection Delay, s/veh / LOS	77.2						E					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

Need 4 lanes on Timberline

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst		Intersection	TIMBERLINE & ZEPHYR
Agency/Co.		Jurisdiction	
Date Performed	11/21/2017	East/West Street	
Analysis Year	2017	North/South Street	TIMBERLINE
Time Analyzed	(ST) LT (AM) PM	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description			



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	0		1	1	0	0	1	2	1	0	1	2	1
Configuration		L		TR		L		TR		L	T	R		L	T	R
Volume (veh/h)		135	10	80		20	5	130		25	1190	15		60	675	50
Percent Heavy Vehicles		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

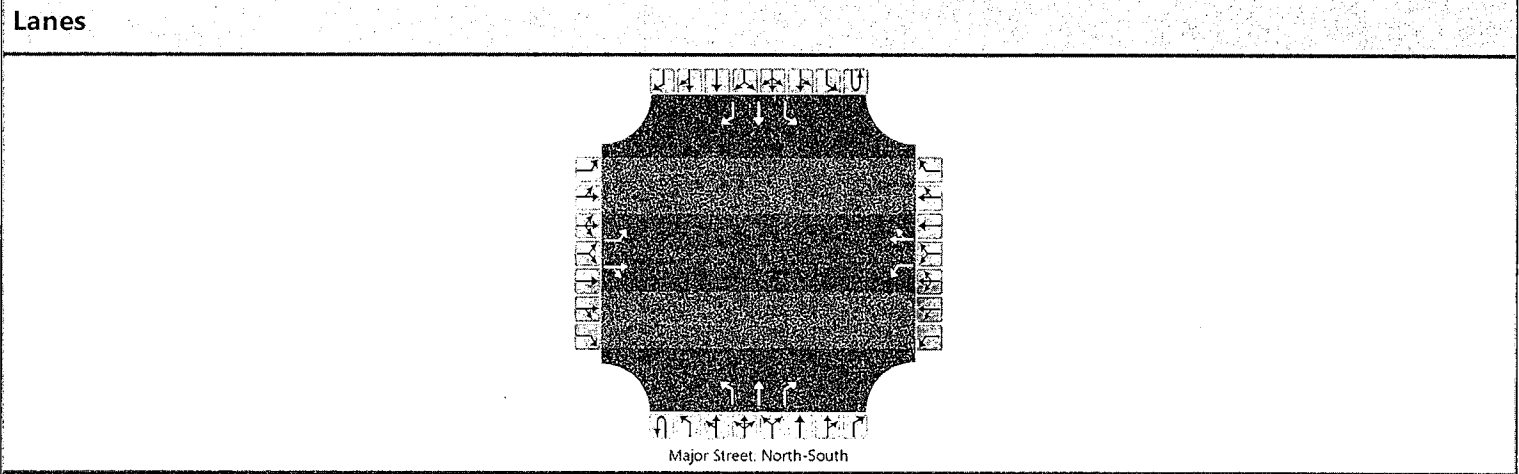
Delay, Queue Length, and Level of Service

Flow Rate (veh/h)		147		98		22		146		27				65		
Capacity		104		222		97		304		821				519		
v/c Ratio		1.41		0.44		0.23		0.48		0.03				0.13		
95% Queue Length		10.6		2.1		0.8		2.5		0.1				0.4		
Control Delay (s/veh)		305.6		33.4		52.5		27.3		9.5				12.9		
Level of Service (LOS)		F		D		F		D		A				B		
Approach Delay (s/veh)	196.7				30.6				0.2				1.0			
Approach LOS	F				D											

Need Traffic Signal

HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst		Intersection	TIMBERLINE & ZEPHYR
Agency/Co.		Jurisdiction	
Date Performed	11/21/2017	East/West Street	
Analysis Year	2017	North/South Street	TIMBERLINE
Time Analyzed	(ST) LT AM (PM)	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	ONE NORTH - SOUTH LANE ON TIMBERLINE		



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	0		1	1	0	0	1	1	1	0	1	1	1
Configuration		L		TR		L		TR		L	T	R		L	T	R
Volume (veh/h)		120	10	70		25	15	60		100	980	35		85	1340	180
Percent Heavy Vehicles		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Left Only															
Median Storage	1															

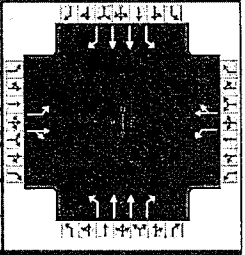
Delay, Queue Length, and Level of Service

Flow Rate (veh/h)		130		87		27		81		109				92		
Capacity		0		52		0		41		387				629		
v/c Ratio				1.67				1.97		0.28				0.15		
95% Queue Length				8.3				8.5		1.1				0.5		
Control Delay (s/veh)				496.2				662.8		17.9				11.7		
Level of Service (LOS)		F		F				F		C				B		
Approach Delay (s/veh)									1.6				0.6			
Approach LOS																

Need Traffic Signal

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/30/2017	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street		Analysis Year		Analysis Period	1> 7:00
Intersection	TIMBERLINE - ZEPHYR		File Name	TIMBERLINE-ZEPHYR.xus	
Project Description	ST LT AM PM				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	135	10	80	30	5	170	25	1190	15	60	675	50

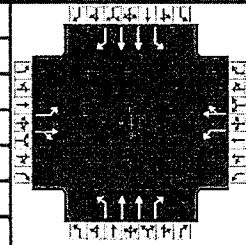
Signal Information													
Cycle, s	87.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
				Green	6.0	43.0	25.0	0.0	0.0	0.0			
				Yellow	3.0	3.0	4.0	0.0	0.0	0.0			
				Red	1.0	1.0	1.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		30.0		30.0	10.0	47.0	10.0	47.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.3		3.3	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		19.9		10.3	2.6	27.0	3.5	13.4
Green Extension Time (g _e), s		0.6		0.9	0.0	5.3	0.0	6.2
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.37		0.00	0.51	0.16	1.00	0.02

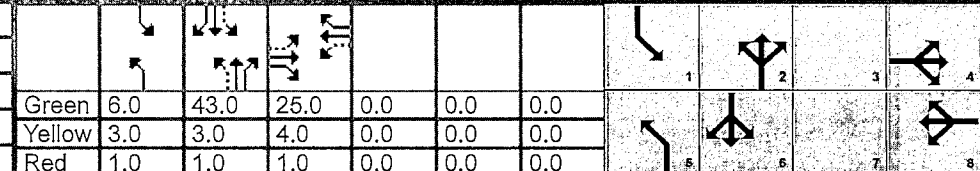
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	147	98		33	190		27	1293	16	65	734	54
Adjusted Saturation Flow Rate (s), veh/h/ln	1212	1638		1318	1617		1810	1809	1610	1810	1809	1610
Queue Service Time (g _s), s	9.7	3.9		1.7	8.3		0.6	25.0	0.5	1.5	11.4	1.6
Cycle Queue Clearance Time (g _c), s	17.9	3.9		5.6	8.3		0.6	25.0	0.5	1.5	11.4	1.6
Green Ratio (g/C)	0.29	0.29		0.29	0.29		0.55	0.48	0.48	0.55	0.48	0.48
Capacity (c), veh/h	316	471		402	465		449	1746	777	282	1746	777
Volume-to-Capacity Ratio (X)	0.465	0.208		0.081	0.409		0.061	0.741	0.021	0.231	0.420	0.070
Back of Queue (Q), ft/ln (50 th percentile)	78.2	39.3		13.6	83.3		6	248.7	4	16.3	109.7	13.8
Back of Queue (Q), veh/ln (50 th percentile)	3.1	1.6		0.5	3.3		0.2	9.9	0.2	0.7	4.4	0.6
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	32.3	23.5		25.6	25.0		10.0	18.1	11.8	14.0	14.6	12.0
Incremental Delay (d ₂), s/veh	4.8	1.0		0.4	2.7		0.3	2.9	0.0	1.9	0.7	0.2
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	37.1	24.5		26.0	27.7		10.2	21.0	11.8	15.9	15.3	12.2
Level of Service (LOS)	D	C		C	C		B	C	B	B	B	B
Approach Delay, s/veh / LOS	32.1		C	27.4		C	20.7		C	15.2		B
Intersection Delay, s/veh / LOS	20.5						C					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency		Duration, h	0.25				
Analyst		Analysis Date	7/30/2017				
Jurisdiction		Time Period					
Urban Street		Analysis Year					
Intersection	TIMBERLINE - ZEPHYR	File Name	TIMBERLINE-ZEPHYR.xus				
Project Description	(SI) LT AM (PM)						

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	120	10	70	30	15	85	100	980	35	85	1340	180

Signal Information															
Cycle, s	87.0	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	Yes	Simult. Gap E/W	On												
Force Mode	Fixed	Simult. Gap N/S	On												
Green	6.0	43.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Yellow	3.0	3.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Red	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

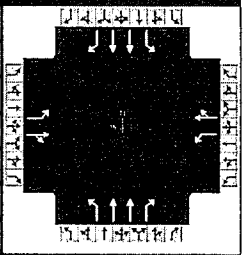
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		30.0		30.0	10.0	47.0	10.0	47.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		13.7		7.1	4.5	20.8	4.1	32.3
Green Extension Time (g _e), s		0.6		0.7	0.0	8.6	0.0	5.7
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.00		0.00	1.00	0.20	1.00	0.55

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	130	87		33	109		109	1065	38	92	1457	196
Adjusted Saturation Flow Rate (s), veh/h/in	1305	1641		1331	1648		1810	1809	1610	1810	1809	1610
Queue Service Time (g _s), s	7.4	3.5		1.6	4.4		2.5	18.8	1.1	2.1	30.3	6.2
Cycle Queue Clearance Time (g _c), s	11.7	3.5		5.1	4.4		2.5	18.8	1.1	2.1	30.3	6.2
Green Ratio (g/C)	0.29	0.29		0.29	0.29		0.55	0.48	0.48	0.55	0.48	0.48
Capacity (c), veh/h	392	472		412	474		249	1746	777	339	1746	777
Volume-to-Capacity Ratio (X)	0.333	0.184		0.079	0.230		0.437	0.610	0.049	0.273	0.834	0.252
Back of Queue (Q), ft/in (50 th percentile)	60.8	34.6		13.5	44		31.2	183.2	9.6	22.8	308.6	55
Back of Queue (Q), veh/in (50 th percentile)	2.4	1.4		0.5	1.8		1.2	7.3	0.4	0.9	12.3	2.2
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	28.1	23.3		25.3	23.7		17.6	16.5	11.9	12.2	19.5	13.2
Incremental Delay (d ₂), s/veh	2.3	0.9		0.4	1.1		5.5	1.6	0.1	2.0	4.9	0.8
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	30.4	24.2		25.6	24.8		23.1	18.1	12.0	14.2	24.3	14.0
Level of Service (LOS)	C	C		C	C		C	B	B	B	C	B
Approach Delay, s/veh / LOS	27.9	C		25.0	C		18.4	B		22.6	C	
Intersection Delay, s/veh / LOS	21.5			C			C			C		

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency		Duration, h	0.25			
Analyst		Analysis Date	7/30/2017		Area Type	Other
Jurisdiction		Time Period	PHF			0.92
Urban Street		Analysis Year	Analysis Period			1> 7:00
Intersection	TIMBERLINE - TRILBY		File Name	TIMBERLINE-TRILBY.xus		
Project Description	EX (ST) LT (AM) PM					



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	320	65	70	65	60	5	65	540	25	5	450	215

Signal Information				Signal Timing (s)								Signal Phases				
Cycle, s	87.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	6.0	38.0	30.0	0.0	0.0	0.0						
Uncoordinated	Yes	Simult. Gap EW	On	Yellow	3.0	3.0	4.0	0.0	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.0	0.0	0.0	0.0						

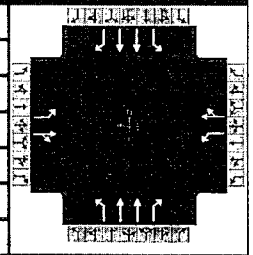
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		35.0		35.0	10.0	42.0	10.0	42.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.1		3.1	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		24.8		11.0	3.8	11.7	2.1	10.5
Green Extension Time (g _e), s		0.7		1.2	0.0	3.2	0.0	3.1
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.35		0.00	1.00	0.00	0.11	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	348	147		71	71		71	587	27	5	489	234
Adjusted Saturation Flow Rate (s), veh/h/ln	1351	1738		1261	1874		1810	1809	1610	1810	1809	1610
Queue Service Time (g _s), s	20.5	5.3		3.7	2.2		1.8	9.7	0.9	0.1	7.8	8.5
Cycle Queue Clearance Time (g _c), s	22.8	5.3		9.0	2.2		1.8	9.7	0.9	0.1	7.8	8.5
Green Ratio (g/C)	0.34	0.34		0.34	0.34		0.49	0.43	0.43	0.49	0.43	0.43
Capacity (c), veh/h	514	599		441	646		495	1539	685	453	1539	685
Volume-to-Capacity Ratio (X)	0.677	0.245		0.160	0.109		0.143	0.382	0.040	0.012	0.318	0.341
Back of Queue (Q), ft/ln (50 th percentile)	178.8	54.1		28.5	24.4		18.3	96.2	7.8	1.4	77.6	78.7
Back of Queue (Q), veh/ln (50 th percentile)	7.2	2.2		1.1	1.0		0.7	3.8	0.3	0.1	3.1	3.1
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	27.2	20.4		23.6	19.4		12.2	17.2	14.6	11.9	16.6	16.8
Incremental Delay (d ₂), s/veh	7.0	1.0		0.8	0.3		0.6	0.7	0.1	0.0	0.5	1.4
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	34.2	21.4		24.4	19.7		12.8	17.9	14.7	12.0	17.2	18.2
Level of Service (LOS)	C	C		C	B		B	B	B	B	B	B
Approach Delay, s/veh / LOS	30.4	C		22.1	C		17.2	B		17.4	B	
Intersection Delay, s/veh / LOS	20.8						C					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/30/2017	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street		Analysis Year		Analysis Period	1> 7:00
Intersection	TIMBERLINE - TRILBY		File Name	TIMBERLINE-TRILBY.xus	
Project Description	EX (ST) LT AM (PM)				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	280	75	90	50	90	15	95	610	35	10	745	40

Signal Information																
Cycle, s	87.0	Reference Phase	2													
Offset, s	0	Reference Point	End													
Uncoordinated	Yes	Simult. Gap EW	On	Green	6.0	38.0	30.0	0.0	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	3.0	4.0	0.0	0.0	0.0						
				Red	1.0	1.0	1.0	0.0	0.0	0.0						

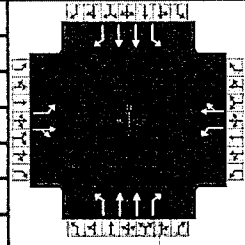
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		35.0		35.0	10.0	42.0	10.0	42.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		24.3		11.5	4.7	13.2	2.3	16.4
Green Extension Time (g _e), s		0.8		1.3	0.0	3.9	0.0	3.6
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.30		0.00	1.00	0.01	0.19	0.04

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	304	179		54	114		103	663	38	11	810	43
Adjusted Saturation Flow Rate (s), veh/h/ln	1299	1730		1224	1852		1810	1809	1610	1810	1809	1610
Queue Service Time (g _s), s	18.6	6.6		3.0	3.7		2.7	11.2	1.2	0.3	14.4	1.4
Cycle Queue Clearance Time (g _c), s	22.3	6.6		9.5	3.7		2.7	11.2	1.2	0.3	14.4	1.4
Green Ratio (g/C)	0.34	0.34		0.34	0.34		0.49	0.43	0.43	0.49	0.43	0.43
Capacity (c), veh/h	475	597		412	639		369	1539	685	422	1539	685
Volume-to-Capacity Ratio (X)	0.641	0.301		0.132	0.179		0.280	0.431	0.056	0.026	0.526	0.063
Back of Queue (Q), ft/ln (50 th percentile)	156.1	67.9		22.2	40.7		29.1	111.8	11	2.7	144.7	12.7
Back of Queue (Q), veh/ln (50 th percentile)	6.2	2.7		0.9	1.6		1.2	4.5	0.4	0.1	5.8	0.5
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	27.7	20.8		24.3	19.9		13.6	17.6	14.7	12.2	18.5	14.8
Incremental Delay (d ₂), s/veh	6.5	1.3		0.7	0.6		1.9	0.9	0.2	0.1	1.3	0.2
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	34.2	22.1		25.0	20.5		15.5	18.5	14.9	12.3	19.8	14.9
Level of Service (LOS)	C	C		C	C		B	B	B	B	B	B
Approach Delay, s/veh / LOS	29.7	C		22.0	C		17.9	B		19.5	B	
Intersection Delay, s/veh / LOS	21.3						C					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/30/2017	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street		Analysis Year		Analysis Period	1> 7:00
Intersection	TIMBERLINE - KECHTER	File Name	TIMBERLINE-KECHTER.xus		
Project Description	EX (ST) LT (AM) PM				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	45	20	30	95	5	195	15	1000	185	60	515	15

Signal Information													
Cycle, s	87.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap EW	On										
Force Mode	Fixed	Simult. Gap N/S	On										
		Green		6.0	43.0	25.0	0.0	0.0	0.0				
		Yellow		3.0	3.0	4.0	0.0	0.0	0.0				
		Red		1.0	1.0	1.0	0.0	0.0	0.0				

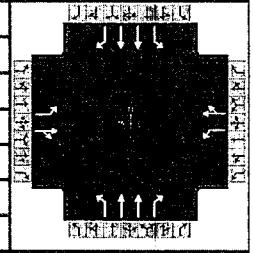
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		30.0		30.0	10.0	47.0	10.0	47.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.3		3.3	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		14.7		11.6	2.4	21.3	3.5	10.2
Green Extension Time (g _e), s		0.7		0.8	0.0	4.9	0.0	5.1
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.01		0.00	0.27	0.04	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	49	54		103	217		16	1087	201	65	560	16
Adjusted Saturation Flow Rate (s), veh/h/ln	1182	1715		1371	1616		1810	1809	1610	1810	1809	1610
Queue Service Time (g _s), s	3.1	2.0		5.2	9.6		0.4	19.3	6.4	1.5	8.2	0.5
Cycle Queue Clearance Time (g _c), s	12.7	2.0		7.2	9.6		0.4	19.3	6.4	1.5	8.2	0.5
Green Ratio (g/C)	0.29	0.29		0.29	0.29		0.55	0.48	0.48	0.55	0.48	0.48
Capacity (c), veh/h	292	493		445	464		523	1746	777	333	1746	777
Volume-to-Capacity Ratio (X)	0.168	0.110		0.232	0.468		0.031	0.622	0.259	0.196	0.321	0.021
Back of Queue (Q), ft/ln (50 th percentile)	23.6	21		44.1	98		3.5	188.3	57	15.6	78.6	4
Back of Queue (Q), veh/ln (50 th percentile)	0.9	0.8		1.8	3.9		0.1	7.5	2.3	0.6	3.1	0.2
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	30.8	22.8		25.5	25.5		9.4	16.6	13.3	12.1	13.8	11.8
Incremental Delay (d ₂), s/veh	1.2	0.5		1.2	3.4		0.1	1.7	0.8	1.3	0.5	0.0
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	32.0	23.3		26.7	28.9		9.5	18.3	14.1	13.4	14.3	11.8
Level of Service (LOS)	C	C		C	C		A	B	B	B	B	B
Approach Delay, s/veh / LOS	27.4	C		28.2	C		17.6	B		14.1	B	
Intersection Delay, s/veh / LOS	18.5						B					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency				Duration, h	0.25		
Analyst				Analysis Date	7/30/2017		
Jurisdiction				Area Type	Other		
Urban Street				Time Period	PHF		
Intersection	TIMBERLINE - KECHTER			PHF	0.92		
Project Description	EX (ST) LT AM (PM)			Analysis Year	Analysis Period		
					1> 7:00		
	File Name			TIMBERLINE-KECHTER.xus			



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	25	15	30	285	40	135	25	850	160	135	1120	30

Signal Information												
Cycle, s	87.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap EW	On	Green	6.0	43.0	25.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	3.0	4.0	0.0	0.0	0.0		
				Red	1.0	1.0	1.0	0.0	0.0	0.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		30.0		30.0	10.0	47.0	10.0	47.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		11.6		22.4	2.6	17.4	5.4	24.8
Green Extension Time (g _e), s		1.0		0.4	0.0	7.0	0.0	6.3
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.00		1.00	0.51	0.07	1.00	0.17

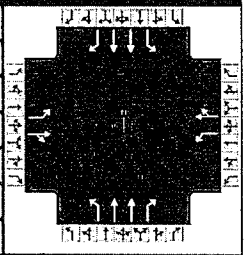
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	27	49		310	190		27	924	174	147	1217	33
Adjusted Saturation Flow Rate (s), veh/h/ln	1212	1696		1378	1668		1810	1809	1610	1810	1809	1610
Queue Service Time (g _s), s	1.6	1.8		18.5	8.0		0.6	15.4	5.4	3.4	22.8	0.9
Cycle Queue Clearance Time (g _c), s	9.6	1.8		20.4	8.0		0.6	15.4	5.4	3.4	22.8	0.9
Green Ratio (g/C)	0.29	0.29		0.29	0.29		0.55	0.48	0.48	0.55	0.48	0.48
Capacity (c), veh/h	320	487		450	479		300	1746	777	381	1746	777
Volume-to-Capacity Ratio (X)	0.085	0.100		0.689	0.397		0.091	0.529	0.224	0.385	0.697	0.042
Back of Queue (Q), ft/ln (50 th percentile)	12.3	18.8		170.1	82.7		6.4	149.1	48.4	37.4	223.8	8.1
Back of Queue (Q), veh/ln (50 th percentile)	0.5	0.8		6.8	3.3		0.3	6.0	1.9	1.5	9.0	0.3
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	28.8	22.7		30.2	24.9		12.6	15.6	13.0	11.8	17.5	11.9
Incremental Delay (d ₂), s/veh	0.5	0.4		8.4	2.4		0.6	1.2	0.7	2.9	2.3	0.1
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	29.3	23.2		38.6	27.4		13.2	16.8	13.7	14.7	19.9	12.0
Level of Service (LOS)	C	C		D	C		B	B	B	B	B	B
Approach Delay, s/veh / LOS	25.4	C		34.3	C		16.2	B		19.1	B	
Intersection Delay, s/veh / LOS	20.7						C					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

APPENDIX E

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency		Duration, h	0.25			
Analyst		Analysis Date	7/30/2017		Area Type	Other
Jurisdiction		Time Period	PHF			0.92
Urban Street		Analysis Year			Analysis Period	1> 7:00
Intersection	TIMBERLINE - ZEPHYR		File Name	TIMBERLINE-ZEPHYR.xus		
Project Description	ST (LT) (AM) PM					



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	185	15	120	35	10	175	35	1435	15	65	820	70

Signal Information				Signal Phases								
Cycle, s	87.0	Reference Phase	2									
Offset, s	0	Reference Point	End									
Uncoordinated	Yes	Simult. Gap E/W	On									
Force Mode	Fixed	Simult. Gap N/S	On									
Green	6.0	43.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	3.0	3.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

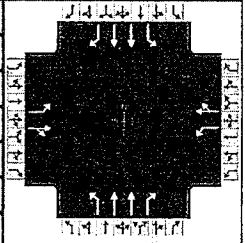
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		30.0		30.0	10.0	47.0	10.0	47.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.4		3.4	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		25.0		10.8	2.8	36.1	3.6	16.7
Green Extension Time (g _e), s		0.0		1.2	0.0	3.8	0.0	8.2
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		1.00		0.00	0.84	0.74	1.00	0.10

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	201	147		38	201		38	1560	16	71	891	76
Adjusted Saturation Flow Rate (s), veh/h/ln	1200	1638		1261	1624		1810	1809	1610	1810	1809	1610
Queue Service Time (g _s), s	14.2	6.1		2.1	8.8		0.8	34.1	0.5	1.6	14.7	2.2
Cycle Queue Clearance Time (g _c), s	23.0	6.1		8.2	8.8		0.8	34.1	0.5	1.6	14.7	2.2
Green Ratio (g/C)	0.29	0.29		0.29	0.29		0.55	0.48	0.48	0.55	0.48	0.48
Capacity (c), veh/h	307	471		357	467		392	1746	777	230	1746	777
Volume-to-Capacity Ratio (X)	0.656	0.312		0.107	0.431		0.097	0.893	0.021	0.307	0.510	0.098
Back of Queue (Q), ft/ln (50 th percentile)	120.7	61.6		16.8	89		8.6	359.3	4	20.2	141.4	19.6
Back of Queue (Q), veh/ln (50 th percentile)	4.8	2.5		0.7	3.6		0.3	14.4	0.2	0.8	5.7	0.8
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	34.6	24.3		27.5	25.2		10.6	20.5	11.8	18.3	15.4	12.2
Incremental Delay (d ₂), s/veh	10.5	1.7		0.6	2.9		0.5	7.5	0.0	3.4	1.1	0.3
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	45.0	26.0		28.1	28.1		11.1	27.9	11.8	21.7	16.5	12.5
Level of Service (LOS)	D	C		C	C		B	C	B	C	B	B
Approach Delay, s/veh / LOS	37.0		D	28.1		C	27.4		C	16.6		B
Intersection Delay, s/veh / LOS	25.0			C			C			B		

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency		Duration, h	0.25			
Analyst		Analysis Date	7/30/2017		Area Type	Other
Jurisdiction		Time Period			PHF	0.92
Urban Street		Analysis Year			Analysis Period	1> 7:00
Intersection	TIMBERLINE - ZEPHYR		File Name	TIMBERLINE-ZEPHYR.xus		
Project Description	ST (LT) AM (PM)					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	155	15	90	35	20	90	135	1155	35	90	1565	130

Signal Information													
Cycle, s	87.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	6.0	43.0	25.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	3.0	4.0	0.0	0.0	0.0			
				Red	1.0	1.0	1.0	0.0	0.0	0.0			

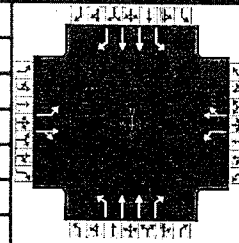
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		30.0		30.0	10.0	47.0	10.0	47.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.3		3.3	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		16.8		8.6	5.4	25.9	4.2	41.9
Green Extension Time (g _e), s		0.6		0.8	0.0	9.1	0.0	0.1
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.05		0.00	1.00	0.43	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	168	114		38	120		147	1255	38	98	1701	141
Adjusted Saturation Flow Rate (s), veh/h/ln	1292	1646		1299	1656		1810	1809	1610	1810	1809	1610
Queue Service Time (g _s), s	10.0	4.6		2.0	4.8		3.4	23.9	1.1	2.2	39.9	4.3
Cycle Queue Clearance Time (g _c), s	14.8	4.6		6.6	4.8		3.4	23.9	1.1	2.2	39.9	4.3
Green Ratio (g/C)	0.29	0.29		0.29	0.29		0.55	0.48	0.48	0.55	0.48	0.48
Capacity (c), veh/h	382	473		387	476		208	1746	777	291	1746	777
Volume-to-Capacity Ratio (X)	0.441	0.241		0.098	0.251		0.706	0.719	0.049	0.337	0.974	0.182
Back of Queue (Q), ft/ln (50 th percentile)	83.4	46.5		16.2	48.8		57	235.8	9.6	25.5	465.6	38.2
Back of Queue (Q), veh/ln (50 th percentile)	3.3	1.9		0.6	2.0		2.3	9.4	0.4	1.0	18.6	1.5
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	29.5	23.7		26.3	23.8		19.7	17.8	11.9	14.2	22.0	12.8
Incremental Delay (d ₂), s/veh	3.7	1.2		0.5	1.3		18.3	2.6	0.1	3.1	16.2	0.5
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	33.2	24.9		26.8	25.1		38.0	20.4	12.0	17.3	38.2	13.3
Level of Service (LOS)	C	C		C	C		D	C	B	B	D	B
Approach Delay, s/veh / LOS	29.8	C		25.5	C		22.0	C			35.3	D
Intersection Delay, s/veh / LOS	29.5			29.5			C			C		

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/30/2017	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street		Analysis Year		Analysis Period	1> 7:00
Intersection	TIMBERLINE - KECHTER	File Name	TIMBERLINE-KECHTER.xus		
Project Description	EX ST (LT) (AM) PM				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	50	20	40	120	5	240	15	1225	220	70	630	40

Signal Information				Signal Timing (s)								Signal Phases					
Cycle, s	87.0	Reference Phase	2														
Offset, s	0	Reference Point	End	Green	6.0	43.0	25.0	0.0	0.0	0.0							
Uncoordinated	Yes	Simult. Gap EW	On	Yellow	3.0	3.0	4.0	0.0	0.0	0.0							
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.0	0.0	0.0	0.0							

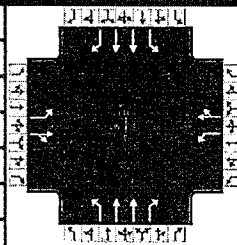
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		30.0		30.0	10.0	47.0	10.0	47.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.3		3.3	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		18.0		14.2	2.4	28.2	3.7	12.5
Green Extension Time (g _e), s		0.7		0.9	0.0	5.6	0.0	7.0
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.13		0.02	0.27	0.25	1.00	0.03

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	54	65		130	266		16	1332	239	76	685	43
Adjusted Saturation Flow Rate (s), veh/h/ln	1131	1696		1358	1615		1810	1809	1610	1810	1809	1610
Queue Service Time (g _s), s	3.7	2.5		6.9	12.2		0.4	26.2	7.8	1.7	10.5	1.2
Cycle Queue Clearance Time (g _c), s	16.0	2.5		9.3	12.2		0.4	26.2	7.8	1.7	10.5	1.2
Green Ratio (g/C)	0.29	0.29		0.29	0.29		0.55	0.48	0.48	0.55	0.48	0.48
Capacity (c), veh/h	249	487		434	464		468	1746	777	274	1746	777
Volume-to-Capacity Ratio (X)	0.219	0.134		0.300	0.574		0.035	0.762	0.308	0.278	0.392	0.056
Back of Queue (Q), ft/ln (50 th percentile)	28.1	25.4		57.8	127		3.5	261.3	69.8	19.5	100.8	11
Back of Queue (Q), veh/ln (50 th percentile)	1.1	1.0		2.3	5.1		0.1	10.5	2.8	0.8	4.0	0.4
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	33.3	23.0		26.4	26.5		9.7	18.4	13.7	14.7	14.4	12.0
Incremental Delay (d ₂), s/veh	2.0	0.6		1.8	5.1		0.1	3.2	1.0	2.5	0.7	0.1
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	35.3	23.5		28.2	31.5		9.9	21.6	14.7	17.2	15.0	12.1
Level of Service (LOS)	D	C		C	C		A	C	B	B	B	B
Approach Delay, s/veh / LOS	28.9	C		30.4	C		20.5	C			15.1	B
Intersection Delay, s/veh / LOS	20.7						C					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency				Duration, h	0.25		
Analyst				Analysis Date	7/30/2017		
Jurisdiction				Area Type	Other		
Urban Street				Time Period	PHF		
Intersection	TIMBERLINE - KECHTER			PHF	0.92		
Project Description	EX ST LT AM PM			Analysis Year	Analysis Period		
				File Name	TIMBERLINE-KECHTER.xus		



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	30	15	40	350	45	165	30	1030	190	160	1380	40

Signal Information				Signal Phases																				
Cycle, s	87.0	Reference Phase	2																					
Offset, s	0	Reference Point	End																					
Uncoordinated	Yes	Simult. Gap E/W	On																					
Force Mode	Fixed	Simult. Gap N/S	On																					
				Green	6.0	43.0	25.0	0.0	0.0	0.0	Yellow	3.0	3.0	4.0	0.0	0.0	0.0	Red	1.0	1.0	1.0	0.0	0.0	0.0

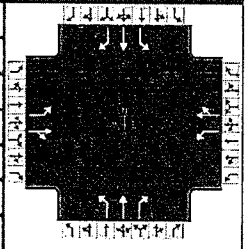
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		30.0		30.0	10.0	47.0	10.0	47.0
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		13.9		27.0	2.7	22.2	6.1	33.9
Green Extension Time (g _e), s		1.2		0.0	0.0	8.8	0.0	5.2
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		0.03		1.00	0.66	0.26	1.00	0.66

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	33	60		380	228		33	1120	207	174	1500	43
Adjusted Saturation Flow Rate (s), veh/h/ln	1171	1680		1364	1665		1810	1809	1610	1810	1809	1610
Queue Service Time (g _s), s	2.1	2.3		22.7	9.9		0.7	20.2	6.6	4.1	31.9	1.2
Cycle Queue Clearance Time (g _c), s	11.9	2.3		25.0	9.9		0.7	20.2	6.6	4.1	31.9	1.2
Green Ratio (g/C)	0.29	0.29		0.29	0.29		0.55	0.48	0.48	0.55	0.48	0.48
Capacity (c), veh/h	287	483		439	478		241	1746	777	324	1746	777
Volume-to-Capacity Ratio (X)	0.114	0.124		0.867	0.477		0.135	0.641	0.266	0.537	0.859	0.056
Back of Queue (Q), ft/ln (50 th percentile)	15.5	23.2		252.3	102.9		8.1	196.9	58.7	49.8	328.1	11
Back of Queue (Q), veh/ln (50 th percentile)	0.6	0.9		10.1	4.1		0.3	7.9	2.3	2.0	13.1	0.4
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	30.5	22.9		32.9	25.6		16.2	16.9	13.4	14.0	19.9	12.0
Incremental Delay (d ₂), s/veh	0.8	0.5		20.0	3.4		1.2	1.8	0.8	6.2	5.8	0.1
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	31.3	23.4		52.9	29.0		17.3	18.7	14.2	20.2	25.6	12.1
Level of Service (LOS)	C	C		D	C		B	B	B	C	C	B
Approach Delay, s/veh / LOS	26.2	C		43.9	D		18.0	B		24.7	C	
Intersection Delay, s/veh / LOS	25.4			C			C			C		

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency				Duration, h	0.25		
Analyst				Area Type	Other		
Jurisdiction				PHF	0.92		
Urban Street				Analysis Period	1> 7:00		
Intersection	TIMBERLINE - TRILBY		File Name	TIMBERLINE-TRILBY EX.xus			
Project Description	EX ST LT AM PM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	385	80	90	80	75	5	75	660	30	5	590	265

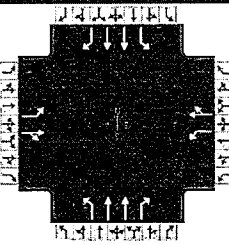
Signal Information													
Cycle, s	75.4	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap EW	On	Green	0.6	0.3	28.7	27.8	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	3.0	4.0	4.0	0.0	0.0			
				Red	1.0	1.0	1.0	1.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		6.0		6.0	1.1	3.0	1.1	3.0
Phase Duration, s		32.8		32.8	8.9	38.0	4.6	33.7
Change Period, (Y+R _c), s		5.0		5.0	4.0	5.0	4.0	5.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0	3.1	3.0
Queue Clearance Time (g _s), s		27.2		11.8	3.9	27.8	2.1	25.8
Green Extension Time (g _e), s		0.6		1.5	0.0	3.2	0.0	2.9
Phase Call Probability		1.00		1.00	0.82	1.00	0.11	1.00
Max Out Probability		1.00		0.00	1.00	0.18	0.11	0.32

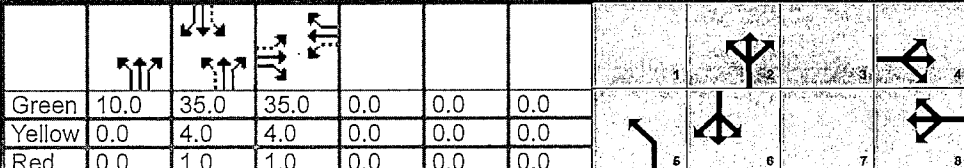
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	418	185		87	87		82	717	33	5	641	288
Adjusted Saturation Flow Rate (s), veh/h/ln	1331	1735		1218	1879		1810	1900	1610	1810	1900	1610
Queue Service Time (g _s), s	22.9	5.7		4.1	2.3		1.9	25.8	0.9	0.1	23.8	10.2
Cycle Queue Clearance Time (g _c), s	25.2	5.7		9.8	2.3		1.9	25.8	0.9	0.1	23.8	10.2
Green Ratio (g/C)	0.37	0.37		0.37	0.37		0.47	0.44	0.44	0.39	0.38	0.38
Capacity (c), veh/h	545	639		453	693		266	831	704	163	723	613
Volume-to-Capacity Ratio (X)	0.767	0.289		0.192	0.126		0.307	0.864	0.046	0.033	0.887	0.470
Back of Queue (Q), ft/ln (50 th percentile)	179.5	51.5		27.1	22.7		16.9	277.6	7.1	1.3	275.3	85.3
Back of Queue (Q), veh/ln (50 th percentile)	7.2	2.1		1.1	0.9		0.7	11.1	0.3	0.1	11.0	3.4
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	24.1	16.8		20.3	15.8		15.9	19.2	12.2	17.8	21.8	17.6
Incremental Delay (d ₂), s/veh	5.0	0.1		0.1	0.0		0.2	5.9	0.0	0.0	8.4	0.2
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	29.1	16.9		20.4	15.8		16.1	25.1	12.2	17.8	30.2	17.8
Level of Service (LOS)	C	B		C	B		B	C	B	B	C	B
Approach Delay, s/veh / LOS	25.4	C		18.1	B		23.7	C			26.3	C
Intersection Delay, s/veh / LOS	24.7											

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency		Duration, h	0.25				
Analyst		Analysis Date	7/30/2017				
Jurisdiction		Time Period					
Urban Street		Analysis Year					
Intersection	TIMBERLINE - TRILBY	File Name	TIMBERLINE-TRILBY.xus				
Project Description	EX ST (LT) AM (PM)						

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	330	90	110	60	110	15	115	745	40	10	915	50

Signal Information																	
Cycle, s	90.0	Reference Phase	2	Green	10.0	35.0	35.0	0.0	0.0	0.0							
Offset, s	0	Reference Point	End	Yellow	0.0	4.0	4.0	0.0	0.0	0.0							
Uncoordinated	Yes	Simult. Gap E/W	On	Red	0.0	1.0	1.0	0.0	0.0	0.0							
Force Mode	Fixed	Simult. Gap N/S	On														

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		6.0		6.0	1.0	3.0		5.3
Phase Duration, s		40.0		40.0	10.0	50.0		40.0
Change Period, (Y+R _c), s		5.0		5.0	0.0	5.0		5.0
Max Allow Headway (MAH), s		3.2		3.2	3.1	3.0		3.0
Queue Clearance Time (g _s), s		29.6		13.6	5.2	15.0		22.9
Green Extension Time (g _e), s		1.0		1.6	0.1	5.0		4.3
Phase Call Probability		1.00		1.00	1.00	1.00		1.00
Max Out Probability		0.41		0.00	0.11	0.05		0.19

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	359	217		65	136		125	810	43	11	995	54
Adjusted Saturation Flow Rate (s), veh/h/ln	1273	1729		1182	1860		1810	1809	1610	684	1809	1610
Queue Service Time (g _s), s	23.3	7.9		3.7	4.3		3.2	13.0	1.2	0.9	20.9	1.9
Cycle Queue Clearance Time (g _c), s	27.6	7.9		11.6	4.3		3.2	13.0	1.2	3.9	20.9	1.9
Green Ratio (g/C)	0.39	0.39		0.39	0.39		0.52	0.50	0.50	0.39	0.39	0.39
Capacity (c), veh/h	514	672		436	723		371	1809	805	323	1407	626
Volume-to-Capacity Ratio (X)	0.698	0.323		0.150	0.188		0.337	0.448	0.054	0.034	0.707	0.087
Back of Queue (Q), ft/ln (50 th percentile)	191.5	79.9		26.6	46.6		35	124.8	11	4	219.5	18
Back of Queue (Q), veh/ln (50 th percentile)	7.7	3.2		1.1	1.9		1.4	5.0	0.4	0.2	8.8	0.7
Queue Storage Ratio (RQ) (50 th percentile)	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d ₁), s/veh	27.2	19.2		23.3	18.1		14.7	14.5	11.6	19.0	23.2	17.4
Incremental Delay (d ₂), s/veh	7.7	1.3		0.7	0.6		2.4	0.8	0.1	0.2	3.0	0.3
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	34.9	20.5		24.0	18.7		17.2	15.3	11.7	19.2	26.2	17.7
Level of Service (LOS)	C	C		C	B		B	B	B	B	C	B
Approach Delay, s/veh / LOS	29.5	C		20.4	C		15.4	B		25.7	C	
Intersection Delay, s/veh / LOS	22.5						C					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS				
Bicycle LOS Score / LOS				



June 1, 2017

Jeff Mark
President
The Landhuis Company
212 N. Wahsatch Ave., Suite 301
Colorado Springs, CO 80903

RE: Ecological Characterization Study (ECS) Letter Report for the Proposed Hansen Property Development, Fort Collins, Colorado

Jeff:

This letter report is submitted to satisfy the requirements of Section 3.4.1 of the Land Use Code of the City of Fort Collins regarding the submittal of an ECS report for proposed development projects. The Hansen Property project site is an approximate 70-acre parcel located west of Timberline Road, South of Kechter Road, and north of Trilby Road in the northeast ¼ of Section 7 (Township 6 North, Range 68 West) in Fort Collins, Colorado. Ecological characteristics of the property were previously reviewed on December 6, 2012 for McWhinney, and site conditions again evaluated on May 15, 2017.

The field surveys were conducted to characterize existing wildlife habitats, as well as identify any unique or sensitive natural resource features. Prior to the initiation of the field survey, Natural Resources Conservation Service (NRCS) soils mapping (<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>) was reviewed to determine if any known hydric (wetland) or highly erosive soil mapping units are located on the property. Observations recorded during the field evaluation included: major vegetation communities / wildlife habitats present within the property; dominant vegetation associated with each community / habitat; unique habitat features; and observations of wildlife species and/or definitive sign. Photographs showing representative views of existing habitats were also taken to document site conditions. Wildlife presence and habitat use was based on on-site observations and habitat presence in conjunction with the known habitat requirements of potential wildlife species. Existing habitats were also evaluated regarding their ability to support populations of threatened, endangered, and other sensitive plant and wildlife species.

The following provides a summary of information required by Fort Collins Land Use Code under 3.4.1 (D) (1) items (a) through (k).

ECOLOGICAL STUDY CHARACTERIZATION CHECKLIST

(a & j) Existing habitats on the property consist almost entirely of grass/alfalfa hayfield with a few exceptions. Aside from grass/alfalfa hayfield there is a small strip of nearly pure grass hayfield along the southern property boundary (see attached Figure 1). The majority of the property's surface has been planted to alfalfa (*Medicago sativa*¹) and non-native grass, primarily smooth brome (*Bromus inermis*), for hay production (see attached Figure 1). Less dominant vegetation species recorded in grass/alfalfa hayfield included tall fescue (*Festuca arundinacea*), cheatgrass (*Bromus tectorum*), field bindweed (*Convolvulus arvensis*), common dandelion (*Taraxacum officinale*), and Canada thistle (*Cirsium arvense*). Attached Photo 1 provides a representative view of grass/alfalfa hayfield. The grass hayfield strip is dominated by smooth brome.

There are three other habitats or habitat features on the property. These are irrigation ditches, mature trees, and wetlands. Irrigation ditches run along the south, north, and west edges of the property. These ditches

¹ Scientific nomenclature follows USDA, NRCS Plants Database. Available online at: <http://plants.usda.gov/java/>

support pockets of wetland vegetation as well as several large, mature eastern cottonwood trees (*Populus deltoides*), small multi-trunked peachleaf willows (*Salix amygdaloides*), and one green ash tree (*Fraxinus pennsylvanicus*) (see attached Figure 1). Wetland vegetation, within the irrigation ditches banks, consists non-continuous pockets of reed canarygrass (*Phalaris arundinacea*), Emory sedge (*Carex emoryi*), showy milkweed (*Asclepias speciosa*), and sandbar willow (*Salix exigua*). One other small, isolated wetland is present on the property (see following Section b).

There are also a number of large deciduous and evergreen trees supported in the residence/farmstead area at the southeast property corner and a cluster of 21 blue spruce (*Picea pungens*) trees in the southeast portion of the hayfield (see attached Figure 1). A number of large cottonwoods also grow along the north irrigation ditch (Mail Creek Ditch). These trees are outside the Hansen Property north boundary. Most trees on the property are over 6 inches in diameter and may be classified by the City Forester as significant based on the Fort Collins Land Use Code. The City Forester or a private arborist will need to evaluate the health of these trees in order for their significance status to be determined.

Aside from potentially significant trees, irrigation ditches, and small wetland areas, the property does not support any native vegetation or other unique habitat features, and no features of ecological value exist within 500 feet of the development site. Grass/alfalfa and grass hayfields are non-native habitats that have been planted after clearing native vegetation and woody species, and as a result, support no natural habitat features and have minimal ecological and wildlife habitat value. Trees on the property may be used for perching, nesting, and foraging by raptors and urban-adapted songbirds, and Canada geese grass may occasionally graze the hayfield areas. Raptor nests located in trees along the irrigation ditches during the December 2012 survey were no longer present at the time of the May 15, 2017 survey.

(b) Wetlands within the Mail Creek and unnamed irrigation ditches were not delineated since project development would have no impacts on the ditches or wetlands supported within the ditches. One other isolated wetland area, not associated with the ditches, exists on the property in a depression that appears to collect excess irrigation water (see attached Figure 1 and Photo 2). The central and wettest portion of this wetland is typically saturated or holds shallow standing water during the growing season and is dominated by smartweed (*Polygonum* sp.) and broadleaved pepperweed (*Lepidium latifolium*). The outer perimeter portion of this wetland is dominated by reed canarygrass (*Phalaris arundinacea*). Several young (< 6-inch) eastern cottonwoods grow around the edge of the depression. The wetland in this depression was delineated on December 6, 2012 using the methods and techniques specified for "routine on-site delineations" in the publication, Corps of Engineers Wetlands Delineation Manual (USACOE 1987), and supplemented by the document, Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (USACOE 2008). Northern Engineering of Fort Collins surveyed the wetland boundaries after the delineation was completed and determined the wetland area to be 0.29 acre in size. The wetland report and a request for a jurisdictional determination was submitted to the U.S. Army Corps of Engineers (Littleton District Office) on January 2, 2013. The U.S. Army Corps of Engineers determined the wetland survey and report as *accurate and acceptable* and that the wetland was *non-jurisdictional* since it had no connection to Waters of the United States (see attached Corps letter). The date on the Corps letter is incorrect and should be January 16, 2013, not January 16, 2012. Corps wetland approvals and jurisdictional determinations apply for a five-year period so the wetland survey and non-jurisdictional determination are good until January 16, 2018.

(c) The Hansen Property provides relatively unobstructed views of the Front Range foothills.

(d & e) As indicated in Section a & j the Hansen Property supports little native vegetation, and significant trees and other woody vegetation are restricted to the irrigation ditches and the residential/farmstead area (see Figure 1). Trees on the property will need to be inventoried by the City Forester to determine significance potential and possible need for mitigation, if trees need to be removed for development. Russian olive (*Elaeagnus angustifolia*) trees are considered undesirable, invasive species, but even non-significant or undesirable, non-

native tree species provide some wildlife habitat, and mitigation may be required for those trees lost to development.

(f) There are no natural drainages on or near the Hansen Property. Mail Creek Ditch and the unnamed irrigation ditches on or adjacent to the property are constructed water conveyance ditches for irrigation water distribution. The 50-foot buffer zone to be established for these ditches would be sufficient to protect water quality in the ditches and maintain possible wildlife use of the ditches as movement corridors.

(g) There is no suitable habitat for any threatened, endangered, or other sensitive species on or adjacent to the Hansen Property. As indicated under Section a & i there has been past raptor nesting in trees along the irrigation ditches, but no evidence of these nests was found by the May 15, 2017 survey. Historical observations have indicated some bald eagle winter perching use of large cottonwood trees along the south boundary irrigation ditch. The property owner (Doug Hansen) retained Cedar Creek Associates, Inc. in the late winter (early February-early March) of 2004 to determine if these perch sites represented important winter roosting sites or simply occasional daytime perching use. Based on the survey completed (see attached report), it was determined that none of the large trees on the property were used as important night roost sites by bald eagles or other raptor species. No bald eagle winter perching use of these trees was noted during the December 6, 2012 survey.

(h) Past agricultural and residential conversion of the lands on the Hansen Property has eliminated the potential for any special habitat features on the property, aside from the large trees and small wetland areas.

(i) The Mail Creek Ditch along the north property edge represents the only possible wildlife movement corridor on the Hansen property. This ditch connects open space at the west end of the Hansen Property with open space, agricultural land, and eventually Fossil Creek Reservoir east of the Hansen Property. However Timberline Road and Ziegler Road interrupt the continuity of this corridor. The irrigation ditches along the west and south property boundaries does not represent a potential wildlife movement corridor since their continued continuity ends at Timberline Road.

(k) Because of the lack of natural habitat features on the Hansen Property there is only one issue regarding the timing of property development and ecological features or wildlife use of the project area. If development includes removal of any trees on the property or if construction occurs near an occupied bird nest during the songbird nesting season (March through July), these activities could result in the loss or abandonment of a nest and may be in violation of the federal Migratory Bird Treaty Act.

(l) Since the entire project area has been converted to agricultural or residential land use, project development would have no impact on natural habitats or important habitat features, other than existing trees on the property. The 50-foot buffer established for the Mail Creek and unnamed ditches in the current development plans would protect the current condition of project area portions of the canal as wildlife movement corridors. This buffer would also meet the City buffer standard for wetlands less than 0.3 acres in size since the canal wetlands are confined entirely with the canal embankments. It is recommended that existing native and non-native trees and shrubs adjacent to canals be preserved to the extent possible, unless they are in poor condition. Removal of any trees classified as significant would need to be mitigated with replacement trees, as determined by the City Forester based on the Land Use Code. Mitigation plantings of trees and shrubs would also be appropriate within the ditch buffer zones as long as plantings are in compliance with ditch operation and maintenance activities.

Supplemental irrigation may be required for initial establishment of shrubs, trees, and herbaceous species in the buffer zone. A weed management plan should be developed in concert with habitat enhancement plantings to minimize the development of non-desirable, invasive species in the buffer zone enhancement area.

The Land Use Code wetland buffer requirement of 50 feet would apply the small wetland located on the project area since it is less than 0.3 acre in size. The most current concept plan for the proposed development indicates planned housing lots would encroach into the 50-foot buffer and a small portion of the southwest corner of the wetland. Any wetland loss would need to be mitigated on a one-to-one basis with an established 50-foot buffer. Reconfiguration of the existing wetland with the stormwater detention area planned for the project site may be the most appropriate means of mitigating wetland loss with a buffer zone as long as sufficient soil moisture conditions can be created to sustain a created wetland area.

Because tree removal or construction near trees during the nesting season could result in the loss or abandonment of a nest, it is recommended that tree removal or construction near trees occur outside of the nesting season (February – July 31), or trees be surveyed to ensure lack of nesting prior to removal or construction activities during the nesting season. This mitigation recommendation would preclude the possible incidental take or disturbance of active songbird or raptor nests.

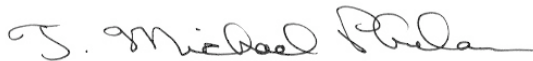
Another raptor use consideration for the Hansen property is the historic bald eagle winter perching use of two of the large cottonwood trees along southern property boundary. Previous habitat assessment surveys completed by Cedar Creek in January 2004 for the Hansen property, as well as casual observations made by the property owner (Doug Hansen, pers. comm.), indicate bald eagles occasionally perch in the large cottonwood trees along the Hansen property southern boundary. The trees are apparently used as a daytime foraging perch sites during the winter season. What was not known, at the time, was whether or not any of the larger trees surrounding the property were used as a communal night roost. Night roost sites are typically communal (used by more than one eagle) and usually provide some level of protection from winter wind and precipitation events. Cedar Creek completed surveys from early February through early March 2004 to determine if bald eagles use any of the trees near on or near the Hansen property as communal roost sites. The results of these surveys indicated that bald eagles occasionally use these trees for daytime and early evening perch sites, but the trees were not used as communal night roosts. It is possible that occasional bald eagle perching use of these trees continues, but no bald eagles were observed on the property during the December 6, 2012 field survey. It is unlikely these trees would ever be used as communal winter night roost since they are relatively exposed and would provide little protection from inclement winter weather.

One final mitigation recommendation is based on Article 3.2.4(D)(6) in the City of Fort Collins Land Use Code, which requires protection of natural areas and natural features from light spillage from off site sources. Therefore, the intensity of night lighting from the areas of development facing the ditch buffer zones should be shielded or directed to minimize the intrusion of artificial nighttime light into these areas.

This concludes Cedar Creek Associates, Inc.'s evaluation of the Hansen Property. If you have any questions or require additional information regarding my evaluation, please give me a call.

Sincerely,

Cedar Creek Associates, Inc.



T. Michael Phelan
Principal, Senior Wildlife Biologist

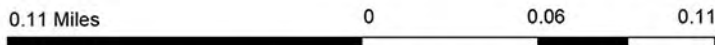
attachments: Figure 1, Habitat Mapping for the Hansen Property; Photos 1 and 2; 2013 Wetland Report and Army Corps of Engineers determination letter; Night Roosting Raptor Report for the Hansen Property, 2004

pc: K. Turner, The Birdsall Group



LEGEND

-  Property Boundary
-  Habitat Boundary



Aerial photo source: Larimer County Web Map GIS Data - 2012 Aerial Imagery

CEDAR CREEK ASSOCIATES, INC.
 916 Wilshire Ave., Fort Collins, CO 80521 • (970) 493-4394

FIGURE 1
Habitat Mapping
for the Hansen
Property



Photo 1. View of Grass/Alfalfa Hayfield on the Hansen Property. (View is looking west from northeast property corner. Trees along Mail Creek Ditch are in background on the right. Trees along the two unnamed ditches are in left and middle background.)



Photo 2. View of 0.29-Acre, Isolated Wetland on the Hansen Property. (View is looking north from south side of wetland. Trees around wetland perimeter are primarily young eastern cottonwoods.)



January 2, 2013

Terry McKee
U.S. Army Corps of Engineers, Omaha District
Denver Regulatory Office
9307 South Wadsworth Blvd.
Littleton, CO 80128-6901

RE: Wetland and Other Waters of the U.S. Delineation for the Hansen Property in Fort Collins, Colorado

Dear Terry:

This letter is submitted to request a jurisdictional determination and approval of the wetland delineation for a small wetland area on the Hansen Property. The Hansen Property is an approximate 70-acre parcel located west of Timberline Road, South of Kechter Road, and north of Trilby Road in the northeast ¼ of Section 7 (Township 6 North, Range 68 West) in Fort Collins, Colorado (see attached Figure 1). The Hansen Property is proposed for subdivision and development of single and multi-family residences and commercial office space. Cedar Creek Associates, Inc. completed a field wetland and other Waters of the U.S. delineation for the project site on December 6, 2012. The objective of the delineation work was to fulfill the requirements of Section 404 of the Clean Water Act regarding the delineation of wetlands and other potential Waters of the U. S. prior to proposed development activities. Aside from wetlands supported with project area irrigation ditches, only one wetland area was located and delineated in the project area. Latitude and longitude coordinates for the approximate center of the wetland located on the property are 40.50482 and -105.07661, respectively (NAD 83 Datum). Irrigation ditch wetlands were not delineated since the proposed development would have no effect on the ditches.

The main project contact is as follows.

Ms. Kim Perry
Vice President Community Design
McWhinney
2725 Rocky Mountain Avenue, Suite 200
Loveland, CO 80538
Phone: (970) 962-9990
E-mail: kimp@mcwhinney.com

Survey Methodology

Prior to initiation of field delineation work, aerial photography and NRCS soils mapping of the project site were reviewed for an overview of site characteristics and to determine the characteristics of soils overlying the project area. Potential hydric soils were identified for evaluation during the field delineation work.

Wetland delineation and sampling work for the wetlands and open channel features within the project area were completed using the methods and techniques specified for "routine on-site delineations" in the publication, *Corps of Engineers Wetlands Delineation Manual* (USACOE 1987), and supplemented by the document, *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (USACOE 2008). The project area was evaluated and potential wetland, transition zone, and upland vegetation communities were identified. Using the three-parameter approach via test hole

characteristics, the wetland/upland boundaries were flagged. Three formal sample point locations (H-1, H-2, and H-3) were established to characterize the wetland area and adjacent uplands. The sample point locations are depicted on the attached wetland delineation map.

At each sample point, percent total cover of dominant plant species was estimated. Species were then classed as OBL (obligate wetland species), FACW (facultative wetland species), FAC (facultative species), FACU (facultative upland species) or UPL (upland species), based on the USDA, NRCS 2012 National Wetland Plant List (<http://plants.usda.gov/wetland.html>). Soil and hydrologic data were also collected to determine the presence or absence of wetlands at each sample point. A formal field data sheet was completed for each sample point. The wetland/upland boundaries was flagged with pink fluorescent tape and sample points were marked with an orange pin flag tied with pink fluorescent tape for subsequent surveying work. Adjunct test holes were also dug, where appropriate, to gain additional vegetation, soil, and hydrologic information used to aid in the characterization of wetlands, uplands, and transition zones. Data sheets were not completed for test holes. Northern Engineering of Fort Collins surveyed the wetland boundaries after the delineation was completed.

The results of the field delineation are summarized in the following section. A location map, copies of the field data sheets, and wetland delineation map are included as attachments to assist the Corps in completing its evaluation of this project site.

Results

NRCS mapping for Larimer County indicates Nunn Clay loam; Nunn Clay loam, wet; Fort Collins loam; and Caruso clay loam are the four soil map units in the project area. The wetland located on the property is within the Caruso clay loam soil-mapping unit. No vegetation, soils, or hydrologic characteristics of wetlands were found in the other soil-mapping units in the project area. The majority of the project area is composed of upland alfalfa grass hayfield areas that are associated with the Fort Collins loam, Nunn clay loam, and Nunn clay loam, wet soil-mapping units.

The single, isolated wetland found on the property exists in a depression (see attached Wetland Exhibit) that appears to collect excess irrigation water. The test pit at sample point H-1 also indicated a high water table at this location since standing water was present at an 8-inch depth in the soil sample hole. The central and wettest portion of this wetland typically holds standing water during the growing season and is dominated by smartweed (*Persicaria* sp., FACW-OBL). The outer perimeter portion of this wetland is dominated by reed canarygrass (*Phalaris arundinacea*, FACW). Several young (< 6-inch) eastern cottonwoods grow around the edge of the depression outside of the wetland perimeter. The survey completed by Northern Engineering determined the size of the wetland to be 0.29 acre

Sample point H-1 was established to characterize the central portion of the wetland depression, while sample point H-2 was established in the wetland transition area dominated by reed canarygrass. Adjacent uplands dominated by smooth brome (*Bromus inermis*, UPL) and alfalfa (*Medicago sativa*, UPL) are characterized by sample point H-3. Table 1 provides a summary of each sample point.

Sample Point	Dominant Species	Hydric Soil Indicator(s)	Primary & Secondary Hydrology Indicator(s)	COE Wetland
H-1	<i>Persicaria</i> sp. – FACW-OBL	F3	A1, A3, B1, B2, B7, B11	PEM1b
H-2	<i>Phalaris arundinacea</i> – FACW	A11, F3	B3, B7, B11	PEM1a

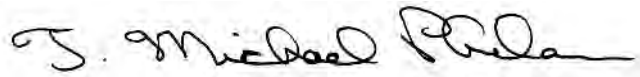
TABLE 1				
Summary of Hansen Property Wetland and Upland Sample Point Characteristics				
	<i>Lactuca serriola</i> - FAC			
H-3	<i>Bromus inermis</i> – UPL <i>Medicago sativa</i> – UPL <i>Bromus tectorum</i> – UPL <i>Convolvulus arvensis</i> - UPL	none	none	none

Jurisdictional Considerations

The wetland mapped on the Hansen property is surrounded by alfalfa/grass hayfield uplands and has no wetland, drainage, or irrigation ditch connection to Waters of the United States.

Terry, the preceding paragraphs summarize the results of the wetland survey completed for the Hansen Property. Please give me a call if you have any questions.

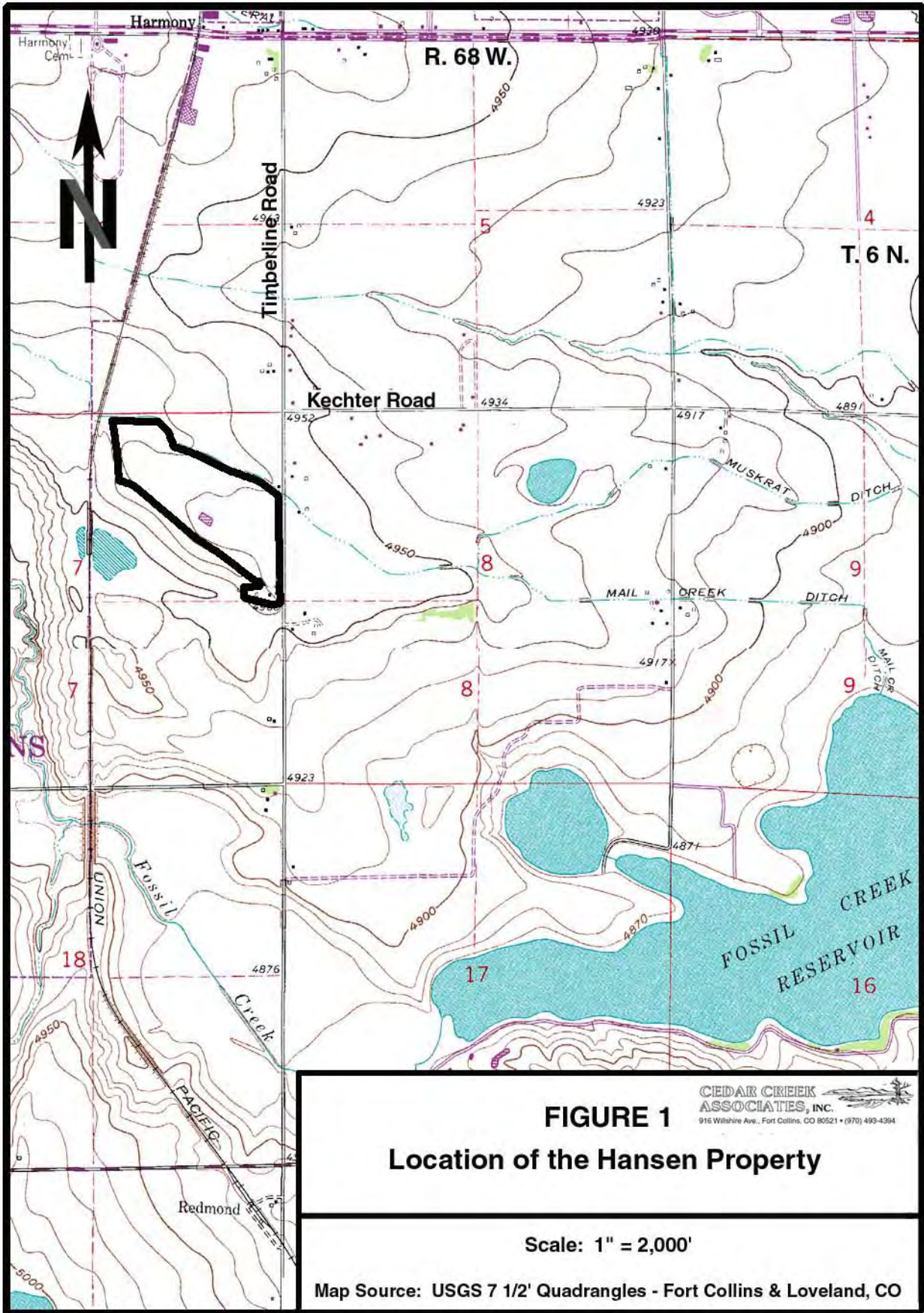
Sincerely,
CEDAR CREEK ASSOCIATES, INC.



T. Michael Phelan
Principal

attachments: location map, data sheets, and wetland exhibit

pc: K. Perry, McWhinney



WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Hansen Property City/County: Ft Collins/Larimer Sampling Date: 12/6/12
 Applicant/Owner: McWhinney State: CO Sampling Point: H-1
 Investigator(s): M. Phelan Section, Township, Range: NE 1/4 S 7, T 6 N, R 68 W
 Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR): G Lat: 40.50482 Long: -105.04254 Datum: NAD 83
 Soil Map Unit Name: Caruso clay loam NWI classification: PEM1b

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: <u>Sampling pt. in center of lowest portion of depression</u>	

VEGETATION – Use scientific names of plants.

Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
<u>Tree Stratum</u>				Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>1</u> (A)
1. _____				Total Number of Dominant Species Across All Strata: <u>1</u> (B)
2. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
3. _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
4. _____				
_____ = Total Cover				
<u>Sapling/Shrub Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
<u>Herb Stratum</u> (Plot size: <u>30' dia</u>)				Hydrophytic Vegetation Indicators: ___ Dominance Test is >50% ___ Prevalence Index is ≤3.0 ¹ ___ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Perisicaria sp.</u>	<u>60</u>	<input checked="" type="checkbox"/>	<u>FACW-OBL</u>	
2. <u>Rumex crispus</u>	<u>10</u>		<u>FAC</u>	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
_____ = Total Cover	<u>70</u>			
<u>Woody Vine Stratum</u> (Plot size: _____)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1. _____				
2. _____				
% Bare Ground in Herb Stratum <u>25</u>				
Remarks: <u>Phalaris arundinacea (FACW) is dominant species around the perimeter of lowest portion of depression</u>				

SOIL

Sampling Point: H-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
<u>14</u>	<u>10YR 5/1</u>	<u>90</u>	<u>5YR 6/6</u>	<u>10</u>	<u>RM</u>	<u>M</u>	<u>clay loam</u>	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR F)
- 1 cm Muck (A9) (LRR F, G, H)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- 5 cm Mucky Peat or Peat (S3) (LRR F)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils³:

- 1 cm Muck (A9) (LRR I, J)
 - Coast Prairie Redox (A16) (LRR F, G, H)
 - Dark Surface (S7) (LRR G)
 - High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
 - Reduced Vertic (F18)
 - Red Parent Material (TF2)
 - Other (Explain in Remarks)
- ³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)

- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- FAC-Neutral Test (D5)
- Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): 23
 Saturation Present? (includes capillary fringe) Yes No Depth (inches): 0

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Hansen Property City/County: Atcholla/Laurens Sampling Date: 12/6/12
 Applicant/Owner: McWhinney State: CO Sampling Point: H-2
 Investigator(s): M. P. Holden Section, Township, Range: NE 1/4 S7, T6N, R68W
 Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 2%
 Subregion (LRR): G Lat: 40.50470 Long: -105.04244 Datum: NAD 83
 Soil Map Unit Name: Caruso clay loam NWI classification: PEM1a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: <u>Transitional wetland at upper edge of depression</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (AVB)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: _____) 1. _____ 2. _____ 3. _____ 4. _____ 5. _____				
_____ = Total Cover				
Herb Stratum (Plot size: <u>10x30</u>) 1. <u>Lactuca scariola</u> <u>30</u> ✓ <u>FAC</u> 2. <u>Chenopodium album</u> <u>15</u> ✓ <u>FACU</u> 3. <u>Phalaris arundinacea</u> <u>35</u> ✓ <u>FACW</u> 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____				
<u>80</u> = Total Cover				
Woody Vine Stratum (Plot size: _____) 1. _____ 2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>20</u> _____ = Total Cover				

Remarks:

SOIL

Sampling Point: H-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR4/1	100						
6-14	10YR4/1	80	5YR5/3	20	Rm	m	clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Reduced Vertic (F18)
<input checked="" type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> (where tilled)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)
<input type="checkbox"/> Salt Crust (B11)	
<input type="checkbox"/> Aquatic Invertebrates (B13)	
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:

Surface Water Present? Yes No Depth (inches): _____

Water Table Present? Yes No Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes No Depth (inches): _____

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: upper edge of saturated depression

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Hansen Property City/County: Ft. Collins/Larimer Sampling Date: 12/6/12
 Applicant/Owner: McWhinny State: CO Sampling Point: H-3
 Investigator(s): M. Phelan Section, Township, Range: NE 1/4 S7, T6N, R68W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR): G Lat: 40.50464 Long: -105.04236 Datum: NAD83
 Soil Map Unit Name: Caruso clay loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum (Plot size: <u>30' dia</u>)				
1. <u>Bromus inermis</u>	<u>20</u>	<input checked="" type="checkbox"/>	<u>UPL</u>	
2. <u>Taraxacum officinale</u>	<u>5</u>	<input type="checkbox"/>	<u>UPL</u>	
3. <u>Medicago sativa</u>	<u>20</u>	<input checked="" type="checkbox"/>	<u>UPL</u>	
4. <u>Bromus tectorum</u>	<u>10</u>	<input checked="" type="checkbox"/>	<u>UPL</u>	
5. <u>Gnolulus arvensis</u>	<u>10</u>	<input checked="" type="checkbox"/>	<u>UPL</u>	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>30</u>				
_____ = Total Cover				
Remarks:				

Hydrophytic Vegetation Indicators:
 ___ Dominance Test is >50%
 ___ Prevalence Index is ≤3.0¹
 ___ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes No



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
DENVER REGULATORY OFFICE, 9307 SOUTH WADSWORTH BOULEVARD
LITTLETON, COLORADO 80128-6901

January 16, 2012

Ms. Kim Perry
Vice President Community Design
McWhinney
2725 Rocky Mountain Avenue, Suite 200
Loveland, CO 80538

**RE: Approved Jurisdictional Determination, Hansen Property Wetland
Corps File No. NWO-2013-60-DEN**

Dear Ms. Perry:

Reference is made to the above-mentioned project, submitted to Mr. Terry McKee of my office on your behalf by Mr. Michael Phelan of Cedar Creek Associates, Inc. My office considers the wetland delineation accurate and acceptable. This site is located in Section 7, Township 6 North, Range 68 West, Larimer County, Colorado. The wetland at this location was determined to be non-jurisdictional and is not regulated under Section 404 of the Clean Water Act.

This site has been reviewed in accordance with Section 404 of the Clean Water Act under which the U.S. Army Corps of Engineers regulates the discharge of dredged and fill material and certain excavation activities in waters of the United States. Waters of the U.S. may include ephemeral, intermittent and perennial streams, their surface connected wetlands and adjacent wetlands and certain lakes, ponds, drainage ditches and irrigation ditches that have a nexus to interstate commerce.

An approved jurisdictional determination (JD) has been completed for this project. The JD is attached to this letter. If you are not in agreement with the JD decision, you may request an administrative appeal under regulation 33 CFR 331, by using the attached Appeal Form and Administrative Appeal Process form. The request for appeal must be received within 60 days from the date of this letter. If you would like more information on the jurisdictional appeal process, contact this office. It is not necessary to submit a Request for Appeal if you do not object to the JD.

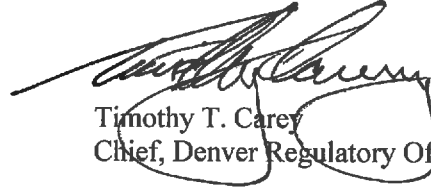
This JD is valid for a period of five years from the date of this letter, unless new information warrants revisions of the JDs before the expiration date, or unless the Corps has identified, after a possible public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.

The Omaha District, Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to complete our Customer Service Survey found on our website at <http://per2.nwp.usace.army.mil/survey.html>. If you do not have Internet access, you may call and request a paper copy of the survey that you can complete and return to us by mail or fax. (Completing the survey is a voluntary action)

Please notify your consultant, Mr. Michael Phelan, of your receipt of this letter.

If there are any questions call **Mr. Terry McKee** of my office at **303-979-4120** and reference **Corps File No. NWO-2013-60-DEN.**

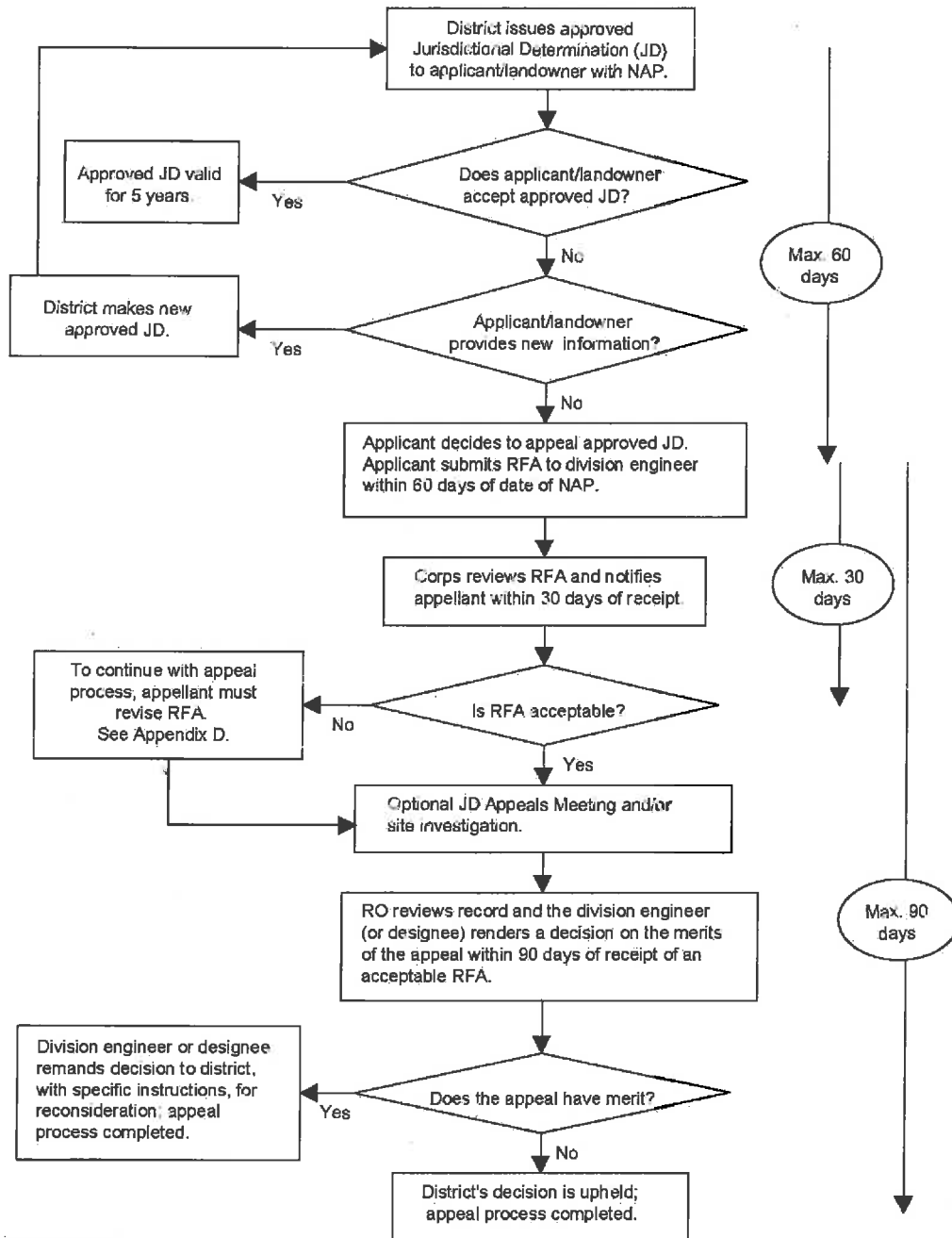
Sincerely,

A handwritten signature in black ink, appearing to read "Timothy T. Carey". The signature is written in a cursive style with a large, sweeping initial "T".

Timothy T. Carey
Chief, Denver Regulatory Office

tm

Administrative Appeal Process for Approved Jurisdictional Determinations



Appendix C

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant:	File Number: NWO-2013-60-DEN	Date:
Attached is:	See Section below	
<input type="checkbox"/>	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
<input type="checkbox"/>	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
<input type="checkbox"/>	PERMIT DENIAL	C
<input checked="" type="checkbox"/>	APPROVED JURISDICTIONAL DETERMINATION	D
<input type="checkbox"/>	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://usace.army.mil/inet/functions/cw/cecwo/reg> or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

If you only have questions regarding the appeal process you may also contact:

US Army Corps of Engineers, Northwestern Division
Attn: Mary Hoffman, Northwestern Division Administrative Appeals Officer
1125 NW Couch Street
Portland, OR 97208-2870 Telephone (503) 808-3888
Mary.J.Hoffman@usace.army.mil

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.	Date:	Telephone number:
----------------------------------	-------	-------------------

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): January 15, 2013

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

Denver Regulatory Office, Hansen Property wetland, NWO-2013-60-DEN

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Isolated wetland

State: **CO** County/parish/borough: **Larimer** City: **Fort Collins**
Center coordinates of site (lat/long in degree decimal format): Lat. **40.50485 N**; Long. **-105.04258 W**
Name of nearest waterbody: **Mail Creek Ditch**
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: **none**
Name of watershed or Hydrologic Unit Code (HUC): **10190007**

- Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
 Check if other sites (e.g., offsite mitigation sites, disposal sites, etc...) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

- Office (Desk) Determination. Date: **January 7, 2013**
 Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [Required]

- Waters subject to the ebb and flow of the tide.
 Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [Required]

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area (check all that apply):¹

- TNWs, including territorial seas
 Wetlands adjacent to TNWs
 Relatively permanent waters² (RPWs) that flow directly or indirectly into TNWs
 Non-RPWs that flow directly or indirectly into TNWs
 Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
 Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
 Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
 Impoundments of jurisdictional waters
 Isolated (interstate or intrastate) waters, including isolated wetlands

b. Identify (estimate) size of waters of the U.S. in the review area:

Non-wetland waters: linear feet: width (ft) and/or acres.
Wetlands: acres.

c. Limits (boundaries) of jurisdiction based on: **Pick List**

Elevation of established OHWM (if known):

2. Non-regulated waters/wetlands (check if applicable):³

- Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
Explain: **This wetland is located in an upland agricultural field. The topography slopes inward from the agricultural property boundary toward this wetland. The wetland sump was dug around 1969 or 1970 as an irrigation water sump. It was only partially successful, as the**

¹ Boxes checked below shall be supported by completing the appropriate sections in Section III below.

² For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

³ Supporting documentation is presented in Section III.F.

excess irrigation water usually exceeded the capacity of the sump during the time that the fields were routinely irrigated. The wetland is 0.15 miles SW of and down gradient from the Mail Creek Ditch. The wetland hydrology is supplied by snow and rain events and hay meadow irrigation and possible high ground water. This wetland is isolated with no nexus to interstate commerce.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW

Identify TNW:

Summarize rationale supporting determination:

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody⁴ is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size: **Pick List**

Drainage area: **Pick List**

Average annual rainfall: inches

Average annual snowfall: inches

(ii) Physical Characteristics:

(a) Relationship with TNW:

Tributary flows directly into TNW.

Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.

Project waters are **Pick List** river miles from RPW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Project waters are **Pick List** aerial (straight) miles from RPW.

Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW⁵:

Tributary stream order, if known:

⁴ Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

⁵ Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) **General Tributary Characteristics (check all that apply):**

- Tributary is: Natural
 Artificial (man-made). Explain:
 Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):

Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

- | | | |
|--|--|-----------------------------------|
| <input type="checkbox"/> Silts | <input type="checkbox"/> Sands | <input type="checkbox"/> Concrete |
| <input type="checkbox"/> Cobbles | <input type="checkbox"/> Gravel | <input type="checkbox"/> Muck |
| <input type="checkbox"/> Bedrock | <input type="checkbox"/> Vegetation. Type/% cover: | |
| <input type="checkbox"/> Other. Explain: | | |

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:

Presence of run/riffle/pool complexes. Explain:

Tributary geometry: **Pick List**

Tributary gradient (approximate average slope): %

(c) **Flow:**

Tributary provides for: **Pick List**

Estimate average number of flow events in review area/year: **Pick List**

Describe flow regime:

Other information on duration and volume:

Surface flow is: **Pick List.** Characteristics:

Subsurface flow: **Pick List.** Explain findings:

- Dye (or other) test performed:

Tributary has (check all that apply):

- | | | |
|---|---|--|
| <input type="checkbox"/> Bed and banks | | |
| <input type="checkbox"/> OHWM ⁶ (check all indicators that apply): | | |
| <input type="checkbox"/> clear, natural line impressed on the bank | <input type="checkbox"/> the presence of litter and debris | |
| <input type="checkbox"/> changes in the character of soil | <input type="checkbox"/> destruction of terrestrial vegetation | |
| <input type="checkbox"/> shelving | <input type="checkbox"/> the presence of wrack line | |
| <input type="checkbox"/> vegetation matted down, bent, or absent | <input type="checkbox"/> sediment sorting | |
| <input type="checkbox"/> leaf litter disturbed or washed away | <input type="checkbox"/> scour | |
| <input type="checkbox"/> sediment deposition | <input type="checkbox"/> multiple observed or predicted flow events | |
| <input type="checkbox"/> water staining | <input type="checkbox"/> abrupt change in plant community | |
| <input type="checkbox"/> other (list): | | |
| <input type="checkbox"/> Discontinuous OHWM. ⁷ Explain: | | |

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

- | | |
|--|--|
| <input checked="" type="checkbox"/> High Tide Line indicated by: | <input checked="" type="checkbox"/> Mean High Water Mark indicated by: |
| <input type="checkbox"/> oil or scum line along shore objects | <input type="checkbox"/> survey to available datum; |
| <input type="checkbox"/> fine shell or debris deposits (foreshore) | <input type="checkbox"/> physical markings; |
| <input type="checkbox"/> physical markings/characteristics | <input type="checkbox"/> vegetation lines/changes in vegetation types. |
| <input type="checkbox"/> tidal gauges | |
| <input type="checkbox"/> other (list): | |

(iii) **Chemical Characteristics:**

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.). Explain:

Identify specific pollutants, if known:

(iv) **Biological Characteristics. Channel supports (check all that apply):**

⁶A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

⁷Ibid.

- Riparian corridor. Characteristics (type, average width):
- Wetland fringe. Characteristics:
- Habitat for:
 - Federally Listed species. Explain findings:
 - Fish/spawn areas. Explain findings:
 - Other environmentally-sensitive species. Explain findings:
 - Aquatic/wildlife diversity. Explain findings:

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain:

Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain:

Surface flow is: **Pick List**

Characteristics:

Subsurface flow: **Pick List**. Explain findings:

Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

Directly abutting

Not directly abutting

Discrete wetland hydrologic connection. Explain:

Ecological connection. Explain:

Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List**.

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) Biological Characteristics. Wetland supports (check all that apply):

Riparian buffer. Characteristics (type, average width):

Vegetation type/percent cover. Explain:

Habitat for:

Federally Listed species. Explain findings:

Fish/spawn areas. Explain findings:

Other environmentally-sensitive species. Explain findings:

Aquatic/wildlife diversity. Explain findings:

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately () acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)

Size (in acres)

Directly abuts? (Y/N)

Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs. Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:
2. Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs. Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:
3. Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW. Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:

- TNWs: linear feet width (ft), Or, acres.
- Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**

- Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
- Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):

- Tributary waters: linear feet width (ft).
 - Other non-wetland waters: acres.
- Identify type(s) of waters:

3. **Non-RPW⁸ that flow directly or indirectly into TNWs.**

- Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):

- Tributary waters: linear feet width (ft).
 - Other non-wetland waters: acres.
- Identify type(s) of waters:

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**

- Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
- Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is

⁸See Footnote # 3.

directly abutting an RPW:

- Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

Provide acreage estimates for jurisdictional wetlands in the review area: _____ acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**

- Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: _____ acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**

- Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: _____ acres.

7. **Impoundments of jurisdictional waters.⁹**

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

- Demonstrate that impoundment was created from "waters of the U.S.," or
 Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
 Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):¹⁰**

- which are or could be used by interstate or foreign travelers for recreational or other purposes.
 from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
 which are or could be used for industrial purposes by industries in interstate commerce.
 Interstate isolated waters. Explain:
 Other factors. Explain:

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):

- Tributary waters: _____ linear feet _____ width (ft).
 Other non-wetland waters: _____ acres.
Identify type(s) of waters:
 Wetlands: _____ acres.

F. **NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):**

- If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
 Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
 Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
 Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
 Other: (explain, if not covered above): **This wetland is located on an upland agricultural field. The topography slopes inward from the agricultural field property boundary toward this wetland. The wetland was dug in about 1969 or 1970 as an irrigation water sump. It was only partially successful, as the excess irrigation water usually exceeded the capacity of the sump during the time that the fields were routinely irrigated. The wetland is 0.15 miles SW and down gradient from the Mail Creek Ditch, the closest tributary. The wetland hydrology is supplied by snow and rain events and hay meadow irrigation and possible high ground water. This wetland is isolated with no nexus to interstate commerce.**

⁹ To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

¹⁰ Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

There is no information available to show that the wetlands in review 1) is or could be used by interstate or foreign travelers for recreational or other purposes, 2) produces fish or shellfish which are or could be taken and sold in interstate or foreign commerce, or 3) is or could be used for industrial purposes by industries in the interstate commerce.

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- Lakes/ponds:
- Other non-wetland waters: acres. List type of aquatic resource:
- Wetlands: **0.24 acre**

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

- Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- Lakes/ponds: acres.
- Other non-wetland waters: acres. List type of aquatic resource:
- Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: **Cedar Creek Associates**
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
 - Office concurs with data sheets/delineation report.
 - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps:
- Corps navigable waters' study:
- U.S. Geological Survey Hydrologic Atlas:
 - USGS NHD data.
 - USGS 8 and 12 digit HUC maps.
 - U.S. Geological Survey map(s). Cite scale & quad name: **1:24000, Fort Collins**
- USDA Natural Resources Conservation Service Soil Survey. Citation:
- National wetlands inventory map(s). Cite name:
- State/Local wetland inventory map(s):
- FEMA/FIRM maps:
- 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)
- Photographs: Aerial (Name & Date):
or Other (Name & Date):
- Previous determination(s). File no. and date of response letter:
- Applicable/supporting case law: **Rapanos and Carabell cases.**
- Applicable/supporting scientific literature:
- Other information (please specify):

**NIGHT ROOSTING RAPTOR SURVEY REPORT
FOR THE
HANSEN PROPERTY**

Prepared
by
Cedar Creek Associates, Inc.
Fort Collins, Colorado

Prepared
for
Doug Hansen
Lafayette, Colorado

March 16, 2004

NIGHT ROOSTING RAPTOR SURVEY REPORT FOR THE HANSEN PROPERTY

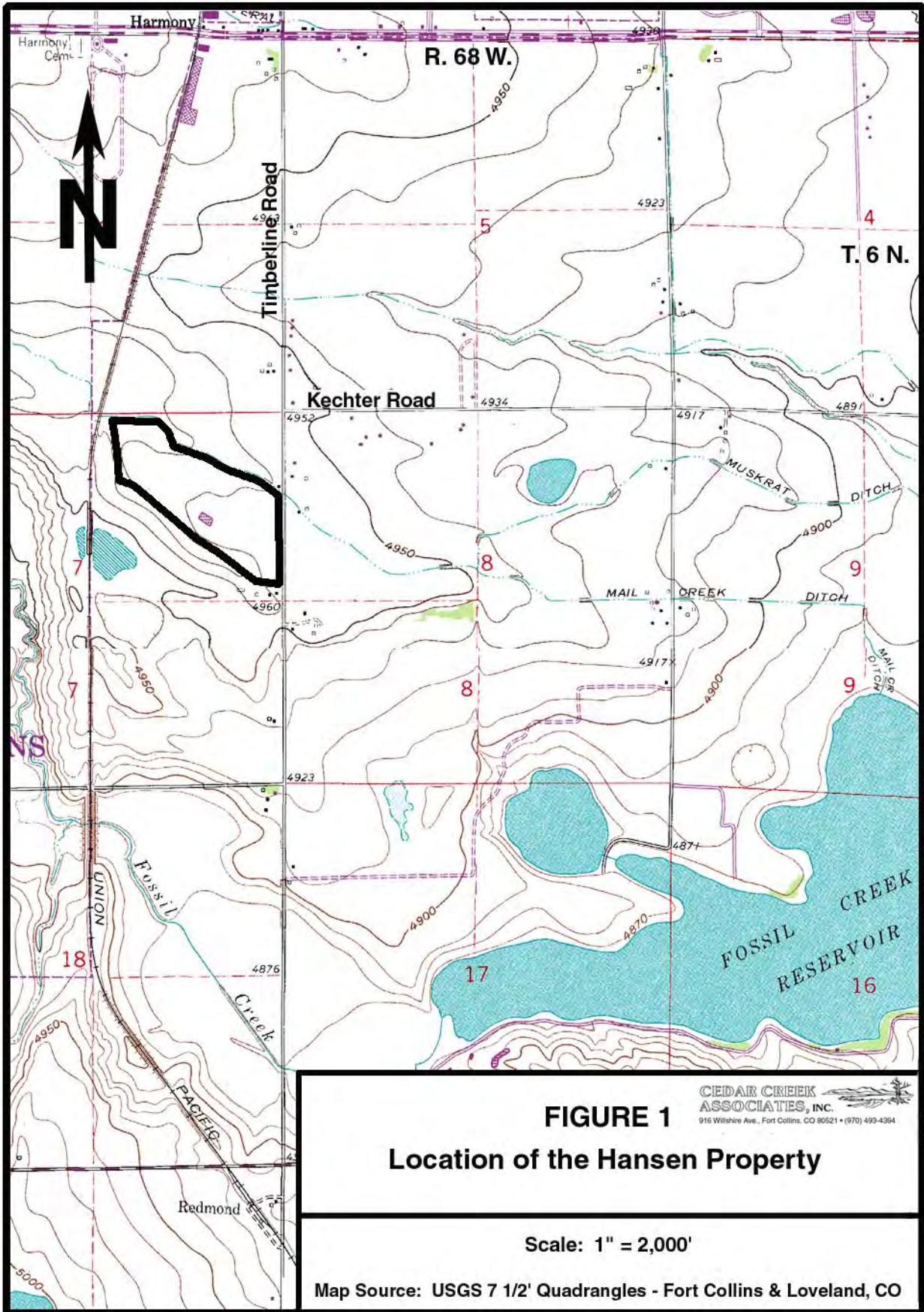
1.0 BACKGROUND AND LOCATION

Bald eagles in the Fort Collins area occur primarily as wintering birds from late November through early March. Although its dietary staple is fish, wintering bald eagles also consume waterfowl, shorebirds, prairie dogs, and carrion. Wintering birds are attracted to the area to feed on dead and crippled geese or ducks on open or frozen reservoirs, prairie dogs in open rangeland, deer carcasses, or road kills in some areas. They also occasionally perch and forage along the major river corridors in the region. Bald eagles typically prefer foraging in areas where large trees provide suitable perch sites overlooking hunting sites. In the Fort Collins area suitable perch sites are typically large cottonwood trees with dead limbs near the top that permit unobstructed landing and takeoff as well as providing commanding views of suitable foraging habitat. Large trees along the southern property boundary of the Hansen property provide views of golf course greens to the west and ponds to the south that attract Canada geese, which in turn, provide a potential food source for bald eagles, particularly if geese wounded by hunting land in these areas.

Night roost sites are another winter habitat feature for wintering bald eagles, especially during periods of inclement weather. Night roost sites are typically communal (used by more than one eagle) and usually provide some level of protection from winter wind and precipitation events.

Previous habitat assessment surveys completed for the Hansen property, as well as casual observations made by the property owner (Doug Hansen, pers. comm.), indicate bald eagles occasionally perch in one large cottonwood tree along the Hansen property southern boundary. This tree is apparently used as a daytime foraging perch site during the winter season. What is not known is whether or not any of the larger trees surrounding the property are used as night roost sites as well. The purpose of the surveys completed for this report was to determine if bald eagles or other raptors use any of the trees near or near the Hansen property for night roosting purposes.

The property addressed by this report is located in Fort Collins, Colorado in the northeast 1/4 of Section 7 (T. 6 N. R. 68 W.). The property boundaries are defined by the Mail Creek Ditch and Willow Springs residential development on the north, Timberline Road on the east, an unnamed irrigation ditch on the south, and existing fencelines and undeveloped land on the west. Large cottonwood trees are supported along the ditches along the north and south property boundaries. The location of the Hansen Property is shown on Figure 1.



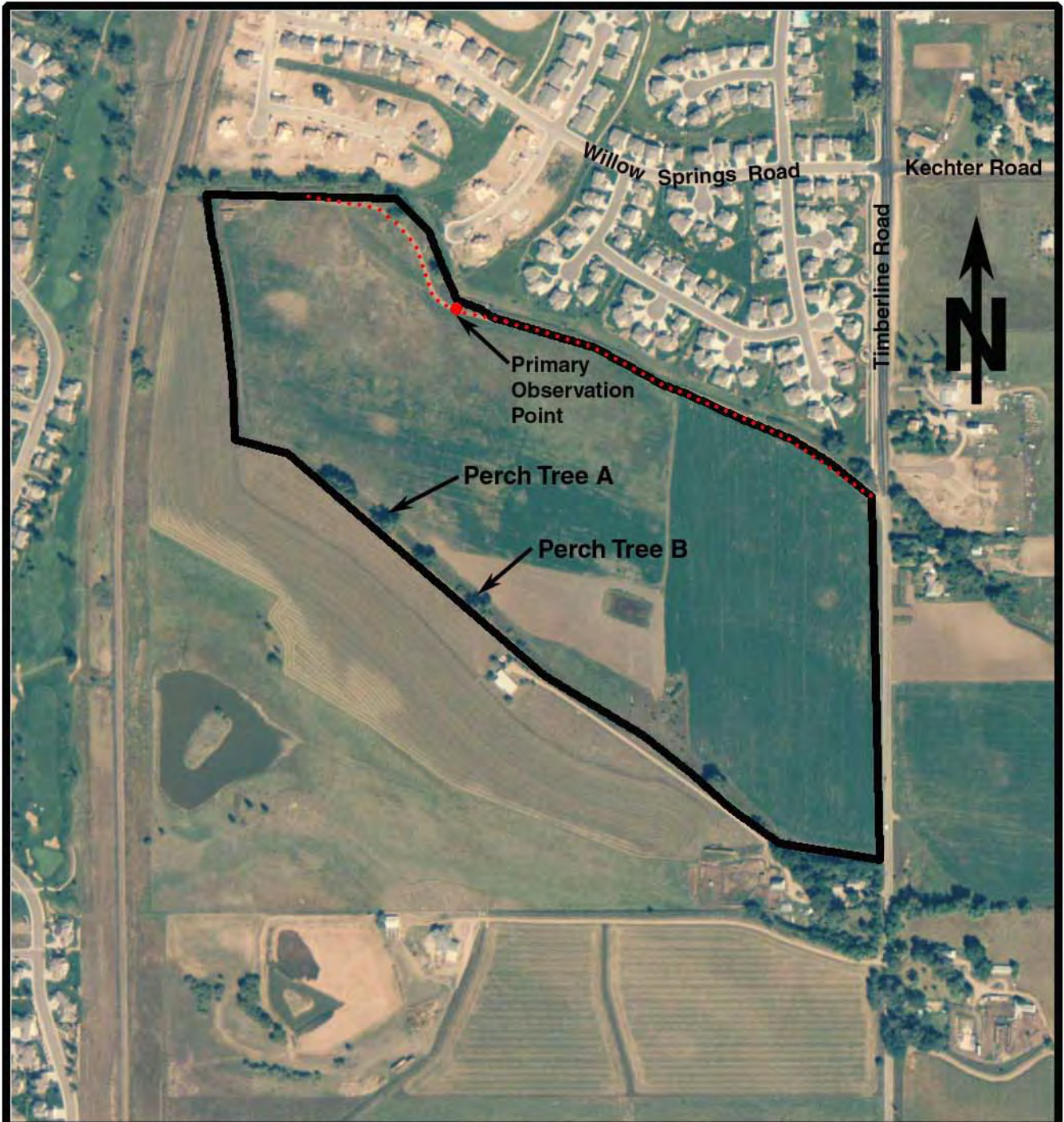
2.0 METHODOLOGY

An initial habitat survey was completed for the property on January 19, 2004. This survey documented bald eagle perching use of one tree along the southern property edge, and subsequent conversations with the property owner, Doug Hansen, confirmed that bald eagles occasionally used the same diurnal perch tree through the winter period, particularly during the waterfowl hunting season. Follow-up surveys to check for possible night-roosting raptor use were completed on a weekly basis (both in the early morning and early evening hours) from early February through the first week of March 2004. Timing for the raptor night roost surveys targeted primarily an hour in the early evening (from before sunset to last light). Two surveys were also completed for an hour in the early morning (starting at first light before sunrise) to check the possibility of night roosting use by raptors arriving in the area after complete darkness in the evening.

Each survey included viewing of all the trees surrounding the property and identifying any raptors located in these trees. Binoculars and a spotting scope were used to aid species identification. Survey emphasis was placed on searching the large cottonwood trees along the property boundary ditches for perching or roosting hawks. Surveys were conducted from a vehicle by slowly driving and stopping along the dirt two-track road located along the northern property edge. Unobstructed views could be obtained of all trees along both edges of the property from this dirt road. Much of the survey period utilized a single observation station that provided excellent views of most of the larger cottonwood trees. Locations of the survey route and the primary observation point are plotted on Figure 2. Raptor observations made on or near the property were recorded by species, time, location, and specific activity (perching, hunting, territorial behavior, flyover, etc.).

3.0 RESULTS

Table 1 provides a compilation of all raptor observations recorded for the property during the survey period. Bald eagle and red-tailed hawk were the only raptor species observed on site. Bald eagles were observed on three occasions while red-tailed hawk was only recorded on one occasion. Raptor observations are recorded graphically for each survey visit on Chart 1. Chart 2 portrays the frequency of the total number of raptor observations for all survey periods. Observations of bald eagle and red-tailed hawk consisted entirely of these birds perching in at the beginning of the evening survey period. For the three bald eagle observations, these birds all left their perch site by the end of the survey period. The single perching red-tailed hawk remained on the property until viewing was obscured by darkness and a heavy snowstorm. No raptor observations were recorded during the two early morning surveys. The March 2 bald eagle observation indicated the bird was feeding on an undetermined prey item. No other behavioral activity, such as hunting or courtship, was noted during survey period.



LEGEND

- Hansen Property Boundary
-** Survey Route

Scale: 1 inch = ~530 feet

Date of Aerial Photography - May 2002

CEDAR CREEK ASSOCIATES, INC.
 916 Wilshire Ave., Fort Collins, CO 80521 • (970) 493-4394

FIGURE 2
Bald Eagle Winter Perch Sites
Near the Hansen Property

TABLE 1

Hansen Property Raptor Night Roosting Survey Results - February 5 through March 4, 2004

Week	Date	Time	Raptors Observed (# - species)	Activity and Comments	Weather
1	2/5/04	4:55-5:50 PM	1-bald eagle	Bald eagle perched in Tree A at start of survey. Remained in tree until near dark then flew off to southeast. Hundreds of starlings flocking in and out of perch tree and trees to west.	24° F at start; mostly cloudy; 5-10 mph southeast wind; 4" fresh snow on ground.
	2/6/04	5:00-6:00 PM	no observations	Hundreds of starlings flocking in and out of perch tree and trees to west.	28° F at start; clear; 0-3 mph north wind
	2/10/04	5:10-6:05 PM	no observations	No activity	27° F at start; mostly clear, ~25% cloud cover. calm
2	2/12/04	5:15-6:15 PM	1-bald eagle	Bald eagle perched in Tree A at start of survey. Remained in tree until 5:40 PM then flew off to east-southeast.	25° F at start; clear; calm
	2/17/04	5:15-6:15 PM	no observations	Hundreds of starlings flocking in and out of perch tree and trees to west.	40° F at start; ~25% cloud cover; calm
3	2/19/04	6:20-7:20 AM	no observations	No activity	42° F at start; 100% cloud cover; calm
	2/24/04	5:15-6:15 PM	no observations	Hundreds of starlings flocking in and out of perch tree and trees to west.	45° F at start; ~75% cloud cover; calm
4	2/26/04	6:10-7:10 PM	no observations	No activity	27° F at start; ~75% cloud cover; calm
	3/2/04	5:30-6:30 PM	1-bald eagle	Bald eagle perched in Tree B at start of survey. Eagle appeared to be feeding on prey item. Remained in tree until 6:10 PM then flew off to the west-northwest.	40° F at start; ~35% cloud cover; 0-3 mph east wind
5	3/4/04	5:30-6:20 PM	1 - red-tailed hawk	Red-tailed hawk perched in Tree A at start of survey. Snowing heavily with poor visibility. Hawk was likely waiting out storm and remained in tree for duration of survey. Survey ended when view of tree was obscured by falling snow and darkness.	33° F at start; snowing heavily; snow started ~ 4:30 PM; 1-3 mph northeast wind

CHART 1
Number of Raptor Observations Recorded by Survey
Date on the Hansen Property - February through early March 2004

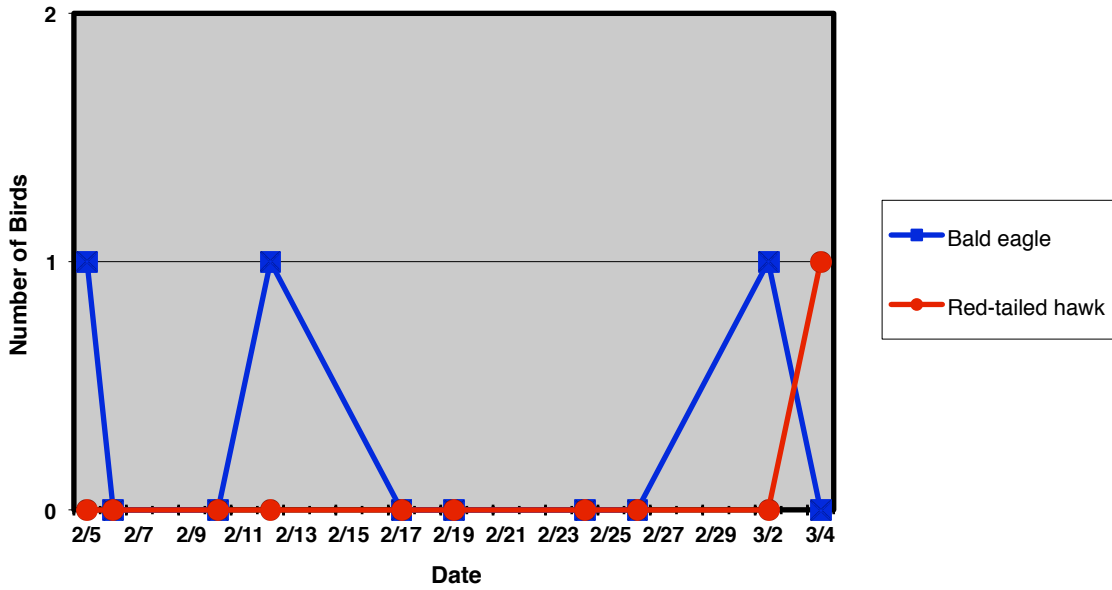
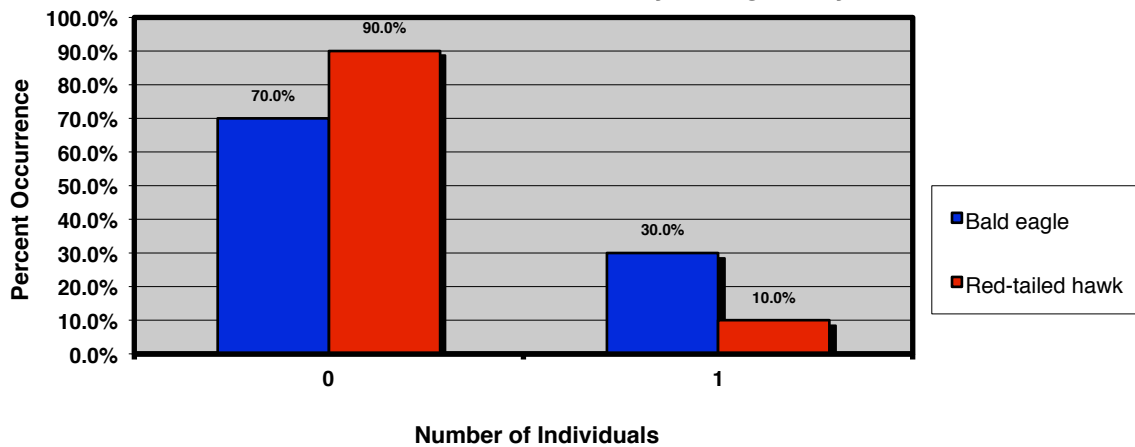


CHART 2
Frequency of the Total Number of Individual Raptors
Observed for All Site Visits - February through Early March 2004



As indicated in Table 1, all perching birds, except for the March 2 bald eagle observation were in Perch Tree A (see Figure 2). This tree appears to be the tallest cottonwood on the property, and it has a dead upper branch that was used consistently for perching. The two bald eagles observed during the initial site survey on January 19 were also observed in Perch Tree A, and Doug Hansen indicated that the majority of his incidental observations of bald eagles were located in this tree as well. The March 2 bald eagle was the only observation recorded in Perch Tree B (see Figure 2). This perch site also appeared to be a dead limb, but the height of this tree limb is near mid-height of the tree rather than close to the top like the dead limb used in Perch Tree A.

4.0 CONCLUSIONS

Based on the results of this survey, it does not appear that any of the trees located on or near the Hansen Property are used as night roost sites by bald eagles or other raptor species. The single observation of a red-tailed hawk that remained in Perch Tree A until after dark was likely the result of the heavy snowstorm occurring at the time and did not represent consistent night-roosting use of this tree.



Hansen Farm – Mixed-Use Project Neighborhood Meeting Notes (6/20/2017)

Overview

City Staff:

Project Planner: Pete Wray, Senior City Planner, AICP
Sylvia Tatman-Burruss, Development Review Liaison
Marc Virata, Civil Engineer III
Nicole Hahn, Civil Engineer II
Suzanne Bassinger, Parks
Anna Simpkins, Planning Technician

Jeff Mark, Applicant – The Landhuis Company
Kristen Turner, Applicant – TB Group

Neighborhood Meeting Date: June 20, 2017

Proposed Project

- Purpose of meeting is to share conceptual plans at an early stage in process and gather feedback from neighbors for inclusion in record.
- Hansen Farm – 6029 S Timberline Rd.
- This is a conceptual review project and an application has not been submitted to the City
- Majority of the site is in the Low Density Mixed-Use Neighborhood (LMN) District, and the eastern section falls in to Medium Density Mixed-Use Neighborhood (MMN) District and Neighborhood Commercial (NC) Zone Districts.
- Maximum allowable building height in LMN is 2 and one half stories.
- Proposed initial phase of development includes 126 Single-Family detached Residential lots, and 60 single-family attached (townhome) residential Units. The remaining zoning identified for future phases includes a neighborhood commercial center, Medium Density Mixed-Use Neighborhoods (multi-family) residential, and small neighborhood park, located at the southeastern corner of the parcel.
- Type 2 review and hearing, with the Planning and Zoning Board as acting decision maker.

Applicant Presentation

- The applicant is in the conceptual review stage. A formal development proposal has not yet been submitted to the City for review.
- Applicant proposed a mixed-use development with single family lots, townhomes, multi-family structures and open park space that will be dedicated to the City.
- Primary access off Timberline Drive.

Questions/Comments and Answers

General Topics:

- **What is the HOA plan for this development?**

Applicant explains that the development will have an HOA; likely multiple HOAs for the different uses. HOAs would comply with Colorado standards.

- **Questions regarding the quality and aesthetics of the development; approximate value, square footage, price range, height?**

Developer ventured that the price would be based off of the lot price, with properties selling in the ballpark of \$500,000. Houses would range from 2,000-3,000 square feet but could be larger. Developer did not comment on the aesthetic/layout of the houses until they have a builder. Developer states that these will be one and two story homes.

Pete Wray explained that when the developer submits a formal proposal to the city, the proposal includes detailed site plans and elevations, all of which are available for public view online. [Development Review website: <http://www.fcgov.com/developmentreview/>]

- **Can you make lot sizes more in balance with the Willow Springs lots to the north?**

Developer explained that there is a sizable landscape buffer off of the Mail Creek Ditch along the north property boundary, and as a result, this is the plan they are putting forth consistent with existing zoning, and they do not intend to change lot sizes.

- **Do petitions have any sway with the city?**

Pete Wray explained that this proposal would be subject to Planning and Zoning Board approval, and that the Planning and Zoning board wants to see all comments made throughout the review process. Citizens are also able to comment at Planning and Zoning Board hearings.

Sylvia Tatman-Burress encouraged attendees to refer to existing plans that have already been adopted by City Council and reference where they believe the proposed development fits or does not fit with existing zoning or land use. She also mentioned that the Planning and Zoning board functions with legal parameters and they like to hear from neighbors.

- **Why would you put commercial on Timberline?**

Pete Wray answered that this Neighborhood Commercial (NC) zone designation was added to the Fossil Creek Plan in the late 1990s and City Structure Plan maps, with the intent that the center would be smaller than a typical shopping center with grocery store. These policy plans established future land use and zoning both approved by City Council. The intent of the zoning would be for a neighborhood supported uses such as a coffee shop, offices, convenience stores, or laundromat.

The Applicant explained that any future commercial development would have to go through normal steps with the City; the developer was just putting that designation on their plan. The

Applicant also mentioned that the city only allows certain uses for the site specific to the existing assigned zoning, and any new application would go through the development review process (at a later time) and any potential use would have to meet the land use code.

- **Question regarding the lot sizes proposed. Residents were told when they purchased Willow Springs lots that any future development to the south would mirror their lot size. What changed?**

Pete Wray explained that the original 1998 Fossil Creek Reservoir Area Plan determined future land uses and densities. The area south of Willow Springs was amended about 6 years after the original plan to include a neighborhood commercial center and medium density mixed-use neighborhood land use designations. Previous public discussions at that time included recognizing similar single-family development abutting Willow Springs with future development as being more compatible, while locating the multi-family and commercial further to the south.

The current LMN zoning is different than the zoning and development in Willow Springs. The density range is between 4-9 dwellings units per acre. The potential for a transition of residential densities and lot sizes is reflective in the Plan and zoning. The Low Density Mixed-Use Neighborhoods zoning adjacent to Willow Springs allows for flexibility with future development for providing a range of lot sizes and feathering of density in the area. The proposed design shows single family detached dwellings on the north edge and next to Willow Springs with slightly smaller lots sizes than the existing neighborhood, but consistent with current zoning.

- **Question regarding the proposed spacing between the new residential buildings on these smaller lots?**

Applicant indicated that their building plans would meet all city requirements for setbacks and spacing appropriate to the various zone districts present. The minimum side yard setback is 5' from the property line to the building.

Pete Wray and Suzanne Bassinger explained that the Mill Creek Ditch runs along the south side of Willow Springs. The ditch has a 30 foot easement that would create open space between the existing lots and proposed lots. The City is proposing a regional trail connection along the ditch.

- **Why don't you know specifics about what is going in development and when will you know?**

The applicant explained that the Overall Development Plan (ODP) is the next phase after this conceptual review. The ODP includes defining density, access, trails, etc. This is a phased project with the LMN zone district going in first, with the multi-family residential and commercial to be developed later as part of separate development applications. The density is defined by the existing zoning, and the layout will again be available for public comment. All proposals will meet the land use code.

Applicant explained that with development today, single-family residential lots are planned out first. Townhomes, apartments, and commercial development are more complicated and typically occur as future phases, until a user is present to determine layout and amenities. Based on the market, the developer is certain the need is there. Anyone buying a home in the proposed development knows the adjacent areas are zoned as they are and should anticipate the multi-family units and commercial developing in the future.

- **Comment stating the proposed multi-family units are not needed since there are 300 apartments up the road that are very expensive.**
- **Resident who previously assisted in drafting the Fossil Creek plan brought up density in the area, indicating Willow Springs density is just over 3 dwelling units/acre. The density is going up almost double for proposed development. Does not match with Fossil Creek Plan (Pg 16 Ch 2) regarding transitions at neighborhoods.**

Applicant responded that the higher density multi-family units are not adjacent to the 3 dwelling units/acre found, and the zoning for the MMN requires a minimum of 12 dwelling units/acre. The largest lots are along the ditch backing up to Willow Springs and density is feathered in the middle.

Schools:

- **What are the impacts on education? Where will these kids go to school? Existing schools do not have capacity; Poudre School District needs to be aware. Also a safety risk having additional traffic around Bacon Elementary.**

Pete Wray explained how all of the existing schools in southeast Fort Collins were coordinated with PSD in the late 1990s while drafting the Fossil Creek plan. PSD is aware of future development opportunities. Planner did not want to speak on behalf of PSD regarding enrollment capacity. Planner offered to check with school district if those interested desire further information and can call or email him.

Nicole Hahn indicated that improvements for Timberline would have a separate public meeting. The purpose of the traffic study required from the developer is a way to determine possible future impacts that may indicate when larger infrastructure projects occur and ensuring safety near the school is a high priority.

Parks:

- **Would the proposed regional trail provide a railroad crossing? Neighborhoods are cut off from major trail networks. What is the timeline for a crossing?**

Suzanne Bassinger explained that a study of trail connections was completed a couple of years ago. One option would be an above grade connection at Keenland, but an underpass was no longer feasible. Some neighbors concerned about an above grade crossing near existing neighborhood. Any proposal for an above grade railroad crossing visible from neighborhoods would require a neighborhood meeting to discuss conceptual designs. It is possible that this could be accomplished in 5-6 years.

- **Comment stating the proposed multi-family units are not needed since there are 300 apartments up the road that are very expensive.**

Zoning:

- **Can you change the zoning plan as times change?**

Pete Wray explained that the developer is entitled to the current zoning. The City has a process for proposed changes to zoning, with a decision by City Council.

Traffic:

- **Multiple attendees expressed that they do not want this development to have a vehicular connection through to the Willow Springs neighborhood. One Willow Springs resident asked developer for a commitment that they would not change the street pattern shown in the rendering provided at the meeting.**

Applicant responded that it was not their intent to provide any access directly into Willow Springs or make any alterations from what was shown, and that fire requirements are what determine access.

- **What is the plan for Timberline? Where does widening occur? What is the Timeline?**

Nicole Hahn explained that the Timberline widening project has recently been funded. This project will widen Timberline to a 4 lane section and is slated for design.

Nicole Hahn and Mark Virata explained that widening Timberline between Stetson Creek and Trilby will likely occur on both sides of the existing roadway depending on the frontage available. Potential environmental impacts, and right of way needs resulting from the widening would be considered in planning.

- **Does the City plan to widen Trilby, too?**

Mark Virata responded that there are no current plans to widen Trilby since heavy development along the corridor has not yet occurred. Nicole Hahn explained that Trilby is, however, a future consideration and the City is anticipating how the corridor may grow.

- **How do you assume density without more specific plans to determine traffic needs?**

Nicole Hahn explained that with a development proposal of this size, the developer is required to submit a traffic study with density and other parameters set. If parameters change, then a new traffic study is required. Multi-family residential is included in density.

- **What is happening with Zephyr? Is it being extended to the west, south of the proposed development like the rendering shows?**

Pete Wray explained that the City wants that connection, but currently have no control over the property south of where the development is proposed. The developer does not own the property to the south.

- **Attendee asked what measures the City was taking to improve traffic monitoring. Noted there are already too many crashes on Timberline and people speed through yellow lights because they know how short the cycle is.**

Nicole Hahn explained that the traffic study that is required with plan submittal would help the city determine when the Zephyr intersection may become signaled, and that Zephyr is an important connection in the area. She explained that crash data from the area indicates the majority of collisions are rear ends and that the short lights on side streets keeps the majority traffic moving, and ultimately reduces crashes. Enforcement is another option to help with red light running if this is a common occurrence in this area.

- **Please consider all grandfather clauses before moving forward with development. Is the developer responsible for improvements to Timberline?**

Nicole Hahn answered that the developer would be responsible for frontage on Timberline Rd and would pay into a fund that helps pay for overall street and traffic improvements. The City is looking at phasing for various connectors in the south end of town.

- **Resident who previously assisted in drafting the Fossil Creek plan in the late 1990s questioned timetable and status of transportation improvements.**

Pete Wray explained that this area includes additional street connections and improvements based on the Master Street Plan. Trilby is also in need of improvements.

Marc Virata confirmed Keenland is still identified as a crossing on the master street plan, but coordinating with railroad and determining funding is a lengthy process. Update: The connection shown on the master street plan at Keenland is a bike and pedestrian crossing only. An update to the Master Street Plan is currently underway and this conversation can be revisited if an connection is desired.

- **Does the City require the developer to provide access to Willow Springs? Will the streets be as narrow as Willow Springs and West Chase?**

Mark Virata explained that in the single-family area, the public streets are designed to local residential standards, and private drive has a narrower width for rear-loaded units. Regarding the multi-family residential units, the City now requires a 36' flowline to improve navigation adjacent to parked cars. Street access from this project to Willow Springs is not required since an existing street stub-out is not provided from the north.

Public Involvement:

- **Is there anything neighbors can do to stop the project?**

Sylvia Tatman-Burress explained that this proposal is only in the conceptual review stage and the meeting is happening so that neighbors can have their concerns heard. Concerns are listed in the meeting notes and are considered by planning staff who make recommendations to the Planning and Zoning Board. Comments can continue to be submitted to Sylvia Tatman-Burress or Pete Wray. All comments are considered throughout the process and citizens have the opportunity to voice concerns at the Planning and Zoning Board hearing. Public comments will not necessarily stop a project, but other things could come up throughout the Development Review process.

Pete Wray explained that all present attendees would receive a copy of the notes taken at the meeting and they would also be sent to the Planning and Zoning Board. Emailed comments are also included in the Planning and Zoning Board record. Pete Wray encouraged citizens to

attend the Planning and Zoning Board hearing since they are the decision-maker. Planner explained that based on the current zoning of the parcel, the developer has the right to develop the property within those zoning parameters, requiring they meet the land use code. If the project is not in compliance with Land Use Code requirements, planning staff will not recommend approval to the Planning and Zoning Board. All appeals to Planning and Zoning Board decisions are heard by City Council.

- **To whom do we direct questions that are not addressed now?**

Pete Wray encourages attendees to call, email, or come in and meet with him for further project clarification.

Sylvia Tatman-Buress also encouraged attendees to sign up for weekly Development Review emails through Development Review website where she explains where plans are in the overall process. She encouraged attendees to reach out to her if they have trouble finding any information on the Development Review website.



Hansen Farm – Project Development Plan 2nd Neighborhood Meeting Notes (12/13/2017)

Overview

City Staff:

Pete Wray, Project Planner
Sylvia Tatman-Burruss, Development Review Liaison
Nicole Hahn, Engineering
Marc Virata, Engineering
Suzanne Bassinger, Park Planning
Stephanie Blochowiak, Environmental Planning
Anna Simpkins, Planning Technician

Applicant:

Jeff Mark, Landhuis Company
Kristin Turner, TB Group

Neighborhood Meeting Date: December 13, 2017

Proposed Project

- The purpose of the second neighborhood meeting was to share the latest plan by the developer and how it has addressed some of the concerns voiced at the first neighborhood meeting in June 2017. The June 2017 meeting was required for the both the Overall Development Plan (ODP) and subsequent Project Development Plan (PDP). The ODP was reviewed and approved by the Planning and Zoning Board in October 2017. The ODP looks at land uses and how pieces will be arranged on the site, but does *not* give the property owner any vested right to build.
- The developer has submitted PDP plans for the Low-Density Mixed-Use (LMN) zoned portion of the property. [The future medium-density mixed-use (MMN) and neighborhood commercial (NC) zones are NOT addressed in this application; there will be future neighborhood meetings when projects are submitted for those uses].
- The proposal only includes the LMN portion of the overall site with a combination of 179 single-family detached dwellings and attached (townhouses).
- The maximum allowable building height in the LMN zone district is 2 and one-half stories.
- The minimum density allowed in the LMN zone district per the Land Use Code is 4 dwelling units per net acre; the maximum is 9 dwelling units per gross acre. The proposed project is roughly 4.2 dwelling units per acre (staff calculation, internal roadways are excluded).
- The single-family use in the LMN zone district is subject to a Type 1 hearing. A type one hearing only has one decision maker (a land use attorney from outside of Fort Collins), but the hearing is still public and the decision maker will consider all comments provided up to an at the hearing.

Anyone who received notice for the public meeting and or provided their address on the sign in sheet will receive notice of the future hearing date.

Applicant Presentation

- The project has completed the conceptual review stage and a PDP application has been submitted to the Town. The applicant has received round #1 comments from Staff and are currently working on preparing the second submittal.
- The current PDP is proposing single family attached and detached houses.
- Primary access off Timberline Drive.

Questions/Comments and Answers

Development Review Process:

- **Where did all the feedback go that was provided at the June neighborhood meeting?**

Pete Wray explained that the June neighborhood meeting was part of the Overall Development Plan (ODP) and future application for a Project Development Plan. The Planning and Zoning Board reviewed and approved the ODP in October 2017. All comments received up to the hearing and testimony during the June 2017 meeting were included in the Planning and Zoning Board record for review by the board members. It is important to note that not all comments received pertained to the ODP, so although they were included, some were out of the purview for the board to review at that time. The packet of information provided to the Planning and Zoning Board containing information about the Hansen Farm ODP is public record and can be viewed on the City website here:

<http://citydocs.fcgov.com/?cmd=convert&vid=46&dt=AGENDA&docid=3041467&board=PLANNING+AND+ZONING+BOARD&docdate=OCT-19-2017>

If you need additional assistance locating documents related to the Planning and Zoning Board review of and decision for the ODP, please contact Development Review Liaison, Sylvia Tatman-Burruss at (970) 224-6076 or statman-burruss@fcgov.com

- **Why couldn't the Planning and Zoning Board consider our comments at the October Hearing?**

The Planning and Zoning Board could not consider any comments related to a future project development plan that had not yet been submitted. The applicant has since submitted a formal project development plan, but the use dictates that a single hearing officer will be the final decision maker at a Type 1 hearing instead of being reviewed by the Planning and Zoning Board. A Type 1 hearing functions the same as a Type 2 (Planning and Zoning Board Hearing), except that there is only the single decision maker and they have 10 days to render their decision. A Type 1 hearing is still open to the public with opportunities to make additional comments. Everyone notified about the public meetings and/or who signed in at a public meeting will be notified when a hearing is scheduled and of the final decision. If you have neighbors who are not on the list but who would like to be, they can contact Project Planner, Pete Wray, and ask to be added to the mailing list pwray@fcgov.com.

- **Is the ODP an approval of the project or an approval to proceed?**

The ODP is a big-picture view of the general land use, natural features, street connections and existing site conditions. The Planning and Zoning Board approved the ODP. The developer has since submitted a project development plan *only* considering the single family residential uses. The approved ODP does not give the developer vested rights to start building any of the single family residential pieces. The ODP provides general parameters for project phasing for multiple applications that will follow. The project development plan currently under review will have to be approved by a hearing officer before developer can proceed with any single-family development.

- **Where does the hearing officer come from for a Type 1 hearing?**

The City works with a couple of Land Use Attorneys who are based outside of Fort Collins to maintain neutrality. They render the final decision.

- **What happens if the hearing officer approves the proposed project and neighbors are still against it?**

The hearing officer can approve a proposed project, deny a proposed project, or approve with conditions. Just like the Planning and Zoning Board, the hearing officer will consider all testimony provided through neighborhood meetings, emails, phone calls, etc. and comments provided at the hearing. The hearing officer has 10 days to render a decision, and neighbors will be notified. The decision can be appealed and appeals are heard by City Council.

- **Why is this project not being heard by the Planning and Zoning Board?**

Per the Land Use Code, the proposed use dictates the review process. In this case, the proposed single family residential uses fall under permitted uses subject to administrative (Type 1) review.

- **Does staff provide a recommendation for a Type 1 hearing?**

Yes, staff will provide a written recommendation. The hearing officer will review the recommendation prior to the hearing.

- **When can we address concerns about the multi-family and commercial?**

Multi-family residential (MMN zoning) tracts and the Neighborhood Commercial (NC) tract will come in as separate Project Development Plans. If the use and/or density dictates that the Planning and Zoning Board will review the projects, then the developer will be required to hold additional neighborhood meetings. No plans have been submitted for the MMN and NC portions of the parcel. The project under review *only* applies to the single family residential.

Proposed single-family buildings/lots:

- **What kind of fencing is proposed on the north lots for the rear yards?**

The applicant explained that the current vision is for a 6-foot privacy fence, but he is open to the idea of using a split rail fence if that is a more cohesive design with the surrounding neighborhoods.

- **How many stories are the townhouses? What is the square footage?**

The applicant explained that the townhouses are all two stories with a crawl space and one or two car garages. The Land Use Code has height requirements and three stories is not permitted. The townhouses range between approximately 1,800 and 3,000 square feet.

- **What is your anticipated price range for the townhouses?**

The applicant estimates the final selling price for the townhouses after the cost of the lot and development fees will be in the \$300,000 range. The single family detached houses will have separate covenants from the townhouses and will be in the \$400-\$500,000 range (generally 1,800-3,000 square feet).

- **Will there be enough parking for the townhouses that only have a one car garage?**

The applicant explained that there will be on street parking on both sides of the street throughout the development, as well as a 20-foot driveway for off street-parking. The entire neighborhood will park itself.

- **What is the expected buildout for the single family with this proposal and future multi-family and commercial?**

The applicant ventured that the 179 single family lots under review will be completed and sold in about 18 months. The multifamily and commercial areas are more difficult to predict since they have no tenant or buyer, and no plans have been submitted to the City, but likely between 2 and 5 years.

- **Will the neighborhood have an HOA?**

The applicant explained the project will have an HOA and there will be separate covenants for the townhouses and single-family detached houses.

- **Which builders will be constructing the townhouses and single family detached houses?**

The applicant explained that they have no contracts on lots today and are not looking to sell lots until they have completed wet utilities.

Traffic:

- **Can you confirm there are no roads connecting the Hansen Property to Willow Springs on the north?**

The applicant confirmed that no road connections have ever been planned, connecting the two developments. There are also no pedestrian/bike connections planned from the proposed trail over the ditch to Willow Springs.

- **How will Timberline accommodate an additional 179 units and more traffic?**

Engineer Nicole Hahn explained that widening this section of Timberline is a capital project with funding available in 2020, although engineering is working to advance funds and get the Timberline widening design started ahead of 2020. The traffic study that was prepared for the ODP includes all phases of development, not just the 179 single family units that are proposed in the PDP. The full traffic study for all phases of development is available on the City website here:

- **Will there be a roundabout a Zephyr?”**

Engineer Nicole Hahn explained that a roundabout had been considered at one point west of Timberline on Zephyr, this came out of the project during the early rounds of review and is no longer in the plan. The intersection of Timberline/Zephyr will be signalized. Engineering Staff is working with the applicant team and Traffic Operations to determine timing of the signalization.

- **Will they delay building the houses until Timberline is widened?**

Engineer Nicole Hahn explained that in the City of Fort Collins, one way roads are funded is through development. As properties develop, fees are to fund road network improvements. This is the reason development moves slightly ahead of some of the more major improvements. When sufficient funds have been collected, a capital project, in this case Timberline, can be initiated.

The traffic impact study looks at impacts from a proposed development. In this case there is a capital project identified and funded within the next three years. Based on the current standards the applicant can assume the funded improvement in their study, and the traffic engineer has assumed the improvements in the provided study. The study results do not show any of the intersections as Adequate Public Facilities (APF) constrained.

The city is currently pursuing opportunities to advance funding. The PDP includes just the single family properties which is about 1/3 of the total traffic based on the study. The developer does not have a current timeline on the other phases of the project. The City's goal is to make the gap between full site development and the Timberline widening as small as possible. Further discussions on phasing with the developer and more opportunities to advance funding will add clarity to these timelines.

- **Residents south of this property use Timberline to access amenities too; what about the intersection at Trilby and College?**

Engineer Nicole Hahn explained that improvements for the intersection at College and Trilby is funded for the near term.

Schools:

- **What schools will this neighborhood feed into?**

Pete Wray explained that the west side of Timberline Rd feeds into Werner Elementary to the northwest of the proposed project per his conversation with Poudre School District. The district website indicates Preston Middle School and Fossil Ridge High School.

Trail/Neighborhood Park:

- **Is the trail lighted? Will the light spill into our yards?**

Park Planner Suzanne Bassinger explained that the City of Fort Collins does not light any of their trails.

- **Will the HOA provide dog waste stations for the proposed trail?**

Pete Wray explained that the Parks department would maintain the proposed trail and they provide stations.

- **What is the proposed timeline for the neighborhood park?**

Park Planner Suzanne Bassinger explained that the park is still conceptual and the City requires 75% of the area be built out so that they have generated enough impact fees to proceed. Build out in this case would include the Rennat property as well so now it's looking between 5 and 10 years.

- **How will you irrigate the neighborhood park?**

Park Planner Suzanne Bassinger explained that there is an existing lateral along the property, and anything at this point is conceptual but that option could be explored in the future. Parks prefers to irrigate with non-potable water but at the time has not explored detailed options for how to do that on this site.

- **How can you make sure residents are not wandering into our neighborhood and using our amenities?**

The applicant explained that no one can be stopped from using sidewalk system in other developments but that this proposal includes sidewalks for residents, trails around the proposed detention and a future neighborhood park. There will be connections with Hansen and properties to the south as they develop so people will really be funneled away from Willow Springs.

- **Is a 50-foot buffer along the ditch sufficient for the ditch company to maintain the ditch?**

The applicant explained that the 50-foot buffer is typically sufficient and legally the ditch company has a right from the top to bottom of ditch and have easements or other formal documents giving them access. Even having the trail within the buffer, there would still be adequate access should the ditch company need it.

Other:

- **Is there any consideration for how all this added density and traffic will impact our property values?**

Sylvia Tatman-Burruss explained that property value is not something that can be considered or regulated by the Land Use Code.

- **Can neighbors change the minimum density to have less units?**

The minimum density requirements are governed by zone district and the provisions set forth in the Land Use Code. The zoning was in place when this property was purchased and the applicant has not proposed any changes.

- **Would you consider switching the smaller lots at the east side of the property with the larger lots currently backing up to the railroad and increasing the lot sizes adjacent to Willow Springs?**

The applicant explained that they had also discussed those proposed lot changes, and were prepared to make it on revised plans to enhance compatibility with this development and Willow Springs.



NORTHERN
ENGINEERING

September 7, 2018

**PRELIMINARY DRAINAGE AND
EROSION CONTROL REPORT FOR
HANSEN PROPERTY**
Fort Collins, Colorado


Prepared for:
Jeff Mark
Lorson South Land Corp
212 N. Wahsatch Ave, Suite 301
Colorado Springs, CO 80903

Prepared by:



NORTHERN
ENGINEERING

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www.northernengineering.com

 This Drainage Report is consciously provided as a PDF.
Please consider the environment before printing this document in its entirety.
When a hard copy is absolutely necessary, we recommend double-sided printing.

Project Number: 911-015



September 7, 2018

City of Fort Collins
Stormwater Utility
700 Wood Street
Fort Collins, Colorado 80521

**RE: Preliminary Drainage and Erosion Control Report for
*HANSEN PROPERTY***

Dear Staff:

Northern Engineering is pleased to submit this Preliminary Drainage and Erosion Control Report for your review. This report accompanies the Project Development Plan submittal for the proposed Hansen Property development.

This report has been prepared in accordance to Fort Collins Stormwater Criteria Manual (FCSCM), and serves to document the stormwater impacts associated with the proposed project. We understand that review by the City is to assure general compliance with standardized criteria contained in the FCSCM.

If you should have any questions as you review this report, please feel free to contact us.

Sincerely,
NORTHERN ENGINEERING SERVICES, INC.

A handwritten signature in black ink, appearing to read 'Frederick S. Wegert'.

Frederick S. Wegert, PE
Project Engineer

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Proposed Drainage Exhibit

I. GENERAL LOCATION AND DESCRIPTION

A. Location

1. Vicinity Map

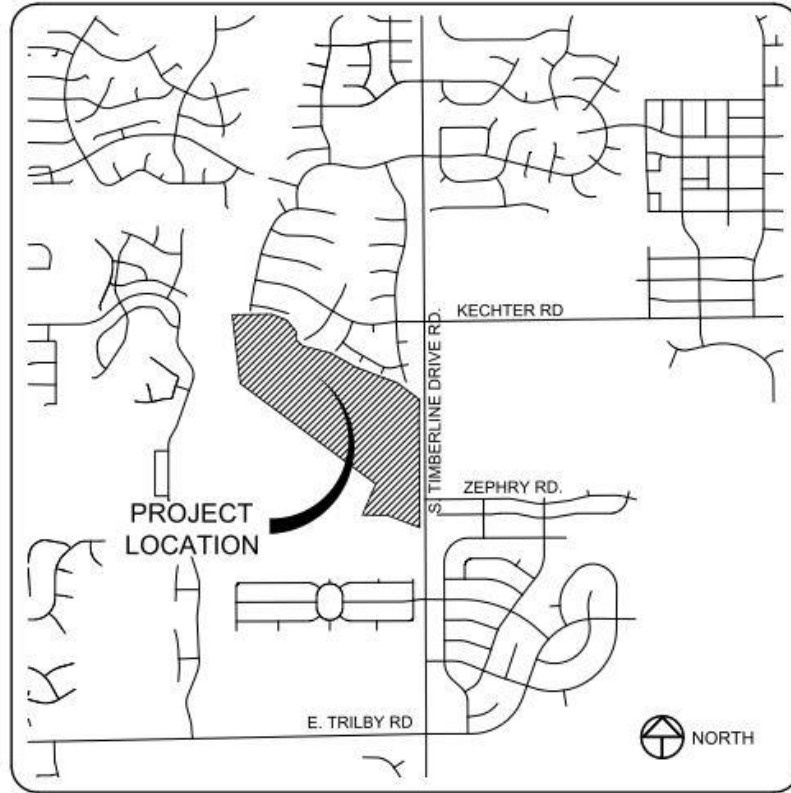


Figure 1 -- Vicinity Map

2. The project site is located in the northeast quarter of Section 7, Township 6 North, Range 68 West of the 6th Principal Meridian, City of Fort Collins, County of Larimer, State of Colorado.
3. The proposed development site is located northwest of the intersection of South Timberline Road and Zephyr Road in Fort Collins, Colorado. The site is bounded to the north by the Mail Creek Ditch, to the south and west by a lateral of the Mail Creek Ditch, and the east by South Timberline Road.
4. The project site is in the City of Fort Collins Fossil Creek Master Drainage Basin. The required onsite detention is typically the runoff volume difference between the 100-year developed inflow rate and the historic 2-year release rate. However, flows are also limited by the capacity of the outfall ditch to the Timbers. Additionally, the site must provide water quality treatment. Water quality treatment methods are proposed for the site, and are described in further detail below.
5. The area to the north, west, and southeast of the site is fully developed. The area to the east is partially developed. The area to the immediate south is undeveloped, but the Linden Park Subdivision is approximately 1,000 feet to the south. Zoning across the site includes Low Density Mixed Use Neighborhood (LMN), Neighborhood Commercial (NC), and Medium Density Mixed Use Neighborhood (MMN).
6. Because of the Mail Creek Ditch, there are no offsite flows that impact the site.

B. Description of Property

1. The development area is roughly 69.8 net acres.

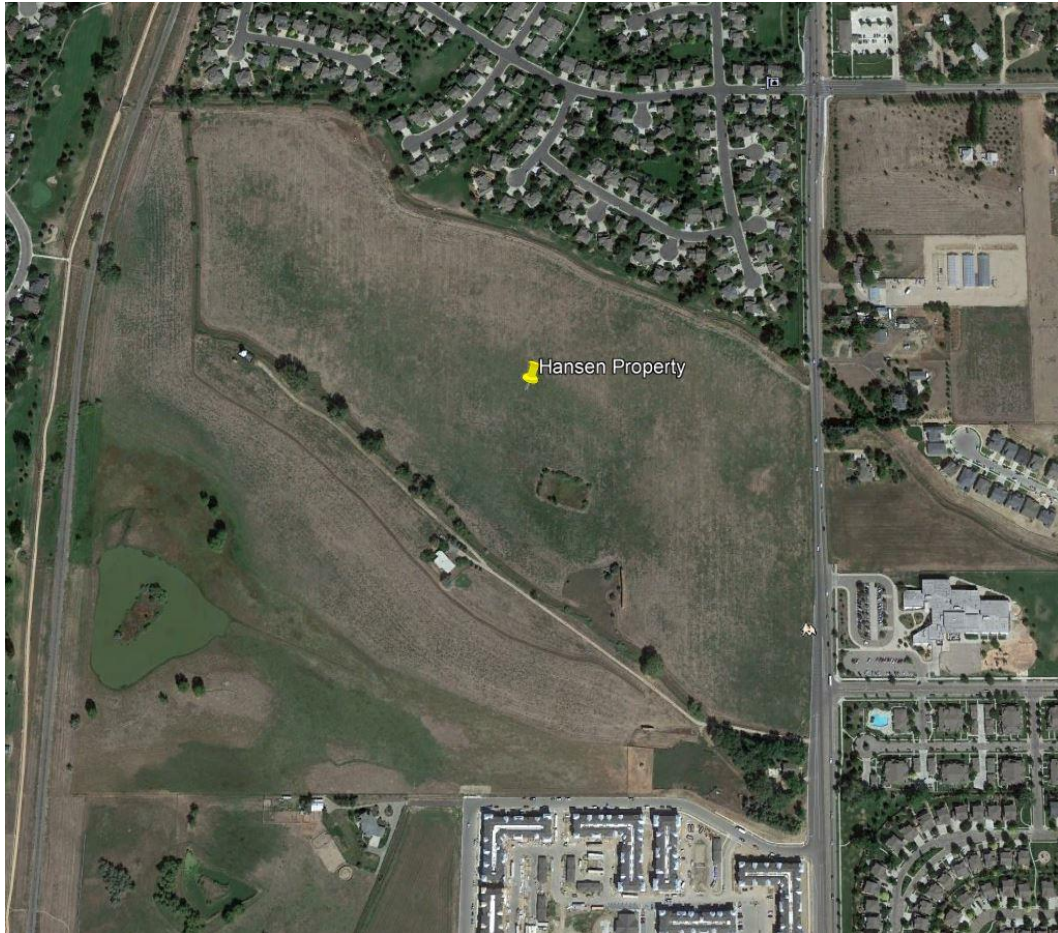


Figure 2 – Aerial Photograph

2. The subject property is currently composed of irrigated farmland, with ground cover consisting of grass. Existing ground slopes are mild to moderate (i.e., 1 - 3±%) through the interior of the property. General topography slopes from the exterior of the property towards a depressed area in the center.
3. According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey website: <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>, the site consists of Nunn clay loam and Caruso clay loam, which fall into Hydrologic Soil Groups C and D, respectively.
4. The proposed project site plan is composed of the development of single-family homes; multi-family apartment in the north-central of the site and towards the east; and commercial buildings towards southeast. Associated site work, water, and sewer lines will be constructed with the development. Onsite detention water quality treatment is proposed and will consist of several features which are discussed in Section IV, below.

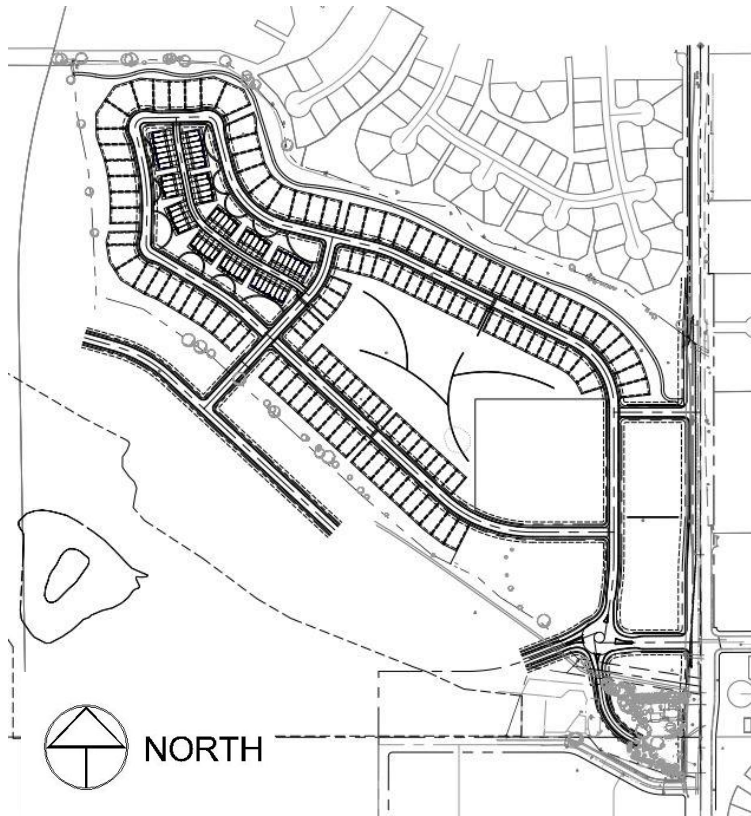


Figure 3– Proposed Site Plan

5. There are no known irrigation laterals crossing the site, but the Mail Creek Ditch bounds the site to the north, and an irrigation lateral bounds the site to the south.
6. The proposed land use is single-family homes; multi-family apartment in the north-central of the site and towards the east; and commercial buildings towards southeast

C. Floodplain

1. According to the Overall Drainage Report for the Hansen Overall Development Plan, the project site is not encroached by any floodplains
2. A 50' natural habitat buffer along the Mail Creek Ditch and the irrigation lateral to the south exists on the site. All drainage improvements will be located outside this 50' natural habitat buffer.

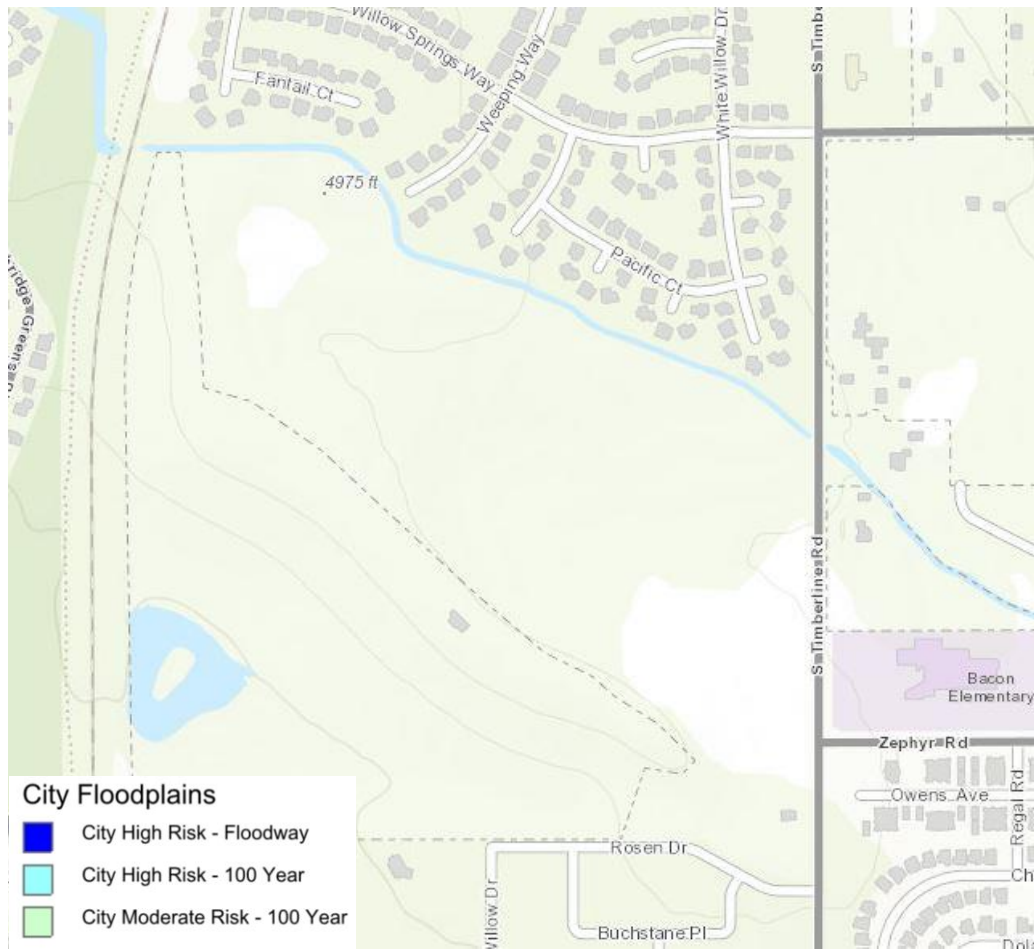


Figure 4 –Area Floodplain Mapping



II. DRAINAGE BASINS AND SUB-BASINS

A. Major Basin Description

1. The project site is in the City of Fort Collins Fossil Creek Master Basin. Detention requirements for this basin are to detain the difference between the 100-year developed inflow rate and the historic 2-year release rate, specified as 0.20 cfs/ac.
2. However, outflow from this property is limited by an existing outfall ditch, located on the southern property line of The Timbers subdivision, to The Timbers. Basins A and B of The Timbers (Final Drainage Report prepared by TST, Inc.) and Bacon Elementary School (Final Drainage Report prepared by Nolte Associates, Inc.) were included in the attached SWMM model (see **Appendix C**). According to the SWMM Model, the peak discharge from the proposed ponds for the Hansen Property will occur 2 hours after the peak from The Timbers PD, but it will coincide with the release from the Bacon Elementary School detention pond. Therefore, the outflow from the Hansen Property is limited by the peak discharge within The Timbers outfall ditch of 139.4 cfs minus the flow from The Timbers and Bacon Elementary School. The Bacon Elementary School detention pond will release 17.10 cfs during the peak flow from Hansen.

B. Sub-Basin Description

1. The subject property historically drains towards the east side of the of the property at a low point in Timberline Road.
2. A more detailed description of the project drainage patterns is provided below.

III. DRAINAGE DESIGN CRITERIA

A. Regulations

There are no optional provisions outside of the FCSCM proposed with the proposed project.

B. Four Step Process

The overall stormwater management strategy employed with the proposed project utilizes the “Four Step Process” to minimize adverse impacts of urbanization on receiving waters. The following is a description of how the proposed development has incorporated each step.

Step 1 – Employ Runoff Reduction Practices

Several techniques have been utilized with the proposed development to facilitate the reduction of runoff peaks, volumes, and pollutant loads as the site is developed from the current use by implementing multiple Low Impact Development (LID) strategies including:

- NE Conserving existing amenities in the site including the existing vegetated areas.
- NE Providing vegetated open areas throughout the site to reduce the overall impervious area and to minimize directly connected impervious areas (MDCIA).
- NE Routing flows, to the extent feasible, through vegetated swales to increase time of concentration, promote infiltration and provide initial water quality.

Step 2 – Implement BMPs That Provide a Water Quality Capture Volume (WQCV) with Slow Release

The efforts taken in Step 1 will facilitate the reduction of runoff; however, urban development of this intensity will still generate stormwater runoff that will require additional BMPs and water quality. The majority of stormwater runoff from the site will ultimately be intercepted and treated using detention and LID treatment methods prior to exiting the site.

Step 3 – Stabilize Drainageways

There are no major drainageways within the subject property. While this step may not seem applicable to proposed development, the project indirectly helps achieve stabilized drainageways nonetheless. By providing water quality treatment, where none previously existed, sediment with erosion potential is removed from downstream drainageway systems. Furthermore, this project will pay one-time stormwater development fees, as well as ongoing monthly stormwater utility fees, both of which help achieve City-wide drainageway stability.

Step 4 – Implement Site Specific and Other Source Control BMPs.

The proposed project will improve upon site specific source controls compared to historic conditions:

- NE The proposed development will provide LID and water quality treatment; thus, eliminating sources of potential pollution previously left exposed to weathering and runoff processes.

C. Development Criteria Reference and Constraints

The subject property is surrounded by currently developed properties. Thus, several constraints have been identified during the course of this analysis that will impact the proposed drainage system including:

- NE Existing elevations along the property lines will generally be maintained.
- NE As previously mentioned, overall drainage patterns of the existing site will be maintained.
- NE Elevations of existing downstream facilities that the subject property will release to will be maintained.

D. Hydrological Criteria

1. The City of Fort Collins Rainfall Intensity-Duration-Frequency Curves, as depicted in Figure RA-16 of the FCSCM, serve as the source for all hydrologic computations associated with the proposed development. Tabulated data contained in Table RA-7 has been utilized for Rational Method runoff calculations.
2. The Rational Method has been employed to compute stormwater runoff utilizing coefficients contained in Tables RO-11 and RO-12 of the FCSCM.
3. Three separate design storms have been utilized to address distinct drainage scenarios. A fourth design storm has also been computed for comparison purposes. The first design storm considered is the 80th percentile rain event, which has been employed to design the project's water quality features. The second event analyzed is the "Minor," or "Initial" Storm, which has a 2-year recurrence interval. The third event considered is the "Major Storm," which has a 100-year recurrence interval. The fourth storm computed, for comparison purposes only, is the 10-year event.
4. No other assumptions or calculation methods have been used with this development that are not referenced by current City of Fort Collins criteria.

E. Hydraulic Criteria

1. As previously noted, the subject property maintains historic drainage patterns.
2. All drainage facilities proposed with the project are designed in accordance with criteria outlined in the FCSCM and/or the Urban Drainage and Flood Control District (UDFCD) Urban Storm Drainage Criteria Manual.
3. As stated above, the subject property is not located in a City designated floodplain. The proposed project does not propose to modify any natural drainageways.

F. Modifications of Criteria

1. The proposed development is not requesting any modifications to criteria at this time.

IV. DRAINAGE FACILITY DESIGN

A. General Concept

1. The main objectives of the project drainage design are to maintain existing drainage patterns, and to ensure no adverse impacts to any adjacent properties.
2. LID treatment will be provided in pre-treatment areas upstream of detention ponds for Basin 1. Multi-family and commercial areas within Basins 2, 3, and 4 will be required to provide their own site-specific LID treatment prior to discharging into the detention ponds. Thus, the "treatment train" philosophy will be followed, with

stormwater treatment occurring through a variety of in-series methods prior to ultimate discharge into the Fossil Creek drainageway.

3. Drainage patterns anticipated for drainage basins shown in the Drainage Exhibit are described below. Drainage basins have been defined for preliminary design purposes and are subject to change at Final design; however, general drainage patterns and concepts are not expected to be significantly altered.

Basins 1A to 1N (Detention Pond 1)

Basins 1A to 1F and 1G to 1N consist of single-family homes, local streets, and landscaped areas. Basins 1A, 1G and 1H consist of multi-family apartments, parking lots, and landscaped areas. Detention Pond 1 is in Basin 1A, and rain gardens are located in Basins 1B and 1L to intercept the surface runoff from Basins 1C to 1K prior to entering Detention Pond 1. These basins will generally drain via overland flow and street curb and gutter first into the proposed LID features as shown on the Drainage Exhibit, and ultimately into Detention Pond 1.

Basin 2A to 2G (Detention Pond 2)

Basin 2A consists of Detention Pond 2. Basins 2B, 2C, 2D, 2E, and 2F consist of single-family homes, local streets, and landscaped areas. Basin 2G consist of multi-family apartments, parking lots, and landscaped area. We anticipate some form of LID pre-treatment for Basin 2G, when these basins develop in the future. These basins will generally drain via overland flow and street and parking lot curb and gutter into Detention Pond 2.

Basins 2H to 2L (Detention Pond 3)

Basins 2H, 2I, 2J, and 2K consist of multi-family apartments, parking, local streets, and landscaped areas. Basin 2L consists of a proposed neighborhood park. We anticipate some form of LID pre-treatment and onsite detention for Basins 2H and 2K, when these basins develop in the future. These basins will generally drain via overland flow and street and parking lot curb and gutter into Detention Pond 3.

Basins 3A and 3B (Detention Pond 4)

Basin 3A is anticipated to be developed in the future in accordance to the Neighborhood Commercial (NC) zoning requirements. Basin 3B consist of local street runoff. We anticipate some form of LID pre-treatment and onsite detention for Basins 3A and 3B, when these basins develop in the future. If the discharge from Detention Pond 4 increases the total discharge from Ponds 1, 2, 3, and 4 beyond 13.58 cfs, then the developer for Basin 3 would need to demonstrate the additional flows do not exceed the capacity of the outfall ditch for Timbers.

Basin 4 (Detention Pond 5)

Basin 4 is anticipated to be developed in the future in accordance to the Neighborhood Commercial (NC) zoning requirements. We anticipate some form of LID pre-treatment and onsite detention for Basin 4, when this basin develops in the future. The development of Basin 4 will be required to negotiate with neighboring property owners for a drainage easement to discharge stormwater. Detention Pond 5, per the Overall Development Drainage Plan, assumes an impervious area of 90%, a pond size of 35,250 ft³, and a release rate of 0.60 cfs.

A full-size copy of the Drainage Exhibit can be found in the Map Pocket at the end of this report.

B. Specific Details

- Five detention ponds are proposed within the site and will detain up to the 100-year storm event and release at or below the allowable (for Fossil Creek Basin) runoff rate of 0.20 cfs per acre. The ponds have been modeled utilizing the computer program EPA SWMM 5.1. Please see SWMM modeling results provided in Table 1, below, and SWMM modeling output provided in **Appendix C**.

The release rates for Ponds 1, 2, 3, and 4 were adjusted to insure the total flowrate at the Timbers outfall ditch is less than 139.4 cfs. Basins A and B from The Timbers and Bacon Elementary School were included in the SWMM model. According to the SWMM model in **Appendix C**, the flowrate at The Timbers outfall ditch is 137.2 cfs. In addition, the minimum release rates for Ponds 1, 2, 3, and 4 are limited by Colorado State Statue 37-92-602.

- LID pre-treatment with rain gardens are currently proposed to treat storm runoff for the single-family homes on this project. Stormwater from Basins 1B through 1L will first enter a rain garden prior to discharging into Detention Pond 1. In addition, the lots with rear yards facing Detention Pond 1 (south side of Street A, east side of Street C, and north side of Street E) will have a 3' to 12' wide grass buffer prior to the edge of the detention pond. The slope of the grass buffer varies from 2% to 6% with an average slope of 3%. Basins 1M and 1N were not included in the LID calculation because a rain garden was not provided at their discharge point into Detention Pond 1. See Table 1 for further detail regarding LID treatment. We intend to meet or exceed the LID treatment requirement of 50% of residential areas.

Table 1 – 50% On-Site LID Treatment for Single-Family Residences

50% On-Site Treatment by LID Summary Table for Single-Family Residences			
Basin(s)	LID Treatment	Total Basin(s) Area (Ac.)	Rain Garden Req'd Min. Vol. (Cu.-Ft.)
1A	None (Pond)	10.43	
1B, 1C, 1D, 1E, & 1F	NE Rain Garden	11.34	6,794
1G, 1H, 1I, 1J, 1K, & 1L	NW Rain Garden	16.08	9,506
1M & 1N	None	5.46	
2A	None (Pond)	2.81	
2B, 2C, 2D, 2E, 2I, & 2J	None	3.92	
2F, 2G, 2H, 2K, & 2L	Site Specific	13.22	
3A	Site Specific	3.09	
3B	None	0.33	
4	Site Specific	3.10	
<i>Total Site Area</i>		69.78	
<i>Areas Requiring Site Specific LID Treatment</i>			
Multi-family lots (Tract D)		5.39	Acres
Multi-family lots (Tract E)		4.21	Acres

Local Commerical (Tract C)	4.55	Acres
Detention Pond (Tract L)	0.78	Acres
Detention Pond (Tract M)	0.50	Acres
Neighborhood Park (Tract B)	3.00	Acres
Total Newly Developed Area less Site Specific Areas & Ponds		
	38.11	Acres
Total Newly Developed Area Treated		
	27.42	Acres
Percent of Newly Developed Area Treated		
	71.9%	

- Future development within Basins 2F, 2G, 2H, 2K, 2L, 3A, and 4 will be required to provide their own site-specific LID treatment. These basins consist of large multi-family and sites zoned as MMF and NC. We anticipate these large multi-family and commercial sites will be required to provide their own site-specific LID treatment during the individual site design process. See Table 1 for further detail regarding LID treatment.
- Please see preliminary LID information and Water Quality Capture Volume (Extended Detention) computations provided in **Appendix D**.

Table 2 - SWMM Modeling Output and Detention Volume Summary

Pond ID	Pond Volume (CF)	Pond Volume (AC-FT)	Peak Release (CFS)
1	435,893	10.01	3.08
2	76,661	1.76	3.38
3	97,168	2.23	9.92
4	41,078	0.94	0.46
5	35,250	0.81	0.60

- Final design details, and construction documentation shall be provided to the City of Fort Collins for review prior to Final Development Plan approval.
- Stormwater facility Standard Operating Procedures (SOP) will be provided by the City of Fort Collins in the Development Agreement.

V. CONCLUSIONS

A. Compliance with Standards

- The drainage design proposed with the proposed project complies with the City of Fort Collins' Stormwater Criteria Manual.
- The drainage design proposed with this project complies with requirements for Fossil Creek Basin.
- The drainage plan and stormwater management measures proposed with the proposed development are compliant with all applicable State and Federal regulations governing stormwater discharge.

B. Drainage Concept

- The drainage design proposed with this project will effectively limit any potential damage associated with its stormwater runoff by providing detention and water

quality mitigation features.

2. The drainage concept for the proposed development is consistent with requirements for the Fossil Creek Basin.

References

1. Fort Collins Stormwater Criteria Manual, City of Fort Collins, Colorado, as adopted by Ordinance No. 174, 2011, and referenced in Section 26-500 (c) of the City of Fort Collins Municipal Code.
2. Larimer County Urban Area Street Standards, Adopted January 2, 2001, Repealed and Reenacted, Effective October 1, 2002, Repealed and Reenacted, Effective April 1, 2007.
3. Soils Resource Report for Larimer County Area, Colorado, Natural Resources Conservation Service, United States Department of Agriculture.
4. Urban Storm Drainage Criteria Manual, Volumes 1-3, Urban Drainage and Flood Control District, Wright-McLaughlin Engineers, Denver, Colorado, Revised April 2008.
5. Final Drainage Report for The Timbers PD, TST, Inc.; Fort Collins, Colorado, June 28, 2002.
6. 2003 Prototype Elementary School: Timberline Site: Final Drainage and Erosion Control Report for Poudre School District, Nolte Associates, Inc.; Fort Collins, Colorado, May 28, 2002.
7. Overall Drainage Report for Hansen Overall Development Plan, Northern Engineering; Fort Collins, Colorado, August 29, 2017.

APPENDIX A

HYDROLOGIC COMPUTATIONS

HISTORIC COMPOSITE % IMPERVIOUSNESS AND RUNOFF COEFFICIENT CALCULATIONS

CHARACTER OF SURFACE:	Runoff Coefficient ¹	Percentage Impervious ²	
LMN Zoning	0.55	60%	Project: Hansen Calculations By: F. Wegert Date: September 7, 2018 2-year C _f = 1.00 10-year C _f = 1.00 100-year C _f = 1.25 Composite Runoff Coefficient with Adjustment
MMN Zoning	0.65	70%	
NC Zoning	0.95	90%	
Streets, Parking Lots, Roofs, Alleys, and Drives:			
Asphalt	0.95	100%	
Concrete	0.95	90%	
Gravel (packed)	0.50	40%	
Roofs.....	0.95	90%	
Pavers.....	0.40	22%	
Undeveloped			
Open Lands, Transition	0.20	2%	
Greenbelts, Agriculture	0.20	2%	
USDA SOIL TYPE: C			

Sub-Basin ID	Sub-Basin Area (sq. ft.)	Sub-Basin Area (ac.)	Area of Asphalt (ac.)	Area of Roofs (ac.)	Area of SF Homes ³ (ac.)	Area of Landscaping 2% to 7% (ac)	Area of MMN (ac.)	Area of NC (ac.)	2-year Composite Runoff Coefficient	10-year Composite Runoff Coefficient	100-year Composite Runoff Coefficient	Composite % Imperv.
H1	2,832,002	65.01	0.00	0.00	0.00	65.01	0.00	0.00	0.20	0.20	0.25	2%
H3	74,352	1.71	0.00	0.10	0.00	1.61	0.00	0.00	0.24	0.24	0.30	7%
H4	134,123	3.08	0.00	0.00	0.00	3.08	0.00	0.00	0.20	0.20	0.25	2%

1) Runoff coefficients are taken from the Fort Collins Stormwater Criteria Manual, Table 3.2.1 and Table 3.2.2.
 2) Runoff coefficients are taken from the Overall Drainage Report for Hansen Overall Development Plan prepared by Northern Engineering dated 8/29/2017.
 3) Assume single-family residences are 3/4 roof & driveways (C = 0.95) and 1/4 lawn (C=0.25)

HISTORIC TIME OF CONCENTRATION COMPUTATIONS

Overland Flow, Time of Concentration:

$$T_i = \frac{1.87(1.1 - C * C_f)\sqrt{L}}{S^{1/3}}$$

Project: Hansen
Calculations By: F. Wegert
Date: September 7, 2018

Gutter/Swale Flow, Time of Concentration:

$$T_t = L / 60V$$

$$T_c = T_i + T_t \text{ (Equation RO-2)}$$

$$\text{Velocity (Gutter Flow), } V = 20 \cdot S^{1/2}$$

$$\text{Velocity (Swale Flow), } V = 15 \cdot S^{1/2}$$

} (Equation RO-4)

NOTE: C-value for overland flows over grassy surfaces; C = 0.25

Design Point	Sub-Basin	Overland Flow											Gutter Flow					Time of Concentration			
		Is Length > 500' ?	C*C _f (2-yr C _f =1.00)	C*C _f (10-yr C _f =1.00)	C*C _f (100-yr C _f =1.25)	Length, L (ft)	Up Stream Elevation	Down Stream Elevation	Slope, S (%)	T _i 2-yr (min)	T _i 10-yr (min)	T _i 100-yr (min)	Length, L (ft)	Up Stream Elevation	Down Stream Elevation	Slope, S (%)	Velocity, V (ft/s)	T _t (min)	2-yr T _c (min)	10-yr T _c (min)	100-yr T _c (min)
h1	H1	No	0.20	0.20	0.25	275	4975.00	4972.00	1.09%	27.1	27.1	25.6	2560	4972.00	4960.00	0.47%	1.37	31.2	58.3	58.3	56.8
h3	H3	No	0.24	0.24	0.30	200	67.00	63.00	2.00%	18.0	18.0	16.7	229	63.00	56.87	2.68%	3.27	1.2	19.2	19.2	17.9
h4	H4	No	0.20	0.20	0.25	200	67.00	65.00	1.00%	23.8	23.8	22.5	485	65.00	54.00	2.27%	3.01	2.7	26.5	26.5	25.2

HISTORIC RUNOFF COMPUTATIONS

Rational Method Equation:

$$Q = C_f (C)(i)(A)$$

Project: Hansen

Calculations By: F. Wegert

Date: September 7, 2018

Rainfall Intensity:

Rainfall Intensity taken from the Fort Collins Stormwater Criteria Manual (FCSCM), Tables RA-7 and RA-8

Design Point	Sub-Basin(s)	Area, A (acres)	2-yr T _c (min)	10-yr T _c (min)	100-yr T _c (min)	C ₂	C ₁₀	C ₁₀₀	Intensity, i ₂ (in/hr)	Intensity, i ₁₀ (in/hr)	Intensity, i ₁₀₀ (in/hr)	Flow, Q ₂ (cfs)	Flow/Acre, Q ₂ (cfs/acre)	Flow, Q ₁₀ (cfs)	Flow, Q ₁₀₀ (cfs)
h1	H1	65.01	58	58	57	0.20	0.20	0.25	0.84	1.43	2.98	10.92	0.17	18.59	48.35
h3	H3	1.71	19	19	18	0.24	0.24	0.30	1.65	2.82	6.01	0.68	0.40	1.17	3.10
h4	H4	3.08	26	26	25	0.20	0.20	0.25	1.40	2.39	4.98	0.86	0.28	1.47	3.83

PROPOSED % IMPERVIOUSNESS AND RUNOFF COEFFICIENT CALCULATIONS

CHARACTER OF SURFACE:	Runoff Coefficient ¹	Percentage Impervious ²	
<i>LMN Zoning</i>	0.55	60%	Project: Hansen Calculations By: F. Wegert Date: September 7, 2018
<i>MMN Zoning</i>	0.65	70%	
<i>NC Zoning</i>	0.95	90%	
<i>Streets, Parking Lots, Roofs, Alleys, and Drives:</i>			
Asphalt	0.95	100%	
Concrete	0.95	90%	
Gravel (packed)	0.50	40%	
Roofs.....	0.95	90%	
Pavers.....	0.40	22%	
<i>Lawns and Landscaping</i>			
Sandy Soil			2-year C _f = 1.00 10-year C _f = 1.00 100-year C _f = 1.25 Composite Runoff Coefficient with Adjustment
Flat <2%	0.10	0%	
Average 2% to 7%	0.15	0%	
Steep >7%	0.20	0%	
Clayey Soil			
Flat <2%	0.20	0%	
Average 2% to 7%	0.25	0%	
Steep >7%	0.35	0%	
USDA SOIL TYPE: C			

Sub-Basin ID	Sub-Basin Area (sq. ft.)	Sub-Basin Area (ac.)	Area of Asphalt (ac.)	Area of Roofs (ac.)	Area of SF Homes ³ (ac.)	Area of Landscaping 2% to 7% (ac)	Area of MMN (ac.)	Area of NC (ac.)	2-year Composite Runoff Coefficient	10-year Composite Runoff Coefficient	100-year Composite Runoff Coefficient	Composite % Imperv.
1A	454,134	10.43	0.36	0.00	1.70	6.57	1.80	0.00	0.43	0.43	0.54	27%
1B	21,514	0.49	0.01	0.00	0.20	0.29	0.00	0.00	0.48	0.48	0.59	29%
1C	16,870	0.39	0.14	0.00	0.21	0.03	0.00	0.00	0.79	0.79	0.99	73%
1D	42,294	0.97	0.36	0.00	0.53	0.08	0.00	0.00	0.80	0.80	1.00	74%
1E	57,948	1.33	0.20	0.00	0.65	0.49	0.00	0.00	0.61	0.61	0.76	47%
1F	355,462	8.16	1.31	0.00	3.88	2.96	0.00	0.00	0.61	0.61	0.77	48%
1G	98,794	2.27	0.70	0.41	0.00	1.16	0.00	0.00	0.59	0.59	0.74	47%
1H	116,600	2.68	1.12	0.91	0.00	0.65	0.00	0.00	0.78	0.78	0.98	72%
1I	413,297	9.49	1.67	0.26	3.31	4.26	0.00	0.00	0.58	0.58	0.72	44%
1J	31,582	0.73	0.30	0.00	0.18	0.25	0.00	0.00	0.67	0.67	0.83	58%
1K	14,337	0.33	0.15	0.00	0.15	0.03	0.00	0.00	0.80	0.80	1.00	75%
1L	25,957	0.60	0.01	0.00	0.20	0.38	0.00	0.00	0.44	0.44	0.55	25%
1M	117,764	2.70	0.50	0.00	1.41	0.79	0.00	0.00	0.65	0.65	0.82	54%
1N	120,273	2.76	0.52	0.00	1.47	0.78	0.00	0.00	0.66	0.66	0.82	55%
NE Rain Garden	494,088	11.34	2.02	0.00	5.47	3.85	0.00	0.00	0.63	0.63	0.78	50%

PROPOSED % IMPERVIOUSNESS AND RUNOFF COEFFICIENT CALCULATIONS

CHARACTER OF SURFACE:	Runoff Coefficient ¹	Percentage Impervious ²	
<i>LMN Zoning</i>	0.55	60%	Project: Hansen Calculations By: F. Wegert Date: September 7, 2018
<i>MMN Zoning</i>	0.65	70%	
<i>NC Zoning</i>	0.95	90%	
<i>Streets, Parking Lots, Roofs, Alleys, and Drives:</i>			
Asphalt	0.95	100%	
Concrete	0.95	90%	
Gravel (packed)	0.50	40%	
Roofs.....	0.95	90%	
Pavers.....	0.40	22%	
<i>Lawns and Landscaping</i>			
Sandy Soil			
Flat <2%	0.10	0%	
Average 2% to 7%	0.15	0%	
Steep >7%	0.20	0%	
Clayey Soil			
Flat <2%	0.20	0%	
Average 2% to 7%	0.25	0%	
Steep >7%	0.35	0%	
USDA SOIL TYPE: C			2-year C _f = 1.00 10-year C _f = 1.00 100-year C _f = 1.25 Composite Runoff Coefficient with Adjustment

Sub-Basin ID	Sub-Basin Area (sq. ft.)	Sub-Basin Area (ac.)	Area of Asphalt (ac.)	Area of Roofs (ac.)	Area of SF Homes ³ (ac.)	Area of Landscaping 2% to 7% (ac)	Area of MMN (ac.)	Area of NC (ac.)	2-year Composite Runoff Coefficient	10-year Composite Runoff Coefficient	100-year Composite Runoff Coefficient	Composite % Imperv.
NW Rain Garden	700,567	16.08	3.96	1.57	3.83	6.72	0.00	0.00	0.62	0.62	0.77	49%
Total Basin 1 (Pond 1)	1,886,826	43.32	7.35	1.57	13.88	18.71	1.80	0.00	0.58	0.58	0.72	45%
2A	122,608	2.81	0.11	0.00	0.00	2.70	0.00	0.00	0.28	0.28	0.35	4%
2B	43,016	0.99	0.16	0.00	0.79	0.04	0.00	0.00	0.78	0.78	0.98	70%
2C	18,802	0.43	0.14	0.00	0.21	0.08	0.00	0.00	0.73	0.73	0.92	65%
2D	26,807	0.62	0.52	0.00	0.00	0.10	0.00	0.00	0.84	0.84	1.00	84%
2E	9,086	0.21	0.17	0.00	0.00	0.04	0.00	0.00	0.81	0.81	1.00	81%
2F	11,382	0.26	0.21	0.00	0.00	0.05	0.00	0.00	0.82	0.82	1.00	82%
2G	59,274	1.36	0.15	0.00	0.00	0.07	1.15	0.00	0.66	0.66	0.83	70%
2H	268,814	6.17	0.00	0.00	0.00	0.00	6.17	0.00	0.65	0.65	0.81	70%
2I	53,058	1.22	1.12	0.00	0.00	0.10	0.00	0.00	0.89	0.89	1.00	92%
2J	19,834	0.46	0.36	0.00	0.00	0.10	0.00	0.00	0.80	0.80	1.00	79%
2K	75,924	1.74	0.38	0.00	0.00	0.10	1.26	0.00	0.69	0.69	0.87	72%
2L	160,432	3.68	0.53	0.00	0.00	3.15	0.00	0.00	0.35	0.35	0.44	14%

PROPOSED % IMPERVIOUSNESS AND RUNOFF COEFFICIENT CALCULATIONS

CHARACTER OF SURFACE:	Runoff Coefficient ¹	Percentage Impervious ²	
<i>LMN Zoning</i>	0.55	60%	Project: Hansen Calculations By: F. Wegert Date: September 7, 2018
<i>MMN Zoning</i>	0.65	70%	
<i>NC Zoning</i>	0.95	90%	
<i>Streets, Parking Lots, Roofs, Alleys, and Drives:</i>			
Asphalt	0.95	100%	
Concrete	0.95	90%	
Gravel (packed)	0.50	40%	
Roofs.....	0.95	90%	
Pavers.....	0.40	22%	
<i>Lawns and Landscaping</i>			
Sandy Soil			2-year C _f = 1.00 10-year C _f = 1.00 100-year C _f = 1.25 Composite Runoff Coefficient with Adjustment
Flat <2%	0.10	0%	
Average 2% to 7%	0.15	0%	
Steep >7%	0.20	0%	
Clayey Soil			
Flat <2%	0.20	0%	
Average 2% to 7%	0.25	0%	
Steep >7%	0.35	0%	
USDA SOIL TYPE: C			

Sub-Basin ID	Sub-Basin Area (sq. ft.)	Sub-Basin Area (ac.)	Area of Asphalt (ac.)	Area of Roofs (ac.)	Area of SF Homes ³ (ac.)	Area of Landscaping 2% to 7% (ac)	Area of MMN (ac.)	Area of NC (ac.)	2-year Composite Runoff Coefficient	10-year Composite Runoff Coefficient	100-year Composite Runoff Coefficient	Composite % Imperv.
Total Pond 2	290,974	6.68	1.45	0.00	1.00	3.07	1.15	0.00	0.55	0.55	0.69	44%
Total Pond 3	578,061	13.27	2.39	0.00	0.00	3.45	7.43	0.00	0.60	0.60	0.75	57%
Total Basin 2	869,035	19.95	3.85	0.00	1.00	6.52	10.38	0.00	0.64	0.64	0.80	59%
3A	134,634	3.09	0.88	0.00	0.00	0.15	0.00	2.06	0.95	0.95	1.00	88%
3B	14,456	0.33	0.29	0.00	0.00	0.04	0.00	0.00	1.95	1.95	1.00	88%
Total Basin 3 (Pond 4)	149,090	3.42	1.17	0.00	0.00	0.19	0.00	2.06	0.91	0.91	1.00	88%
4 (Pond 5)	134,860	3.10	0.10	0.00	0.00	0.02	0.00	2.98	0.95	0.95	1.00	90%
Total Development	3,039,811	69.8	12.5	1.6	14.9	25.4	12.2	5.0	0.63	0.63	0.79	53%

1) Runoff coefficients are taken from the Fort Collins Stormwater Criteria Manual, Table 3.2.1 and Table 3.2.2.

2) Runoff coefficients are taken from the Overall Drainage Report for Hansen Overall Development Plan prepared by Northern Engineering dated 8/29/2017.

3) Assume single-family residences are 3/4 roof & driveways (C = 0.95) and 1/4 lawn (C=0.25)

PROPOSED TIME OF CONCENTRATION COMPUTATIONS

Overland Flow, Time of Concentration:

$$T_i = \frac{1.87(1.1 - C * C_f) \sqrt{L}}{S^{1/3}}$$

Gutter/Swale Flow, Time of Concentration:

$$T_t = L / 60V$$

$$T_c = T_i + T_t \text{ (Equation RO-2)}$$

$$\text{Velocity (Gutter Flow), } V = 20 \cdot S^{1/2}$$

$$\text{Velocity (Swale Flow), } V = 15 \cdot S^{1/2}$$

} (Equation RO-4)

Project: Hansen
Calculations By: F. Wegert
Date: September 7, 2018

NOTE: C-value for overland flows over grassy surfaces; C = 0.25

Design Point	Sub-Basin	Overland Flow									Gutter Flow				Time of Concentration		
		Is Length > 500' ?	C*C _f (2-yr C _f =1.00)	C*C _f (10-yr C _f =1.00)	C*C _f (100-yr C _f =1.25)	Length, L (ft)	Slope, S (%)	T _i 2-yr (min)	T _i 10-yr (min)	T _i 100-yr (min)	Length, L (ft)	Slope, S (%)	Velocity, V (ft/s)	T _t (min)	2-yr T _c (min)	10-yr T _c (min)	100-yr T _c (min)
1a	1A	No	0.43	0.43	0.54	81	1.06%	11.1	11.1	9.3	730	1.06%	2.06	5.9	17.0	17.0	15.2
1b	1B	No	0.48	0.48	0.59	74	2.30%	7.6	7.6	6.2	205	0.88%	1.87	1.8	9.4	9.4	8.0
1c	1C	No	0.79	0.79	0.99	53	2.70%	3.0	3.0	1.1	260	0.59%	1.54	2.8	5.8	5.8	5.0
1d	1D	No	0.80	0.80	1.00	55	2.62%	3.1	3.1	1.1	573	0.66%	1.63	5.9	8.9	8.9	6.9
1e	1E	No	0.61	0.61	0.76	231	2.32%	10.6	10.6	7.3	245	0.79%	1.78	2.3	12.9	12.9	9.6
1f	1F	No	0.61	0.61	0.77	186	3.28%	8.4	8.4	5.7	1579	0.68%	1.65	16.0	24.3	24.3	21.7
1g	1G	No	0.59	0.59	0.74	80	3.16%	5.8	5.8	4.1	870	0.88%	1.87	7.7	13.5	13.5	11.8
1h	1H	No	0.78	0.78	0.98	81	2.38%	4.0	4.0	1.6	805	0.90%	1.89	7.1	11.1	11.1	8.6
1i	1I	No	0.58	0.58	0.72	186	3.28%	9.0	9.0	6.5	1417	0.63%	1.59	14.8	23.8	23.8	21.4
1j	1J	No	0.67	0.67	0.83	47	15.83%	2.2	2.2	1.4	280	0.77%	1.76	2.7	5.0	5.0	5.0
1k	1K	No	0.80	0.80	1.00	67	3.28%	3.1	3.1	1.1	206	0.67%	1.63	2.1	5.2	5.2	5.0
1l	1L	No	0.44	0.44	0.55	65	5.98%	5.5	5.5	4.5	160	0.15%	0.77	3.4	8.9	8.9	8.0
1m	1M	No	0.65	0.65	0.82	47	15.83%	2.3	2.3	1.4	446	0.95%	1.95	3.8	6.1	6.1	5.3
1n	1N	No	0.66	0.66	0.82	180	2.46%	8.2	8.2	5.1	454	0.66%	1.63	4.6	12.8	12.8	9.8
1a	Basin 1	No	0.58	0.58	0.72	186	3.28%	8.9	8.9	6.5	1579	0.68%	1.65	16.0	24.9	24.9	22.4
2a	2A	No	0.28	0.28	0.35	109	2.40%	12.0	12.0	11.0	545	2.11%	2.90	3.1	15.1	15.1	14.1
2b	2B	No	0.78	0.78	0.98	33	8.30%	1.7	1.7	0.6	288	0.68%	1.65	2.9	5.0	5.0	5.0
2c	2C	No	0.73	0.73	0.92	53	2.70%	3.6	3.6	1.8	252	0.77%	1.76	2.4	6.0	6.0	5.0
2d	2D	No	0.84	0.84	1.00	42	1.19%	3.0	3.0	1.1	346	1.05%	2.05	2.8	5.8	5.8	5.0
2e	2E	No	0.81	0.81	1.00	12	5.75%	1.0	1.0	0.4	186	0.46%	1.35	2.3	5.0	5.0	5.0
2f	2F	No	0.82	0.82	1.00	19	2.11%	1.8	1.8	0.6	196	0.50%	1.41	2.3	5.0	5.0	5.0
2g	2G	No	0.66	0.66	0.83	200	0.82%	12.4	12.4	7.7	255	0.46%	1.36	3.1	15.5	15.5	10.8
2h	2H	No	0.65	0.65	0.81	150	3.19%	7.0	7.0	4.5	389	2.20%	2.97	2.2	9.2	9.2	6.7
2i	2I	No	0.89	0.89	1.00	55	2.00%	2.3	2.3	1.1	425	0.64%	1.61	4.4	6.7	6.7	5.5

PROPOSED TIME OF CONCENTRATION COMPUTATIONS

Overland Flow, Time of Concentration:

$$T_i = \frac{1.87(1.1 - C * C_f) \sqrt{L}}{S^{1/3}}$$

Gutter/Swale Flow, Time of Concentration:

$$T_t = L / 60V$$

$$T_c = T_i + T_t \text{ (Equation RO-2)}$$

$$\text{Velocity (Gutter Flow), } V = 20 \cdot S^{1/2}$$

$$\text{Velocity (Swale Flow), } V = 15 \cdot S^{1/2}$$

} (Equation RO-4)

Project: Hansen
Calculations By: F. Wegert
Date: September 7, 2018

NOTE: C-value for overland flows over grassy surfaces; C = 0.25

Design Point	Sub-Basin	Overland Flow									Gutter Flow				Time of Concentration		
		Is Length > 500' ?	C*C _f (2-yr C _f =1.00)	C*C _f (10-yr C _f =1.00)	C*C _f (100-yr C _f =1.25)	Length, L (ft)	Slope, S (%)	T _i 2-yr (min)	T _i 10-yr (min)	T _i 100-yr (min)	Length, L (ft)	Slope, S (%)	Velocity, V (ft/s)	T _t (min)	2-yr T _c (min)	10-yr T _c (min)	100-yr T _c (min)
2j	2J	No	0.80	0.80	1.00	41	2.61%	2.6	2.6	0.9	430	1.54%	2.48	2.9	5.5	5.5	5.0
2k	2K	No	0.69	0.69	0.87	175	1.06%	9.9	9.9	5.7	219	0.69%	1.67	2.2	12.1	12.1	7.9
2l	2L	No	0.35	0.35	0.44	178	2.49%	13.8	13.8	12.2	530	0.53%	1.46	6.1	19.8	19.8	18.2
pond 2a	Pond 2A	No	0.66	0.55	0.69	200.00	0.82%	12.4	15.5	11.7	255.00	0.46%	1.36	3.1	15.5	18.7	14.8
pond 2b	Pond 2B	No	0.35	0.60	0.75	178	2.49%	13.8	9.2	6.4	530	0.53%	1.46	6.1	19.8	15.3	12.5
2a	Basin 2	No	0.64	0.64	0.80	178	2.49%	8.4	8.4	5.5	530	0.53%	1.46	6.1	14.5	14.5	11.5
3a	3A	No	0.95	0.95	1.00	175	2.00%	2.9	2.9	2.0	200	4.20%	4.10	0.8	5.0	5.0	5.0
3b	3B	No	1.95	1.95	1.00	41	2.61%	-7.4	-7.4	0.9	271	2.08%	2.88	1.6	5.0	5.0	5.0
3a	Basin 3	No	0.91	0.91	1.00	200	2.30%	3.8	3.8	2.0	231	1.79%	2.67	1.4	5.2	5.2	5.0
4	Basin 4	No	0.95	0.95	1.00	200	1.00%	4.0	4.0	2.6	485	2.27%	3.01	2.7	6.7	6.7	5.3

PROPOSED RUNOFF COMPUTATIONS

Rational Method Equation:

$$Q = C_f (C)(i)(A)$$

Project: Hansen
Calculations By: F. Wegert
Date: September 7, 2018

Rainfall Intensity:

Rainfall Intensity taken from the Fort Collins Stormwater Criteria Manual (FCSCM), Tables RA-7 and RA-8

Design Point	Sub-Basin(s)	Area, A (acres)	2-yr T _c (min)	10-yr T _c (min)	100-yr T _c (min)	C ₂	C ₁₀	C ₁₀₀	Intensity, i ₂ (in/hr)	Intensity, i ₁₀ (in/hr)	Intensity, i ₁₀₀ (in/hr)	Flow, Q ₂ (cfs)	Flow, Q ₁₀ (cfs)	Flow, Q ₁₀₀ (cfs)
1a	1A	10.43	17	17	15	0.43	0.43	0.54	1.78	3.04	6.52	7.96	13.57	36.43
1b	1B	0.49	9	9	8	0.48	0.48	0.59	2.30	3.93	8.59	0.54	0.92	2.52
1c	1C	0.39	6	6	5	0.79	0.79	0.99	2.76	4.72	9.95	0.85	1.45	3.81
1d	1D	0.97	9	9	7	0.80	0.80	1.00	2.35	4.02	9.06	1.82	3.10	8.75
1e	1E	1.33	13	13	10	0.61	0.61	0.76	2.02	3.45	7.88	1.63	2.79	7.96
1f	1F	8.16	24	24	22	0.61	0.61	0.77	1.46	2.49	5.39	7.30	12.44	33.67
1g	1G	2.27	14	14	12	0.59	0.59	0.74	1.95	3.34	7.29	2.62	4.49	12.25
1h	1H	2.68	11	11	9	0.78	0.78	0.98	2.13	3.63	8.21	4.45	7.59	21.44
1i	1I	9.49	24	24	21	0.58	0.58	0.72	1.48	2.52	5.46	8.05	13.75	37.24
1j	1J	0.73	5	5	5	0.67	0.67	0.83	2.85	4.87	9.95	1.38	2.36	6.02
1k	1K	0.33	5	5	5	0.80	0.80	1.00	2.85	4.87	9.95	0.75	1.28	3.27
1l	1L	0.60	9	9	8	0.44	0.44	0.55	2.35	4.02	8.59	0.62	1.06	2.84
1m	1M	2.70	6	6	5	0.65	0.65	0.82	2.67	4.56	9.95	4.72	8.06	21.98
1n	1N	2.76	13	13	10	0.66	0.66	0.82	2.02	3.45	7.88	3.67	6.28	17.94
1a	Basin 1	43.32	25	25	22	0.58	0.58	0.72	1.45	2.47	5.32	36.24	61.83	166.80
2a	2A	2.81	15	15	14	0.28	0.28	0.35	1.87	3.19	6.71	1.46	2.49	6.55
2b	2B	0.99	5	5	5	0.78	0.78	0.98	2.85	4.87	9.95	2.20	3.77	9.62
2c	2C	0.43	6	6	5	0.73	0.73	0.92	2.76	4.72	9.95	0.87	1.49	3.94
2d	2D	0.62	6	6	5	0.84	0.84	1.00	2.76	4.72	9.95	1.43	2.44	6.12
2e	2E	0.21	5	5	5	0.81	0.81	1.00	2.85	4.87	9.95	0.48	0.83	2.08
2f	2F	0.26	5	5	5	0.82	0.82	1.00	2.85	4.87	9.95	0.61	1.05	2.60
2g	2G	1.36	15	15	11	0.66	0.66	0.83	1.87	3.19	7.57	1.69	2.88	8.53
2h	2H	6.17	9	9	7	0.65	0.65	0.81	2.30	3.93	9.06	9.23	15.76	45.40
2i	2I	1.22	7	7	6	0.89	0.89	1.00	2.60	4.44	9.63	2.82	4.83	11.73
2j	2J	0.46	5	5	5	0.80	0.80	1.00	2.85	4.87	9.95	1.04	1.78	4.53
2k	2K	1.74	12	12	8	0.69	0.69	0.87	2.05	3.50	8.59	2.47	4.23	12.96
2l	2L	3.68	20	20	18	0.35	0.35	0.44	1.63	2.78	5.92	2.11	3.59	9.56
pond 2a	Pond 2A	6.68	15	19	15	0.55	0.55	0.69	1.87	2.86	6.62	6.87	10.51	30.39
pond 2b	Pond 2B	13.27	20	15	12	0.60	0.60	0.75	1.63	3.19	7.16	12.98	25.41	71.28

PROPOSED RUNOFF COMPUTATIONS

Rational Method Equation:

$$Q = C_f (C)(i)(A)$$

Project: Hansen
Calculations By: F. Wegert
Date: September 7, 2018

Rainfall Intensity:

Rainfall Intensity taken from the Fort Collins Stormwater Criteria Manual (FCSCM), Tables RA-7 and RA-8

Design Point	Sub-Basin(s)	Area, A (acres)	2-yr T _c (min)	10-yr T _c (min)	100-yr T _c (min)	C ₂	C ₁₀	C ₁₀₀	Intensity, i ₂ (in/hr)	Intensity, i ₁₀ (in/hr)	Intensity, i ₁₀₀ (in/hr)	Flow, Q ₂ (cfs)	Flow, Q ₁₀ (cfs)	Flow, Q ₁₀₀ (cfs)
2a	Basin 2	19.95	14	14	12	0.64	0.64	0.80	1.92	3.29	7.29	24.60	42.15	116.74
3a	3A	3.09	5	5	5	0.95	0.95	1.00	2.85	4.87	9.95	8.37	14.30	30.75
3b	3B	0.33	5	5	5	1.95	1.95	1.00	2.85	4.87	9.95	1.84	3.15	3.30
3a	Basin 3	3.42	5	5	5	0.91	0.91	1.00	2.85	4.87	9.95	8.89	15.19	34.06
4	Basin 4	3.10	7	7	5	0.95	0.95	1.00	2.60	4.44	9.95	7.63	13.04	30.80

APPENDIX B

USDA SOILS REPORT

Custom Soil Resource Report for Larimer County Area, Colorado



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map


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

Custom Soil Resource Report Soil Map



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Larimer County Area, Colorado
 Survey Area Data: Version 11, Sep 23, 2016

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

Date(s) aerial images were photographed: Mar 20, 2015—Oct 15, 2016

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

Map Unit Legend

Larimer County Area, Colorado (CO644)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Aquepts, loamy	15.4	8.8%
22	Caruso clay loam, 0 to 1 percent slope	4.0	2.3%
34	Fort Collins loam, 0 to 1 percent slopes	1.9	1.1%
35	Fort Collins loam, 0 to 3 percent slopes	8.6	4.9%
36	Fort Collins loam, 3 to 5 percent slopes	30.9	17.6%
37	Fort Collins loam, 5 to 9 percent slopes	1.1	0.6%
55	Kim loam, 5 to 9 percent slopes	4.4	2.5%
63	Longmont clay, 0 to 3 percent slopes	6.6	3.8%
73	Nunn clay loam, 0 to 1 percent slopes	23.5	13.4%
74	Nunn clay loam, 1 to 3 percent slopes	67.6	38.5%
76	Nunn clay loam, wet, 1 to 3 percent slopes	3.8	2.2%
79	Otero sandy loam, 5 to 9 percent slopes	7.7	4.4%
Totals for Area of Interest		175.6	100.0%

Map Unit Descriptions

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

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

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

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

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

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

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

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

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

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

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion

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of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

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

Larimer County Area, Colorado

5—Aquepts, loamy

Map Unit Setting

National map unit symbol: jpws
Elevation: 4,500 to 6,700 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 39 to 50 degrees F
Frost-free period: 80 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Aquepts and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aquepts

Setting

Landform: Depressions, draws, stream terraces
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium

Typical profile

H1 - 0 to 60 inches: variable

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.60 to 99.90 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: Rare
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Minor Components

Fort collins

Percent of map unit: 5 percent
Hydric soil rating: No

Nunn

Percent of map unit: 5 percent
Hydric soil rating: No

Stoneham

Percent of map unit: 5 percent
Hydric soil rating: No

Kim

Percent of map unit: 5 percent
Hydric soil rating: No

22—Caruso clay loam, 0 to 1 percent slope

Map Unit Setting

National map unit symbol: jpv
Elevation: 4,800 to 5,500 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 135 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Caruso and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caruso

Setting

Landform: Flood-plain steps, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 35 inches: clay loam
H2 - 35 to 44 inches: fine sandy loam, sandy loam
H2 - 35 to 44 inches: sand, gravelly sand
H3 - 44 to 60 inches:
H3 - 44 to 60 inches:

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent

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

Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 3w

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Loveland

Percent of map unit: 9 percent

Landform: Terraces

Hydric soil rating: Yes

Fluvaquents

Percent of map unit: 6 percent

Landform: Terraces

Hydric soil rating: Yes

34—Fort Collins loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: jpw7

Elevation: 4,800 to 5,500 feet

Mean annual precipitation: 13 to 15 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 135 to 150 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Fort collins and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fort Collins

Setting

Landform: Terraces, fans

Landform position (three-dimensional): Base slope, tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

H1 - 0 to 8 inches: loam

H2 - 8 to 18 inches: loam, clay loam

H2 - 8 to 18 inches: loam, silt loam, fine sandy loam

H3 - 18 to 60 inches:

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H3 - 18 to 60 inches:

H3 - 18 to 60 inches:

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

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

Available water storage in profile: Very high (about 26.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 3c

Hydrologic Soil Group: B

Ecological site: Loamy Plains (R067XY002CO)

Hydric soil rating: No

Minor Components

Stoneham

Percent of map unit: 6 percent

Hydric soil rating: No

Larim

Percent of map unit: 5 percent

Hydric soil rating: No

Ascalon

Percent of map unit: 4 percent

Hydric soil rating: No

35—Fort Collins loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tlnc

Elevation: 4,020 to 6,730 feet

Mean annual precipitation: 14 to 16 inches

Mean annual air temperature: 46 to 48 degrees F

Frost-free period: 143 to 154 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Fort collins and similar soils: 85 percent

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Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fort Collins

Setting

Landform: Interfluves

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Pleistocene or older alluvium derived from igneous, metamorphic and sedimentary rock and/or eolian deposits

Typical profile

Ap - 0 to 4 inches: loam

Bt1 - 4 to 9 inches: clay loam

Bt2 - 9 to 16 inches: clay loam

Bk1 - 16 to 29 inches: loam

Bk2 - 29 to 80 inches: loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 12 percent

Salinity, maximum in profile: Nonsaline (0.1 to 1.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 0.5

Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 4c

Hydrologic Soil Group: C

Ecological site: Loamy Plains (R067BY002CO)

Hydric soil rating: No

Minor Components

Nunn

Percent of map unit: 10 percent

Landform: Terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Loamy Plains (R067BY002CO)

Hydric soil rating: No

Vona

Percent of map unit: 5 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope, base slope

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Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sandy Plains (R067BY024CO)
Hydric soil rating: No

36—Fort Collins loam, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: jpw9
Elevation: 4,800 to 5,500 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 135 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Fort collins and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fort Collins

Setting

Landform: Terraces, fans
Landform position (three-dimensional): Base slope, riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 9 inches: loam
H2 - 9 to 20 inches: loam, clay loam
H2 - 9 to 20 inches: loam, silt loam, fine sandy loam
H3 - 20 to 60 inches:
H3 - 20 to 60 inches:
H3 - 20 to 60 inches:

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

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Available water storage in profile: Very high (about 25.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Ecological site: Loamy Plains (R067XY002CO)

Hydric soil rating: No

Minor Components

Ascalon

Percent of map unit: 5 percent

Hydric soil rating: No

Kim

Percent of map unit: 3 percent

Hydric soil rating: No

Stoneham

Percent of map unit: 2 percent

Hydric soil rating: No

37—Fort Collins loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: jpw b

Elevation: 4,800 to 5,500 feet

Mean annual precipitation: 13 to 15 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 135 to 150 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Fort collins and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fort Collins

Setting

Landform: Terraces, fans

Landform position (three-dimensional): Base slope, riser

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

H1 - 0 to 6 inches: loam

H2 - 6 to 18 inches: loam, clay loam

H2 - 6 to 18 inches: loam, silt loam, fine sandy loam

H3 - 18 to 60 inches:

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H3 - 18 to 60 inches:

H3 - 18 to 60 inches:

Properties and qualities

Slope: 5 to 9 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

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

Available water storage in profile: Very high (about 26.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Ecological site: Loamy Plains (R067XY002CO)

Hydric soil rating: No

Minor Components

Larimer

Percent of map unit: 8 percent

Hydric soil rating: No

Kim

Percent of map unit: 4 percent

Hydric soil rating: No

Stoneham

Percent of map unit: 3 percent

Hydric soil rating: No

55—Kim loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: jpwz

Elevation: 4,800 to 5,600 feet

Mean annual precipitation: 13 to 15 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 135 to 150 days

Farmland classification: Farmland of local importance

Map Unit Composition

Kim and similar soils: 85 percent

Custom Soil Resource Report

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kim

Setting

Landform: Fans

Landform position (three-dimensional): Base slope, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Mixed alluvium

Typical profile

H1 - 0 to 7 inches: loam

H2 - 7 to 60 inches: loam, clay loam, sandy clay loam

H2 - 7 to 60 inches:

H2 - 7 to 60 inches:

Properties and qualities

Slope: 5 to 9 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Available water storage in profile: Very high (about 26.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: B

Ecological site: Loamy Plains (R067XY002CO)

Hydric soil rating: No

Minor Components

Thedalund

Percent of map unit: 10 percent

Hydric soil rating: No

Stoneham

Percent of map unit: 5 percent

Hydric soil rating: No

63—Longmont clay, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: jpx8

Elevation: 4,800 to 5,800 feet

Mean annual precipitation: 13 to 15 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 135 to 150 days

Farmland classification: Prime farmland if irrigated and reclaimed of excess salts and sodium

Map Unit Composition

Longmont and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Longmont

Setting

Landform: Flood plains, valleys

Landform position (three-dimensional): Base slope, tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Clayey alluvium derived from shale

Typical profile

H1 - 0 to 60 inches: clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Poorly drained

Runoff class: High

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

Depth to water table: About 24 to 30 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Gypsum, maximum in profile: 5 percent

Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 20.0

Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6w

Hydrologic Soil Group: D

Ecological site: Salt Meadow (R067BY035CO)

Hydric soil rating: No

Minor Components

Dacono

Percent of map unit: 5 percent

Hydric soil rating: No

Aquolls

Percent of map unit: 5 percent

Landform: Swales

Hydric soil rating: Yes

Heldt

Percent of map unit: 5 percent

Hydric soil rating: No

73—Nunn clay loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2t1ng

Elevation: 4,100 to 5,700 feet

Mean annual precipitation: 14 to 15 inches

Mean annual air temperature: 48 to 52 degrees F

Frost-free period: 135 to 152 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Nunn and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nunn

Setting

Landform: Terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Pleistocene aged alluvium and/or eolian deposits

Typical profile

Ap - 0 to 6 inches: clay loam

Bt1 - 6 to 10 inches: clay loam

Bt2 - 10 to 26 inches: clay loam

Btk - 26 to 31 inches: clay loam

Bk1 - 31 to 47 inches: loam

Bk2 - 47 to 80 inches: loam

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Custom Soil Resource Report

Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 7 percent
Salinity, maximum in profile: Nonsaline (0.1 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 0.5
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Clayey Plains (R067BY042CO)
Hydric soil rating: No

Minor Components

Heldt

Percent of map unit: 10 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey Plains (R067BY042CO)
Hydric soil rating: No

Wages

Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Plains (R067BY002CO)
Hydric soil rating: No

74—Nunn clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tlpl
Elevation: 3,900 to 5,840 feet
Mean annual precipitation: 13 to 17 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Nunn and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nunn

Setting

Landform: Terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Pleistocene aged alluvium and/or eolian deposits

Typical profile

Ap - 0 to 9 inches: clay loam

Bt - 9 to 13 inches: clay loam

Btk - 13 to 25 inches: clay loam

Bk1 - 25 to 38 inches: clay loam

Bk2 - 38 to 80 inches: clay loam

Properties and qualities

Slope: 1 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

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

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 7 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 0.5

Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: Clayey Plains (R067BY042CO)

Hydric soil rating: No

Minor Components

Heldt

Percent of map unit: 10 percent

Landform: Terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Clayey Plains (R067BY042CO)

Hydric soil rating: No

Satanta

Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy Plains (R067BY002CO)
Hydric soil rating: No

76—Nunn clay loam, wet, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: jpxq
Elevation: 4,800 to 5,600 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 135 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Nunn, wet, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nunn, Wet

Setting

Landform: Alluvial fans, stream terraces
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 10 inches: clay loam
H2 - 10 to 47 inches: clay loam, clay
H2 - 10 to 47 inches: clay loam, loam, gravelly sandy loam
H3 - 47 to 60 inches:
H3 - 47 to 60 inches:
H3 - 47 to 60 inches:

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: Rare

Custom Soil Resource Report

Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very high (about 19.8 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Heldt

Percent of map unit: 6 percent
Hydric soil rating: No

Dacono

Percent of map unit: 3 percent
Hydric soil rating: No

Mollic halaquepts

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

79—Otero sandy loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: jpxt
Elevation: 4,800 to 5,600 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 135 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Otero and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Otero

Setting

Landform: Fans
Landform position (three-dimensional): Base slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or eolian deposits

Custom Soil Resource Report

Typical profile

H1 - 0 to 14 inches: sandy loam

H2 - 14 to 60 inches: sandy loam, fine sandy loam, loamy very fine sand

H2 - 14 to 60 inches:

H2 - 14 to 60 inches:

Properties and qualities

Slope: 5 to 9 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Somewhat excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 5 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Available water storage in profile: Very high (about 15.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: A

Ecological site: Sandy Plains (R067BY024CO)

Hydric soil rating: No

Minor Components

Kim

Percent of map unit: 9 percent

Hydric soil rating: No

Nelson

Percent of map unit: 6 percent

Hydric soil rating: No

Tassel

Percent of map unit: 5 percent

Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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.

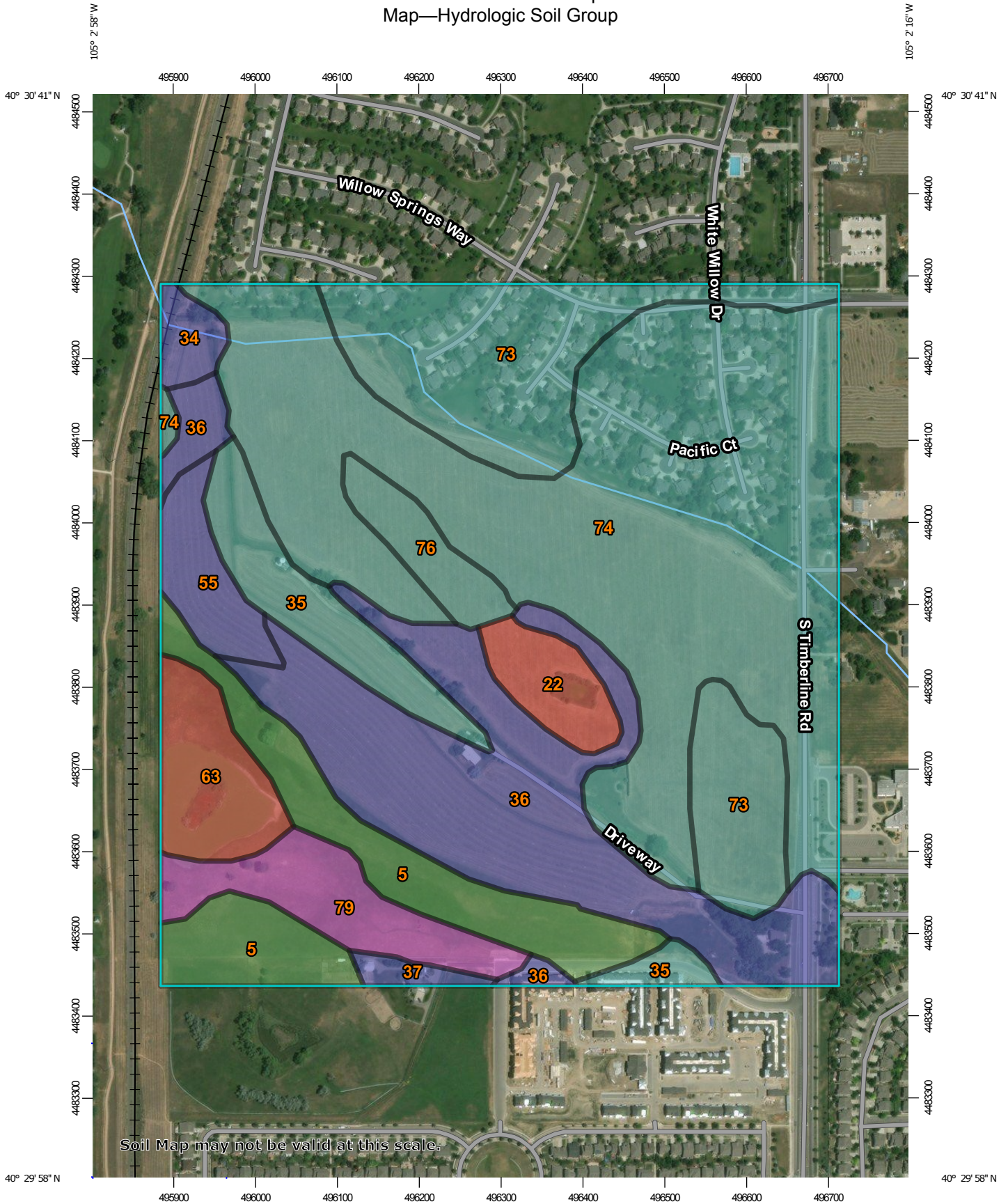
Custom Soil Resource Report

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.

Custom Soil Resource Report Map—Hydrologic Soil Group



Soil Map may not be valid at this scale.

Map Scale: 1:6,420 if printed on A portrait (8.5" x 11") sheet.

0 50 100 200 300 Meters


0 300 600 1200 1800 Feet

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



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines


-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points






-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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: Larimer County Area, Colorado
 Survey Area Data: Version 11, Sep 23, 2016

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

Date(s) aerial images were photographed: Mar 20, 2015—Oct 15, 2016

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.

Table—Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Larimer County Area, Colorado (CO644)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
5	Aquepts, loamy	A/D	15.4	8.8%
22	Caruso clay loam, 0 to 1 percent slope	D	4.0	2.3%
34	Fort Collins loam, 0 to 1 percent slopes	B	1.9	1.1%
35	Fort Collins loam, 0 to 3 percent slopes	C	8.6	4.9%
36	Fort Collins loam, 3 to 5 percent slopes	B	30.9	17.6%
37	Fort Collins loam, 5 to 9 percent slopes	B	1.1	0.6%
55	Kim loam, 5 to 9 percent slopes	B	4.4	2.5%
63	Longmont clay, 0 to 3 percent slopes	D	6.6	3.8%
73	Nunn clay loam, 0 to 1 percent slopes	C	23.5	13.4%
74	Nunn clay loam, 1 to 3 percent slopes	C	67.6	38.5%
76	Nunn clay loam, wet, 1 to 3 percent slopes	C	3.8	2.2%
79	Otero sandy loam, 5 to 9 percent slopes	A	7.7	4.4%
Totals for Area of Interest			175.6	100.0%

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

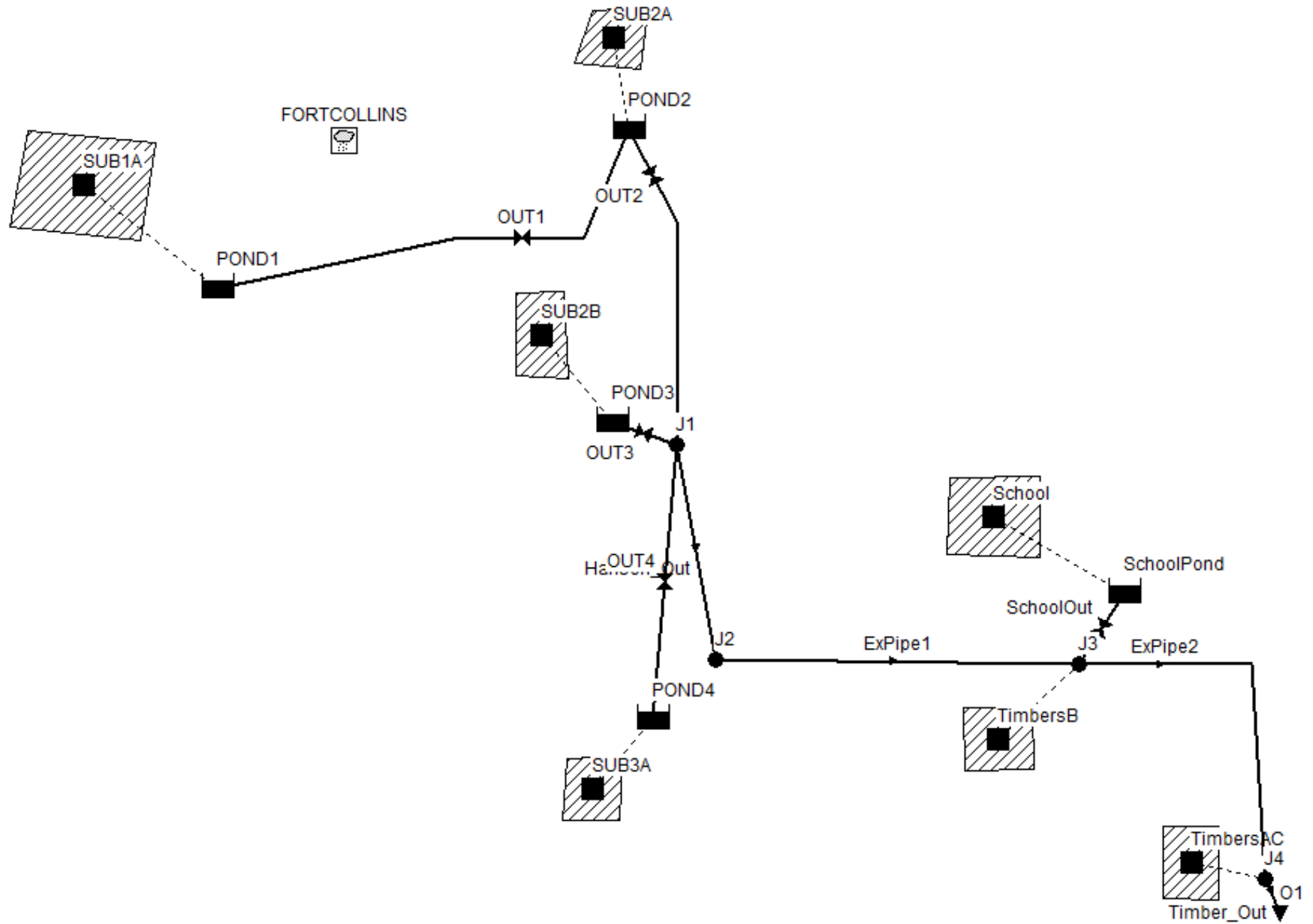
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX C

SWMM Modeling; Detention Computations



EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

 Analysis Options

Flow Units CFS
 Process Models:
 Rainfall/Runoff YES
 RDII NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method KINWAVE
 Starting Date 03/15/2016 00:00:00
 Ending Date 03/20/2016 06:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:05:00
 Wet Time Step 00:05:00
 Dry Time Step 00:30:00
 Routing Time Step 15.00 sec

*****	Volume	Depth
Runoff Quantity Continuity	acre-feet	inches
*****	-----	-----
Total Precipitation	30.879	3.669
Evaporation Loss	0.000	0.000
Infiltration Loss	6.611	0.786
Surface Runoff	24.030	2.855
Final Storage	0.418	0.050
Continuity Error (%)	-0.586	

*****	Volume	Volume
Flow Routing Continuity	acre-feet	10 ⁶ gal
*****	-----	-----
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	24.030	7.831
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000

Hansen PDP 100-yr.rpt

```

External Outflow .....      24.944      8.128
Flooding Loss .....         0.000      0.000
Evaporation Loss .....      0.000      0.000
Exfiltration Loss .....     0.000      0.000
Initial Stored Volume ....   0.931      0.303
Final Stored Volume .....   0.000      0.000
Continuity Error (%) .....  0.071
  
```

Highest Flow Instability Indexes

Link SchoolOut (3)
Link ExPipe2 (1)

Routing Time Step Summary

```

Minimum Time Step      : 15.00 sec
Average Time Step      : 15.00 sec
Maximum Time Step     : 15.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.01
Percent Not Converging : 0.00
  
```

Subcatchment Runoff Summary

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10 ⁶ gal	Peak Runoff CFS	Runoff Coeff
SUB1A	3.67	0.00	0.00	0.84	2.80	3.29	225.92	0.763
SUB2A	3.67	0.00	0.00	0.79	2.87	0.52	53.94	0.781
SUB2B	3.67	0.00	0.00	0.62	3.02	1.09	93.77	0.823
SUB3A	3.67	0.00	0.00	0.16	3.45	0.32	31.11	0.940
TimbersAC	3.67	0.00	0.00	0.76	2.87	1.05	70.18	0.783
School	3.67	0.00	0.00	1.01	2.64	0.85	62.46	0.718
TimbersB	3.67	0.00	0.00	0.73	2.91	0.72	56.97	0.794

Node Depth Summary

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
------	------	--------------------------	--------------------------	------------------------	--	-------------------------------

Hansen PDP 100-yr.rpt

Node	Type	Inflow	Outflow	Volume	Time	Balance
J1	JUNCTION	0.22	0.79	51.99	0 01:44	0.79
J2	JUNCTION	0.24	0.85	48.98	0 01:45	0.85
J4	JUNCTION	0.28	3.25	42.50	0 00:41	3.14
J3	JUNCTION	0.27	2.20	44.85	0 00:40	2.17
O1	OUTFALL	0.28	3.25	42.36	0 00:41	3.14
POND1	STORAGE	1.37	4.11	58.71	0 02:35	4.11
POND2	STORAGE	3.42	6.34	59.34	0 02:25	6.34
POND3	STORAGE	0.44	6.26	59.76	0 01:30	6.26
POND4	STORAGE	1.29	5.57	60.57	0 02:21	5.57
SchoolPond	STORAGE	0.08	5.78	49.53	0 01:04	5.78

Node Inflow Summary

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
J1	JUNCTION	0.00	13.58	0 01:44	0	5.52	0.000
J2	JUNCTION	0.00	13.58	0 01:45	0	5.52	0.000
J4	JUNCTION	70.18	137.20	0 00:41	1.05	8.13	0.000
J3	JUNCTION	56.97	71.67	0 00:40	0.716	7.08	0.000
O1	OUTFALL	0.00	137.18	0 00:41	0	8.13	0.000
POND1	STORAGE	225.92	225.92	0 00:40	3.29	3.48	0.003
POND2	STORAGE	53.94	55.54	0 00:40	0.52	4.06	0.003
POND3	STORAGE	93.77	93.77	0 00:40	1.09	1.13	0.041
POND4	STORAGE	31.11	31.11	0 00:40	0.32	0.333	0.006
SchoolPond	STORAGE	62.46	62.46	0 00:40	0.847	0.847	0.019

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
POND1	96.761	15	0	0	435.893	69	0 02:35	3.08
POND2	24.445	24	0	0	76.661	74	0 02:25	3.38

Hansen PDP 100-yr.rpt

POND3	3.187	3	0	0	97.168	99	0	01:30	9.92
POND4	6.352	13	0	0	41.078	86	0	02:21	0.46
SchoolPond	0.475	0	0	0	44.858	36	0	01:04	17.10

 Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
01	95.21	2.52	137.18	8.128
System	95.21	2.52	137.18	8.128

 Link Flow Summary

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Veloc ft/sec	Max/ Full Flow	Max/ Full Depth
Hansen_Out	CONDUIT	13.58	0 01:45	9.14	0.15	0.26
Timber_Out	CONDUIT	137.18	0 00:41	10.14	0.76	0.65
ExpPipe1	CONDUIT	13.58	0 01:47	6.11	0.06	0.17
ExpPipe2	CONDUIT	70.20	0 00:42	8.58	0.39	0.44
OUT1	DUMMY	3.08	0 02:35			
OUT2	DUMMY	3.38	0 02:25			
OUT3	DUMMY	9.92	0 01:30			
OUT4	DUMMY	0.46	0 02:21			
SchoolOut	DUMMY	17.10	0 00:52			

 Conduit Surcharge Summary

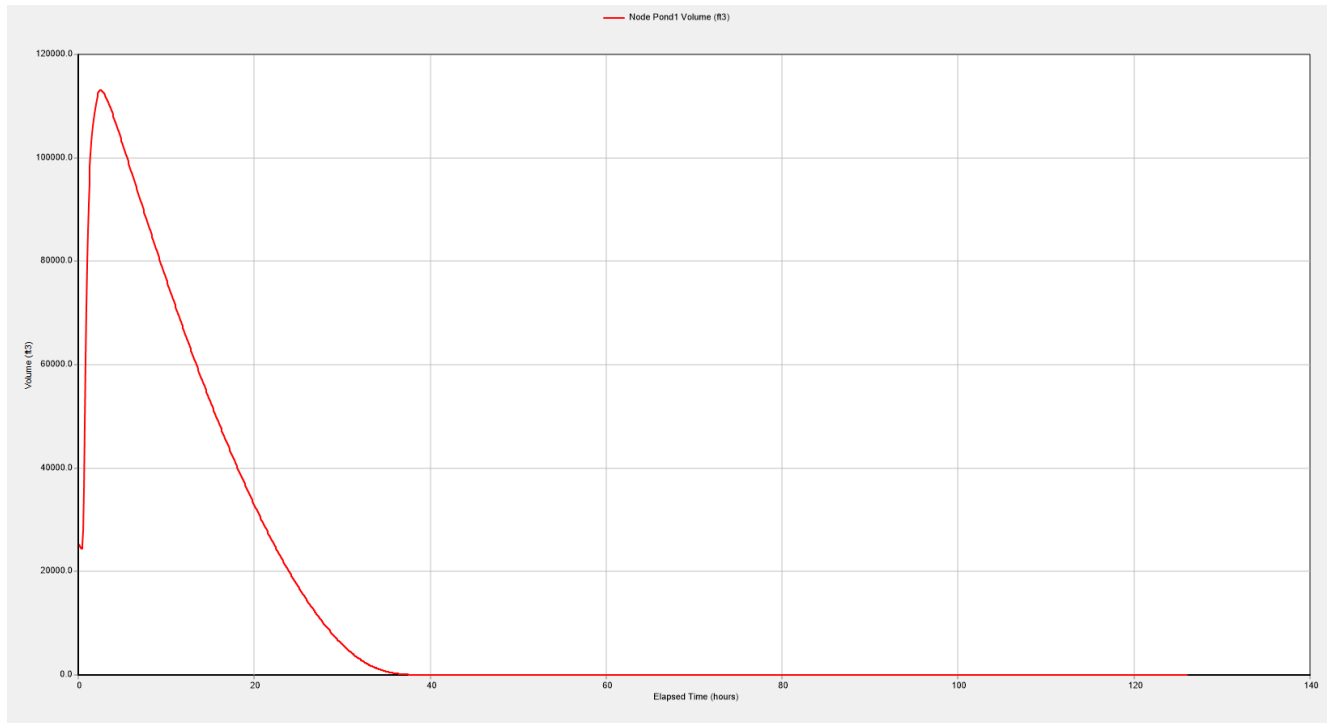
No conduits were surcharged.

Analysis begun on: Thu Sep 06 10:29:40 2018
 Analysis ended on: Thu Sep 06 10:29:40 2018
 Total elapsed time: < 1 sec

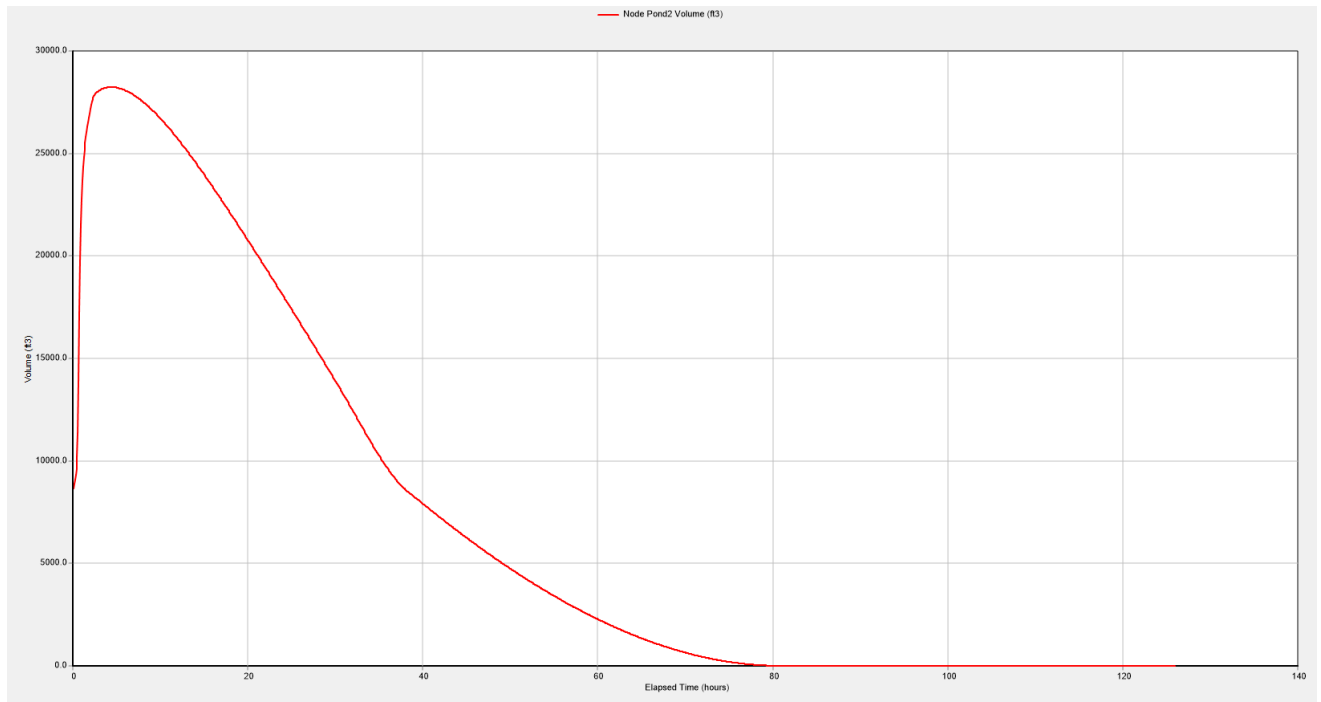
SWMM Detention Summary (5-YR)			
Project:	911-015		
Date:	9/7/2018		
By:	FSW		
Pond ID	Pond Volume (CF)	Pond Volume (AC-FT)	Peak Release (CFS)
1	113,059	2.60	1.67
2	28,238	0.65	1.63
3	27,605	0.63	3.99
4	14,242	0.33	0.25

SWMM Detention Summary (100-YR)			
Project:	911-015		
Date:	9/7/2018		
By:	FSW		
Pond ID	Pond Volume (CF)	Pond Volume (AC-FT)	Peak Release (CFS)
1	435,893	10.01	3.08
2	76,661	1.76	3.38
3	97,168	2.23	9.92
4	41,078	0.94	0.46

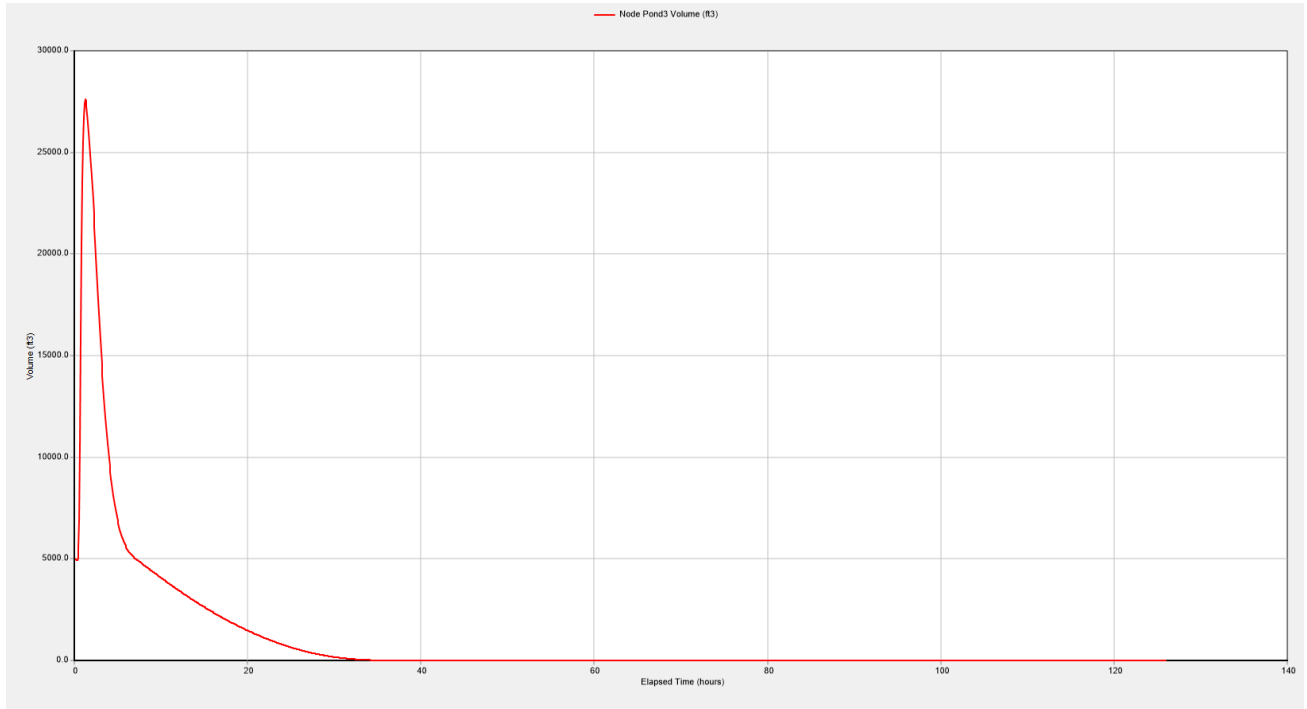
Pond 1 5-Year



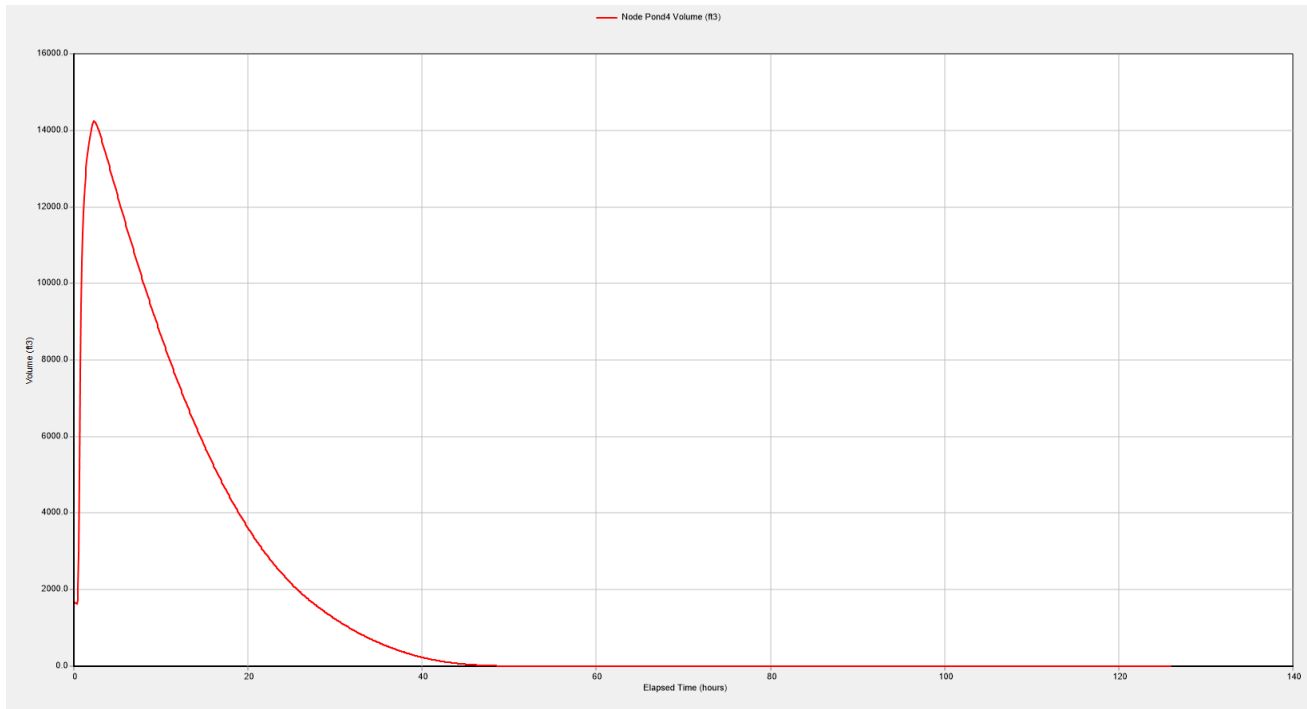
Pond 2 5-Year



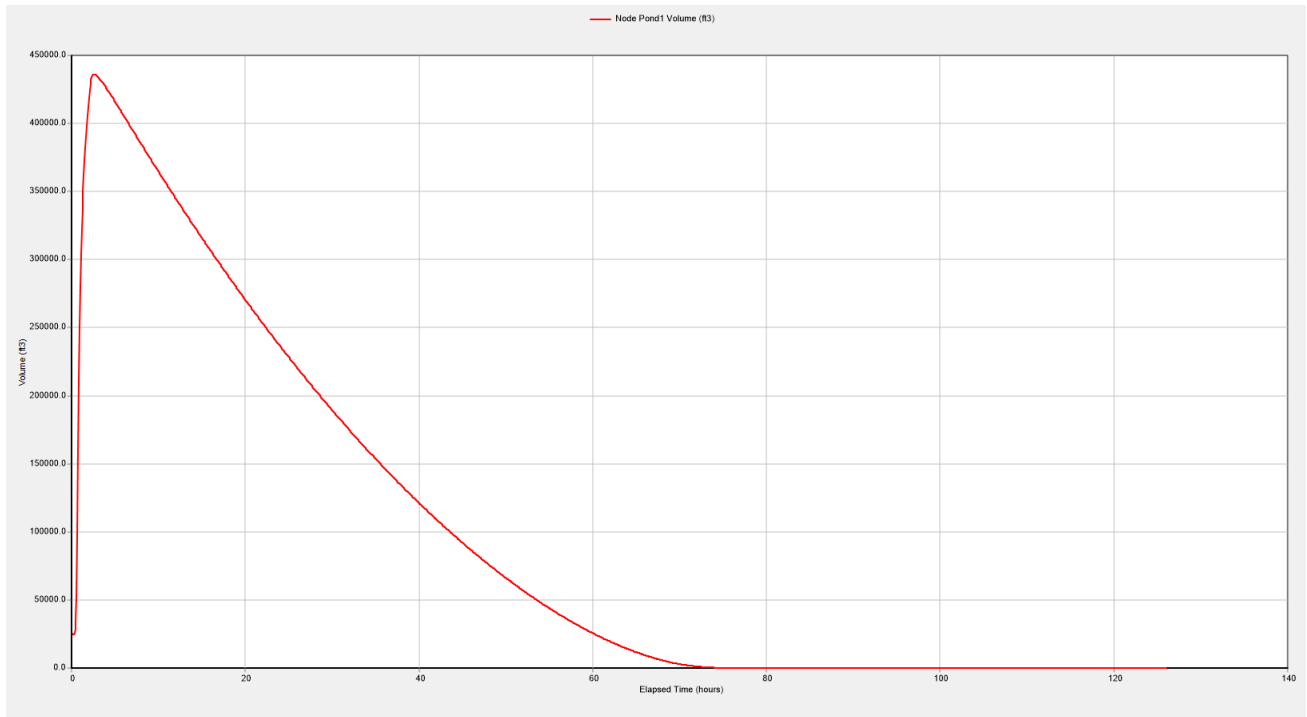
Pond 3 5-Year



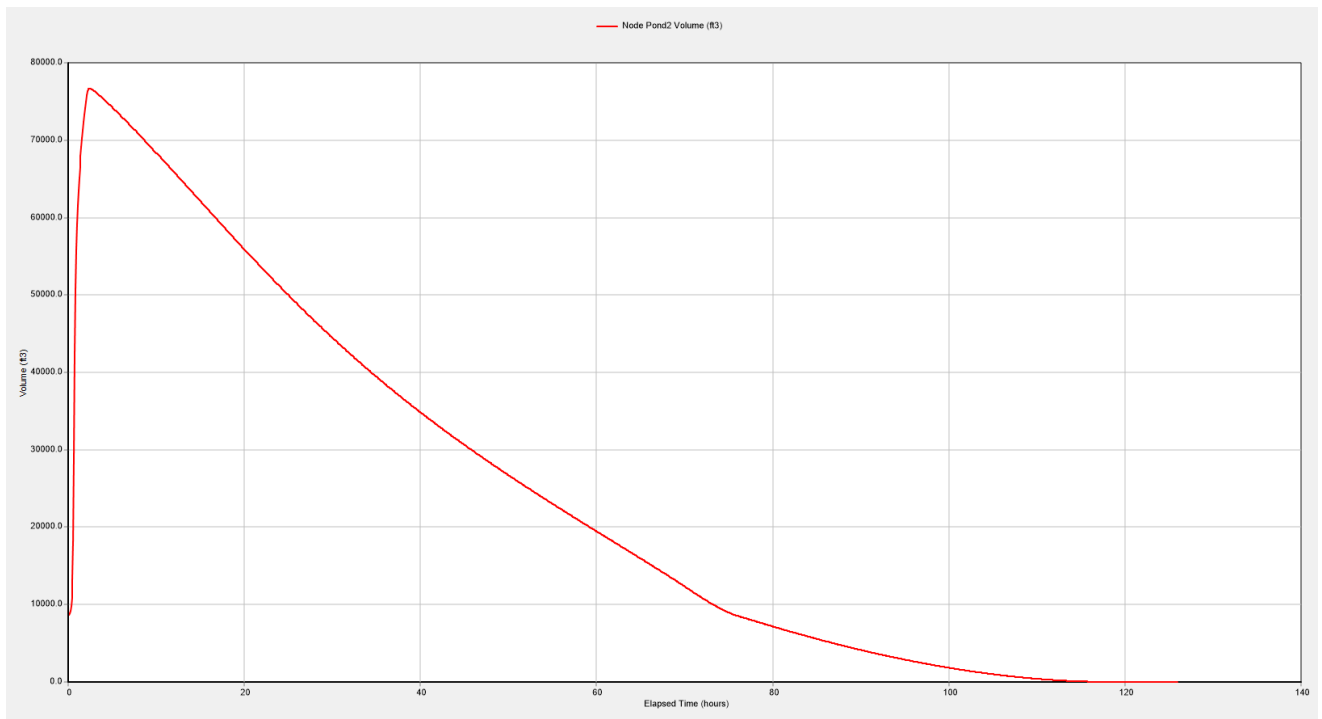
Pond 4 5-Year



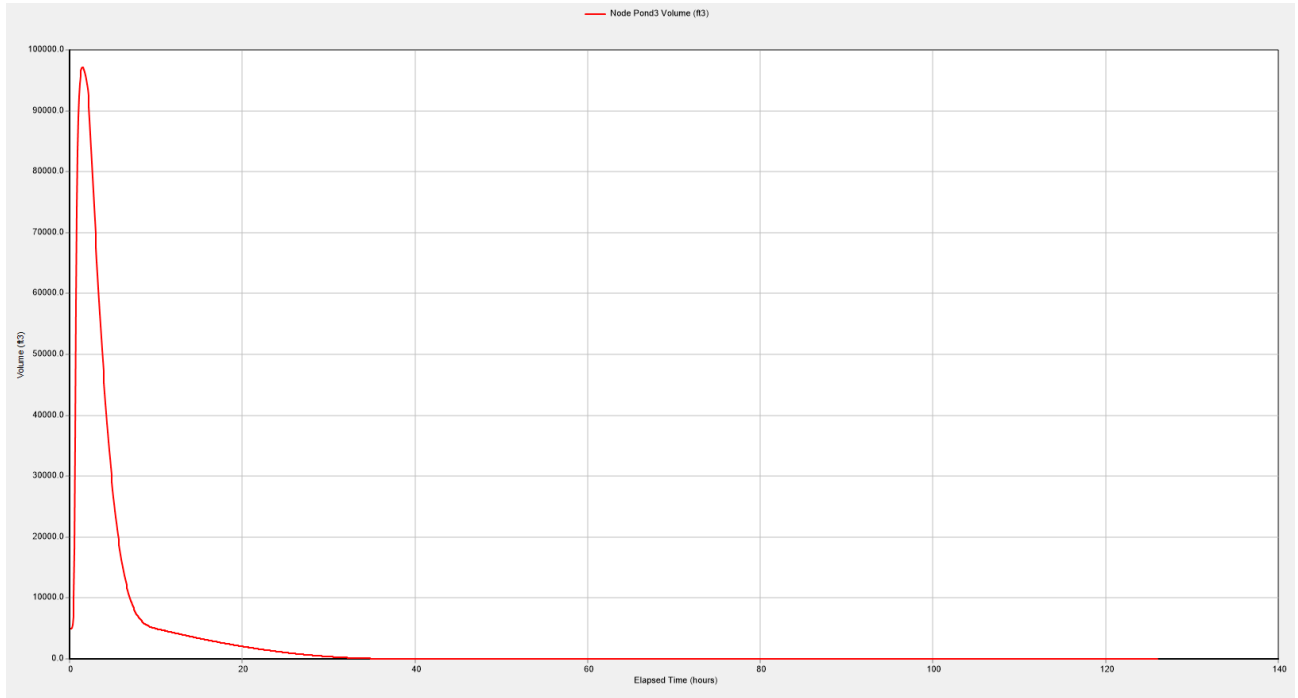
Pond 1 100-Year



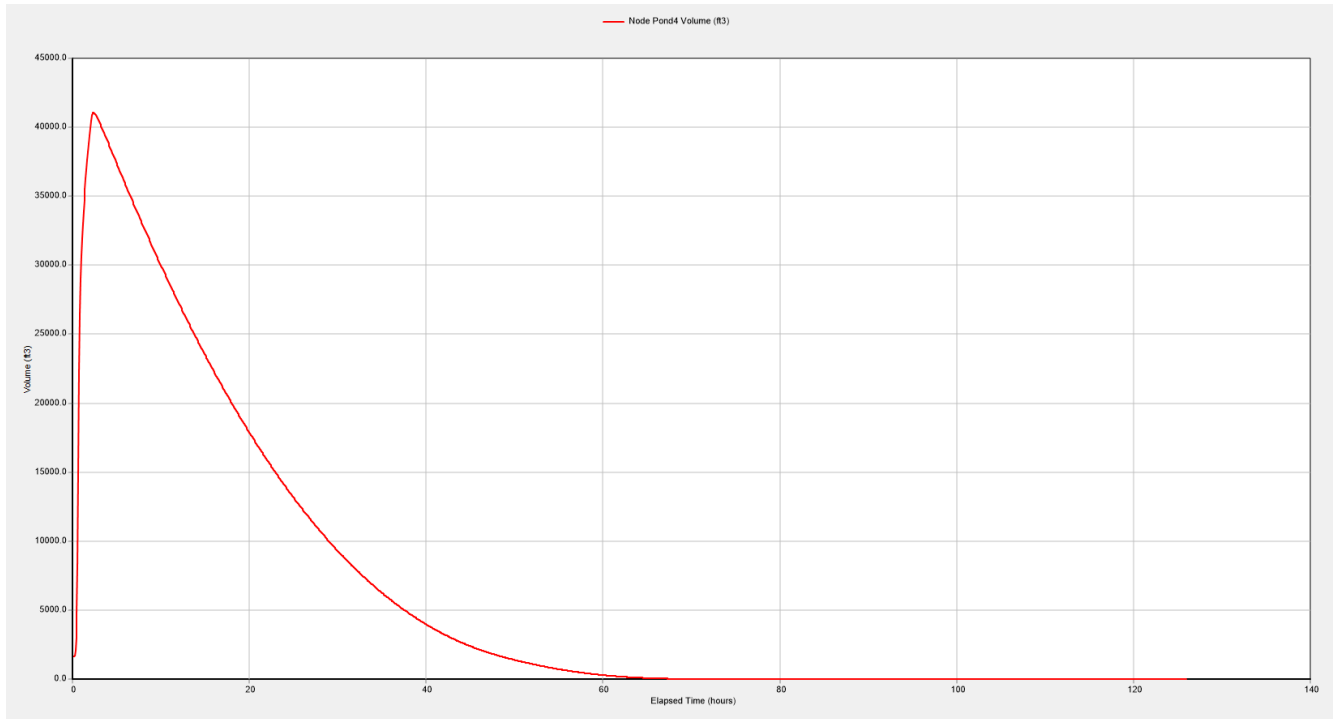
Pond 2 100-Year



Pond 3 100-Year



Pond 4 100-Year



APPENDIX D

WATER QUALITY CALCULATIONS

50% On-Site Treatment by LID Summary Table for Single-Family Residences

Basin(s)	LID Treatment	Total Basin(s) Area (Ac.)	Rain Garden Req'd Min. Vol. (Cu.-Ft.)
1A	None (Pond)	10.43	
1B, 1C, 1D, 1E, & 1F	NE Rain Garden	11.34	8,773
1G, 1H, 1I, 1J, 1K, & 1L	NW Rain Garden	16.08	9,506
1M & 1N	None	5.46	
2A	None (Pond)	2.81	
2B, 2C, 2D, 2E, 2I, & 2J	None	3.92	
2F, 2G, 2H, 2K, & 2L	Site Specific	13.22	
3A	Site Specific	3.09	
3B	None	0.33	
4	Site Specific	3.10	
<i>Total Site Area</i>		69.78	
<i>Areas Requiring Site Specific LID Treatment</i>			
Multi-family lots (Tract D)		5.39	Acres
Multi-family lots (Tract E)		4.21	Acres
Local Commerical (Tract C)		4.55	Acres
Detention Pond (Tract L)		0.78	Acres
Detention Pond (Tract M)		0.50	Acres
Neighborhood Park (Tract B)		3.00	Acres
<i>Total Newly Developed Area less Site Specific Areas & Ponds</i>		38.11	Acres
<i>Total Newly Developed Area Treated</i>		27.42	Acres
<i>Percent of Newly Developed Area Treated</i>		71.9%	

Design Procedure Form: Rain Garden (RG)

Sheet 1 of 2

Designer: F. Wegert
Company: Northern Engineering
Date: April 3, 2018
Project: Hansen
Location: Northeast

<p>1. Basin Storage Volume</p> <p>A) Effective Imperviousness of Tributary Area, I_a (100% if all paved and roofed areas upstream of rain garden)</p> <p>B) Tributary Area's Imperviousness Ratio ($i = I_a/100$)</p> <p>C) Water Quality Capture Volume (WQCV) for a 12-hour Drain Time ($WQCV = 0.8 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i)$)</p> <p>D) Contributing Watershed Area (including rain garden area)</p> <p>E) Water Quality Capture Volume (WQCV) Design Volume $Vol = (WQCV / 12) * Area$</p> <p>F) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm</p> <p>G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume</p> <p>H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)</p>	<p>$I_a =$ <u>50.0</u> %</p> <p>$i =$ <u>0.500</u></p> <p>WQCV = <u>0.17</u> watershed inches</p> <p>Area = <u>494,088</u> sq ft</p> <p>$V_{WQCV} =$ <u>6,794</u> cu ft</p> <p>$d_6 =$ _____ in</p> <p>$V_{WQCV\ OTHER} =$ _____ cu ft</p> <p>$V_{WQCV\ USER} =$ _____ cu ft</p>
<p>2. Basin Geometry</p> <p>A) WQCV Depth (12-inch maximum)</p> <p>B) Rain Garden Side Slopes ($Z = 4$ min., horiz. dist per unit vertical) (Use "0" if rain garden has vertical walls)</p> <p>C) Mimimum Flat Surface Area</p> <p>D) Actual Flat Surface Area</p> <p>E) Area at Design Depth (Top Surface Area)</p> <p>F) Rain Garden Total Volume ($V_T = ((A_{Top} + A_{Actual}) / 2) * Depth$)</p>	<p>$D_{WQCV} =$ <u>12.00</u> in</p> <p>$Z =$ <u>4.00</u> ft / ft</p> <p>$A_{Min} =$ <u>4941</u> sq ft</p> <p>$A_{Actual} =$ <u>5983</u> sq ft</p> <p>$A_{Top} =$ <u>8030</u> sq ft</p> <p>$V_T =$ <u>7,007</u> cu ft</p>
<p>3. Growing Media</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>Choose One _____</p> <p><input checked="" type="radio"/> 18" Rain Garden Growing Media</p> <p><input type="radio"/> Other (Explain): _____</p> </div> <p>_____</p> <p>_____</p>
<p>4. Underdrain System</p> <p>A) Are underdrains provided?</p> <p>B) Underdrain system orifice diameter for 12 hour drain time</p> <p style="margin-left: 20px;">i) Distance From Lowest Elevation of the Storage Volume to the Center of the Orifice</p> <p style="margin-left: 20px;">ii) Volume to Drain in 12 Hours</p> <p style="margin-left: 20px;">iii) Orifice Diameter, 3/8" Minimum</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>Choose One _____</p> <p><input checked="" type="radio"/> YES</p> <p><input type="radio"/> NO</p> </div> <p>$y =$ _____ ft</p> <p>$Vol_{12} =$ <u>N/A</u> cu ft</p> <p>$D_o =$ <u>N/A</u> in</p>

Design Procedure Form: Rain Garden (RG)

Sheet 2 of 2

Designer: F. Wegert
Company: Northern Engineering
Date: April 3, 2018
Project: Hansen
Location: Northeast

5. Impermeable Geomembrane Liner and Geotextile Separator Fabric

A) Is an impermeable liner provided due to proximity of structures or groundwater contamination?

Choose One
 YES
 NO

6. Inlet / Outlet Control

A) Inlet Control

Choose One
 Sheet Flow- No Energy Dissipation Required
 Concentrated Flow- Energy Dissipation Provided

7. Vegetation

Choose One
 Seed (Plan for frequent weed control)
 Plantings
 Sand Grown or Other High Infiltration Sod

8. Irrigation

A) Will the rain garden be irrigated?

Choose One
 YES
 NO

Notes: _____

Design Procedure Form: Rain Garden (RG)

Sheet 1 of 2

Designer: F. Wegert
Company: Northern Engineering
Date: April 3, 2018
Project: Hansen
Location: Northwest

<p>1. Basin Storage Volume</p> <p>A) Effective Imperviousness of Tributary Area, I_a (100% if all paved and roofed areas upstream of rain garden)</p> <p>B) Tributary Area's Imperviousness Ratio ($i = I_a/100$)</p> <p>C) Water Quality Capture Volume (WQCV) for a 12-hour Drain Time ($WQCV = 0.8 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i)$)</p> <p>D) Contributing Watershed Area (including rain garden area)</p> <p>E) Water Quality Capture Volume (WQCV) Design Volume $Vol = (WQCV / 12) * Area$</p> <p>F) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm</p> <p>G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume</p> <p>H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)</p>	<p>$I_a =$ <u>49.0</u> %</p> <p>$i =$ <u>0.490</u></p> <p>WQCV = <u>0.16</u> watershed inches</p> <p>Area = <u>700,567</u> sq ft</p> <p>$V_{WQCV} =$ <u>9,506</u> cu ft</p> <p>$d_6 =$ _____ in</p> <p>$V_{WQCV\ OTHER} =$ _____ cu ft</p> <p>$V_{WQCV\ USER} =$ _____ cu ft</p>
<p>2. Basin Geometry</p> <p>A) WQCV Depth (12-inch maximum)</p> <p>B) Rain Garden Side Slopes ($Z = 4$ min., horiz. dist per unit vertical) (Use "0" if rain garden has vertical walls)</p> <p>C) Mimimum Flat Surface Area</p> <p>D) Actual Flat Surface Area</p> <p>E) Area at Design Depth (Top Surface Area)</p> <p>F) Rain Garden Total Volume ($V_T = ((A_{Top} + A_{Actual}) / 2) * Depth$)</p>	<p>$D_{WQCV} =$ <u>12.00</u> in</p> <p>$Z =$ <u>4.00</u> ft / ft</p> <p>$A_{Min} =$ <u>6866</u> sq ft</p> <p>$A_{Actual} =$ <u>9434</u> sq ft</p> <p>$A_{Top} =$ <u>12280</u> sq ft</p> <p>$V_T =$ <u>10,857</u> cu ft</p>
<p>3. Growing Media</p>	<p>Choose One _____</p> <p><input type="radio"/> 18" Rain Garden Growing Media</p> <p><input type="radio"/> Other (Explain): _____</p> <p>_____</p> <p>_____</p>
<p>4. Underdrain System</p> <p>A) Are underdrains provided?</p> <p>B) Underdrain system orifice diameter for 12 hour drain time</p> <p style="margin-left: 20px;">i) Distance From Lowest Elevation of the Storage Volume to the Center of the Orifice</p> <p style="margin-left: 20px;">ii) Volume to Drain in 12 Hours</p> <p style="margin-left: 20px;">iii) Orifice Diameter, 3/8" Minimum</p>	<p>Choose One _____</p> <p><input type="radio"/> YES</p> <p><input type="radio"/> NO</p> <p>$y =$ _____ ft</p> <p>$Vol_{12} =$ <u>N/A</u> cu ft</p> <p>$D_O =$ <u>N/A</u> in</p>

Design Procedure Form: Rain Garden (RG)

Designer: F. Wegert
Company: Northern Engineering
Date: April 3, 2018
Project: Hansen
Location: Northwest

5. Impermeable Geomembrane Liner and Geotextile Separator Fabric

A) Is an impermeable liner provided due to proximity of structures or groundwater contamination?

Choose One _____
 YES
 NO

6. Inlet / Outlet Control

A) Inlet Control

Choose One _____
 Sheet Flow- No Energy Dissipation Required
 Concentrated Flow- Energy Dissipation Provided

7. Vegetation

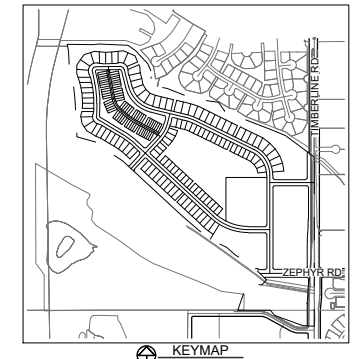
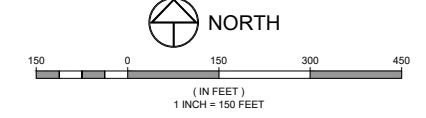
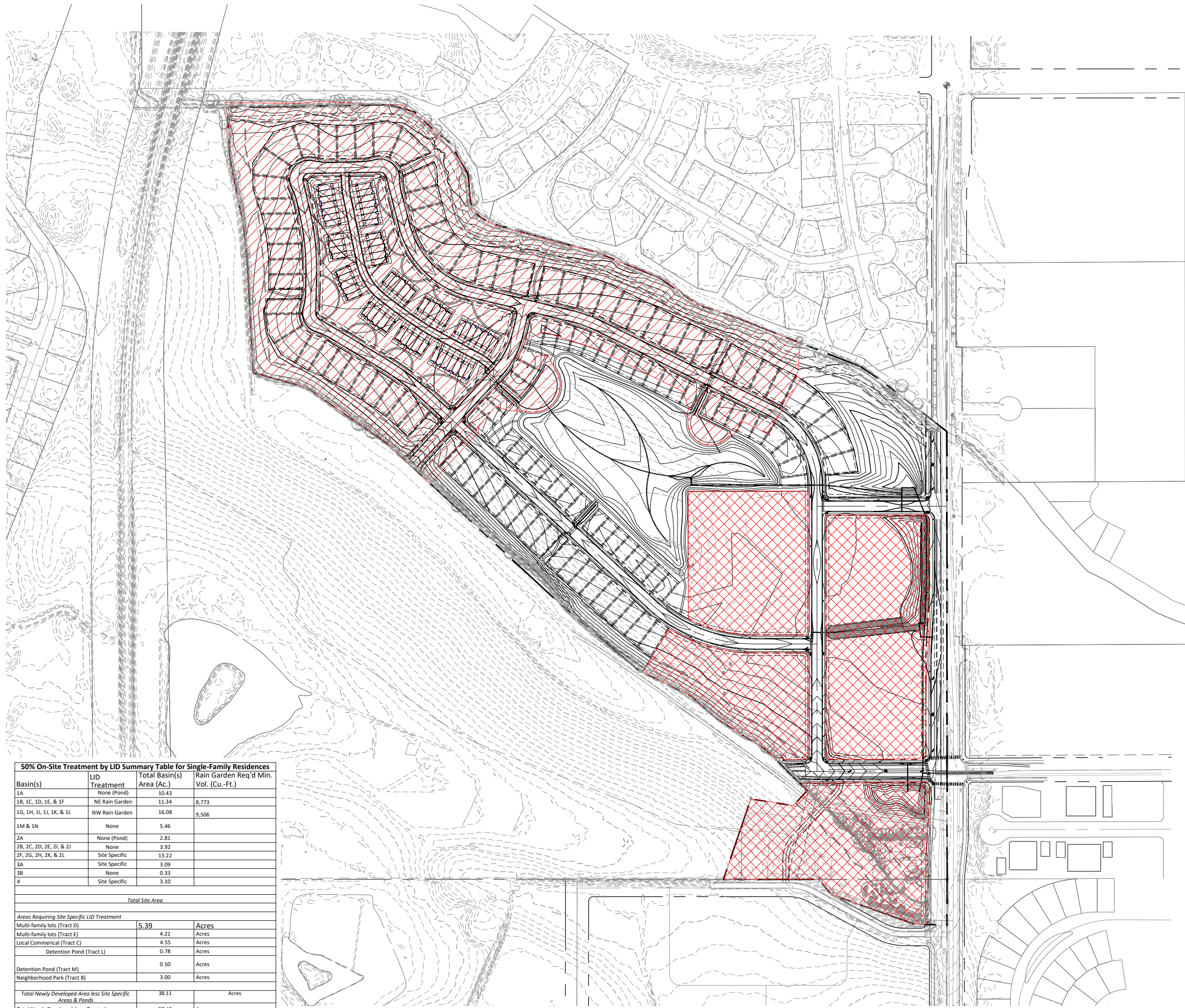
Choose One _____
 Seed (Plan for frequent weed control)
 Plantings
 Sand Grown or Other High Infiltration Sod

8. Irrigation

A) Will the rain garden be irrigated?

Choose One _____
 YES
 NO

Notes: _____



LEGEND:

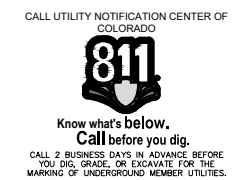
EXISTING STORM SEWER	
PROPOSED STORM SEWER	
PROPOSED STORM INLET	
PROPOSED CONTOUR	
EXISTING CONTOUR	
PROPOSED SWALE	
PROPOSED CURB AND GUTTER	
PROPERTY BOUNDARY	
PROPOSED LOT LINE	
EXISTING RIGHT OF WAY	
PROPOSED RIGHT OF WAY	
PROPOSED EASEMENT	
PROPOSED AREA OF LID TREATMENT	
PROPOSED AREA OF SITE-SPECIFIC LID TREATMENT	

NOTES:

- EXISTING UNDERGROUND AND OVERHEAD PUBLIC AND PRIVATE UTILITIES AS SHOWN ARE INDICATED ACCORDING TO THE BEST INFORMATION AVAILABLE TO THE ENGINEER. THE ENGINEER DOES NOT GUARANTEE THE ACCURACY OF SUCH INFORMATION. EXISTING UTILITY MAINS AND SERVICES MAY NOT BE STRAIGHT LINES OR AS INDICATED ON THESE DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE TO CALL ALL UTILITY COMPANIES (PUBLIC AND PRIVATE) PRIOR TO ANY CONSTRUCTION TO VERIFY EXACT UTILITY LOCATIONS.
- REFER TO THE "PRELIMINARY DRAINAGE AND EROSION CONTROL REPORT FOR HANSEN PROPERTY" BY NORTHERN ENGINEERING, DATED APRIL 3, 2018 FOR ADDITIONAL INFORMATION.
- ALL PROJECT DATA IS ON THE CITY OF FORT COLLINS VERTICAL DATUM: NAVD83. SEE COVER SHEET FOR BENCHMARK REFERENCES.
- REFER TO THE PLAT FOR LOT AREAS, TRACT SIZES, EASEMENTS, LOT DIMENSIONS, UTILITY EASEMENTS, OTHER EASEMENTS, AND OTHER SURVEY INFORMATION.

50% On-Site Treatment by LID Summary Table for Single-Family Residences

Basin(s)	LID Treatment	Total Basin(s) Area (Ac.)	Rain Garden Req'd Min. Vol. (Cu.-Ft.)
1A	None (Pond)	10.43	
1B, 1C, 1D, 1E, & 1F	NE Rain Garden	11.34	8,773
1G, 1H, 1I, 1J, 1K, & 1L	NW Rain Garden	16.08	9,506
1M & 1N	None	5.46	
2A	None (Pond)	2.81	
2B, 2C, 2D, 2E, 2I, & 2J	None	3.92	
2F, 2G, 2H, 2K, & 2L	Site Specific	13.22	
3A	Site Specific	3.00	
3B	None	0.33	
4	Site Specific	3.10	
Total Site Area			
Areas Requiring Site Specific LID Treatment			
Multi-family lots (Tract D)		5.39	Acres
Multi-family lots (Tract E)		4.21	Acres
Local Commercial (Tract C)		4.55	Acres
Detention Pond (Tract L)		0.78	Acres
Detention Pond (Tract M)		0.50	Acres
Neighborhood Park (Tract B)		3.00	Acres
Total Newly Developed Area less Site Specific Areas & Ponds			
		38.11	Acres
Total Newly Developed Area Treated			
		27.42	Acres
Percent of Newly Developed Area Treated			
		71.9%	



**City of Fort Collins, Colorado
UTILITY PLAN APPROVAL**

APPROVED: _____ City Engineer _____ Date

CHECKED BY: _____ Water Utility _____ Date

CHECKED BY: _____ Stormwater Utility _____ Date

CHECKED BY: _____ Parks & Recreation _____ Date

CHECKED BY: _____ Traffic Engineer _____ Date

CHECKED BY: _____ Environmental Planner _____ Date

Revisions:
REVIEW SET
NOT FOR CONSTRUCTION
 04/13/18

NORTHERN ENGINEERING
 301 North Howe Street, Suite 100
 Fort Collins, Colorado 80521
 PHONE: 970.221.4158
 www.northerneng.com

PROJECT: 911-015
 DATE: 04/13/18
 DESIGNED BY: D. Weber
 SCALE: 1"=150'
 DRAWN BY: M. Ruetzel
 REVIEWED BY: D. Weber

HANSEN SUBDIVISION
 OVERALL
 LID EXHIBIT

APPENDIX E

EROSION CONTROL REPORT

EROSION CONTROL REPORT

A comprehensive Erosion and Sediment Control Plan (along with associated details) will be included with the final construction drawings. It should be noted, however, that any such Erosion and Sediment Control Plan serves only as a general guide to the Contractor. Staging and/or phasing of the BMPs depicted, and additional or different BMPs from those included may be necessary during construction, or as required by the authorities having jurisdiction.

It shall be the responsibility of the Contractor to ensure erosion control measures are properly maintained and followed. The Erosion and Sediment Control Plan is intended to be a living document, constantly adapting to site conditions and needs. The Contractor shall update the location of BMPs as they are installed, removed or modified in conjunction with construction activities. It is imperative to appropriately reflect the current site conditions at all times.

The Erosion and Sediment Control Plan shall address both temporary measures to be implemented during construction, as well as permanent erosion control protection. Best Management Practices from the Volume 3, Chapter 7 – *Construction BMPs* will be utilized. Measures may include, but are not limited to, silt fencing along the disturbed perimeter, gutter protection in the adjacent roadways and inlet protection at existing and proposed storm inlets. Vehicle tracking control pads, spill containment and clean-up procedures, designated concrete washout areas, dumpsters, and job site restrooms shall also be provided by the Contractor.

Grading and Erosion Control Notes can be found on the Utility Plans. The Final Plans will contain a full-size Erosion Control sheet as well as a separate sheet dedicated to Erosion Control Details. In addition to this report and the referenced plan sheets, the Contractor shall be aware of, and adhere to, the applicable requirements outlined in the Development Agreement for the development. Also, the Site Contractor for this project will be required to secure a Stormwater Construction General Permit from the Colorado Department of Public Health and Environment (CDPHE), Water Quality Control Division – Stormwater Program, prior to any earth disturbance activities. Prior to securing said permit, the Site Contractor shall develop a comprehensive StormWater Management Plan (SWMP) pursuant to CDPHE requirements and guidelines. The SWMP will further describe and document the ongoing activities, inspections, and maintenance of construction BMPs.

MAP POCKET

DRAINAGE EXHIBITS

