



## 17 Avenue SE Corridor Study

Stoney Trail to East City Limit

The City of Calgary

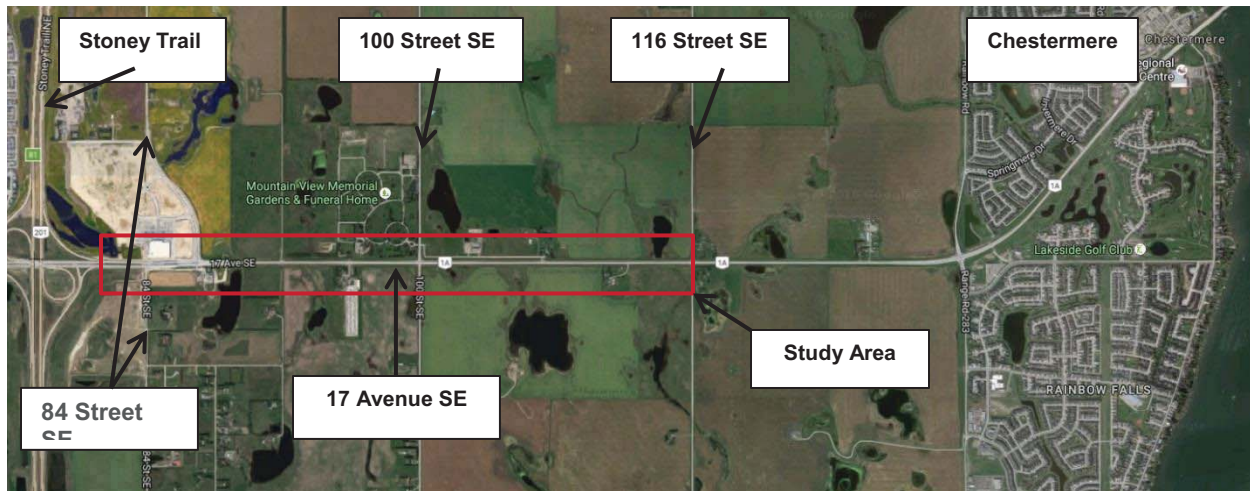
**Executive Summary**

September 2016

## Executive Summary

### Study Background

17 Avenue SE between Stoney Trail and the East City Limit (116 Street SE) is currently a rural highway in a greenfield area that is planned to transition to a productive and active urban street.



Study area between Stoney Trail interchange and 116 Street SE

The City of Calgary (The City) has produced the Belvedere Area Structure Plan to guide future development in the area and adjacent to 17 Avenue. The Belvedere Area is envisioned to become a flagship mixed use area that supports a vibrant and local economy as well as connecting to the broader region. 17 Avenue will play a vital role in supporting this vision. It will be the backbone of the local transportation system in the area and will provide access to and within the area for all modes of travel. 17 Avenue is also an important component of the City's overall transportation system linking downtown Calgary with Stoney Trail SE, Chestermere and the Trans-Canada Highway.

To ensure logical transition from its existing rural state to a street that supports the vision and role of the area, a corridor study has been undertaken. The study incorporates an inclusive assessment of all modes of travel and integration with future land use. The main outcome of the study is a street design for the corridor that meets the needs of all modes and aligns with the area vision.

In addition, the 17 Avenue SE corridor study has carried out the following:

- ☒ Reviewed previous work including citywide mobility policy and local area planning, including work carried out by the City of Calgary, as well as the Chestermere Boulevard Corridor Plan carried out by the City of Chestermere.
- ☒ Considered the transportation network needs along 17 Avenue SE including connecting streets, long term capacity, and access management.
- ☒ Identified dedicated bus rapid transit lanes to achieve the Calgary Transportation Plan's Primary Transit Network and the RouteAhead objectives.

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- ☒ Helped to create the conditions for vibrant pedestrian and cyclist activity.
- ☒ Considered goods movement for the purpose of local access.
- ☒ Created an ultimate plan for a Liveable Street with all modes of transportation.

Considering further the specific elements of the future corridor, the options considered included the following:

- ☒ Sidewalks on both sides and a generous public realm
- ☒ High quality cycling facilities
- ☒ Median dedicated transit facility
- ☒ Two vehicular travel lanes in each direction
- ☒ Incorporation of Complete Streets principles

This is consistent with the facilities planned for the corridor sections to the west and east of the study, as follows:

- ☒ 17 Avenue SE Transportation Planning Study (2011) – covering the section between Deerfoot Trail and Stoney Trail
- ☒ Chestermere Boulevard Corridor Plan (2014) – covering the section east of 116 Street (i.e. within the City of Chestermere)

17 Avenue SE will transition from a high-speed rural road that connects the City to regional transportation networks and destinations, to a street that supports local needs and has a strong community connection. Its primary role will be to function as a liveable street and support a vibrant, walkable and transit-oriented new community. It will provide convenient access to commercial land uses, employment centres and residential units, with high connectivity into the surrounding area. It will also support active street frontages where the land use is envisioned to consist of higher intensity development, and will adopt a main street role similar to the role which the corridor west of Stoney Trail has historically functioned.

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Rendering of Urban Boulevard section of 17 Avenue SE

Ultimately, the section of 17 Avenue in the Belvedere Area will be the final segment of a continuous urban street linking Calgary's city centre to the centre of the City of Chestermere, and will consist of the following classifications as defined in the City's Complete Streets guidelines:

- ☒ Parkway classification from Stoney Trail to 100 Street SE
- ☒ Urban Boulevard classification from 100 Street SE to 116 Street SE

There will be an increased number of trips in future time horizons with the "build -out" of the Belvedere area and further development of the Chestermere area. Taking into account the provision of the high quality transit, cycling and pedestrian facilities, the percentage of these sustainable trip modes increases significantly. Although median Bus Rapid Transit (BRT) would be provided in the early stage, provision will be made for a future upgrade to Light Rail Transit (LRT) in the long term, to provide even higher transit capacity in this corridor.



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## Options Development

Three corridor options were taken forward for assessment, all of which included facilities for each mode which could seamlessly connect with the facilities planned for the adjacent sections of 17 Avenue.

### Elements common to all three options

#### Transit and Travel Lanes

- ☒ As previously discussed, the Chestermere Boulevard Corridor Plan east of the Belvedere area identifies a cross section containing median bidirectional transit lanes and two vehicular travel lanes in each direction. To the west of the Belvedere area, the existing roadway consists of two vehicular travel lanes in each direction, and plans for reconstruction of the corridor in this location will also include median bidirectional transit lanes. This reconstruction is scheduled to take place between 2016 and 2018.
- ☒ In order to provide a safe and logical cross section design for the study area portion of 17 Avenue SE, similar transit and vehicular facilities are required. As such, every option developed includes a bidirectional median transit facility and two vehicular travel lanes in each direction. The inclusion of a median transit facility in all options will also ensure future mode progression is accounted for and the facility can transition from BRT to LRT service with minimal additional construction impacts and costs.

#### On Street Parking

- ☒ In accordance with the Complete Streets guidelines, all the New Build options require on street parallel parking within the Urban Boulevard segment of the corridor. On street parking is required to support the vision for active corridor uses and to support local commercial activities. This allows for lower on site parking requirements and encourages more productive use of developable land. The inclusion of on street parking will provide about 250 to 300 parking spaces within the Urban Boulevard.
- ☒ On street parking will also have a traffic calming effect, which ensures that the posted speeds are more likely to be adhered to by the average vehicle driver.

#### Sidewalk and Public Realm

- ☒ The development of cross section options allowed for the inclusion of unique public realm and pedestrian facilities for each of the three New Build options. Previous plans and policy direction did not mandate particular design widths or inclusions; however, the design criteria based on the Complete Streets guidelines played a large contributing role in shaping the options.
- ☒ The Complete Streets guidelines state that sidewalks wider than 2.0 m should be provided along transit routes and connections to transit hubs, and should also be provided for connections to schools, within activity centres and near major pedestrian generators. In general, sidewalk widths should be determined based on surrounding land uses (higher density requires wider sidewalks).

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- ☒ Ultimately, it was determined that a 3.0 metre sidewalk would be preferred for all options, and this will be provided on both sides of the street, within both the Parkway and Urban Boulevard sections.
- ☒ For the Public Realm Zone – the width for the three options varies between 4.1m and 5.1m wide in the Parkway section, and consistent at 4.55m wide in the Urban Boulevard section.

## Unique Elements in Options

The design criteria and Complete Streets Guide also provides relevant direction with regard to the planning of cycling facilities. The below is excerpted directly from the guide:

*A buffered (e.g., min 1.0m painted or textured buffer) or physically separated (e.g., by a curb or parked vehicles) exclusive facility should be provided when any of the following criteria are met:*

- a) Truck volumes are >10 per cent of total volume*
- b) Design speed is >60 km/hr*
- c) Two-way traffic volumes exceed 20,000 vehicles per day*
- d) The speed differential between cyclists and motor vehicles is too great (e.g., when traveling uphill).*

About 30,000 vehicles per day are forecasted for the year 2039 on the corridor. Under these conditions, a buffered bike lane should be considered at minimum. Additional physical separation of the facilities should be considered to improve conditions for cycling. This can be achieved through various design measures and facility alignments. The cross section options development addresses these considerations.

As such, cycling facilities form the main element that varies across the three New Build options. With regard to the type of cycling facility to be progressed further, several types were not progressed for the following reasons:

## Multiuse Pathway

These are shared with other active mode users (e.g. pedestrians) and it was considered that in a more “urban” environment with significant pedestrian flows, it would be safer to provide dedicated facilities for cyclists and pedestrians.

## Conventional one-way bike lane

These are typically provided on the street and operate with other vehicular traffic with no physical delineation/segregation – only pavement markings are provided. This form of bike lane may be less effective in encouraging new or inexperienced cyclists to cycle in this corridor, due to it being perceived as less “safe” and “uncomfortable”.

## Two-way bikeway

Although these have been implemented successfully in the Downtown areas of Canadian cities, they were not progressed in this corridor, as the need to locate the two cycle lanes on only one side of the corridor, could make the overall cross-section “unbalanced” – bearing in mind that development is proposed for both sides of the corridor.

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**Median bikeway**

These are not as commonplace as other forms of bikeways, and although they could be beneficial for “longer distance” cyclists, access to/from the land uses on either side of the corridor would be less convenient.

The three forms of cycling facilities that were brought forward for further consideration (Buffered Bike Lane, Separated Bikeway and Raised Separated Bikeway) were considered to provide safe cycling facilities that would interact well with other modes (i.e. pedestrians and other road users) in the urban environment that is envisaged for this corridor. Each form of bike facility would be provided on both sides of the street, operating in the direction of travel.

**Assessed Options**

The three options taken forward for assessment are described below, as follows:

**Option 1 – Buffered Bike Lane**

- ☒ 1.5m bike lane, with “buffers” on each side formed by pavement markings
- ☒ 1.0m buffer from moving vehicles
- ☒ 0.8m buffer from parked vehicles

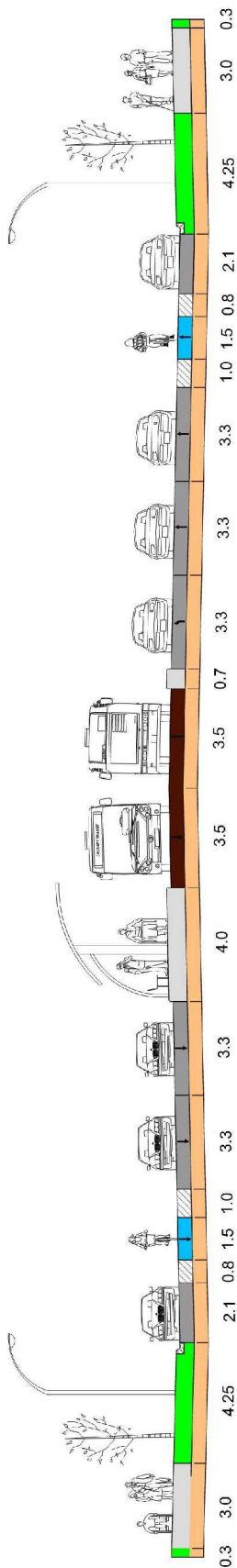
**Option 2 – Separated Bikeway**

- ☒ 2.0m bikeway with a physical median separation between the bikeway and the adjacent vehicular lane.
- ☒ 1.0m physical median separation

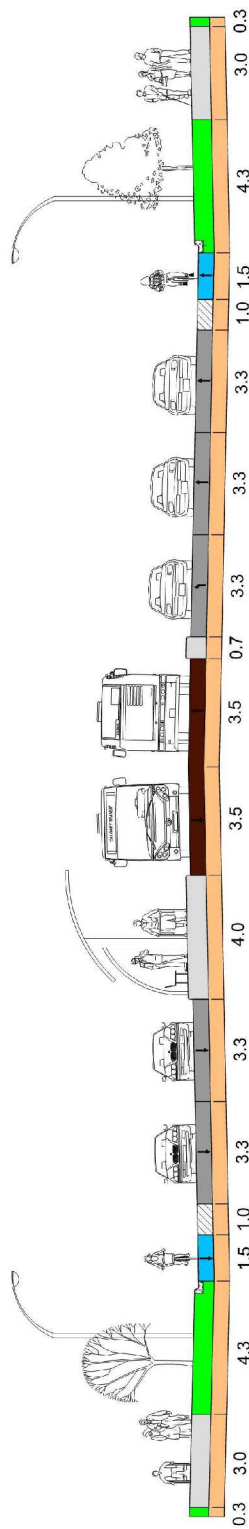
**Option 3 – Raised Separated Bikeway**

- ☒ 2.0m raised bikeway with separation, located in public realm area.
- ☒ These would be at the same elevation as the sidewalk, so 0.25m wide “buffers” between the bikeways and the adjacent sidewalks would be included within the bikeway right of way, to delineate between the different sections for cyclists and pedestrians.

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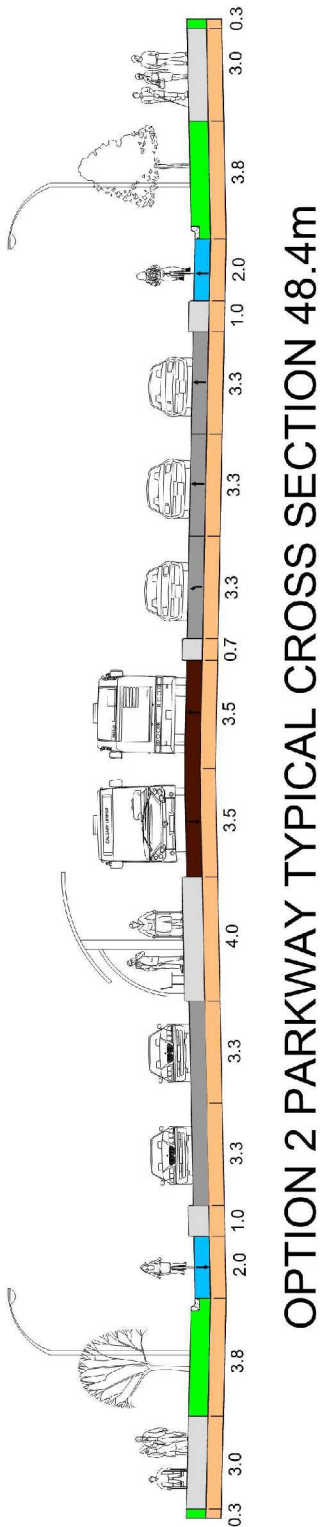
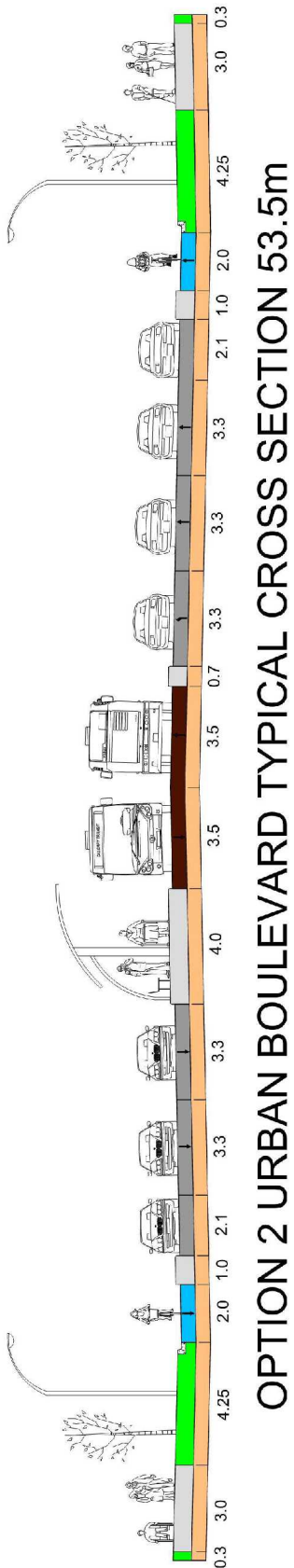
OPTION 1 URBAN BOULEVARD TYPICAL CROSS SECTION 54.1m

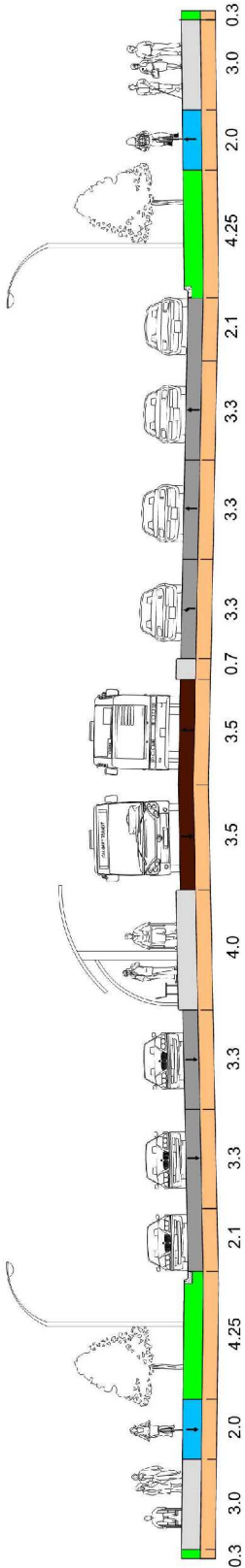


OPTION 1 PARKWAY TYPICAL CROSS SECTION 48.4m

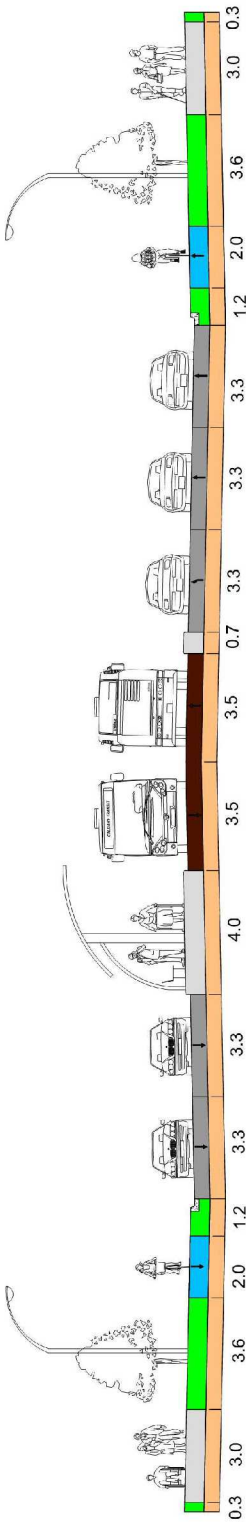


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OPTION 3 URBAN BOULEVARD TYPICAL CROSS SECTION 51.5m



OPTION 3 PARKWAY TYPICAL CROSS SECTION 48.4m

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## Options Evaluation

To determine the option to be selected, two different assessment methods were applied:

- ☒ Multiple Account Evaluation
- ☒ Benefit Cost Analysis

The Multiple Account Evaluation was used as a selection tool between the three options outlined above, and a “Do Nothing” option (i.e. maintaining the existing two-lane cross-section of 17 Avenue). There were seven accounts and 22 sub-accounts considered as part of this process, along with weighting factors, as shown in the table below:

| Account                | Sub-Account            | Weighting |     |
|------------------------|------------------------|-----------|-----|
| Pedestrian Environment | Capacity and Comfort   | 10%       | 20% |
|                        | Roadway Size           | 20%       |     |
|                        | Public Realm           | 20%       |     |
|                        | Safety                 | 30%       |     |
|                        | Travel Time (Delay)    | 20%       |     |
| Cycling Facilities     | Capacity               | 15%       | 20% |
|                        | Level of Separation    | 25%       |     |
|                        | Safety                 | 30%       |     |
|                        | Land Use Integration   | 15%       |     |
|                        | Travel time            | 20%       |     |
| Transit Integration    | Community connectivity | 60%       | 20% |
|                        | Safety                 | 20%       |     |
|                        | Travel Time (Delay)    | 20%       |     |
| Vehicles               | On-street parking      | 33%       | 10% |
|                        | Safety                 | 33%       |     |
|                        | Travel time            | 33%       |     |
| Goods Movement         | Loading & Unloading    | 100%      | 5%  |
| Cost                   | Capital Costs          | 50%       | 10% |
|                        | Land Costs             | 50%       |     |
| Social/Environmental   | Wetland impacts        | 33%       | 15% |
|                        | Construction impacts   | 33%       |     |
|                        | Emissions Impacts      | 33%       |     |

The “Do Nothing” option plus Options 1, 2 and 3 were considered with the criteria and weightings shown above, with the following results:










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| Account  | Do Nothing | Option 1 | Option 2 | Option 3 | Evaluation Comments   |
|--|------------|----------|----------|----------|---|
| <b>Pedestrian Environment</b>  |            |          |          |          |   |
| Capacity and Comfort   |            |          |          |          | All three New Build options are preferred. The Do Nothing option has no sidewalks                                   |
| Roadway Size   |            |          |          |          | Do Nothing is preferred. The existing roadway has the narrowest asphalt width                                       |
| Public Realm   |            |          |          |          | Option 2 is preferred. It has the largest right of way dedicated to the public realm                                |
| Safety   |            |          |          |          | Option 2 and 3 are equally preferred. Lowest crossing distances/ conflict exposure                                  |
| Travel Time  |            |          |          |          | All three New Build options are preferred. Large delays in Do Nothing   |
| <b>Cycling Facilities</b>  |            |          |          |          |   |
| Capacity   |            |          |          |          | Do Nothing is preferred. Largest capacity as it makes use of a 3.0m shoulder  |
| Level of Separation  |            |          |          |          | Option 3 is preferred. It has the largest separation between vehicular facilities and cycle facilities              |
| Safety   |            |          |          |          | Options 2 and 3 are preferred. Studies have found separated facilities provide lower relative injury/fatality risk  |
| Land Use Integration   |            |          |          |          | Do Nothing and Option 3 are preferred. Facilities would be closely adjacent to future land uses and buildings       |
| Travel Time  |            |          |          |          | Options 2 and 3 are preferred. Similar levels of delay in these options; large delays in Do Nothing                 |
| <b>Transit Integration</b>   |            |          |          |          |   |
| Community Connectivity   |            |          |          |          | Do Nothing is preferred. It would facilitate curbside loading which places customers closer to land uses            |
| Safety   |            |          |          |          | Options 2 and 3 are preferred - similar provision of safe facilities & provide lower crossing distances to stations |
| Travel Time  |            |          |          |          | Options 1 and 2 are preferred - similar corridor length travel times  |
| <b>Vehicular Facilities</b>  |            |          |          |          |   |
| On-Street Parking  |            |          |          |          | Option 3 is preferred. It facilitates an environment with the lowest potential conflicts between users.             |
| Safety   |            |          |          |          | Options 2 and 3 are preferred. Provide environments with the lowest potential conflicts between users.              |
| Travel Time  |            |          |          |          | All three New Build options are preferred - similar corridor length travel times                                    |
| <b>Goods Movement</b>  |            |          |          |          |   |
| Loading & Unloading  |            |          |          |          | Option 3 is preferred. Options 1 and 2 pose larger obstructions and conflicts for loading activities                |
| <b>Costs</b>   |            |          |          |          |   |
| Capital Costs  |            |          |          |          | Do Nothing is preferred. It is associated with minimal capital costs.   |
| Land Costs   |            |          |          |          | Do Nothing is preferred. It fits within the available right of way  |
| <b>Social &amp; Environmental</b>  |            |          |          |          |   |
| Wetland Impacts  |            |          |          |          | Do Nothing is preferred. As there is no construction in this option, wetlands will not be materially impacted       |
| Construction Impacts   |            |          |          |          | Do Nothing is preferred. No construction impacts associated with this option.                                       |
| Emissions Impacts  |            |          |          |          | Options 2 and 3 are preferred. These options will foster mode shift and reduce localized congestion emissions       |
| <div>  Least Preferred            Somewhat Not Preferred            Neutral / No Preference            Most Preferred         </div> |            |          |          |          |   |



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A summary of the Multiple Account Evaluation is shown below. The check marks show which of the options had the highest amount of “Most Preferred” ratings for each of the different accounts.

| Main Account           | Do Nothing  | Option 1 | Option 2  | Option 3   |
|------------------------|---|----------|---|--|
| Pedestrian Environment |   |          |  |  |
| Cycling Facilities     |   |          |   |   |
| Transit Integration    |  |          |   |  |
| Vehicle Accommodation  |   |          |   |   |
| Goods Movement         |   |          |   |   |
| Cost                   |  |          |   |  |
| Social / Environmental |   |          |  |   |
| Overall                |   |          |   |  |

**Option 3 (Raised Separated Bikeway)** had the highest rating from the Multiple Account Evaluation process.

Further to the Multiple Account Evaluation, a Benefit Cost Analysis exercise was carried out to compare the Do Nothing (No Build) Scenario, and the Build Scenario (which was assumed as the average of the New Build options). The Benefit Cost Analysis confirmed that there is a strong case for proceeding with an upgraded cross-section in 17 Avenue SE, with high-quality facilities for pedestrians, cyclists and transit, as the resulting benefits include the reduction of the following:

- ☒ Fuel costs
- ☒ Vehicle Delay (Auto and Transit)
- ☒ Greenhouse Gas Emissions
- ☒ Air Contaminant Emissions
- ☒ Collisions

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## Public Engagement

Public Engagement was a crucial part of this study, to inform the public and other stakeholders of the proposed development of 17 Avenue SE to a more “urban” style, and seek their comments on the various options. The engagement process focused on consulting a broad range of stakeholders, including adjacent landowners, nearby community associations, government representatives and interest groups representing all transportation modes (walking, cycling, driving or taking transit). The following public engagement events were carried out:

A **Vision and Context Workshop** was held in June 2015 at the Prince of Peace Lutheran Church and School, Garden Road N.E.

- ☒ 53 stakeholders were invited to the workshop, and these were chosen due to their proximity to the study corridor (e.g. adjacent landowners and nearby community associations) as well as representing existing and potential users of the corridor.
- ☒ Seven stakeholders attended the workshop, and 9 feedback forms were submitted.

The stakeholders were asked to rank several factors as high or low, with the results as shown below:

|   |                  |  |
|---|------------------|--|
| 1. Public transit   | <b>Most</b>      |  |
| 2. Business/residential access                              | <b>Important</b> |  |
| 3. Community connectivity/access across the road            |                  |  |
| 4. Emergency access   |                  |  |
| 5. Pedestrian facilities including sidewalks and crosswalks |                  |  |
| 6. Urban character/aesthetics                               |                  |  |
| 7. Cycling facilities                                       |                  |  |
| 8. Environmental impacts                                    |                  |  |
| 9. Property impacts   |                  |  |
| 10. Construction costs                                      | <b>Least</b>     |  |
| 11. Goods movement  | <b>Important</b> |  |

It was highlighted at the Workshop that the 17 Avenue SE corridor study should align with the elements of the two adjacent corridor studies – namely the 17 Avenue SE Transportation Planning Study (2011) and the Chestermere Boulevard Corridor Plan (2014). This would result in the following being provided in the 17 Avenue SE corridor:

- ☒ Median dedicated transit facility
- ☒ Two vehicular travel lanes in each direction
- ☒ High quality cycling facilities
- ☒ Sidewalks on both sides and a generous public realm
- ☒ Incorporation of Complete Streets principles

Using the input from the first phase of the study, the project team identified the area constraints and determined that the corridor would have two vehicle lanes, a median (middle) transitway, high quality bike facilities and high quality public realm.

An **Options Development Workshop** was held in October 2015 at Venue1008, 14<sup>th</sup> Street S.E. to gather feedback on the remaining roadway elements. The project team also developed several

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preliminary options for discussion, and stakeholders were asked which option they preferred, as well as why and how they could be improved.

The invitees were chosen under the same criteria that applied for the Vision and Context Workshop in June 2015. 53 stakeholders were invited and 14 attended the Options Development Workshop.

Workshop attendees heard a presentation about the public input thus far, the purpose of the workshop and how the feedback in this phase would be used. After the presentation, attendees broke into small groups to discuss and provide feedback on the preliminary options and the roadway elements mentioned earlier. Seven feedback forms were submitted online after the event.

Feedback resulting from the Options Development Workshop included:

- ☒ The much wider sidewalks were not seen to be providing additional benefit - a more typical design was favoured rather than an extra wide facility.
- ☒ Cycling facilities – many stakeholders selected the multi-use pathway option, but preference was also shown for buffered bike lanes, bikeways, and raised bikeways.
- ☒ On-street parking facilities – stakeholders showed approximately equal preference for the provision of on-street parking space or not.

Public input from the previous engagement was used to develop three options for the study area, with the following common features:

- ☒ Median dedicated transit facility
- ☒ Two vehicular travel lanes in each direction
- ☒ High quality cycling facilities
- ☒ Sidewalks on both sides and a generous public realm
- ☒ Incorporation of Complete Streets principles

The three options had different forms of cycle facilities, as described earlier:

- ☒ Option 1: Buffered Bike Lane
- ☒ Option 2: Separated Bikeway
- ☒ Option 3: Raised Separated Bikeway

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An **Options Evaluation Open House** was held in January 2016 at the East Hills Walmart on 17 Avenue SE - this location was selected to raise awareness among road users in the undeveloped study area who might not otherwise participate in the engagement process. Participants could provide feedback at the open house, online, by calling 311 or by commenting on the study's web page. Stakeholders and landowners were invited to the Open House. Over one hundred people spoke with the project team at the event, including:

- ☒ Area residents
- ☒ Area business owners and employees
- ☒ Road users
- ☒ Ward 10 Councillor Chabot

Participants viewed information boards including the three options for the study area.

The responses can be summarized as follows:

- ☒ 25 feedback forms were collected at the open house
- ☒ 92 people provided feedback online
- ☒ 3 people provided input through 311

93% of the respondents who participated online did not attend the open house.

The majority of participants who responded at this stage preferred a raised separated bikeway for the following reasons:

- ☒ Safe for all users
- ☒ Separated from vehicles
- ☒ Easier to maintain
- ☒ A shorter crossing distance
- ☒ Less disruptive to other activities

As a result of the public engagement feedback, plus the technical analysis, the preferred option was identified as **Option 3: Raised Separated Bikeway** and is described as follows:

- ☒ Median dedicated transit facility: 3.5m wide transit lanes, one in each direction
- ☒ Two vehicular travel lanes in each direction: each lane 3.3m wide
- ☒ 2.1m wide parking lane in each direction provided in the Urban Boulevard section only
- ☒ 2.0m wide raised separated bikeway in each direction (at same elevation as adjacent sidewalk, and delineated by 0.25m wide "buffer" treatment on each side).
- ☒ Sidewalks on both sides (3.0m wide) and a generous public realm (5.1m wide in the Parkway section and 4.55m wide in the Urban Boulevard section).
- ☒ Incorporation of Complete Streets principles throughout.

Option 3 is also shown on the attached cross-section, plan and profile drawings.



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## Right of Way Requirements

With regard to Right of Way required for these improvements, at the 84 Street SE intersection, where the southern leg of the intersection is proposed to be moved approx. 300m to the east to align with the current northern leg, two properties on the SE corner of the intersection are impacted by the realignment plan, and 6.5 acres of land would be required.



84 Street SE realignment – southern leg of intersection moved east to align with northern leg

For the corridor as a whole, the existing right of way varies between about 48m and 50m along the corridor, with a few localized areas where the right of way is even wider. The preferred option requires the least amount of additional right of way. The Parkway segment of the preferred option fits within the existing right of way, including the Stoney Trail TUC east of 84 Street SE (west leg). It utilizes almost all of the available right of way.

The typical Urban Boulevard segment cross section is 51.5m wide. This segment will encroach over existing property lines by about 1.0m to 1.5m on either side of the corridor. At the location where the corridor horizontal alignment curves to avoid the wetlands, the cross section will encroach over the property line by approximately 10.0m.

In some locations along the corridor, where the cross section does not utilize the entirety of the existing right of way or in the localized areas where there the right of way is wider than the typical

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48.0m to 50.0m, surplus right of way will be available. The total additional right of way required, as well as right of way surplus where the existing right of way is larger than typical is provided below.

## Right of Way Account

|                       |                     |
|-----------------------|---------------------|
| Right of Way Required | 0.49 hectares       |
| Right of Way Surplus  | 1.51 hectares       |
| Net Right of Way      | <b>1.1 hectares</b> |

This 1.1 hectares of additional right of way can be retained for future corridor purposes or used for development purposes and to offset the need for additional right of way in other locations. Not all of the surplus right of way will facilitate productive development. About 0.08 hectares at the wetlands east of 116 Street SE will be difficult to reallocate and up to about 0.64 hectares is contained within the Stoney Trail TUC.

The Right of Way Required and the Surplus Right of Way is shown on plans included with this Executive Summary.

## Project Implementation and Staging

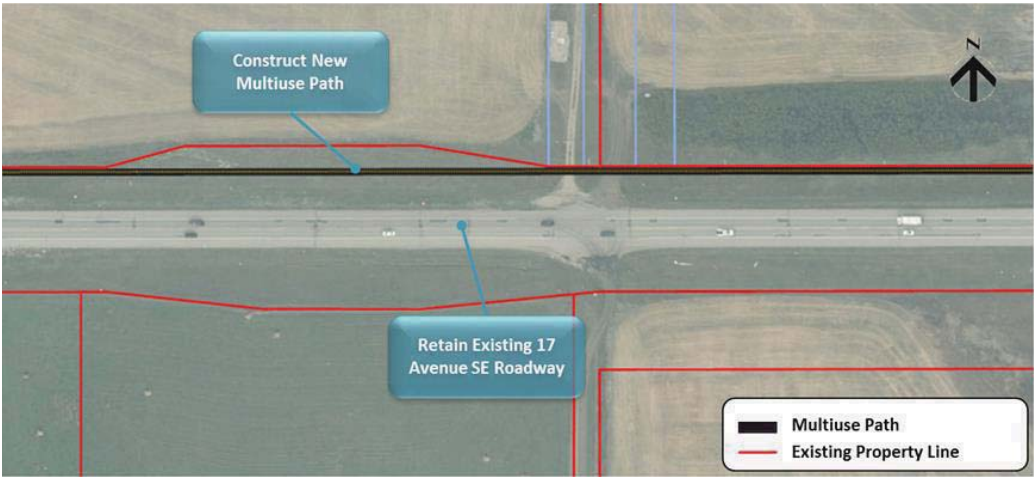
The timeline for implementing the recommended final design will depend on available funding and the level and rate of residential and business development in the area. A staging and implementation plan is required to minimize construction throwaway costs and impacts, and provide interim facilities to transition to and support a more multimodal environment.

The corridor study includes recommendations for several interim designs for the corridor. To account for changing conditions and funding mechanisms, the following interim designs can be sequenced in several ways. It is recommended to implement the interim designs as shown below, however it may be desirable to combine and construct Interim Design B and Interim Design C to minimize overall construction activity required. As well, low-cost projects such as the multiuse path in Interim Design A may be funded through existing City programs and can be implemented in the short term.

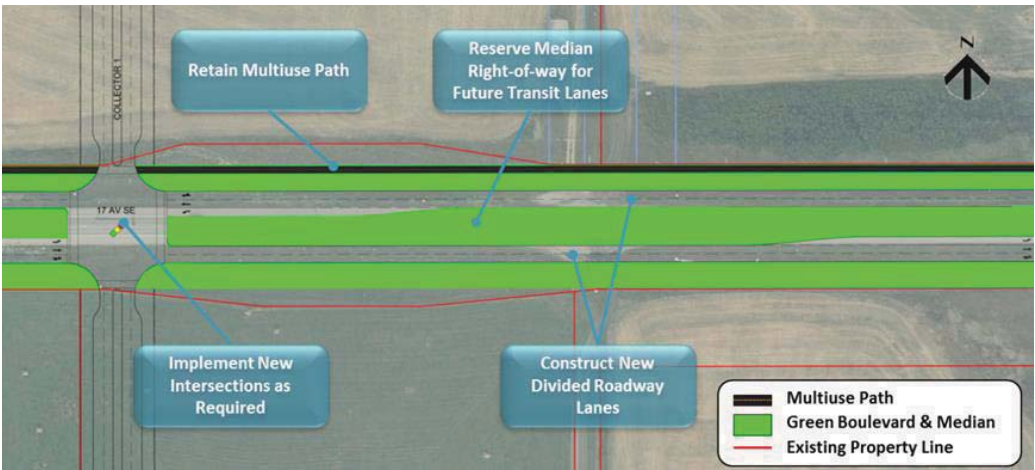
The timescales for widening of the corridor from 2 to 4 lanes and the provision of median transit lanes will be impacted by the extent and timing of development along the corridor. Traffic increases are mainly due to new development and increased traffic within the City of Chestermere and other areas outside the City of Calgary, and would not be a determinant of when upgrading / widening work is required on 17 Avenue SE. This traffic would have other routes available for these types of trips. The Recommended Staging Sequence of the interim designs is illustrated in the following graphics.

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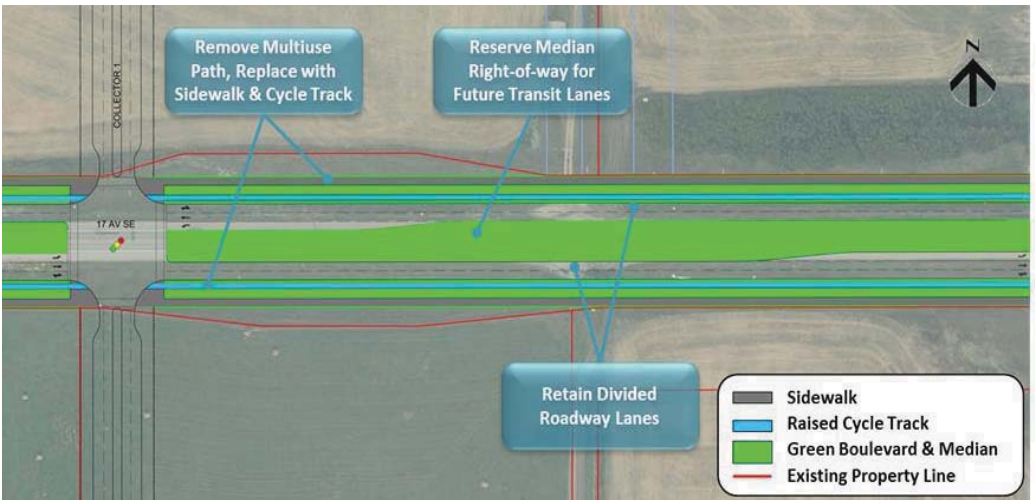
Interim Design A



Interim Design B



Interim Design C



17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary

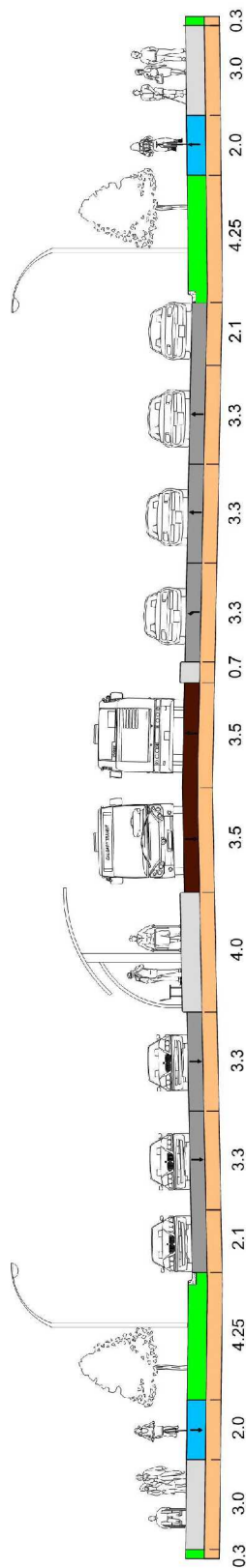
## Cost Estimate

A Class IV Cost Estimate was developed to provide the estimated construction and project costs for the 17 Avenue SE corridor preferred option from Stoney Trail to the East City Limit.

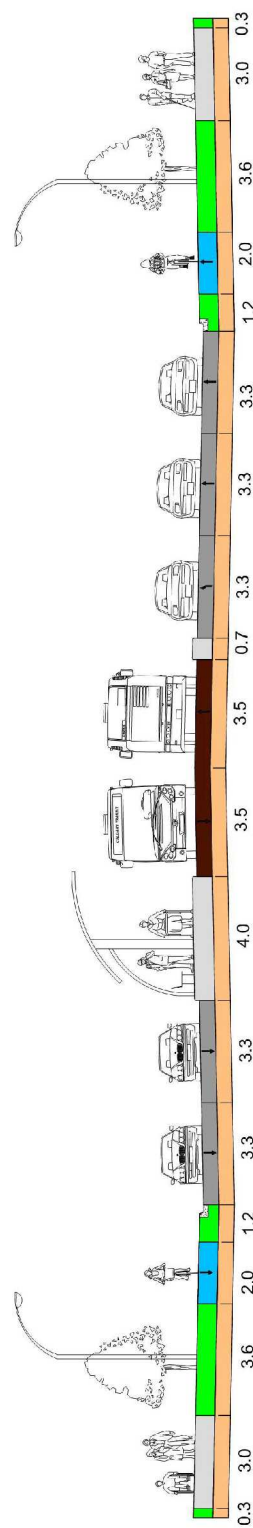
**The total estimated construction cost for the project is \$53,151,029 excluding applicable taxes.**

## Design Drawings

Design drawings for Option 3 showing the Urban Boulevard and Parkway cross-sections, as well as Plan and Profile drawings, are shown on the following pages.

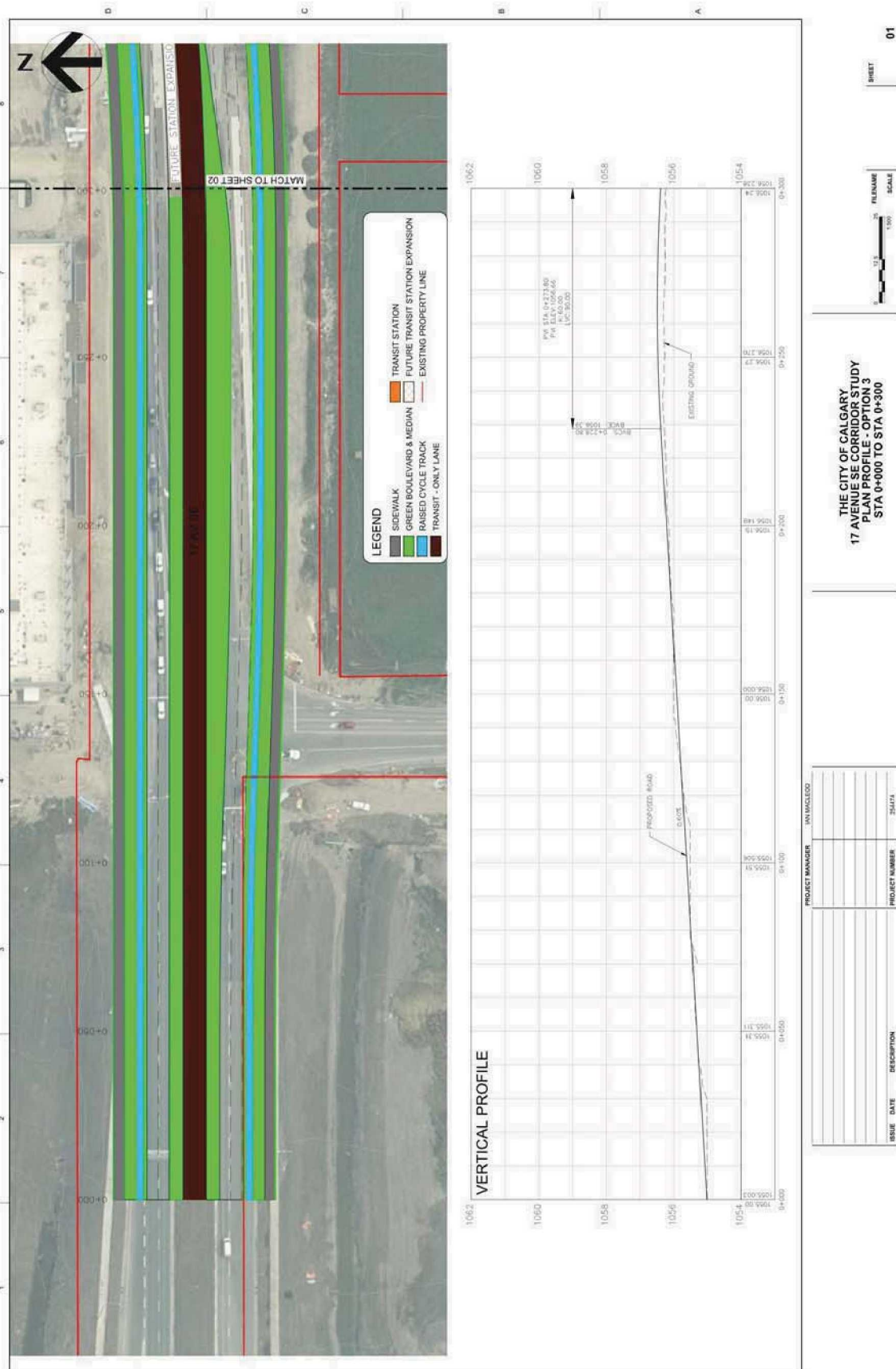


OPTION 3 URBAN BOULEVARD TYPICAL CROSS SECTION 51.5m



OPTION 3 PARKWAY TYPICAL CROSS SECTION 48.4m

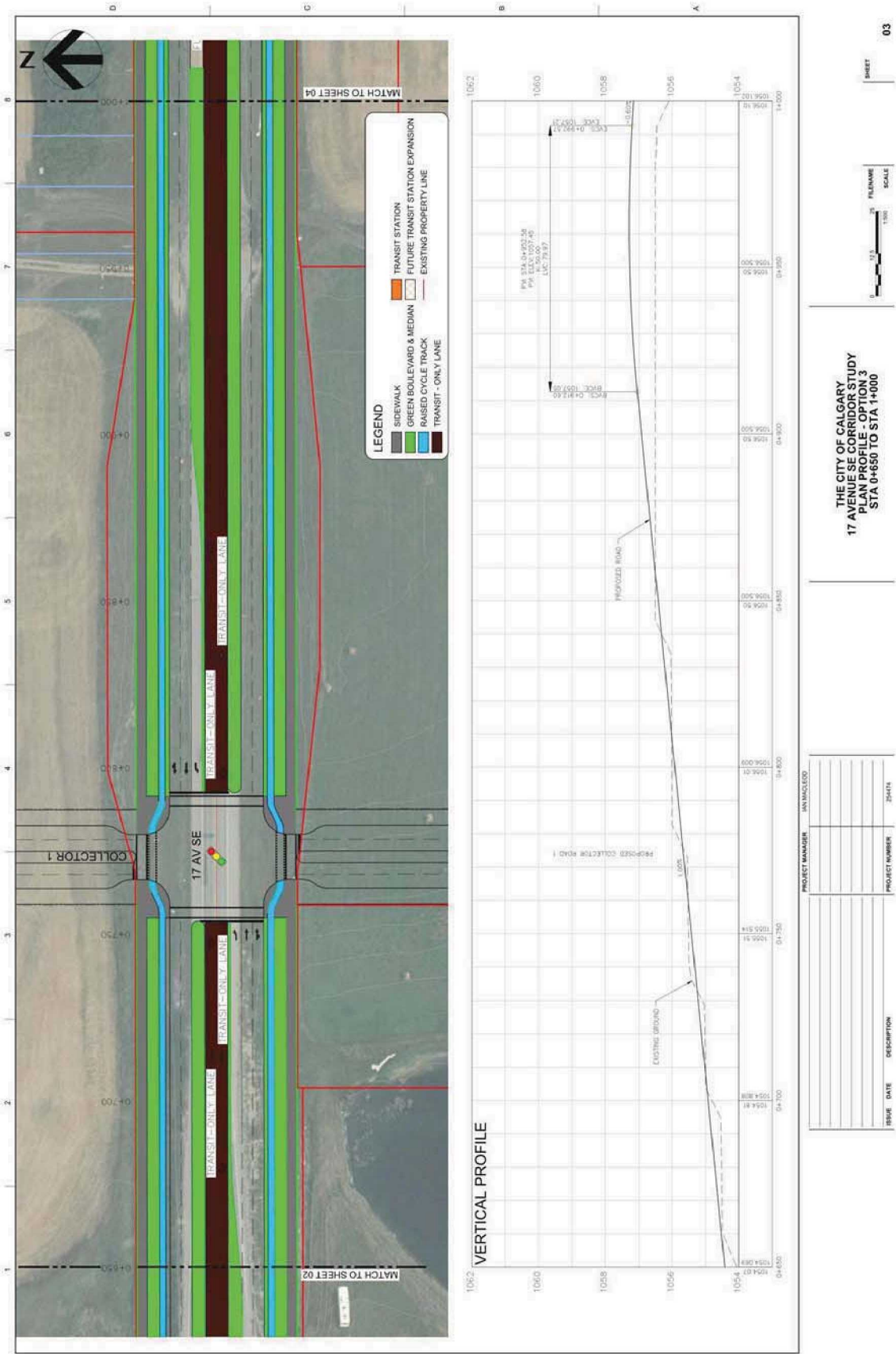




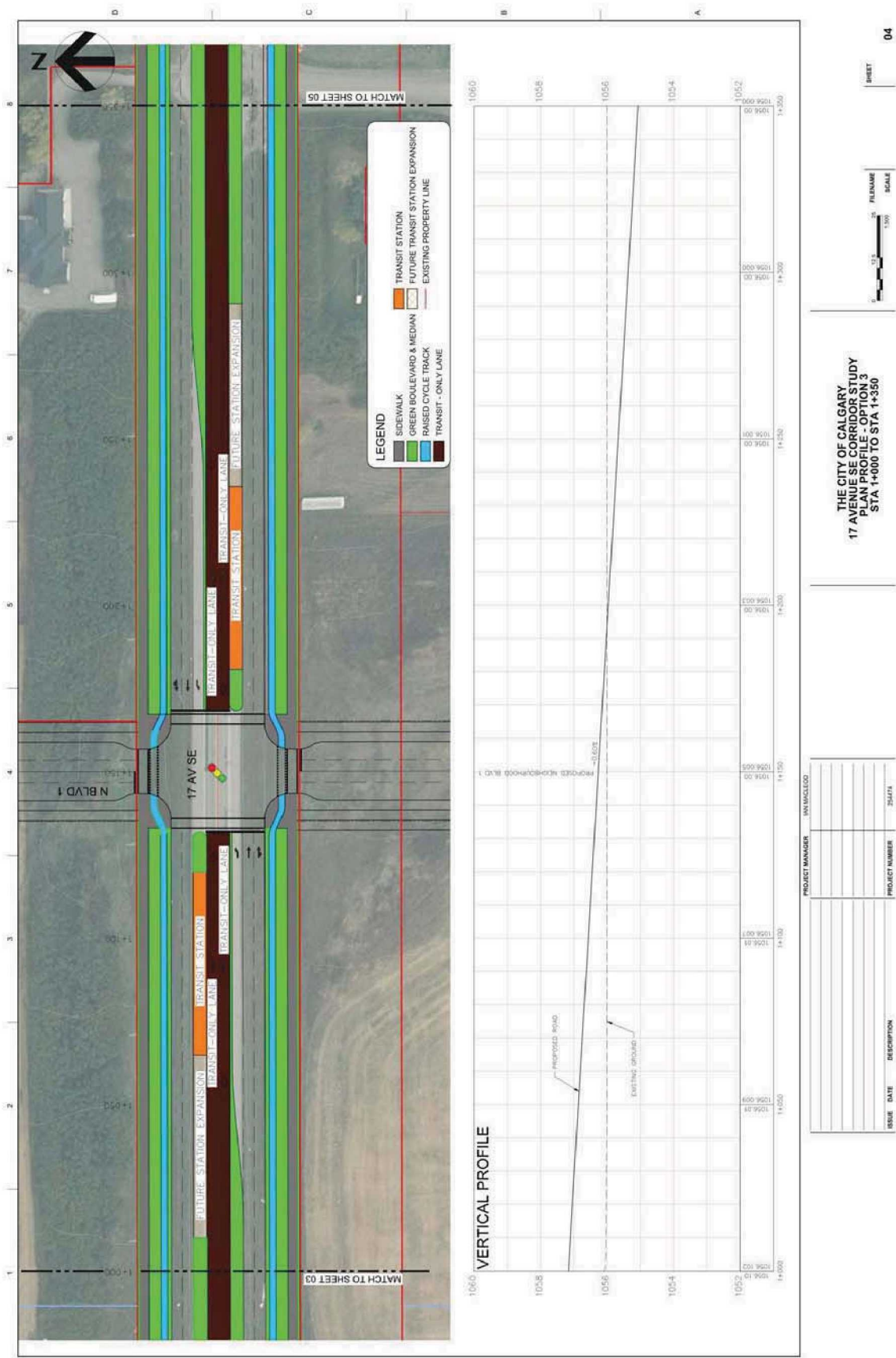


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17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary

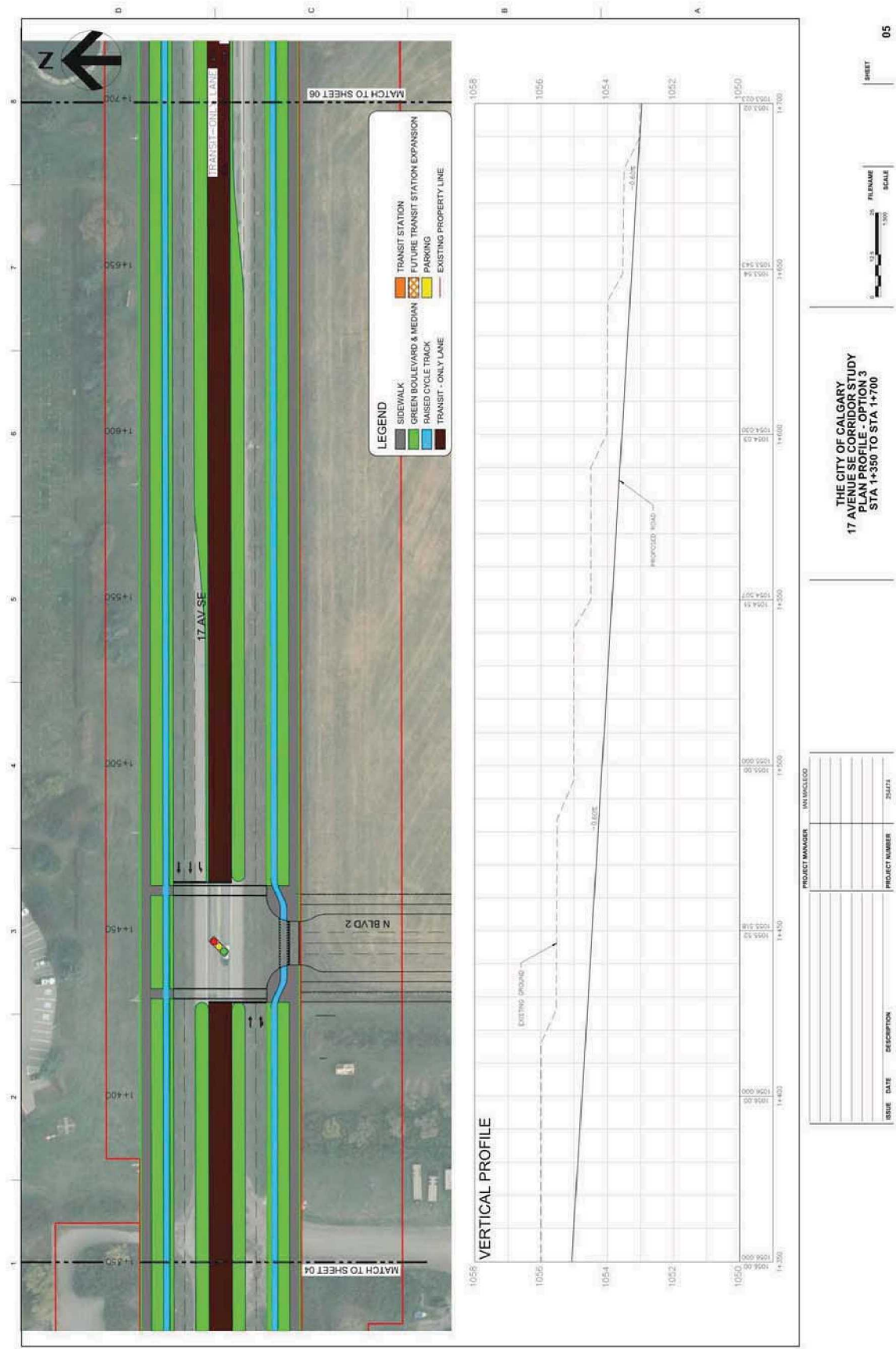


17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary

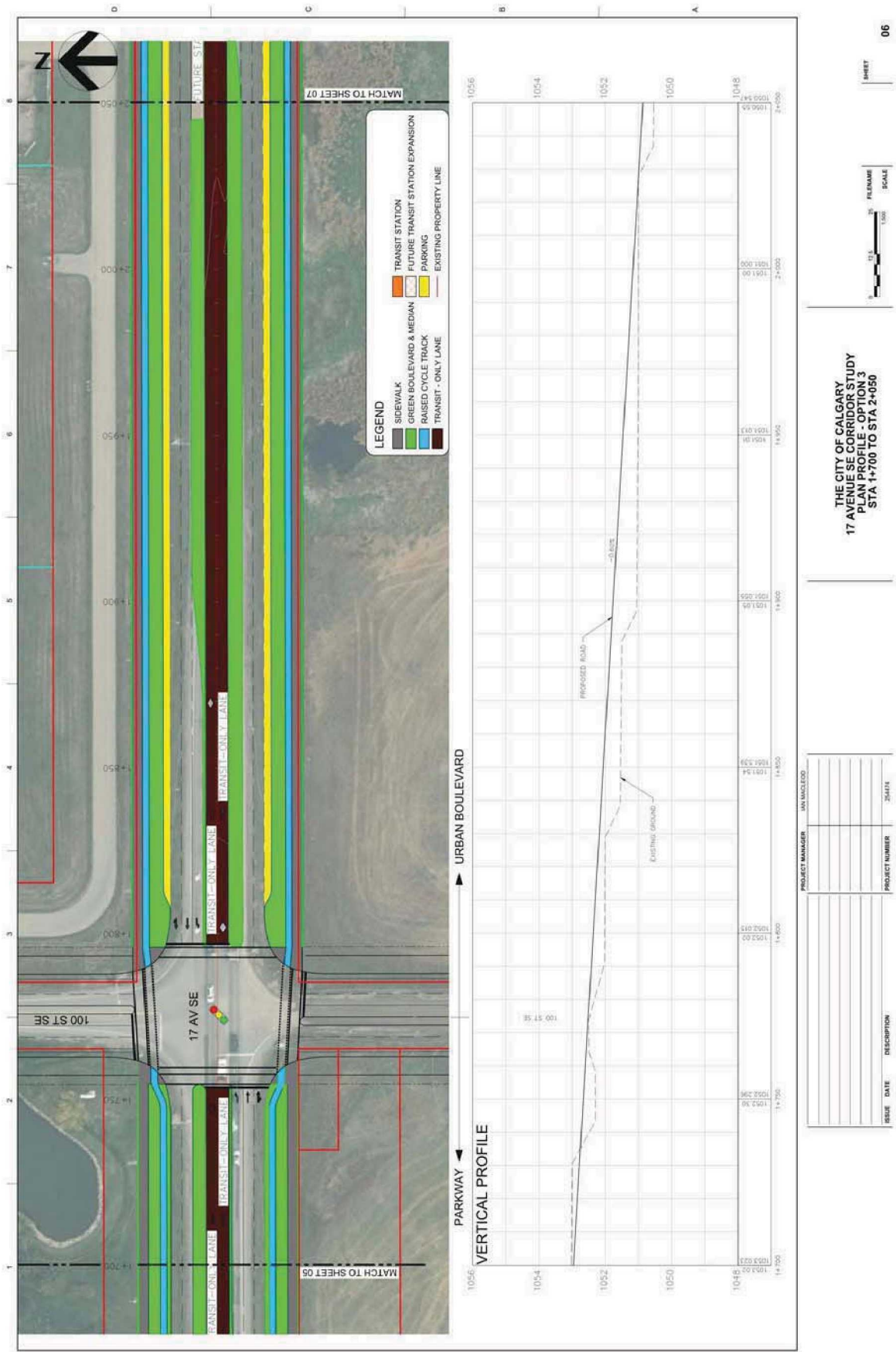




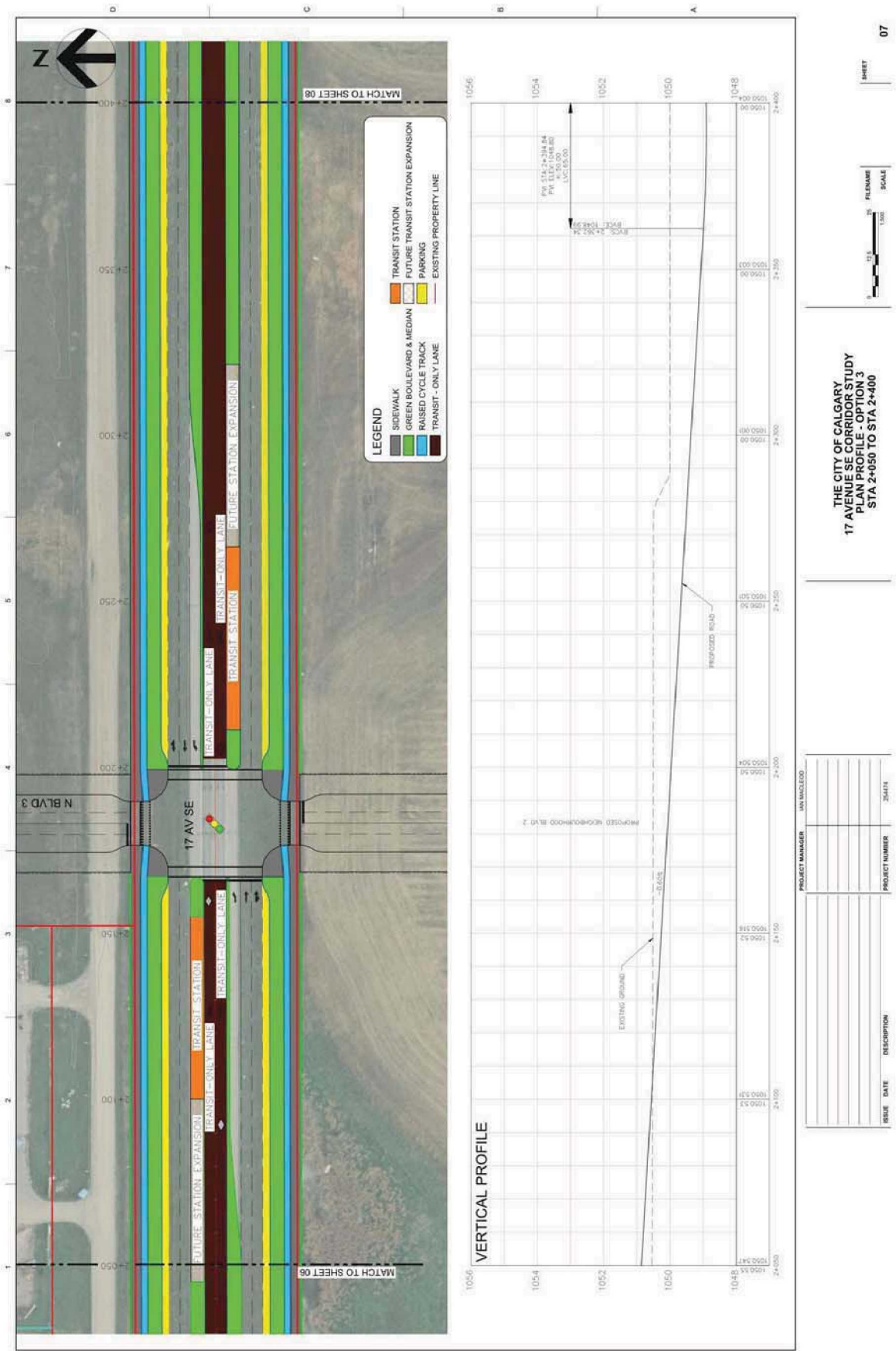
17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary



17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary



17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary





[illegible]

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116 ST SE

17 AV SE

176 ST SE

FUTURE STATION EXPANSION

TRANSIT - ONLY LANE

REFER TO CHESTMERE BLVD CORRIDOR PLAN

LEGEND

- SIDEWALK
- GREEN BOULEVARD & MEDIAN
- RAISED CYCLE TRACK
- TRANSIT - ONLY LANE
- TRANSIT STATION
- FUTURE TRANSIT STATION EXPANSION
- PARKING
- EXISTING PROPERTY LINE

MATCH TO SHEET 09

MATCH TO SHEET 08

VERTICAL PROFILE

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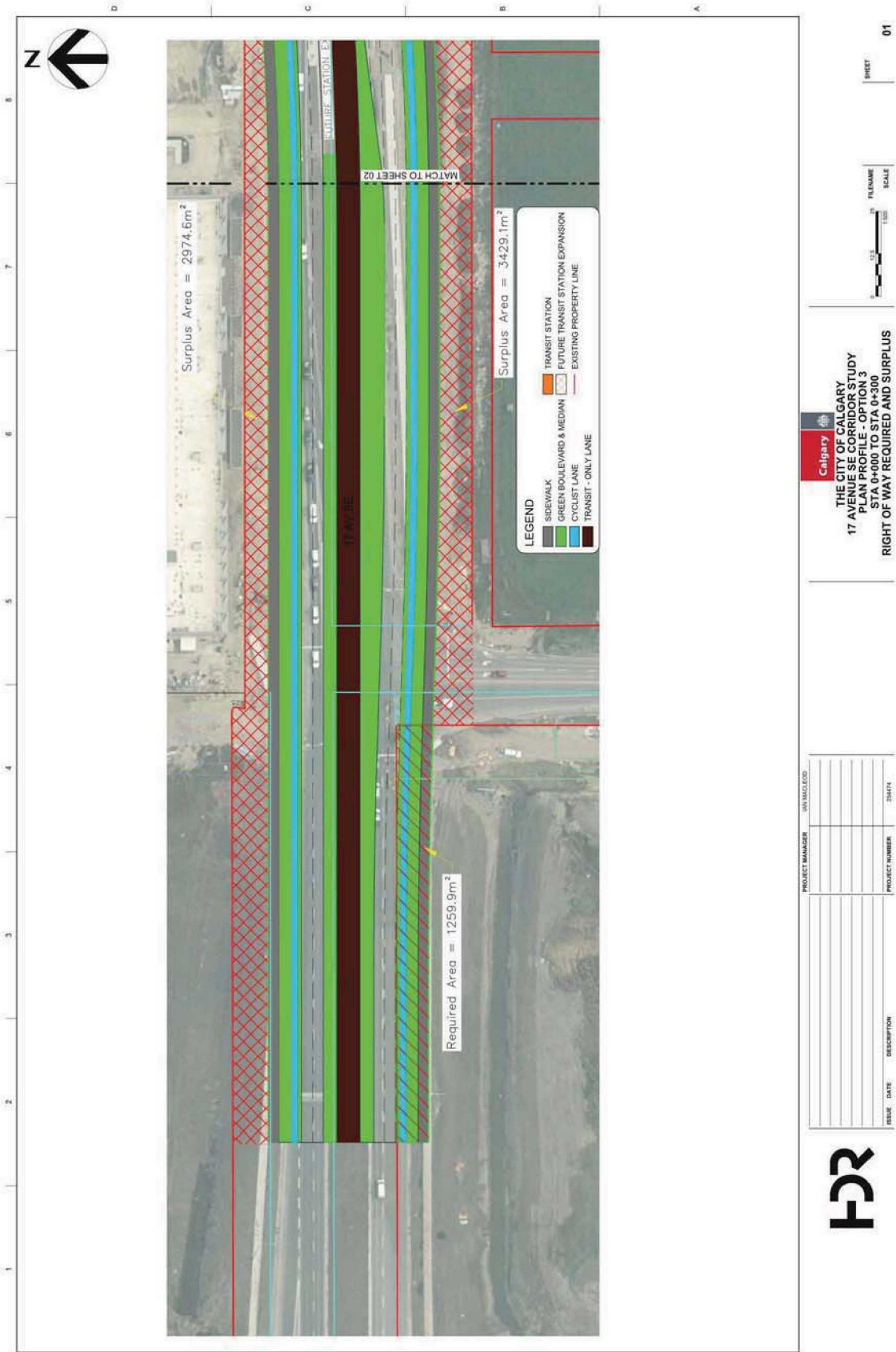
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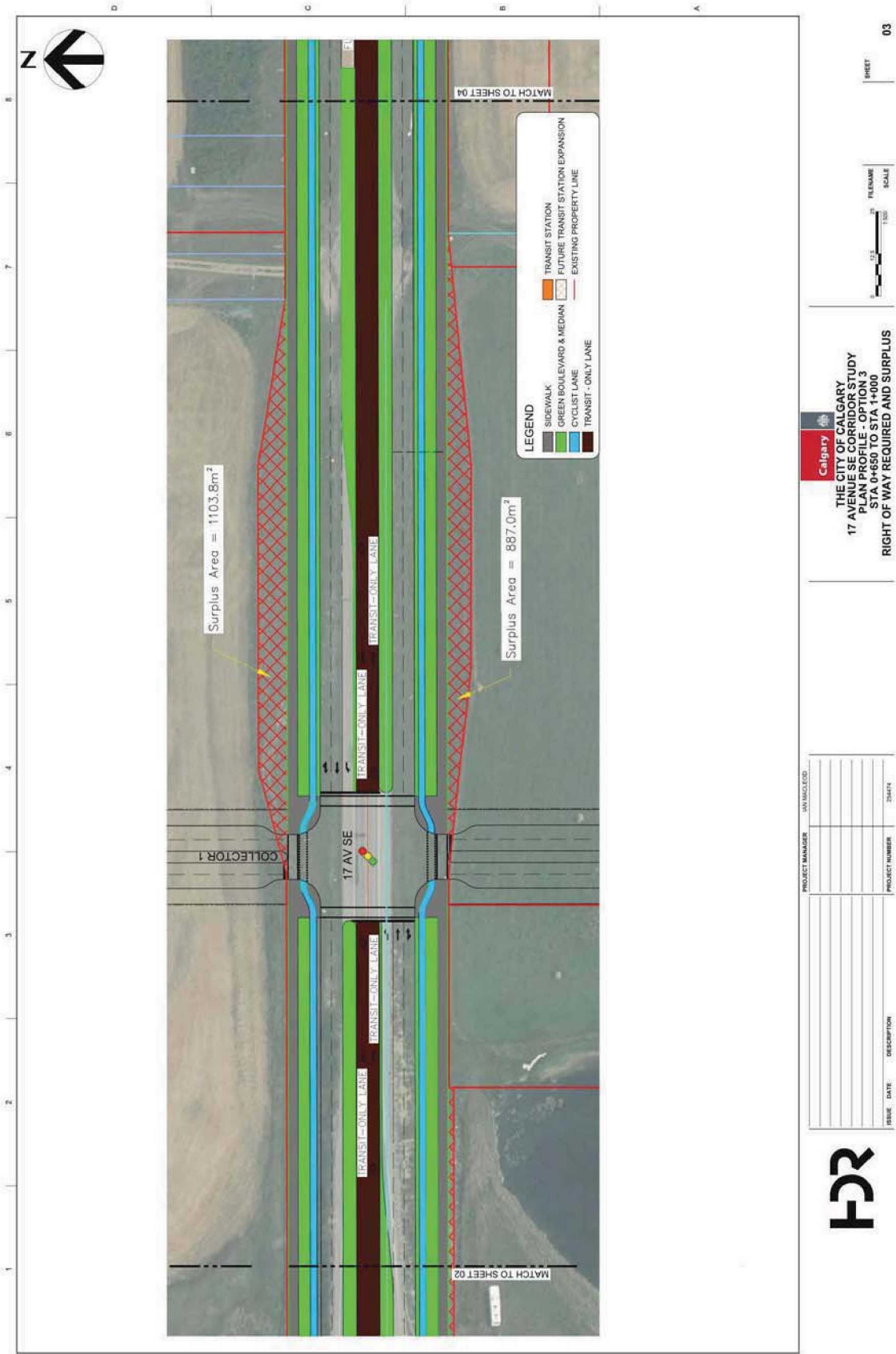


17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary



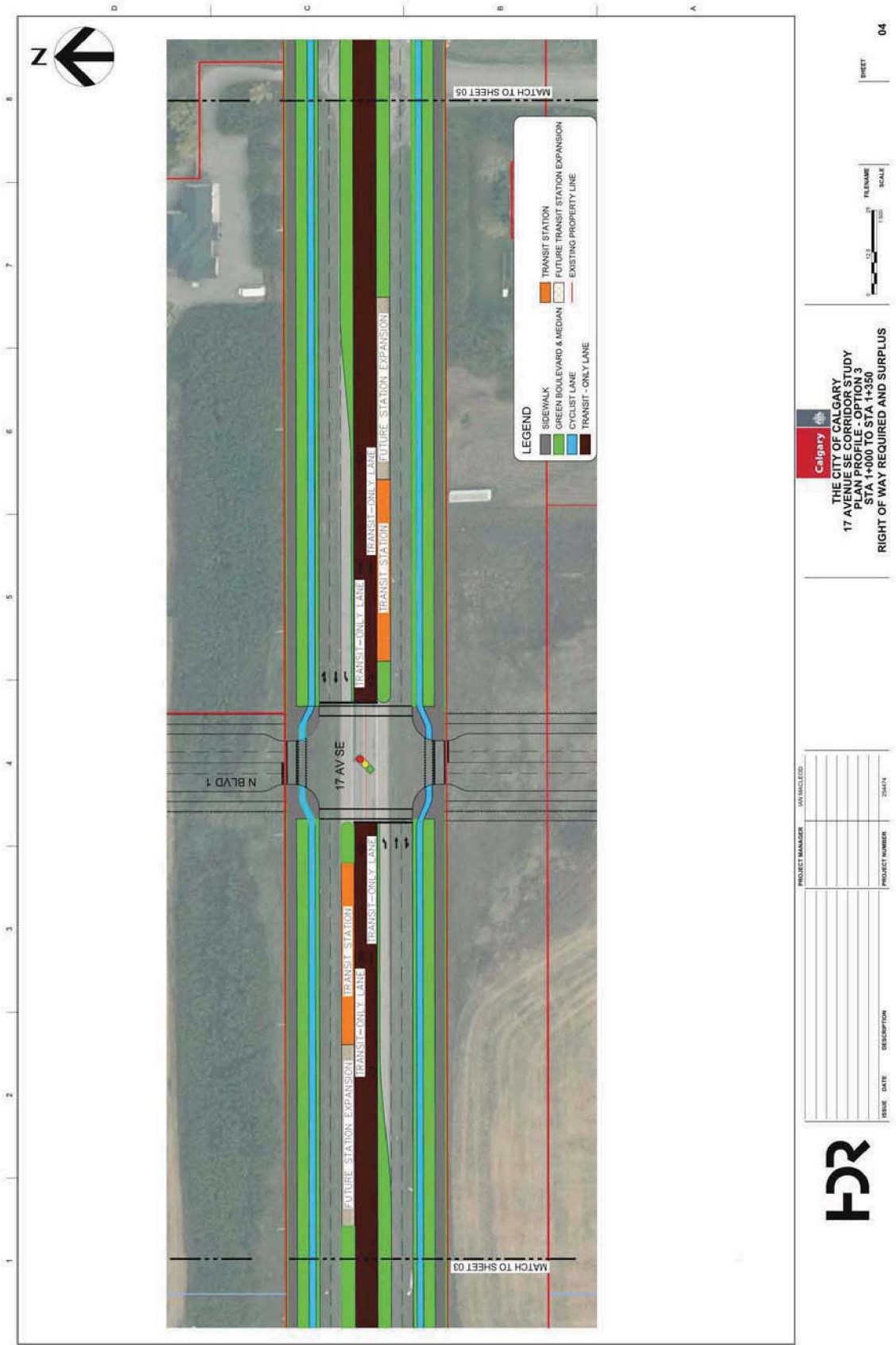
Plan view of the 17 Avenue SE corridor showing the proposed transit station expansion and intersection with 84 St SE and 17 Ave SE. The plan includes a legend for various transit features, a north arrow, and a scale bar. The plan view shows the intersection of 17 Ave SE and 84 St SE, with the proposed transit station expansion highlighted in orange. The plan also shows the existing transit station and the proposed expansion area. The plan includes a legend for various transit features, a north arrow, and a scale bar.

17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary

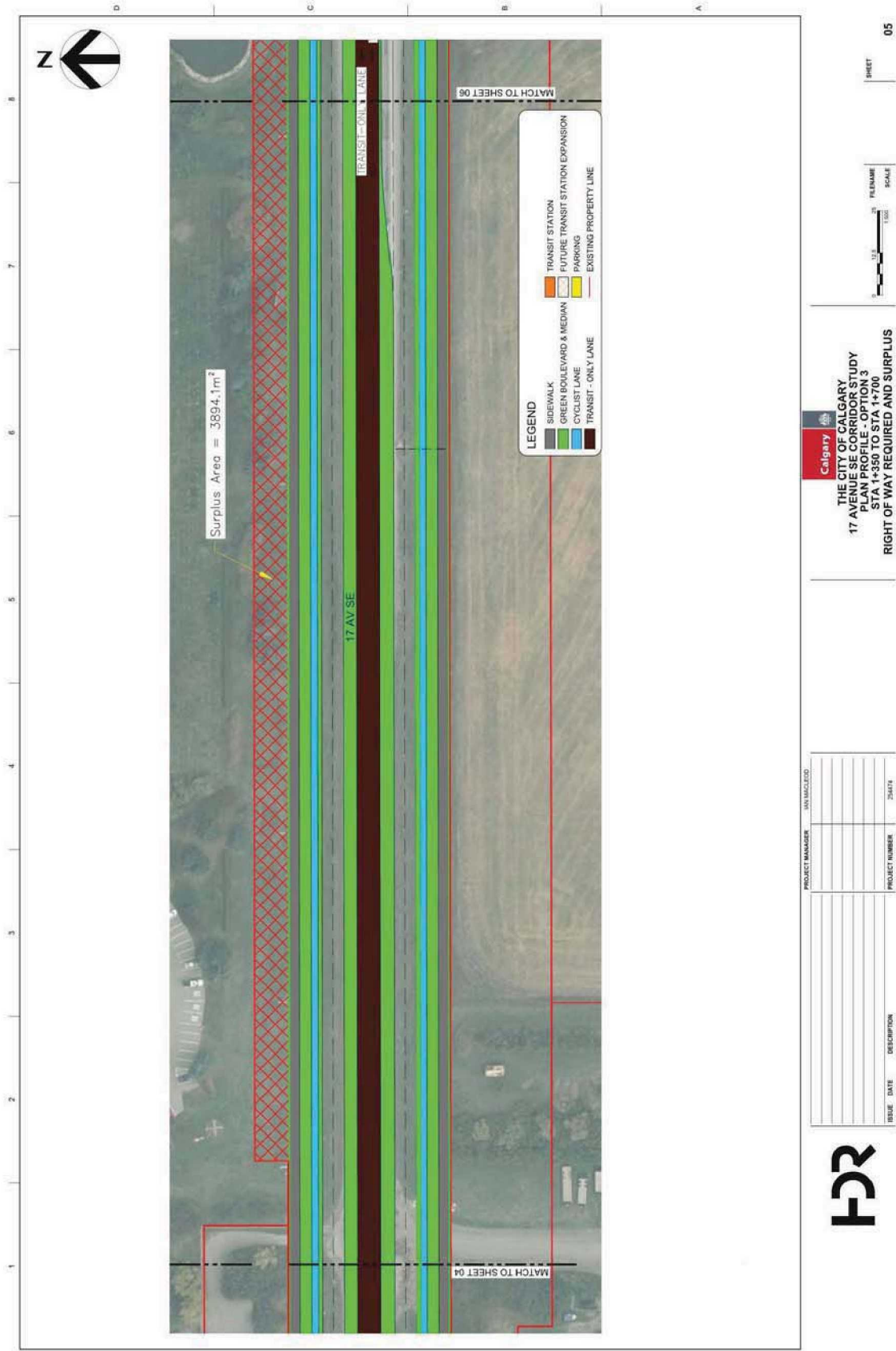




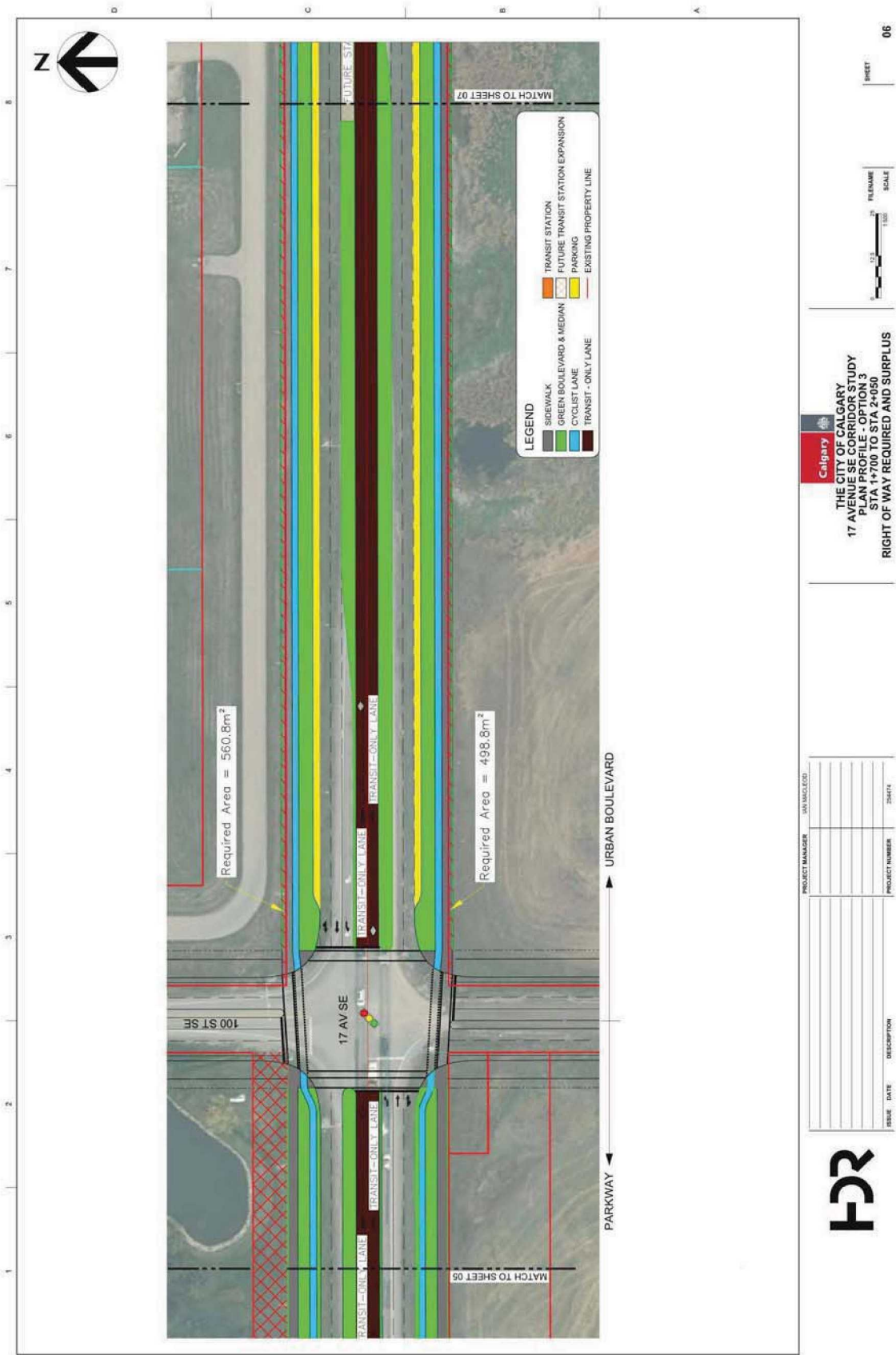
17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary



17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary

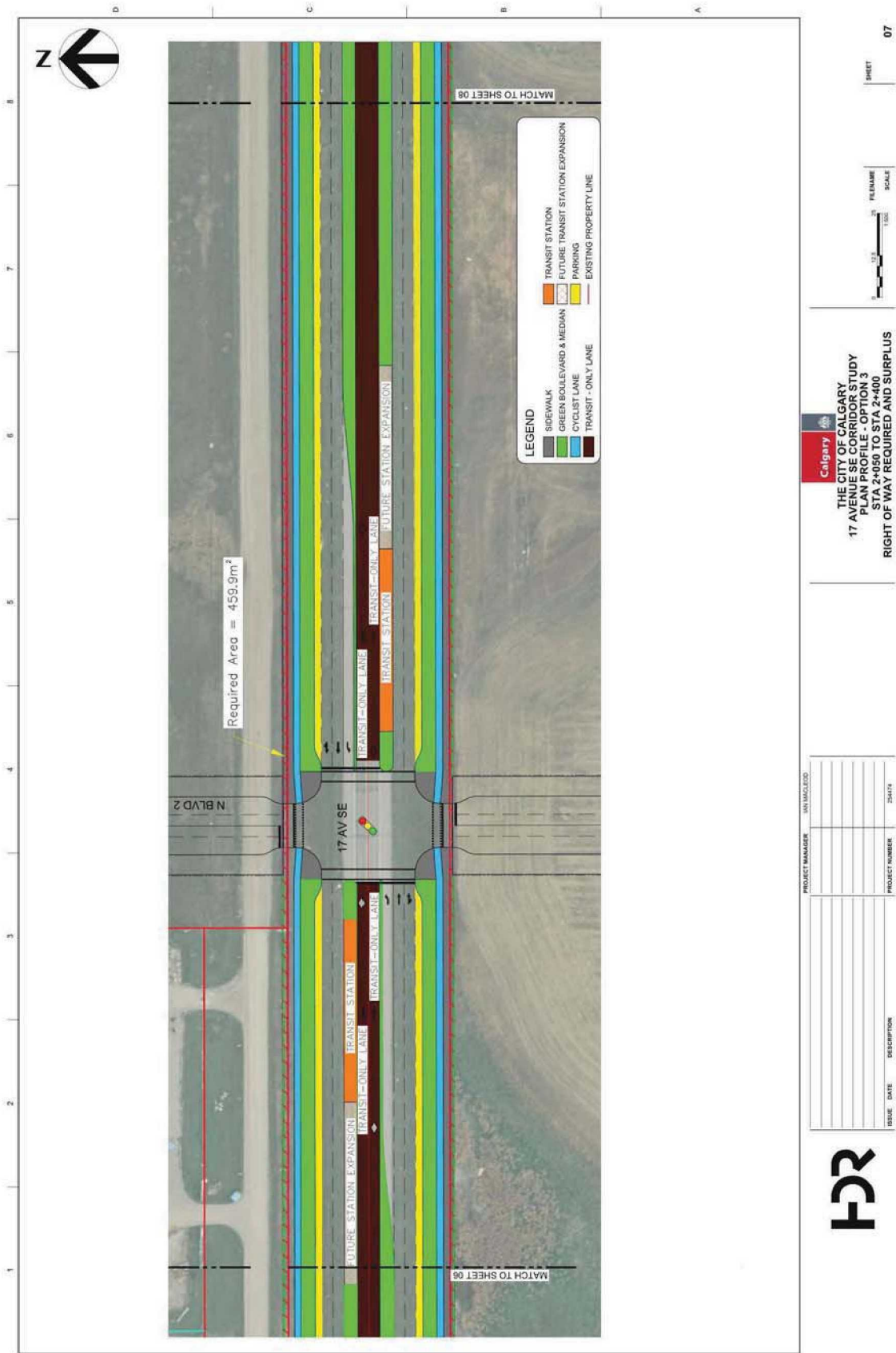


17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary





17 Avenue S.E. Corridor Study  
(Stoney Trail to East City Limit)  
Executive Summary



[illegible]

[illegible]



**LEGEND**

- SIDEWALK
- GREEN BOULEVARD & MEDIAN
- CYCLIST LANE
- TRANSIT - ONLY LANE
- PARKING
- EXISTING PROPERTY LINE
- TRANSIT STATION
- FUTURE TRANSIT STATION EXPANSION

**Required Area = 54.7m<sup>2</sup>**

**Surplus Area = 813.5m<sup>2</sup>**

**Required Area = 1738.3m<sup>2</sup>**

**MATCH TO SHEET 09**

**REFER TO CHESTMERE BLVD CORRIDOR PLAN**

**17 AV SE**

**116 ST SE**

**PROJECT MANAGER** WML/MCE/DD  
**ISSUE** DATE DESCRIPTION  
**PROJECT NUMBER** 254474

**THE CITY OF CALGARY**  
**17 AVENUE SE CORRIDOR STUDY**  
**PLAN PROFILE - OPTION 3**  
**STA 3+100 TO STA 3+391.163**  
**RIGHT OF WAY REQUIRED AND SURPLUS**

**HDR**

**FILE NAME** SCALE

**SHEET** 10

**THE CITY OF CALGARY**  
**17 AVENUE SE CORRIDOR STUDY**  
**84 ST SE REALIGNMENT**  
**RIGHT OF WAY REQUIRED**  
**SHEET 1**

**Legend**

- GREEN BOULEVARD & MEDIAN
- EXISTING PROPERTY LINE

**Area = 3601.0m<sup>2</sup>**

**Area = 5401.6m<sup>2</sup>**

**Area = 7100.5m<sup>2</sup>**

**PROPOSED ROW**

**84 ST SE**

**17 AVE SE**

**MATCH TO SHEET 02**

**0 10 20**

**0 10 20**

**0 10 20**

[illegible]



**N**

0 5 10 15 20 METERS

**LEGEND**

- GREEN BOULEVARD & MEDIAN
- EXISTING PROPERTY LINE

Area = 149.6m<sup>2</sup>

PROPOSED ROW

MATCH TO SHEET 02

84 ST SE

PROJECT MANAGER: UNAPPLICABLE

| ISSUE | DATE | DESCRIPTION |
|-------|------|-------------|
|       |      |             |
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PROJECT NUMBER: 20474

THE CITY OF CALGARY  
17 AVENUE SE CORRIDOR STUDY  
84 ST SE REALIGNMENT  
RIGHT OF WAY REQUIRED  
SHEET 3

HDR

SHEET 3

**LEGEND**

- GREEN BOULEVARD & MEDIAN
- EXISTING PROPERTY LINE

INTERSECTION WILL BE CLOSED

Scale: 1" = 100'

North Arrow

Grid: A-J, 1-10