

| | |
|-----------------|--|
| TO: | CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON FEBRUARY 20, 2019 |
| FROM: | KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR ENVIRONMENTAL AND ENGINEERING SERVICES AND CITY ENGINEER |
| SUBJECT: | SOUTHDALE ROAD WEST AND WICKERSON ROAD IMPROVEMENTS ENVIRONMENTAL STUDY REPORT |

| |
|-----------------------|
| RECOMMENDATION |
|-----------------------|

That, on the recommendation of the Managing Director, Environmental and Engineering Services and City Engineer, the following actions **BE TAKEN** with respect to the Southdale Road West / Wickerson Road Improvements Environmental Assessment:

- (a) Southdale Road West / Wickerson Road Improvements Environmental Study Report **BE ACCEPTED**;
- (b) A Notice of Study Completion for the Project **BE FILED** with the Municipal Clerk; and
- (c) The Environmental Study Report **BE PLACED** on the public record for a 30 day review period.

| |
|--|
| PREVIOUS REPORTS PERTINENT TO THIS MATTER |
|--|

- Civic Works Committee – June 19, 2012 – London 2030 Transportation Master Plan.
- Strategic Priorities and Policy Committee – June 23, 2014 – Approval of 2014 Development Charges By-Law and DC Background Study.
- Civic Works Committee – August 25, 2014 – Southdale Road and Boler Road Intersection Improvements Environmental Assessment Appointment of Consulting Engineer.
- Civic Works Committee – July 18, 2016 – Environmental Assessment Appointment of Consulting Engineer.

| |
|---|
| COUNCIL’S 2015-19 STRATEGIC PLAN |
|---|

The following report supports the Strategic Plan through the strategic focus area of *Building a Sustainable City* by implementing and enhancing safe and convenient mobility choices for transit, automobile users, pedestrians, and cyclists through the vertical alignment changes to provide increased safety for all users.

BACKGROUND

Purpose

This report provides Committee and Council with an overview of the Municipal Class Environmental Assessment (EA) for the Southdale Road West from Boler Road to Wickerson Road, including a portion of Wickerson Road north of Southdale Road West, and seeks approval to finalize the study. The completed Environmental Study Report (ESR) documents the EA process undertaken.

Background

Due to rising traffic volumes, developments in the area, and increasing safety concerns, the City identified a need for improvements along the Southdale Road West corridor, which included the portion of Wickerson Road. More recently, the City's Cycling Master Plan, The London Plan and the 2030 Transportation Master Plan show the importance of improvements to the Southdale Road West corridor for all modes of transportation to better and more safely connect the city's transportation network. An EA is required due to the anticipated impacts associated with reconstructing the road to address the current substandard conditions.

The Southdale Road West / Wickerson Road Improvements Class EA was carried out in accordance with Schedule 'C' of the Municipal Class Environmental Assessment (Class EA) document. The Class EA process is approved under the Ontario Environmental Assessment Act and outlines the process whereby municipalities can comply with the requirements of the Act.

The Class EA study has satisfied the requirements of the Ontario Environmental Assessment Act by providing a comprehensive, environmentally sound planning process with public participation, and facilitating dialogue with parties representing a number of diverse interests. This ESR documents the decision making process carried out during the Southdale Road West / Wickerson Road Improvements Class EA Study. See below Figure 1.0 which illustrates the study area.

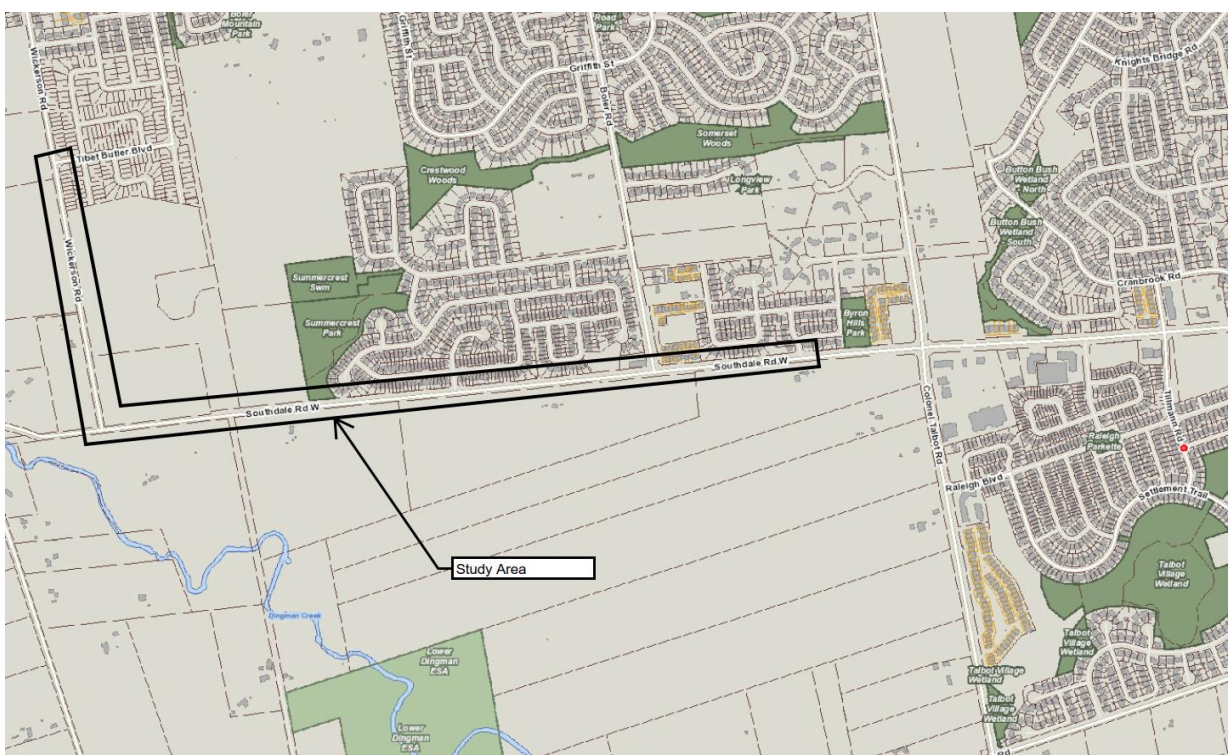


Figure 1.0 – Southdale Road West and Wickerson Road Improvements EA Study Area

Within the study area, Southdale Road West is 1.7 km of two-lane arterial roadway extending from approximately 430m east of Boler Road to Wickerson Road in the west. Also included in the study area is Wickerson Road which is 650m of two-lane secondary collector extending from Southdale Road west at the southern limit to approximately 150m south of Tibet Butler Boulevard. The study area includes four intersections Southdale Road West/Byronhills Drive, Southdale Road West/Boler Road, Southdale Road West/Bramblewood Place, and Southdale Road West/Wickerson Road. Southdale Road West throughout the study area is characterized by steep slopes up to approximately 11% both in and out of vertical crests and sags and restricted sight lines. The current posted speed along Southdale Road West is 60 km/hr east of Boler Road and 50 km/hr west of Boler Road, with Wickerson Road being 60 km/hr. The surrounding area is predominantly rural with significant grades and localized woodlots. Improvements to the road are necessary as traffic volumes are increasing with surrounding development.

The EA identifies solutions to improve Southdale Road West. The proposed vertical alignment of Southdale Road West will allow for improved sightlines, operations, maintenance, and overall safety to meet the mobility and accessibility needs of all users. The project will allow for safer usage by emergency services, vehicular users, cyclists, and pedestrian's where service is currently limited by road geometrics.

The London Plan

The London Plan, which encompasses the objectives and policies for the City's short and long-term physical land development, classifies this portion of Southdale Road West as a Rural Thoroughfare. The land use surrounding this portion of Southdale Road West is primarily Green Space, Environmental Review lands, and Neighbourhoods. The London Plan classifies this portion of Wickerson Road as a Neighbourhood Connector, with the surround land use being the same as Southdale Road West.

The Rural Thoroughfare street classification places a priority on through movement of vehicles, farm equipment and freight/goods, and withholds a quality of standard of urban design. The Neighbourhood Connector street classification places a priority on pedestrians, move low to medium volumes of cycle, transit and vehicle movements, minimize width of vehicle zone, very high-quality pedestrian realm, and very high standard of urban design.

2030 Transportation Master Plan (2013)

One of the five "Smart Moves" that form the basis of the TMP is a More Strategic Program of Road Network Improvements. There is a greater emphasis in this TMP on transit, active transportation, travel demand management, and safety. The City's approach to defining the need for road network improvements has become more strategic. This approach is consistent with the City's objective to facilitate an increase to transit and active transportation modal shares from current levels. The City's approach also explicitly recognizes that road improvements will be required for different purposes, including safety.

DISCUSSION

Project Description

The ESR documents the process followed to determine the recommended undertaking and the environmentally significant aspects of the planning, design, and construction of the proposed improvements. It describes the problem being addressed, the existing social, natural and cultural environmental considerations, planning and design alternatives that were considered and a description of the recommended alternative.

The ESR also identifies environmental effects and proposed mitigation measures, commitments to further work and consultation associated with the implementation of the project. A copy of the Executive Summary for the ESR is contained in *Appendix A*.

Planning and Analysis of Alternatives

Phase I of the Municipal Class EA (MCEA) process involved the identification of the problem and opportunity statement. It was determined that significant improvements are required to the grade and cross-section of Southdale Road West and Wickerson Road. The study is assessing the need for traffic operations and safety improvements, access modifications and pedestrian and cyclist friendly design features on the two roads.

Phase 2 of the MCEA process involved identifying alternative solutions (planning alternatives) to address the problem/opportunity statement.

The following two alternative solutions were examined in relation to the geometric deficiency on Southdale and Wickerson Road:

- Alternative 1 – Do Nothing
- Alternative 2 – Improvements to Southdale Road West and Wickerson Road to meet minimum design Standards.
 - Sub-Alternative 1 – vertical and cross section reconstruction to meet design standards on the existing horizontal alignment
 - Sub-Alternative 2 – horizontal realignment of Southdale Road West and Wickerson Road outside of the current footprint of the roadway. This alternative would also include vertical and cross section reconstruction to meet design standards.

Following consultation with agencies and the public, the preferred planning solution was selected as Alternative 2 – Sub-Alternative 1, vertical and cross-section reconstruction to meet design standards on the existing horizontal alignment.

Key factors for Alternative 2 – Sub-Alternative 1 being selected as the preferred planning solution include the following:

- Meet's the City's minimum road design standards;
- Improves safety;
- Provides opportunities for active mobility;
- Improves drainage and can accommodate other planned servicing improvements; and
- Has minimized impacts on natural heritage features, existing land uses, and archaeological resources through thorough mitigation measures.

Design Alternatives

Phase 3 of the MCEA process involves the development and evaluation of alternative design concepts. The main outcome in this phase of the study was developing road cross-sections and layout concepts for the recommended planning solution.

Identification of the land requirements for this project was a key outcome to identify appropriate mitigation measures such as minimizing cultural, socio-economic and environmental impacts, while still meeting the City's design standards.

In addition to the city and national design guidelines, the following factors were considered in the development of alternative designs:

- Design options through the corridors were constrained due to existing grades and slopes. Centreline grades were restricted to 6% excluding vertical curves for similar reasons.
- The centreline alignment is proposed to be maintained on the existing horizontal alignment to have minimized impacts on natural heritage features, existing lane uses and archaeological resources.

After reviewing design options, six feasible alternative design options were developed and analyzed using the design criteria, and are as follows:

- Rural vs. Urban Cross-Section
 - Urban section was chosen to minimize footprint and manage stormwater.
- Cut Slopes in Constrained Areas
 - Options included: retaining walls and slopes of varying inclination.
 - Vertical slopes at 2 horizontal : 1 vertical slopes were chosen to minimize cost, simplify construction, provide a more natural appearance and provide additional area for replanting on slopes with no significant increase in impacts to trees or vegetation.
- Fill Slopes in Constrained Areas
 - Options included: retaining walls and slopes of varying inclination
 - Steeper reinforced slopes at 1 horizontal : 1 vertical were chosen to minimize the footprint, provide a more natural appearance and minimize the length of the culvert.
- Profile Optimization
 - Options included: standard (6% max) and substandard (8%) grades.
 - Profile was chosen to meet standards for arterial roads, manage cuts/fills and minimize driveway impacts.
 - It was also determined that there was no significant benefit by increasing grades to 8% which would have more negative impacts.
- Stormwater Management
 - Storm sewers and low impact development (LID) stormwater solutions will be implemented to manage stormwater.
- Active Transportation
 - Sidewalks will be provided on the north side of Southdale Road and the east side of Wickerson Road. Multi-use trail to be implemented per Cycling Master Plan and on-street bike lanes to be provided on Southdale Road.

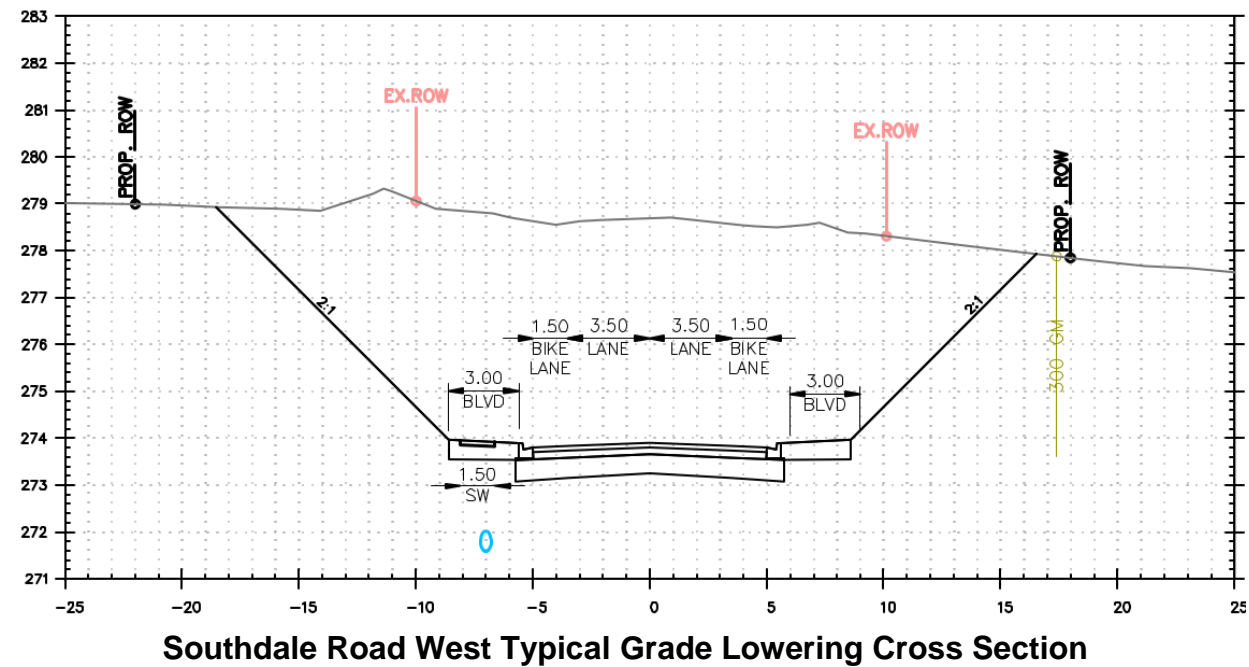
Recommended Alternative

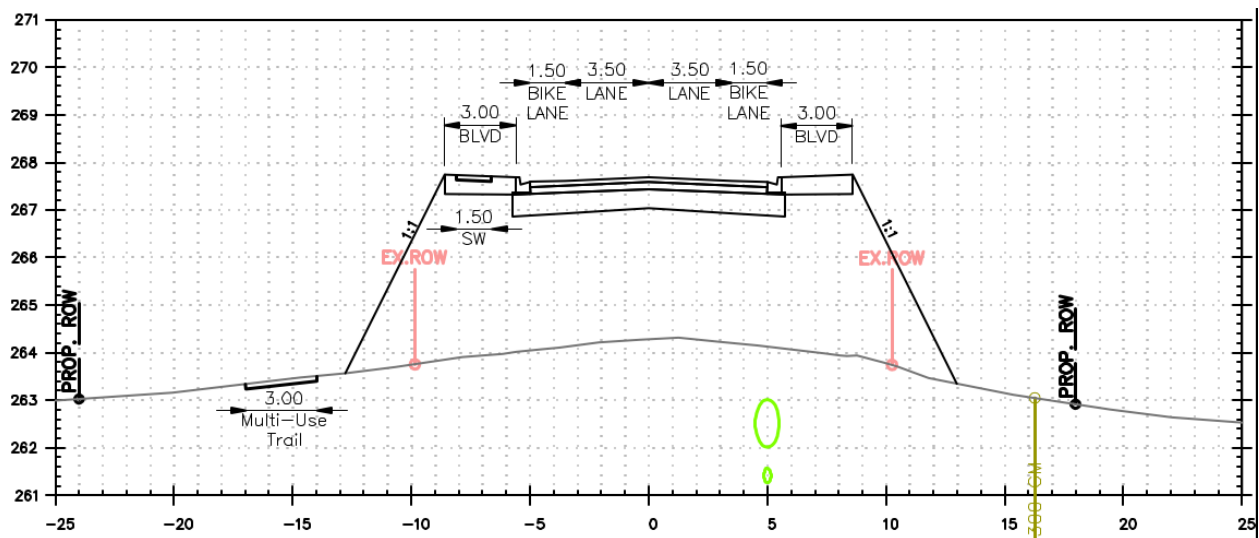
It is recommended to proceed with Alternative 2 – Sub-Alternative 1, vertical and cross-section reconstruction to meet design standards on the existing horizontal alignment with the following design criteria:

- urban cross-section;
- slightly steeper cut slopes of typical inclination (2 horizontal : 1 vertical);
- steeper fill slopes requiring reinforcement on Southdale Road to minimize footprint and impacts to the natural environment;
- longitudinal profile meeting arterial road standards;
- storm sewers and LID stormwater solutions;
- a sidewalk; and,
- a multi-use path.

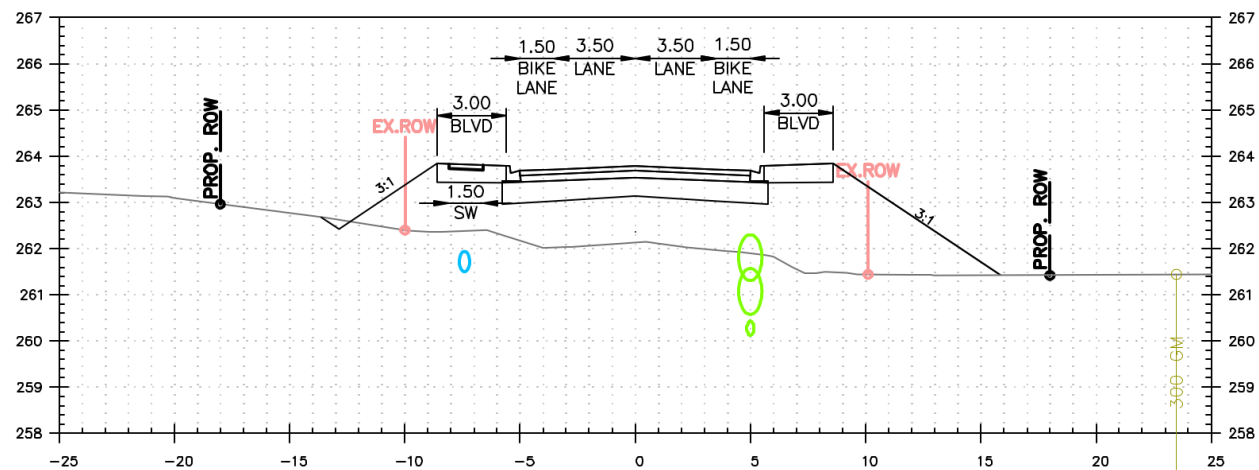
The preferred design best addresses the project problem statement based on the detailed evaluation and feedback received from the public. Factors such as impacts of archaeological potential, built heritage resources, existing vegetation, property, and existing sightline and safety issues as well as opportunities for active transportation guided the evaluation.

The design solution, as illustrated in the following figures, involves the vertical realignment of Southdale Road, west of Boler Road, and Wickerson Road, north of Southdale Road. This will result in a flatter road with improved operations throughout both corridors. Improvements of the urban cross-section include standard lane widths, bike lanes, sidewalk, and a multi-use path to accommodate pedestrians and cyclists. Future consideration and accommodation will be given to connections of cycling infrastructure in the entire area.





Southdale Road West Typical Grade Raising Cross Section



Wickerson Road Typical Cross Section

Additional design components such as intersection design and current driveway intersections were considered.

As mentioned above, four intersections exist within the study area. Three intersection designs were compared: unsignalized intersection, signalized intersection, and roundabout. Based on the intersection design evaluation, unsignalized intersections were recommended due both the current and projected traffic volumes not warranting signalization under the studied horizon.

Existing driveways along these two corridors connect to the roadway at locations where sight lines are limited along Southdale Road.

The Southdale Road West / Wickerson Road Improvements project is situated within a rural area adjacent to significant woodlots. The natural environment was considered in the evaluations throughout the study. The selected alternative provides an opportunity to improve roadway operations while minimizing impacts to the natural environment by retaining the existing alignment. The focus of the design options was how to best minimize impacts to trees and the natural environment.

Public and Agency Consultation

Consultation was a key component of this Class EA study in order to provide an opportunity for stakeholder groups and the public to gain an understanding of the study process and provide feedback. The consultation plan was organized around key study milestones, including the two Public Information Centres (PIC's), stakeholder engagement and participation of technical review/regulatory agencies. The key stakeholders included residence, interested public, agencies, Indigenous Communities and those who may be affected by the project.

A Notice of Study Commencement was issued in November 2016. The study team received correspondence from the public and agencies indicating their interest in the study and requesting to be kept informed.

Public Information Centre No. 1 was held on March 3, 2017 to present the study, including information on existing conditions, alternative planning solutions, evaluation criteria and design considerations. It served as an opportunity for the public to review the project information, ask questions, and provide input to the members of the study team.

Public Information Centre No. 2 was held on May 31, 2018 as an opportunity for attendees to review the impact of the road improvement options on the social, cultural, economic, and natural environments as well as review the preliminary preferred design.

Agencies and stakeholders were notified at study milestones and during specific phases of the study which required an information update pertaining to them. In addition to formal public events, the project team conducted in-person meetings with stakeholders and agencies as requested and required. Presentations were made to the City of London Environmental and Ecological Planning Advisory Committee (EEPAC), Cycling Advisory Committee (CAC) and Transportation Advisory Committee (TAC) throughout the project.

In general all agencies and stakeholders understand the need for roadway improvements but some had concerns regarding natural heritage impacts and protection for future growth of the corridor. Mitigation of potential impacts involves the avoidance or minimization of potential impacts through good design, construction practices and / or restoration and enhancement activities. If mitigation is not possible then compensation is possible to achieve a no net-impact for particular natural heritage features. Detailed mitigation measures will be finalized in consultation with impacted property owners, City and UTRCA, as part of detailed design. Recommended construction mitigation measures will include:

- Detailed tree survey completed during Detailed Design and a tree preservation plan be prepared with the goal of minimizing impacts to trees,
- Edge Management and Compensation Planting Plan to reduce impacts to remaining woodland community by improving the vegetative buffer along the newly created woodland edge, and
- Compensation plantings of native trees based on the number of removals required to facilitate road improvements.

| |
|-----------------------|
| IMPLEMENTATION |
|-----------------------|

Construction Staging

Construction is currently scheduled to begin as early as possible and potentially in 2020. However, this is subject to property acquisition and budget availability. Utility relocations, property acquisitions and tree clearing will be completed prior to construction.

The construction is expected to take two years due to the extent of the project area, and the large amount of cut and fill required. Road closures will be required for portions of this project due to the significant grade adjustments. Network traffic management and a communications plan will be developed during detailed design to inform road users, outline detours during closures and instruct local traffic movement. Access to residential properties will be maintained during construction.

| |
|---------------------------------|
| FINANCIAL CONSIDERATIONS |
|---------------------------------|

Preliminary Cost Estimates

The estimated total project cost associated with the proposed improvements, including engineering, roadway construction, earthworks, stormwater management, watermain works, traffic signal/illumination, utility relocations, landscaping, staging, and other project costs is approximately \$12.8 M. An additional investment of \$2.0 M for coordinated watermain and sanitary sewer lifecycle renewal will benefit from project efficiencies. A detailed cost breakdown is shown below.

| Item | Estimated Cost (2019 \$) |
|----------------------------------|--------------------------|
| Transportation Improvements | |
| Roadworks and Earthworks | 4,700,000 |
| Storm Sewers | 2,500,000 |
| Traffic Signals and Illumination | 500,000 |
| Miscellaneous | 700,000 |
| Utility Relocation (10%) | 800,000 |
| Sub-total | 9,200,000 |
| Property Acquisition | 390,000 |
| Contingency (20%) | 1,840,000 |
| Engineering and Consulting (15%) | 1,380,000 |
| Total Preliminary Cost Estimate | 12,810,000 |
| Lifecycle Renewal Cost Estimate | |
| Sanitary Sewers | -- |
| Watermain | 1,500,000 |
| Sub-total | 1,500,000 |
| Contingency (20%) | 300,000 |
| Engineering and Consulting (15%) | 225,000 |
| Total Preliminary Cost Estimate | 2,025,000 |

The current 2014 Development Charges Background Study includes a cost estimate of \$9.4 M. This estimate was based on 2014 dollars, limited project information and made assumptions based on speculated grading impacts and construction staging which have implications on schedule. The completion of this EA provides a more informed cost estimate for this unique project that will be used to inform the 2019 Development Charge Background Study development and enable better long-term financial planning. The final cost of the project will be influenced through detailed design, as mitigation measures are fully developed.

CONCLUSION

Improvements to the Southdale Road West and Wickerson Road corridors are necessary to bring the roads up to current design standards to accommodate increasing traffic volumes due to surrounding development. A Municipal Class Environmental Assessment (EA) was undertaken to confirm the detailed preferred solution to proceed in coordination with the required corridor improvements. The ESR is ready for final public review.

The Southdale Road West and Wickerson Road Class EA Study was carried out in accordance with Schedule 'C' of the Municipal Class Environmental Assessment process.

Two alternative planning solutions were developed and assessed against their ability to reasonably address the above problems and opportunities. The preferred planning solution improves safety with compliance with current design standards, promotes active transportation, increase level of services for emergency service and maintenance vehicles and minimizes impacts on the natural environment.

Six alternative design concepts were developed and evaluated based on factors such as impact on areas of archaeological potential, built heritage resources, vegetation and existing natural environmental features, property, landscaping, cut/fill volumes, utilities, and opportunities for active transportation. The impact of these factors was similar between all six alternative design features. The recommended design will reconstruct to improved design standards along the existing horizontal alignment. The reconstruction will include storm sewers and LIDs, sidewalks and multi-use path. This was selected as it best addresses the project problem statement based on detailed evaluation and feedback received from the public while minimizing impacts as much as feasible. Coordinated watermain and sanitary sewer renewal will also be undertaken with the project.

Consultation was a key component of this study. The Class EA was prepared with input from agencies, utilities, emergency service providers, property owners in proximity to the study and Indigenous Communities.

Pending Council approval, a Notice of Study Completion will be filed, and the ESR will be placed on public record for a 30-day review period. Stakeholders and the public are encouraged to provide input and comments regarding the study during this time period. Should the public and stakeholders feel that the EA process has not been adequately addressed, they may request a Part II Order to the Minister of the Environment within the 30-day review period per MOECP instructions on their website.

The project will be implemented as soon as possible. It may be possible to begin the construction of the Southdale Road West and Wickerson Road improvements in 2020. However, this is subject to property acquisition and approvals timings.

Acknowledgements

This report was prepared with assistance from Sam Shannon, C.E.T., Technologist II, and Ted Koza, P. Eng., of the Transportation Planning and Design Division.

| | |
|--|--|
| PREPARED BY: | RECOMMENDED BY: |
| | |
| DOUG MACRAE, P. ENG., MPA DIVISION MANAGER TRANSPORTATION PLANNING AND DESIGN | KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR ENVIRONMENTAL AND ENGINEERING SERVICES AND CITY ENGINEER |

Attach: Appendix A – Environmental Study Report Executive Summary

c: Brian Huston, Dillon Consulting

Appendix A Environmental Study Report Executive Summary

Executive Summary

Introduction

The City of London (the “City”) retained Dillon Consulting Limited (Dillon) to complete a Municipal Class Environmental Assessment (EA) for improvements to Southdale Road West and Wickerson Road from approximately 430 m east of Boler Road to approximately 650 m north of the Wickerson Road/Southdale Road West intersection (the “project”). Completed as a Schedule “C” project under the Municipal Class Environmental Assessment process (October 2000, as amended in 2007, 2011 and 2015) (MCEA), the project assessed the need for road improvements including vertical and horizontal alignment changes to both Southdale Road West and Wickerson Road.

Problem/Opportunity Statement

The following Problem/Opportunity Statement was developed as part of Phase 1 of the Class EA process. The statement is based on an overview of planning, engineering and environmental conditions potentially affected by the proposed corridor improvements.

Improvements to the profile and cross-section of Southdale Road West and Wickerson Road are required to meet design standards. Both roads will be improved to a two-lane standard, with the inclusion of active transportation and storm water management measures, and will require grading beyond the existing ROW.

The improvements will be planned and designed to:

- Be consistent with The London Plan, Cycling Master Plan and the 2030 Smart Moves Transportation Master Plan
- Take advantage of opportunities to provide a clear edge between the urban and rural areas of the City
- Incorporate required infrastructure and make provision for future infrastructure, where feasible
- Avoid or minimize impacts on the surrounding neighbourhoods and the Lower Dingman Corridor ESA
- Improve access/safety for properties adjacent to corridor.

Public and Agency Consultation

A Notice of Commencement was issued for the project in November 2016. The City received a total of four comments from the Notice of Commencement. Comments were primarily related to requests to be kept informed and requests that natural environment features in the Study Area be given careful consideration throughout the project.

Public Information Centre (PIC) 1 was held on March 3, 2017, at the Byron Optimist Community Centre. The purpose of PIC 1 was to obtain public and agency input on existing conditions, the problem and opportunity statement and alternative solutions for the corridor. A total of 21 people attended the PIC



and 14 written submissions were received following the PIC. In general, most of the PIC 1 attendees were supportive of the project. Concerns were raised regarding impacts to natural heritage features throughout the corridor and road safety concerns based on the existing profile of Southdale Road West.

PIC 2 was held on May 31, 2018, at the Byron United Church. The purpose of the second PIC was to present the preferred design for the corridor. A total of 23 people attended the PIC and six written submissions were received following the event. Comments received primarily related to the extent of natural heritage impacts and suggestions on ways to further minimize impacts from tree removals. Additionally, several residents along Southdale Road West raised concerns regarding pedestrian crossings of Southdale Road at Byron Hills Drive.

Throughout the project several meetings were held with directly impacted landowners to discuss site specific impacts, including potential tree removals and grading impacts. Several landowners have concerns regarding tree removals and impacts to the natural heritage system.

Presentations were made to the City of London Environmental and Ecological Planning Advisory Committee (EEPAC), Cycling Advisory Committee (CAC) and Transportation Advisory Committee (TAC) throughout the project. Comments were received from EEPAC and CAC for the project. In general all committees understand the need for roadway improvements but had concerns regarding natural heritage impacts and protection for future growth of the corridor.

Alternative Solutions

Along with the “Do nothing” alternative, two alternative solutions were developed for the project:

- No improvements to Southdale Road West and Wickerson Road. Roads would remain in the same condition with no improvements (Do Nothing)
- Improvements to Southdale Road West and Wickerson Road to meet minimum design standards
 - Alternative 1 – vertical and cross section reconstruction to meet design standards on the existing horizontal alignment
 - Alternative 2 – horizontal realignment of Southdale Road West and Wickerson Road outside of the current footprint of the roadway. This alternative would also include vertical and cross section reconstruction to meet design standards.

Preferred Alternative

Alternative 1 is recommended as the preferred solution as it can meet the City’s minimum road design standards, improve safety, provide opportunities for active mobility, improve drainage and accommodate other planned servicing improvements. Although it will have some impacts on natural heritage features, existing land uses, and archaeological resources, the impacts will be minimized by through appropriate mitigation measures during construction and compensation measures where necessary.



Design Options

Several design options were developed for the preferred alternative. As the selected alternative provides an opportunity to improve roadway operations with some impact to the natural environment, the focus of design options was to best minimize impacts to trees and the natural environment. The following design options were developed:

- Cross Section Type:
 - Rural (wide shoulders and roadside ditches)
 - Urban (curb and gutter and sewer system)
- Cut slopes in constrained areas:
 - Retaining walls
 - Reinforced slopes (1:1)
 - Standard 2:1 slopes with no reinforcement
- Fill slope at culvert in valley
 - Retaining walls
 - Reinforced slopes (1:1)
 - Standard 2:1 slopes with no reinforcement
- Profile optimization
 - Standard maximum roadway grade (6%)
 - Substandard roadway grade (8%)
- Stormwater Management (i.e., addition of storm sewers and low impact developments)
 - No improvements
 - Include Improvements
- Active Transportation (i.e., sidewalks, multi-use trails, cycling infrastructure)
 - No improvements
 - Include Improvements.

Comparative Evaluation of Design Options

Dillon evaluated each of the design options. The selected option for each is provided in **Table E1**.



Table E1: Design Option Evaluation Results

| Design Option | Selected Option | Evaluation Factors |
|---------------------------------|-----------------------|--|
| Cross Section | Urban | Minimizes footprint of roadway and while managing stormwater runoff |
| Cut slopes in constrained areas | 2:1 slopes | Minimizes construction and maintenance costs, simplifies construction, provides a more natural appearance and provides an additional area for replanting on slopes |
| Fill slope at culvert in valley | Reinforced 1:1 slopes | Minimizes footprint, provides a more natural appearance than retaining walls and minimizes length of culvert |
| Profile optimization | Standard Maximum (6%) | Standard maximum meets arterial road standards, manages cut/fills and minimizes impacts to driveways. No significant benefit in steepening slopes to non-standard 8% profile |
| Stormwater Management | Improvements | Can be implemented to better manage stormwater runoff without impacting footprint of roadway, meet stormwater management and avoid downstream impacts |
| Active Transportation | Improvements | Sidewalks to be provided for connectivity to existing infrastructure. Multi-use trail and on-street bike lanes to be provided per cycling master plan |

Preferred Design

The preferred plan and profiles are shown in **Appendix C**. Design features include:

- Significant profile upgrades to Southdale Road West to meet design standards
- Vertical profile improvements on Wickerson Road to meet design speed standards
- Horizontal alignment shift of Wickerson Road approximately 5 m to the east to better align with adjacent roadway improvements completed as part of ongoing development work north of the project Study Area
- Southdale Road West and Wickerson Road will be updated to an urban cross section to minimize footprint impacts and manage stormwater runoff
- Installation of sidewalks on the east side of Wickerson Road and north side of Southdale Road West within the project limits and on the south side of Southdale Road West between Colonel Talbot Road and Boler Road
- Extension of the existing multi-use trail on north side of Southdale Road West from Bramblewood place to the existing Boler Mountain Access Road
- Installation of on road bike lanes along Southdale Road West
- Construction of a new 450 mm watermain on Wickerson Road and on Southdale Road West between Wickerson Road and Boler Road
- Installation of low impact development features to control stormwater including:
 - Oversized stormwater storage pipes, along with infiltration pipes located below them



- A raingarden infiltration or bio retention cell facility located on the south side of the intersection of Southdale and Wickerson to mimic or enhance the existing infiltration rates
- Oil Grit Separators will be used to pre-treat the flow to these infiltration measures
- New illumination will be provided within the project limits.

Recommendations for Mitigation of Potential Impacts

Mitigation involves the avoidance or minimization of potential impacts through good design, construction practices and/or restoration and enhancement activities. If mitigation is not possible then compensation is possible to achieve a no net-impact for particular natural heritage features. Detailed mitigation measures will be finalized in consultation with the City and UTRCA, if necessary, as part of Detailed Design. Mitigation measures may include:

- Development of environmental concerns and commitments for the construction period
- Invasive Species Management Plan
- Edge Management and Compensation Plan
- Wetland Offsetting
- Erosion and Sediment Control Plan
- Wildlife Impact Mitigation Plan
- Stormwater Management Plan
- Environmental Monitoring Plan.

Construction Timing and Traffic Management During Construction

Construction is currently scheduled to begin in 2020, subject to budget availability and property acquisition. Utility relocations, property acquisitions and tree clearing will be completed prior to construction.

A Traffic Management Plan will be developed during Detailed Design and will outline detours during closures for local traffic movements. Road closures will be required. Access to residential properties will be maintained during construction.

Preliminary Cost Estimate

As shown in **Table E2**, the preliminary construction cost estimate for the proposed corridor improvements to Southdale Road West and Wickerson Road, including the City's share of utility relocations (but excluding property cost), is approximately \$14.9 Million.



Table E2: Preliminary Construction Cost Estimate

| Item | Estimated Cost |
|--|---------------------|
| Roadworks and Earthworks | \$ 4,700,000 |
| Sanitary Sewers and Appurtenances | -- |
| Storm Sewers and Appurtenances | \$2,500,000 |
| Watermains and Appurtenances | \$1,500,000 |
| Traffic Signals and Illumination | \$500,000 |
| Miscellaneous | \$700,000 |
| Utility Relocations | \$800,000 |
| Sub-total | \$10,700,000 |
| Contingency (20%) | \$2,140,000 |
| Engineering and Consulting (15%) | \$1,605,000 |
| Property Acquisition | \$390,000 |
| TOTAL PRELIMINARY COST ESTIMATE | \$14,825,000 |

