FUNCTIONAL PLANNING REPORT

SHAGANAPPI TRAIL

Sarcee Trail NW to Bow Trail SW

PREPARED BY

The City of Calgary

ENGINEERING DEPARTMENT

JANUARY 1970

THE CITY OF CALGARY

CITY CLERK'S DEPARTMENT

(Sheet of)

TO: Director of Planning

COPIES TO: Director of Transportation

CITY OF CALGARY TRANSPORTATION DEPARTMENT
JAN 03 1978
DIRECTION

DECISION OF CITY COUNCIL

January 3, 1978

EXTRACT FROM Minutes of a meeting of the Standing Policy Committee on Operations and Development dated December 12, 1977, dealt with by City Council at its meeting on December 21, 1977, and adopted.

8 SHAGANAPPI TRAIL EXTENSION ACROSS THE BOW RIVER
(O.D. - 8)

THE COMMITTEE AGREED TO AMEND THE RECOMMENDATION OF THE COMMISSIONERS BY ADDING THE FOLLOWING:

That concerning Bowness which is an established community, a N.I.P. area presently in design brief presentation, as the "protection" as applied in A-1 does not give protection for acquisition, that applications for development or reclassification up to R-2A be given favourable consideration.

RECOMMENDATION - Shaganappi Trail across Bow River

THE COMMITTEE AGREED THAT THE FOLLOWING RECOMMENDATION BE FORWARDED TO COUNCIL FOR CONSIDERATION AT ITS NEXT REGULAR MEETING:

A. THAT COUNCIL RE-AFFIRM THEIR DECISION OF NOVEMBER 15TH, 1976 TO:-

(a) ADOPT AS A PLANNING STRATEGY THE CONTINUED PROTECTION OF:

i. THE SARCEE TRAIL TRANSPORTATION CORRIDOR FOR EXPRESSWAY STANDARD ROADWAY FROM THE CROWCHILD TRAIL TO THE TRANS CANADA HIGHWAY

ii. THE SHAGANAPPI TRAIL TRANSPORTATION CORRIDOR FOR AN EXPRESSWAY STANDARD ROADWAY FROM THE CROWCHILD TRAIL TO THE BOW TRAIL

B. THAT APPLICATIONS FOR DEVELOPMENT OR RECLASSIFICATION IN BOWNESS UP TO R-2A BE GIVEN FAVOURABLE CONSIDERATION.

(Alderman Lee OPPOSED)

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PREFACE

The following report, concerned with recommendations for development of the Shaganappi Trail Transportation Corridor, is a typical example of The City of Calgary's inter-disciplinary approach to the functional planning and design of various links in the City's arterial thoroughfare network. The Transportation Planning section of the Engineering Department has been responsible for ensuring design standards commensurate with the thoroughfare's functional classification and preparation of the text and plans contained in the main body of the report. The detailed planning reflected in the text and plans is, however, a composite input of the talents of many people in several Departments.

A general procedure, established for previous functional reports, has been followed. It consists essentially of the following steps:

1. *Preparation of preliminary design plans indicating location, alignment and basic details.*
2. *Presentation of the preliminary design plans to the Traffic Planning Team for purposes of familiarization. The Team is composed of technical representatives from the Planning, Transit, Land and Engineering Departments.*
3. *Circulation of the preliminary plans to the above named Departments for study and comment by various intra-departmental disciplines.*
4. *Presentation of the preliminary plans, amended in accordance with the circulation comments, to the Technical Coordinating Committee. This group is made up of the Chief Commissioner; the Commissioner of Operations and Development; the heads, assistant heads, division heads and various technical personnel of the Planning, Transit, Land and Engineering Departments. It is also at this stage that the Provincial Department of Highways becomes involved in the planning process.*
5. *Preparation of final report plans and profiles and a draft copy of the text.*
6. *Circulation of final plans and draft text to the same Departments for study and comments as in Step 3.*
7. *Preparation of final text, amended in accordance with the circulation comments.*
8. *Presentation to City Council.*

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LIST OF EXHIBITS

INTRODUCTION

The need for a high capacity traffic artery in the general vicinity of the Shaganappi Trail corridor was realized more than ten years ago. Collection of data, projected trips and the network proposed by a "Traffic Survey Committee", as reported in the Calgary Metropolitan Area Transportation Study, Part 1, 1958-59, brought the need for the facility into focus at that time. It envisioned the total route as a freeway having its northern terminus in the area north of Crowchild Trail (then No. 1 'A' Highway), extending southward in the presently defined corridor to 24th Avenue N.W. It then continued eastward along 24th Avenue N.W. to University Drive, southeastward on University Drive to Crowchild Trail (then 24th Street N.W.) and continuing southward on Crowchild Trail. The remainder of the corridor, from 24th Avenue N.W. across the Bow River to Bow Trail (then Banff Coach Road), was foreseen as having expressway characteristics. Although that report, somewhat limited in its comprehensiveness, has been rendered obsolete by rapid City growth and drastically revised land use patterns, the need for the basic corridor has remained.

A continuous route for Shaganappi Trail as an expressway was shown on the 1963 General Thoroughfare Plan. In this case it had been extended to the north City Limits at 80th Avenue N., and followed 80th Avenue N. eastward to an intersection with a future Blackfoot Trail alignment in the Nose Creek valley. In addition, instead of turning eastward along 24th Avenue, the route continued southward across Trans Canada Highway and the Bow River to terminate at the proposed junction of Sarcee Trail and Banff Coach Road (now Bow Trail). It was subsequent to this stage in the evolution of Shaganappi Trail that development of land adjacent to the route first occured. The first phases of the Varsity Acres residential subdivision gave recognition to it in the form of a right-of-way, albeit severely restricted in width.

In early 1968 the first volume of the Calgary Transportation Study was approved by City Council as a basis for more detailed studies, further confirming the essential nature of the Shaganappi Trail corridor. The location shown was almost identical with that of the 1963 General Plan. By this time the eastern half of a four lane divided thoroughfare had been constructed on the right-of-way from Crowchild Trail to Varsity Drive, and then later extended to Valiant Drive. The roadway thus provided has served as an important access to Varsity Acres since that time.

Further study of the future road pattern in the Nose Hill area has led to the conclusion that Shaganappi Trail should eventually be extended northward beyond the City Limits to an intersection with the future Sarcee Trail (Northwest Bypass). 80th Avenue N. would then serve as a major thoroughfare linking Shaganappi Trail with Blackfoot Trail. The recommended plans contained in this report reflect this latest thinking.

This report is intended to fill in the gaps between the Calgary Transportation Study, as it relates to Shaganappi Trail, and the detailed geometric design. It has defined the location within close limits and recommended the horizontal and vertical components of alignment. Approximate extent of right-of-way has been determined and interchange configurations capable of accommodating projected traffic volumes and appropriate to their location have been recommended. The complex interchange configuration shown for the Shaganappi Trail - Trans Canada Highway - Memorial Drive intersection has been reproduced intact from plans which will be incorporated in a later Trans Canada Highway functional report.

SUMMARY AND RECOMMENDATIONS

Shaganappi Trail is a vital link in the overall City of Calgary thoroughfare network. It has been designed not only to provide convenient local access to adjoining areas but to supply direct connections to those segments of the arterial thoroughfare grid and Provincial primary highway system which it intersects. In consideration of this latter aspect its northern terminus is the future Sarcee Trail or Northwest By-pass, which will constitute a fast and convenient route to No. 2 Highway north and No. 1 Highway east. It intersects with Crowchild Trail which is No. 1 'A' Highway west and an important route toward the Central Business District. Access to No. 1 Highway both east and west is provided by the Shaganappi Trail - Trans Canada Highway - Memorial Drive interchange. A direct route to No. 2 Highway south and the southwesterly sections of the City is gained via the Shaganappi Trail - Sarcee Trail - Bow Trail interchange.

The recommendations contained in this report can be summarized as follows:

1. That Shaganappi Trail be constructed and maintained to expressway standard throughout its length in recognition of its role in the transportation network and in order to accommodate projected traffic volumes.

2. That first stage construction consist of a basic four lane divided thoroughfare from Sarcee Trail north of the City Limits to 3rd Avenue N.W. and having at-grade intersections at all connecting streets with the exceptions of Sarcee Trail and Trans Canada Highway. When Sarcee Trail is constructed, connection would be via a full interchange. An existing underpass structure at Trans Canada Highway would be utilized in a first stage interchange at that location. First stage construction is shown on Exhibits 6 to 14 inclusive.

3. That, depending on timing of adjacent planned land development, second stage construction consist of the initial stage of an ultimate three-level split diamond interchange at the Crowchild Trail intersection, a partial cloverleaf interchange at the 32nd Avenue N.W. intersection, and the first stage of a revised interchange at Trans Canada Highway incorporating an interchange with Memorial Drive be constructed. This intermediate stage of construction is illustated on Exhibits 15 to 17 inclusive.

4. That a final stage of construction from John Laurie Boulevard to Trans Canada Highway be implemented, with timing again dependent on development of adjacent land uses. This stage would consist of a diamond interchange at John Laurie Boulevard, a modified diamond interchange at Dalhousie Drive, and a partial cloverleaf at 40th Avenue N. Also involved would be the widening to a total of six basic travelling lanes from Crowchild Trail to Trans Canada Highway.

5. That, when traffic conditions warrant, Shaganappi Trail be extended southward across the Bow River to the Bow Trail - Sarcee Trail interchange as a six lane facility, with the necessary additions to the Bow Trail - Sarcee Trail and Trans Canada Highway - Memorial Drive interchanges. Recommendations 4 and 5 are illustrated on Exhibits 18 to 32 inclusive.

6. That due consideration be given to the aspects of local access, pedestrian accommodation, and aesthetics as outlined in the main body of the report.

GENERAL

Scope

The purpose of this functional planning report is to determine requirements for the Shaganappi Trail Transportation Corridor. Base information used to determine the type and size of the necessary facility within the transportation corridor was the 1986 projected north - south vehicular volumes in the northwest sector of the City as determined by the Calgary Transportation Study (CALTS). These projected volumes are directly related to the City's anticipated population growth, land use, and employment trends; particularly in the area under study. In this study it was considered important to relate the function of the transportation corridor to both the current arterial thoroughfare network and the proposed 1986 arterial thoroughfare network.

Study Area

The area under study related to this corridor is delineated on the north by the City Limits and on the south by Bow Trail. This is illustrated on the key plans (Exhibits 1 and 2). Fringe area boundaries could be considered as being delineated on the west by the future Sarcee Trail and on the east by a north - south transportation corridor at a final location to be determined by studies presently in progress.

Intersecting thoroughfares having a direct influence upon the corridor were studied in sufficient detail to determine the means by which they could be connected, grade separated, or terminated by cul-de-sacs. All intersecting road links and existing abutting land uses along the corridor were examined in order to produce a design which would maintain traffic operation at an acceptable service level.

TRAFFIC

Relationship to CALTS Report

Basic information, indicating the traffic volumes and purposes of trips that this corridor would serve in the proposed 1986 arterial thoroughfare network, was supplied by the CALTS report. To derive the 1986 projected vehicular volumes, computer assigned volumes for alternate networks, utilized for evaluation purposes in the CALTS report, were examined in considerable detail. A gravity model was used in the CALTS transportation planning process to distribute trips generated by each traffic zone to all other traffic zones. Vehicular trips were then assigned to the proposed 1986 thoroughfare network.

An analysis of the 1986 projected traffic volumes, in conjunction with associated engineering studies of intersection channelization, interchange types, local traffic access and traffic circulation patterns resulted in the conclusion that the Shaganappi Trail Corridor must be developed and maintained to expressway standard. The functional designs for Shaganappi Trail, therefore, have been developed according to the standards recommended by the Canadian Good Roads Association for their classification of UAD 50.

In conducting the traffic volume projection phase of this report it was necessary to make certain assumptions regarding the ultimate development of other major transportation facilities in this area of the City of Calgary. The assumptions made, as follows, are in accordance with the overall transportation concept presented in the 1968 CALTS report.

1. The Sarcee Trail Transportation Corridor, located approximately one mile west of Shaganappi Trail, will be developed to freeway standards.

2. There will be a north - south Transportation Corridor developed to freeway standards between approximately 14th and 24th Streets West.

3. As a complement to the proposed highway network, the Northwest sector of the City will ultimately be served by a rapid transit facility.

The non-realization, or alternate location, of any of these facilities could revise the role and standard recommended for Shaganappi Trail in this report.

Traffic Volume Analysis in the Study Area

Since the production of the CALTS report, modifications in land use planning philosophies have necessitated revisions in design year projections of land use configurations and population. In order to accommodate these revisions, in this study it was necessary to make manual adjustments to the computer assigned volumes received via the CALTS report on the road links within the study area.

Traffic volumes were predicted for the chosen design year 1986. Exhibit 3 indicates Average Weekday Traffic expected to develop in the corridor by the design year. Traffic volumes, however, will increase at a rate that is directly related to, and controlled by, the rate and type of land use development within the study area.

Design Hour Volumes

Exhibits 4 and 5 indicate the A.M. and P.M. peak hour traffic volumes, or peaking characteristics, that can be expected in this corridor by 1986. For design purposes, these peak hour volumes are generally used in capacity - volume analysis to determine the traffic land requirements within the corridor. To convert the average weekday traffic into a two-way design hour volume, a K factor of approximately 11 percent was used. This K factor represents the percentage that the peak hour volume is of the 24 hour traffic flow. It is a factor which depends upon various characteristics of the area of the City which is being studied. In addition, a D factor of approximately 60 percent was used to convert the two-way design hour volume to the one-way design hour volume in the heavy direction of flow. The direction of the heavier traffic volume generally reverses from the A.M. to the P.M. peak hour.

Traffic Diversion

It is essential that Shaganappi Trail be developed and play its proper role in the arterial thoroughfare network if other facilities, in particular Crowchild Trail, are not to eventually experience forced flow conditions. To circumvent these forced flow conditions, and to decrease travel time, traffic would avoid the congested routes by filtering through the residential street system as volumes and travel time inevitably increase. The warrant to determine the timing for Shaganappi Trail to cross the Bow River is closely related to the staging of a north - south transportation corridor in the proximity of 14th Street W.

Anticipated High Density Generators

The Shaganappi Trail Corridor will provide service to two proposed major regional shopping centres. These are the Northwest Market Mall to be located on the west side of Shaganappi Trail between 32nd Avenue N. and 40th Avenue N., and Northland Village, to be located on the east side of Shaganappi Trail between Crowchild Trail and Dalhousie Drive. Based on current proposals, it is expected that the Northwest Market Mall will ultimately handle 36,500 vehicle trips on an average weekday, while Northland Village will handle 31,800 trips. To accommodate these volumes it has been necessary to plan for additional capacity on the portion of Shaganappi Trail between 32nd Avenue N. and Dalhousie Drive. It is essential that adequate right-of-way for this purpose be reserved through the shopping centre sites and other presently undeveloped areas.

Another major function of the Shaganappi Trail Corridor is to provide a route at an acceptable level of service to the University of Calgary via 32nd Avenue N. This function will become increasingly important when the route is extended southward across the Bow River.

Service Level and Lane Requirements

The entire length of Shaganappi Trail has been designed to provide a level of service C as defined by the Highway Capacity Manual - 1965 (Highway Research Board Special Report No. 87). To achieve this service level six basic lanes will be required from Bow Trail to Crowchild Trail. Four basic lanes will be required from Crowchild Trail northward to Sarcee Trail. Vehicular volumes in the design year vary from a high of approximately 50,000 per day at the south end of the corridor to approximately 16,000 per day at the north end. The number of lanes required has been determined from basic volume - capacity relationships, and, even where particular conditions reduce land requirements for short distances, the basic number of lanes has been maintained in order to avoid erratic maneuvers or potential bottlenecks.

To provide flexibility in the design, auxiliary lanes and collector - distributor roads have been provided at specific locations to ensure a smooth flow of traffic and to maintain the prescribed service level.

DESCRIPTION OF RECOMMENDED PLAN

Recommended plans and profiles, showing the detailed functional design for Shaganappi Trail, are illustrated on Exhibits 6 to 32 inclusive. Stage 1 construction is shown on Exhibits 6 to 14; Stage 2 on Exhibits 15 to 17; and Stage 3 on Exhibits 18 to 32 inclusive. Stage 3 plans also indicate the limits of required right-of-way. The following is a general description of each stage of the recommended plan.

Stage 1

First stage construction will consist of a four lane divided thoroughfare from the future Sarcee Trail, north of the north City boundary, southward to 3rd Avenue N.W. The proposed cross-section will consist basically of two roadways having a pavement width of twenty-four feet and separated by a curbed median.

The alignment from Sarcee Trail to John Laurie Boulevard (Exhibits 6 and 7) was chosen so that earthwork during construction would be kept to a minimum, and to maintain grades within acceptable limits for this class of thoroughfare.

Sarcee Trail is classed as a freeway in the thoroughfare network and Shaganappi Trail would, therefore, connect to it via an interchange. The type of interchange required at this location was not determined, and is not shown in this report, since it will be located outside of the north City boundary.

80th Avenue N.W. is intended as one of the major future accesses to the top of Nose Hill. Locating the 80th Avenue N.W. connection to Shaganappi Trail in the "draw" (Exhibit 6) was advantageous in that the right-of-way will utilize relatively undevelopable land. It also facilitates the design of an at-grade intersection with Shaganappi Trail. Because 80th Avenue N.W. is near the north City boundary, construction of Shaganappi Trail from John Laurie Boulevard to 80th Avenue N.W. will not be required until development on the top of Nose Hill has been well advanced.

Construction of the first stage from John Laurie Boulevard to Crowchild Trail (Exhibits 8 and 9) is presently tentatively scheduled for 1972. The alignment from Crowchild Trail to Dalhousie Drive is a straight projection of that existing to the south,

(Exhibit 8). It is intended that Dalhousie Drive will curve southward for the dual purpose of forming a continuation of 37th Street N.W. and in order that an essentially right-angled crossing of Shaganappi Trail will be possible.

The east half of the Shaganappi Trail roadway is already constructed from Crowchild Trail to Valiant Drive. Construction of the west half is scheduled for 1970. Scheduled at the same time is the construction of Crowchild Trail from Brisebois Drive to Shaganappi Trail. Construction of these facilities will provide a high standard of arterial road access to the far northwest residential areas of the City.

Scheduled for completion in 1970 is construction of the first stage of Shaganappi Trail from Valiant Drive to south of Trans Canada Highway (Exhibits 10 to 13). Access to a proposed regional shopping centre between 32nd and 40th Avenues N.W. will necessitate provision at this time of a one-way service road on the west side, (Exhibit 10). Its southern end will form the southbound to westbound ramp of a future interchange at 32nd Avenue N.W. This service road will be retained as part of the final stage construction (Stage 3), except that the exit terminal will be relocated to the north of 40th Avenue N.W., as shown on the Stage 3 plans.

An existing structure under the Trans Canada Highway will be utilized for the construction of a first stage interchange at this location, (Exhibit 12). Several turning movements will not be provided at this interchange. The omitted movements will all be achieved by utilizing 3rd Avenue N.W. and the immediately adjacent existing Montgomery interchange. The ramps necessary to accommodate these movements were deliberately omitted from the interchange design because of their interference with operation of existing ramps of the Montgomery interchange and the fact that they were possible nearby.

Alignment from 3rd Avenue N.W. northward to Station 85 + 00 has been so designed that it will not interfere with construction of later stages of Shaganappi Trail and its interchange with Trans Canada Highway. Conversely, construction of the later stages will be able to proceed with a minimum of traffic flow interruption.

Stage 2

Exhibits 15, 16 and 17 are included in this report to illustrate intermediate

staging of Shaganappi Trail from John Laurie Boulevard to Memorial Drive. This upgrading is expected to be necessary within the next ten to fifteen years. Precise timing of intermediate staging will depend, to a considerable degree, on traffic growth generated by planned adjacent intensive land use development.

The intersections at John Laurie Boulevard and Dalhousie Drive will remain as in Stage 1 (Exhibit 15). A split diamond interchange at Crowchild Trail will form the first stage of a three-level diamond interchange ultimately required at this location. This type of interchange was chosen after comparison with a conventional cloverleaf design. The cloverleaf interchange was rejected because of its excessive land requirements, its inability to accommodate anticipated turning traffic, and its inflexible staging characteristics.

From Crowchild Trail to approximately 1500 feet south of 40th Avenue N.W., alignment of Shaganappi Trail has been revised from that shown for Stage 1. Explanation for this realignment is given in detail in the discussion of Stage 3.

At-grade intersections are shown at Varsity Drive, Valiant Drive, and 40th Avenue N.W. (Exhibit 16). Traffic signals will be installed at these intersections if warranted. The interchange at 32nd Avenue N.W. will be necessary in this intermediate stage to accommodate expected turning traffic generated by the adjacent regional shopping centre and the University of Calgary.

The interchange at Trans Canada Highway (Exhibit 17) forms part of the final, or Stage 3, design. All of the roadways and ramps of Stage 2 will be utilized in the final stage when Shaganappi Trail is constructed southward across the Bow River. Construction of this second stage would be timed to coincide with the upgrading of Trans Canada Highway in this area. It would entail abandonment of both the present Montgomery interchange and the interim interchange described for Stage 1. Following completion of construction, the first stage of the Shaganappi Trail roadway south of Station 85 + 00 would also have to be abandoned.

Only two turning movements will not be possible at this interchange. Westbound vehicles on Memorial Drive will not be able to proceed eastbound on Trans Canada Highway, nor will the reverse movement be possible. These were excluded because the predicted vehicular trips desiring to make these two movements were very low and could be

accommodated elsewhere. The deletion of these connections also tended to slightly simplify what is readily recognized as an extremely complex interchange at this location.

Stage 3

Functional plans for the final stage of development of Shaganappi Trail are illustrated on Exhibits 18 to 32 inclusive.

From Sarcee Trail on the north to approximately 1500 feet north of John Laurie Boulevard (Exhibits 18 and 19), no further upgrading will be required over that shown for Stage 1. As mentioned in the discussion of Stage 1, an interchange at Sarcee Trail will be required when Shaganappi Trail is extended north of 80th Avenue N.W. An at-grade intersection is again shown at 80th Avenue N.W. since the volume of projected traffic will not warrant an interchange.

A conventional diamond interchange, favouring Shaganappi Trail, will handle anticipated future traffic volumes at John Laurie Boulevard (Exhibits 20, 21 and 22). Traffic generated by the Northland Village site will provide the warrant for a diamond interchange at Dalhousie Drive. In this case, however, the close spacing to both John Laurie Boulevard and Crowchild Trail precludes accommodation of conventional diamond ramps. It will, therefore, be necessary to use parallel collector - distributor roads from John Laurie Boulevard to Crowchild Trail (Exhibit 20). With this type of treatment, northbound traffic destined for Dalhousie Drive must use the exit ramp south of Crowchild Trail (Ramp "C") and follow the collector - distributor road northward to Dalhousie Drive. Similarly, southbound traffic destined for Dalhousie Drive must use the exit ramp north of John Laurie Boulevard (Ramp "B") and follow the collector - distributor road southward to Dalhousie Drive. While this will be acceptable from a capacity standpoint, it will require careful signing in order to be operationally successful.

When the two level split diamond interchange at Crowchild Trail experiences difficulty in handling increasing traffic, a third level overpass structure to provide free flowing through movements on Shaganappi Trail will be constructed (Exhibits 20 and 23). This treatment will relieve anticipated congestion at the intersections of the second stage interchange.

Projected traffic volumes will necessitate construction of an additional lane in each direction south of Crowchild Trail in this final stage (Exhibits 20, 24 and 25). The existing right-of-way from Crowchild Trail to 40th Avenue N.W. is not, however, of sufficient width to accommodate these additional lanes. It is recommended that the realignment required to effect the necessary widening be toward the west. Although this will necessitate acquisition of a number of residential properties, widening to the west is estimated to be considerably more economical than either widening exclusively to the east or widening on both sides.

Varsity Drive will retain its at-grade intersection with Shaganappi Trail in this final stage (Exhibit 24). Current arterial road plans for this sector of the City are expected to maintain the traffic volume on Varsity Drive at such a level that an interchange will not be required at the Shaganappi Trail - Varsity Drive intersection.

The proposed regional shopping centre between 32nd and 40th Avenues N.W., and the University of Calgary, are anticipated as heavy traffic generators. The interchange described for Stage 2 at 32nd Avenue N.W. will be capable of handling the predicted traffic volumes from these sources (Exhibits 16 and 26). It is anticipated, however, that a heavy northbound to westbound movement during the P.M. peak period will overtax Loop "B" of this interchange. The interchange which will be required to replace the at-grade intersection at 40th Avenue N.W. in the final stage (Exhibits 24 and 25) will play a relief role for the congestion at 32nd Avenue N.W. at this time of day.

The 40th Avenue N.W. interchange is basically an overpass structure with the provision of only two turning ramps. Loop "A" is expected to handle the majority of return trips from the north side of the regional shopping centre to the districts north of 40th Avenue N.W. (Dalhousie, Brentwood, Nose Hill, etc). Ramp "G" will provide access service to the north side of the shopping centre for motorists northbound on Shaganappi Trail as well as relief for the 32nd Avenue interchange mentioned above.

The ultimate stage of the Trans Canada Highway interchange, (Exhibits 27, 28, 30, 31 and 32), is one of the most complex interchanges proposed within the City of Calgary. Its complexity is due to the fact that it is the focal point of six approach legs. This results in a greatly increased number of turning movements which must be accommodated in comparison with the usual interchange of four approach legs.

Only six turning movements are not provided in the final stage of this interchange. Omission of these movements was deemed necessary to simplify the interchange as much as possible. In any case, the movements omitted are possible at other equally logical locations along the appropriate routes. As with Stage 2, the movement from westbound on Memorial Drive to eastbound on Trans Canada Highway will not be possible, nor will the return trip. The 29th Street N.W. link between Memorial Drive and Trans Canada Highway will have to be utilized in lieu of these two movements. The movements from northbound on Shaganappi Trail to westbound on both Trans Canada Highway and Memorial Drive, as well as the return movements, will also not be possible at this interchange. The Sarcee Trail section between Bow Trail and Trans Canada Highway will serve in lieu of these four movements, as is the case at present.

A connector road from 3rd Avenue N.W. to Memorial Drive (Exhibit 27), will be necessary to provide good access for the Provincial Highways Building. If the adjacent drive-in theatre ceases operation in the future, this connector road should be located farther eastward to ensure adequate weaving distance between the Ramp "F" entrance terminal to Memorial Drive and the intersection of Memorial Drive with the connector road.

Extension of Shaganappi Trail southward across the Bow River, to a termination at the intersection of Sarcee Trail and Bow Trail, will be required in the third and final stage (Exhibits 27 to 29). This section will require a basic three lanes in each direction to handle anticipated traffic. A future interchange of Shaganappi Trail with Bow Trail and Sarcee Trail will be required at that time. It is anticipated that a first stage of this interchange will be required at the intersection of Sarcee Trail and Bow Trail prior to extension of Shaganappi Trail southward across the river.

Since Sarcee Trail is the highest category of the three intersecting thoroughfares, consideration of the interchange at this location has been left for inclusion in a Sarcee Trail Functional Report.

Exhibits 33 and 34 illustrate recommended typical cross-sections at specific locations along Shaganappi Trail.

ADJACENT LAND USE AND LOCAL ACCESS

By definition, Shaganappi Trail is an expressway and, therefore, all access to it from abutting land must be gained via the cross streets which will intersect it either at grade or by means of grade separated interchanges. This control of access is protected by The City of Calgary Bylaw Number 7061, the Controlled Streets Bylaw, which establishes Shaganappi Trail as a controlled street and lists those cross streets which will be permitted to intersect with it. Control in this manner has made possible a design which will provide a high standard of access while, at the same time, maintaining the facility free of the capacity reducing influence and accident potentiality of numerous local accesses directly to abutting land parcels.

Adjacent to the corridor, and north of the north City boundary, there is a reasonably large, potentially developable, area which forms part of the Nose Hill plateau. Although this area is outside the City's jurisdiction, the spacing between 80th Avenue N. and Sarcee Trail is sufficient to permit introduction of an at-grade intersection if, or when, development occurs. This connection would enable Shaganappi Trail to be used as a convenient route from this area to the University of Calgary, planned regional shopping centres, and other trip attractors. It would also provide a connection northward to the future Sarcee Trail which would be used as the route to Highway No. 2 north, Trans Canada Highway west, and the southwest bypass to Highway No. 2 south. An at-grade intersection with Shaganappi Trail is considered adequate for this connection, on the assumption that other accesses to the area would also be available; i.e. 14th Street W. major thoroughfare for southbound trips and 80th Avenue N.W. for eastbound and southeastbound trips.

The 80th Avenue N. connection to Shaganappi Trail will serve the same purposes as those described above, only in this case for the portion of Nose Hill plateau contained within the City limits. It is similarly assumed that the area will be served by other road extensions; i.e. 80th Avenue N. from the east, 64th Avenue N. from the east, and 14th Street W. major thoroughfare from the south. It should also be noted that a four-way intersection could be constructed at 80th Avenue N. if it was required to serve developable land to the west of Shaganappi Trail.

The residential subdivisions of Brentwood and Dalhousie will gain access to Shaganappi Trail mainly via Dalhousie Drive - 37th Street W., a major thoroughfare. Alternatives, although slightly less direct, will be via John Laurie Boulevard and Crowchild Trail, an expressway and future freeway respectively. Access to these two thoroughfares would, in turn, be via Brisebois Drive for Brentwood and 53 Street W. for Dalhousie. In addition, another minor access to John Laurie Boulevard is planned from the Brentwood subdivision. Transit service in Brentwood and Dalhousie is planned to cross Shaganappi Trail on Dalhousie Drive.

The area between Crowchild Trail and Dalhousie Drive - 37th Street W., on the east side of Shaganappi Trail, is currently planned as a regional shopping centre. This area will gain all access to Shaganappi Trail via Dalhousie Drive - 37th Street W. because of the limited access nature of both Shaganappi Trail and Crowchild Trail, the only other thoroughfares by which it is bounded. Should plans for this shopping centre materialize it would be necessary to permanently connect Dalhousie Drive - 37th Street W. to Crowchild Trail in order to avoid overloading the intersections of Shaganappi Trail with Crowchild Trail and Dalhousie Drive - 37th Street W.

The contiguous area on the west side of Shaganappi Trail is presently planned for a high density residential development. Access to it from Shaganappi Trail would also mainly be via Dalhousie Drive. The development may also precipitate construction of a connecting road between Dalhousie Drive and Crowchild Trail, on the west side of the site, in order that adequate access can be provided. Traffic generation from this highly concentrated development and from the shopping centre is expected to require an interchange at Dalhousie Drive in the final construction stage of Shaganappi Trail.

In initial stages of construction, access from the Varsity Acres residential subdivision will be via Valiant Drive, a residential collector; Varsity Drive and 40th Avenue N., both secondary thoroughfares; and 32nd Avenue N., a major thoroughfare. The proximity of the Valiant Drive intersection to the 40th Avenue N. intersection could adversely affect the operational efficiency of an interchange required at the latter location in the ultimate construction stage. This will necessitate the terminating of Valiant Drive by cul-de-sacs on each side of Shaganappi Trail or, alternatively, the crossing of Shaganappi Trail by means of a grade separation structure with no turning movements provided.

Because Valiant Drive is of quite limited length, and has convenient cross connections to both Varsity Drive and 40th Avenue N., eventual terminating via cul-de-sacs is recommended.

A planned regional shopping centre on the west side of Shaganappi Trail between 32nd Avenue N. and 40th Avenue N. will gain access in the first stage via both 32nd Avenue N. and 40th Avenue N. through at-grade intersections with Shaganappi Trail where all turns will be possible. In addition, a one-way service road on the west side, with an exit ramp directly from Shaganappi Trail, will provide access for southbound traffic. In the second, or intermediate stage, an interchange with all turning movements provided will replace the 32nd Avenue N. at-grade intersection. The at-grade intersection at 40th Avenue N. will be replaced in the third, or ultimate stage, by an interchange providing only the following turning movements: (a) northbound to eastbound, (b) northbound to westbound, and (c) eastbound to northbound.

The University of Calgary campus abuts the east side of Shaganappi Trail, extending from 32nd Avenue N. to Trans Canada Highway. Access to Shaganappi Trail from the campus will be via 32nd Avenue N. exclusively. Campus planners have, on occasion, expressed interest in a connecting road to Montgomery, following a small "draw" and underpassing Shaganappi Trail at about Station 88 + 00 (Exhibit 27). While such a road is physically possible, no ramp connections between it and Shaganappi Trail could be permitted because of its close proximity to, and the capacity restraint it would impose on the Trans Canada Highway interchange. It would, of necessity, connect to the existing street system in Montgomery and encourage a high volume of traffic through a residentially developed area having streets of only residential width. For this and other reasons it is understood that the concept of such a connecting road has now been abandoned.

Residents of Montgomery will be able to gain access to Shaganappi Trail via 32nd Avenue N. in all stages of construction; via 3rd Avenue N. in the first stage; and via Trans Canada Highway in the second and third stages. Upgrading of Trans Canada Highway to freeway standard through Montgomery will confine access to that thoroughfare to one local interchange.

While the first stage of Shaganappi Trail is in operation total access to the Provincial Government complex (Department of Highways and Transport and Department

of Public Works), situated on the east side of Shaganappi Trail between Trans Canada Highway and 3rd Avenue N., will be almost identical with that enjoyed at present. Shaganappi Trail will, however, provide a faster and more direct route to the site than presently exists for residents in the far northwestern subdivisions of the City. Access to and from the east via Trans Canada Highway will be altered upon introduction of the Stage 2 interchange adjacent to the site (Exhibit 17), and this new access pattern will also apply to the final stage of construction. It will be necessary for westbound vehicles to turn south at 29th Street N.W. and gain access to the site via 3rd Avenue N. or Memorial Drive. The return trip would be the reverse of this procedure. With the westward extension of Memorial Drive in the second stage of construction a connecting road link will be provided from Memorial Drive to 3rd Avenue N. to provide convenient access to the site from Memorial Drive.

Extension of Shaganappi Trail southward across the Bow River in the third stage of construction will necessitate only slight revision to the Edworthy Park access road which originates at the west end of Spruce Drive. Continuity of the Park area, even though partially affected by the expressway, can be maintained via certain access arrangements. Access to the west side of the park area at the lower level will be provided by the existing access road which will underpass Shaganappi Trail via a southward extension of the Canadian Pacific Railway overpass (Exhibit 27). Should access to the west side be required at the upper level, an overpass structure could be provided at the location shown on the aforementioned Exhibit.

Access to Shaganappi Trail from Wildwood, and other nearby residential communities, will be via Bow Trail (formerly Banff Coach Road). A convenient route is thereby provided for these areas to the University of Calgary, Trans Canada Highway eastbound, and the proposed regional shopping centres.

TRANSIT CONSIDERATIONS

The CALTS report stressed the importance of planning a balanced transportation system for The City of Calgary, with public transit facilities assuming a maximum practical role at all times during development. The parts of the resultant dual system were envisaged as augmenting and complementing each other with the aim of benefiting the maximum number of citizens. This concept was incorporated in the phase of the study which distributed projected trips among various links of the thoroughfare network. It is also reflected in the traffic assigned to Shaganappi Trail as reported herein.

Because of the expressway characteristics of Shaganappi Trail, it is not expected that a transit route with passenger pickup along it will be implemented. This will not, of course, preclude the use of it, or any section of it, for a non-stop express bus route, although such use is not immediately planned.

There are a number of locations where normal transit routes, both existing and proposed, will cross Shaganappi Trail while serving adjacent areas. Service to Brentwood and Dalhousie is planned to cross on Dalhousie Drive. Present and future service in Varsity Acres and Varsity Village will cross Shaganappi Trail at Varsity Drive, 40th Avenue N., and 32nd Avenue N. The line which will cross on 32nd Avenue is planned as a main crosstown route, extending into Montgomery to serve that community as well. Present transit service to Montgomery will be continued and will cross Shaganappi Trail at 3rd Avenue in Stage 1, and on Memorial Drive in future stages.

Terminal facilities for the northwest leg of the future Rapid Transit system are planned near Crowchild Trail and 37th Street N.W. Shaganappi Trail is expected to serve as a convenient route from adjacent communities to the transit terminal for many trips ultimately destined for Downtown.

A transit problem yet to be resolved is related to servicing the proposed residential area on top of Nose Hill. Trip attractors adjacent to Shaganappi Trail farther south, including the Rapid Transit terminal, are expected to precipitate requests for bus service from the Nose Hill area. Another east - west crosstown transit route is proposed for this area which would reach the top of Nose Hill on the eastern side via 64th Avenue N.

Although 80th Avenue N. is the closest practical connection to Shaganappi Trail north of John Laurie Boulevard, use of it for the western portion of the crosstown route would result in an undesirable lengthening of travel distances for transit vehicles.

PEDESTRIAN ACCOMMODATION AND CONTROL

Pedestrian walks paralleling Shaganappi Trail within the right-of-way have been specifically excluded from the design in all stages of construction. Such walkways would be incompatible with the expressway standard of Shaganappi Trail and, considering the volume and speed of vehicular traffic anticipated on the facility, detrimental to the safety of pedestrians using them.

In the first stage all cross streets, with the exception of Trans Canada Highway, will intersect Shaganappi Trail at grade. Of these cross streets, 80th Avenue N., Dalhousie Drive and 32 Avenue N. are classified as major thoroughfares, while Varsity Drive, Valiant Drive and 40th Avenue N. are secondary, or collector, thoroughfares. It is anticipated that signalization will be necessary at each of these at-grade intersections, and cross pedestrian traffic will be accommodated within crosswalks at each of the major and collector thoroughfares.

Of the remaining cross streets, John Laurie Boulevard is designated as an expressway, while Crowchild Trail and Trans Canada Highway are classified as future freeways. Since there will be no sidewalks along these three thoroughfares, crosswalks will not be provided at their points of intersection with Shaganappi Trail.

Interchanges are proposed in later construction stages at John Laurie Boulevard, Dalhousie Drive, Crowchild Trail, 40th Avenue N., 32nd Avenue N., and Trans Canada Highway. Sidewalks will be incorporated in the grade separation structures at Dalhousie Drive, 40th Avenue N., and 32nd Avenue N., replacing the previous at-grade crosswalks. As before, there will be no provision for pedestrian crossings at John Laurie Boulevard, Crowchild Trail, or Trans Canada Highway.

When the route is extended southward across the Bow River, pedestrian users of Edworthy Park will be able to cross Shaganappi Trail by means of walkways incorporated in the grade separation structures provided for vehicular cross traffic.

The planned shopping centre between 32nd Avenue N. and 40th Avenue N. is foreseen as an attractor for large numbers of pedestrians from the Varsity Village residential area lying east of Shaganappi Trail. This will be particularly true from a

planned high density development immediately adjacent to Shaganappi Trail opposite the shopping centre. Preliminary plans for the shopping centre indicate that it will eventually be integrated with the apartment development by means of a structure utilizing air space over Shaganappi Trail right-of-way. This structure would incorporate a walkway system to permit free flow of pedestrian traffic without affecting Shaganappi Trail.

A somewhat similar demand is anticipated at the proposed shopping centre between Crowchild Trail and Dalhousie Drive. In this case a high density residential development has been proposed on the west side of Shaganappi Trail opposite the shopping centre site. It is recommended that the developer incorporate a pedestrian crossing structure in his plans for the total complex.

The Montgomery residential area abuts Shaganappi Trail directly west of the University of Calgary campus. Should a future demand arise for significant numbers of pedestrians to cross between these two areas, an overpass structure could be provided at a location about midway between the 32nd Avenue N. and Trans Canada Highway interchanges.

The crossing provisions described above represent a high standard of service for pedestrians. Since Shaganappi Trail generally does not bisect neighbourhoods or public school catchment areas, no demand for additional crossing provisions can be foreseen. It is unfortunately true, however, that despite the number of legitimate crossing locations a certain percentage of pedestrians will cross at random locations. It is also possible for children to wander on to the roadway if measures are not taken to protect them. For these reasons it is planned to fence both sides of the Shaganappi Trail right-of-way as construction of each section is completed. This procedure has, in fact, been already followed along the partially completed section between Crowchild Trail and Valiant Drive.

AESTHETIC CONSIDERATIONS

A detailed description of the numerous factors which contribute to the design of a highway facility that is visually pleasing, both to the user and to those who must live or work in the near vicinity, is beyond the scope of this report. The matter is of such overriding importance in the urban environment, however, that it cannot be ignored even in a functional report of this nature.

Features of a highway which have the greatest influence on visual impact are engineering features. Poor design and execution of these features result in unsatisfactory appearances which can never be completely concealed by planting or other camouflage. It is essential, therefore, that highway planning be an integral part of the total land planning process, and that aesthetics be identified and implemented as an integral component of the planning and design process rather than as a cosmetic additive.

Because of more critical boundary conditions and, more often than not, particularly restrictive right-of-way, the urban highway designer has considerably less latitude with respect to achieving an attractive facility than does his rural counterpart. This is particularly true with respect to location and horizontal and vertical alignment. Fortunately those features which add to a pleasing appearance also have definite functional value by contributing to such items as erosion control, motorist safety and reduced maintenance.

As many aesthetic aspects as possible, consistent with the study objectives, have been given consideration in the recommended plans forming part of this report, and the cost of achieving them included in the cost estimates. Following is a partial list of those which should be carefully considered in conjunction with detailed design of Shaganappi Trail.

Integration With Environment

1. Use of expressway as deliberate boundary between areas of disparate zoning, between neighbourhoods, etc.

2. Alleviation of undesirable effects of sight and sound of large numbers of vehicles by proper attention to adequate right-of-way.

3. Use of land remnants not required for right-of-way for mini-parks, play areas, etc.

4. Employment of alignment which follows, rather than cutting diagonally across, the "grain" of the City.

5. Employment of alignment and construction which preserves and accentuates the best qualitites of the landscape.

Horizontal and Vertical Alignment

1. Use of alignment as directional as possible, consistent with topography. Use of a flowing line that will conform generally to natural contours and will keep construction scars to a minimum.

2. Elimination of winding alignment composed of numerous short curves.

3. Employment of transition curves long enough that pavement edges do not appear distorted to the driver.

4. For small deflection angles, use of curves long enough to avoid appearance of a kink.

5. Avoidance of two curves in the same direction separated by a short tangent.

6. Use of a smooth grade line with gradual changes.

7. Use of horizontal alignment carefully coordinated with profile design to avoid a distorted appearance.

8. Observance of horizontal and vertical alignment in proper balance; e.g. avoiding a widely fluctuating grade line simply to achieve straight horizontal alignment.

9. Effecting changes of median width on curved main alignment wherever possible. Use of very flat reverse curvature otherwise.

10. Even in relatively flat terrain, use of a gently curvalinear alignment to effect a more visually pleasing alignment.

Basic Grading

1. Use of flattened excavation and embankment slopes and well-rounded cross-sectional contour so as to mold the highway into the terrain and make it a harmonious feature of the natural landscape.

2. "Daylighting" cut slopes between adjacent roads or ramps, and wherever an unnatural mound would otherwise be left.

3. Application of gradual and graceful sloping of the ground lines between roadways of different elevation.

4. Use of maximum slopes consistent with existing land and ground forms.

5. In excavation and embankment sections, use of flatter slopes on the ends where the cut or fill is light and gradually steepening toward the controlling maximum on heavier portions.

6. Use of a "bell-mouth" technique in cut sections, where the beginning and end of the section is generously flared and molded into the natural contours.

Structures

1. Abandonment of any attempt at applied ornamentation apart from interesting surface treatment.

2. Elimination of unnecessary massiveness and keeping structural details as simple as possible.

3. Avoidance, wherever possible, of the necessity for a bridge structure located on a sag vertical curve.

4. Elimination of buttresses close to the roadway edge.

5. Where a series of structures are encountered in succession, design should endeavour to give both an individual and collective impact.

Landscaping

1. Avoidance of symmetrical or formal planting.

2. Practice of planting with due regard to the safety of the motorist; i.e. - where it will not restrict necessary sight distance, obscure signs, or cause damage on impact if a vehicle should inadvertently leave the roadway.

3. Judicious use of screen planting, in some cases to screen the road user from unsightly adjacent land use and in other cases to screen adjacent property owners from the road.

4. Employment of shrub and tree planting in proper open and slope areas so that they approach the "natural" appearance for the area.

5. Application of planting types native to the area, located in natural groups.

6. Pay special attention to the relatively large areas at interchanges in order to provide a spacious park-like setting for nearby land uses.

7. Necessary right-of-way fencing hidden by planting wherever possible.

COST ESTIMATES

The cost estimates for Shaganappi Trail have been broken down into logical sections, and into the various construction stages. A summary of these estimated costs is contained on the following pages.

It is anticipated that the Provincial Department of Highways and Transport will contribute financially to the cost of constructing the various stages of Shaganappi Trail, since it forms a vital link in the overall arterial thoroughfare network. Contribution has, in fact, been received for the half width of roadway already constructed from Crowchild Trail to Valiant Drive. Considering its expressway category, assistance amounting to fifty percent of shareable items could be expected according to the present formula for cost sharing. No attempt has been made to show possible Provincial contributions in the cost summary, although the first three items listed in the breakdowns, could, as a rough guide, be considered as shareable items, while the last two items are presently non-shareable.

Several points should be noted with respect to the cost summaries, as follows:

1. All construction cost estimates are based on current prices; that is, no provision has been made for an inflation factor.

2. The item for utilities includes relocation of any utilities to facilitate construction of the road works, new storm drainage installations required for the road facility only, and alteration and extension of the storm drainage system that might be necessary as successive stages are implemented.

3. In some instances sufficient land for the final stage of construction has been assumed to be acquired in the initial stage. This accounts for the zero land costs shown for certain portions in Stages 2 and 3.

4. Land cost estimates are based on current market values.

5. A policy, adopted in earlier functional planning reports, with respect to assignment of land and construction costs for interchanges has been maintained in this report. In essence, this assigns the full cost of interchanges with thoroughfares of lower category to the thoroughfare under study; fifty percent of the cost to each thoroughfare in the

case of intersections with thoroughfares of similar category; and, in the case of intersections with thoroughfares of higher category, none of the cost is assigned to the facility being studied. In this case the full cost of the interchanges at Dalhousie Drive, 40th Avenue N., and 32nd Avenue N., fifty percent of the interchange at John Laurie Boulevard; and none of the cost of interchanges at Crowchild Trail or Trans Canada Highway have been assigned to Shaganappi Trail. Although the cost breakdown has been shown for all of these interchanges, the policy just described is reflected in the totals. This is not to say, however, that when actual construction occurs the policy will necessarily be carried out in the capital budgeting process.

6. The item shown as "Miscellaneous" is intended to cover such things as sprinkler systems for landscaped areas.

STAGE 1 – COST SUMMARY

SECTION	Roadwork	Structures	Utilities	Signing Lighting Miscellaneous	Land	TOTAL
Sarcee Trail to John Laurie Boulevard	760,000	–	105,000	168,000	251,000	**1,284,000** [1]
John Laurie Boulevard to Crowchild Trail	355,000	–	59,000	80,000	668,000	**715,000** [2]
Crowchild Trail to Valiant Drive	136,000	–	–	44,000	–	**180,000**
Valiant Drive to 32nd Avenue N.	327,000	–	157,000	77,000	–	**561,000**
32nd Avenue N. to 3rd Avenue N.	495,000	–	68,000	128,000	225,000	**691,000** [3]
TOTAL	**2,073,000**	–	**389,000**	**497,000**	**472,000**	**$3,431,000**

1. *Costs of interchange with Sarcee Trail have not been included.*
2. *100% of land costs at Crowchild Trail ($372,000) have been assigned to Crowchild Trail, and 50% of land costs at John Laurie Boulevard ($75,000) have been assigned to John Laurie Boulevard.*
3. *100% of land costs at Trans Canada Highway have been assigned to Trans Canada Highway.*

STAGE 2 – COST SUMMARY

SECTION	Roadwork	Structures	Utilities	Signing Lighting Miscellaneous	Land	TOTAL
Crowchild Trail Interchange	344,000	400,000	90,000	173,000	411,000	– [1]
32nd Avenue N. Interchange	250,000	500,000	12,000	134,000	–	**896,000**
32nd Avenue N. to Trans Canada Highway	183,000	–	12,000	7,000	–	**202,000**
Trans Canada Highway Interchange	1,520,000	2,205,000	272,000	375,000	1,535,000	– [2]
TOTALS	**433,000**	**500,000**	**24,000**	**141,000**	–	**$1,098,000**

1. *100% of all costs have been assigned to Crowchild Trail.*
2. *100% of all costs have been assigned to Trans Canada Highway.*

STAGE 3 – COST SUMMARY

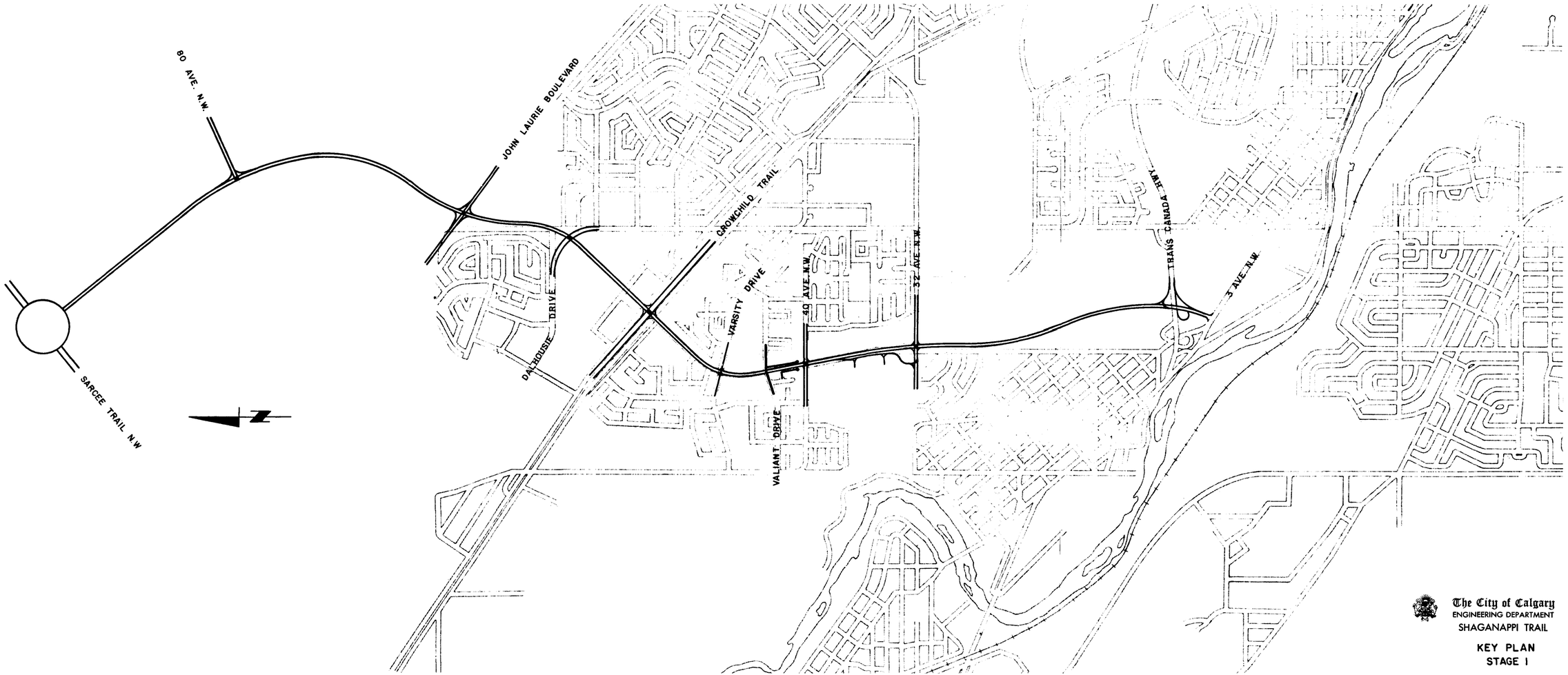
SECTION	Roadwork	Structures	Utilities	Signing Lighting Miscellaneous	Land	TOTAL
80th Avenue N. to John Laurie Boulevard	95,000	–	29,000	45,000	–	**169,000**
John Laurie Boulevard Interchange	98,000	400,000	12,000	52,000	–	**281,000**[1]
John Laurie Boulevard to Dalhousie Drive	217,000	–	50,000	64,000	90,000	**421,000**
Dalhousie Drive Interchange	55,000	400,000	8,000	11,000	–	**474,000**
Crowchild Trail Interchange	163,000	1,080,000	25,000	46,000	–	– [2]
Crowchild Trail to 40th Avenue N.	187,000	–	30,000	28,000	320,000	**565,000**
40th Avenue N. Interchange	106,000	270,000	11,000	62,000	45,000	**494,000**
40th Avenue N. to 32nd Avenue N.	174,000	–	24,000	35,000	–	**233,000**
Trans Canada Highway Interchange	452,000	2,730,000	37,000	124,000	11,000	– [3]
Memorial Drive Interchange	144,000	950,000	14,000	16,000	–	**562,000**[4]
Trans Canada Highway to Bow Trail	600,000	4,796,000	102,000	62,000	193,000	**5,753,000**[5]
TOTAL	**1,555,000**	**6,141,000**	**267,000**	**341,000**	**648,000**	**$8,952,000**

1. *50% of all costs ($281,000) have been assigned to John Laurie Boulevard.*
2. *100% of all costs have been assigned to Crowchild Trail.*
3. *100% of all costs have been assigned to Trans Canada Highway*
4. *50% of all costs ($562,000) have been assigned to Memorial Drive.*
5. *Costs of interchange with Bow Trail - Sarcee Trail have not been included.*

TOTAL COST ESTIMATE SUMMARY

ITEM	Stage 1	Stage 2	Stage 3	TOTAL
Roadwork	2,073,000	433,000	1,555,000	**4,061,000**
Structures	–	500,000	6,141,000	**6,641,000**
Utilities	389,000	24,000	267,000	**680,000**
Signing, Lighting, Miscellaneous	497,000	141,000	341,000	**979,000**
Land	472,000	–	648,000	**1,120,000**
TOTAL	**$3,431,000**	**$1,098,000**	**$8,952,000**	**$13,481,000**

EXHIBIT I

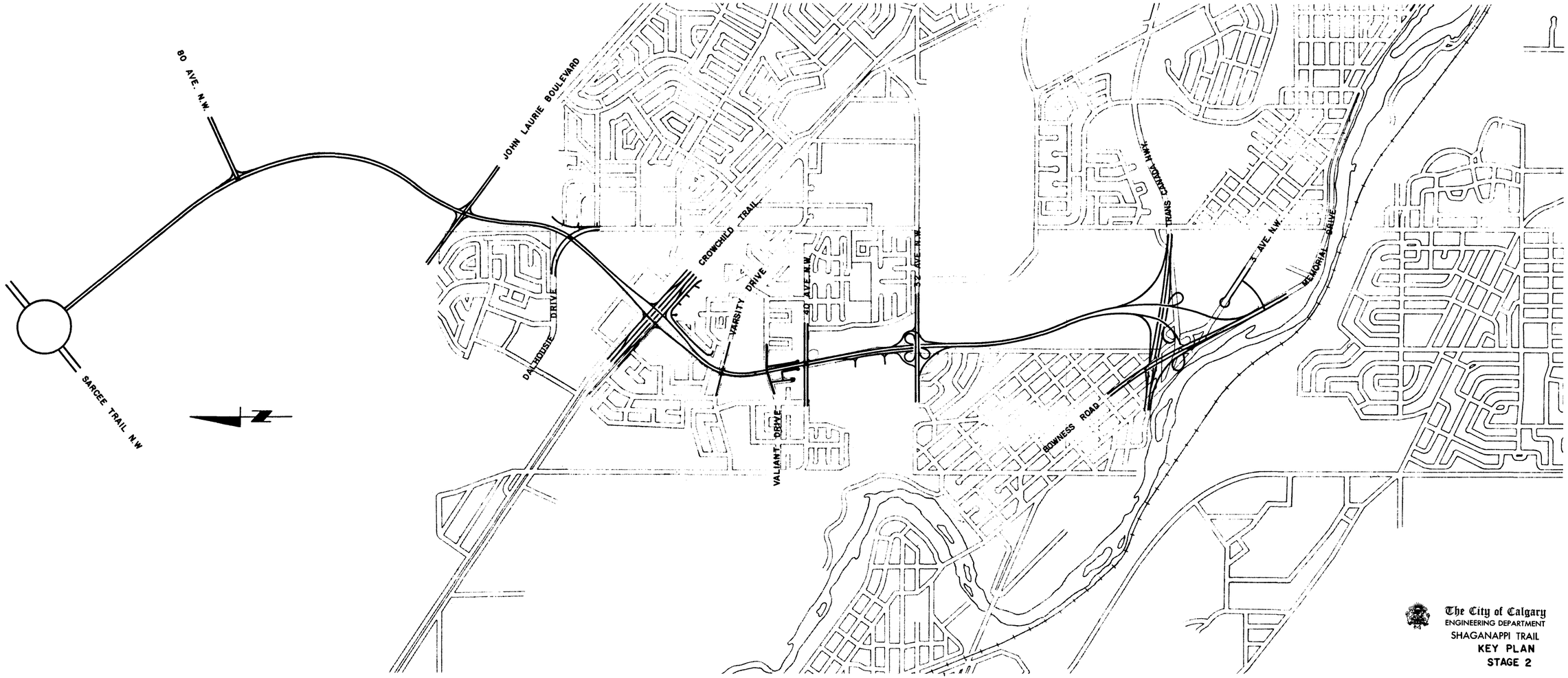


The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

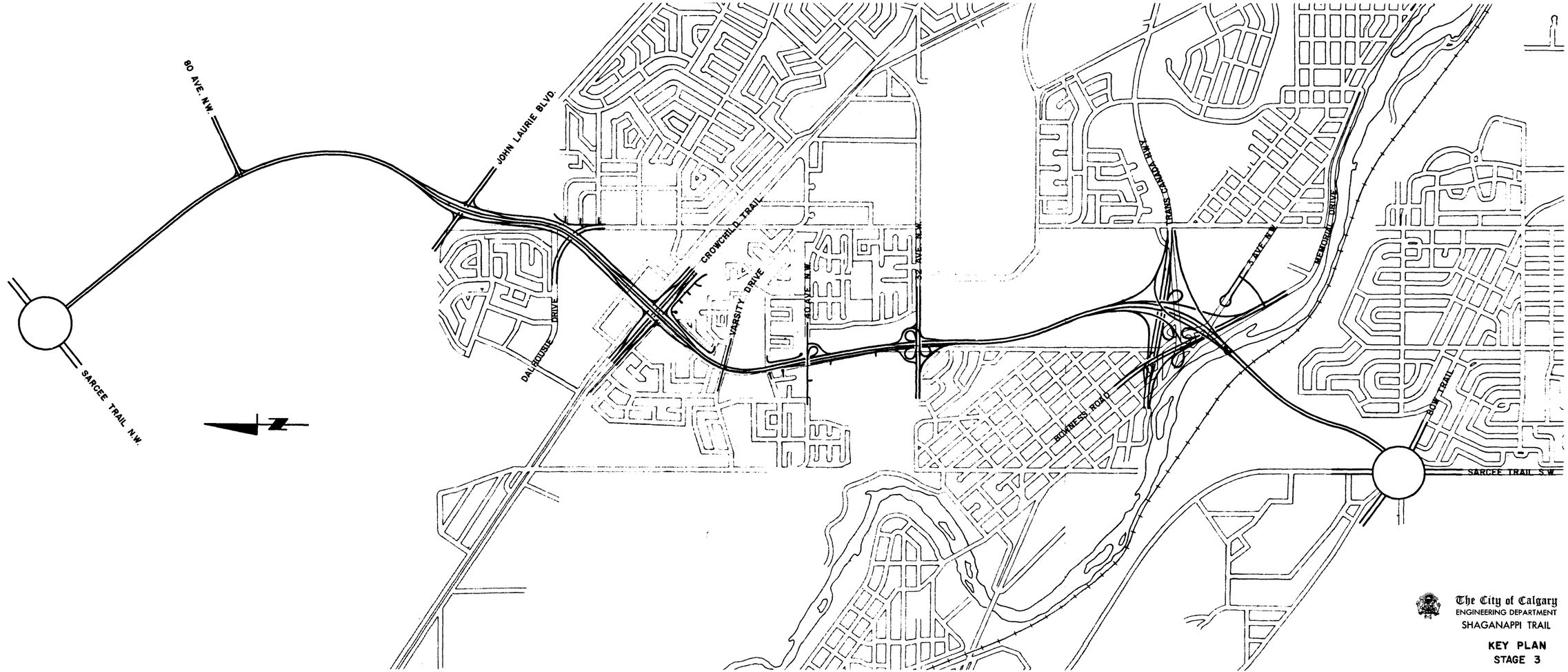
KEY PLAN
STAGE I

EXHIBIT 1A



The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL
KEY PLAN
STAGE 2

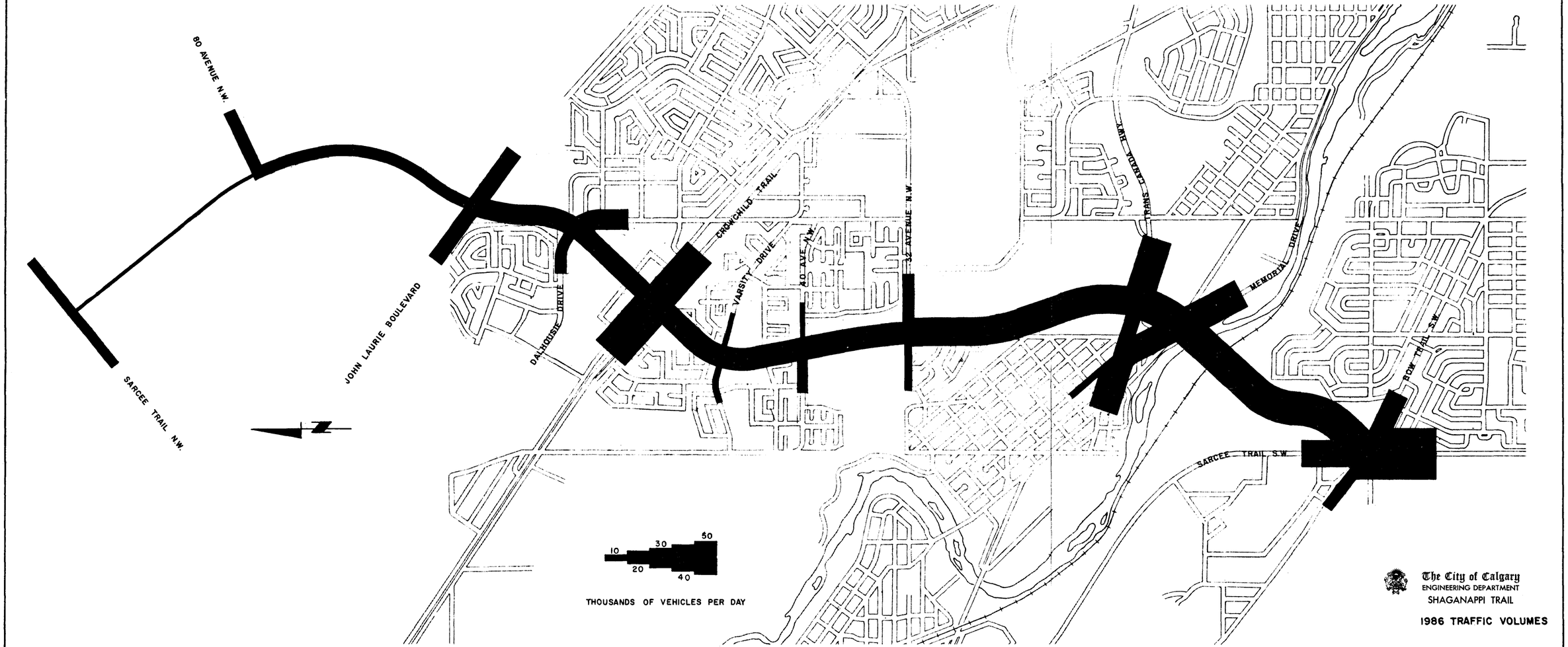
EXHIBIT 2



The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL

KEY PLAN
STAGE 3

EXHIBIT 3

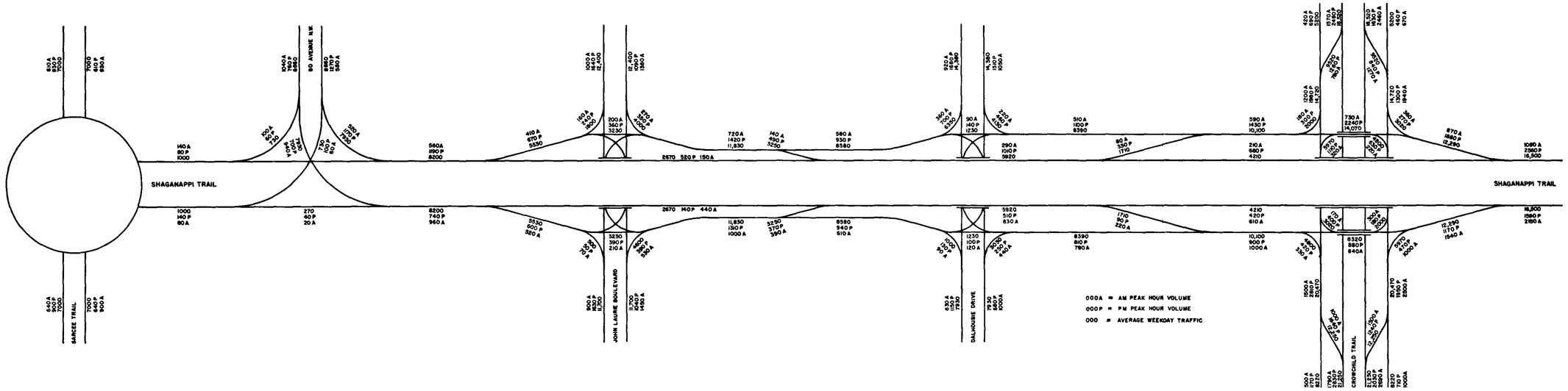


The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

1986 TRAFFIC VOLUMES

EXHIBIT 4



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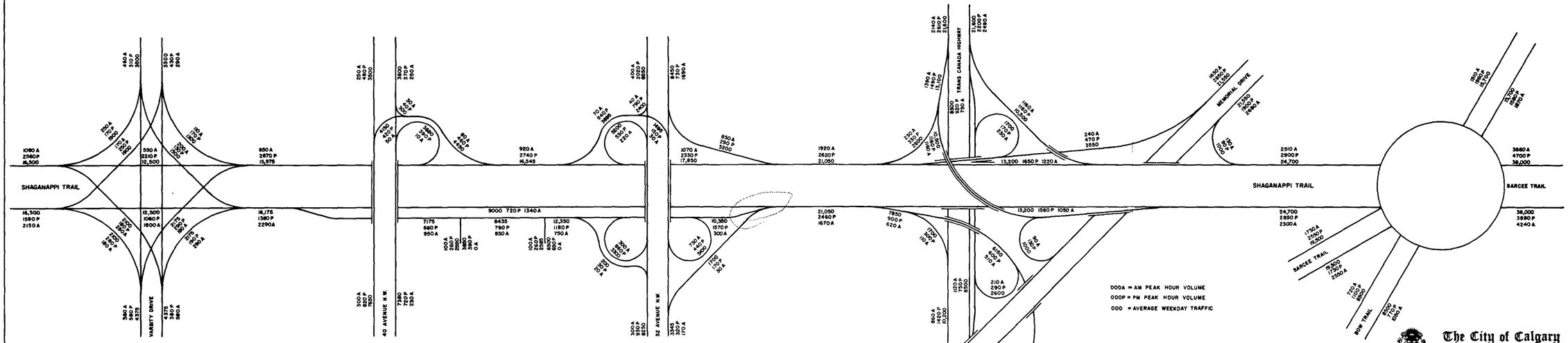
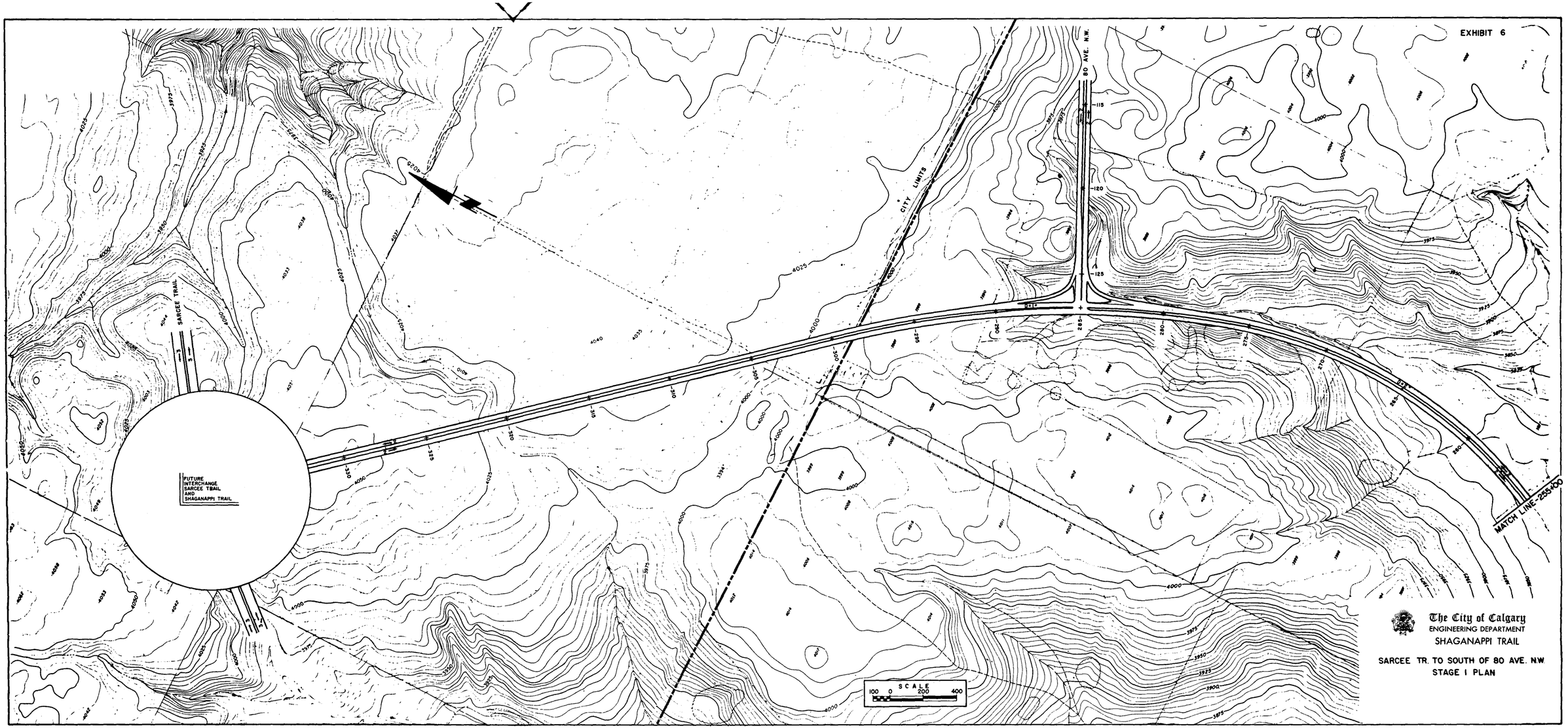


The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL
1986 TRAFFIC VOLUMES
DIAGRAMMATIC

EXHIBIT 6

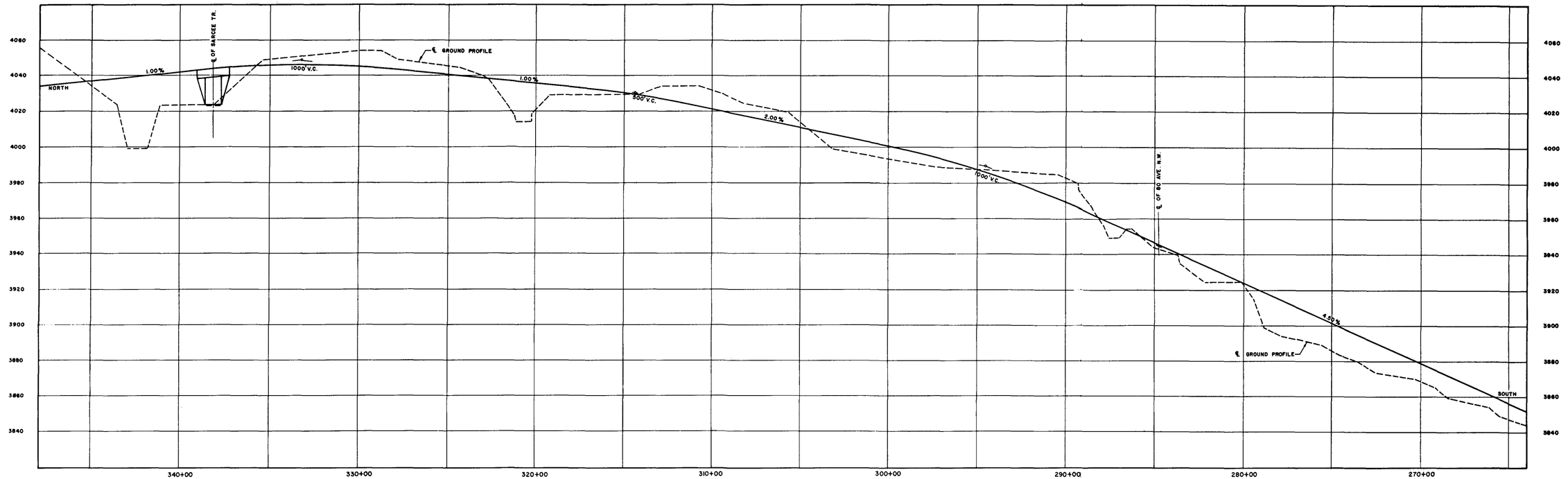


The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

SARCEE TR. TO SOUTH OF 80 AVE. N.W.
STAGE I PLAN

EXHIBIT 7



SHAGANAPPI TRAIL

SCALE

HORIZONTAL

100 0 100 200 300 400 500

VERTICAL

10 0 10 20 30 40 50

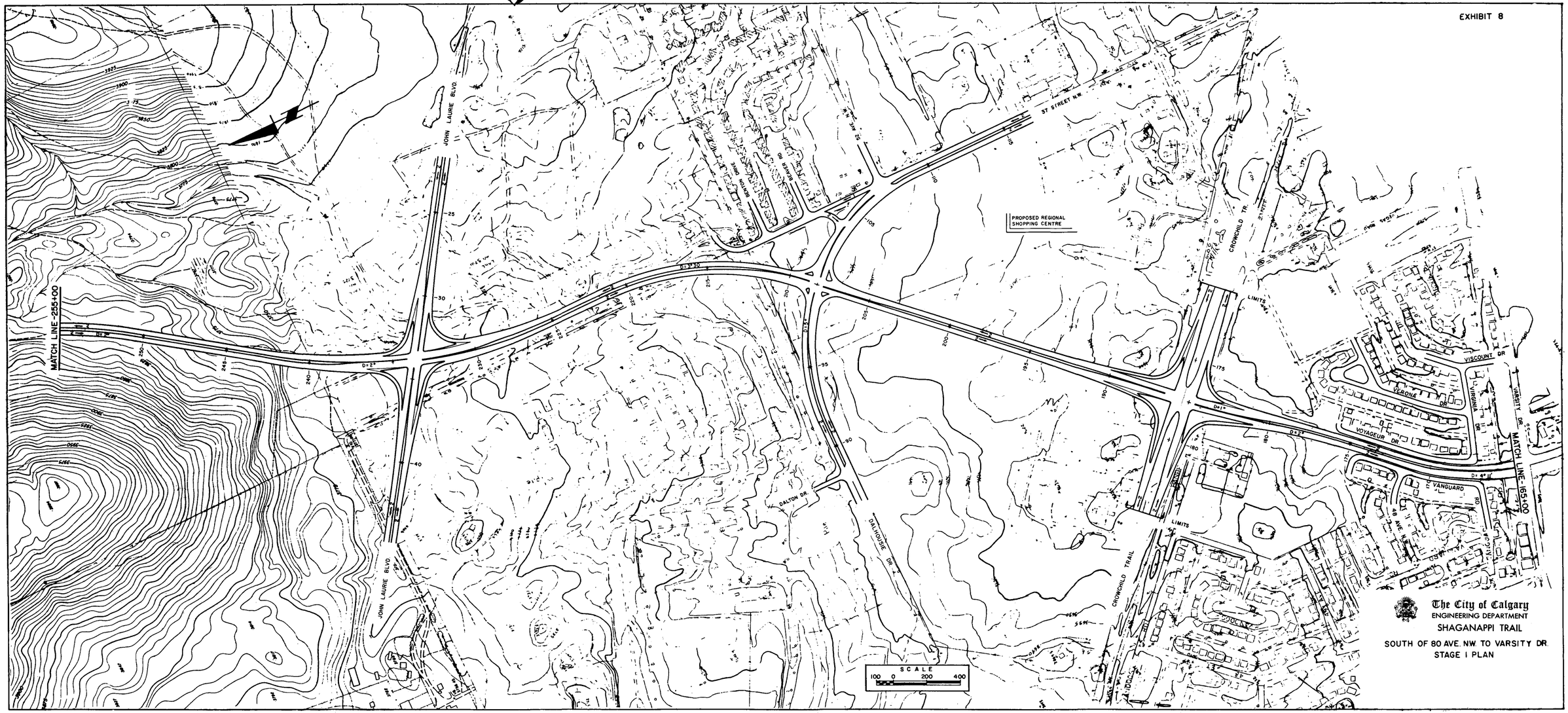
The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

SARCEE TRAIL TO SOUTH OF 80 AVE. N.W.

STAGE I PROFILE

EXHIBIT 8

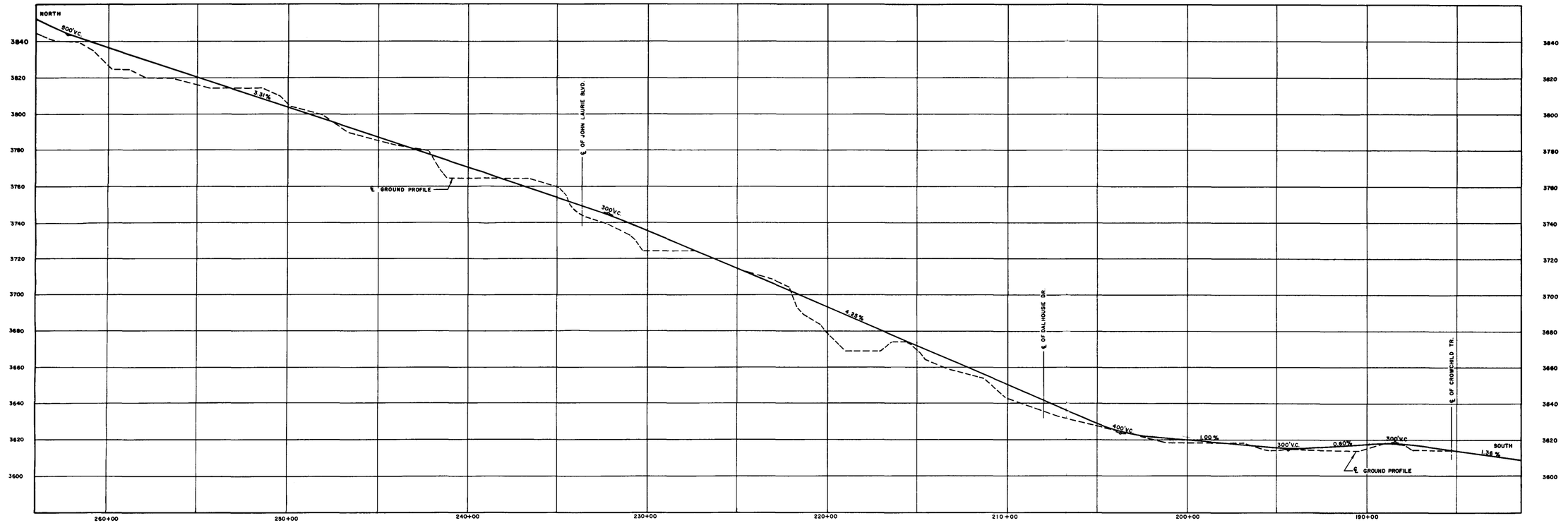


The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

SOUTH OF 80 AVE. NW. TO VARSITY DR.
STAGE I PLAN

EXHIBIT 9



SHAGANAPPI TRAIL

SCALE

HORIZONTAL
100 0 100 200 300 400 500

VERTICAL
10 0 10 20 30 40 50

The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

SOUTH OF 80 AVE. N.W. TO CROWCHILD TR
STAGE I PROFILE

EXHIBIT 10

FUTURE EXTENSION TO THE UNIVERSITY OF CALGARY

PROPOSED REGIONAL SHOPPING CENTRE

RAMP "K"

MATCH LINE 165+00

MATCH LINE 92+00

32 AVE. N.W.

40 AVE. N.W.

VALIANT DR.

VARSITY DR.

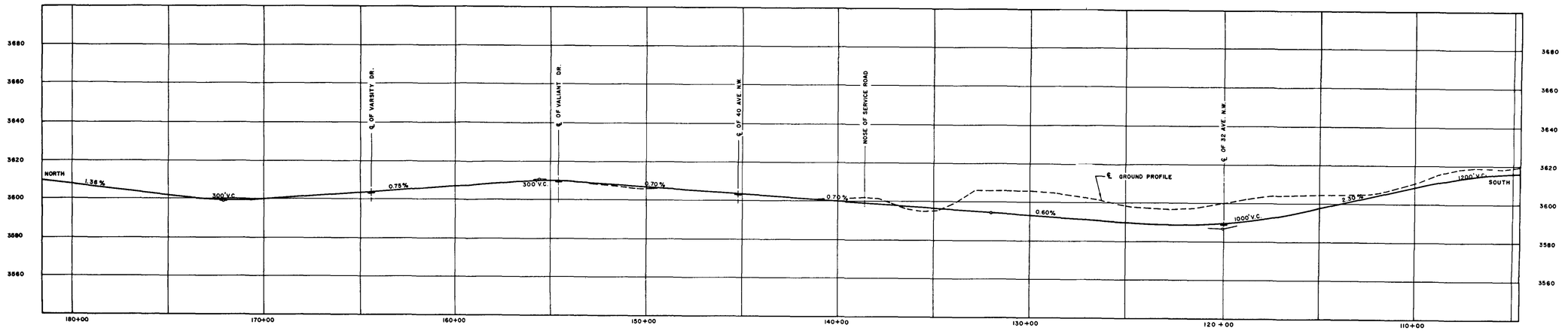
SCALE
100 0 200 400

The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

VARSITY DR. TO SOUTH OF 32 AVE. N.W.
STAGE I PLAN

EXHIBIT 11



SHAGANAPPI TRAIL

SCALE

HORIZONTAL

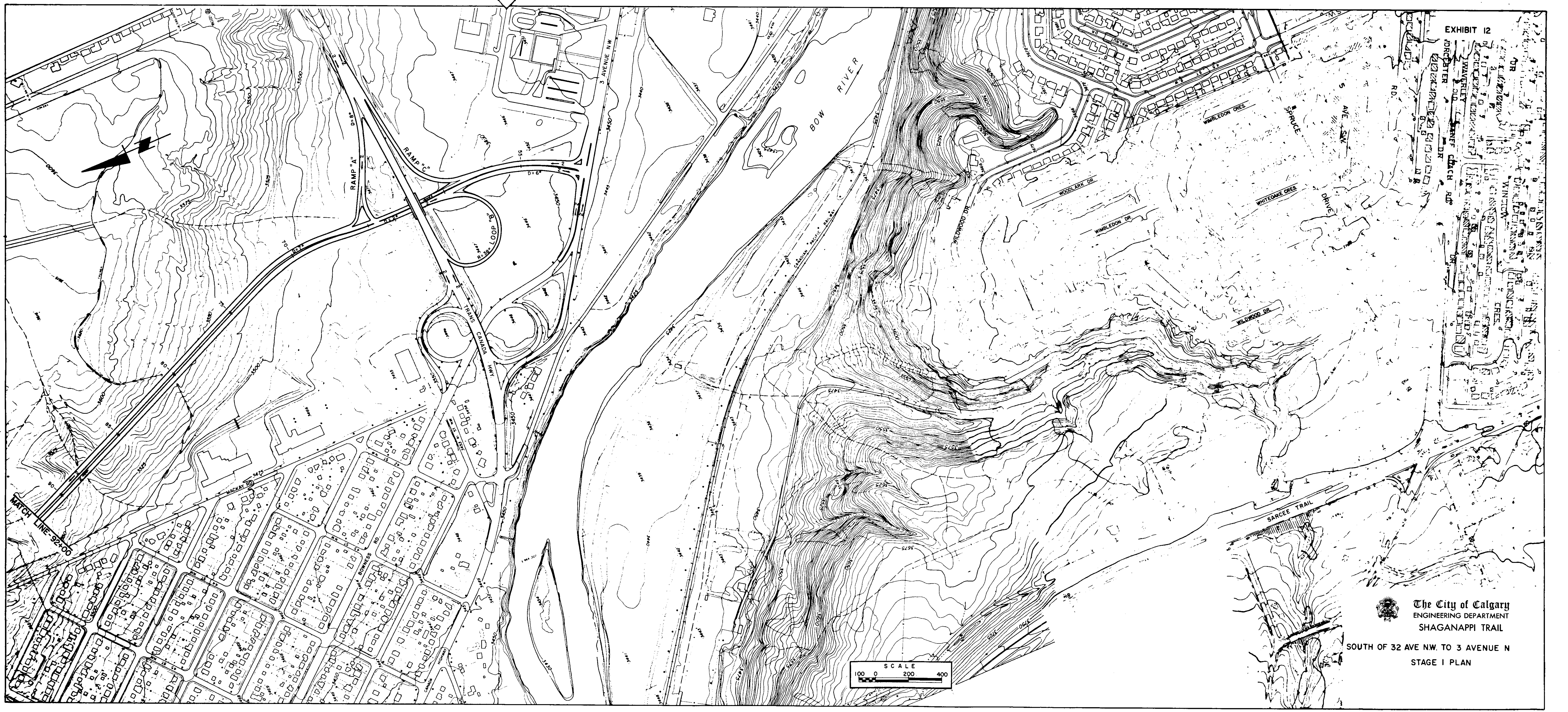
100 0 100 200 300 400 500

VERTICAL

10 0 10 20 30 40 50

The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL

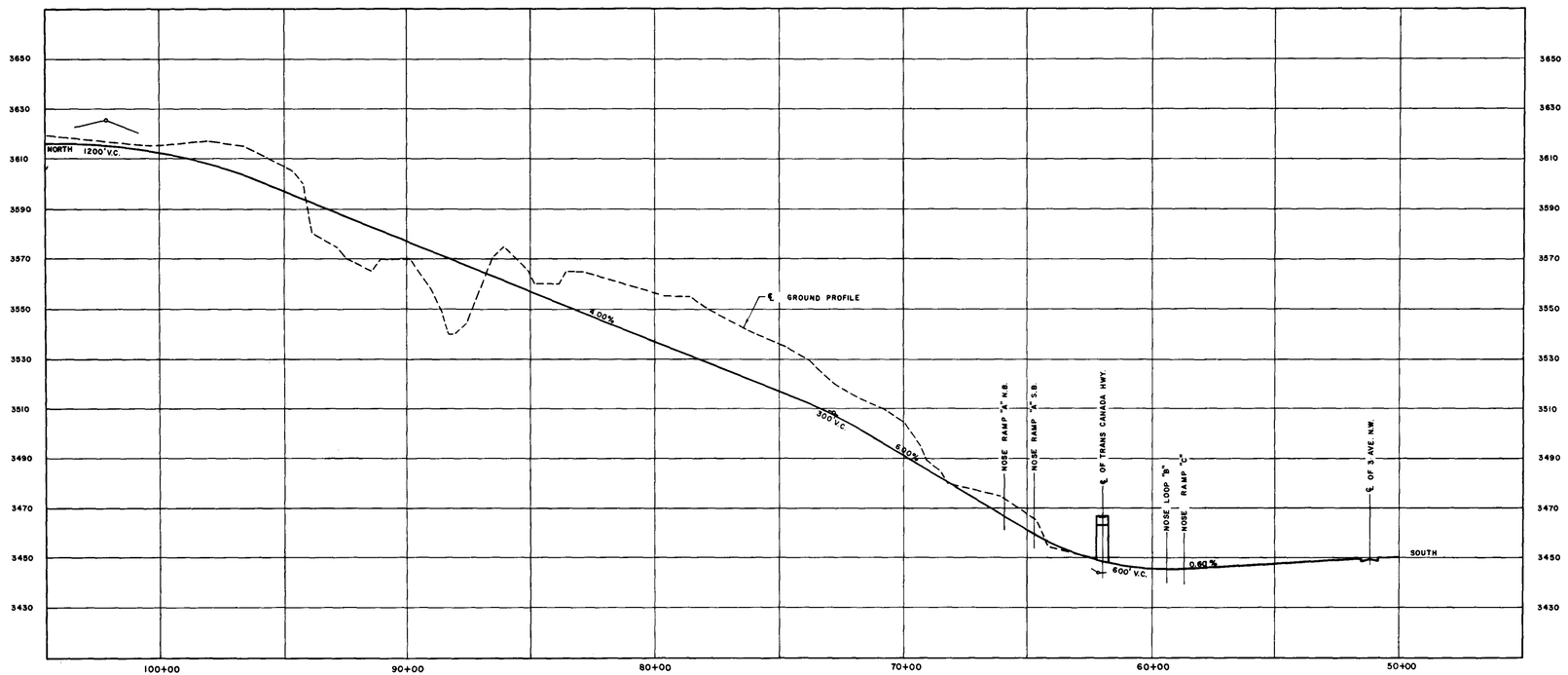
CROWCHILD TR. TO SOUTH OF 32 AVE. N.W.
STAGE I PROFILE



The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL

SOUTH OF 32 AVE N.W. TO 3 AVENUE N
STAGE 1 PLAN

EXHIBIT 13



SHAGANAPPI TRAIL

SCALE

HORIZONTAL

100 0 100 200 300 400 500

VERTICAL

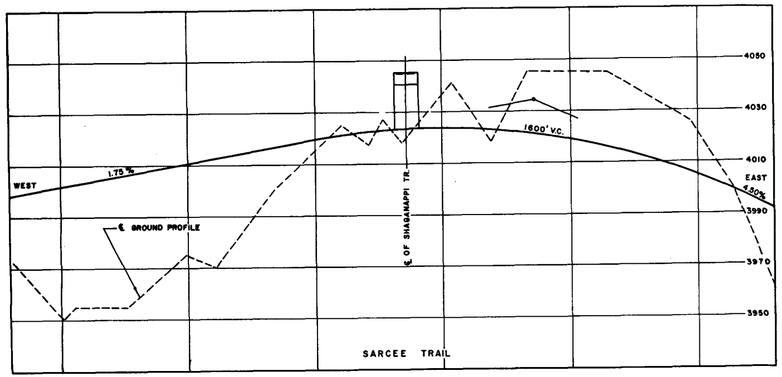
10 0 10 20 30 40 50

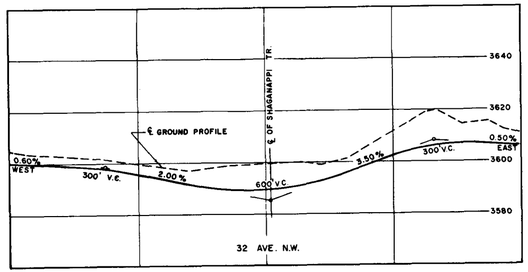
The City of Calgary
ENGINEERING DEPARTMENT

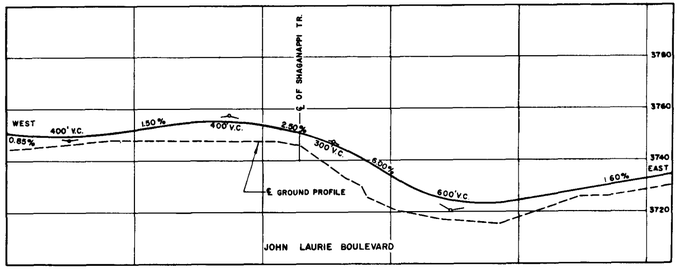
SHAGANAPPI TRAIL

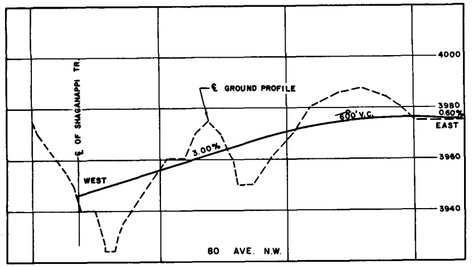
SOUTH OF 32 AVE N.W. TO 3 AVENUE N. W.
STAGE I PROFILE

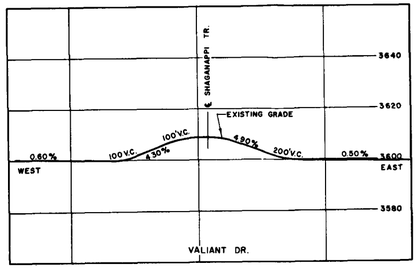
EXHIBIT 14

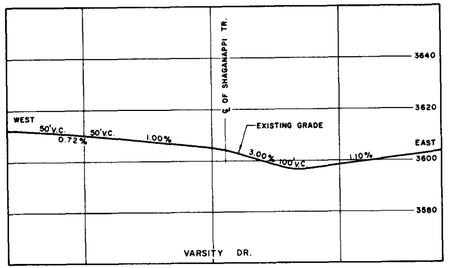


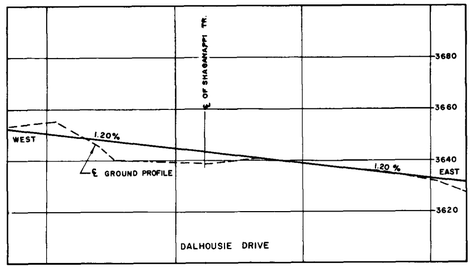


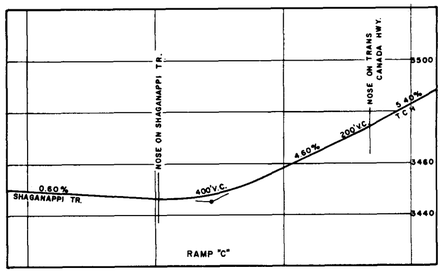


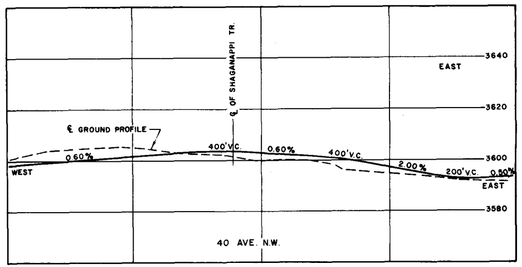


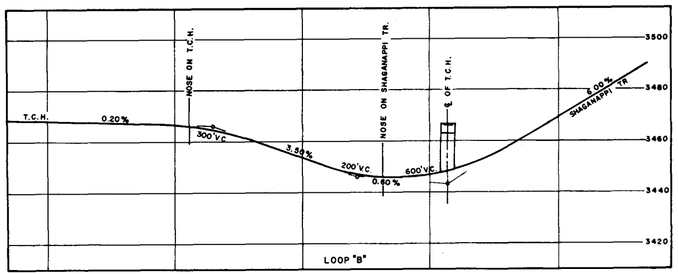


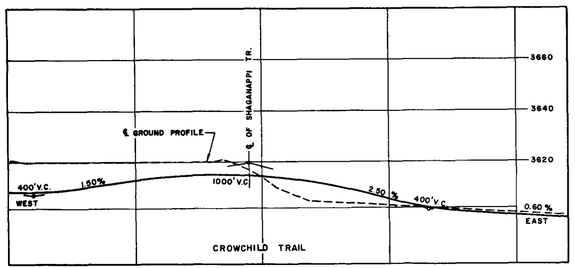


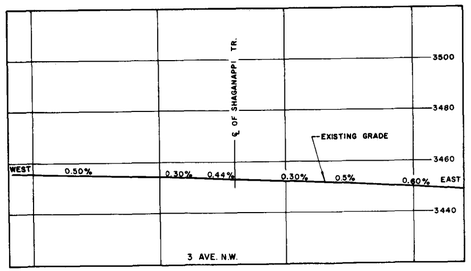


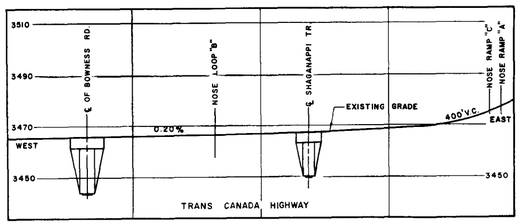


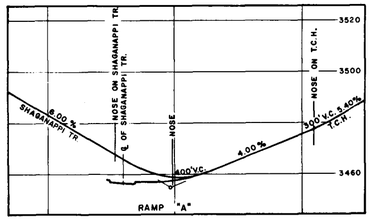












SCALE

HORIZONTAL

100 0 100 200 300 400 500

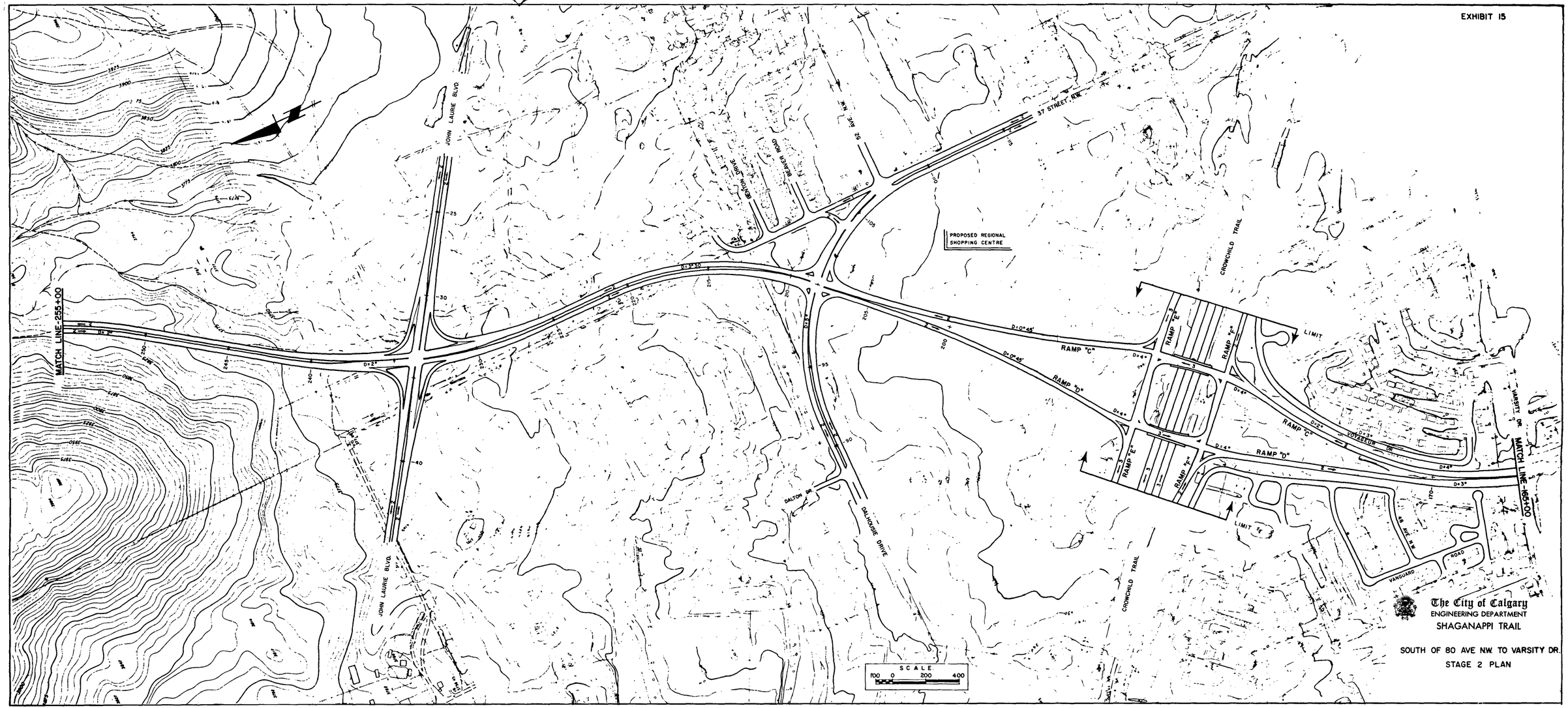
VERTICAL

10 0 10 20 30 40 50

The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL
STAGE I RAMP & INTERSECTING
STREETS PROFILES

EXHIBIT 15



The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

SOUTH OF 80 AVE N.W. TO VARSITY DR.

STAGE 2 PLAN

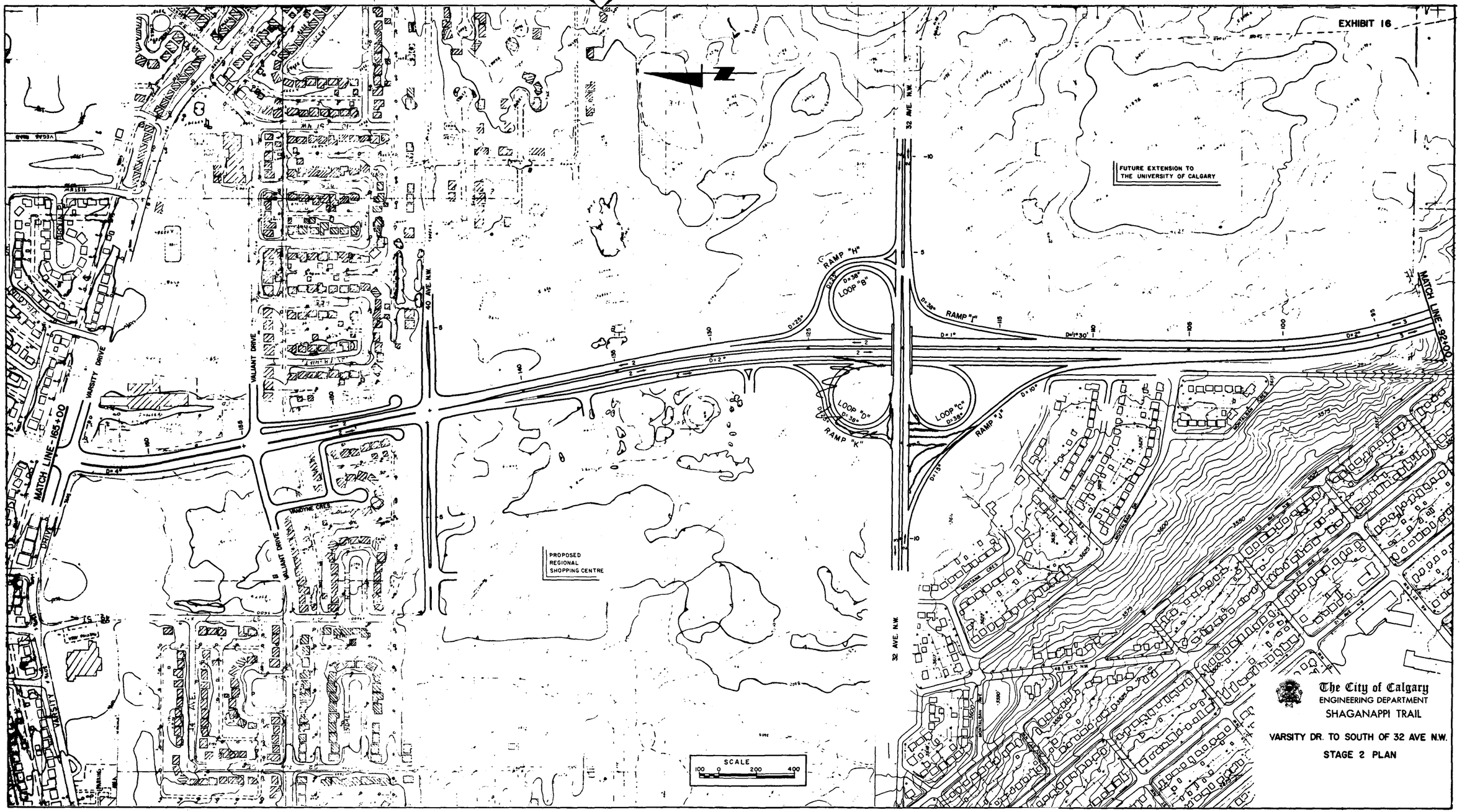


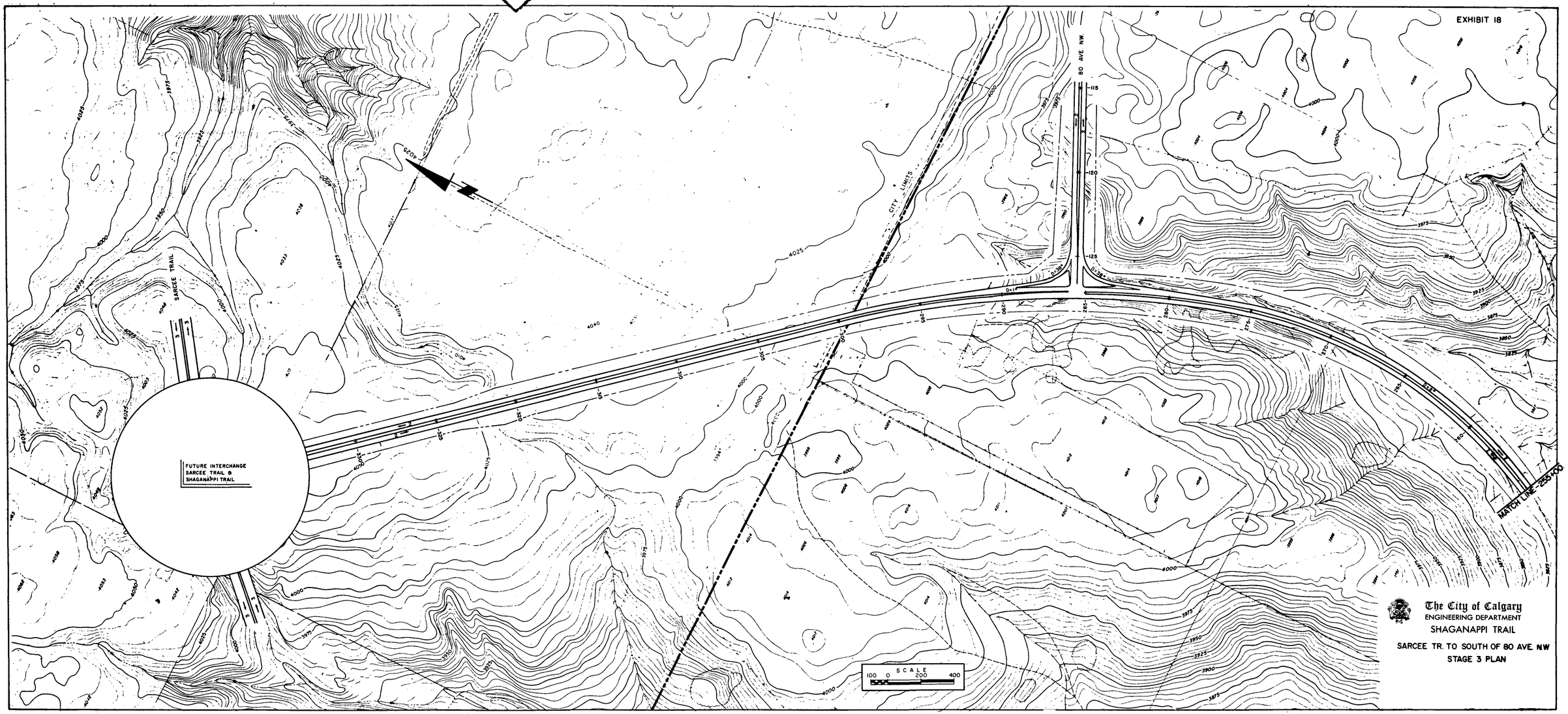
EXHIBIT 16
FUTURE EXTENSION TO THE UNIVERSITY OF CALGARY
PROPOSED REGIONAL SHOPPING CENTRE
RAMP "H"
RAMP "I"
RAMP "J"
RAMP "K"
LOOP "B"
LOOP "C"
LOOP "D"
32 AVE. N.W.
40 AVE. N.W.
VALIANT DRIVE
VARSITY DRIVE
MATCH LINE - 165+00
MATCH LINE - 92+00
SCALE
100 0 200 400
The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL
VARSITY DR. TO SOUTH OF 32 AVE N.W.
STAGE 2 PLAN

EXHIBIT 17

The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL
SOUTH OF 32 AVE. N.W. TO
MEMORIAL DR.
STAGE 2 PLAN

SCALE
100 0 200 400

EXHIBIT 18



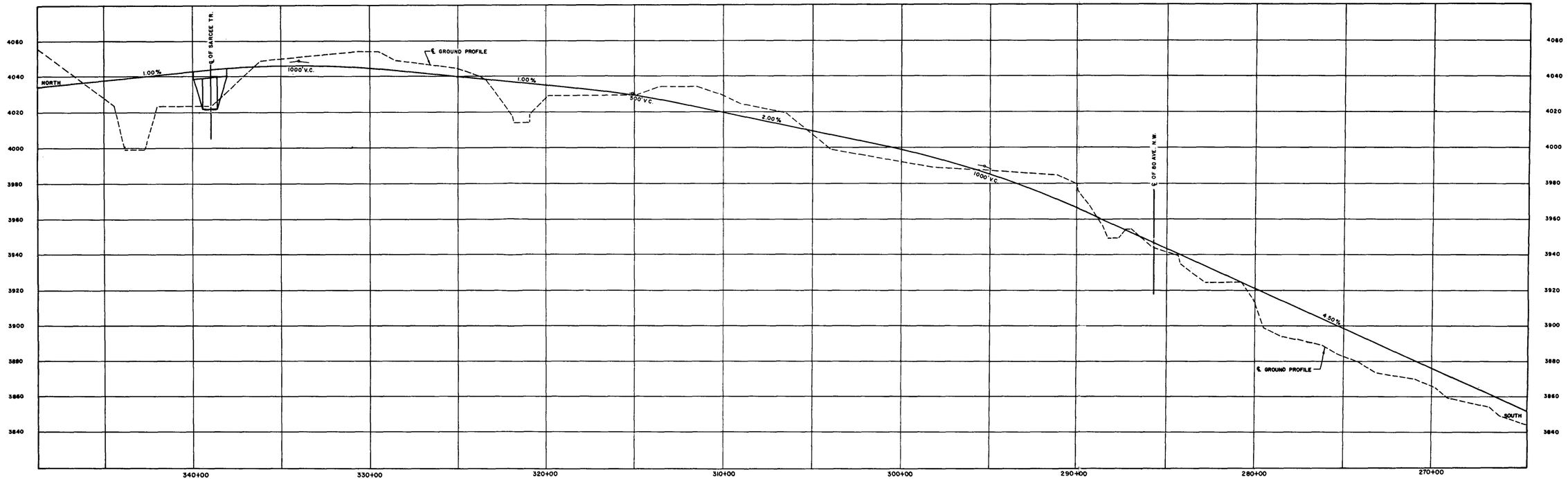
The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

SARCEE TR. TO SOUTH OF 80 AVE. NW

STAGE 3 PLAN

EXHIBIT 19



SHAGANAPPI TRAIL

SCALE

HORIZONTAL

100 0 100 200 300 400 500

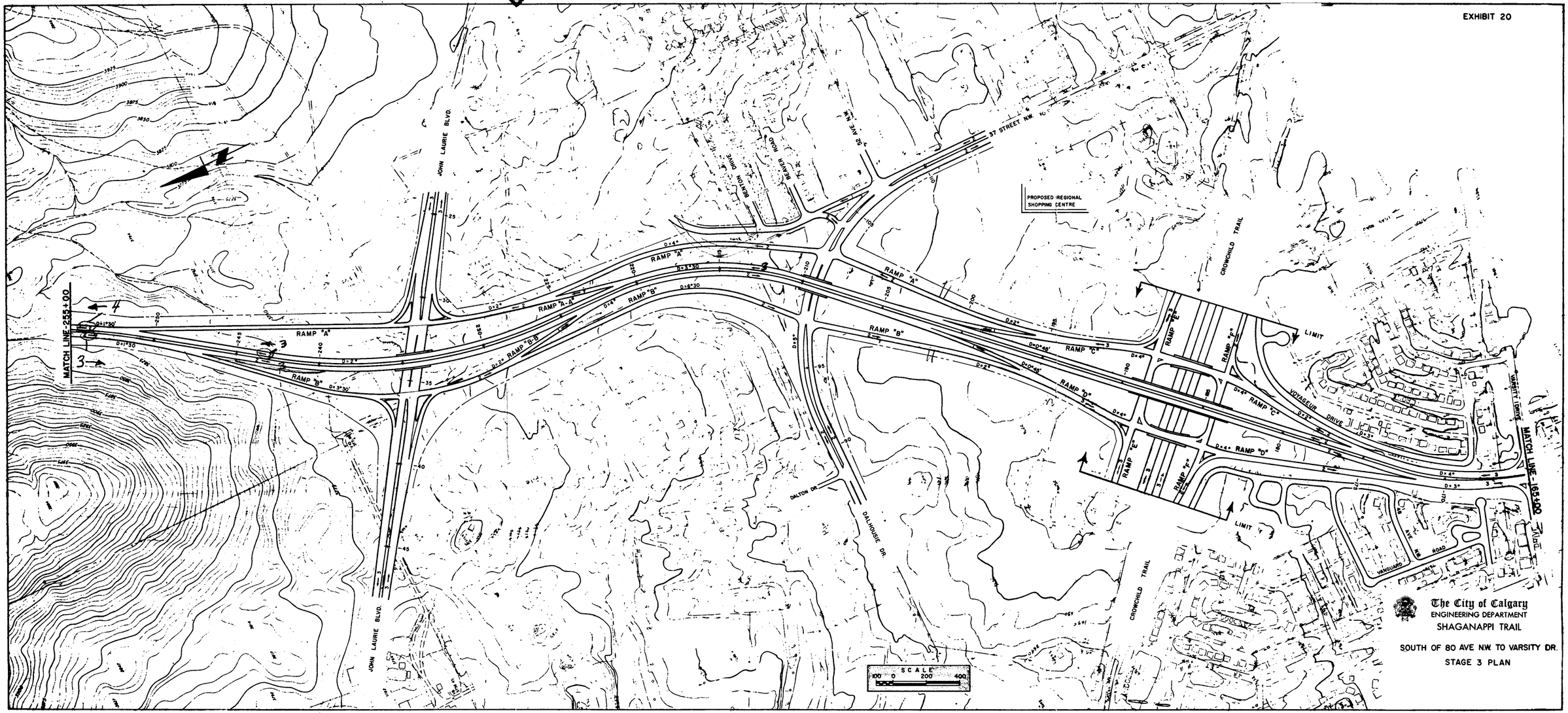
VERTICAL

10 0 10 20 30 40 50

The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL

SARCEE TR. TO SOUTH OF 80 AVE N.W.
STAGE 3 PROFILE

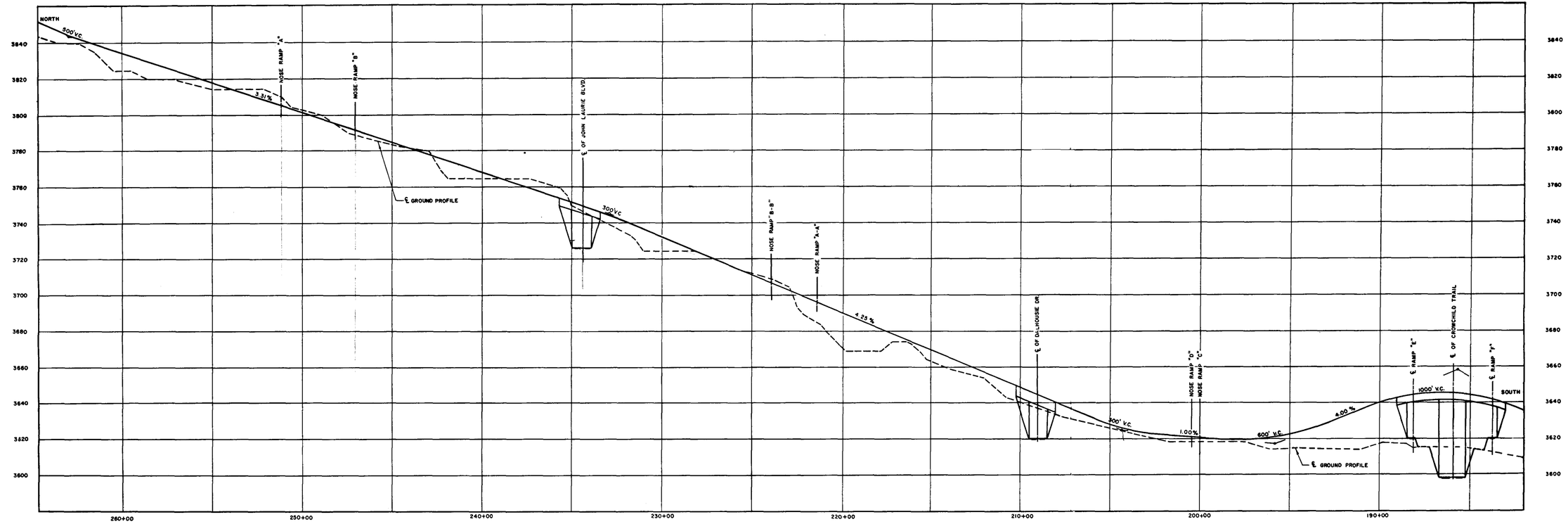
EXHIBIT 20



The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL
SOUTH OF 80 AVE NW TO VARSITY DR.
STAGE 3 PLAN

1123
323

EXHIBIT 21



SHAGANAPPI TRAIL

SCALE

HORIZONTAL

100 0 100 200 300 400 500

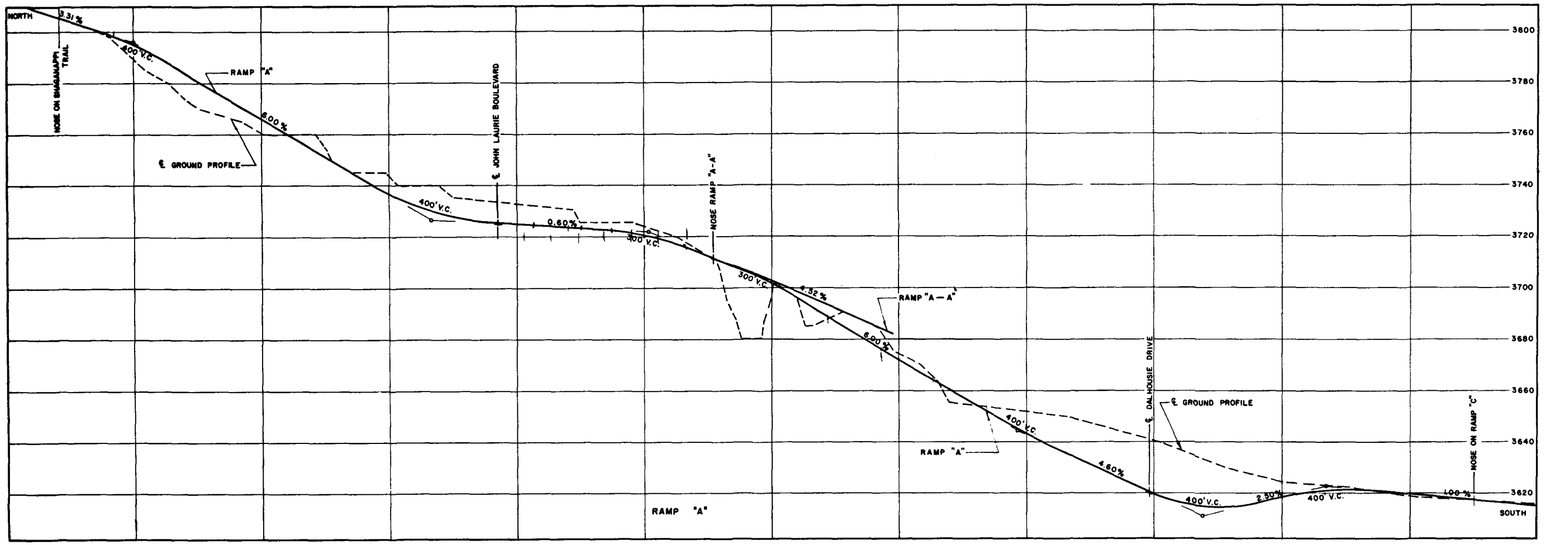
VERTICAL

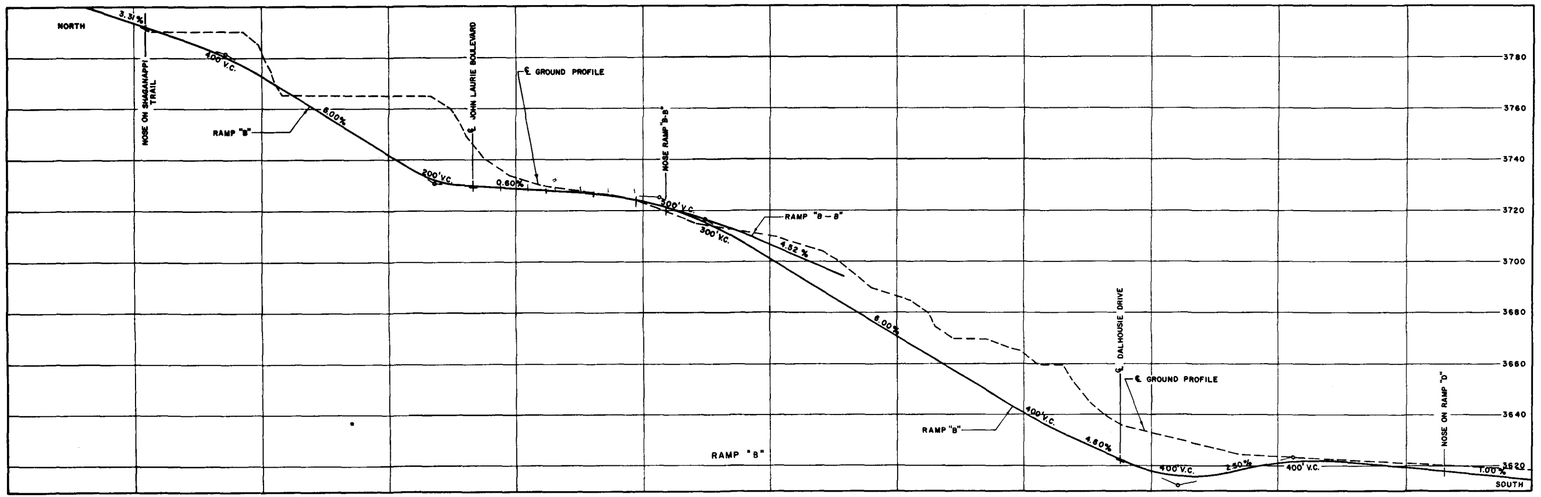
10 0 10 20 30 40 50

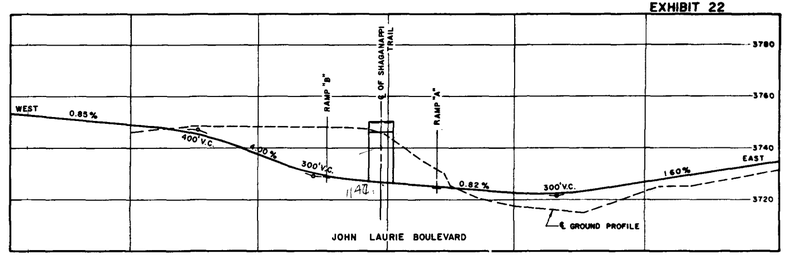
The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL

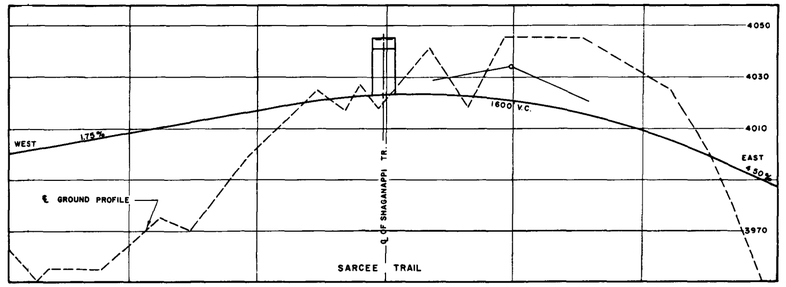
SOUTH OF 80 AVE N.W. TO CROWCHILD TR.
STAGE 3 PROFILE

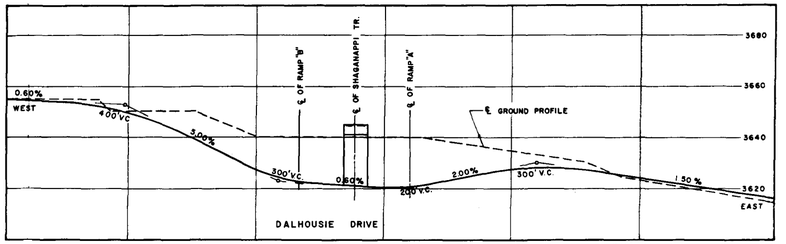
EXHIBIT 22

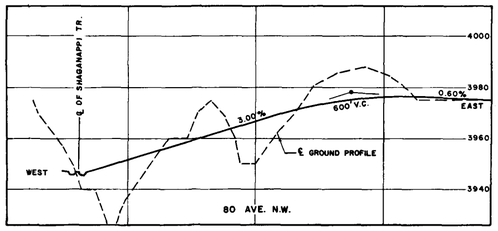












SCALE

HORIZONTAL
100 0 100 200 300 400 500

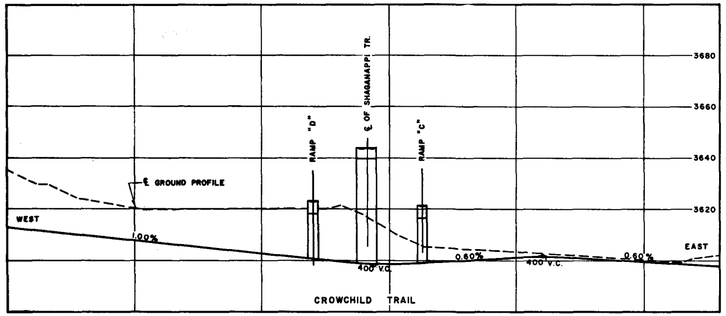
VERTICAL
10 0 10 20 30 40 50

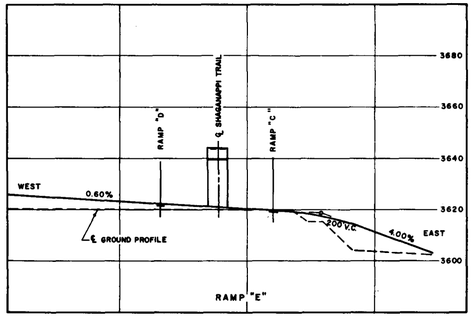
The City of Calgary
ENGINEERING DEPARTMENT

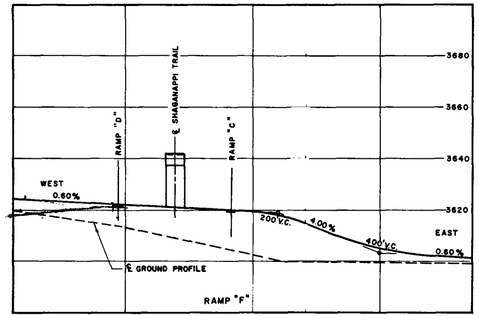
SHAGANAPPI TRAIL

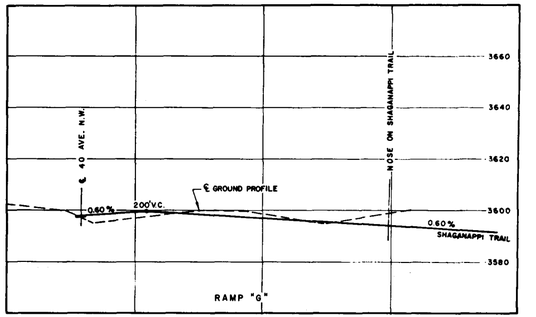
SARCEE TR. TO DALHOUSIE DR.
STAGE 3 RAMP & INTERSECTING STREET PROFILES

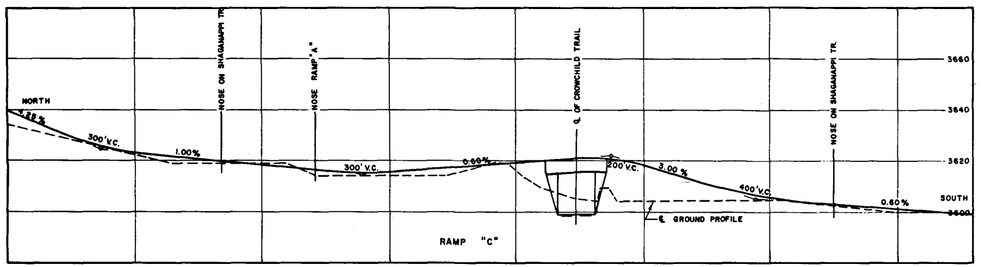
EXHIBIT 23

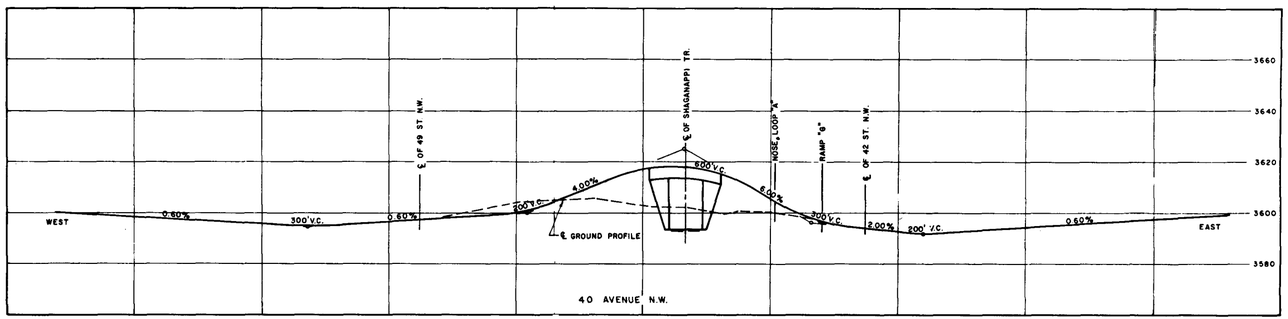


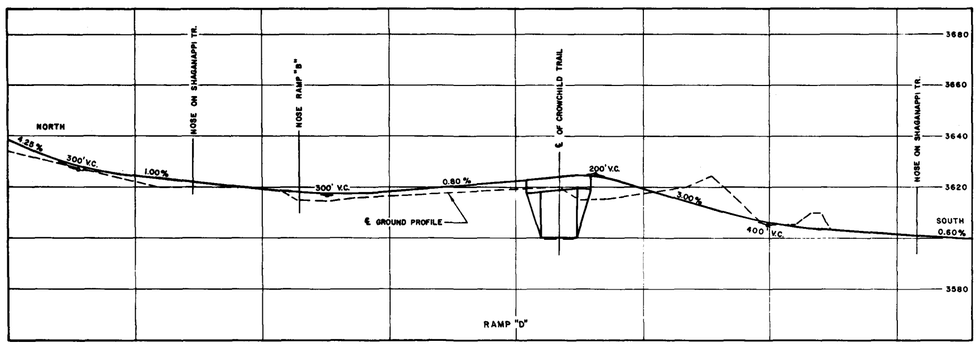


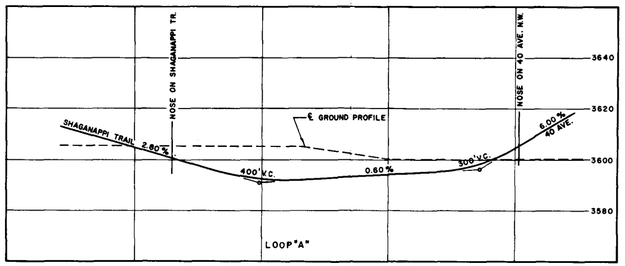












SCALE

HORIZONTAL
100 0 100 200 300 400 500

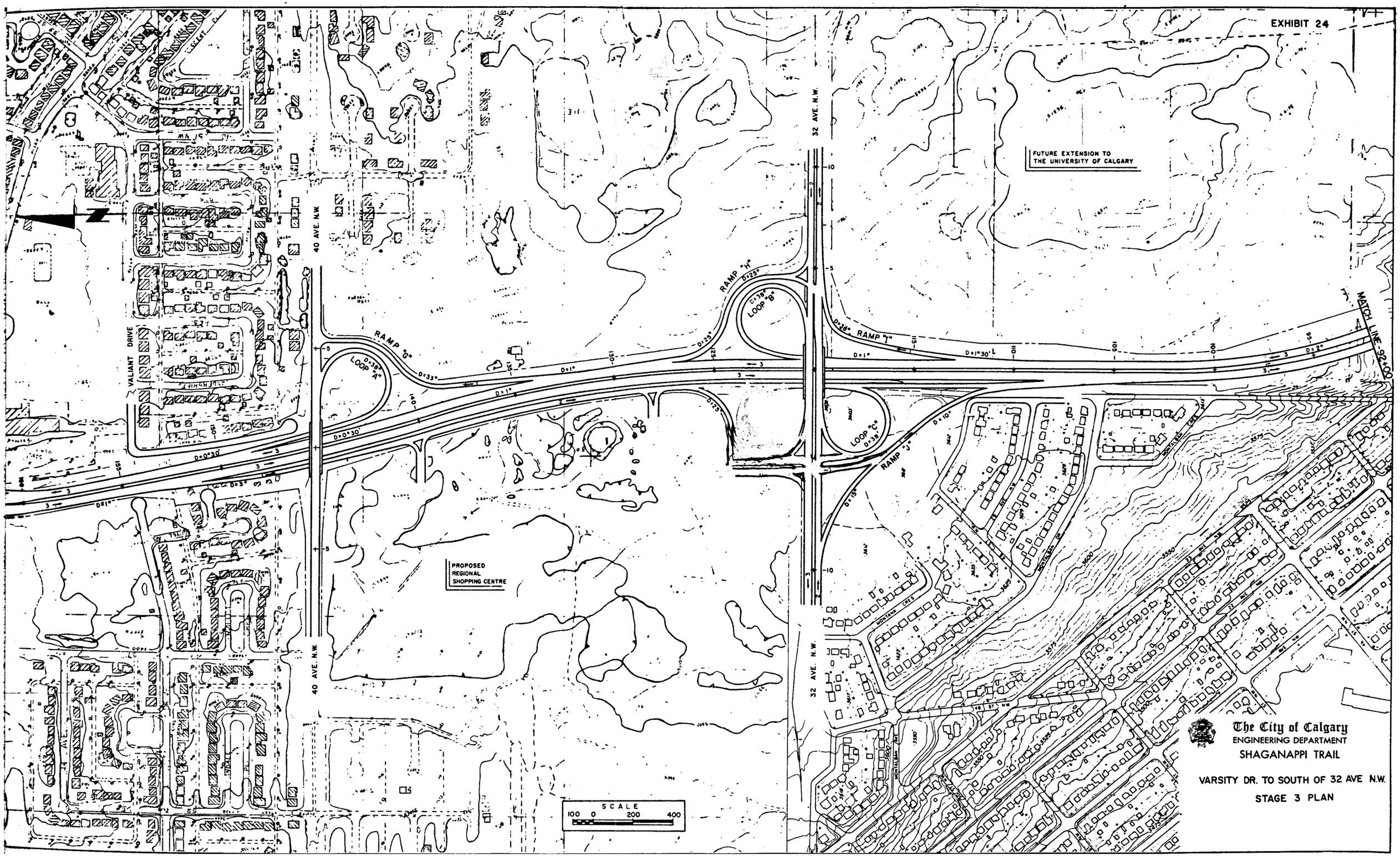
VERTICAL
10 0 10 20 30 40 50

The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

DALHOUSIE DR. TO 40 AVE. N.W.
STAGE 3 RAMP & INTERSECTING
STREET PROFILES

EXHIBIT 24



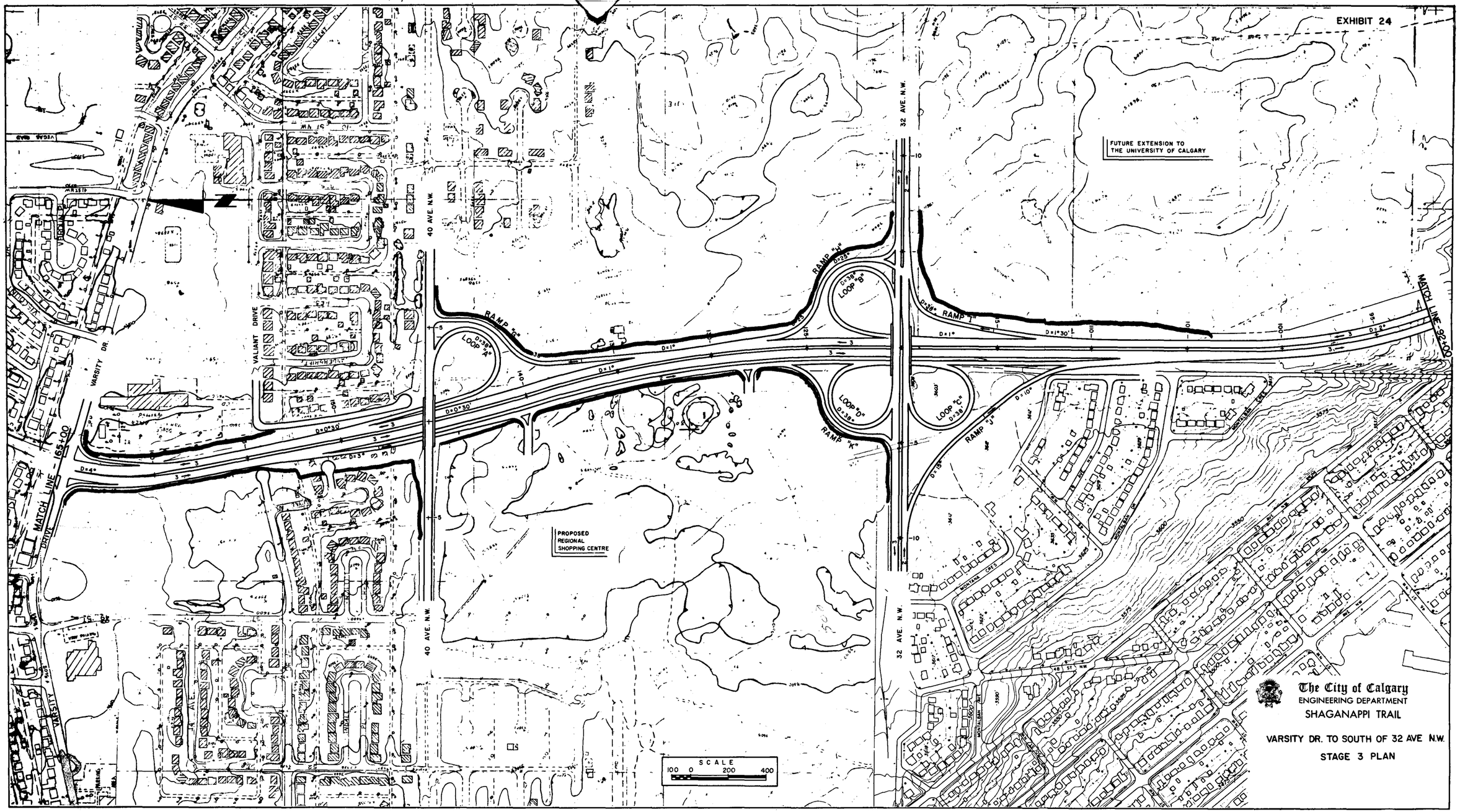
The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

VARSITY DR. TO SOUTH OF 32 AVE N.W.

STAGE 3 PLAN

EXHIBIT 24



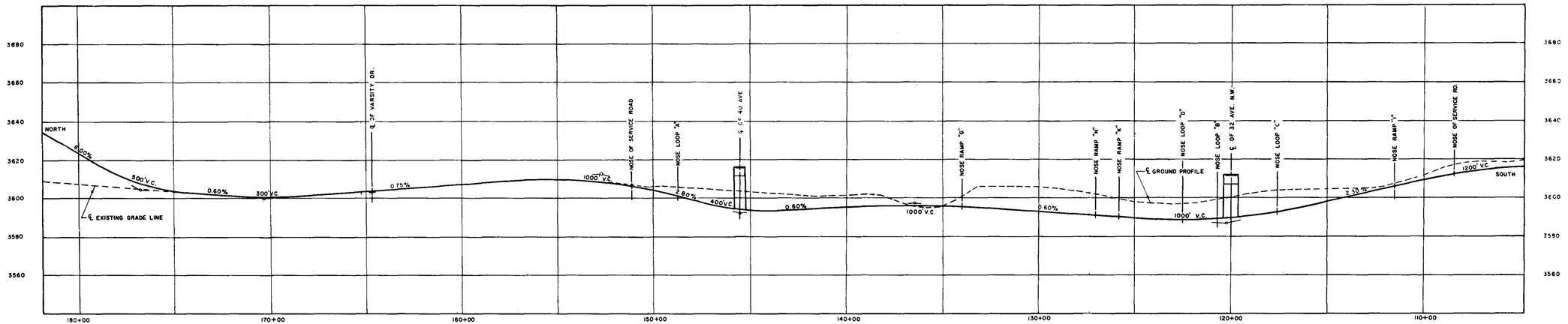
The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

VARSITY DR. TO SOUTH OF 32 AVE. N.W.

STAGE 3 PLAN

EXHIBIT 25



SHAGANAPPI TRAIL

SCALE

HORIZONTAL

100 0 100 200 300 400 500

VERTICAL

10 0 10 20 30 40 50

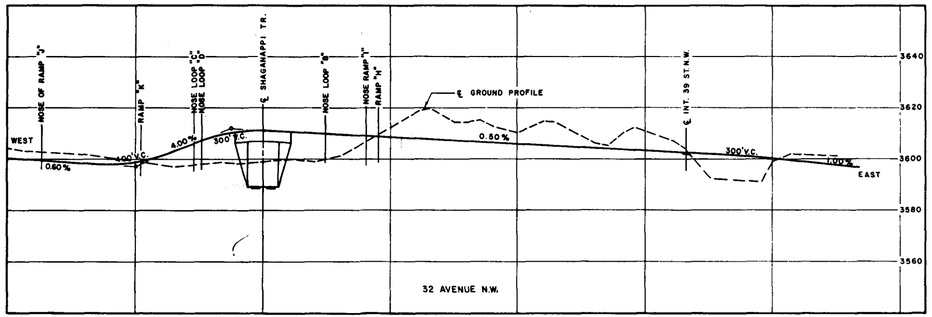
The City of Calgary
ENGINEERING DEPARTMENT

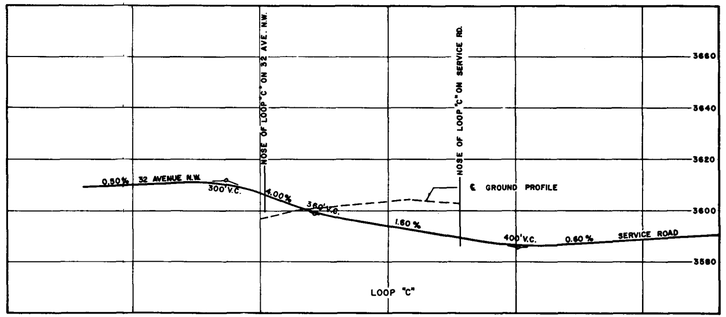
SHAGANAPPI TRAIL

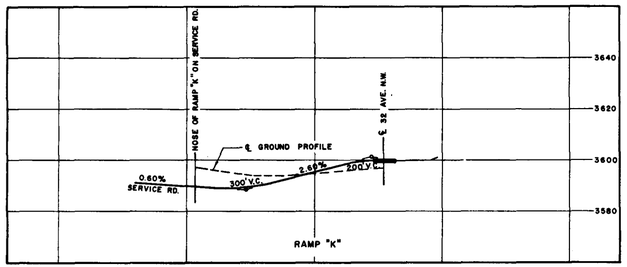
CROWCHILD TR. TO SOUTH OF 32 AVE NW

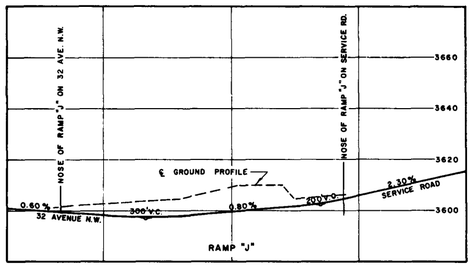
STAGE 3 PROFILE

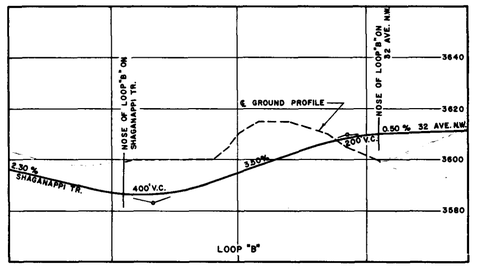
EXHIBIT 26



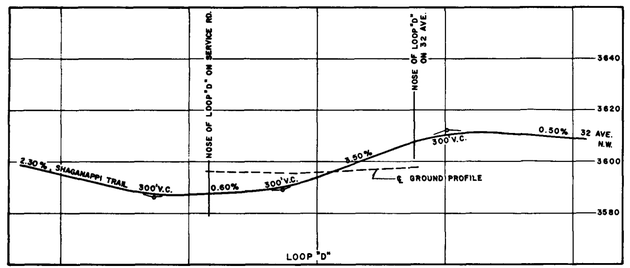


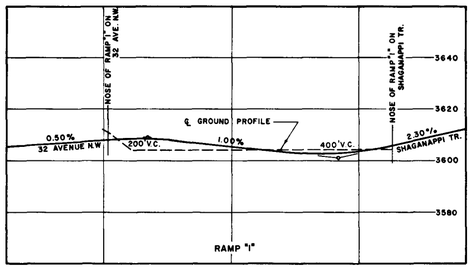


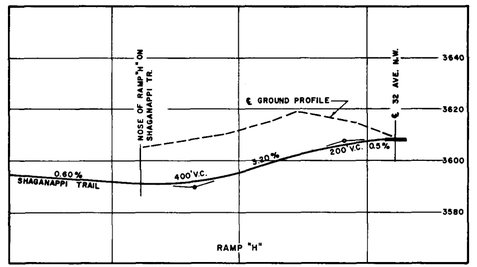




FOR 40 AVE. N.W. STAGE 3 PROFILE
SEE EXHIBIT 23







SCALE

HORIZONTAL
100 0 100 200 300 400 500

VERTICAL
10 0 10 20 30 40 50

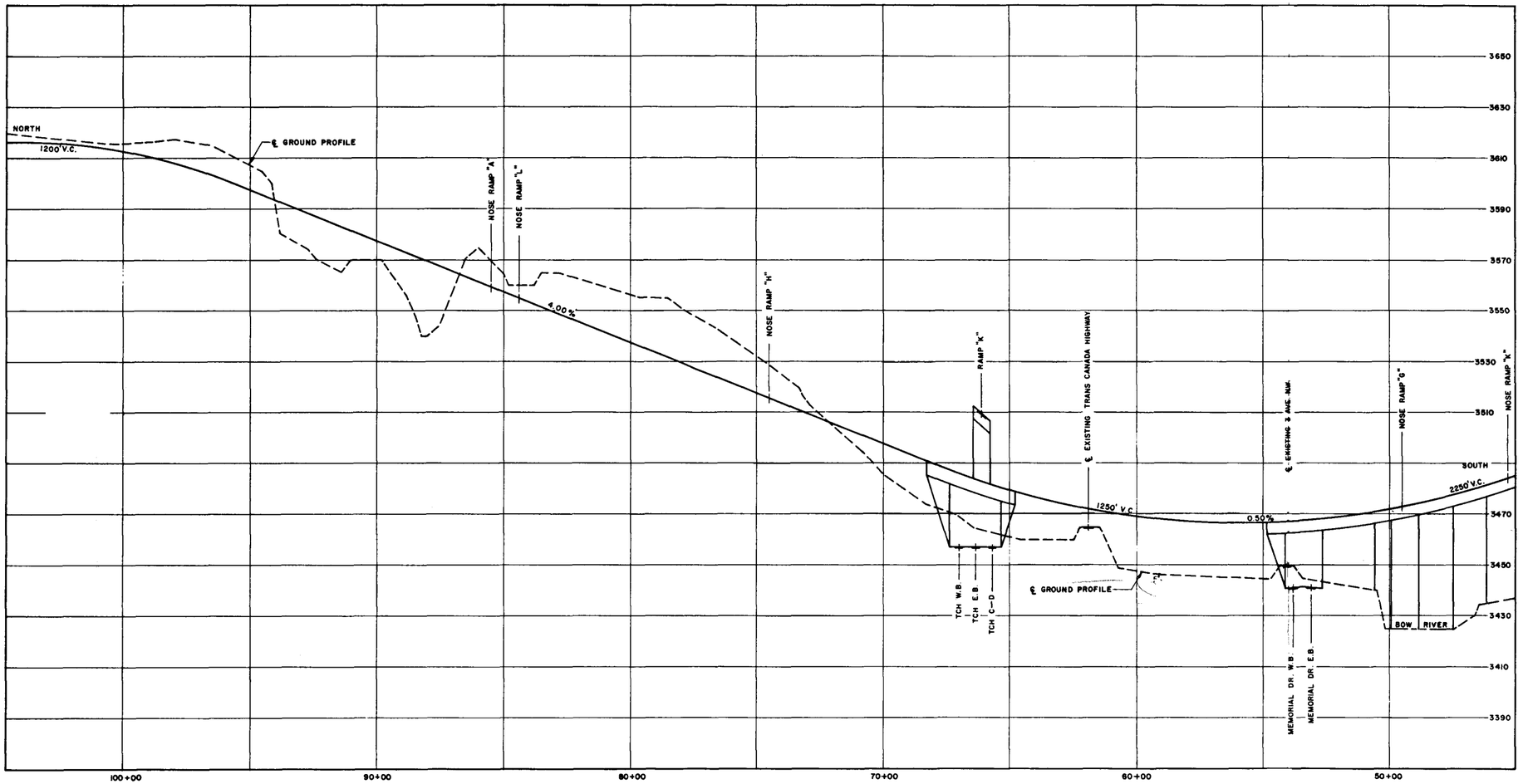
The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

32 AVE INTERCHANGE
STAGE 3 PROFILES


EXHIBIT 27
TRANS CANADA HWY
3 AVENUE N.W.
MEMORIAL DRIVE
BOW RIVER
RAMP "G"
RAMP "H"
RAMP "E"
RAMP "K"
RAMP "L"
RAMP "M"
RAMP "A"
RAMP "B"
RAMP "C"
RAMP "D"
RAMP "F"
LOOP "G"
LOOP "H"
LOOP "C"
LOOP "D"
T.C.N. C.P.
MACKAY
SERVICE ROAD
WILDWOOD DR.
WOODLARK DR.
WIMBLEDON CRES.
WHITEOAK CRES.
WIMBLEDON DR.
SPRUCE AVE. S.W.
WORCESTER RD.
WAVERLEY RD.
SERVICE RD.
SARCEE TRAIL
BOW TRAIL
MATCH LINE - 924.00
FUTURE INTERCHANGE
BOW TRAIL, SARCEE TRAIL
& SHAGANAPPI TRAIL
SCALE
100 0 200 400
The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL
SOUTH OF 32 AVE NW TO BOW TR
STAGE 3 PLAN

EXHIBIT 28



SHAGANAPPI TRAIL

SCALE

HORIZONTAL
100 0 100 200 300 400 500

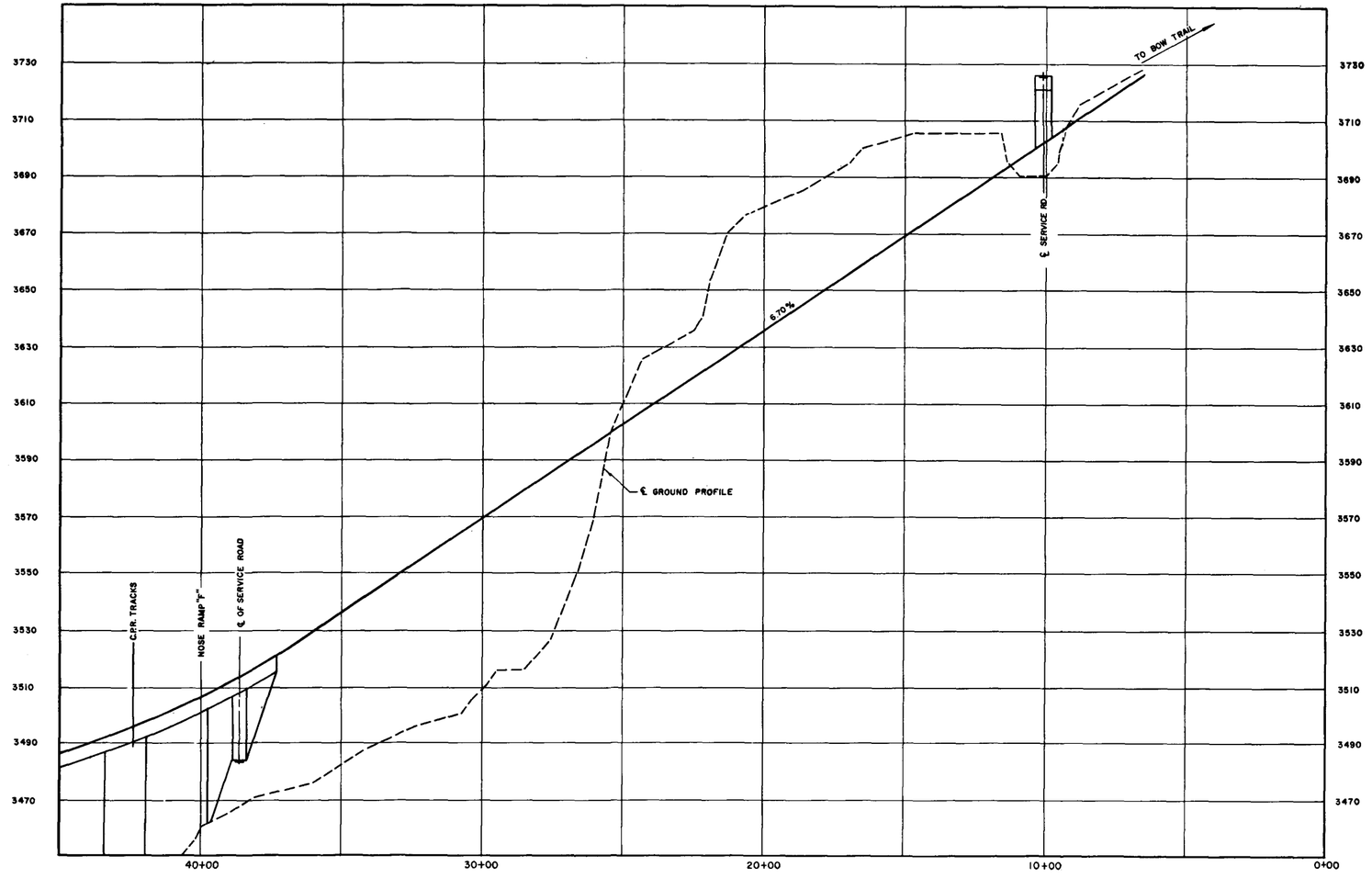
VERTICAL
10 0 10 20 30 40 50

The City of Calgary
ENGINEERING DEPARTMENT

SHAGANAPPI TRAIL

SOUTH OF 32 AVE. N.W. TO BOW RIVER
STAGE 3 PROFILE

EXHIBIT 29



SHAGANAPPI TRAIL

SCALE

HORIZONTAL

100 0 100 200 300 400 500

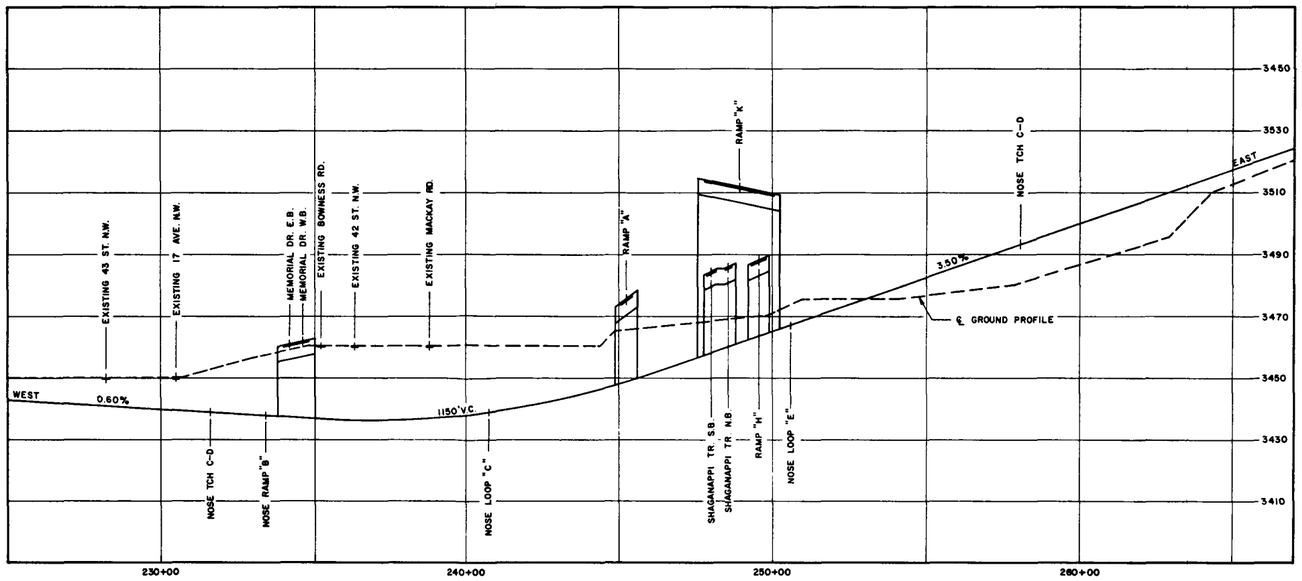
VERTICAL

10 0 10 20 30 40 50

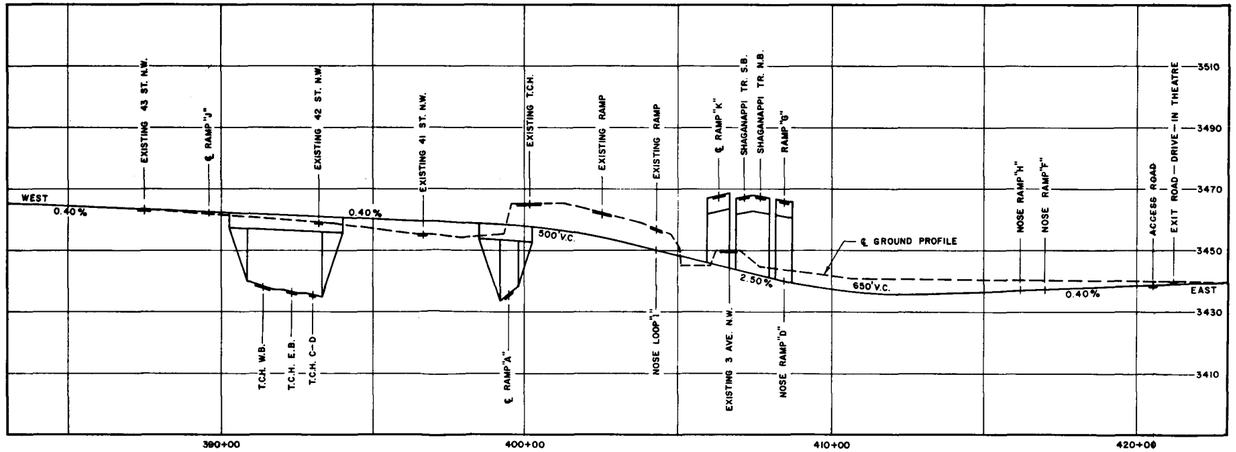
The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL

BOW RIVER TO BOW TRAIL
STAGE 3 PROFILE

EXHIBIT 30



TRANS CANADA HIGHWAY



MEMORIAL DRIVE

SCALE

HORIZONTAL
100 0 100 200 300 400 500

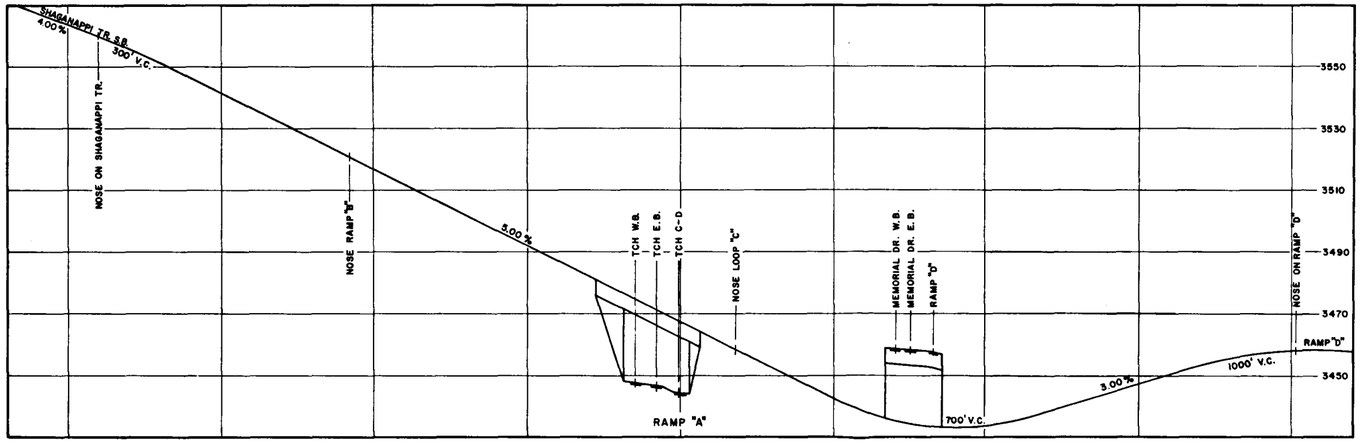
VERTICAL
10 0 10 20 30 40 50

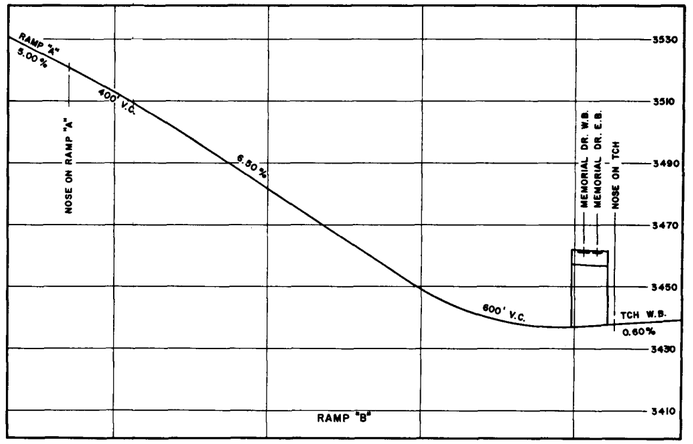
The City of Calgary
ENGINEERING DEPARTMENT

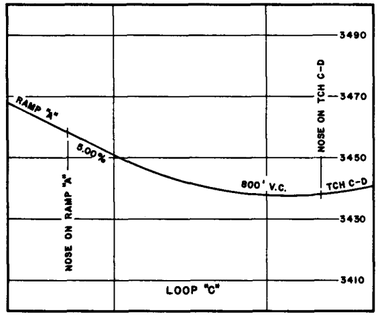
SHAGANAPPI TRAIL

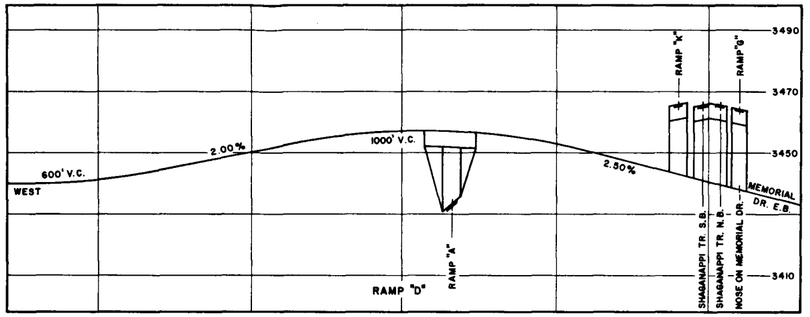
TRANS CANADA HWY. & MEMORIAL DR.
STAGE 3 PROFILES

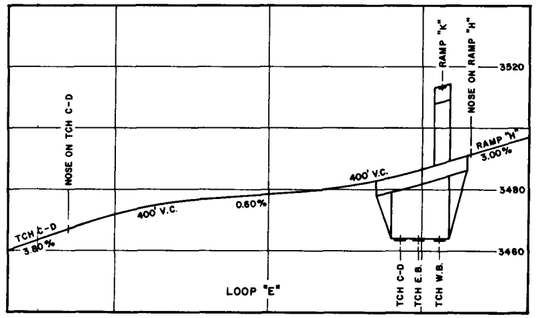
EXHIBIT 31

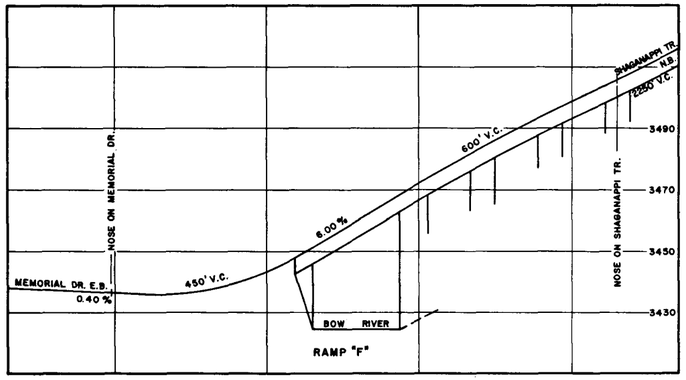


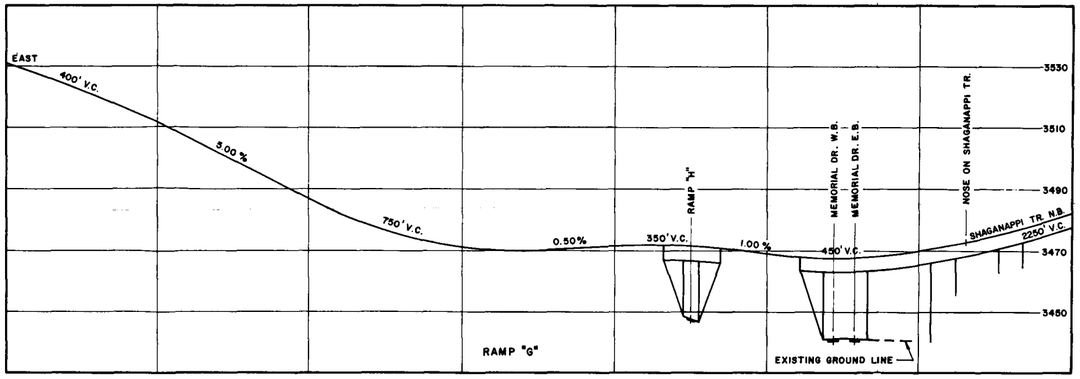












SCALE

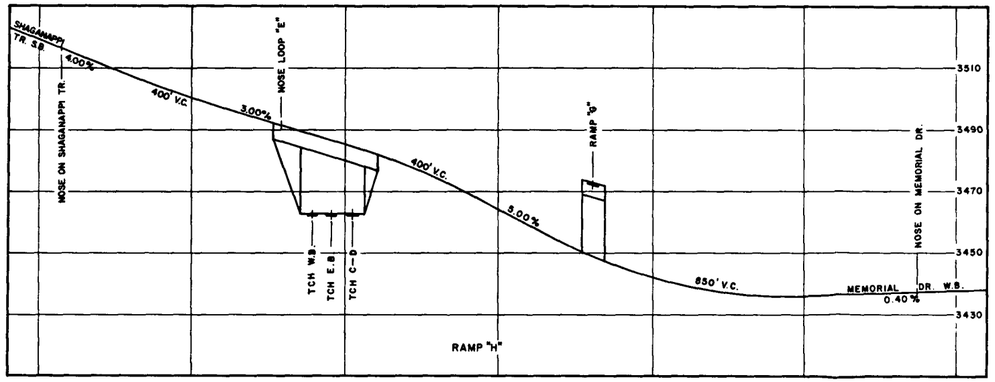
HORIZONTAL
100 0 100 200 300 400 500

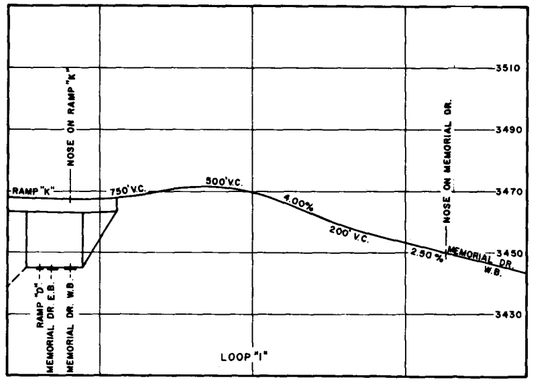
VERTICAL
10 0 10 20 30 40 50

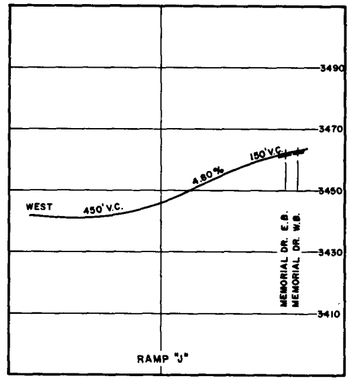
The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL

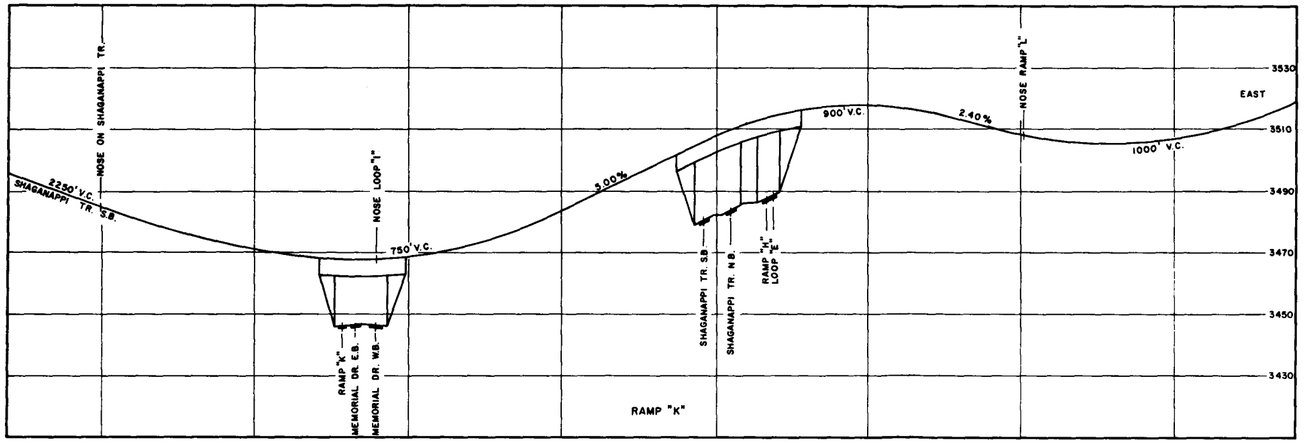
T.C.H. - MEMORIAL DR. INTERCHANGE
STAGE 3 PROFILES

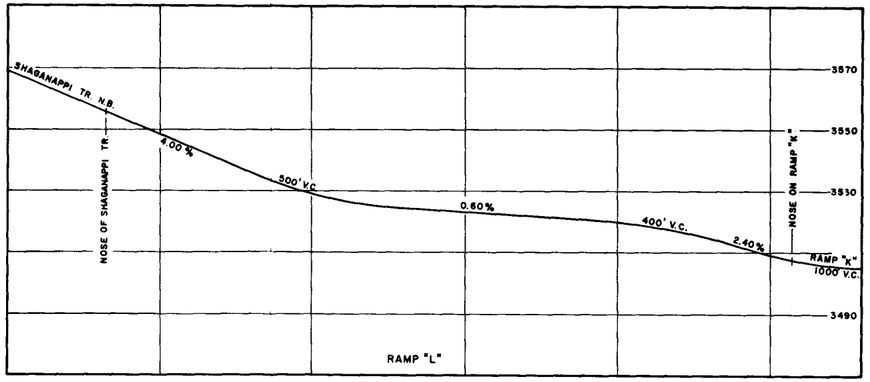
EXHIBIT 32











SCALE

HORIZONTAL

100 0 100 200 300 400 500

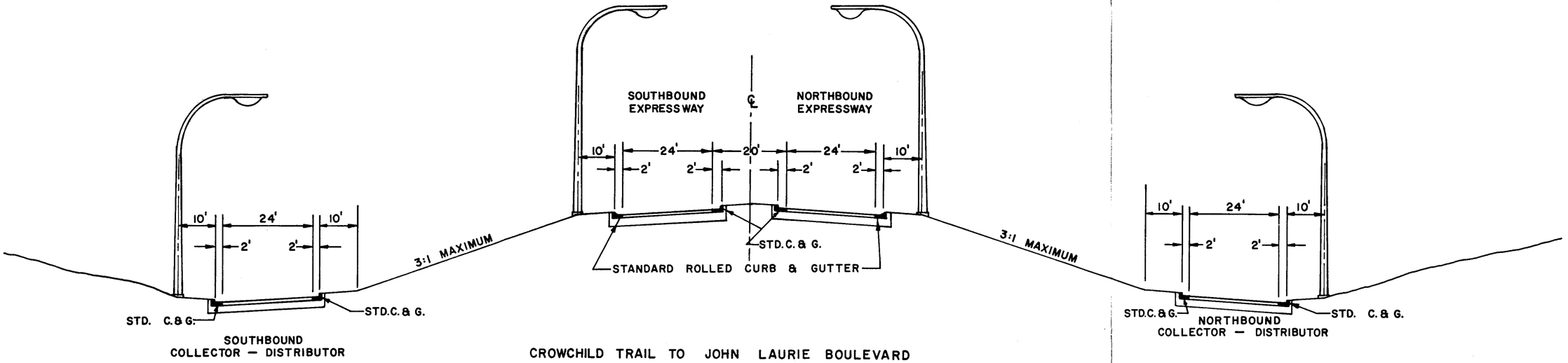
VERTICAL

10 0 10 20 30 40 50

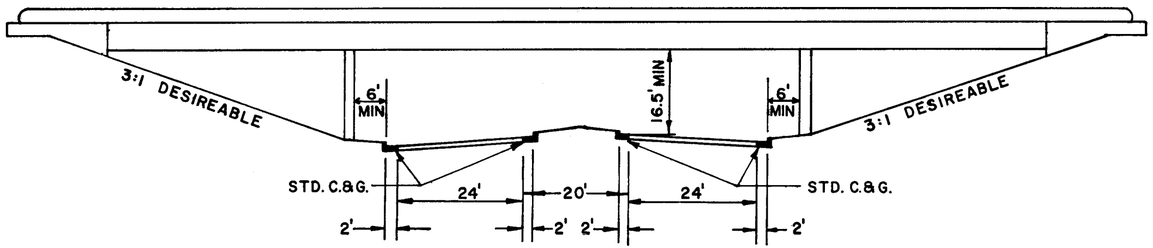
The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL

T.C.H. - MEMORIAL DR. INTERCHANGE
STAGE 3 PROFILES

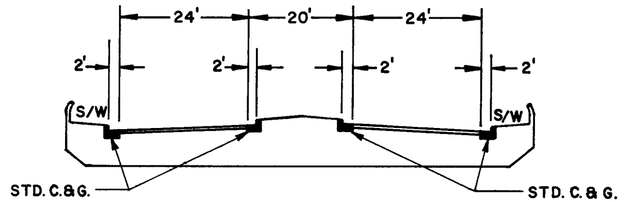
EXHIBIT 33



CROWCHILD TRAIL TO JOHN LAURIE BOULEVARD



SECTION AT UNDERPASSES



SECTION AT OVERPASSES

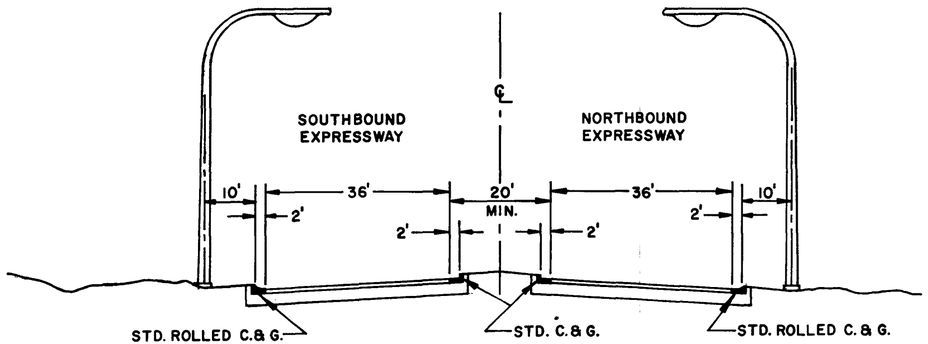
SCALE

10 0 10 20 30 40 50

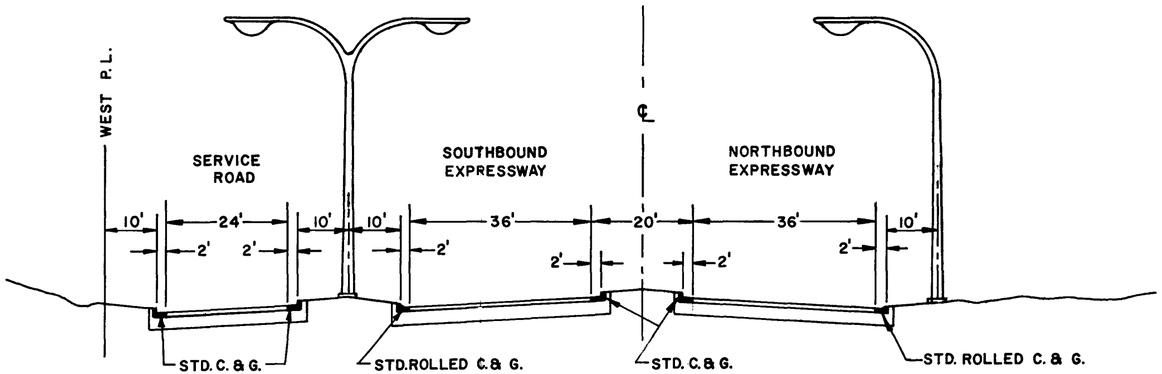
The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL

TYPICAL CROSS SECTIONS
STAGE 3

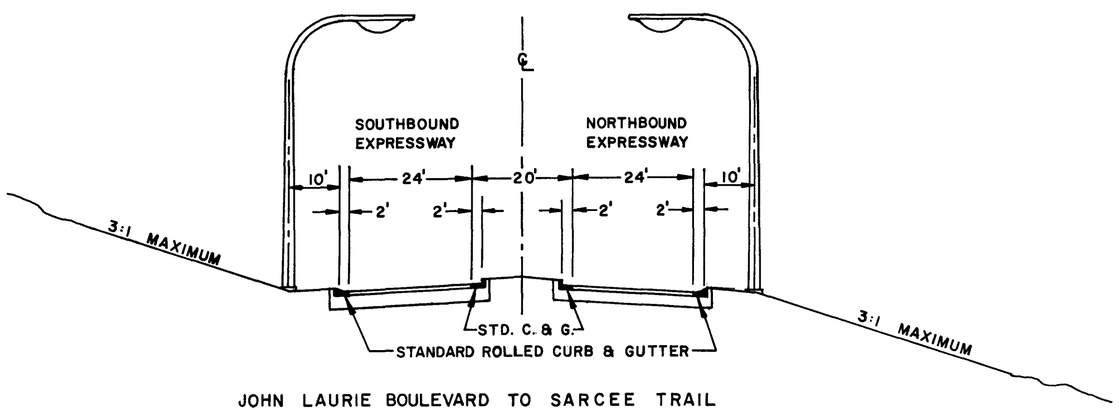
EXHIBIT 34



BOW TRAIL TO 32 nd AVENUE N.W.



32 nd AVENUE TO 40 th AVENUE N.W.



JOHN LAURIE BOULEVARD TO SARCEE TRAIL

SCALE

10 0 10 20 30 40 50

The City of Calgary
ENGINEERING DEPARTMENT
SHAGANAPPI TRAIL

TYPICAL CROSS SECTIONS
STAGE 3

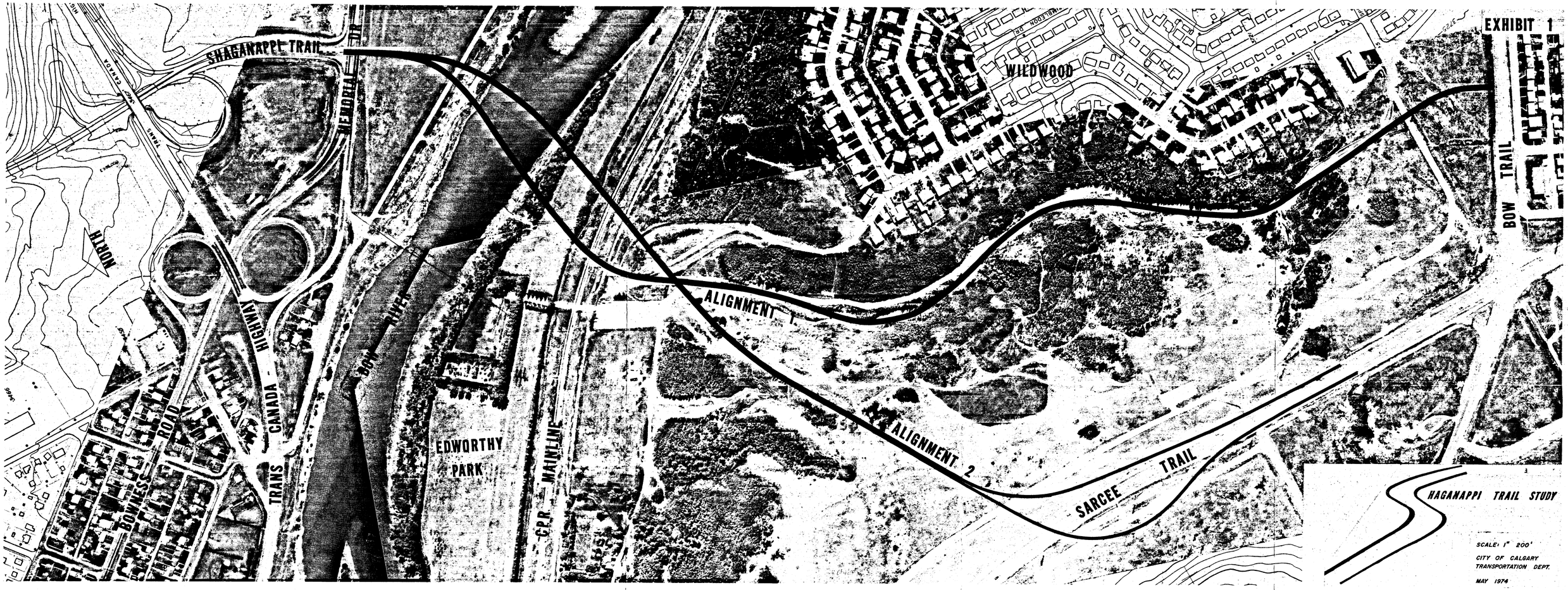


EXHIBIT 1
SHAGANAPPI TRAIL
MEMORIAL DR
WILDWOOD
BOW TRAIL
NORTH
HIGHWAY
TRANS CANADA
BOW TRAIL
ALIGNMENT 1
ALIGNMENT 2
EDWORTHY PARK
C.P.R. MAINLINE
ROAD
BOWNESS
SARCEE TRAIL
HAGANAPPI TRAIL STUDY
SCALE: 1" 200'
CITY OF CALGARY
TRANSPORTATION DEPT.
MAY 1974