Edmonton
Red Deer
Calgary
Fort McMurray
Grande Prairie
Whitecourt
Langley, B.C.
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City of

# Grande Prairie

# 68 Avenue Functional Planning Study

May 2000

Infrastructure Systems Ltd.
ENGINEERS PLANNERS
LANDSCAPE ARCHITECTS

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## Exhibits

# 1

# Introduction

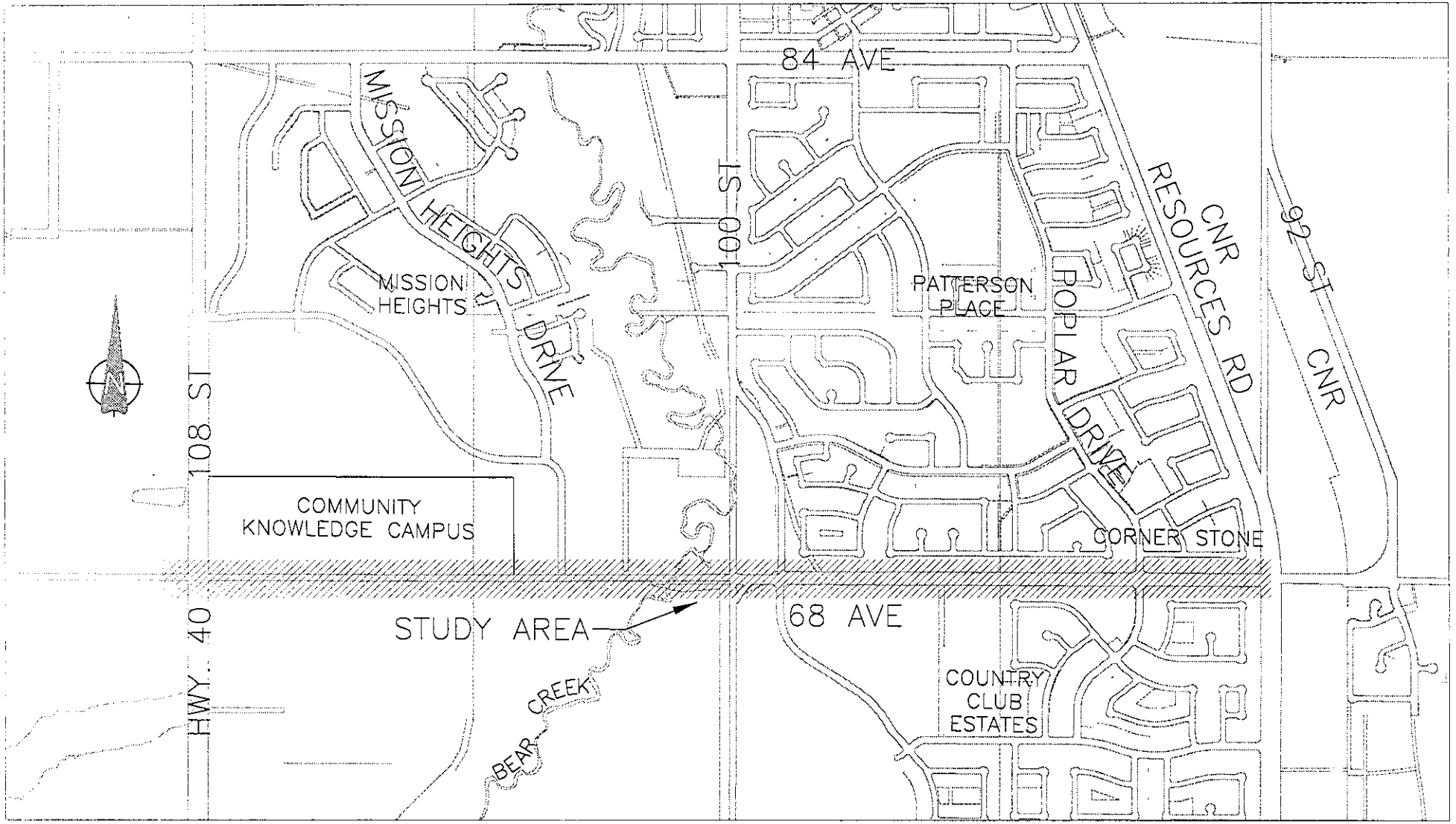
## 1.1 Objective

The continuing growth of the City of Grande Prairie has stimulated the imminent development of the Community Knowledge Campus. Recognizing the pressures that this growth will place on existing facilities the City has undertaken to insure the orderly development of infrastructure to meet the demands of the increased population and to insure that this infrastructure meets the servicing standards of the City of Grande Prairie.

As one component of the planning process Infrastructure Systems Ltd. was commissioned to prepare the functional planning for 68 Avenue from 108 Street to Resources Road. This major arterial roadway will serve the transportation needs of the south half of the City providing access to the new campus, enhancing fire protection for the Kateri area and providing a direct link from the primary highway network to the industrial area east of the Railnet rail yards. The Transportation Master Plan designated 68 Avenue as both a major truck route and a dangerous goods route. The opening of this new corridor will alleviate some of the pressure from 84 Avenue, which is currently serving as a truck route on an interim basis.

This report develops a horizontal alignment for 68 Avenue from 108 Street to Resources Road including the provision of intersection channelization, noise buffering, utility installation, storm drainage and the provision of pedestrian and bikeway facilities. Based on the results of these considerations recommendations are made for the acquisition of additional right-of-way as well as for construction staging to establish an orderly sequence of development. Cost estimates have been prepared to establish the financial requirements for various stages of construction.

RM DECEMBER 02, 1999 K:\3600\3643\3643EX16.DWG




CITY OF GRANDE PRAIRIE ALBERTA

Infrastructure Systems Ltd.
ENGINEERS PLANNERS LANDSCAPE ARCHITECTS

STUDY AREA

# 68 AVENUE FUNCTIONAL PLANNING STUDY

# 2

# Summary and Recommendations

The development of 68 Avenue will add a significant arterial roadway into the City's network. A steadily growing population brought about by increasing commercial and industrial activity reinforces the need for the orderly development of this important corridor. The value of this roadway to the City will extend beyond the obvious advantages enjoyed by the adjoining residents. Reduced transportation costs, increased fire protection and improved access to a variety of facilities are a few of the benefits that will accrue the City as a whole.

The financial implications of this development will be significant over an extended period of time. It is important that the wide variety of factors influencing the effectiveness of this facility be considered in determining the ultimate functionality of the alignment. Working with existing rights-of-way and expanding others where necessary as well as upgrading the existing roadway to make it compatible with current design standards will be important considerations.

## 2.1 Recommendations - Ultimate Roadway

1. 68 Avenue be designed as a 4-lane divided urban facility from 108 Street to Resources Road.
2. The existing 68 Avenue pavement structure shall be incorporated into the ultimate roadway with improvements constructed where necessary to upgrade the existing profile to current City standards.
3. 108 Street be upgraded to a 4-lane urban roadway from 76 Avenue to the City Limit.
4. The alignment across Bear Creek shall be established to avoid the two identified areas of creek bank instability.

5. The profile across the bridge shall be established to keep the sag off of the structure.
6. The established intersections east of Bear Creek are to be upgraded as traffic volumes warrant and that the accesses to the commercial development at poplar Drive be consolidated.
7. The number of intersections west of Bear Creek shall be limited to three spaced at approximately 400 metres and that the intersection with Kateri Drive be established as a "T" intersection.
8. A pedestrian and cycle path shall be established along the north boulevard in conjunction with roadway construction. This pathway is to connect to the existing trail system along Bear Creek and cross Bear Creek on the pipe bridge. No accommodation shall be made for pedestrian or bike traffic on the roadway bridge. The proposed trail from 108 Street to the west access shall be optional.
9. The existing top of bank trail shall be relocated to cross under 68 Avenue at the new structure.
10. Earth berms west of Bear Creek adjacent residential areas shall be developer responsibility. The degree of noise attenuation required along 68 Avenue will be determined at the detailed design stage.
11. Noise buffering east of Bear Creek shall be developed at the discretion of the City. The degree of noise attenuation required along 68 Avenue will be determined at the detailed design stage.
12. Storm drainage infrastructure shall be constructed in conjunction with roadway construction including an underground piped system and storm retention facilities to regulate the discharge and to manage potential hazardous waste spills. Separate systems will be required for 68 Avenue east of Bear Creek as well as west of Bear Creek.
13. Landscaping shall be incorporated into the detailed design of the roadway.
14. The ultimate roadway right-of-way width west of Bear Creek shall be set at 47.0 metres where residential areas are planned for both sides of the roadway and 41.5 metres in front of the Community Knowledge Campus. East of 100 Street the total width including utility lots be maintained at 72 metres.

15. The existing overhead power line between 100 Street and Resources Road shall be replaced with a buried line.
16. Property requirements at proposed intersections shall ensure adequate design sight lines.

## 2.2 Recommendations - Staged Roadway

1. The ultimate westbound lanes from 108 Street to east of the future intersection with Kateri Drive shall be constructed as stage 1.
2. The pedestrian/bike path shall be constructed in conjunction with Stage 1 roadway construction.
3. Stage I shall include storm sewer and storm retention and roadway construction.
4. Storm sewer design criteria shall take into consideration contributing areas beyond the roadway right-of-way.
5. Separate storm sewer systems including retention ponds shall be required on either side of Bear Creek.
6. 108 Street staging shall be contingent on funding, traffic volumes and the proposed Highway 40 upgrading program between the south City boundary and Secondary Highway 668.
7. First Stage 108 Street construction shall include intersection treatment for Highway 40.
8. Stage I detailed design shall include further geotechnical investigation of the existing 68 Avenue pavement structure and a cost benefit analyses in retaining/reconstructing the existing roadway.
9. Intersection treatment at the Canfor haul road shall be discussed with Canfor Industries and Alberta Infrastructure.
10. The functional planning study shall be subjected to a public process prior to initiating the detailed design.

Exhibit 01

POND

SEE INSET #2

MATCHLINE 2

WAPITI RD.

CANFOR HAUL RD.

ACCESS R/W

INSET #2

ONE WAY CANFOR HAUL ROAD

MATCHLINE 2

S.W.1/4 SEC.14-71-6-6

WEST ACCESS

22.0

11.5 10.5

COMMUNITY KNOWLEDGE CAMPUS

COMMUNITY KNOWLEDGE CAMPUS

68 AVENUE

3.0m Bikeway (Optional)

18.0

41.5 23.5

STUDY LIMIT STA 1+000

MATCH LINE STA 1+600

MATCHLINE 1

INSET #1

N.W.1/4 SEC.11-71-6-6

LOT B

LOT D

7.4 7.4

25.0

CANFOR HAUL RD.

MATCHLINE 1

SEE INSET #1

WAPITI RD.

CANFOR HAUL ROAD ONE WAY

SCALE 1:2000 0 20 40 60 80

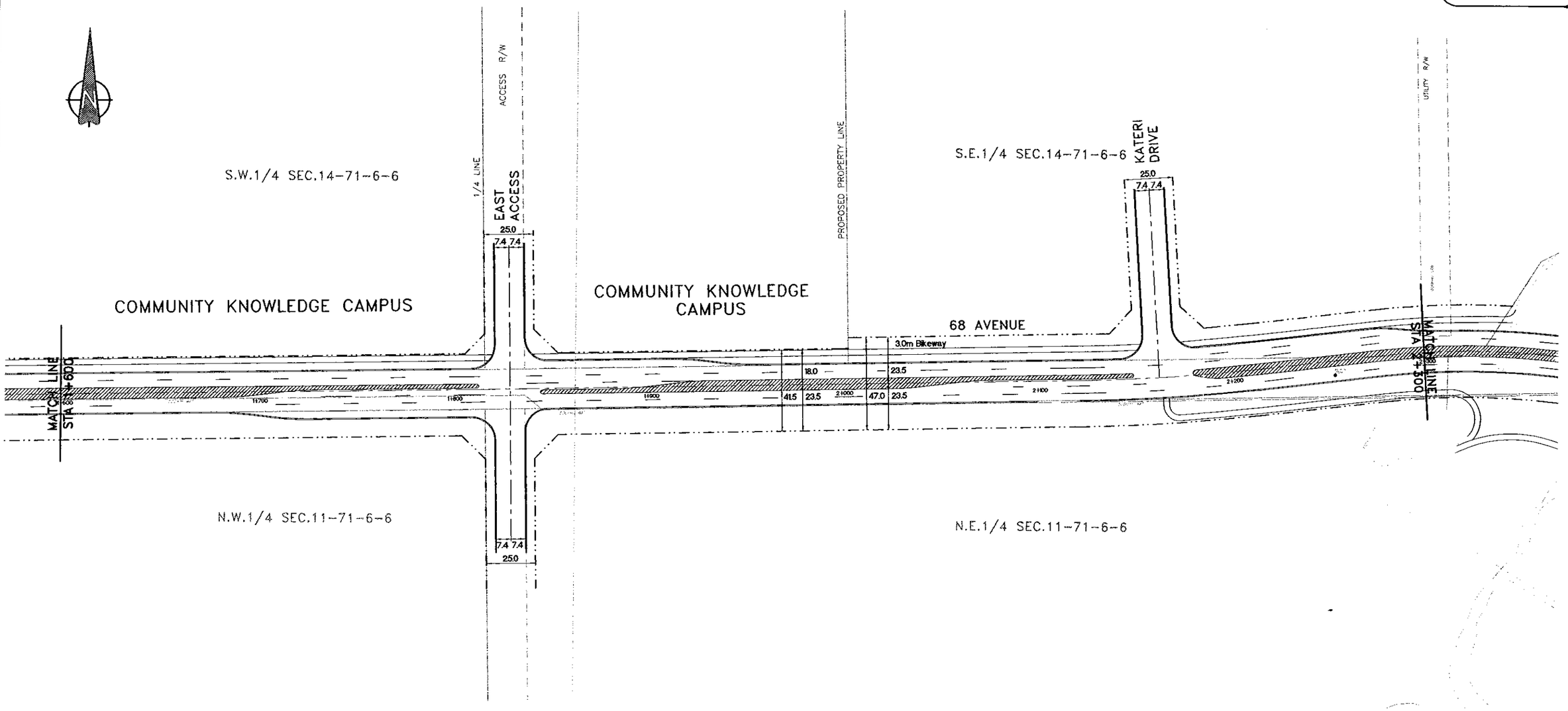
RM MAY 09, 2000 3643EX01.dwg

# 68 AVENUE FUNCTIONAL PLAN

WAPITI ROAD
TO
RESOURCES ROAD
ULTIMATE ALIGNMENT
STA. 1+000 to STA. 1+600

Infrastructure Systems Ltd.
ENGINEERS PLANNERS LANDSCAPE ARCHITECTS

Exhibit 02




# 68 AVENUE FUNCTIONAL PLAN

WAPITI ROAD
TO
RESOURCES ROAD
ULTIMATE ALIGNMENT
STA. 1+600 to STA. 2+300

SCALE 1:2000 0 20 40 60 80

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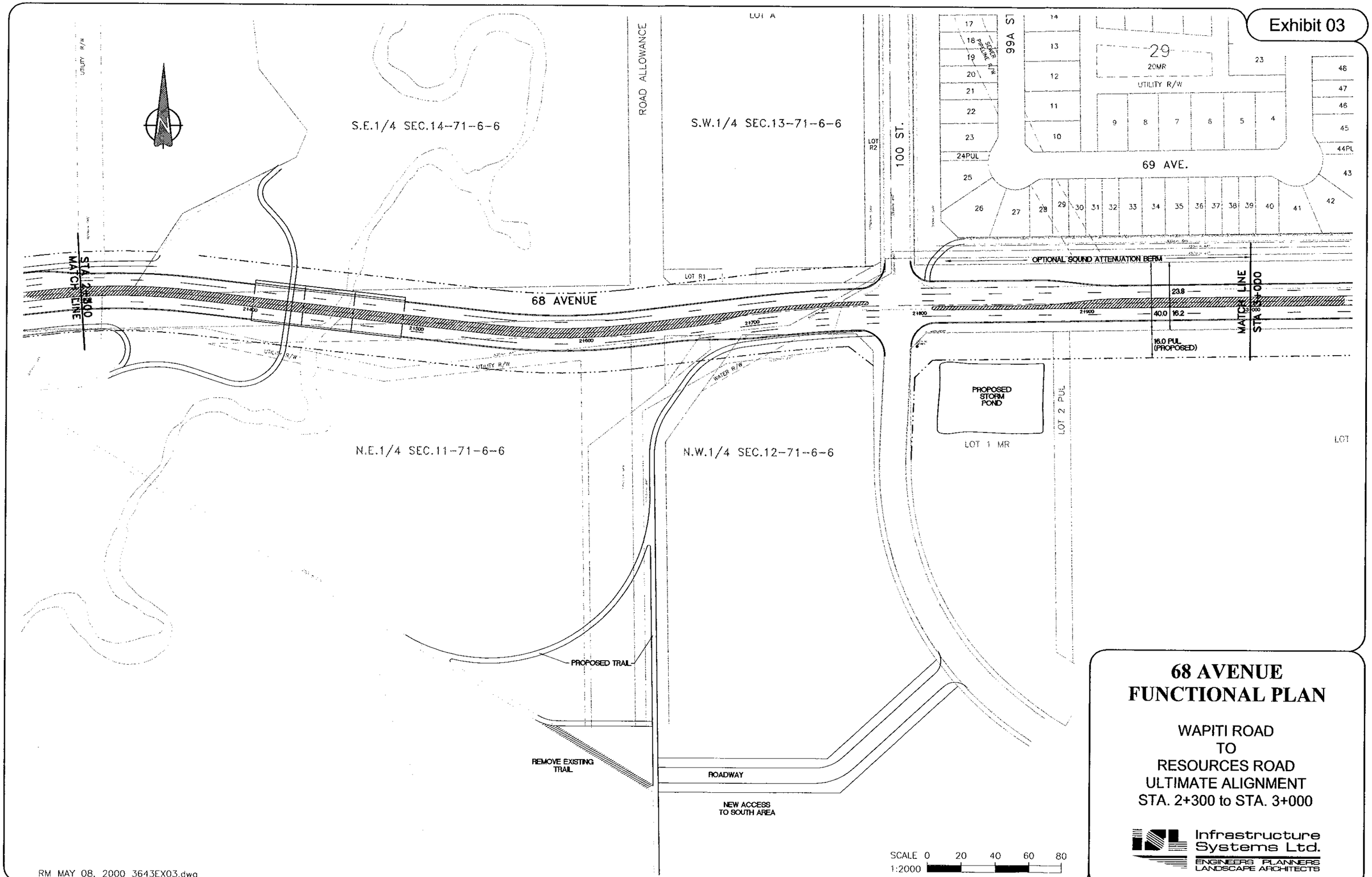
RM MARCH 03, 2000 3643EX02.dwg

Exhibit 03




# 68 AVENUE FUNCTIONAL PLAN

WAPITI ROAD
TO
RESOURCES ROAD
ULTIMATE ALIGNMENT
STA. 2+300 to STA. 3+000

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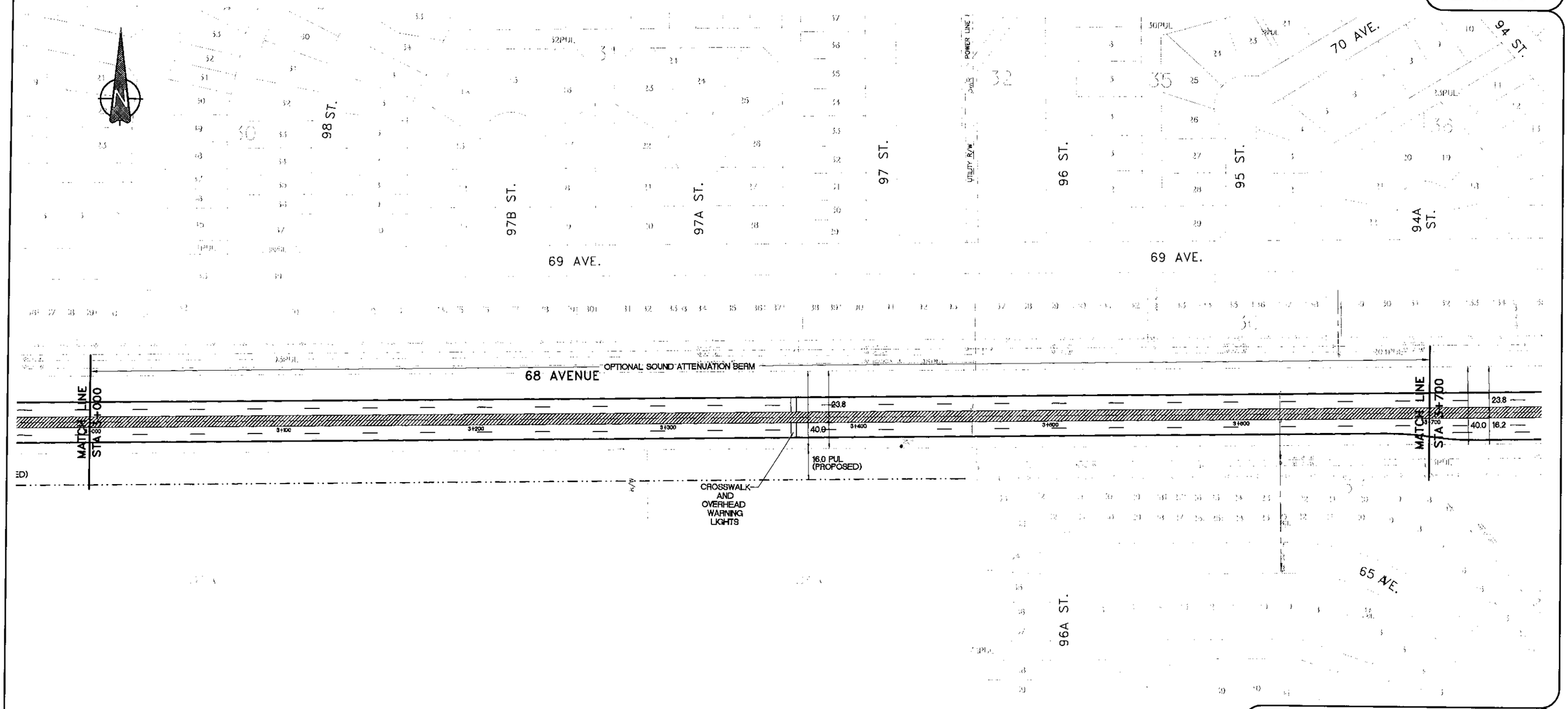
RM MAY 08, 2000 3643EX03.dwg

Exhibit 04




SCALE 0 20 40 60 80
1:2000

# 68 AVENUE FUNCTIONAL PLAN

WAPITI ROAD
TO
RESOURCES ROAD
ULTIMATE ALIGNMENT
STA. 3+000 to STA. 3+700

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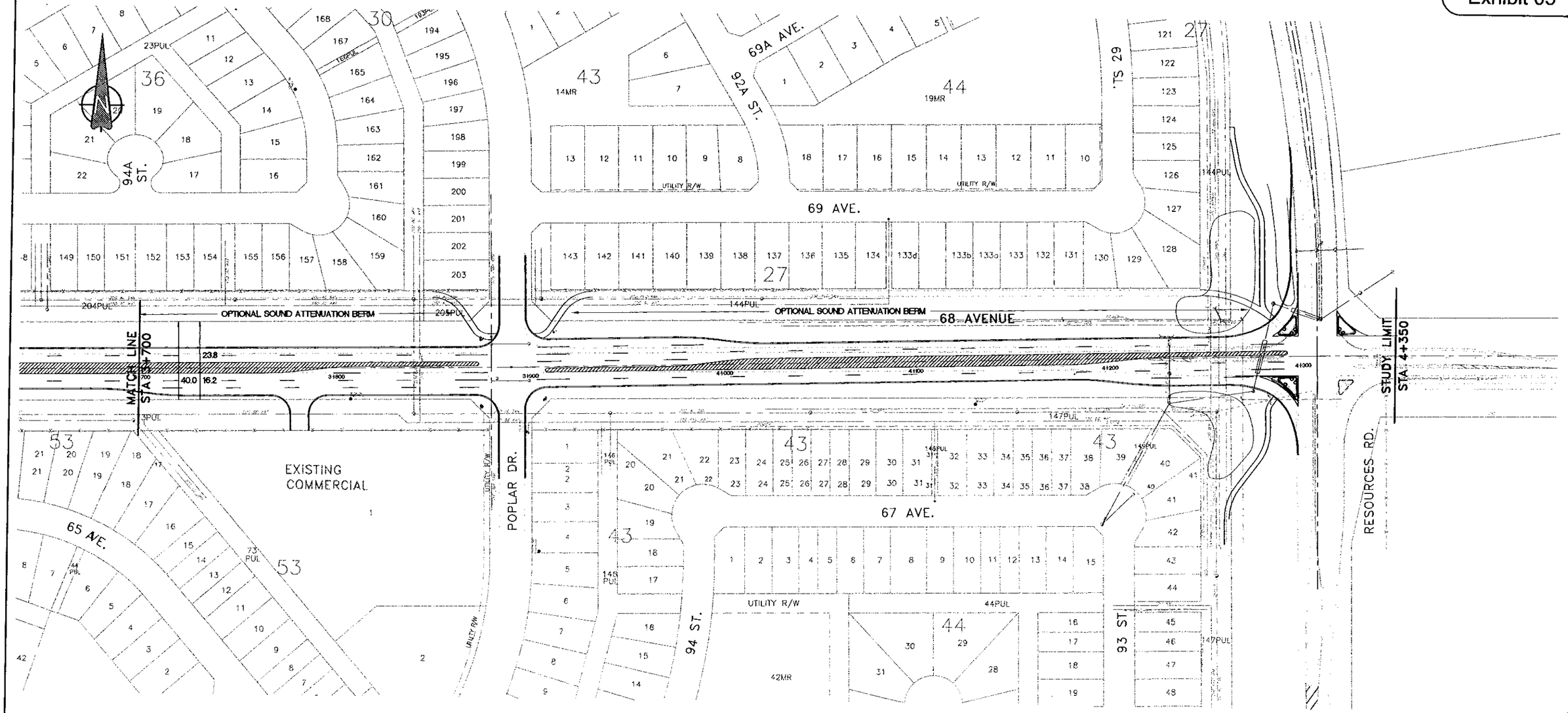
LANDSCAPE ARCHITECTS

RM MAY 26, 2000 3643EX04.dwg

Exhibit 05




# 68 AVENUE FUNCTIONAL PLAN

WAPITI ROAD
TO
RESOURCES ROAD
ULTIMATE ALIGNMENT
STA. 3+700 to STA. 4+350

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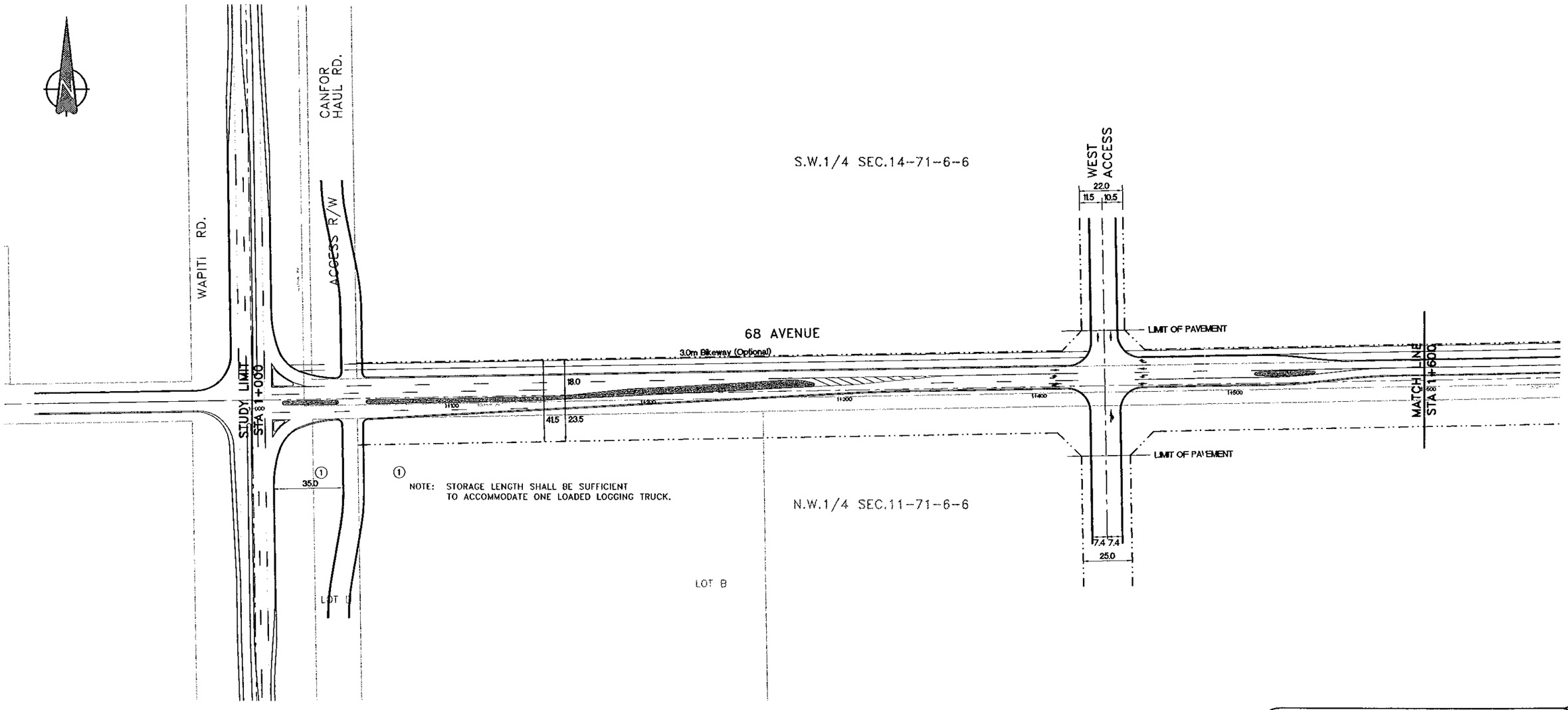
Exhibit 06




SCALE 0 20 40 60 80
1:2000

# 68 AVENUE FUNCTIONAL PLAN

WAPITI ROAD
TO
RESOURCES ROAD
STAGE 1 ALIGNMENT
STA. 1+000 to STA. 1+600

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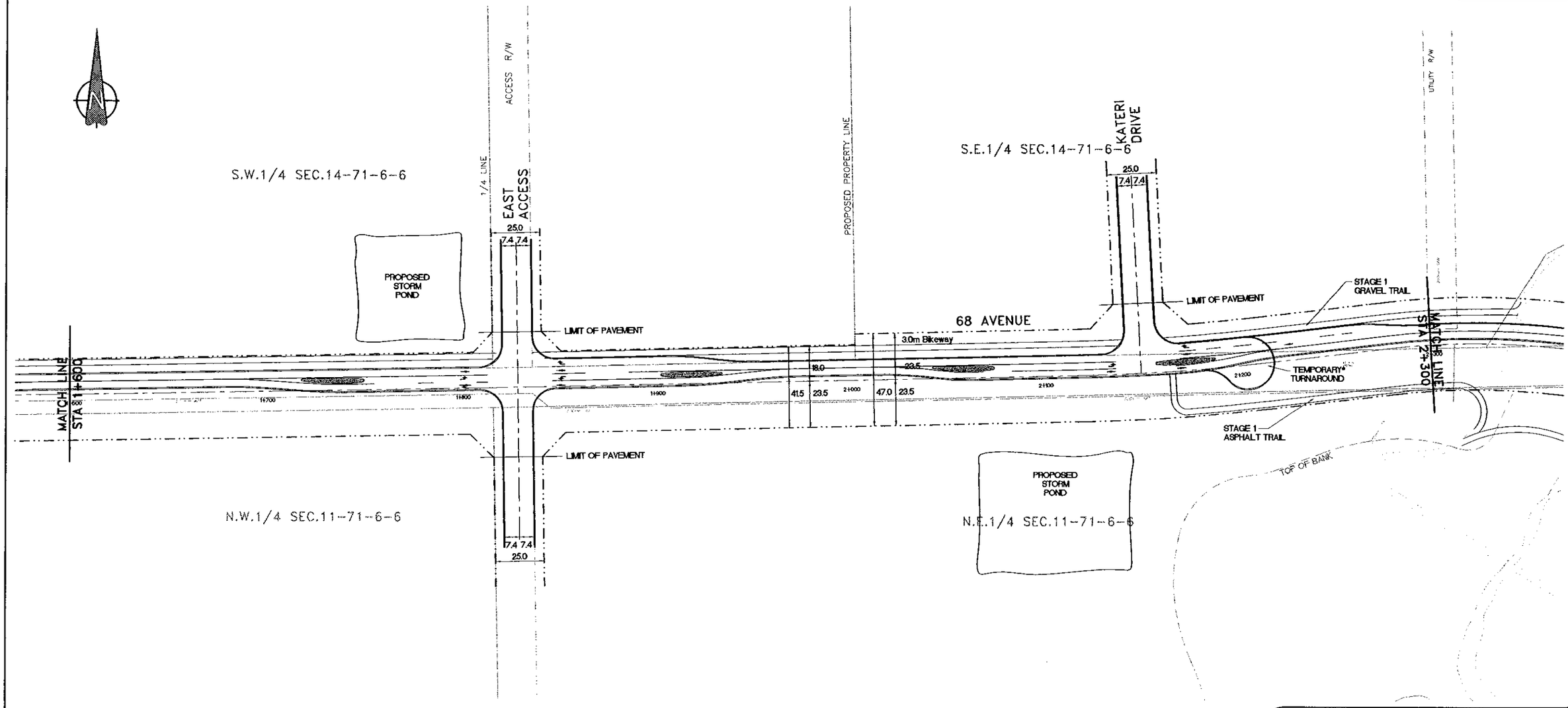
RM MAY 08, 2000 3643EX06.dwg

Exhibit 07




SCALE 1:2000 0 20 40 60 80

# 68 AVENUE FUNCTIONAL PLAN

WAPITI ROAD
TO
RESOURCES ROAD
STAGE 1 ALIGNMENT
STA. 1+600 to STA. 2+300

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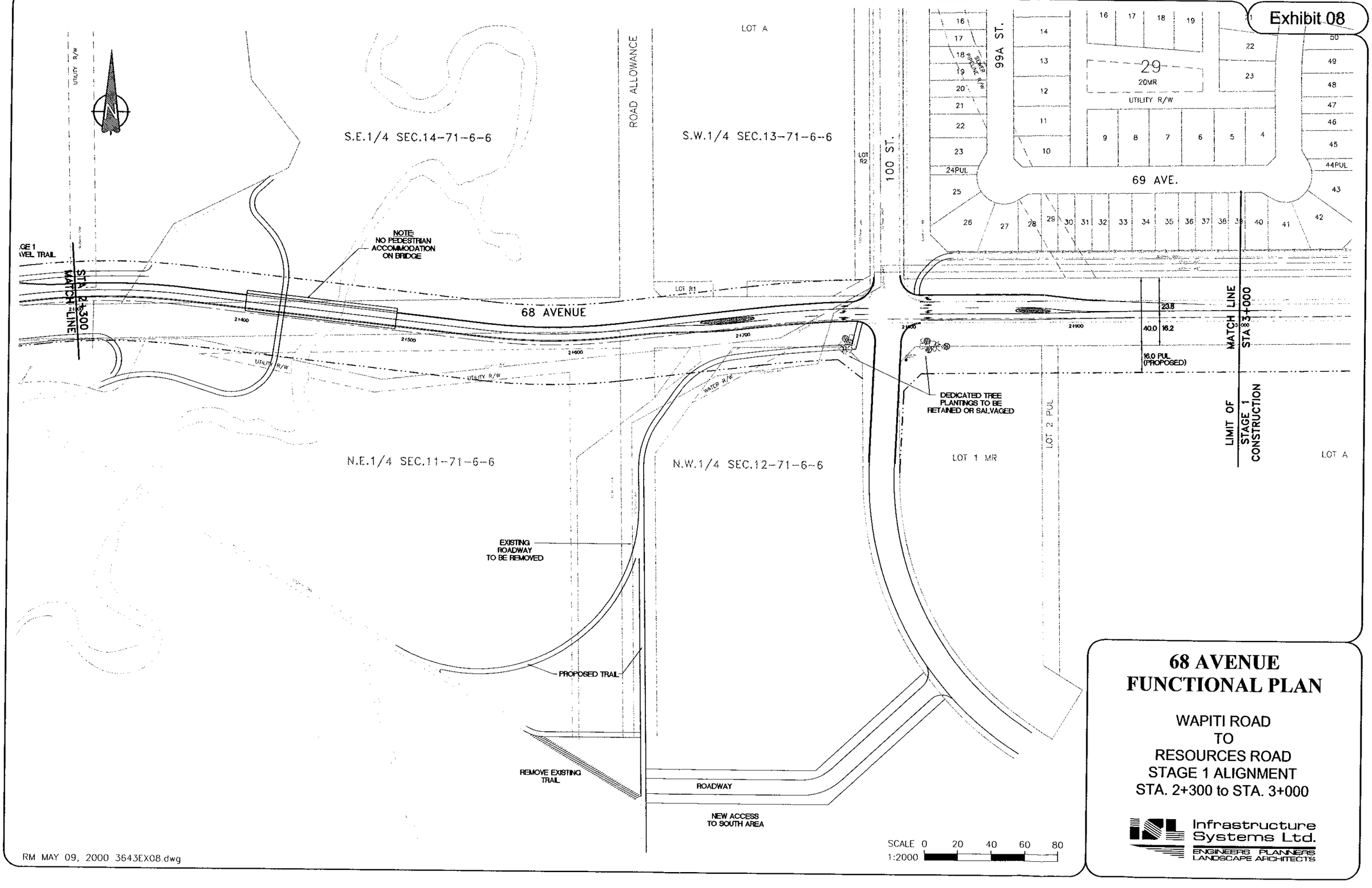
RM MAY 08, 2000 3643EX07.dwg

Exhibit 08




# 68 AVENUE FUNCTIONAL PLAN

WAPITI ROAD
TO
RESOURCES ROAD
STAGE 1 ALIGNMENT
STA. 2+300 to STA. 3+000

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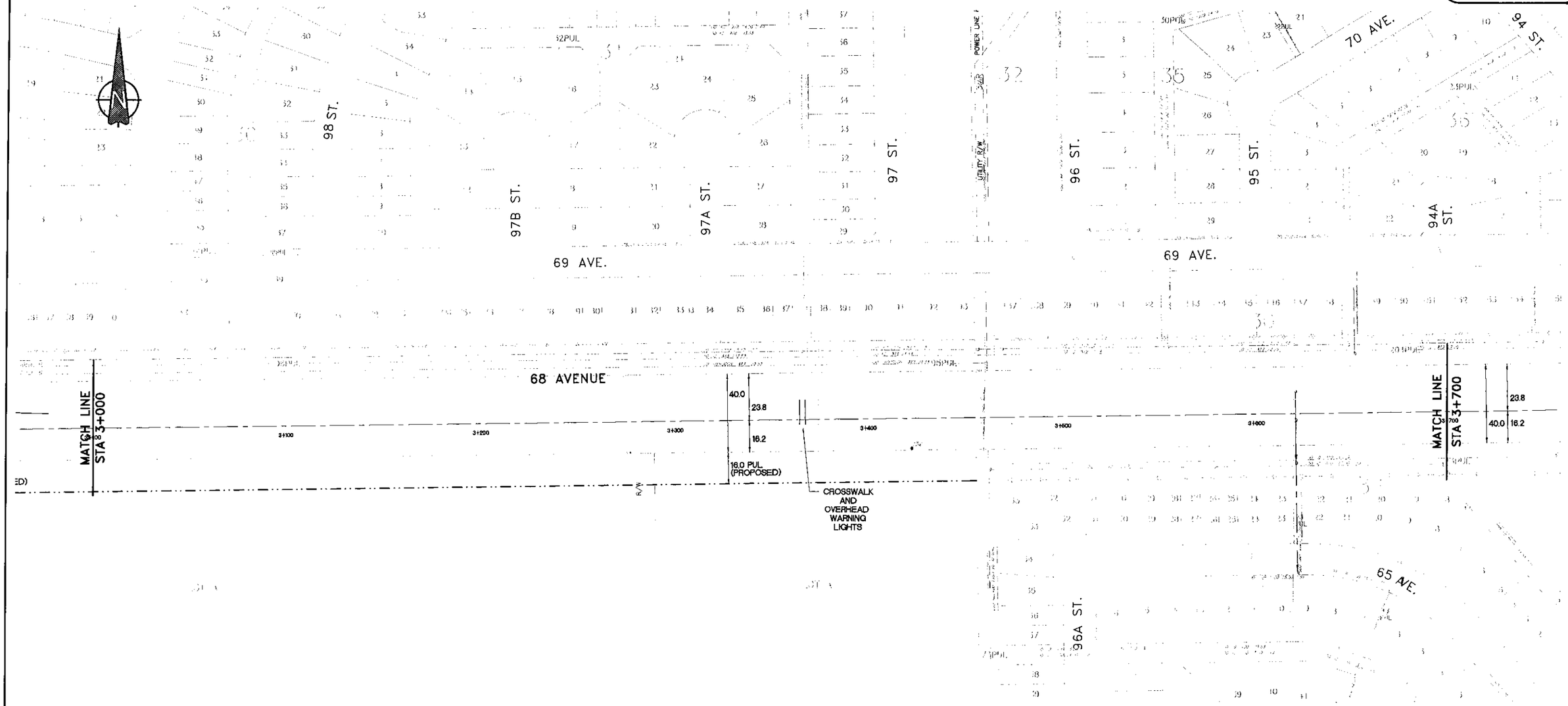
RM MAY 09, 2000 3643EX08.dwg

Exhibit 09

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1:2000

# 68 AVENUE FUNCTIONAL PLAN

WAPITI ROAD
TO
RESOURCES ROAD
STAGE 1 ALIGNMENT
STA. 3+000 to STA. 3+700

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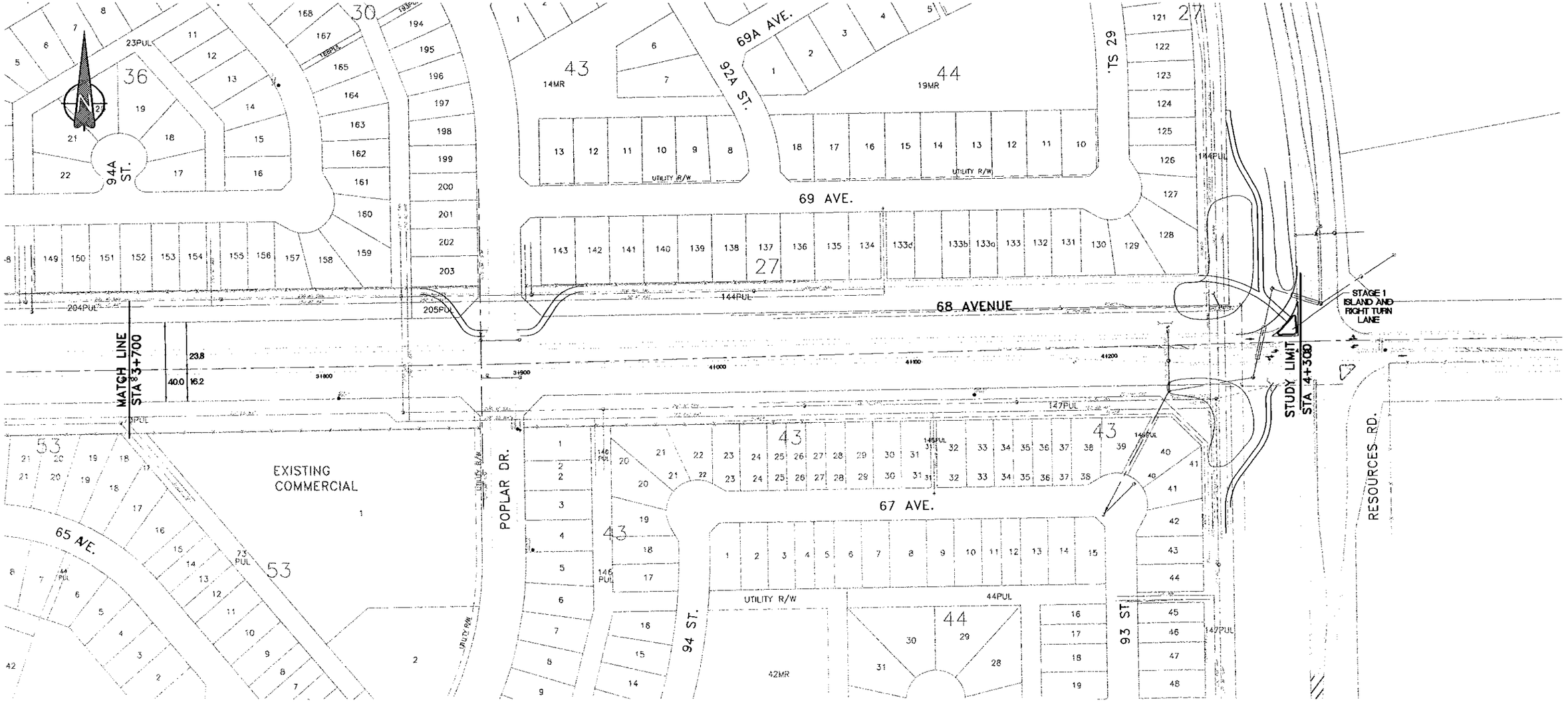
RM MAY 26, 2000 3643EX09.dwg

Exhibit 10




# 68 AVENUE FUNCTIONAL PLAN

WAPITI ROAD
TO
RESOURCES ROAD
STAGE 1 ALIGNMENT
STA. 3+700 to STA. 4+300

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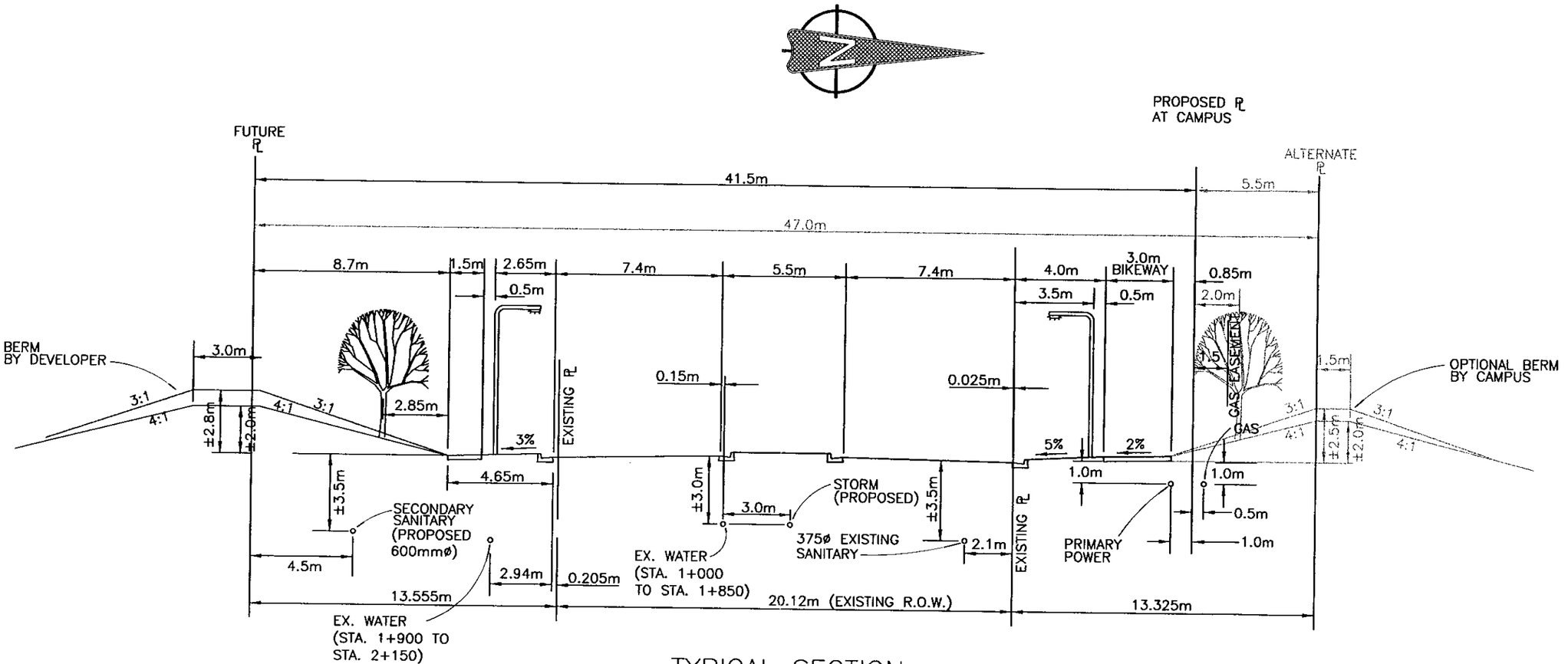
Exhibit 11




# TYPICAL SECTION

STATION 1+000 TO STATION 2+000

HORZ 1:200 0 2 4 6 8

**68 AVENUE FUNCTIONAL PLAN**

WAPITI ROAD
TO
RESOURCES ROAD
TYPICAL SECTION
ULTIMATE CONSTRUCTION

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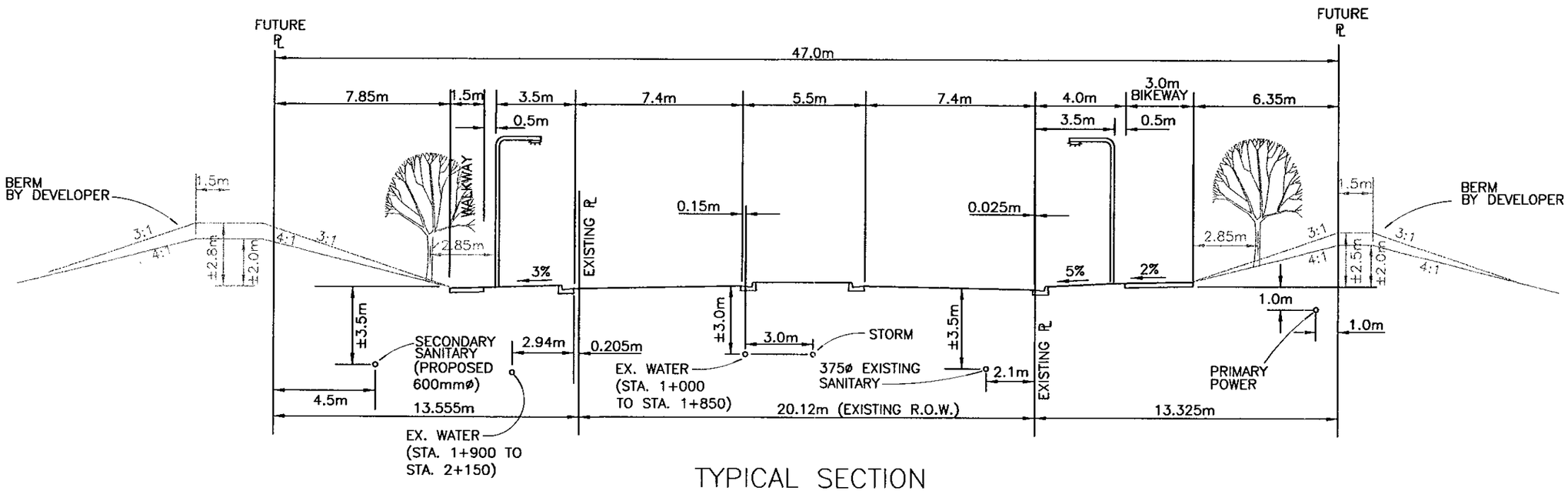
Exhibit 12




TYPICAL SECTION

STATION 2+000 TO STATION 2+350

HORZ 1:200 0 2 4 6 8

**68 AVENUE FUNCTIONAL PLAN**

WAPITI ROAD
TO
RESOURCES ROAD
TYPICAL SECTION
ULTIMATE STAGE
STATION 2+000

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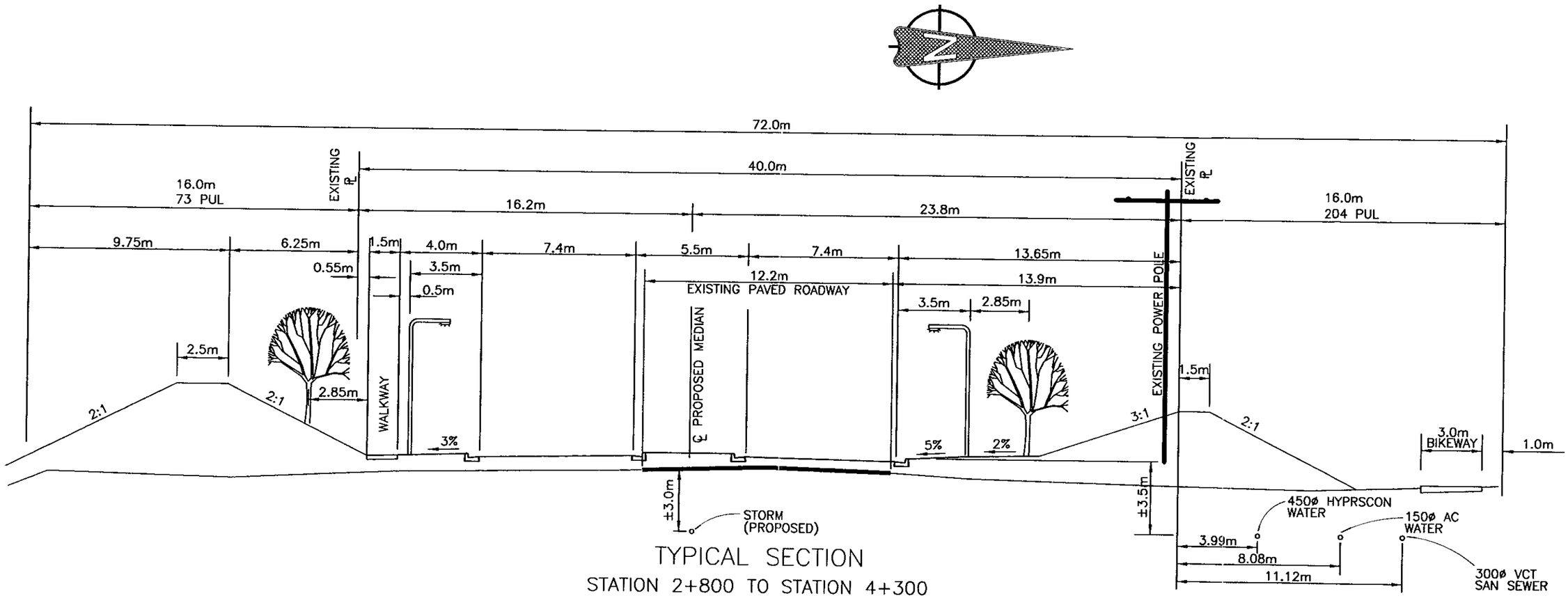
RM MARCH 03, 2000 3643EX14.DWG

Exhibit 13




TYPICAL SECTION

STATION 2+800 TO STATION 4+300

HORZ 1:200 0 2 4 6 8

RM JANUARY 20, 2000 3643EX15.DWG

# 68 AVENUE FUNCTIONAL PLAN

WAPITI ROAD
TO
RESOURCES ROAD
TYPICAL SECTION
ULTIMATE STAGE
STATION 3+750

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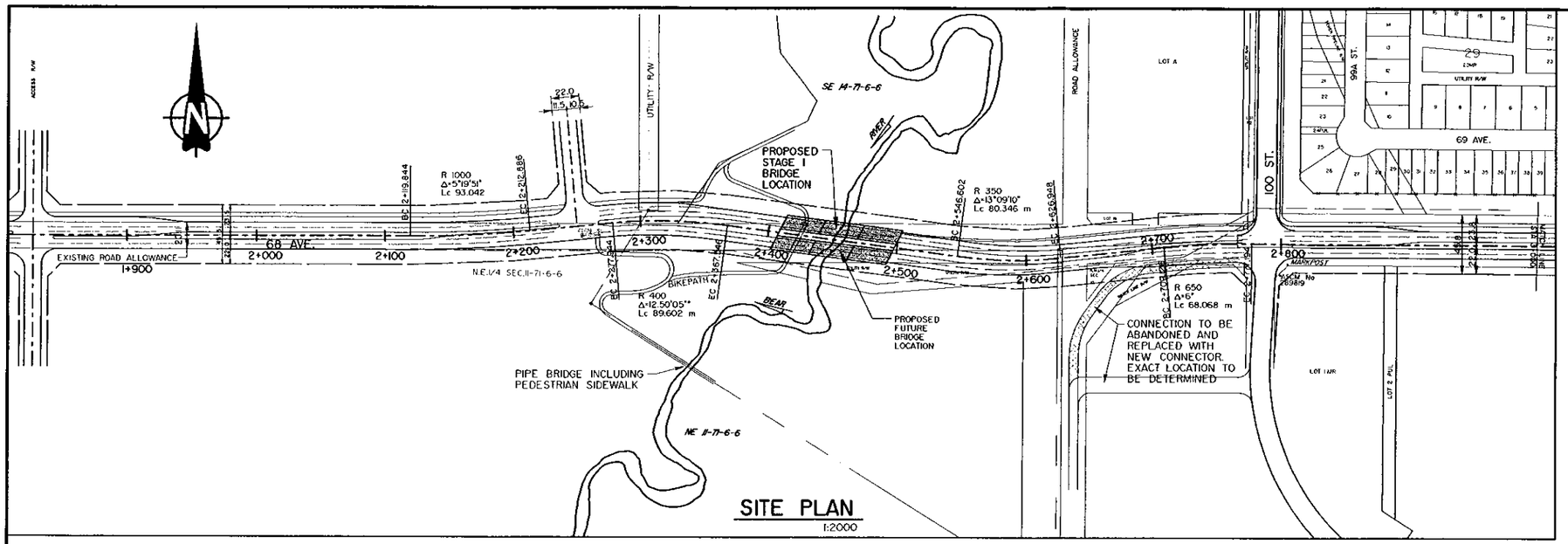
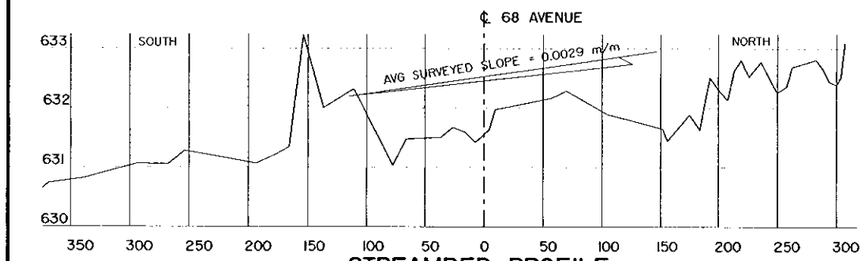
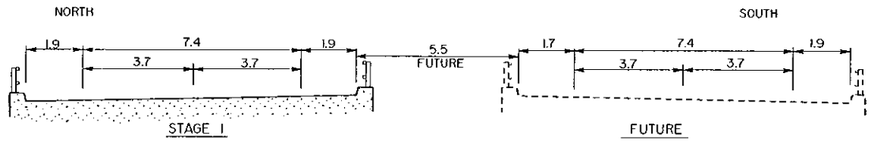
EXHIBIT 14



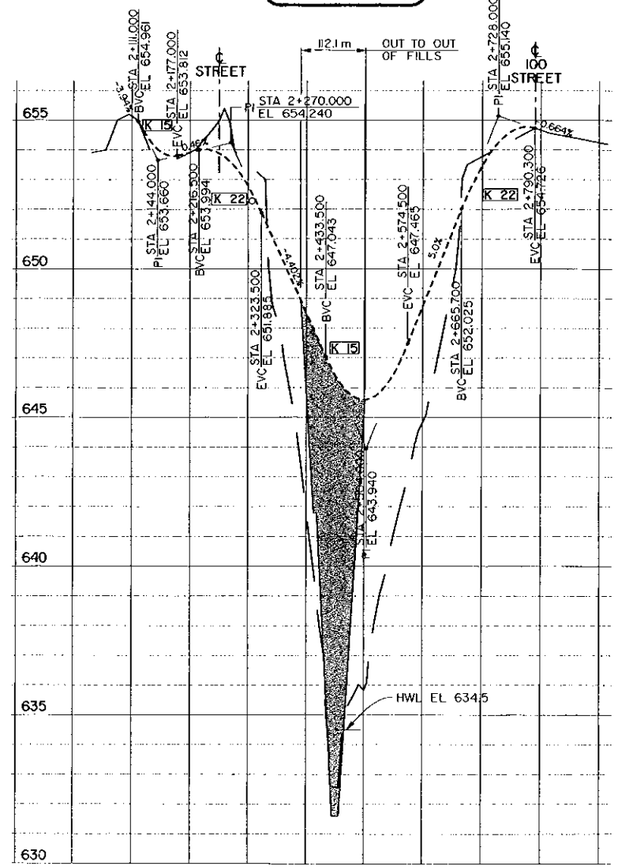

SITE PLAN
1:2000



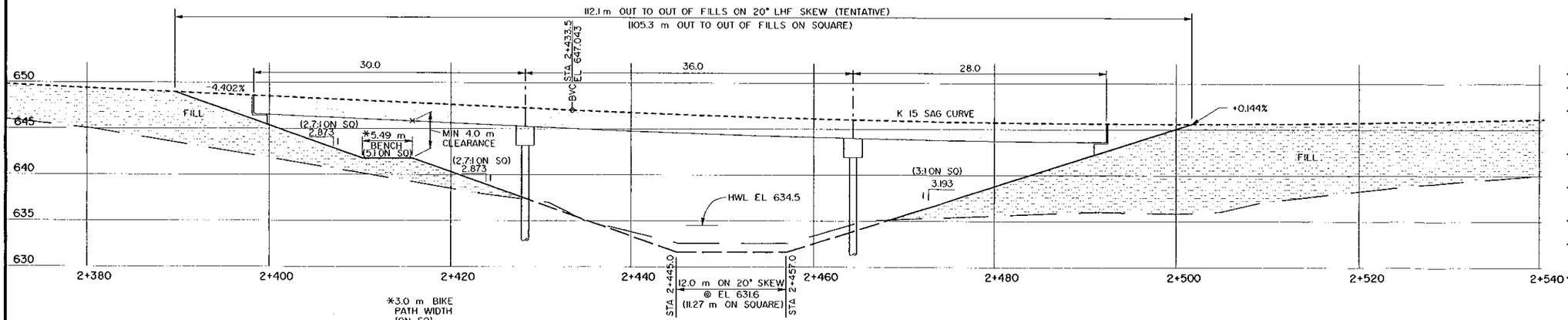

STREAMBED PROFILE
HORIZ 1:5000
VERT 1:50




BRIDGE SECTION
LOOKING EAST 1:00




ROAD PROFILE
HORIZ 1:5000
VERT 1:100




*3.0 m BIKE PATH WIDTH (ON SQ)

ELEVATION
1:250

## NOTES

- ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE
- ALL ALIGNMENT STATIONING IS GIVEN ALONG THE ℄ OF THE PROPOSED FUTURE MEDIAN
- A PRELIMINARY DESIGN DISCHARGE OF 106 $m^3/s$ WAS USED TO ESTABLISH THE HWL ELEVATION. (THE 106 $m^3/s$ CAME FROM THE MARCH 1984 BEAR CREEK WATER SHED STUDY - IN THE ORDER OF 1 IN 100 YEAR EVENT)
- THE GRADELINE, OUT TO OUT OF FILLS, SPAN ARRANGEMENT AND PIER LOCATIONS ARE TENTATIVE AND ARE SUBJECT TO CHANGE FOLLOWING ACTUAL FIELD SURVEY VERIFICATION
- HEADSLOPE DESIGN IS BASED ON A PRELIMINARY GEOTECHNICAL ANALYSIS BY THURBER ENGINEERING LTD AND ARE SUBJECT TO CHANGE
- THE K 15 VERTICAL SAG CURVE LOCATED ON THE BRIDGE IS BASED ON THE COMFORT CONTROL CRITERIA (TAC STANDARDS)
- HEADSLOPE PROTECTION WILL LIKELY BE REQUIRED AT THIS SITE. THE NEED WILL BE DETERMINED DURING THE PRELIMINARY ENGINEERING PHASE OF THE PROJECT
- THIS WATERCOURSE SUPPORTS GAME FISH AND THEREFORE DFO APPROVAL MAY BE MORE INVOLVED

Infrastructure Systems Ltd.
ENGINEERS PLANNERS LANDSCAPE ARCHITECTS

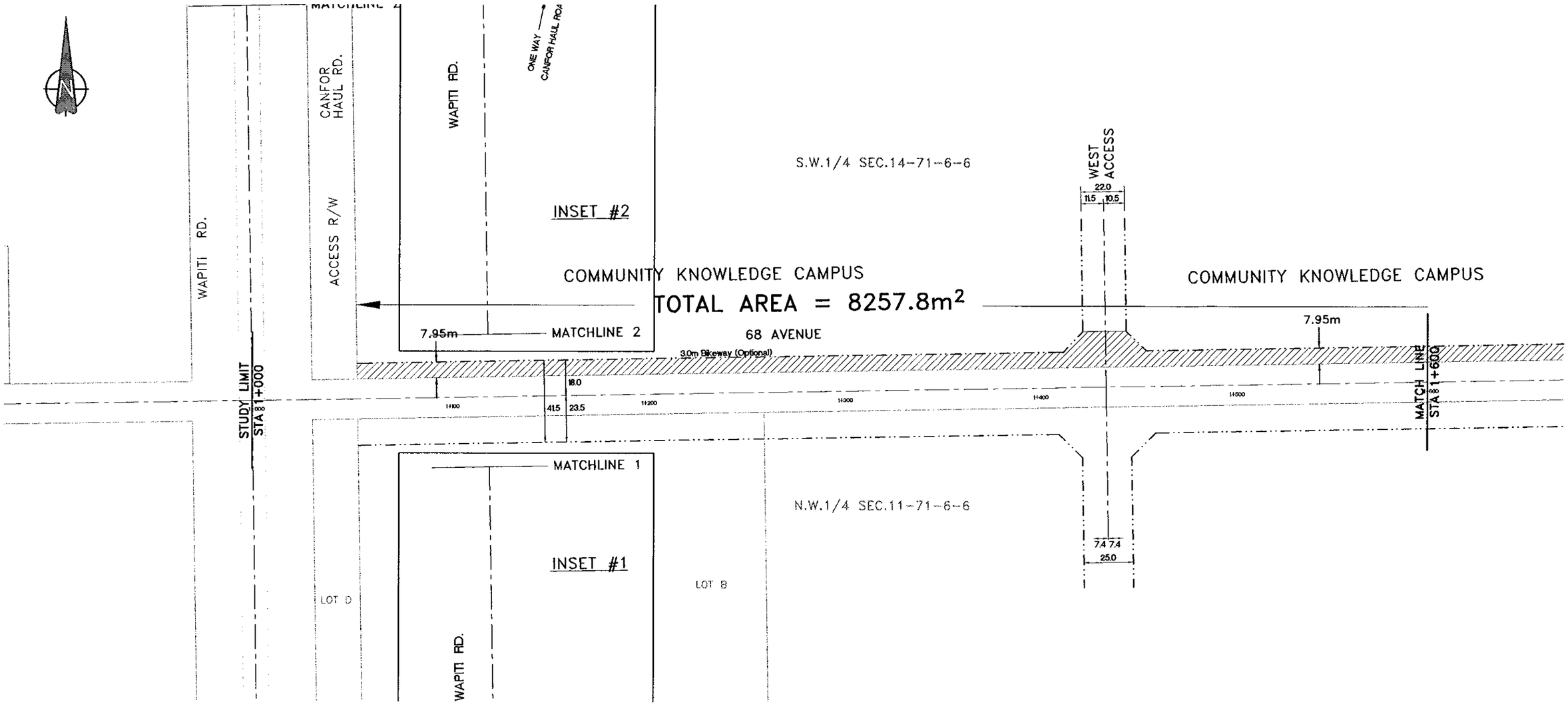
| REV | DATE | REVISIONS | BY |
|---|---|---|---|
| 6 | | | |
| 5 | | | |
| 4 | | | |
| 3 | | | |
| 2 | | | |
| 1 | | | |

**CITY OF GRANDE PRAIRIE**

**68 AVENUE BRIDGE OVER BEAR CREEK PRELIMINARY DESIGN**

| CONSULTANT FILE & DRAWING | DRAWN | DATE | STREAM | LOCATION | HIGHWAY | FILE | SHEET | DRAWING |
|---|---|---|---|---|---|---|---|---|
| 3643PR01 | NH | SEPT/99 | BEAR CREEK | INE 11-71-6-6 | 68 AVE | | OF | |

Exhibit 15




# 68 AVENUE FUNCTIONAL PLAN

RIGHT OF WAY REQUIRED
WAPITI ROAD
TO
WEST OF MISSION HEIGHTS DRIVE

SCALE 1:2000 0 20 40 60 80

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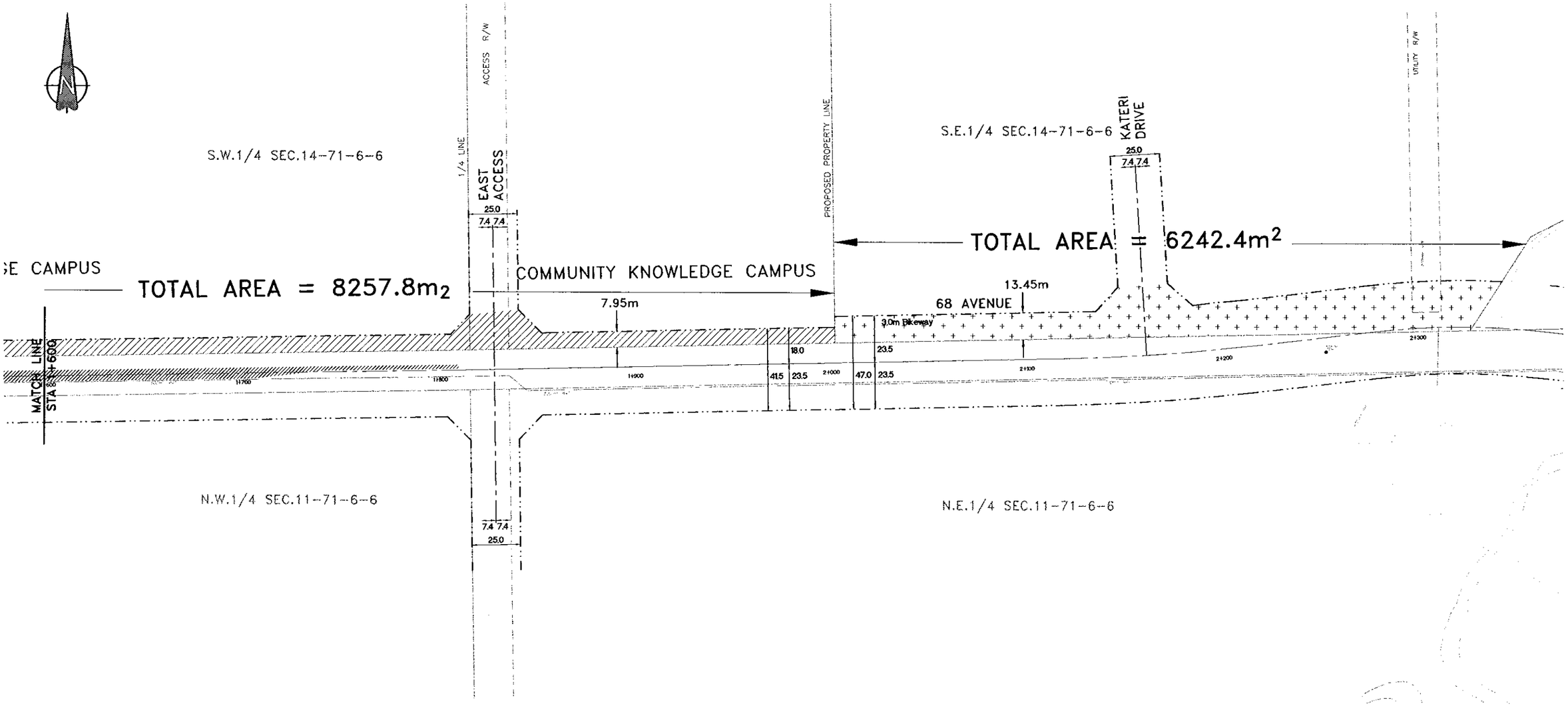
RM JANUARY 20, 2000 3643EX17.dwg

Exhibit 16




# 68 AVENUE FUNCTIONAL PLAN

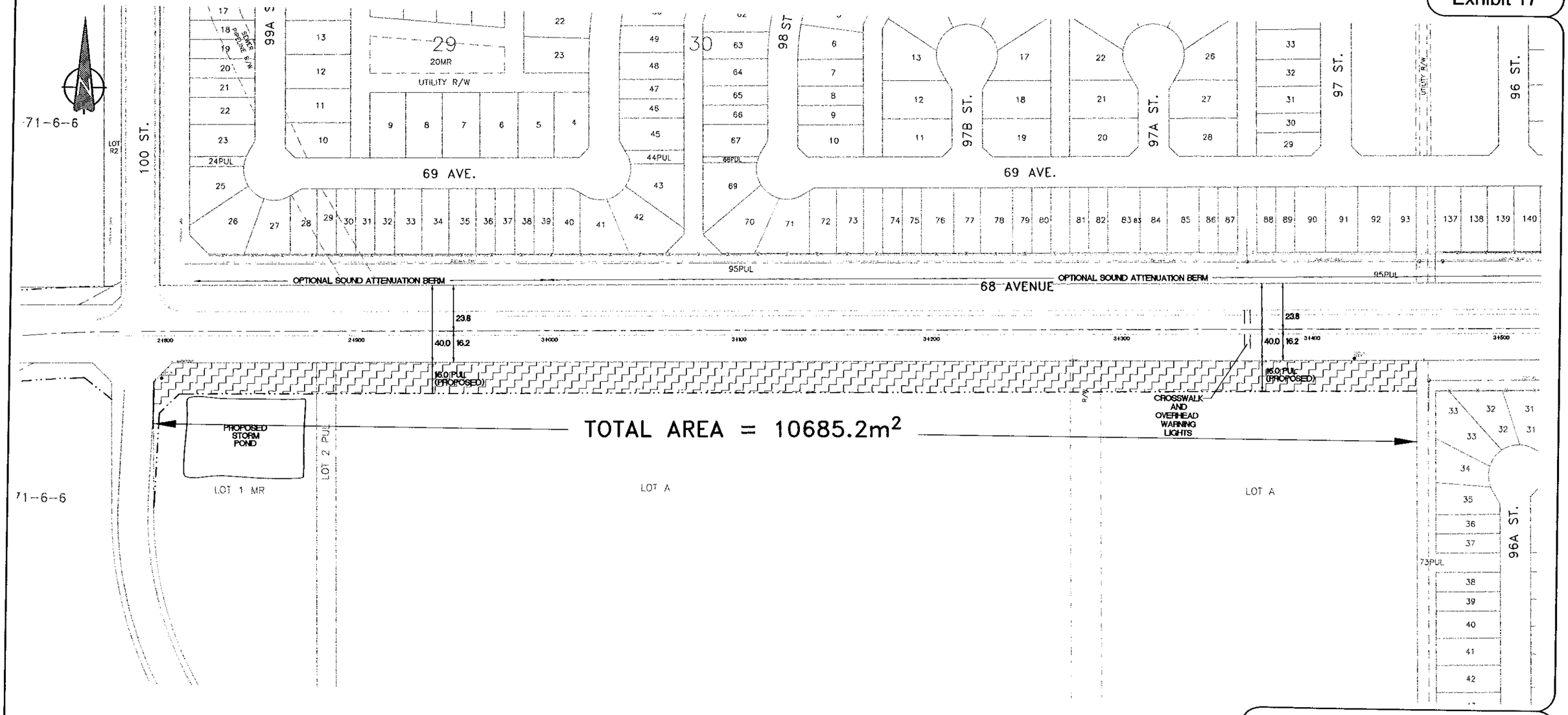
RIGHT OF WAY REQUIRED
WAPITI ROAD
TO
WEST OF MISSION HEIGHTS DRIVE

SCALE 1:2000 0 20 40 60 80

Infrastructure Systems Ltd.
ENGINEERS PLANNERS LANDSCAPE ARCHITECTS

RM JANUARY 24, 2000 3643EX18.dwg

Exhibit 17




RM JANUARY 20, 2000 3643EX19.dwg

SCALE 1:2000 0 20 40 60 80

# 68 AVENUE FUNCTIONAL PLAN

RIGHT OF WAY REQUIRED
100 STREET
TO
97 STREET

Infrastructure Systems Ltd.
ENGINEERS PLANNERS LANDSCAPE ARCHITECTS

# 3

# Existing Conditions

## 3.1 Existing Land Use

The lands adjacent to the study area are zoned for residential, institutional and recreational use. At the present time development has taken place only on the east side of Bear Creek with Patterson Place north of 68 Avenue fully developed and Country Club Estates south of 68 Avenue nearing full development. No development has taken place adjacent to 68 Avenue west of Bear Creek. Future stages of Kateri will however bring the residential area to the immediate vicinity.

The entire area south of 68 Avenue between Bear Creek and 108 Street is zoned for future residential development. Institutional development planned or under way along 68 Avenue includes the elementary schools south of 68 Avenue in the Country Club Estates neighborhood and the imminent development of the Community Knowledge Campus north of 68 Avenue, east of 108 Street. The Community Knowledge Campus is a major development that will be accessed from 68 Avenue. The first step of development is the Catholic High School which is scheduled to be in service by September 2001.

Significant recreational development has occurred along Bear Creek with sports fields and a trail network already in place. Proposals for future development include additional sports facilities and the development of areas for specialized activities such as a par-three golf course, a BMX track and a paint ball area.

## 3.2 Roadway Development

The length of 68 Avenue in the study area is approximately 3.3 kilometres. A two lane paved rural roadway exists from 100 Street to Resources Road. There is one intermediate intersection at Poplar Drive. The existing roadway surface, paved to a width of 14 metres, was designed with minimum grades that in some areas do not meet current City minimum standards. The grades east of 100 Street for a distance of approximately 300 metres were designed at 0.4%. The design grades for the remainder of the roadway to Resources Road are 0.5%. It is likely that in the twenty years since the roadway was constructed that naturally occurring settlement of the roadway surface has reduced all road grades to a degree that would be considered as inadequate for urban standards.

The intersection at Poplar Drive provides access from 68 Avenue to the residential area north and south of 68 Avenue. Stop condition exists for Poplar Drive traffic at the intersection. Two accesses have also been provided from 68 Avenue to a mini-mall development in the southwest quadrant of the intersection. Access has also been provided from the mall on to Poplar Drive.

Minor upgrading was completed on 68 Avenue west of Resources Road, at the Resources Road intersection as part of the 1999 Resources Road upgrading program. The upgrade includes signalization of the intersection and a lane reconfiguration to facilitate turning movements.

Drainage along 68 Avenue is surface drainage along roadside ditches. Runoff is conveyed to the west and spills over the Bear Creek bank west of 100 Street.

There is no roadway between 100 Avenue and 108 Street. Immediately west of 100 Street is the Bear Creek Valley. The valley in this location is approximately 23 metres deep and has unstable banks on either side of 68 Avenue. At the westerly terminus, 68 Avenue will intersect Wapiti Road (108 Street). Wapiti Road at this location is a two lane rural highway which will require upgrading. The Canfor Haul Road is immediately east of Wapiti Road.

## 3.3 Geotechnical Issues

The soil conditions encountered during construction are anticipated to be typical of the soil conditions generally found in the southern half of the City. It is expected that the wet, silty soils conditions encountered during the reconstruction of Resources Road will be also be encountered west of the intersection with conditions gradually improving toward 108 Avenue. The mitigation of frost action in this region may require that sub-grades be sub-cut and replaced with a drier more stable clay material with pit run stabilization required where extreme conditions are encountered.

The Bear Creek valley poses problems in the construction of both the bridge and the roadway embankment leading to the bridge. The Geotechnical investigation of the proposed alignment across the valley prepared by BBT Geotechnical Consultants in 1981 and the Functional Planning Study Geotechnical Investigation prepared by Thurber Engineering in 1999 identified two areas of bank instability. The first area of concern is located north of 68 Avenue and west of 100 Street where a large slide occurred prior to 1981 and the second area is located south of 68 Avenue on the west stream bank where a steep erosional scarp is present. The proposed alignment recognizes these features and provides maximum separation between the roadway and the limits of the unstable areas.

As recommended by the Thurber report a more detailed study and report should be carried out as an integral part of the detailed design phase.

# 4

# 68 Avenue Functional Plan

## 4.1 Design Criteria

The ultimate configuration of 68 Avenue will be a 4-lane divided arterial roadway designated as a truck route as well as a dangerous goods route as outlined in the City's Transportation Master Plan. Typical cross sections for the ultimate configuration are included in this report.

The recommended 47.0 metre right-of-way width west of Bear Creek is required to accommodate the roadway, utilities, a separate sidewalk, a bike path and allowance for the construction of a portion of an earth berm by the residential developer as indicated on the typical roadway section. East of Bear Creek the combined width of the existing 40 metre roadway right-of-way and the two 16 metre Public Utility Lots will be utilized to contain the roadway, separate sidewalk, bike path and utilities. The additional width in this area will allow for the creative placement of landscape elements and optional noise buffering.

The recommended roadway cross-section includes two 3.7 metre wide lanes in each direction with a 5.5 metre wide median. Left and right turn deceleration and storage lanes will be 3.5 metres wide.

All elements of the horizontal and vertical alignments shall be designed in accordance with the TAC Geometric Design Guidelines for Canadian Roads, 1999 Edition. The design speed for the roadway shall be 70 km/h for a posted speed of 60 km/h.

## 4.2 Design Elements

Access control will be maintained throughout the length of study area in accordance with City of Grande Prairie standards and the TAC guidelines. Collector road access on to 68 Avenue will generally be spaced at 400 metres with consideration given to the local constraints imposed by the Bear Creek valley. Recommendations include the construction of full intersections at both the east and west campus accesses, and a "T" intersection at Kateri Drive.

Existing access points east of Bear Creek shall be maintained at 100 Street and at Poplar Drive. It is recommended that one of the two existing commercial accesses from 68 Avenue eastbound into the commercial development west of Poplar Drive be closed.

## 4.3 Roadway Alignment

### 4.3.1 108 Street to Kateri Drive

The proposed roadway alignment from 108 Street to Kateri Drive is to be situated in the right-of way to accommodate existing utilities. The proposed cross-section locates the existing manholes and water valve outside of the wheel path. This will allow access to the utility by maintenance personnel with a single travel lane closure.

The proposed alignment allows for the construction of noise attenuation where required. It also will accommodate the construction of a three metre cycle path as well as a separate 1.5 metre sidewalk as well as all proposed utilities and can be easily and creatively landscaped.

### 4.3.2 Kateri Drive to 100 Street (Bear Creek Valley)

The proposed alignment through the creek valley is designed to accommodate the geotechnical constraints imposed by the slope instability on the east side of the valley north of 68 Avenue and the steep escarpment on the west side of the valley south of 68 Avenue. The proposed alignment distances the roadway from both

elements while at the same time recognizing the desirability of tangent approaches to the bridge structures. The proposed alignment has been set so that super-elevation does not encroach on to the bridge structure.

At the detailed design stage it is recommended that the profile across the structure provide grades greater than minimum along the structure and that the sag point be located off of the structure to minimize the possibility of bridge deck icing. Profile constraints include embankment height and the depth of utilities crossing 68 Avenue near the top of bank west of the creek.

Sideslopes in the river valley shall be designed at a 4:1 slope with consideration given to minimizing the imposed loading on the water transmission line that crosses the Bear Creek valley along the south edge of the 68 Avenue right-of-way. Head slopes at the structure are recommended to be no steeper than 2.5:1 to minimize the effect of embankment creep experienced locally at structures with steeper head slopes.

### 4.3.3 100 Street to Resources Road

This existing section of roadway has a 12-metre paved surface with a rural cross section accommodating drainage along surface ditches. The proposed alignment from 100 Street to Poplar Drive incorporates the existing roadway into the westbound lanes with the future lip of gutter located at the approximate existing north edge of asphalt. East of Poplar Drive the ultimate horizontal alignment will skew slightly to the north to match the alignment of 68 Avenue east of Resources Road.

Sections of roadway where the existing vertical profile does not meet minimum standards may require reconstruction when this section of roadway is urbanized with the construction of curb and gutter and storm sewers.

## 4.4 Intersection Considerations

### 4.4.1 108 Street

The construction of 68 Avenue includes the staged construction of intersection improvements on 108 Street (Highway 40). Initial stages of construction include the widening of 108 Street to allow for left and right turn lanes in both directions on signalization of the intersection. At the ultimate development, 108 Street will be a four lane divided roadway to the South City Limits.

It is recommended that this intersection be signalized at the time of initial construction of 68 Avenue. Traffic control at the intersection is complicated, however by the proximity of the Canfor haul road located immediately east of and running parallel to 108 Street. During periods of log hauling, trucks on the haul road are to receive priority over other traffic. This will result in the need for specialized signals and the placement of signs and pavement markings at non-standard locations. Vehicle detection devices will be installed on the haul road to pre-empt regular signal operations and additional lights will be required to control right turning traffic moving from 108 Street northbound to 68 Avenue eastbound.

Preliminary discussions are ongoing between Canfor, and the City of Grande Prairie and Alberta Infrastructure to investigate the feasibility of directing the Canfor log trucks onto Highway 40, somewhere south of the 68 Avenue but within City limits. The log trucks would remain on the highway until they were north of 68 Avenue where they would return to the haul road. The haul road is maintained by Canfor so that truck loadings in excess of the highway maximum limit can be hauled from the forest to the mill. If the overload limits are permitted on Highway 40, maintenance costs will increase and safety / liability issues can be expected with respect to slow moving vehicles, acceleration / deceleration distances at controlled intersections, as well as with steering / breaking control. The City shall carefully evaluate these liabilities in comparison to the liability of maintaining the existing Canfor crossing on 68 Avenue.

### 4.4.2 West Campus Access

This intersection will ultimately provide access to the Knowledge Campus as well as to the future residential area south of 68 Avenue. Signalization will not be considered at this location until both the campus and residential area approach full development.

### 4.4.3 East Campus Access

This intersection will be developed as a full intersection providing access to both the Knowledge Campus and the two residential neighbourhoods proposed for the area south of 68 Avenue. It is likely that signalization of this intersection can de deferred until 68 Avenue reaches ultimate development.

### 4.4.4 Kateri Drive

This intersection will be developed as a "T" intersection on providing access to Kateri north of 68 Avenue. Signalization shall not be required at this location until the north residential area nears full development.

### 4.4.5 100 Street

This intersection provides access to the residential areas of Patterson Place and Country Club Estates and is a direct link to the downtown commercial area. It also provides access to the recreational area south of 68 Avenue along Bear Creek. Signalization will likely be required at this intersection at the time that 68 Avenue is open between 108 Street and Resources Road.

### 4.4.6 Poplar Drive

This intersection provides an interconnection between Patterson Place and Country Club Estates. It serves as a minor collector feeding from both residential areas to 68 Avenue. Signalization will be a consideration at this intersection at the time that 68 Avenue is open between 108 Street and Resources Road.

### 4.4.7 Resources Road

The Resources Road upgrading project included improvements to this intersection including the installation of traffic control signals. Upgrading 68 Avenue to the ultimate four-lane configuration will include the construction of turn bays and channelization to further increase the capacity of the intersection.

## 4.5 Walkways and Bike Paths

A paved three-metre bike path has been constructed along the north edge of the north utility lot along 68 Avenue between 100 Street and Resources Road. This trail connects the existing Resources Road trail with the Bear Creek valley trail network. This connection is made via the utility pipe bridge located immediately south of 68 Avenue. On the west side of the valley the trail winds north from the pipe bridge following the west top of bank into the Kateri subdivision.

It is recommended that a three-metre bike path be extended along the north boulevard of 68 Avenue to 108 Street connecting the Knowledge Campus with the existing trail network. It is also recommended that the existing trail be re-routed to cross 68 Avenue under the proposed bridge structure. An auxiliary crossing may be provided at the intersection with Kateri Drive with the trail following along the south boulevard from the intersection and connecting directly into the pipe bridge and the valley network.

On the east side of Bear Creek it is recommended that the trail remain in its existing location between Resources Road and 100 Street. The trail would cross 68 Avenue at 100 Street and continue south and west to join into the existing trail crossing the pipe bridge. An extension of the trail west of 100 Street along 68 Avenue and crossing the creek on the 68 Avenue bridge structure is not recommended.

## 4.6 Drainage Requirements

Bear Creek divides 68 Avenue into two distinct drainage catchment areas. A piped drainage system has not been developed for either area. Alberta Environment policy

stipulates that run off from developed areas must be controlled and that the release rates must not be greater than that for undeveloped lands. This policy applies to 68 Avenue and will require the development of a storm water retention system designed for storm events with a return period of one hundred years as described in the Storm Water Master Plan for the City of Grande Prairie. The discharge rate for this facility would be designed at the five year rate. An overland route will also have to be provided to convey storm water from larger events.

There are two basic options for the proposed retention system. The first would include the construction of an underground containment system made up of oversized pipes that would store as well as convey runoff from storm events. This system would be constructed within the roadway right-of-way and would not require the purchase of additional property. The second option would consist of a piped system to convey runoff to a retention pond where water would be stored and released at a controlled rate. On the east side of Bear Creek, existing storm water outfalls may be utilized if flows are detained completely until the receiving pipe is dry. There is no existing storm sewer system west of Bear Creek along 68 Avenue. The proposed system should be designed to accommodate the lands west of Kateri Drive between 68 Avenue and 73 Avenue as well as the 68 Avenue right-of-way. It may be possible to construct a storm water retention pond on Knowledge Campus lands.

## 4.7 Property Requirements

The acquisition or protection of the property required for the development of 68 Avenue to its ultimate stage should be considered as a priority item.

The roadway right-of-way between 100 Street and Resources Road is 40 metres wide supplemented on both sides by 16 metre Public Utility Lots extend from 96 Street to Resources Road. West of 96 Street the 16 metre utility right-of-way exists on the north side only. The property south of 68 Avenue at this location is presently undeveloped and it is recommended that land be acquired or protected for a westward extension of the existing Public Utility Lot from 96 Street to 100 Street.

The existing right-of-way west of Bear Creek is the original 20.12 metre road allowance. It is recommended that this be widened to a minimum 45.5 metre width to accommodate the roadway, utility installation and noise buffering where desired.

The institutional lands designated for the development of the Knowledge Campus will not require noise attenuation. As a result, a 41.5-metre right-of-way is recommended to accommodate development of the roadway and required utilities permitting a greater developable area for campus facilities.

## 4.8 Wildlife Passage

The Bear Creek Valley provides a natural refuge for wildlife in the heart of an urban area. Roadways create physical barriers hindering the passage of wildlife and pathways remove cover and tend to discourage the presence of wildlife.

Methods are being developed that encourage wildlife to remain in natural areas, these include the re-vegetation of disturbed areas such as under bridge structures and restricting human access to natural areas. If this is desirable, then the following action may be considered:

- Steepening the headslope on the east side of the bridge to approximately 2:1 and replanting trees and shrubs under the structure for shelter.

- Restricting pedestrian access along the east side of Bear Creek by not providing pathways or pedestrian bridges across the stream.

## 4.9 Noise Attenuation

Noise level calculations have not been carried out as part of this functional plan. As 68 Avenue is designated as a truck route, noise may become a concern in the future. It is expected that the level of nose will not approach the maximum level recommended by the City's Noise Policy for 15 or 20 years or until the maximum capacity of the roadway is reached.

The recommended right-of-way width does not allow sufficient space for the construction of full height earth berms for noise attenuation. The following actions will ensure that the need for noise attenuation is extended as far into the future as possible:

- Construct earth berms in the initial stage of road construction. Although they will provide little relief from future noise levels they will reduce the height of future noise walls.

- Landscape boulevard areas with trees and shrubs. It has been observed that a visual barrier is almost as effective as reducing noise levels when achieving acceptance from adjacent property owners. Shrubbery will also reduce the impact of any noise walls that may be constructed in the future.

- Restrict the height of housing adjacent to the roadway to a single storey. This will increase the effectiveness of the shrubbery as a visual screen and reduce the height of a noise wall if and when required.

# 5

# Cost Estimates

## 5.1 Stage I

### 5.1.1 Phase I - 108 Street to Kateri Drive

### 5.1.2 Phase II - Kateri Drive to 100 Street

### 5.1.3 Phase III - 100 Street to Resources Road

## 5.2 Highway 40 Intersection Upgrading

### 5.2.1 Option 1 - Minor Improvements

### 5.2.2 Option 2 - Intersection Channelization

### 5.2.3 Option 3 - Widening from 76 Avenue to 68 Avenue

### 5.2.4 Option 4 - Four Lanes from 76 Avenue to South City Limit

## 5.3 Stage II - 68 Avenue Twinning 108 Street to Resources Road

## CITY OF GRANDE PRAIRIE - 68 AVENUE FUNCTIONAL PLANNING STUDY

### PRELIMINARY COST ESTIMATE

**5.1.1 - STAGE 1, PHASE 1 - TWO LANES - 108 STREET TO KATERI DRIVE NOT INCLUDING 108 STREET (HWY. 40) INTERSECTION**

Notes:
Total length 108 St. to Kateri Drive = 1200 m
Component Parts - 108 Street intersection
- Fully developed 4 lanes on 68 Avenue at Highway 40
- Pre-emptive signals for priority trucks on Canfor Haul Road
- Signals on Highway 40
- 68 Avenue
  - Two lanes from transition to Kateri Drive
  - Two Intermediate intersections (not full 4-lane divided)
- Underground Utilities
  - Storm Sewer from 108 Street to Bear Creek
  - Water and Sanitary are existing (adjust valves and manholes)
- Miscellaneous
  - Street lighting full length
  - bike path full length (South separate sidewalk added in stage 2)
  - Landscaping one side (Optional); topsoil and seed full length

| | DESCRIPTION | AMOUNT | |
|---|---|---|---|
| 1 | Roadway Construction | $ | 1,150,000.00 |
| 2 | Storm sewer construction | $ | 860,000.00 |
| 3 | Bridge Construction | $ | - |
| 4 | Traffic control signals | $ | 200,000.00 |
| 5 | Utility Adjustments and relocates | $ | 15,000.00 |
| 6 | contingency | $ | 333,750.00 |
| 7 | Street lighting | $ | 200,000.00 |
| 8 | Engineering and Testing (12.5%) | $ | 319,843.75 |
| | **SUB TOTAL** | $ | 3,078,593.75 |
| | GST (3% Rounded) | $ | 92,357.81 |
| | **TOTAL ESTIMATED COST (ROUNDED)** | **$** | **3,200,000.00** |

## CITY OF GRANDE PRAIRIE - 68 AVENUE FUNCTIONAL PLANNING STUDY

## PRELIMINARY COST ESTIMATE

### 5.1.2 - STAGE 1, PHASE 2 - TWO LANES - KATERI DRIVE TO 100 STREET

Notes:
Total length kateri Drive to 100 Street = 800 m
Component Parts - 2 lane Roadway and 2 lane Bridge
- 4-lane earthworks across Bear Creek Valley
- Signals at 100 Street as warranted
- 68 Avenue
  - Two lanes from Kateri Drive to transition east of 100 Street
  - Tie to existing east of 100 Street
- Underground Utilities
  - Storm Sewer from 108 Street to Bear Creek constructed in Stage 1
  - Storm Sewer from Bear Creek East not included
  - Water and Sanitary are existing (adjust valves and manholes)
- Miscellaneous
  - Street lighting full length
  - bike path to tie into existing trail over pipe bridge
  - Landscaping one side (Optional); topsoil and seed full length

| | DESCRIPTION | AMOUNT | |
|---|---|---|---|
| 1 | Roadway Construction | $ | 910,000.00 |
| 2 | Storm sewer construction | $ | - |
| 3 | Bridge Construction | $ | 1,950,000.00 |
| 4 | Traffic control signals (100 Street) | $ | 80,000.00 |
| 5 | Utility Adjustments and relocates | $ | 20,000.00 |
| 6 | contingency (15%) | $ | 444,000.00 |
| 7 | Street lighting | $ | 120,000.00 |
| 8 | Engineering and Testing (12.5% ) | $ | 440,500.00 |
| | **SUB TOTAL** | $ | 3,964,500.00 |
| | GST (3% Rounded) | $ | 118,935.00 |
| | **TOTAL ESTIMATED COST (ROUNDED)** | **$** | **4,100,000.00** |

## CITY OF GRANDE PRAIRIE - 68 AVENUE FUNCTIONAL PLANNING STUDY

### PRELIMINARY COST ESTIMATE

**5.1.3 - STAGE 1, PHASE 3 - TWO LANES - 100 STREET TO RESOURCES ROAD**

Notes:
Total length 100 St. to Resources Road = 1500 m
Component Parts - Resources Road intersection
- Maintain existing intersection at Resourcs Road
- Maintain existing signals at Resourcs Road
- Signals on Resources Road

- 68 Avenue
  - Two lanes from transition to Resources Road
  - One Intermediate intersection at Poplar Drive
- Underground Utilities
  - Storm Sewer from Resources Road to 100 Street - system sized for roadway only
  - Water and Sanitary are existing (adjust valves and manholes where required)
- Miscellaneous
  - Street lighting full length
  - Existing bike path full length (South separate sidewalk added in stage 2)
  - Landscaping one side (Optional); topsoil and seed full length

| | DESCRIPTION | AMOUNT | |
|---|---|---|---|
| 1 | Roadway Construction | $ | 673,025.00 |
| 2 | Storm sewer construction | $ | 620,000.00 |
| 3 | Bridge Construction | $ | - |
| 4 | Traffic control signals | $ | 20,000.00 |
| 5 | Utility Adjustments and relocates | $ | 15,000.00 |
| 6 | contingency | $ | 199,203.75 |
| 7 | Street lighting | $ | 225,000.00 |
| 8 | Engineering and Testing (12.5%) | $ | 190,903.59 |
| | **SUB TOTAL** | $ | 1,943,132.34 |
| | GST (3% Rounded) | $ | 58,293.97 |
| | **TOTAL ESTIMATED COST (ROUNDED)** | **$** | **2,002,000.00** |

# CITY OF GRANDE PRAIRIE - 68 AVENUE FUNCTIONAL PLANNING STUDY

## PRELIMINARY COST ESTIMATE

**5.2.1 - OPTION 1 - Highway 40 - Minor Improvements**

- Interim Intersection widening only
- No raised median, no overlay of existing.
- Final 90 mm lift is deferred until 68 Avenue is extended across Bear Creek at which time the intersection is upgraded
- Surface drainage - (Rural ditches)
- Cost of signals was included as a 68 Avenue cost

| | | | |
|---|---|---|---|
| 1 | Roadway Construction | $ | 325,000.00 |
| 2 | Deferred Overlay | $ | 120,000.00 |
| 3 | Traffic control signals | $ | - |
| 4 | Utility Adjustments and relocates | $ | 25,000.00 |
| 5 | contingency (20%) | $ | 94,000.00 |
| 6 | Street lighting | $ | 40,000.00 |
| 7 | Engineering and Testing | $ | 76,000.00 |
| | **SUB TOTAL** | $ | 680,000.00 |
| | GST (3% Rounded) | $ | 21,000.00 |
| | **TOTAL ESTIMATED COST** | **$** | **701,000.00** |

# CITY OF GRANDE PRAIRIE - 68 AVENUE FUNCTIONAL PLANNING STUDY

## PRELIMINARY COST ESTIMATE

### 5.2.2 - OPTION 2 - Highway 40 - Intersection Channelization

- Concrete median & overlay of existing.
- Roadway is upgraded to full divided cross-section at intersection
- Final 90 mm lift is Constructed over full length of widening
- Cost of signals included in 68 Avenue cost
- Surface drainage - (Rural ditches)

| | | | |
|---|---|---|---|
| 1 | Roadway Construction | $ | 745,000.00 |
| 2 | Storm sewer construction | $ | - |
| 3 | Traffic control signals | $ | - |
| 4 | Utility Adjustments and relocates | $ | 25,000.00 |
| 5 | contingency (20%) | $ | 154,000.00 |
| 6 | Street lighting | $ | 250,000.00 |
| 7 | Engineering and Testing | $ | 147,000.00 |
| | **SUB TOTAL** | $ | 1,321,000.00 |
| | GST (3% Rounded) | $ | 40,000.00 |
| | **TOTAL ESTIMATED COST** | **$** | **1,361,000.00** |

# CITY OF GRANDE PRAIRIE - 68 AVENUE FUNCTIONAL PLANNING STUDY

## PRELIMINARY COST ESTIMATE

**5.2.3 - OPTION 3 - Highway 40 widening from 76 Ave. to 68 Avenue (Transition to two lanes south of 68 Ave.)**

- Roadway upgraded to full divided section
- Final 90 mm lift is Constructed over full length
- Assume surface drainage (Highway Ditches)
- Assume no outside curb and gutter
- Assume Raised Median

| | | | |
|---|---|---|---|
| 1 | Roadway Construction | $ | 1,360,000.00 |
| 2 | Storm sewer construction | $ | - |
| 3 | Traffic control signals | $ | - |
| 4 | Utility Adjustments and relocates | $ | 60,000.00 |
| 5 | contingency (20%) | $ | 284,000.00 |
| 6 | Street lighting | $ | 320,000.00 |
| 7 | Engineering and Testing | $ | 255,000.00 |
| | **SUB TOTAL** | $ | 2,279,000.00 |
| | GST (3% Rounded) | $ | 70,000.00 |
| | **TOTAL ESTIMATED COST** | **$** | **2,349,000.00** |

# CITY OF GRANDE PRAIRIE - 68 AVENUE FUNCTIONAL PLANNING STUDY

## PRELIMINARY COST ESTIMATE

**5.2.4 - OPTION 4 - Highway 40 widening from 76 Ave. to south City Limit**

- Roadway upgraded to full divided section
- Final 90 mm lift is Constructed over full length
- no transition to two lanes - assume tie to four lanes at City Limits
- Assume surface drainage (Highway Ditches)

| | | | |
|---|---|---|---|
| 1 | Roadway Construction | $ | 2,000,000.00 |
| 2 | Storm sewer construction | $ | - |
| 3 | Traffic control signals | $ | - |
| 4 | Utility Adjustments and relocates | $ | 50,000.00 |
| 5 | contingency (20%) | $ | 410,000.00 |
| 6 | Street lighting | $ | 360,000.00 |
| 7 | Engineering and Testing | $ | 255,000.00 |
| | **SUB TOTAL** | $ | 3,075,000.00 |
| | GST (3% Rounded) | $ | 70,000.00 |
| | **TOTAL ESTIMATED COST** | **$** | **3,145,000.00** |

## CITY OF GRANDE PRAIRIE - 68 AVENUE FUNCTIONAL PLANNING STUDY

## PRELIMINARY COST ESTIMATE

### 5.3 - STAGE 2 - 108 STREET (HIGHWAY 40) TO RESOURCES ROAD

Notes:
Total length = 3300 m
Component Parts - 2 lane Roadway and 2 lane Bridge
- 4-lane earthworks across Bear Creek Valley completed in stage 1
- Signals at intermediate intersections assumed not warranted at this time
- Signals adjustments required at 100 Street and at Resources Road
- Storm Sewer installation completed in stage 1
- Water and Sanitary are existing - adjust valves, manholes and catchbasins

- Miscellaneous
  - Street lighting full length is required for new construction
  - south side concrete sidewalk to tie into existing trail over pipe bridge
  - Landscaping one side ; topsoil and seed full length, trees optional

| | DESCRIPTION | AMOUNT | |
|---|---|---|---|
| 1 | Roadway Construction | $ | 1,825,000.00 |
| 2 | Storm sewer construction | $ | 230,000.00 |
| 3 | Bridge Construction | $ | 1,950,000.00 |
| 4 | Traffic control signals (100 Street) | $ | 160,000.00 |
| 5 | Utility Adjustments and relocates | $ | 30,000.00 |
| 6 | contingency (15%) | $ | 630,000.00 |
| 7 | Street lighting | $ | 440,000.00 |
| 8 | Engineering and Testing (12.5% ) | $ | 660,000.00 |
| 9 | Bury Overhead Power | $ | 370,000.00 |
| | **SUB TOTAL** | $ | 6,295,000.00 |
| | GST (3% Rounded) | $ | 188,850.00 |
| | **TOTAL ESTIMATED COST (ROUNDED)** | **$** | **6,500,000.00** |

# 6

# Public Participation

An open house was held at Muskoseepi Park on Tuesday, May 2, 2000 from 7:00 p.m. to 9:00 p.m. The purpose of the open house was to allow the public to view the preliminary design for the proposed roadway and to provide the opportunity for them to express specific concerns and discuss issues relevant to the project. The Open House was advertised in the Daily Herald Tribune with additional invitations sent directly to groups and individuals that were felt to have a specific interest in the project, in particular the Knowledge Campus groups.

A total of five people attended including:

| | | |
|---|---|---|
| Pat Reede | - | City Councillor |
| Henry Ham | - | Local Developer |
| Tom Shields | - | Local Realtor |
| Claus Penno | - | Canfor |
| Brian Moran | - | Canfor |

The attendees from Canfor provided a valuable insight into the problems and benefits that could be expected if the haul road were eliminated in the vicinity of 68 Avenue and the log trucks were re-routed via Highway 40 (108 Street).