Engineering Component for Precinct Plan
Land Drainage System

FINAL – REV 0

KGS Group 12-2214-002
March 2014

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1.0 INTRODUCTION

The Red River Exhibition Park (RREX) is in the process of updating the precinct plan to include proposed future developments to the site area. As part of the Engineering Component of the Precinct Plan for the Red River Exhibition Park (RREX), KGS Group has completed a preliminary assessment of the conceptual land drainage concepts to be incorporated in these future development plans. The RREX is located immediately west of the City of Winnipeg, between Portage Avenue (PTH 1) and Saskatchewan Avenue, and extends approximately 1.5 km west from the Perimeter Highway to the City of Winnipeg and Rural Municipality (RM) of Headingley border. The existing site drainage services approximately 130.55 ha of land as shown on Figure 1. The RREX has plans to redevelop the area in two main stages, referred to herein as the Interim Development and Ultimate Development, as shown on Figure 2. There are currently no formal plans for the Ultimate Development area, and therefore the land drainage of this area has not been fully addressed in this stage of the study.

As a result of the proposed Interim Development and Ultimate Development, the total contributing drainage area of the Red River Exhibition Park and surrounding amenities would increase from 130.55 ha to 284.73 ha, with an increase in impervious area. The existing area currently drains to the Perimeter Ditch, where MIT has stated that no additional flow can be drained. Therefore, a new land drainage system and retention pond will be built to service the Red River Exhibition Park Interim Development (including the addition of the Westport Festival Development) as shown on Figure 2. The pond will be drained to the Camp Manitou Drain that is owned by the RM of Headingley. An agreement has been made that will allow up to 0.254 m^3/s (9 ft^3/s) to the Camp Manitou Drain.

KGS Group has developed a preliminary land drainage model of the area using the software XP-SWMM 2012 (Storm Water Management Model). The model was used to assess the existing and proposed development scenarios at the site. Because of the conceptual nature of this analysis and issues obtaining accurate data in the study area, many of the details of the current land drainage scheme and the details of the development plans are not known at this time. More detailed analysis is required in the next phase of this project and for the final design.

2.0 EXISTING LAND DRAINAGE SYSTEM

The catchment area associated with the existing drainage infrastructure includes the area bounded by Saskatchewan Avenue to the north, the Perimeter Highway to the east, PTH 1 to the south, and the western boundaries of Pointe West Auto Park, Red River Exhibition grounds, and Assiniboia Downs. This catchment area is approximately 130.55 ha and is shown in Figure 1. The existing site generally drains to the east and to the south, with water storage areas located near the west ends of the system. Two of the existing water storage areas are essentially the remnants of an old borrow pit and have not been properly designed to be retention ponds. The South Pond is approximately 2.66 ha in size while the North Pond is approximately 0.60 ha. The North Pond drains through ditches that service the Pan Am Show Ring area as well as the Training Ring and Barn areas before exiting through an estimated 300 mm diameter pipe underneath the main Assiniboia Downs track. The South Pond empties into a ditch running east through the Exhibition Site. The Pointe West Auto Park is serviced by a separate land drainage system and retention pond. The North and South Pond systems as well as the Pointe West land drainage system drain to a main ditch running south alongside the Perimeter Highway that is owned by Manitoba Infrastructure and Transportation (MIT).

KGS Group has only been able to obtain limited information on the Perimeter Drain from MIT to date. From site observations, the Perimeter Drain runs along the Perimeter Highway, across Highway 1, and discharges into the Assiniboine River. Some additional clarification is required on the channel and culvert inverts, and the backwater conditions for the Perimeter Drain. This outstanding information will be obtained before proceeding with the final design of the proposed land drainage system for the RREX, however this drain will not be the primary drain for the RREX.

The areas located to the west of Pointe West Auto Park and south of RREX site (Westport Festival area), the area to the west of the RREX site (proposed Ultimate Development area), as well as the area located north of Assiniboia Downs and west of the RREX site are all currently a bare fields with no defined drainage (see the location plan in Figure 2). These lands are ineffectively drained and it is expected that extremely little runoff is produced from these areas. Most of the rainfall will infiltrate or be contained within depression storage on the land. Furthermore, there exists a berm to the west of the existing RREX site that prevents runoff from

entering the existing site. The Westport Festival area and proposed Ultimate Development Area appear to drain towards the Camp Manitou Drain culverts underneath PTH 1. The area west of Assiniboia Downs appears to drain to a ditch along Saskatchewan Avenue and ties in to the Perimeter Ditch.

3.0 METHODOLOGY AND DESIGN CRITERIA

A hydraulic model was developed using the software XP-SWMM 2012 (Storm Water Management Model) to assess the existing and proposed development conditions at the site. The model of the existing conditions was used to assess the level of service of the site and to determine the peak flows currently draining into the Perimeter Drain, as MIT has stated that no additional flow be allowed to this drain. Any portions of the Interim Development and Ultimate Development that empty to the Perimeter Drain must therefore not exceed the current peak flow.

The Interim Development of the site is shown in the Red River Exhibition Master Plan (included in the appendix), and the proposed drainage plan is shown on Figure 2. The existing site will be divided along Race Track Road, with everything located to the east of the road continuing to drain to the perimeter ditch (total area of 118.74 ha). The RREX Interim Development including the Westport Festival development (total area of 91.40 ha) will drain to a new retention pond and will empty to the Camp Manitou Drain. An area to the west of the RREX Interim Development has been identified for future developments and is referred to as the Ultimate Development area (total area of 74.59 ha) in this report. There are currently no formal plans for this area, and it has therefore not been addressed in this stage of the study. The drainage for this area will be addressed once a formal plan has been developed, and it is expected that this area will incorporate an additional pond. The hydrology from this area was calculated as a preliminary estimate of the order of magnitude of runoff for costing and future planning purposes.

A hydraulic model of the Interim Development area, as indicated in Figure 2, was created to assess options for a new connection to the drain along Camp Manitou Road (owned by the RM of Headingley), available storage on the site, and pumping requirements from the proposed retention pond(s). The 1974 MacLaren City of Winnipeg design storms were used in all model simulations. The City of Winnipeg standards for stormwater retention pond design were considered as a guideline for the preliminary design of the pond. Some of the specifications that were used to approximate the size of pond include:

- Estimated ground elevation of 239.00 m;

- Average side slope of 5H:1V;
- Minimum freeboard for 100-year storm of 0.90 m*;
- Maximum rise for the 25-year storm of 1.8 m;
- Maximum drawdown time to empty the pond of 120 hrs for 100-year storm and 48 hrs for 5-year storm.

*Grant Mohr (Head of Land Drainage and Flood Protection) of the City of Winnipeg Water and Waste Department has stated that a freeboard of 0.9 m for the 100 year storm must be used under pumping conditions.

4.0 MODELLING ANALYSIS AND RESULTS

4.1 EXISTING CONDITIONS

A model of the existing conditions was created based on available information to assess the current level of service and the peak flows that enter the Perimeter Drain.

The 130.55 ha of the site that is serviced by the existing RREX drainage infrastructure was divided into 25 subcatchment areas. Each subcatchment was assumed to have an average slope of 1% based on the available survey data and the imperviousness was estimated based on the land use which varies from 0% for open fields and agricultural areas to 90% for parking lots, pathways, and buildings. Infiltration losses were calculated using the Green-Ampt method, assuming a silty-clay soil type. The associated depression storage was defined as 1.5 mm for impervious surfaces and 5 mm for pervious surfaces.

The location and alignment of the ditches were taken from the Red River Exhibition Association's Phase III Site Development Plan (included in the Appendix). Detailed ditch geometry or survey data was not available so the ditches were approximated as having 5H:1V side slopes with a base width of 1 m and depth of 1 m. The ditch slopes were estimated based on ground elevations in Drawings RR-1-549 to RR-14-549 for the Phase III Site Development Plan, which range from 0.05% to 0.2%. A number of culvert crossings were also identified throughout the site, although some of their sizes are unknown. During a site visit, the culvert into the perimeter ditch near the MTS Iceplex has been confirmed as a 600 mm culvert and the culvert immediately north of this was confirmed as a 300 mm. Since detailed survey data was not available and site visits were unable to confirm the remaining culvert sizes, it was assumed that these culverts were 300 mm in diameter and sloped similarly to the ditches.

Simulations of the existing RREX site showed that the land drainage system had approximately a 5-year level of service for most of the site. The level of service was less in some specific areas, such as the most upstream portions of the drainage network and in the vicinity of the Assiniboia Downs Racetrack, where the calculations showed minor flooding occurs. The flooding near the racetrack is consistent with the reports of the undersized conduits in that area. Some flooding has occurred in the past and was related to debris in the conduits.

The peak flow from the existing development of the RREX site (130.55 ha) that drains to the Perimeter Ditch, as shown in Figure 1, resulting from the 5-year rainfall event is approximately 2.26 m^3/s. Although flows through the 5 culverts (4-300mm culverts and 1-600mm culvert) amount to a peak of about 0.96 m^3/s, there is approximately 45.18 ha of land that is draining directly to the perimeter ditch, identified as the shaded area on Figure 1, which results in the higher overall peak flow. The peak flows from the proposed RREX Interim Development and Ultimate Development to the Perimeter Drain must therefore be limited to this total amount.

4.2 PROPOSED INTERIM DEVELOPMENT

The Precinct Plan for the RREX includes the redevelopment of the existing exhibition grounds and the development of the Westport Festival area (Interim Development), and an expansion to the west with the potential for commercial and/or agricultural developments (Ultimate Development), as shown in the attached Red River Exhibition Master Plan and the Proposed Site Drainage plan included in Figure 2. As shown in these figures, the size and land use for the RREX site will change. To be conservative, the field located along Saskatchewan Ave north of the RREX was assumed to drain into the Perimeter Ditch. Since a portion of the existing drainage area will be routed to a new retention pond and drained through the Camp Manitou Road Drain, the impact to the Perimeter Ditch due to the addition of this area is minimal. The land use and drainage for the Pointe West Auto Park, Assiniboia Downs, and MTS Ice Plex areas will remain the same. The land use for the Interim Development area was estimated based on the Master Plan drawing. A comparison of the areas for both the existing site and the proposed changes in the Master Plan are summarized in Table 1.

The land drainage will be separated into two main systems split by Race Track Road running north through the site as shown in Figure 2. The existing land drainage system servicing Assiniboia Downs and Pointe West Auto Park will continue to drain to the east into the Perimeter Drain while the RREX Interim Development area will drain to a new retention pond and eventually empty into the drain along Camp Manitou Road.

Approximately 90% of the proposed Westport Festival development located west of the Pointe West Autopark (15.52 ha) is estimated to drain into the RREX site with the remaining area

(1.77 ha) draining south to a ditch along PTH 1. Discussions regarding the drainage plan of Westport Festival and its effects on the proposed RREX land drainage system are ongoing, and the developers responsible for Westport Festival will be submitting a separate land drainage plan. A preliminary configuration for this development is shown on the attached drawing provided by Stantec.

A report by Stantec (see Appendix) has established that the 2% design flow of the west culvert connecting to the Camp Manitou Drain across PTH 1 is 0.338 m^3/s (11.9 ft^3/s) An additional culvert to the east of Camp Manitou Road was identified during a site visit, however it will not be used for this precinct plan. The Stantec report used a contributing area of 67.5 ha which included a portion of the existing development of the RREX grounds as well as some undeveloped agricultural area. Chris Fulsher of the RM of Headingley has approved the RREX to drain up to 0.254 m^3/s (9 ft^3/s) into the Camp Manitou Road Drain in an email correspondence on September 3rd, 2013 (see Appendix). Subsequent designs should confirm this allowable discharge rate to the Camp Manitou Drain. The Interim Development of the exhibition grounds must incorporate a retention pond and limit the peak outflows to 0.254 m^3/s (9 ft^3/s). The existing water storage areas on the site are not proper retention ponds; therefore the South Pond will be converted into a proper retention pond and expanded. The runoff from the exhibition area will be routed to the reconstructed south retention pond via underground conduits. Subsequent studies must confirm whether the Camp Manitou Drain has the available capacity for this additional flow.

TABLE 1

CHANGES IN LAND USE

		Total Area (ha)		Existing Condition				Proposed Condition			
		Existing	Proposed	Imp. Area (ha)	Pervious Area (ha)	Imp. Area (%)	Drains To	Imp. Area (ha)	Pervious Area (ha)	Imp. Area (%)	Drains To
Existing Development (Pointe West Auto Park, Assiniboia Downs, & MTS Ice Plex)		91.51	118.74	52.08	39.44	57%	Perimeter Ditch	53.46	65.28	45%	Perimeter Ditch
Interim Development	Red River Exhibition Park	39.04	74.11	20.40	18.64	52%	Perimeter Ditch	48.85	25.26	66%	Camp Manitou Road
	Westport Festival	N/A	17.29	N/A	N/A	N/A	N/A	15.56	1.73	90%	Camp Manitou Road
Ultimate Development (West of Camp Manitou Rd. Extension)		N/A	74.59	N/A	N/A	N/A	N/A	29.84	44.75	40%	Camp Manitou Road

The redesigned North Pond as shown on the Red River Exhibition Master Plan is too small to serve as a land drainage retention pond and in discussions with the RREX, it was agreed that this pond will be used primarily for aesthetic purposes.

Based on topographic data around the proposed pond location, the ground elevation is approximately 239.00 m. The outfall at the Camp Manitou Road crossing has an elevation of 237.57 m (obtained from KGS Group surveys) and is approximately 700 m from the pond location. Assuming a minimum grade of 0.05% from this outfall location to the pond outlet location, the minimum possible gravity outfall elevation at the pond would be 237.92 m. With a ground surface of 239.00 m, and a required freeboard of 0.90 m, the pond would therefore provide a maximum storage of only 0.18 m. This will not be sufficient for the RREX Interim Development; therefore gravity outflow from the pond will not be possible and pumping will be required on a permanent basis. The pond will be regularly pumped to a normal water level that will provide sufficient storage volume to satisfy the design criteria outlined in Section 3.0. Should a storm event exceed the design parameters of a 100-year storm or in the event of a pump failure or downstream capacity issues, the existing ditch that runs east along Highway 1 and empties into the Perimeter Drain will be used as a controlled gravity overflow for use as an emergency measure.

An XP-SWMM model was created for the Interim Development scenario using the layout and catchment areas as defined on Figure 2. With this model, the inflow volumes and peak flows for the proposed Interim Development were estimated, and the preliminary design of the South Pond to serve the Interim Development was assessed.

The total runoff volume (with zero discharge) for the Interim Development areas (between Race Track Road and the Camp Manitou Road extension) is 43,400 m^3 for the 5-year MacLaren storm and 76,400 m^3 for the 100-year storm. A Normal Water Level (NWL) on the pond of 236.25 m was found to provide enough storage to fully contain a 100-year storm without any outflow, while maintaining the minimum freeboard requirement of 0.90 m. The peak water level resulting from the 100-year storm with no outflow is 238.14 m (0.86 m below ground surface), while the rise on the pond resulting from the 25-year storm is 1.64 m, corresponding to a water level of 237.89 m. The stage-storage curve for the proposed South Pond is shown in Figure 3 below.

In order to satisfy the drawdown requirements and to provide enough storage for subsequent storms, the pond must be pumped to the NWL after each storm. As per the design specifications, the 100-year storm must be pumped within 120 hours and the 5 year storm in 48 hours. Based on the above inflow volumes, a pumping capacity of 0.25 m³/s would be required to drain the pond within the specified time. The pump will discharge into a ditch that runs south along the Camp Manitou Road Extension and across PTH 1 into the Camp Manitou Drain.

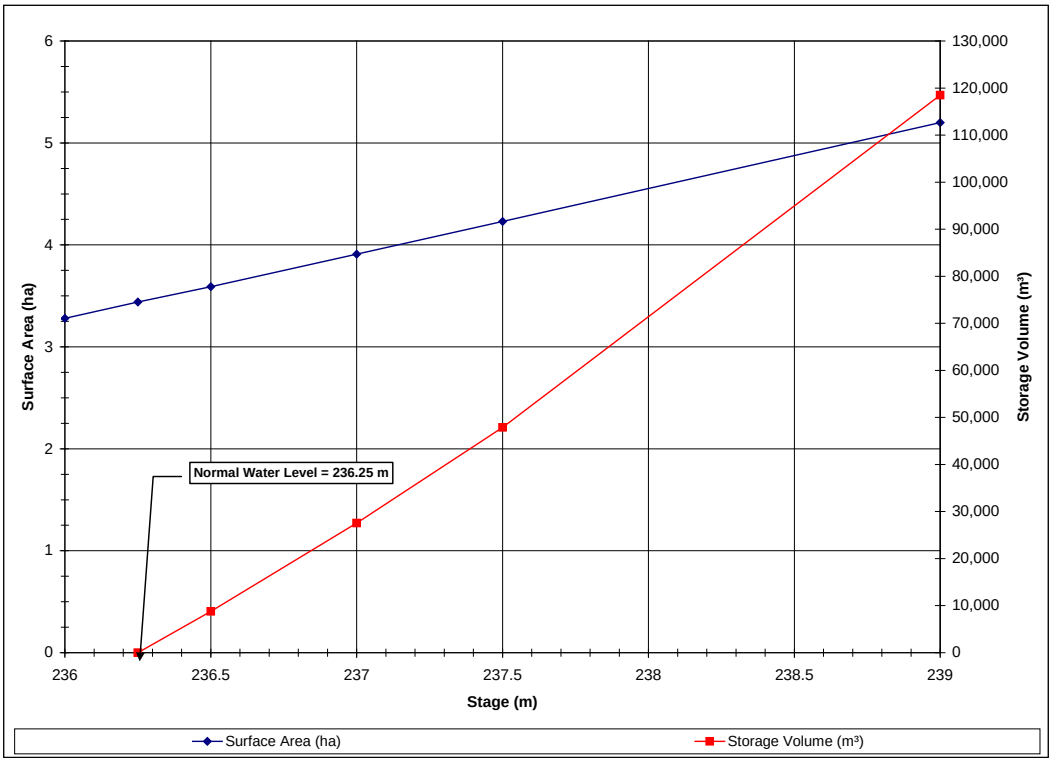


Figure 3 – Stage-Storage curve for proposed South Pond

A small portion of Westport Festival (1.77 ha) will drain directly to the ditch along PTH 1, where it would combine with the pumped outflow from the South Pond and flow into the Camp Manitou Drain. The peak runoff from this small portion of land is 0.17 m³/s, and would need to be drained before the South Pond has begun being pumped to comply with the flow restrictions into Camp Manitou Drain. The details of the required pump, activation/deactivation levels, and the timing of runoff to comply with the flow restrictions into Camp Manitou Drain for a variety of storms must be addressed at the next phase of design. It was found that a 0.25 m³/s pump with an automatic pump activation elevation of 237.00 m would provide enough of a delay in the peak runoff from

the small portion of the Westport Festival for the 5-year MacLaren design storm, resulting in a combined peak flow to the Camp Manitou Drain of 0.254 m³/s.

Grant Mohr of the City of Winnipeg requested that the pond configuration also be tested with the rainfall event that occurred from May 27-30, 2010, when approximately 134 mm of rain fell over a period of three days with a peak intensity of 60 mm/hr (as recorded by the City of Winnipeg at Bernie Wolfe School). With the pumping configuration as defined above the peak level on the pond would reach 238.14 m during this storm event as shown in Figure 4.

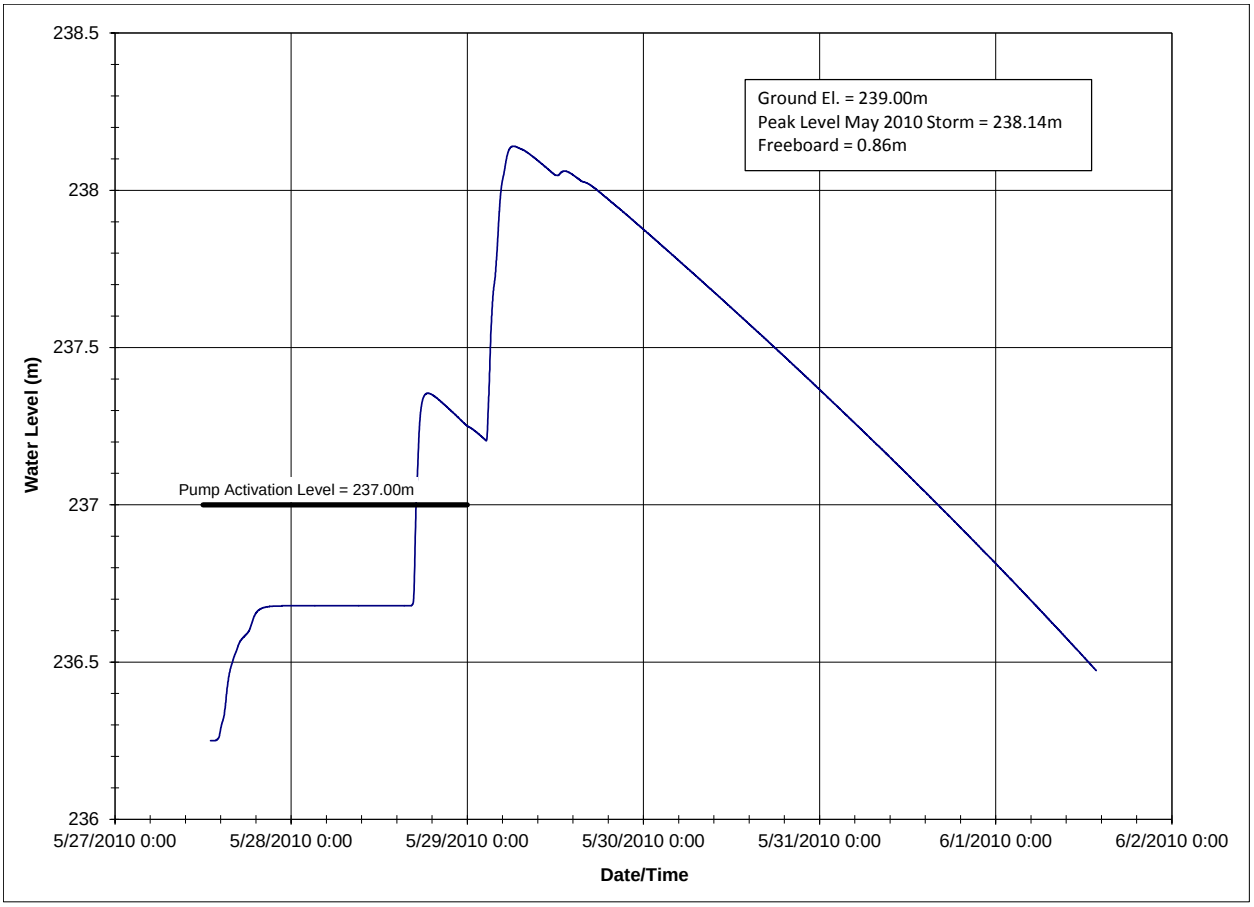


Figure 4 – South Pond Level – May 2010 Storm Simulation

As a result of the proposed land drainage system servicing the RREX Interim Development, portions of the existing catchment area are now draining to the proposed South Pond as part of the Interim Development. The total area draining to the Perimeter Ditch as a result of these proposed changes is 118.74 ha (including the field located between the hacking ring and

Saskatchewan Ave). The peak flow from this area entering the Perimeter Drain for the 5-year storm is 2.12 m^3/s, or approximately 0.15 m^3/s less than the existing condition. With the proposed pumping configuration, the 100 year storm would produce a High Water Level (HWL) on the pond of 237.90 m (1.10 m below ground surface). The rise for the 25 year storm with this configuration is 1.40 m, corresponding to a water level of 237.65 m.

4.3 PROPOSED ULTIMATE DEVELOPMENT

The Ultimate Development area is proposed as a combination of agricultural and recreational land use. An additional retention pond will be added to the west of the proposed Camp Manitou Road extension to serve this Ultimate Development area once plans for the area have been developed. The required size of the additional retention pond has not been determined at this time, and will depend on the final land use of the area. The pond would be sized to accommodate all of the flows from the west of the Camp Manitou Road extension.

Since the details of Ultimate Development area to the west of the Camp Manitou Road extension are not known, only the hydrology of this area was modelled to determine the approximate runoff for costing and future planning purposes. The land was assumed to be 40% impervious with a 1% slope. The total runoff of the Ultimate Development area from the computer simulations using these parameters is 24,000 m^3 for the 5 year storm and 49,200 m^3 for the 100 year storm.

5.0 CONCLUSIONS AND RECOMMENDATIONS

As a result of the proposed Interim Development, the total contributing drainage area of the Red River Exhibition Park and surrounding amenities would increase from 130.55 ha to 284.73 ha, with an increase in impervious area as shown in Table 1 and detailed on Figure 2. The pond will be drained to the Camp Manitou Drain that is owned by the RM of Headingley where an agreement has been made that will allow up to 0.254 m^3/s (9 ft^3/s) to the Camp Manitou Drain. The new retention pond (South Pond) will be approximately 5.2 ha at ground surface and have a normal water level of 236.25 m. The pond will drain via a pump station to a ditch that runs to the culvert across PTH 1 and into the Camp Manitou Drain.

Based on the runoff volumes for the design storms, a pump capacity of 0.25 m^3/s will ensure that the pond is drained to the NWL within 48 hours for the 5-year design storm and within 85 hours for the 100-year design storm. A pump activation level of 237.00 m was chosen for these simulations based on the timing of the peak flows, so that pumping would not occur while the peak flow from the small portion of the Westport Festival Development is entering the Camp Manitou Drain. Details of the pump station and how it is operated will be studied in the next phases of the design once a pump has been chosen and a pumping efficiency curve is provided. The 100-year storm results in a water level on the pond of 237.90 m, providing 1.10 m of freeboard. The maximum rise on the pond for the 25-year design storm is 1.4 m, which is below the maximum specification of 1.8 m. The specifications and simulation results for the pond design are shown in Table 2 below.

TABLE 2

POND DESIGN SPECIFICATIONS

	Specification	Simulation Result
Minimum Depth	2.50 m	2.50 m
Freeboard (100-year storm)	0.90 m	1.10 m
Maximum Rise (25-year storm)	1.80 m	1.40 m
Side Slopes	1V:5H	1V:5H

It should be noted that the calculations show that without any outflow (in the case of a pump failure, for example) the 100-year storm will result in a water level on the pond of 238.14 m (0.86 m freeboard) and a rise of 1.65 m for the 25-year storm to a level of 237.90 m. In the event of a storm that is beyond the design standard (or in the event of a pump failure or downstream capacity issues), the existing ditch that runs east along Highway 1 and empties into the Perimeter Drain at an elevation of approximately 238.00 m will be used as a controlled gravity overflow for use as an emergency measure.

The Ultimate Development area to the west of the Camp Manitou Road extension will be serviced entirely by its own drainage network and an additional pond. At this time, it is expected that this pond would drain to the South Pond where it will be pumped. As part of the ultimate development, additional outflow capacity to accommodate the flows from the additional West Pond must be taken into consideration. The West Pond will be designed in more detail once more is known about the land use for the proposed Ultimate Development area.

6.0 STATEMENT OF LIMITATIONS AND CONDITIONS

6.1 THIRD PARTY USE OF REPORT

This report has been prepared for the Client to whom this report has been addressed and any use a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this report.

FIGURES

R.M. OF HEADINGLEY

CITY OF WINNIPEG

N

PORTAGE AVENUE (PTH 1)

SASKATCHEWAN AVENUE

PERIMETER HIGHWAY (PTH 101)

TO ASSINIBOINE R.

EXISTING POND

A=11.28ha
Imp=50%

A=2.45ha
Imp=60%

TRAILER PAD

A=1.46ha
Imp=90%

A=2.42ha
Imp=60%

RED RIVER EXHIBITION SITE

A=3.09ha
Imp=60%

A=2.81ha
Imp=85%

A=2.16ha
Imp=80%

A=1.10ha
Imp=60%

EXISTING POND

A=4.77ha
Imp=35%

TRAINING RINGS

PAN AM
SHOW RING

A=1.84ha
Imp=50%

A=1.93ha
Imp=15%

BARNS

A=1.08ha
Imp=60%

HACKING RING
A=2.65ha
Imp=30%

PAGE TRACK RD

POINTE WEST AUTOPARK

A=17.65ha
Imp=90%

300 mm ø

A=3.56ha
Imp=0%

MTS ICE PLEX

A=9.46ha
Imp=90%

600 mm ø

A=4.21ha
Imp=90%

300 mm ø

A=4.81ha
Imp=40%

A=8.05ha
Imp=20%

ASSUMED 300 mm ø

A=7.91ha
Imp=20%

A=5.56ha
Imp=20%

ASSUMED 300 mm ø

A=7.06ha
Imp=20%

A=15.82ha
Imp=70%

A=7.42ha
Imp=70%

ASSINIBOIA DOWNS

STABLES

LEGEND

- EXISTING
- DITCH
- CONDUIT
- DIRECTION
- MODEL NODE
- SUBCATCHMENT
- AREA DRAINING OVERLAND TO PERIMETER DITCH (45.22ha)

Notes:

1. The total existing drainage area is approximately 130.55ha.

2. The total existing Red River Exhibition Park area is approximately 74.11ha

PRELIMINARY

NOT TO BE USED FOR CONSTRUCTION

NO.	YY/MM/DD	DESCRIPTION	BY
0	14/03/07	ISSUED WITH FINAL REPORT	DW

REVISIONS / ISSUE

KGS GROUP CONSULTING ENGINEERS

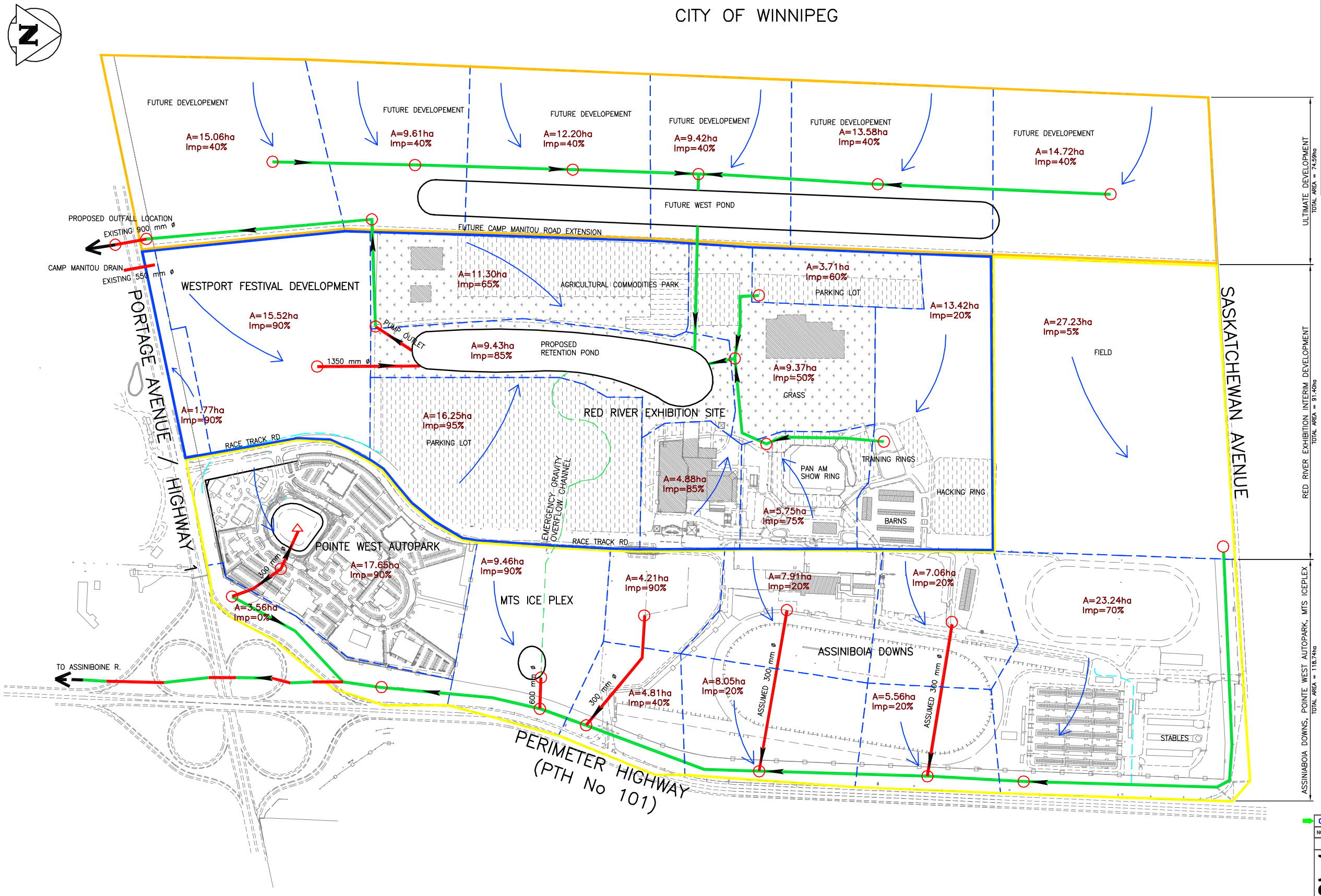
Red River EXHIBITION PARK

RED RIVER EXHIBITION PARK
ENGINEERING COMPONENT
OF PRECINCT PLAN

EXISTING SITE DRAINAGE

MARCH 2014 | FIGURE 1 | REV: 0

R.M. OF HEADINGLEY
CITY OF WINNIPEG



LEGEND

- EXISTING
- DITCH
- CONDUIT (300 mm diameter)
- DIRECTION
- NODE
- SUBCATCHMENT
- ULTIMATE DEVELOPMENT
- INTERIM DEVELOPMENT
- REVISED EXISTING CATCHMENT

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

NO.	YY/MM/DD	DESCRIPTION	BY
0	14/03/07	ISSUED WITH FINAL REPORT	DW

REVISIONS / ISSUE

KGS GROUP CONSULTING ENGINEERS

Red River EXHIBITION PARK

RED RIVER EXHIBITION PARK
ENGINEERING COMPONENT
OF PRECINCT PLAN

FUTURE DEVELOPMENT
PROPOSED SITE DRAINAGE

MARCH 2014 | FIGURE 2 | REV: 0

APPENDICES

APPENDIX A

SUPPORTING DOCUMENTS

Red River Exhibition Site



•Red River Exhibition Site C Values

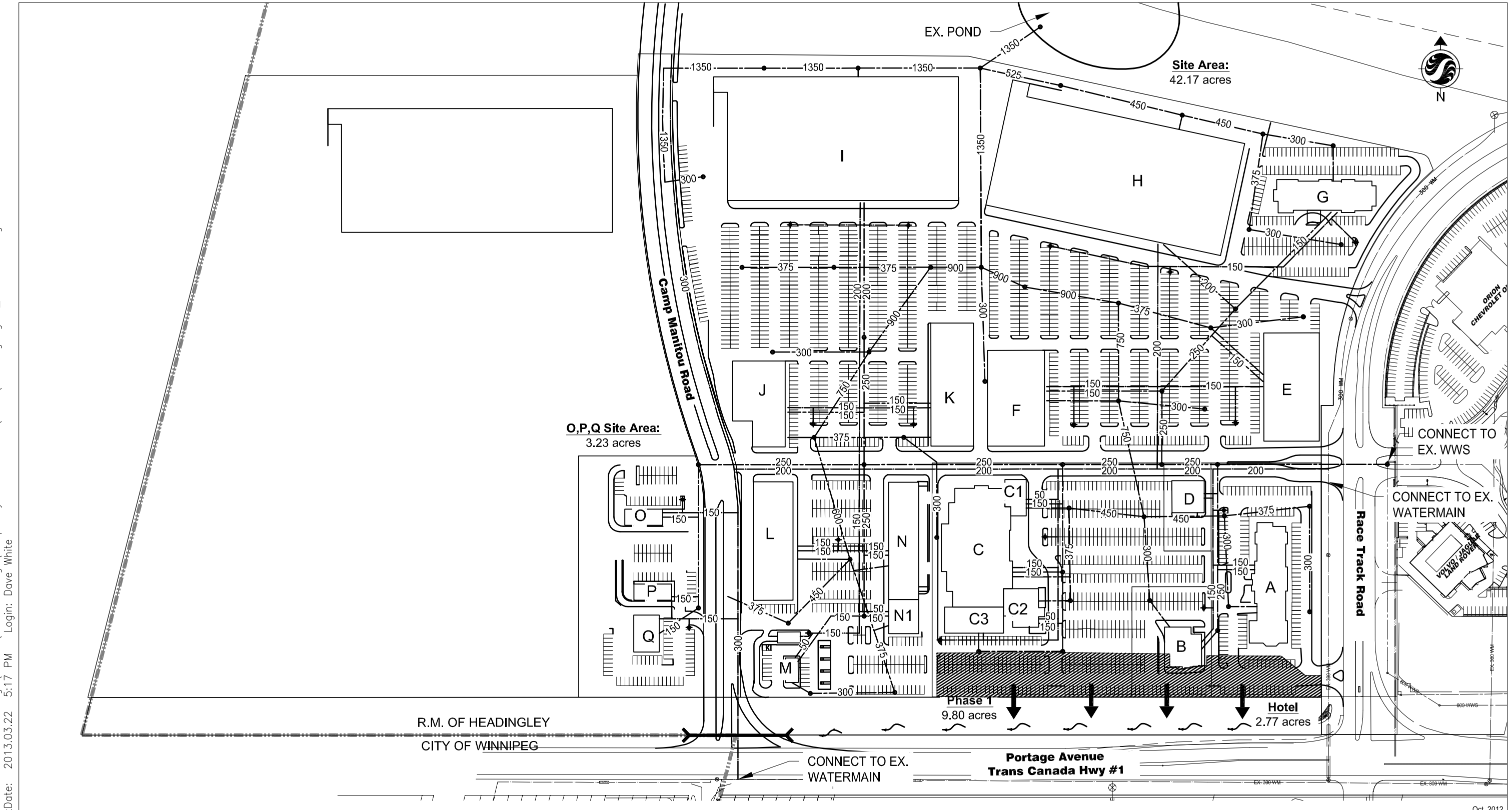
•O:\Land Drainage\Servicing Reports (No SRB)\Precinct Plans\Precinct R - Red River Ex Site\Red River Ex Site C Values 2013 04 08.pdf



POPULOUS®

Red River Exhibition Master Plan

Winnipeg, Manitoba



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Oct, 2012
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EXISTING	LEGEND	PROPOSED
	LAND DRAINAGE SEWER	
	WASTE WATER SEWER	
	WATER MAIN	

Client/Project
SHINDICO
WESTPORT FESTIVAL

Figure No.
2.0

Title
CONCEPTUAL SERVICING PLAN - TOTAL SITE

RED RIVER EXHIBITION ASSOCIATION
SITE DEVELOPMENT
EARTHWORK, DRAINAGE,
SEWERS, WATERMAINS,
PAVEMENTS AND RELATED WORK
PHASE III

PLAN No.	DESCRIPTION
RR-1-549	EXISTING CONDITIONS
RR-2-549	AREA GENERAL LAYOUT
RR-3-549	SITE GENERAL LAYOUT
RR-4-549	300mm WATER SUPPLY LINE STA. 1+00 TO STA. 4+25
RR-5-549	300mm WATER SUPPLY LINE STA. 4+25 TO STA. 7+50
RR-6-549	300mm WATER SUPPLY LINE STA. 7+50 TO STA. 10+58.076
RR-7-549	SEWERS AND WATERMAINS STA. 10+58.076 TO STA. 12+95.809
RR-8-549	SEWERS AND WATERMAINS STA. 1+20.633 TO STA. 4+00
RR-9-549	SEWERS AND WATERMAINS STA. 4+00 TO STA. 6+50
RR-10-549	SEWERS AND WATERMAINS STA. 6+50 TO STA. 8+50
RR-11-549	SEWERS AND WATERMAINS STA. 8+50 TO STA. 9+23
RR-12-549	SEWERS AND WATERMAINS STA. 1+00 TO STA. 2+41.077
RR-13-549	SEWERS AND WATERMAINS STA. 1+00 TO STA. 2+90.500
RR-14-549	DETAILS

IDG Stanley

FILE: D:\ACAD12\DOWNS\MIDWAY\RRE-TITL.DWG 09/03/96 2:07pm SR

PORTAGE AVENUE

DUCK POND

CHAPEL LAWN FUNERAL HOME

ASSUMPTION CEMETERY

EXISTING MAUSOLEUM

EAST PROPERTY LINE
RED RIVER EXHIBITION PARCEL

Ex. 200 WM

1.1ac EXISTING LAKE

EXISTING BERM

EXISTING WARM-UP RING

EXISTING SPECTATOR PAD

EXISTING TREES

EXISTING GRAVEL ROAD

95x30 TENT

EXISTING ASPHALT ROAD

EXISTING ASPHALT PARKING LOT

PADDOCK

EXISTING GRAVEL PARKING LOT

ASPHALT PARKING LOT

Stage

FLAG POLES

ASSINIBOIA DOWNS

PERIMETER HIGHWAY

FILE: D:\ACAD12\HAIPHAM\PORTAGE\RR-2-549.DWG 08/20/96 11:04am hp

NO.	REVISIONS	DATE	BY

PROVINCE OF MANITOBA
D.J. SCOTT
1886
REGISTERED ENGINEER
SEAL

DATE JULY 26, 1996

RED RIVER EXHIBITION ASSOCIATION

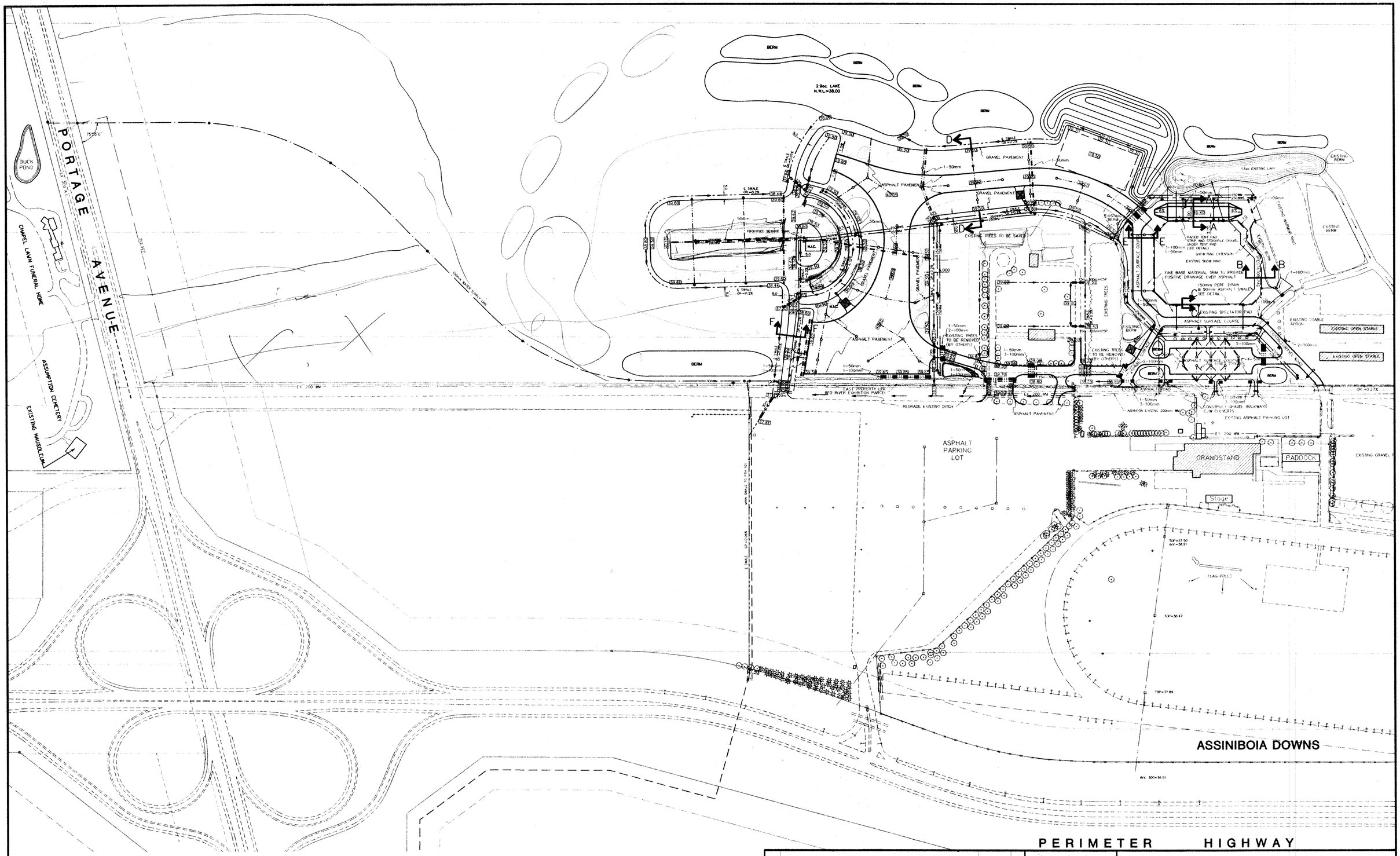
Phase III
Existing Conditions

DESIGNED BY	S.R.
CHECKED BY	S.R.
APPROVED BY	D.J.S.
DRAWN BY	H.P.,S.R.

IDG Stanley
Consulting Engineers & Planners
905 Waverley Street, Winnipeg, Manitoba
Tel 204-489-5900 Fax 204-453-9012

SCALE SCALE 1 : 2000

PLAN NO. RR-1-549



LEGEND

- ACCESS POT
- ACCESS BRANCH
- 250mm/150mm CONDUIT PAIR
- CONDUIT FOR ELECTRICAL (SIZE AS SHOWN)
- CSP CULVERT (SIZE AS SHOWN)
- CATCH POT

NO.	REVISIONS	DATE	BY
2	GENERAL REVISIONS	9/13/96	SR
1	GENERAL REVISIONS	8/2/96	SR

SEAL

DATE JULY 26, 1996

RED RIVER EXHIBITION ASSOCIATION

Area General Layout Phase III

DESIGNED BY	S.R.
CHECKED BY	S.R.
APPROVED BY	D.J.S.
DRAWN BY	H.P.,S.R.
SCALE	1 : 2000
PLAN NO.	RR-2-549

IDG Stanley
Consulting Engineers & Planners
905 Waverley Street, Winnipeg, Manitoba
Tel 204-489-5900 Fax 204-453-9012

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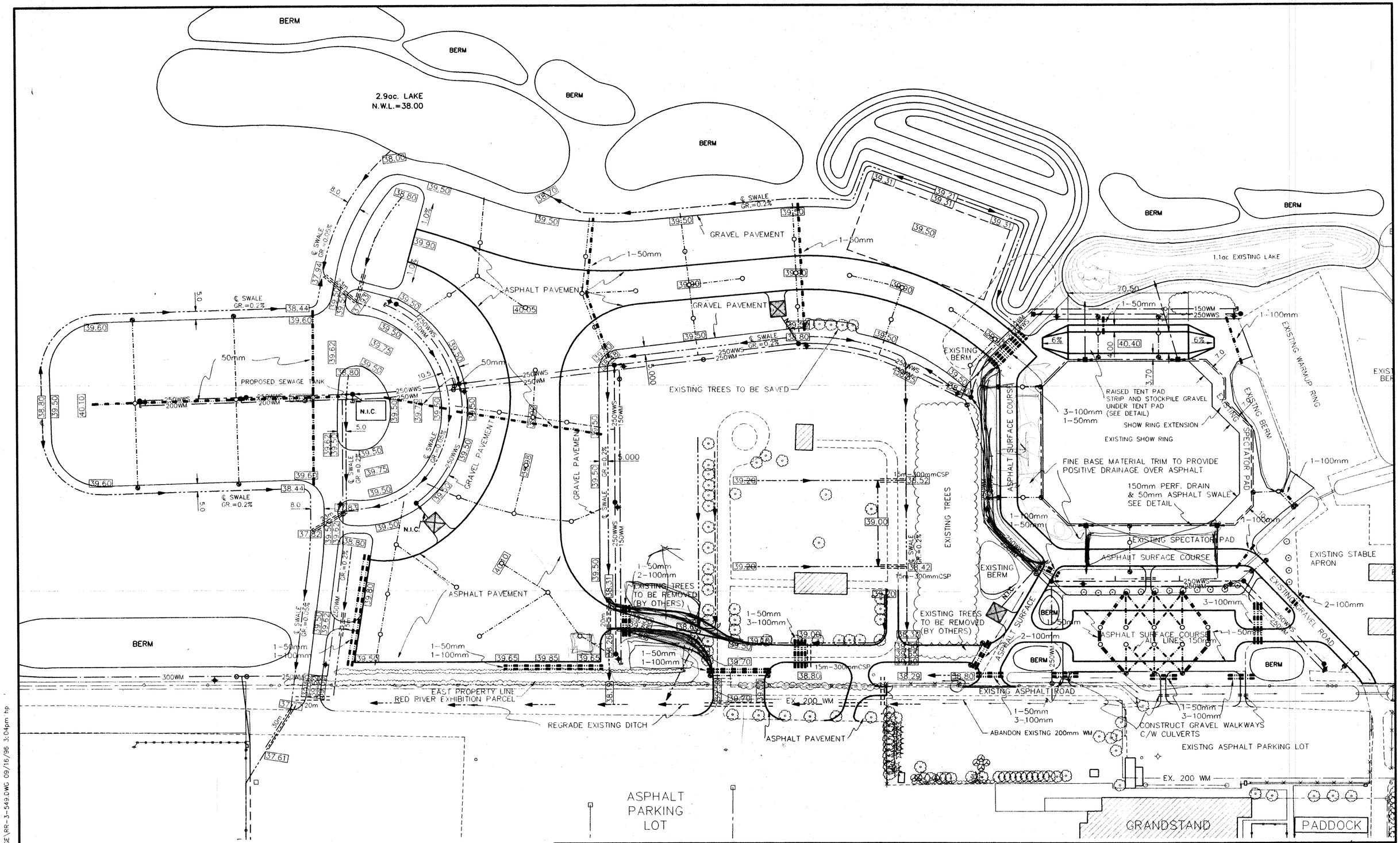

LEGEND

- ACCESS POT
- ACCESS BRANCH
- 250mm/150mm CONDUIT PAIR
- CONDUIT FOR ELECTRICAL (SIZE AS SHOWN)
- CSP CULVERT (SIZE AS SHOWN)
- CATCH POT

NO.	REVISIONS	DATE	BY
3	GENERAL REVISIONS	9/13/96	S.R.
2	RELOCATE LAKE AND BERMS	9/2/96	S.R.
1	GENERAL REVISIONS	8/27/96	S.R.

SEAL

DATE JULY 26, 1996

RED RIVER EXHIBITION ASSOCIATION

Site General Layout Phase III

DESIGNED BY	S.R.
CHECKED BY	S.R.
APPROVED BY	D.J.S.
DRAWN BY	H.P.,S.R.

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Consulting Engineers & Planners
905 Waverley Street, Winnipeg, Manitoba
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SCALE 1 : 1000

PLAN NO. RR-3-549

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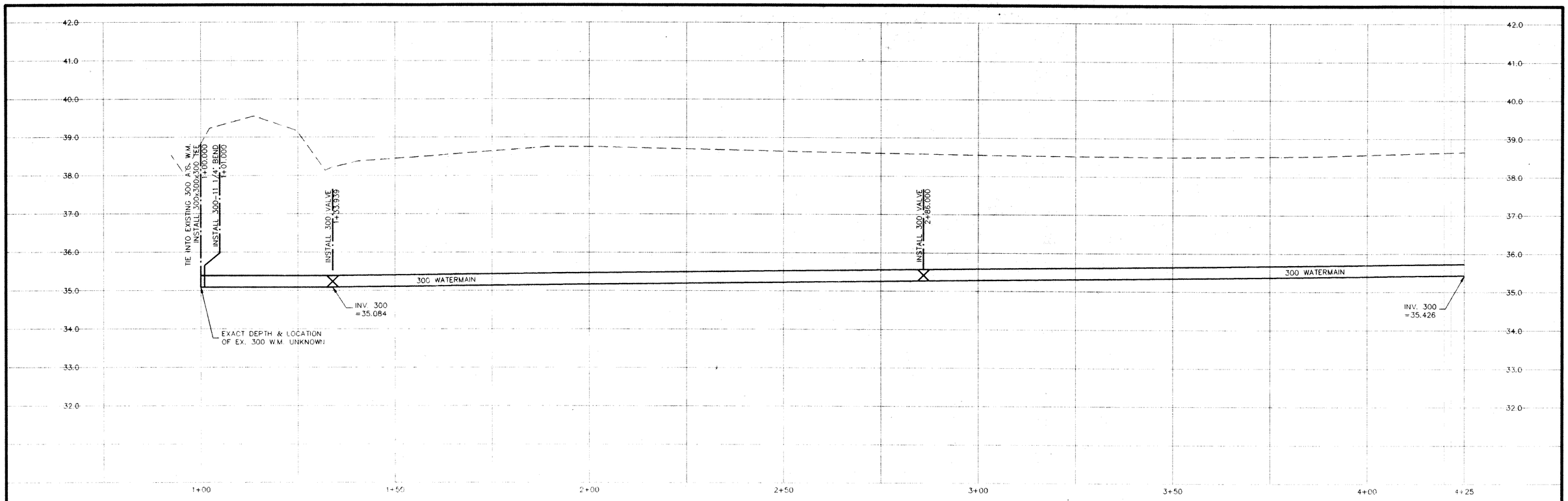

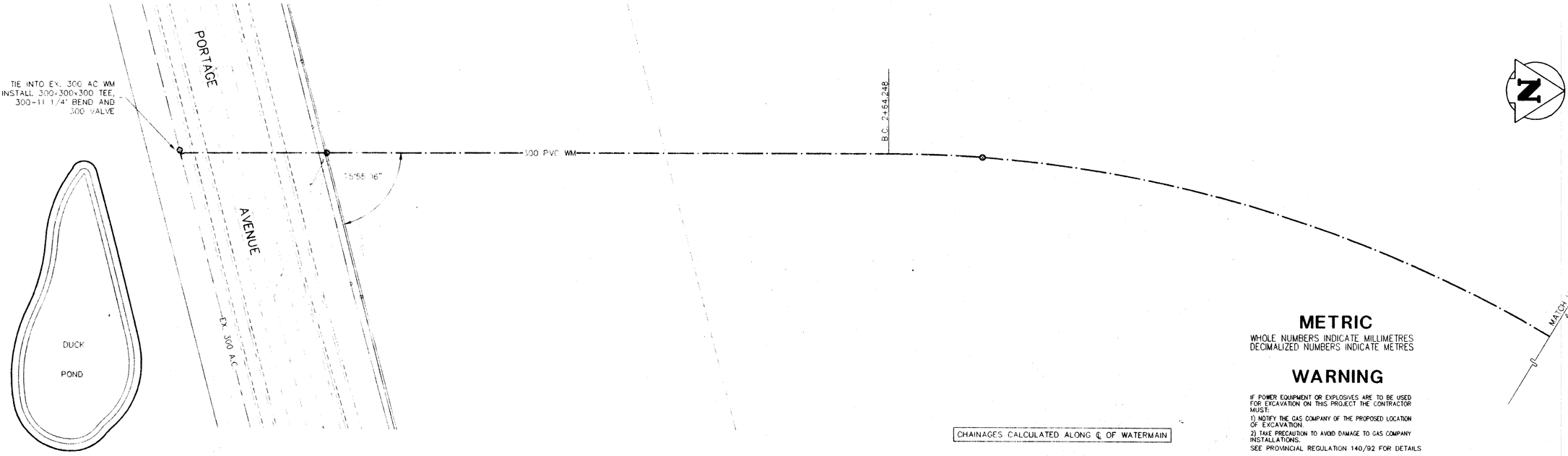

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

WARNING

IF POWER EQUIPMENT OR EXPLOSIVES ARE TO BE USED FOR EXCAVATION ON THIS PROJECT THE CONTRACTOR MUST:

1) NOTIFY THE GAS COMPANY OF THE PROPOSED LOCATION OF EXCAVATION.
2) TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.

SEE PROVINCIAL REGULATION 140/92 FOR DETAILS

NOTES

1. STANDPIPES REQUIRED BETWEEN STA AND STA
2. ALL SEWER HOUSE SERVICES TO BE INSTALLED BELOW STREET WATERMAIN EXCEPT AS NOTED.
3. ALL SEWER HOUSE SERVICES TO BE A MINIMUM OF BELOW AT THE PROPERTY LINE EXCEPT AS NOTED.
4. STREET INTERSECTION FILLETS RADIUS, LANE FILLETS RADIUS EXCEPT AS NOTED.
5. LOCATION AND DEPTH OF EXISTING UNDERGROUND SERVICES AS SHOWN ON DRAWINGS IS APPROXIMATE ONLY. CONTRACTOR SHALL NOTIFY THE RESPECTIVE UTILITIES BEFORE BEGINNING EXCAVATION.
6. BENCH MARK :

EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PLAN	PROPOSED	EXISTING	LEGEND – PROFILE	PROPOSED
150 WM	WATERMAIN	150 WM		M.T.S.		150 WM	WATERMAIN	150 WM
	HYDRANT			CONCRETE			HYDRANT , VALVE	
	VALVE			ASPHALT		300 LDS	LAND DRAINAGE SEWER	300 LDS
300 LDS	LAND DRAINAGE SEWER	300 LDS		SIDEWALK		250 WWS	WASTE WATER SEWER	250 WWS
250 WWS	WASTE WATER SEWER	250 WWS		PROPERTY LINE			℄ PROFILE	
	MANHOLE			SURVEY BAR			NORTH OR WEST GUTTER	
	CATCH BASIN			DITCH			SOUTH OR EAST GUTTER	
	CURB INLET		31.334	ELEVATION	(32.231)		NORTH OR WEST ℄	
	JUNCTIONS						SOUTH OR EAST ℄	
	CULVERT						NORTH OR WEST DITCH	
	FENCES						SOUTH OR EAST DITCH	
	HYDRO							

NO.	REVISIONS	DATE	BY

PROVINCE OF MANITOBA
D. J. SCOTT
21.8.96
REGISTERED ENGINEER
SEAL

DATE AUGUST 6, 1996

RED RIVER EXHIBITION ASSOCIATION

PHASE III
300mm WATER SUPPLY LINE
STA. 1+00 TO STA. 4+25

DESIGNED BY	S.R.
CHECKED BY	D.J.S.
APPROVED BY	D.J.S.
DRAWN BY	S.R

IDG Stanley
Consulting Engineers & Planners
905 Waverley Street, Winnipeg, Manitoba
Tel 204-489-5900 Fax 204-453-9012

SCALE HOR. 1:500
VER. 1:50

PLAN NO. RR-4-549

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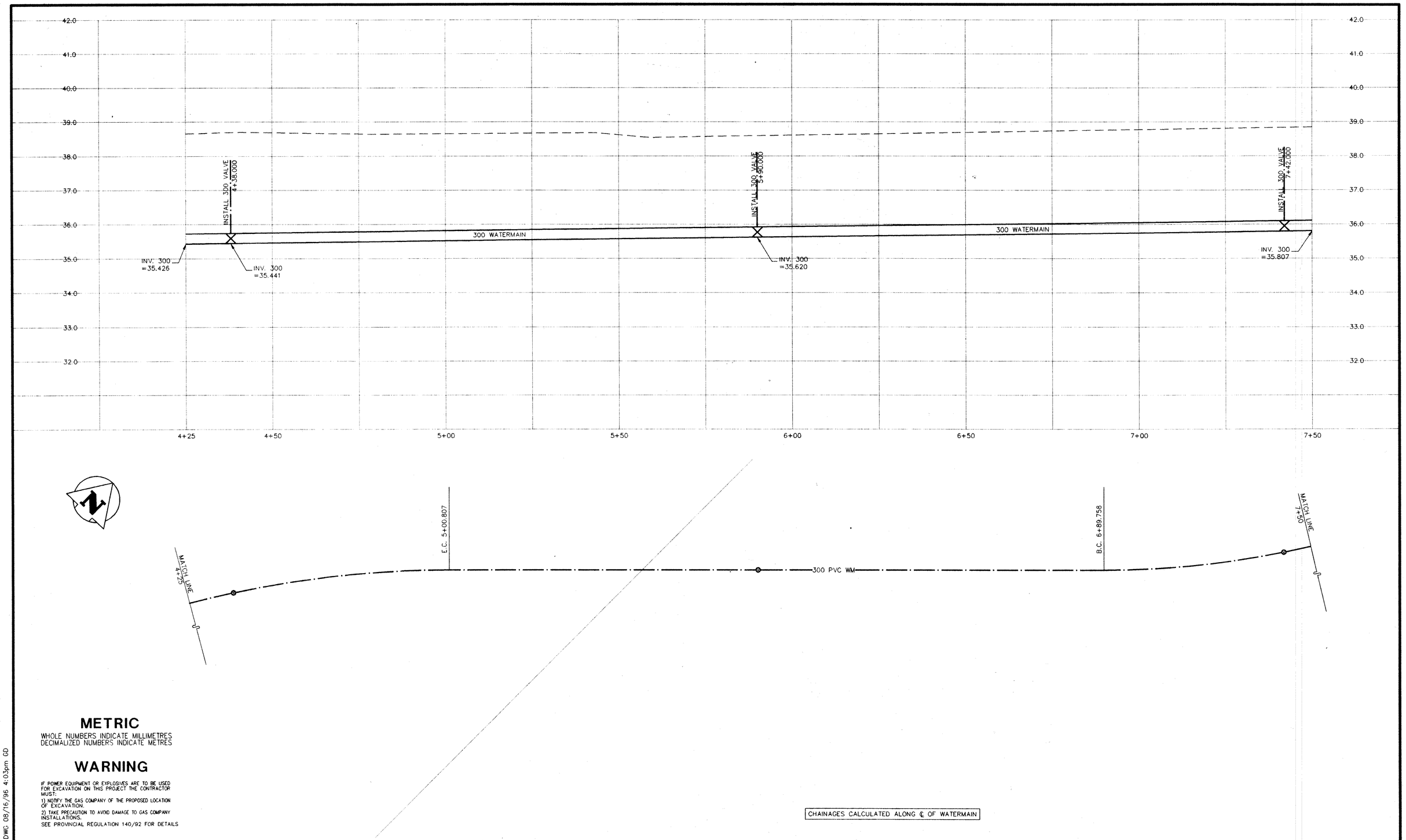

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

WARNING

IF POWER EQUIPMENT OR EXPLOSIVES ARE TO BE USED FOR EXCAVATION ON THIS PROJECT THE CONTRACTOR MUST:
1) NOTIFY THE GAS COMPANY OF THE PROPOSED LOCATION OF EXCAVATION.
2) TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.
SEE PROVINCIAL REGULATION 140/92 FOR DETAILS

CHAINAGES CALCULATED ALONG ℄ OF WATERMAIN

NOTES

1. STANDPIPES REQUIRED BETWEEN STA. AND STA.
2. ALL SEWER HOUSE SERVICES TO BE INSTALLED BELOW STREET WATERMAIN EXCEPT AS NOTED.
3. ALL SEWER HOUSE SERVICES TO BE A MINIMUM OF BURY AT THE PROPERTY LINE EXCEPT AS NOTED.
4. STREET INTERSECTION FILLETS RADIUS, LANE FILLETS RADIUS EXCEPT AS NOTED.
5. LOCATION AND DEPTH OF EXISTING UNDERGROUND SERVICES AS SHOWN ON DRAWINGS IS APPROXIMATE ONLY. CONTRACTOR SHALL NOTIFY THE RESPECTIVE UTILITIES BEFORE BEGINNING EXCAVATION.
6. BENCH MARK :

EXISTING	LEGEND–PLAN	PROPOSED
150 WM	WATERMAIN	150 WM
⊹	HYDRANT	✚
⊗	VALVE	⊗
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
○	MANHOLE	●
□	CATCH BASIN	■
▽	CURB INLET	▼
	JUNCTIONS	
	CULVERT	
	GAS	
	HYDRO	

EXISTING	LEGEND–PLAN	PROPOSED
	M.T.S.	
	CONCRETE	
	ASPHALT	
	SIDEWALK	
	PROPERTY LINE	
⌖	SURVEY BAR	✦
	DITCH	
31.334	ELEVATION	(32.231)

EXISTING	LEGEND–PROFILE	PROPOSED
150 WM	WATERMAIN	150 WM
⊹ ⊗	HYDRANT , VALVE	✚ ⊗
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
×	℄ PROFILE	
⊡	NORTH OR WEST GUTTER	
⊙	SOUTH OR EAST GUTTER	
◇	NORTH OR WEST ℄	
⊙	SOUTH OR EAST ℄	
△	NORTH OR WEST DITCH	
▽	SOUTH OR EAST DITCH	

NO.	REVISIONS	DATE	BY

PROVINCE OF MANITOBA — D. J. SCOTT 21.8.96 — REGISTERED ENGINEER

SEAL

DATE AUGUST 6, 1996

RED RIVER EXHIBITION ASSOCIATION

PHASE III
300mm WATER SUPPLY LINE
STA. 4+25 TO STA. 7+50

DESIGNED BY	S.R.
CHECKED BY	D.J.S.
APPROVED BY	D.J.S.
DRAWN BY	S.R

IDG Stanley
Consulting Engineers & Planners
905 Waverley Street, Winnipeg, Manitoba
Tel 204-489-5900 Fax 204-453-9012

SCALE HOR. 1:500 VER. 1:50

PLAN NO. RR-5-549

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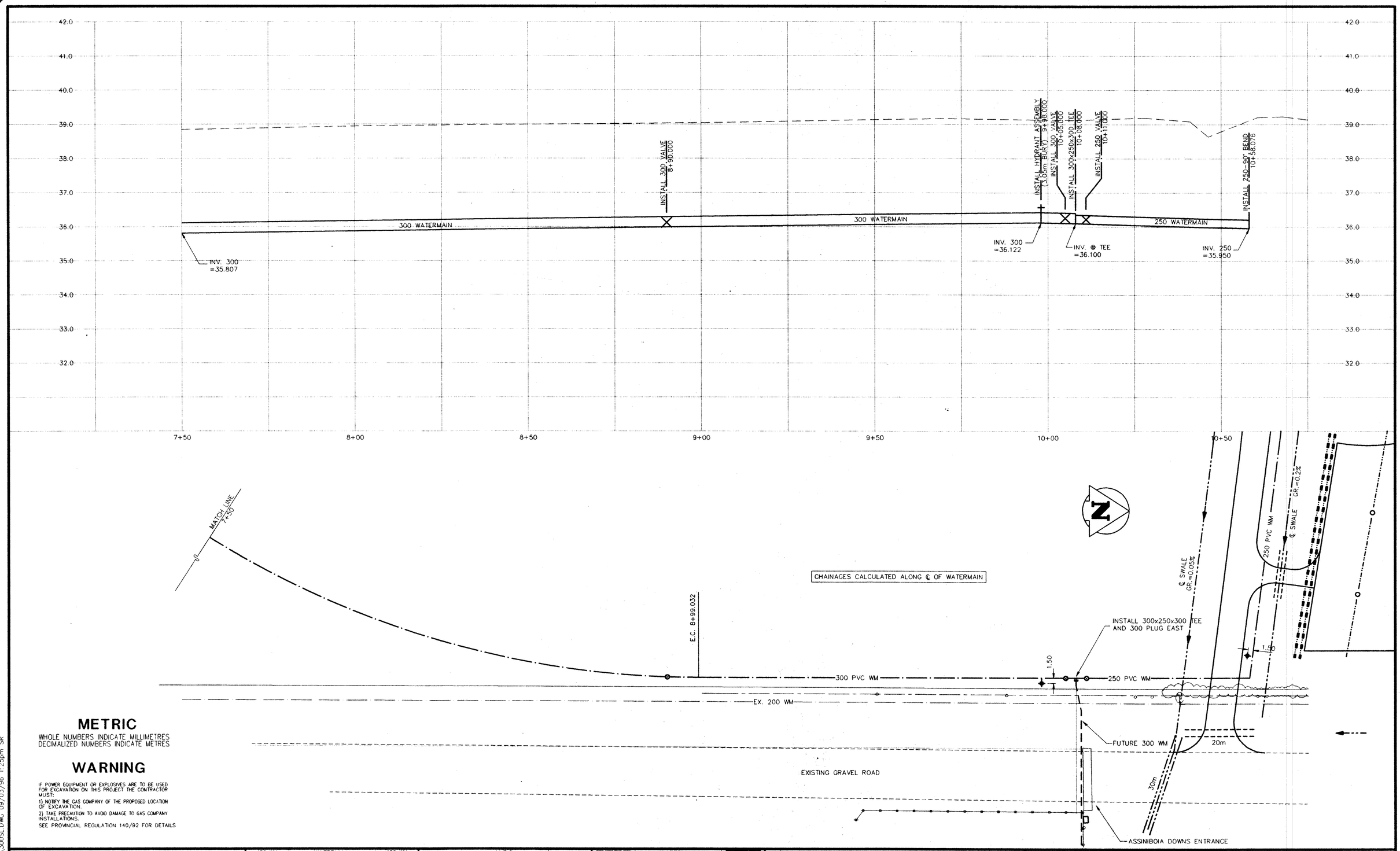

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

WARNING

IF POWER EQUIPMENT OR EXPLOSIVES ARE TO BE USED FOR EXCAVATION ON THIS PROJECT THE CONTRACTOR MUST:

1) NOTIFY THE GAS COMPANY OF THE PROPOSED LOCATION OF EXCAVATION.
2) TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.

SEE PROVINCIAL REGULATION 140/92 FOR DETAILS

NOTES

1. STANDPIPES REQUIRED BETWEEN STA AND STA.
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3. ALL SEWER HOUSE SERVICES TO BE A MINIMUM OF BURY AT THE PROPERTY LINE EXCEPT AS NOTED.
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5. LOCATION AND DEPTH OF EXISTING UNDERGROUND SERVICES AS SHOWN ON DRAWINGS IS APPROXIMATE ONLY. CONTRACTOR SHALL NOTIFY THE RESPECTIVE UTILITIES BEFORE BEGINNING EXCAVATION.
6. BENCH MARK :

EXISTING	LEGEND–PLAN	PROPOSED
150 WM	WATERMAIN	150 WM
✧	HYDRANT	✚
⊗	VALVE	⊗
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
○	MANHOLE	●
□	CATCH BASIN	■
▽	CURB INLET	▼
	JUNCTIONS	
	CULVERT	
	GAS	
	HYDRO	

EXISTING	LEGEND–PLAN	PROPOSED
	M.T.S.	
	CONCRETE	
	ASPHALT	
	SIDEWALK	
	PROPERTY LINE	
⌖	SURVEY BAR	✚
	DITCH	
31.334	ELEVATION	(32.231)

EXISTING	LEGEND–PROFILE	PROPOSED
150 WM	WATERMAIN	150 WM
+ –⊠	HYDRANT , VALVE	+ ⊠
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
×	℄ PROFILE	
⊡	NORTH OR WEST GUTTER	
⊙	SOUTH OR EAST GUTTER	
◇	NORTH OR WEST ℄	
⊙	SOUTH OR EAST ℄	
△	NORTH OR WEST DITCH	
▽	SOUTH OR EAST DITCH	

NO.	REVISIONS	DATE	BY
1	RELOCATED WATERMAIN WEST	9/2/96	SR

PROVINCE OF MANITOBA D.J. SCOTT 16 9 96 REGISTERED ENGINEER

SEAL

DATE AUGUST 6, 1996

RED RIVER EXHIBITION ASSOCIATION

PHASE III
300mm WATER SUPPLY LINE
STA. 7+50 TO STA. 10+58.076

DESIGNED BY	S.R.
CHECKED BY	D.J.S.
APPROVED BY	D.J.S.
DRAWN BY	S.R

IDG Stanley
Consulting Engineers & Planners
905 Waverley Street, Winnipeg, Manitoba
Tel 204-489-5900 Fax 204-453-9012

SCALE HOR 1:500 VER. 1:50

PLAN NO. RR-6-549

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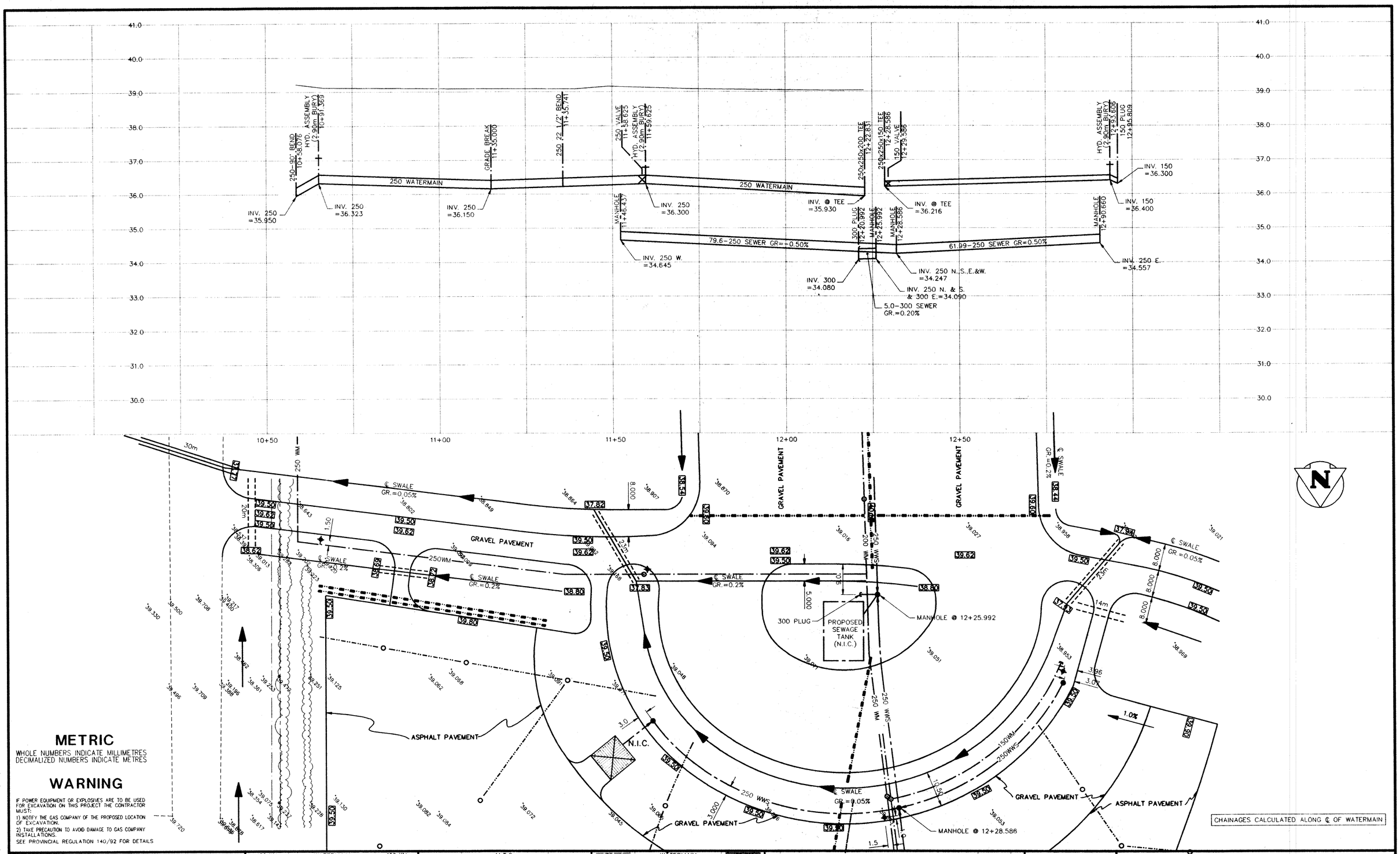

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

WARNING

IF POWER EQUIPMENT OR EXPLOSIVES ARE TO BE USED FOR EXCAVATION ON THIS PROJECT THE CONTRACTOR MUST:

1) NOTIFY THE GAS COMPANY OF THE PROPOSED LOCATION OF EXCAVATION.
2) TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.

SEE PROVINCIAL REGULATION 140/92 FOR DETAILS

NOTES

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6. BENCH MARK :

EXISTING	LEGEND-PLAN	PROPOSED
150 WM	WATERMAIN	150 WM
	HYDRANT	
	VALVE	
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
	MANHOLE	
	CATCH BASIN	
	CURB INLET	
	JUNCTIONS	
	CULVERT	
	GAS	
	HYDRO	

EXISTING	LEGEND-PLAN	PROPOSED
	M.T.S.	
	CONCRETE	
	ASPHALT	
	SIDEWALK	
	PROPERTY LINE	
	SURVEY BAR	
	DITCH	
31.334	ELEVATION	(32.231)

EXISTING	LEGEND-PROFILE	PROPOSED
150 WM	WATERMAIN	150 WM
	HYDRANT , VALVE	
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
	℄ PROFILE	
	NORTH OR WEST GUTTER	
	SOUTH OR EAST GUTTER	
	NORTH OR WEST ℄	
	SOUTH OR EAST ℄	
	NORTH OR WEST DITCH	
	SOUTH OR EAST DITCH	

NO.	REVISIONS	DATE	BY
1	GENERAL REVISIONS	9/2/96	SR

PROVINCE OF MANITOBA — D. J. SCOTT — 16.9.96 — REGISTERED ENGINEER — SEAL

DATE AUGUST 6, 1996

RED RIVER EXHIBITION ASSOCIATION

PHASE III
250mm WATER SUPPLY LINE
STA. 10+58.076 TO STA. 12+95.809

DESIGNED BY	S.R.
CHECKED BY	D.J.S.
APPROVED BY	D.J.S.
DRAWN BY	S.R

IDG Stanley
Consulting Engineers & Planners
905 Waverley Street, Winnipeg, Manitoba
Tel 204-489-5900 Fax 204-453-9012

SCALE HOR. 1:500 VER. 1:50

PLAN NO. RR-7-549

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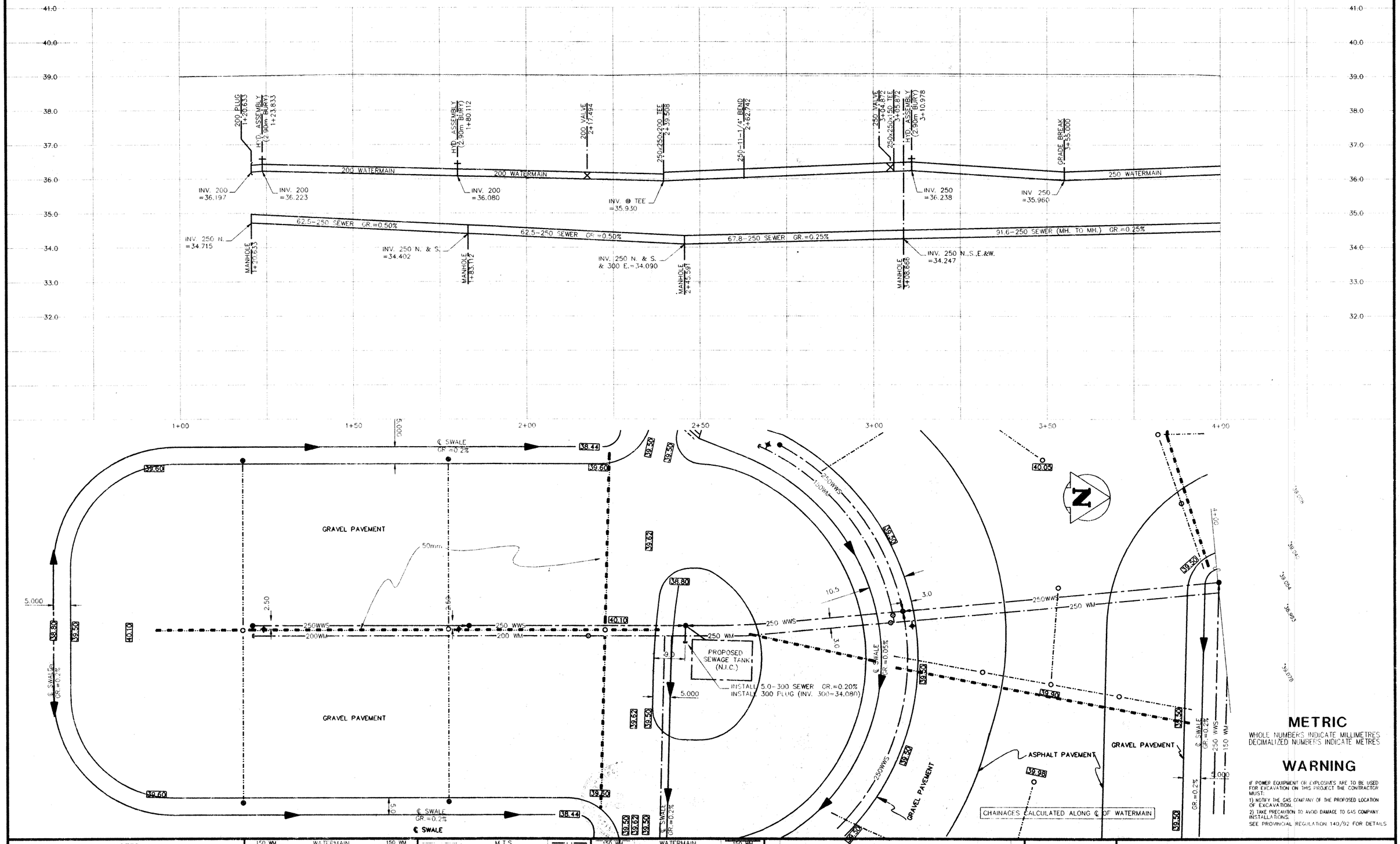

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

WARNING

IF POWER EQUIPMENT OR EXPLOSIVES ARE TO BE USED FOR EXCAVATION ON THIS PROJECT THE CONTRACTOR MUST:
1) NOTIFY THE GAS COMPANY OF THE PROPOSED LOCATION OF EXCAVATION.
2) TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.
SEE PROVINCIAL REGULATION 140/92 FOR DETAILS

NOTES

1. STANDPIPES REQUIRED BETWEEN STA AND STA.
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4. STREET INTERSECTION FILLETS RADIUS, LANE FILLETS RADIUS EXCEPT AS NOTED.
5. LOCATION AND DEPTH OF EXISTING UNDERGROUND SERVICES AS SHOWN ON DRAWINGS IS APPROXIMATE ONLY. CONTRACTOR SHALL NOTIFY THE RESPECTIVE UTILITIES BEFORE BEGINNING EXCAVATION.
6. BENCH MARK :

EXISTING	LEGEND-PLAN	PROPOSED
150 WM	WATERMAIN	150 WM
	HYDRANT	
	VALVE	
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
	MANHOLE	
	CATCH BASIN	
	CURB INLET	
	JUNCTIONS	
	CULVERT	
	GAS	
	HYDRO	

EXISTING	LEGEND-PLAN	PROPOSED
	M.T.S.	
	CONCRETE	
	ASPHALT	
	SIDEWALK	
	PROPERTY LINE	
	SURVEY BAR	
	DITCH	
31.334	ELEVATION	(32.231)

EXISTING	LEGEND-PROFILE	PROPOSED
150 WM	WATERMAIN	150 WM
	HYDRANT , VALVE	
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
	℄ PROFILE	
	NORTH OR WEST GUTTER	
	SOUTH OR EAST GUTTER	
	NORTH OR WEST ℞	
	SOUTH OR EAST ℞	
	NORTH OR WEST DITCH	
	SOUTH OR EAST DITCH	

NO.	REVISIONS	DATE	BY
1	GENERAL REVISIONS	9/3/96	SR

PROFESSIONAL ENGINEERS PROVINCE OF MANITOBA
D. J. SCOTT
16.9.96
SEAL
DATE AUGUST 6, 1996

RED RIVER EXHIBITION ASSOCIATION

PHASE III
SEWERS and WATERMAINS
STA. 1+20.633 TO STA. 4+00

DESIGNED BY	S.R.
CHECKED BY	D.J.S.
APPROVED BY	D.J.S.
DRAWN BY	S.R , G.D.

IDG Stanley
Consulting Engineers & Planners
905 Waverley Street, Winnipeg, Manitoba
Tel 204-489-5900 Fax 204-453-9012

SCALE HOR. 1:500 VER. 1:50
PLAN NO. RR-8-549

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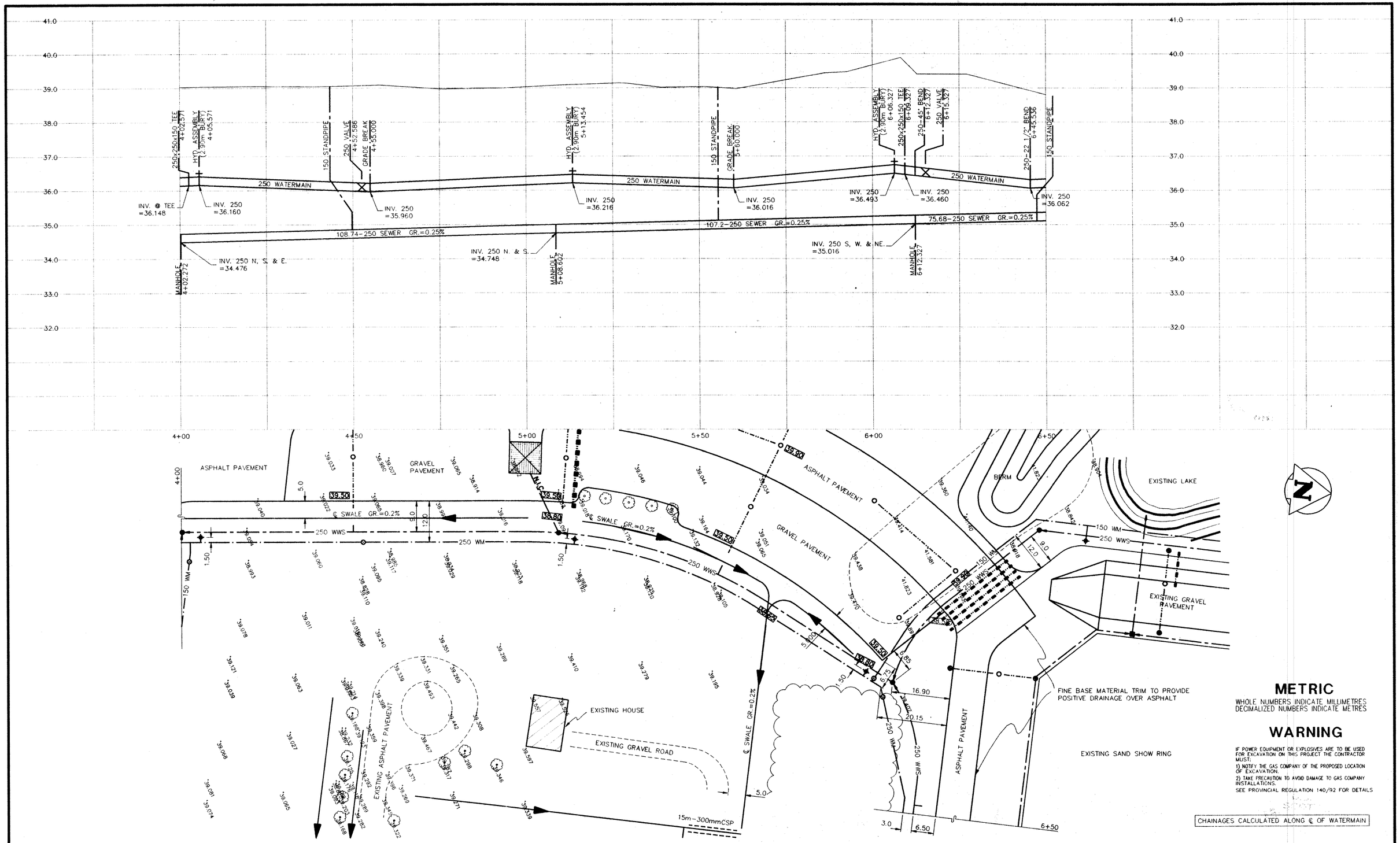

NOTES

1. STANDPIPES REQUIRED BETWEEN STA. AND STA.
2. ALL SEWER HOUSE SERVICES TO BE INSTALLED BELOW STREET WATERMAIN EXCEPT AS NOTED.
3. ALL SEWER HOUSE SERVICES TO BE A MINIMUM OF BURY AT THE PROPERTY LINE EXCEPT AS NOTED.
4. STREET INTERSECTION FILLETS. RADIUS, LANE FILLETS RADIUS EXCEPT AS NOTED.
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6. BENCH MARK :

EXISTING	LEGEND--PLAN	PROPOSED
150 WM	WATERMAIN	150 WM
✧	HYDRANT	+
⊗	VALVE	⊗
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
○	MANHOLE	●
□	CATCH BASIN	■
▽	CURB INLET	▼
	JUNCTIONS	
	CULVERT	
	GAS	
	HYDRO	

EXISTING	LEGEND--PLAN	PROPOSED
	M.T.S.	
	CONCRETE	
	ASPHALT	
	SIDEWALK	
	PROPERTY LINE	
⊕	SURVEY BAR	✦
→	DITCH	→
31.334	ELEVATION	(32.231)

EXISTING	LEGEND--PROFILE	PROPOSED
150 WM	WATERMAIN	150 WM
⊥ ⊠	HYDRANT , VALVE	+ ⊠
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
×	℄ PROFILE	
⊡	NORTH OR WEST GUTTER	
⊙	SOUTH OR EAST GUTTER	
◇	NORTH OR WEST ℄	
⊙	SOUTH OR EAST ℄	
△	NORTH OR WEST DITCH	
▽	SOUTH OR EAST DITCH	

NO.	REVISIONS	DATE	BY

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

WARNING

IF POWER EQUIPMENT OR EXPLOSIVES ARE TO BE USED FOR EXCAVATION ON THIS PROJECT THE CONTRACTOR MUST:

1) NOTIFY THE GAS COMPANY OF THE PROPOSED LOCATION OF EXCAVATION.
2) TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.

SEE PROVINCIAL REGULATION 140/92 FOR DETAILS

CHAINAGES CALCULATED ALONG ℄ OF WATERMAIN

SEAL

DATE AUGUST 6, 1996

RED RIVER EXHIBITION ASSOCIATION

PHASE III
SEWERS and WATERMAINS
STA. 4+00 TO STA. 6+50

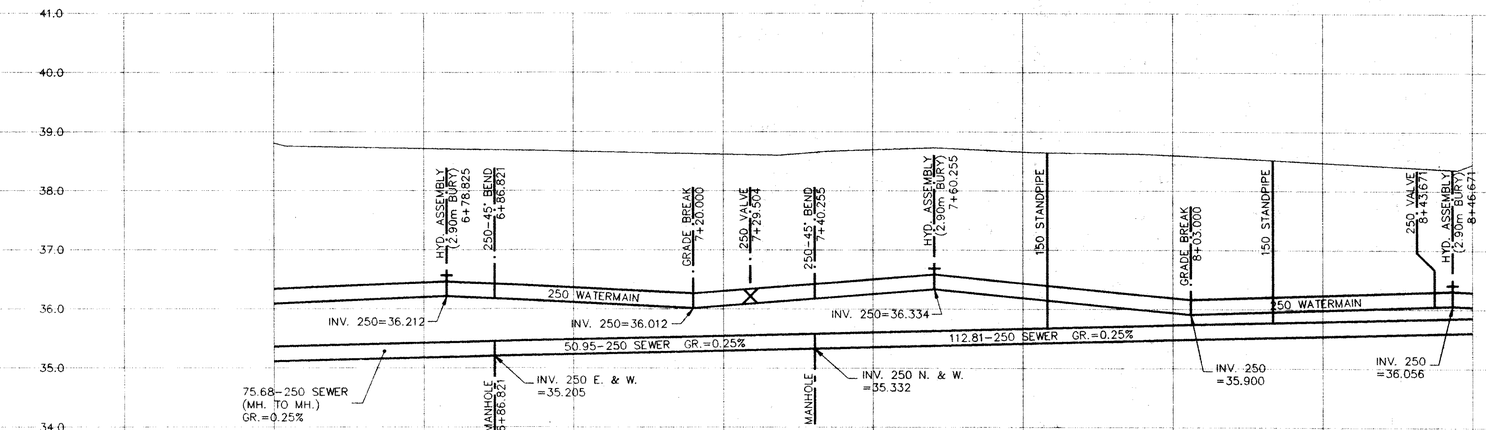
DESIGNED BY	S.R.
CHECKED BY	D.J.S.
APPROVED BY	D.J.S.
DRAWN BY	S.R

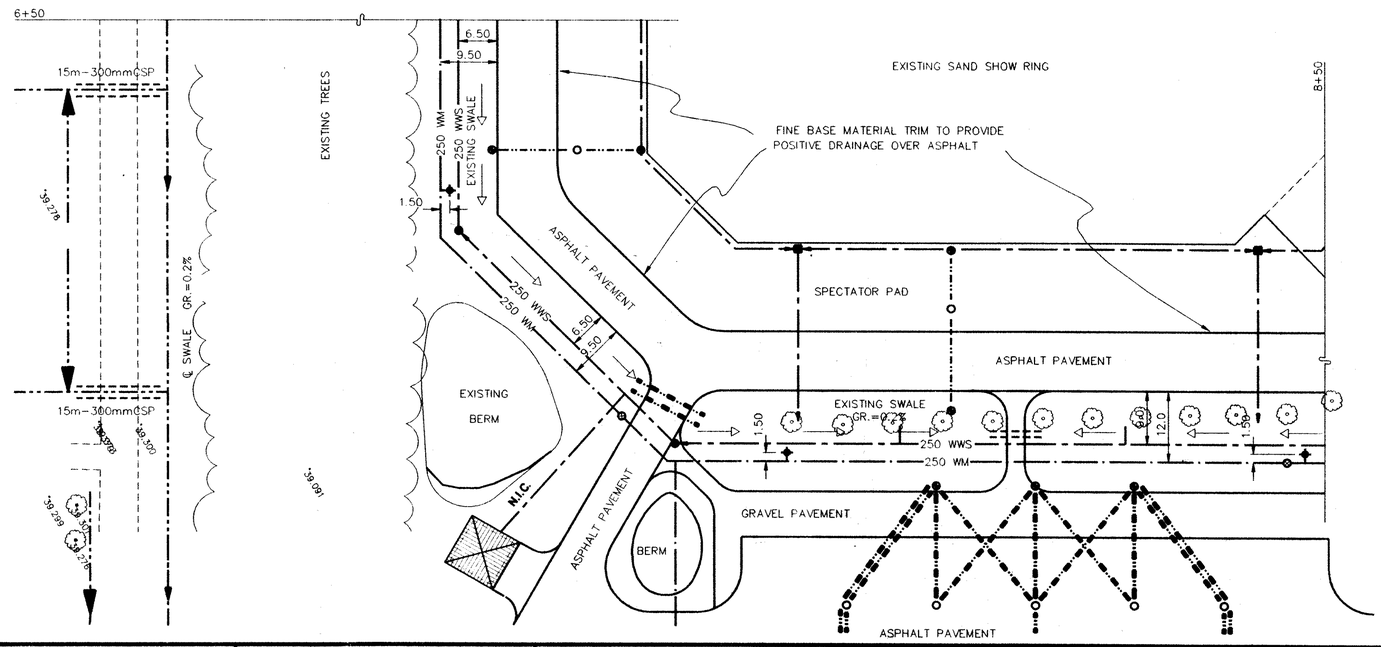
IDG Stanley
Consulting Engineers & Planners
905 Waverley Street, Winnipeg, Manitoba
Tel 204-489-5900 Fax 204-453-9012

SCALE HOR. 1:500 VER. 1:50

PLAN NO. RR-9-549

FILE: D:\ACAD12\DOWNS\MIDWAY\RR-9-549.DWG 09/15/96 12:29pm SR





METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

WARNING

IF POWER EQUIPMENT OR EXPLOSIVES ARE TO BE USED FOR EXCAVATION ON THIS PROJECT THE CONTRACTOR MUST:

1) NOTIFY THE GAS COMPANY OF THE PROPOSED LOCATION OF EXCAVATION.
2) TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.

SEE PROVINCIAL REGULATION 140/92 FOR DETAILS

CHAINAGES CALCULATED ALONG ℄ OF WATERMAIN

NOTES

1. STANDPIPES REQUIRED BETWEEN STA AND STA.
2. ALL SEWER HOUSE SERVICES TO BE INSTALLED BELOW STREET WATERMAIN EXCEPT AS NOTED.
3. ALL SEWER HOUSE SERVICES TO BE A MINIMUM OF BURY AT THE PROPERTY LINE EXCEPT AS NOTED.
4. STREET INTERSECTION FILLETS RADIUS, LANE FILLETS RADIUS EXCEPT AS NOTED.
5. LOCATION AND DEPTH OF EXISTING UNDERGROUND SERVICES AS SHOWN ON DRAWINGS IS APPROXIMATE ONLY. CONTRACTOR SHALL NOTIFY THE RESPECTIVE UTILITIES BEFORE BEGINNING EXCAVATION.
6. BENCH MARK :

EXISTING	LEGEND-PLAN	PROPOSED
150 WM	WATERMAIN	150 WM
✧	HYDRANT	✦
⊗	VALVE	⊗
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
○	MANHOLE	●
□	CATCH BASIN	■
▽	CURB INLET	▼
+-+-+	JUNCTIONS	+-+-+
⊏⊐⊏⊐	CULVERT	⊏⊐⊏⊐
GAS	GAS	GAS
HYDRO	HYDRO	HYDRO

EXISTING	LEGEND-PLAN	PROPOSED
	M.T.S.	
	CONCRETE	
	ASPHALT	
	SIDEWALK	
	PROPERTY LINE	
⌖	SURVEY BAR	⌖
→	DITCH	→
31.334	ELEVATION	(32.231)

EXISTING	LEGEND-PROFILE	PROPOSED
150 WM	WATERMAIN	150 WM
⊥	HYDRANT , VALVE	⊥
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
×	℄ PROFILE	
⊡	NORTH OR WEST GUTTER	
⊙	SOUTH OR EAST GUTTER	
◇	NORTH OR WEST ℄	
⊙	SOUTH OR EAST ℄	
△	NORTH OR WEST DITCH	
▽	SOUTH OR EAST DITCH	

NO.	REVISIONS	DATE	BY
1	GENERAL REVISIONS	9/15/96	S.R

16.9.96

SEAL

DATE AUGUST 6, 1996

RED RIVER EXHIBITION ASSOCIATION

PHASE III
SEWERS and WATERMAINS
STA. 6+50 TO STA. 8+50

DESIGNED BY	S.R.
CHECKED BY	D.J.S.
APPROVED BY	D.J.S.
DRAWN BY	S.R

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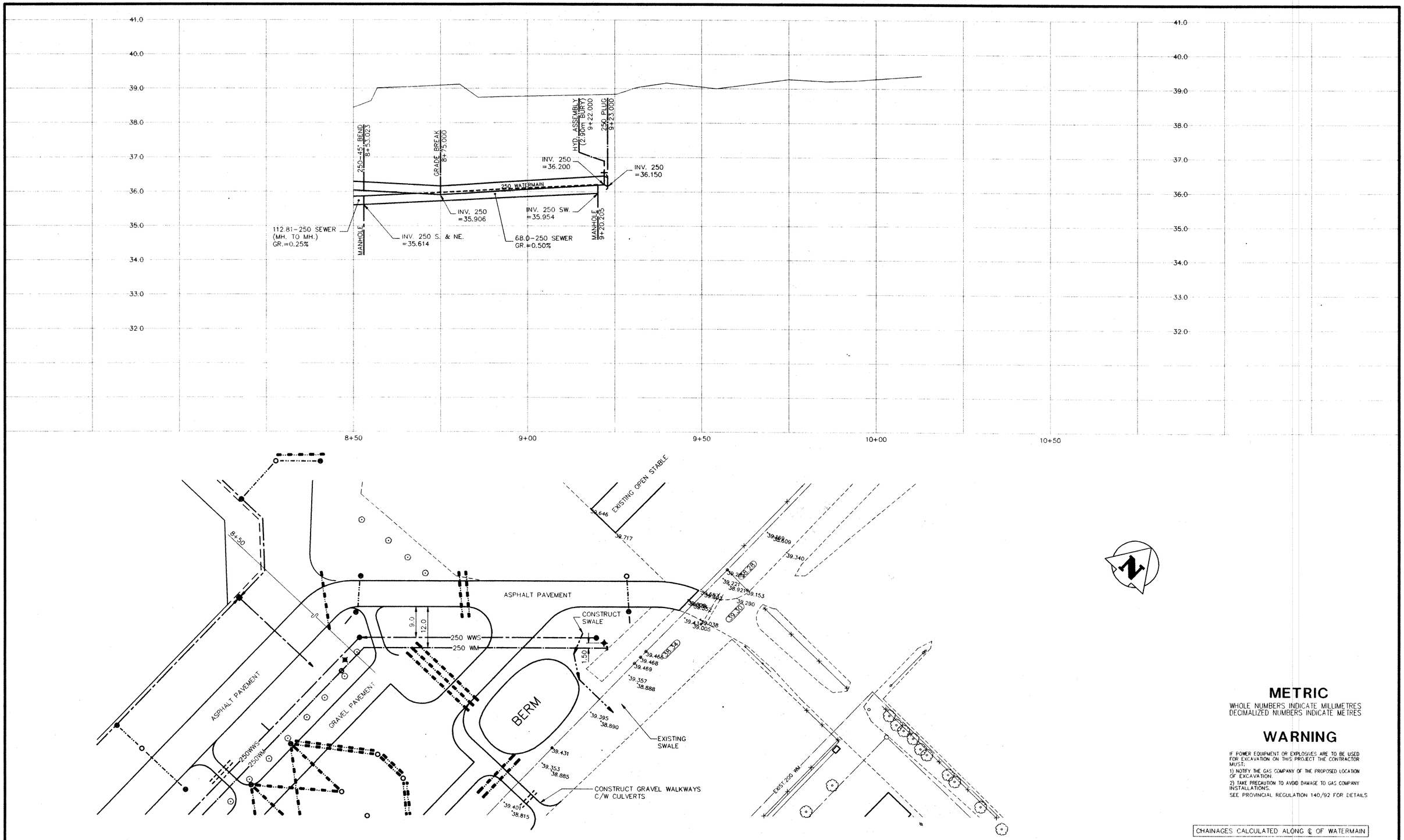
SCALE HOR. 1:500 VER. 1:50

PLAN NO. RR-10-549



METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

WARNING

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CHAINAGES CALCULATED ALONG ℄ OF WATERMAIN

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6. BENCH MARK :

EXISTING	LEGEND–PLAN	PROPOSED
150 WM	WATERMAIN	150 WM
☆	HYDRANT	✚
⊗	VALVE	⊗
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
○	MANHOLE	●
□	CATCH BASIN	■
▽	CURB INLET	▼
	JUNCTIONS	
	CULVERT	
	GAS	
	HYDRO	

EXISTING	LEGEND–PLAN	PROPOSED
	M.T.S.	
	CONCRETE	
	ASPHALT	
	SIDEWALK	
	PROPERTY LINE	
⌖	SURVEY BAR	✦
	DITCH	
31.334	ELEVATION	(32.231)

EXISTING	LEGEND–PROFILE	PROPOSED
150 WM	WATERMAIN	150 WM
±	HYDRANT , VALVE	✚
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
×	℄ PROFILE	
⊡	NORTH OR WEST GUTTER	
⊙	SOUTH OR EAST GUTTER	
◇	NORTH OR WEST ℄	
⊙	SOUTH OR EAST ℄	
△	NORTH OR WEST DITCH	
▽	SOUTH OR EAST DITCH	

NO.	REVISIONS	DATE	BY
1	GENERAL REVISIONS	9/15/96	S.R

SEAL

DATE AUGUST 6, 1996

RED RIVER EXHIBITION ASSOCIATION

PHASE III
SEWERS and WATERMAINS
STA. 8+50 TO STA. 9+23.000

DESIGNED BY	S.R.
CHECKED BY	D.J.S.
APPROVED BY	D.J.S.
DRAWN BY	S.R

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SCALE HOR. 1:500 VER. 1:50

PLAN NO. RR-11-549

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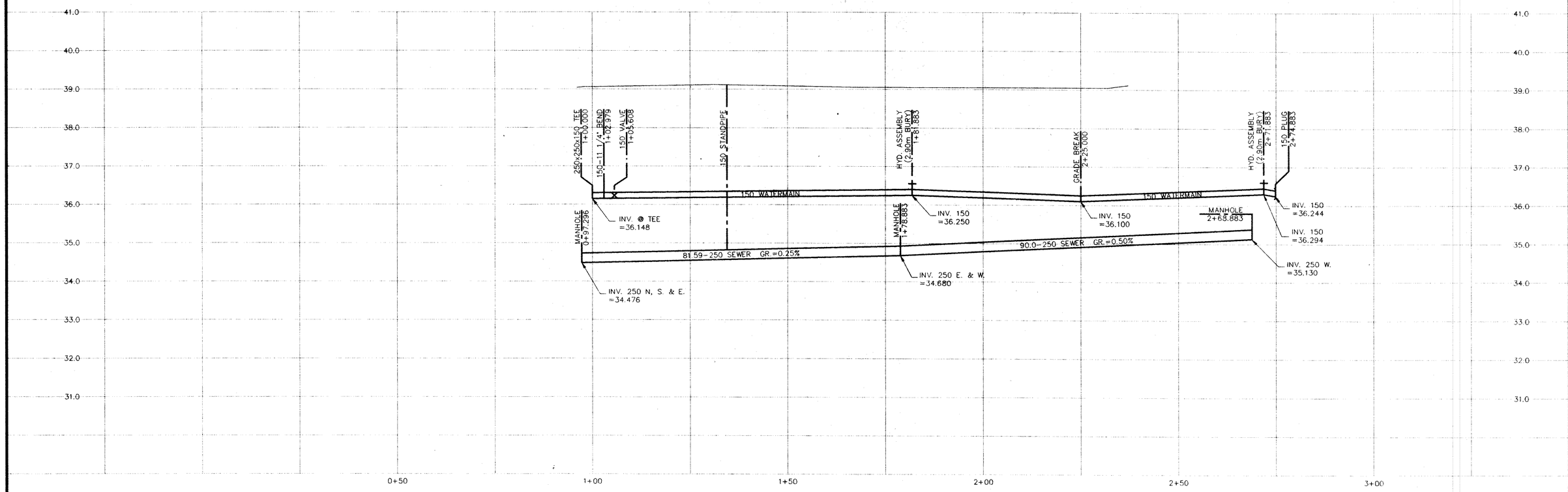

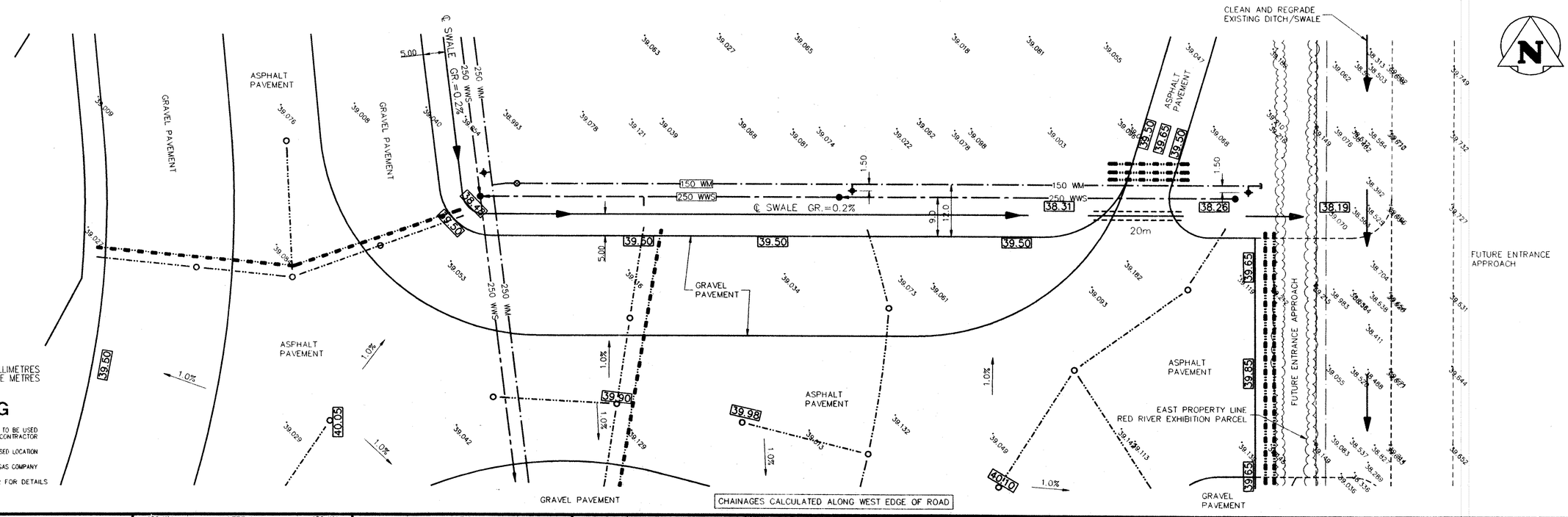

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DECIMALIZED NUMBERS INDICATE METRES

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150 WM	WATERMAIN	150 WM
	HYDRANT	
	VALVE	
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
	MANHOLE	
	CATCH BASIN	
	CURB INLET	
	JUNCTIONS	
	CULVERT	
	GAS	
	HYDRO	

EXISTING	LEGEND-PLAN	PROPOSED
	M.T.S.	
	CONCRETE	
	ASPHALT	
	SIDEWALK	
	PROPERTY LINE	
	SURVEY BAR	
	DITCH	
31.334	ELEVATION	(32.230)

EXISTING	LEGEND-PROFILE	PROPOSED
150 WM	WATERMAIN	150 WM
	HYDRANT, VALVE	
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
	℄ PROFILE	
	NORTH OR WEST GUTTER	
	SOUTH OR EAST GUTTER	
	NORTH OR WEST ℄	
	SOUTH OR EAST ℄	
	NORTH OR WEST DITCH	
	SOUTH OR EAST DITCH	

NO.	REVISIONS	DATE	BY
1	GENERAL REVISIONS	9/15/96	S.R

SEAL
DATE AUGUST 6, 1996

RED RIVER EXHIBITION ASSOCIATION

PHASE III
SEWERS and WATERMAINS
STA. 1+00 TO STA. 2+41.077

DESIGNED BY	S.R.
CHECKED BY	D.J.S.
APPROVED BY	D.J.S.
DRAWN BY	S.R

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SCALE HOR. 1:500 VER. 1:50
PLAN NO. RR-12-549

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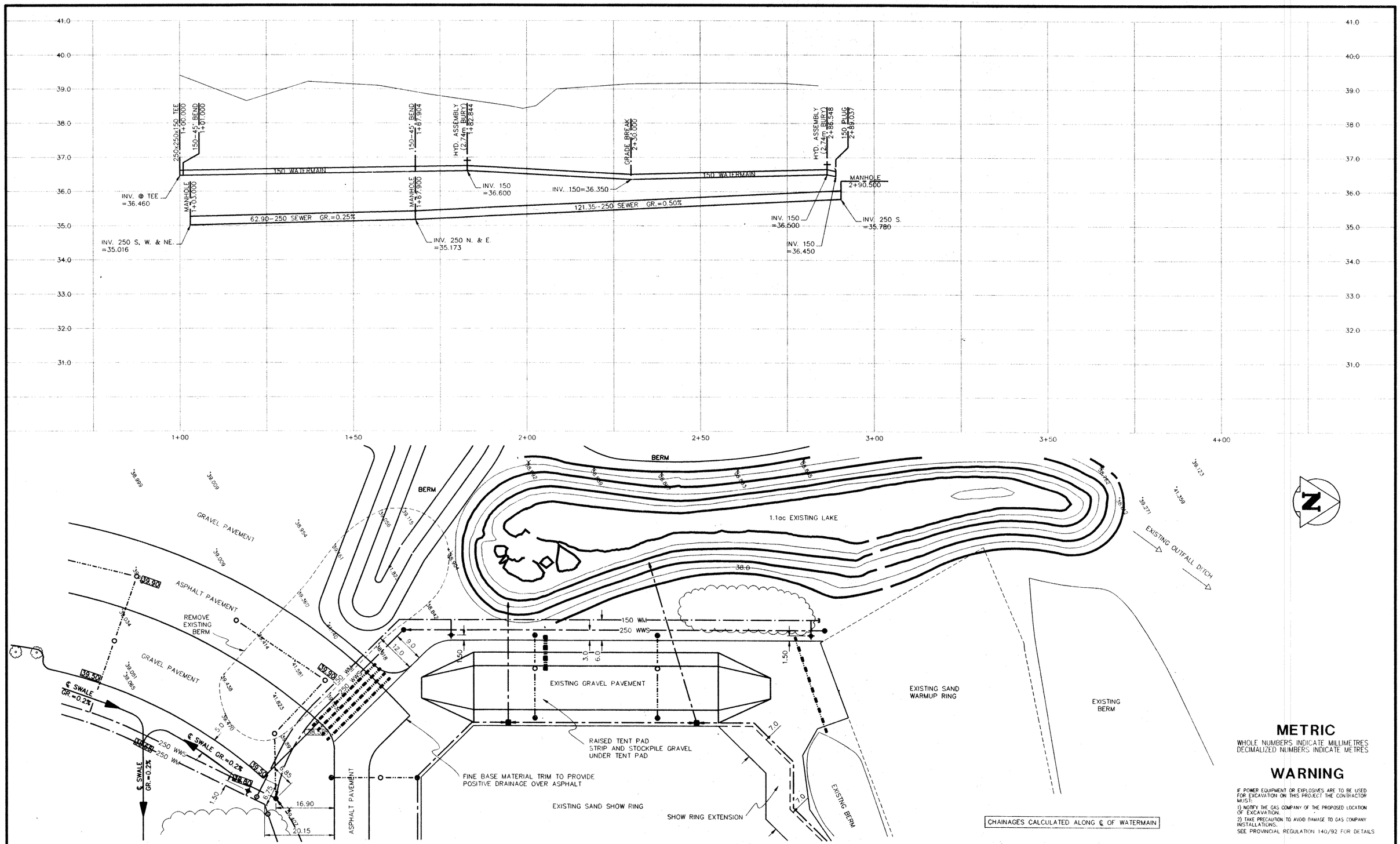

METRIC

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DECIMALIZED NUMBERS INDICATE METRES

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EXISTING	LEGEND—PLAN	PROPOSED
150 WM	WATERMAIN	150 WM
	HYDRANT	
	VALVE	
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
	MANHOLE	
	CATCH BASIN	
	CURB INLET	
	JUNCTIONS	
	CULVERT	
	GAS	
	HYDRO	

EXISTING	LEGEND—PLAN	PROPOSED
	M.T.S.	
	CONCRETE	
	ASPHALT	
	SIDEWALK	
	PROPERTY LINE	
	SURVEY BAR	
	DITCH	
31.334	ELEVATION	(32.230)

EXISTING	LEGEND—PROFILE	PROPOSED
150 WM	WATERMAIN	150 WM
	HYDRANT , VALVE	
300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS
	℄ PROFILE	
	NORTH OR WEST GUTTER	
	SOUTH OR EAST GUTTER	
	NORTH OR WEST ℄	
	SOUTH OR EAST ℄	
	NORTH OR WEST DITCH	
	SOUTH OR EAST DITCH	

NO.	REVISIONS	DATE	BY
1	GENERAL REVISIONS	9/15/96	S.R

SEAL
16.9.96
DATE AUGUST 6. 1996

RED RIVER EXHIBITION ASSOCIATION

PHASE III
SEWERS and WATERMAINS
STA. 1+00 TO STA. 2+90.500

DESIGNED BY	S.R.
CHECKED BY	D.J.S.
APPROVED BY	D.J.S.
DRAWN BY	S.R

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SCALE HOR. 1:500 VER. 1:50
PLAN NO. RR-13-549

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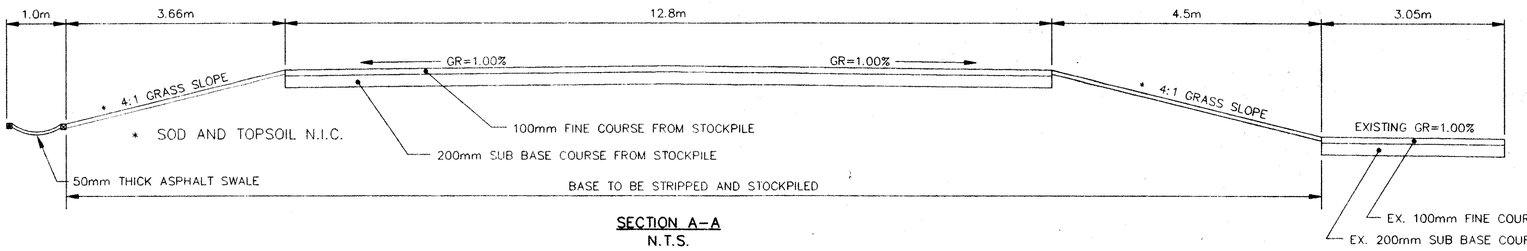

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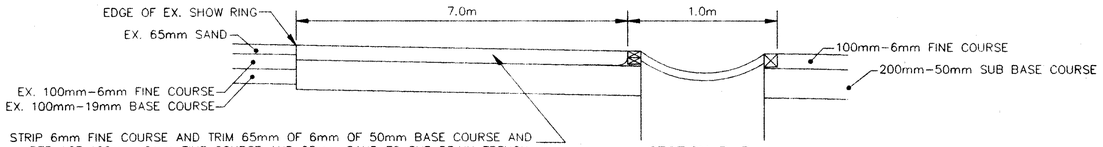

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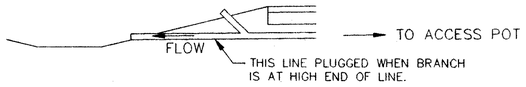
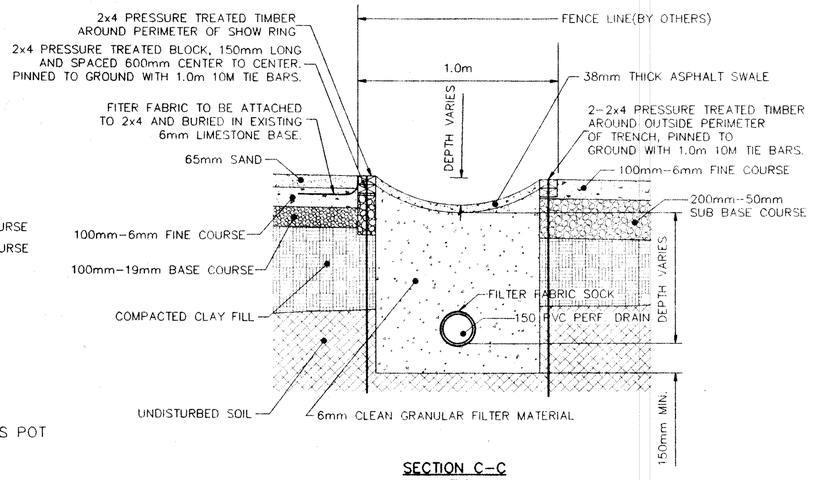


TYPICAL ACCESS BRANCH
N.T.S.



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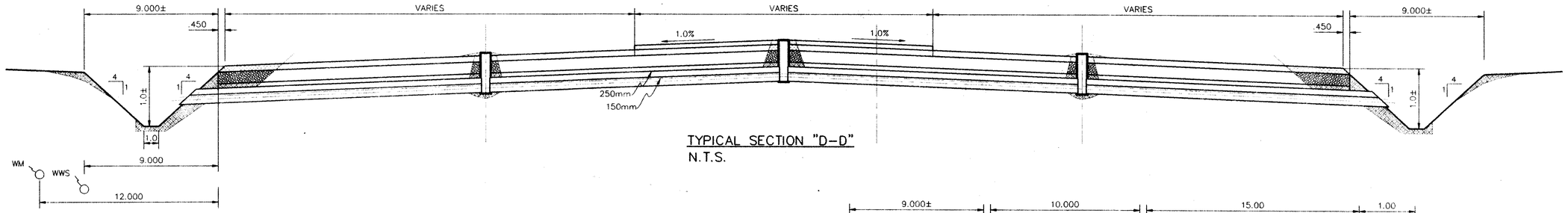

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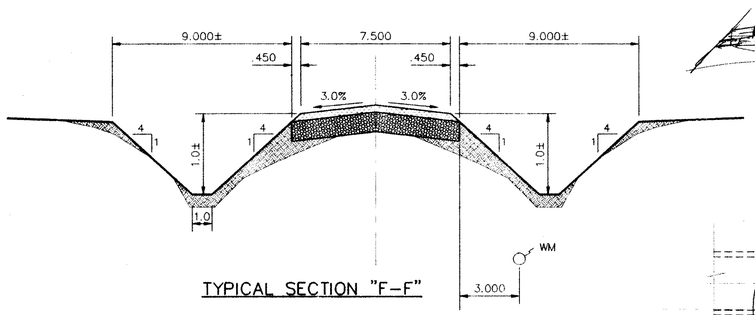

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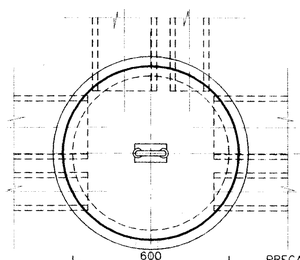
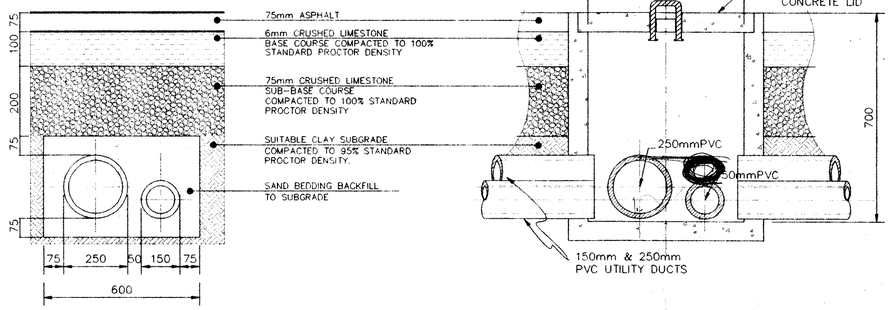
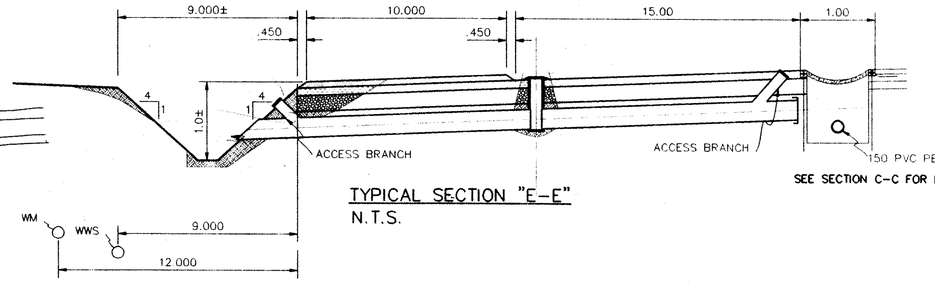




TYPICAL PAVEMENT STRUCTURE WITH UTILITY DUCT SECTION
N.T.S.

TYPICAL ACCESS POT
N.T.S.



TYPICAL SECTION "E-E"
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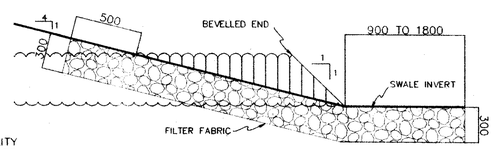
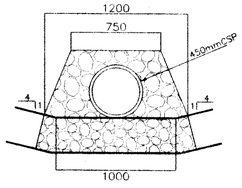
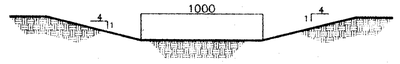


TYPICAL CULVERT END TREATMENT
N.T.S.

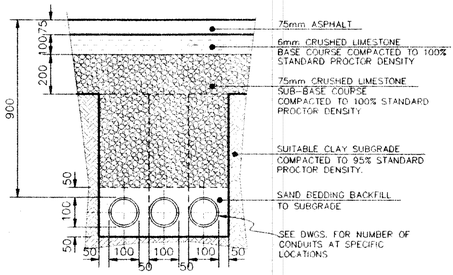




TYPICAL SWALE SECTION
N.T.S.

NOTES

- CSP CULVERT ENDS TO BE BEVELLED 45°.
- SUPPLY AND INSTALL 300mm THICK ROCK RIPRAP ON GEOTEXTILE AT CULVERT ENDS.
- USE SCALED MEASUREMENTS WHERE DIMENSIONS NOT SHOWN.



PERMANENT WIRING CONDUITS
N.T.S.

NO.	REVISIONS	DATE	BY
2	GENERAL REVISIONS	4,8,96	H.P
1	PERMANENT WIRING CONDUITS REVISIONS	22,8,96	H.P

SEAL
16.9.96
DATE AUG. 16, 1996

RED RIVER EXHIBITION ASSOCIATION

PHASE III - DETAILS

DESIGNED BY	S.R.
CHECKED BY	D.J.S.
APPROVED BY	D.J.S.
DRAWN BY	HP.,SR.
SCALE	AS SHOWN
PLAN NO.	RR-14-549

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Tel 204-488-5900 Fax 204-453-9017

FILE: D:\ACAD12\DOWNS\MIDWAY\REX-DET.DWG 09/15/96 12:50pm SR

stantec.com

Memo

Stantec

To:	File Winnipeg	From:	D. Mulder Stantec - Winnipeg
File:	111208850	Date:	March 30, 2006

Further to an email request from Brett Wareham at Manitoba Transportation and Government Services, we have reviewed the capacity of the existing culvert under PTH#1 at Camp Manitou Road.

Design assumptions are as follows:

- Existing culvert under PTH#1 is a 29m long – 910x660mm arch (800mm equivalent) CMP. The planned work will ultimately extend the overall length to 44m and connect the south end of the culvert to a new piped land drainage system that is routed south on Camp Manitou Road to the Assiniboine River.

- Inverts of the culvert under PTH#1 are 237.50m at north end and 237.40m at manhole at south end.

- Based on information received from Manitoba Water Stewardship for similar lands in the Winnipeg area, the unit runoff for the upstream catchment area is assumed to be 0.5 cms/sq. km. for the 2% design event.

- The catchment area based on a northern boundary approximately 1350 m. north of PTH #1 as indicated on Manitoba Water Stewardship Watershed map 26, File No. 92-2-1013, a western boundary 420 meters west of Camp Manitou Road, an eastern boundary 80 meters east of Camp Manitou Road, and a southern boundary of PTH#1 is approximately 67.5 Ha.

- Based on the above, the 2% design flow would be (0.5 cms/sq.km.)(67.5 Ha.)/(100 Ha./sq.km.) = 0.338 cms (11.9 cfs).

- Assuming a roughness coefficient 'n' of 0.024 and a length of 44 meters results in a hydraulic slope of 0.22% through the culvert and a total hydraulic loss from north to south of 0.10 m. In our view this is satisfactory. It should be noted as well however that existing drainage ditches on the fields north of PTH#1 would provide some storage and peak flow reduction during these conditions.

- It should also be noted that future development of the Red River Exhibition property that makes up the entire upstream catchment area will likely result

in on-site storage and diversion of the discharge from this area to the east to the Perimeter Highway. This will reduce the flow through this culvert in the future.

Please call if there are any questions on the above.

STANTEC CONSULTING LTD.

D. G. Mulder, P. Eng.
Senior Project Manager
dmulder@stantec.com

c. C. Fulsher - CAO, RM of Headingley
B. Wareham, P. Eng. - Manitoba Transportation and Government Services

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