52.1 SNOW REMOVAL AND ICE CONTROL (TRUCK)

52.1.1 GENERAL

The Work consists of loading trucks, snowplowing and the application of sand, salt or a sand and salt mixture to roadway surfaces.

52.1.2 MATERIALS

The sand and salt mixture shall be obtained from a premixed stockpile, the salt material from a storage shed and the sand from a separate stockpile. The conditions for the supply of these materials is detailed elsewhere in the Contract Specifications or in the Special Provisions.

52.1.3 EQUIPMENT

52.1.3.1 General

The Contractor shall supply and maintain an equipment fleet meeting the requirements specified herein and in the Special Provisions. The number of trucks and their storage locations will be determined by the Contractor using the method described in the Special Provisions.

52.1.3.2 Loader

The bucket size of the loader shall be a minimum of 1.3 cubic metres.

52.1.3.3 Truck

Tandem axle trucks equipped with a wing shall have a minimum 325 horsepower engine. All other tandem axle trucks shall have a minimum 270 horsepower engine. Single axle trucks shall have a minimum 210 horsepower engine. Gross engine horsepower will be the rating as shown in the manufacturers' specifications. In addition, any trucks which were approved for work with Alberta Transportation and Utilities during the 1994/95 season will also be deemed acceptable. All plow trucks shall have a properly operating engine hour meter.

Each truck shall have a valid Alberta Vehicle registration or equivalent permit and a current Commercial Vehicle Inspection Certificate Decal. The decal shall be displayed on the vehicle at all times. The Contractor shall maintain each truck to the minimum standard established by the commercial vehicle inspection. All snow plow trucks shall be properly designed and engineered to safely operate under the expected load capacity and extreme working conditions. If, in the opinion of the Engineer, the truck is not in a satisfactory mechanical or safe condition, then it shall be removed from the work site until the necessary repairs have been made.

At the beginning of the first winter season, the average age of the snow plow truck fleet shall be no more than nine years. The age of each vehicle will be based on the designated model year as assigned by the manufacturer. For the remainder of the Contract there will be no restriction on the average age of the fleet.

Each truck engaged in the Work shall be assigned a unique number, that is prominently displayed on the truck, for the duration of the Contract. The doors of each truck shall prominently display the Contractor's company name or logo and phone number.

Standard lighting on the truck shall conform to Drawing HMS 52.1A and Drawing HMS 52.1B and be adjusted in accordance with Drawing HMS 52.1C

Trucks shall have 75 mm wide, orange coloured reflector tape applied near the top and along the full width of the truck hopper at the rear of the vehicle and a similar 75 mm wide tape applied to the full width of the tail plate.

When snowplowing on recently applied seal coats or asphalt stabilized base course surfaces, as determined by the Engineer, trucks shall be equipped with power floats, castor wheels or rubber blades to reduce damage done to these surfaces. The use of other "protective equipment" will be subject to the approval of the Engineer. Any damage to these surfaces resulting from the snowplowing operation shall be repaired by the Contractor at his expense.

52.1.3.4 Sanding Unit

The sanding unit shall be either a frame mounted or slide-in-box type with a minimum capacity of 6.1 cubic metres or 8.5 cubic metres for tandem axle units and 3.8 cubic metres for single axle units.

Tandem axle trucks which are replaced during the term of the Contract, shall be replaced with trucks equipped with sanding units having a minimum capacity of 8.5 m^3. In the event the Contractor has a 6.1 m^3 "spare" unit which was previously owned by the Department, such unit may be used to replace an 8.5 m^3 unit when necessary.

Single axle trucks which are replaced during the term of the Contract, shall be replaced with trucks equipped with sanding units having a minimum capacity of 5.0 m^3

Sanding units shall be equipped with height adjustable material deflectors and spinners capable of both clockwise and counter clockwise movements and in-cab controls for regulating the discharge of a sand, salt or a sand and salt mixture, as required by the prevailing road conditions. The Contractor shall ensure the trucks are licensed to carry the minimum capacity.

52.1.3.5 Snowplow

All trucks shall be equipped with a snowplow. The snowplow blade shall be front mounted one-way for right side plowing only or two-way for both left and right side plowing, as indicated in the Special Provisions. The snowplow shall be equipped with a minimum 3.66 metre wide blade, in-cab controls for lifting and adjusting the plow blade and 330 mm x 410 mm red flags mounted on the top outside edges of the blade.

52.1.3.6 Snowplow Wing

The number of trucks to be equipped with snowplow wings and the highways on which wings shall be used is specified in the Special Provisions.

The wing attachment shall be mounted to the passenger side of tandem axle trucks.

The snowplow truck shall be equipped with in-cab controls for lifting and adjusting the wing. The wing functions must be quick acting and positively controlled. The wing control system shall have a "panic button" to provide for fast raising of the wing in emergency situations.

The wing adjustment mechanism shall be of a hydraulic telescopic type to allow for variations in the plow width. The minimum length of the wing blade shall be 2.30 metres.

The wing shall have a rear facing clearance light mounted as close to the end of the wing as practical. The light shall be similar in size, shape and capacity as a Grote Part No. 56052 Red Clearance Light. The wing shall also be equipped with a 330 mm x 410 mm red flag mounted on its top outside edge.

52.1.3.7 Snowplow Blades

The Contractor shall supply snowplow blades and wing blades.

52.1.3.8 Spread Control Device

All snowplow units shall be equipped with a spread control system capable of controlling the application rate of a sand, a sand and salt mixture or salt only. Only field proven products in service for at least one year will be considered unless otherwise approved by the Engineer.

Spread control devices shall be able to be calibrated to ensure consistent and uniform delivery of material to the road.

Spread rate application settings shall be controlled from inside the cab of the vehicle.

The spread control system must be capable of performing the following functions:

52.1.3.8.1 Sand/Salt Application Rate Control

- **!** Controlling an operator determined application rate to an accuracy of ± 5% for at least three different materials of varying densities. The system must also allow the operator to chose the type of load (material).
- **!** Displaying the actual application rate back to the operator when desired.
- **!** A "blast" setting which when activated will provide a maximum application rate.
- **!** A "passing" function which will allow the operator to stop the spinner and the main conveyor for short periods. There can be no delay in continuation of the spreading function after shutting off the passing function.
- **!** An error indicator which will notify the operator when the desired output of the main conveyor is less than expected due to an insufficient flow or high truck speed plus indicate other system related malfunctions.

52.1.3.8.2 Spread Width Control

- **!** The spread width (spinner speed) must be controlled by the operator.

! The spinner rotation direction must be reversible. The spinner must turn at the same speed when switched from one direction to the other while still on the same speed setting.

52.1.3.8.3 Material Calibration

! Material calibration will be required under the following conditions:

- prior to commencement of winter maintenance activities,
- when there is a change of materials or a change in hydraulic components, and
- when requested by the Engineer.

52.1.4 PROCEDURE

52.1.4.1 Snowplowing and Sanding

Truck speeds shall not exceed 70 kilometres per hour. Individual truck speed shall be adjusted to meet snow, wind, highway and traffic conditions and the application requirements of the sand, salt or sand and salt mixture.

Except when performing Work on intersections, trucks shall always be operated such that travel is in the same direction as traffic.

The angle of the snowplow blade shall be adjusted to remove snow and ice from the roadway in an efficient manner and to the satisfaction of the Engineer.

Trucks shall pull over at reasonable intervals to allow traffic to pass. Generally, this interval shall be between 5 and 8 kilometres.

When trucks are operating as multiple unit groupings, they shall be spaced so that traffic can safely pass. Generally the distance between units, on the open highway, shall not be less than 800 metres, but is dependent on snow, weather, and traffic conditions.

When plowing the inside lanes into the median, truck speed shall be adjusted to minimize the amount of snow deposited on the adjacent roadway.

On two-lane highways, truck speed and the angle of the plow blade shall be adjusted to minimize the amount of snow deposited on to oncoming traffic.

When plowing on intersections, crossovers, approaches or other "confined" areas, the Contractor shall ensure that equipment operates in a manner which does not create a hazard to traffic.

When approaching railway crossings, trucks shall have the plow raised sufficiently to clear the tracks. Snow or ice shall not be deposited on the crossing. Damage to the crossing shall be reported to the local railway authority and to the Engineer immediately. Windrows of snow shall not reduce the lateral sight distance of motorists nor obscure the motorists' vision of railway traffic.

When plowing overpass structures, the Contractor shall ensure snow is not plowed off the overpass onto the roadway below.

The Contractor shall supply the Engineer with the number of hours and kilometres worked by each truck in each "winter segment" on a daily basis.

The Contractor shall ensure all truck lights are clear of snow, ice and other materials which may reduce the illumination of the lighting on the truck.

52.1.4.2 Application of Sand, Salt or Sand and Salt Materials

Material application rates will be specified by the Engineer.

The Contractor shall maintain a sand/salt usage inventory system, which shall include:

- daily quantities of sand and salt usage from each material stockpile or salt shed for the particular winter segment worked;
- the time and date of loading for each truck unit.

The Contractor shall provide this information to the Engineer on a daily basis. The Engineer will provide a data form for the reporting of this information.

Generally, material applications shall be carried out at speeds up to 60 kilometres per hour. However, the individual truck speed shall be adjusted to account for weather, traffic, highway conditions and the type of material being applied.

Unless directed otherwise by the Engineer, the Contractor shall adjust the spinner speed to ensure the spread of ice control materials in the following manner:

- **On a Straight-a-Way** - The Contractor shall concentrate the placement of ice control materials on the crown area of the road. The crown is designed so that positive surface drainage occurs on both sides of it. If ice control materials are placed on the crown area, then the brine formed by salt and the subsequent melting of snow and ice will drain off the road in two directions.
- **On a Curve -** The Contractor shall place ice control materials on the high side of the curve so that any melting which may occur will run down the face of the curve and off the roadway surface.
- **On Multiple-Lane-Highways** - The crown is usually in the middle of the roadway. The Contractor shall place ice control materials on one lane or two lanes at a time but starting with the lane or lanes closest to the roadway crown.

The deflector on the spinner must be regularly checked to ensure proper placement of the material on the roadway. Centre mount spinners shall be equipped with deflectors on both sides.

52.1.5 COMMENCEMENT OF WORK

The Contractor shall ensure that equipment and operators are available for work 24 hours a day, 7 days a week and that the loader and a minimum of 2/3 of the trucks assigned by the Contractor per his designated sand/salt sites or snowplow truck storage locations are ready to commence work within 1 hour following the requirement for snow removal or ice control activities. The remaining trucks shall be ready to commence work within 2 hours following the requirement for snow removal or ice control activities. Work will commence at the stockpile site, equipment shop or any other location so designated by the Engineer.

The Contractor shall provide a maximum of three telephone numbers of contact persons authorized to receive a

Work Order for snow and ice control work. The Engineer shall be notified at once and in written form, of any changes to these telephone numbers. A fax transmission is considered a written form.

52.1.6 SNOW PLOW TRUCK AND LOADER STORAGE

The storage location for each truck will be determined by the Contractor using the method detailed in the Request for Proposals with the exception that the Department may identify critical areas which must contain a specified number of trucks. Any such areas and the associated truck requirements are identified in the Special Provisions.

During the Availability Period and as a minimum, all snow plow trucks shall be stored in a totally enclosed structure and be heated with internal electric heaters. (block heater, in-line heater, etc.)

The minimum number of snow plow trucks to be stored in indoor heated locations during the Availability Period is specified in the Special Provisions. Indoor heated storage is defined as a sheltered cover where the temperature inside the shelter is maintained at a minimum of 4°C.

The Contractor has the option of storing all snow plow trucks in indoor heated locations.

Loaders shall be stored at the sand/salt storage locations and shall also be equipped with internal electrical heaters.

52.1.7 AVAILABILITY RATE

Availability Rate is a daily payment made to the Contractor for having snow removal and ice control trucks available to commence work during the period specified in the Special Provisions. The rate applies individually to trucks and will be paid whether the truck is performing the Work or simply available to perform the Work described herein.

The available rate will not be paid for "spare" trucks which are not in use. The Availability Rate will not be paid for any trucks over thirteen years of age and will cease to be paid for any trucks that turn thirteen years of age during the term of the Contract. The age of the vehicle will be based on the designated model year as assigned by the manufacturer.

If, during the term of the Contract, additional snow plow trucks are required as a result of a change in scope in a Contract Maintenance Area, the Availability Rate will be paid for the applicable period each additional truck is required, provided that the truck is less than 13 years of age.

If the Engineer requests a Road Inspection in accordance with Specification 53.39, Highway Maintenance Work, the Contractor has the option of using regular snow removal equipment operators to perform the inspection. Any such use of equipment operators, will not compromise the Contractor's entitlement to the Availability Rate and the employee and equipment will be considered to be available to commence work as defined.

In the event of heavy snowstorms or other unseasonable weather which occurs outside of the period specified for Availability, the Contractor shall make sufficient equipment and personnel available at the earliest possible time. In these cases, the Availability Rate will be paid for the additional days worked.

52.1.8 PAYMENT ADJUSTMENTS

Payment adjustments for snowplow truck usage will be applied yearly at the end of the Department fiscal year. Payment adjustments are based on the total yearly snow plow truck hours accumulated during the Department fiscal year, for all trucks within the Contract area boundaries. The total yearly snow plow truck hours are compared against the "Combined Truck Usage Footprint" to determine the payment adjustments.
The "Combined Truck Usage Footprint" is a range of the estimated total snow plow truck hours required within the Contract area boundaries each fiscal year. The "Combined Truck Usage Footprint" is determined as follows:

(i) the Special Provisions will indicate a Provisional Quantity for snow plow truck hours for each Contract Maintenance Area (CMA)
(ii) the Provisional Quantities for each CMA in the Contract will be totalled to provide the Total Provisional Quantity
(iii) the "Combined Truck Usage Footprint" will be the Total Provisional Quantity +/- 10 %

There will be 4 bands (ranges of truck hours) on either side of the "Combined Truck Usage Footprint" which will also be used in the calculation of payment adjustments. The range of hours for each band will be 10% of the Total Provisional Quantity. Bands above the "Footprint" represent a price reduction. Bands below the "Footprint" represent a price increase.

The payment adjustment factor for each band is expressed as a percentage. The payment adjustment factors are multiplied by the Weighted Average Unit Price per hour for Snow plow Trucks as shown in the following example:

Sample "Combined Truck Usage Footprint" and Calculation for Truck Usage Payment Adjustments

Total Provisional Quantity: 22 800
10%: 2 280

Band 4 110%	**Band 3 107.5%**	**Band 2 105%**	**Band 1 102.5%**	**Footprint**	**Band 1 97.5%**	**Band 2 95%**	**Band 3 92.5%**	**Band 4 90%**

0 13 680 15 960 18 240 20 520 25 080 27 360 29 640 31 920 >31 920

Payment adjustments will be calculated using the "one band back" method as represented by the following calculation examples:

Total Yearly Truck Hours Within Footprint
Say total hours = 21 520 hrs
Payment Adjustment = (20 520 X 1.025 X WUP) + (1 000 X WUP)

Total Yearly Truck Hours Below Footprint
Say total hours = 19 240 hrs
Payment Adjustment = (18 240 X 1.05 X WUP) + (1000 X 1.025 X WUP)

Total Yearly Truck Hours Above Footprint
Say total hours = 26 080 hrs

Payment Adjustment = (25 080 X WUP) + (1000 X 0.97.5 X WUP)

WUP is the Weighted Average Unit Price as calculated based on the total actual hours worked in the year by each category of truck.

52.1.9 MEASUREMENT AND PAYMENT

52.1.9.1 Measurement

Measurement for snow removal and ice control (by truck) will be made in hours (to the nearest ¼ hour) for the number of hours a snow plow truck is engaged in this activity. For trucks which are not parked at the sand/salt stockpile locations, the hours will be measured from the time the truck starts working on the roadway.(plowing and/or applying material) For trucks parked at the sand/salt stockpile locations, the hours will be measured from the time the truck commences loading material after callout.

Measurement for the Availability Rate will be made in days for the time both the snow plow truck and loader are available to engage in the Work during the period specified in the Special Provisions.

Measurement for the snow plow wings will be in hours for the time the unit equipped with a wing is performing Work.

52.1.9.2 Payment

Payment for snow removal and ice control will be made at the applicable hourly rate bid per truck for "Snow Removal and Ice Control (Truck)" for the type of truck and auxiliary equipment specified. This payment will be full compensation for supplying the truck and loader (complete with all auxiliary equipment except wings), loading the trucks, snowplowing, hauling materials from the stockpile site to the roadway, applying a sand, salt or a sand and salt mixture as required, and all labour, equipment, tools and incidentals necessary to complete the Work.

Payment adjustments for truck usage will be applied on a lump sum basis. The lump sum adjustment will either be added to or subtracted from the total yearly snow plow truck payments as applicable.

Payment for Availability Rate will be made at the daily rate per truck established by the Department in the Unit Price Schedule for "Snow Removal and Ice Control (Truck) - Availability Rate". This payment will be full compensation for ensuring both the snowplow truck and loader are available to commence the Work on any day during the period specified in the Special Provisions.

Payment for indoor heated storage will be made at the daily rate per truck established by the Department in the Unit Price Schedule for "Snow Removal and Ice Control (Truck) - Indoor Heated Storage Premium". This payment will be full compensation for storing the snowplow truck in an indoor heated facility. The indoor heated storage premium will be paid each day throughout the specified availability period provided the vehicle is available for work as defined in Section 52.1.7, Availability Rate.

Payment for wings will be made at the unit price bid per hour for "Snow Plow Wings." This hourly rate will be paid regardless of whether or not "winging" is required when performing the Work.

The Contractor will not be paid for the time spent travelling from his home base to the designated worksite at the start of the workday nor from the designated site at the end of his work day to his home base. In addition, the Contractor will not be paid for the time spent changing blades, calibrating his equipment, refuelling, repairs or other servicing, or meal breaks. Each truck and loader will be allowed two 15 minute coffee breaks per day (no

deduction).

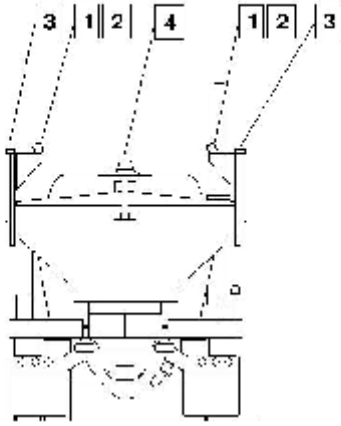
52.1.9.3 Delays in Commencing Work

A penalty of $100 per hour up to a maximum of $500 per day will be assessed for each truck unavailable to commence work within the specified time.

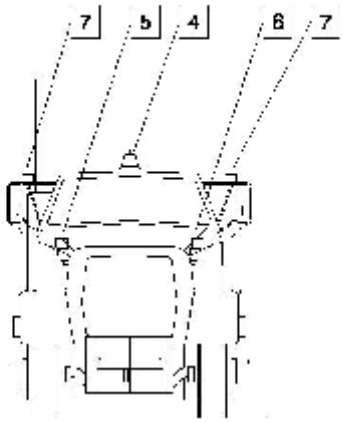
A penalty of $100 per hour up to a maximum of $500 per day will be assessed for each hour the loader is unavailable to commence work within the one hour response time. In addition, if the Contractor is unable to provide the loader within the specified time on any given day, then the "Availability Rate" will not be paid for any of the trucks at the designated site that day.

52.1.10 WARRANTY

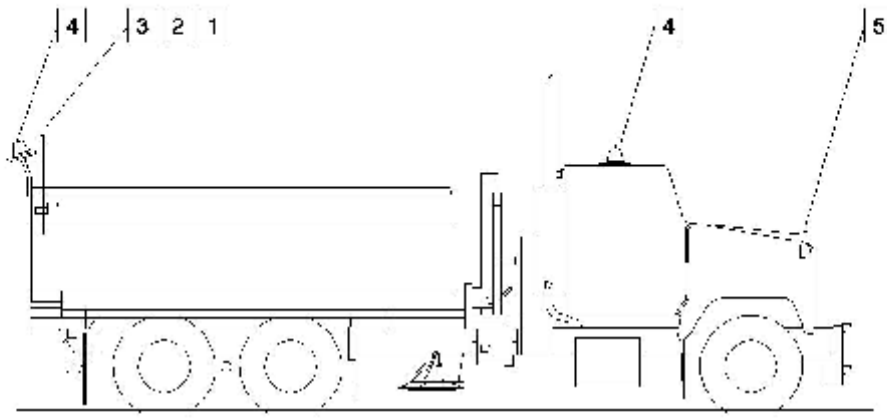
There is no warranty period for this Work.



REAR VIEW



FRONT VIEW



RIGHT SIDE

ITEM	QTY	DESCRIPTION	MFG.	PART NO.
1	2	LAMP HOUSING	GROTT	53010
2	2	SEALED BEAM, AMBER	GE (OTTO)	4414Y
3	2	LAMP RIM	GROTT	39459
4	3	REVOLVING LIGHT (AMBER)	GROTT	39393 or 75393
5	1	TAIL FLOW LAMP	GROTT	54541
6	1	LH FLOW LAMP	GROTT	54541
7	2	MARKER/SIGNAL LAMP RIM/LENS	GROTT	53010

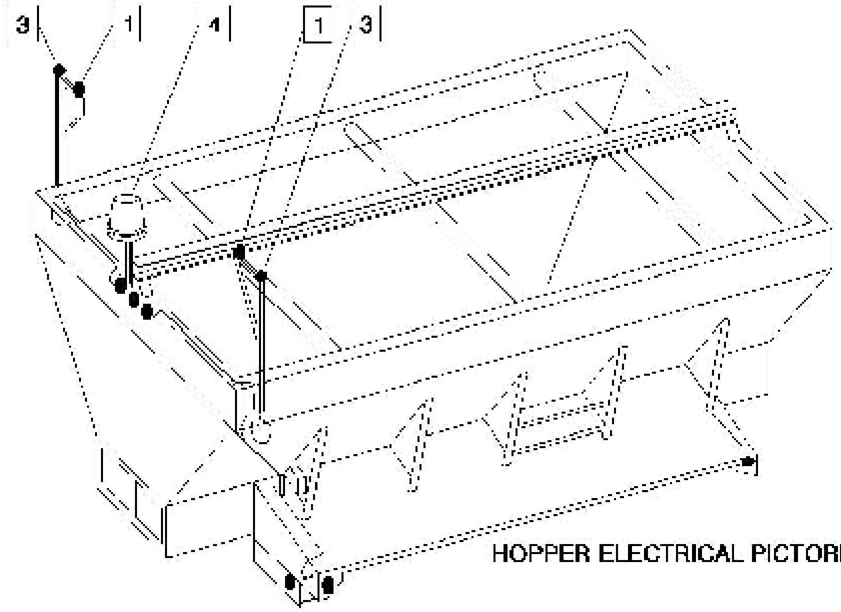
NO.	REVISIONS	BY	DATE

Alberta
INFRASTRUCTURE

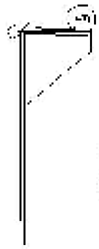
Date: AUGUST 2, 1994

SANDING TRUCK
LIGHTING STANDARD

Drawn:	Checked:	Scale:	Drawing No:
By: M.T.	By: T.W.	N.T.S.	HMS 52.1A

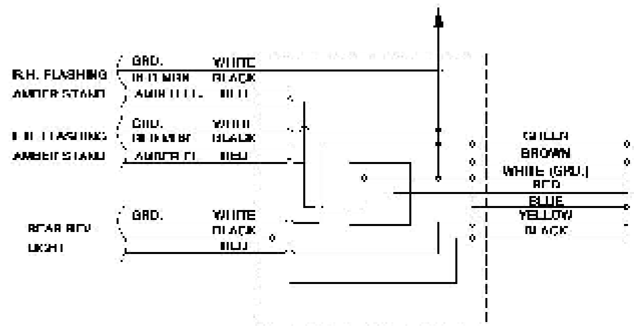


HOPPER ELECTRICAL PICTORIAL

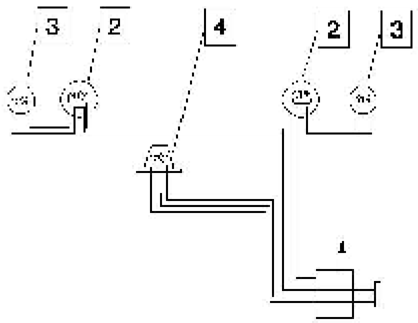


DETAIL

IS A USED AS A "JUNCTION BOX" FOR THE CABLE RUNNING TO THE CLEARANCE LIGHT



JUNCTION BOX ELECTRICAL SCHEMATIC



ELECTRICAL SCHEMATIC

ITEM	QTY	DESCRIPTION	MFG	PART NO
1	2	LAMP HOUSING	GROTE	64940
2	2	SEALED BEAM, AMBER	GE (FOG)	4412A
3	2	LAMP, RED	GROTE	56052
4	2	REVOLVING LIGHT (AMBER)	GROTE	76229 or 76229
*5	1	R.H. PLOW LAMP	GROTE	64251
*6	1	L.H. PLOW LAMP	GROTE	64241
*7	2	MARKER/SIGNAL LAMP, RED/AMBER	GROTE	53020

* ITEMS ILLUSTRATED ON DRAWING NO. HMS 52.1A

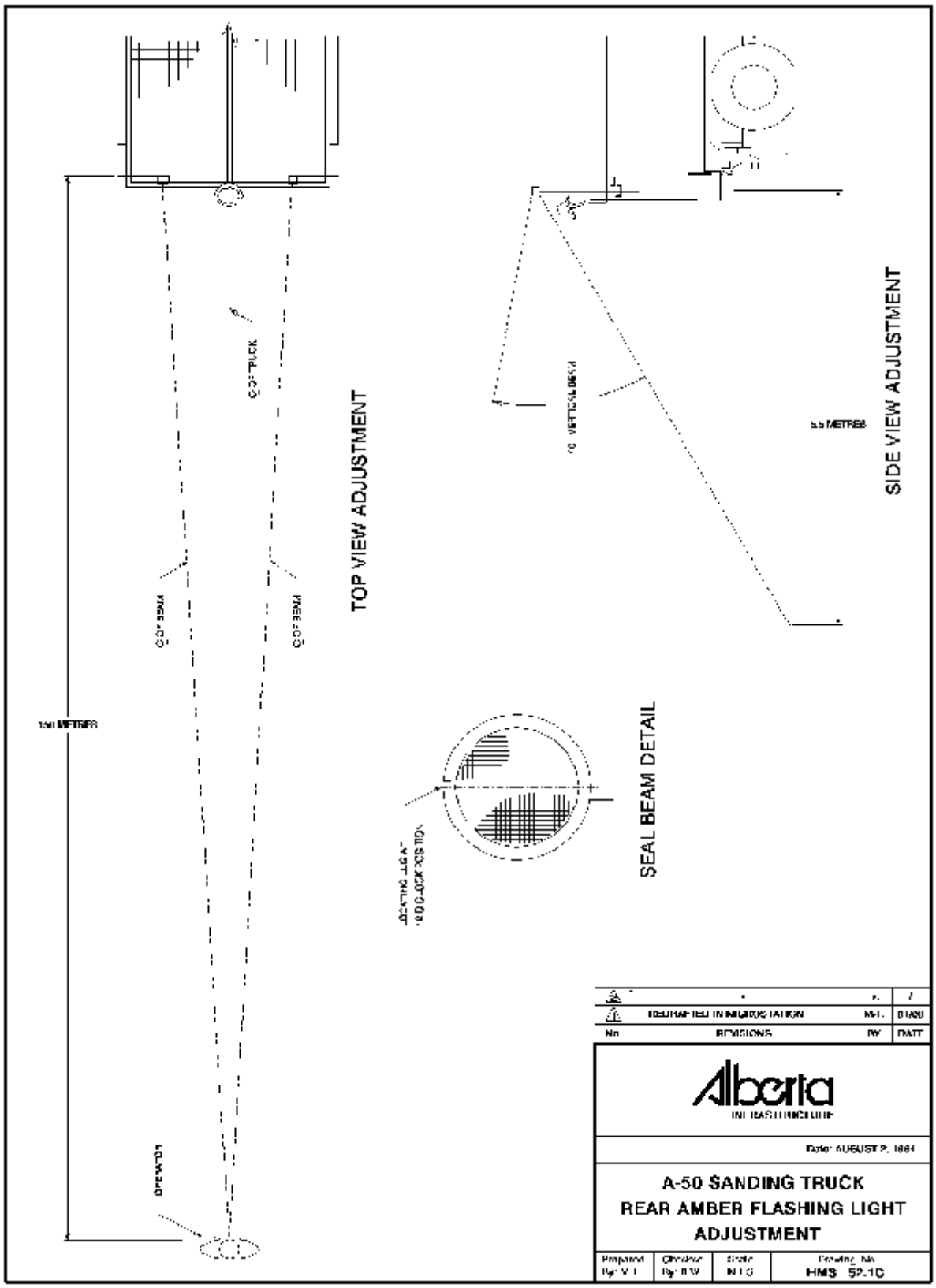
No	REVISIONS	BY	DATE
1	REDRAFTED IN MICROSTATION	M.T.	

Alberta
INFRASTRUCTURE

Date: AUGUST ?, 1994

SANDING TRUCK
REAR LIGHTING STANDARD

Prepared By	Checked By	Scale	Drawing No.
M.T.	B.W.	N.T.S.	HMS 52.1B


TOP VIEW ADJUSTMENT
SIDE VIEW ADJUSTMENT
SEAL BEAM DETAIL
Alberta
A-50 SANDING TRUCK
REAR AMBER FLASHING LIGHT
ADJUSTMENT
HMS 52.1C