Dishaw, H.E. 1963. Airphoto Route Location Study, Bell Rock to Little Buffalo River, Northwest Territories

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AIRPHOTO ROUTE LOCATION STUDY
BELL ROCK TO LITTLE BUFFALO RIVER,
NORTHWEST TERRITORIES

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BELL ROCK TO LITTLE BUFFALO RIVER, NORTHWEST TERRITORIES

Prepared for:

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June 17, 1963.

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INTRODUCTION

Purpose of this study was threefold:

- 1) Check the projected location shown on the mosaic and suggest any revisions.
- 2) Indicate possible granular deposits along the selected route.
- 3) Indicate drainage lines and more prominent areas of organic terrain.

Airphotos provided for this study were flown at 30,000 feet so have a scale of about 1 inch equals 5000 feet. An airphoto mosaic at contact airphoto scale was also used in this study.

PROCEDURE

Contact airphotos were examined several times. Terrain conditions were observed and assessed along the route selected in your office. A route was selected on contact airphotos and was transferred to the mosaic. This route and one short alternate varies only slightly from your selected route. Minor adjustments shown appear to give some improvement in terrain conditions.

Prospective granular material deposits are shown with orange color on both photos and mosaic. Terrain conditions are indicated with green color. Drainage information is shown in blue color.

THE SUGGESTED ROUTE

Adjustments made in the suggested route south of Salt River appear to place longer distances of the route over drier terrain.

Parallax measurements made on airphotos showing the suggested route up the escarpment indicate a rise of 130 feet from point A to B. A natural grade of 3 percent seems feasible at this location. Our suggested route north of Salt River follows yours closely to the triangular muskeg marked "4." Our route stays farther away from this muskeg than yours -- we believe on drier ground.

Our route stays away from "area of eroded sinkholes" shown on photos and mosaic. The potential hazard of these sinkholes can be assessed in the field during location surveys.

North of this point our route deviates from yours by as much as half a mile. Terrain conditions are believed to be a bit drier along our route.

The blue line mentioned in your letter was not shown on the mosaic so we were not able to tell the location of route laid out on the ground last summer.

PROSPECTIVE GRANULAR DEPOSITS

Granular material prospects are shown in orange color both on photos and on mosaic. The river terrace marked near Bell Rock is on the wrong side of the river and is likely sandy but certainly warrants cursory field examination.

Granular beach deposits located on top of the escarpment appear to have the best chance of containing gravel sizes. Very large volumes of granular material are expected in these deposits. Check pit indicated and any other exposures you can find in the field.

Granular prospects marked farther west along the route are believed to be sandy.

GEOLOGY AND SURFICIAL SOILS

Surficial soils east of the escarpment are flood plain deposits of Slave River. These soils are expected to vary from silty clays to sands.

Surficial soils west of the escarpment appear to be sandy for the most part. Where sand is shallow, road cuts in glacial till may be expected. Near the west end of the project stabilization of sandy soils may be troublesome.

The bedrock in the study area has a direct effect on road location. Many sharp, well-developed sinkholes may be seen in airphotos in the landscape west of the escarpment. These pits in the ground surface are caused by solution and collapse of underlying bedrock strata. The following quotations selected from G.S.C. Paper 58-11 indicate that thick beds of gypsum underlie the glacial materials in the area west of the escarpment:

Paper 58-11 'Great Slave and Trout River Map-Areas, Northwest Territories'. By R. J. W. Douglas.

Map-unit 9 (from page 14)

On Little Buffalo River, below the falls, massive gypsum lies conformably below map unit 10. It is in part vaguely bedded to thinly bedded with dark impure streaks. Lower strata are not exposed but probably contain salt, the source of brine springs west of Fort Smith. At Bell Rock, on Slave River, a massive breccia of pale brown cryptograined limestone, dark brown laminated limestone, and light buff dolomitic limestone is separated, by a vertically dipping fault, from massive white gypsum with thin greenish grey shale overlain by pale brown, fine-grained limestone and greyish brown shale.

Gypsum and Salt (from page 29)

Extensive deposits of the gypsum in map-unit 9 are exposed in the southeast part of Great Slave map-area, along the escarpments west of Fort Smith and Little Buffalo River, at Bell Rock, and at Pointe Ennuyeuse on Slave River. Salt, probably from this formation, forms saline aprings west of Fort Smith.

Map-unit 10 (from page 14)

Map-unit 10, which lies in stratigraphic position between map-units 9 and 14, consists mainly of massive, white, crystalline and banded gypsum with some thinly bedded, finely laminated, finely crystalline limestone. The basal beds, exposed at Little Buffalo Falls, are brown and dark grey, cryptograined dolomite, dark brown, medium-grained, vuggy dolomite, and thinly bedded argillaceous and fossiliferous limestone. End quote.

The small scale of airphotos will likely prevent identification of any but the largest of the sinkholes. Location of highway centerline will have to be adjusted in the field to avoid crossing sinkholes.

ORGANIC TERRAIN

Terrain classifications 1 to 4 outlined on airphotos and mosaic are intended to broadly classify the terrain according to degree or excellence of drainage. The best drained ground is classed 1 while the poorest is classed 4. Terrain class 1 will likely contain some wet ground and shallow muskeg. Terrain class 2 is expected to be mostly wet ground with shallow muskeg. Terrain class 3 includes some

wet ground some shallow muskeg and some deep muskeg. Terrain class 4 is expected to be entirely muskeg some of which may be deep.

DRAINAGE

The photo scale is too small to delineate drainage with any degree of accuracy. Of course streams like Salt River and Little Buffalo River can be traced fairly easily. Drainage lines are shown with blue color on the mosaic and contact airphotos. Drainage lines near the edge of the escarpment sometimes disappear into sinkholes in the underlying gypsum bedrock.

Salt springs issuing from the base of the escarpment carry mainly sodium chloride in solution -- according to the G.S.C. literature.

SUMMARY

- 1) Only minor adjustments were made in the location of proposed highway route.
- 2) Prospective granular material deposits are indicated with orange color. Sand sizes are believed to predominate.
- 3) Sinkholes caused by solution and collapse of underlying gypsum strata are numerous near the edge of the escarpment. The hazard of sinkholes can be assessed and location of the route adjusted in the field.
- Surficial soils are expected to be sandy. Soil stabilization may be a problem in some areas. West of the escarpment till cuts may be expected locally where sandy soils are shallow.
- 5) Large areas of wet ground and muskeg occur east of the escarpment. Terrain seems better drained west of the escarpment. Areas of deep muskeg appear to be few and fairly easy to avoid.

