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INCORPORATED**

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FOR ATTENTION: **MR DJ HAGEN**

**SAPPI NGODWANA DAM REHABILITATION:
REQUEST FOR APPROVAL OF A HAUL ROUTE ALONG
ELAND VALLEY SECTION 7X OF N4**

Your correspondence dated 10 July 2020 refers. DMV Consultants Nelspruit Inc. was appointed to conduct the required traffic impact assessment for the proposed haul of material for the rehabilitation of the Ngodwana dam. This letter summarises the findings of the investigation.

INTRODUCTION

It is proposed to do rehabilitation work on the Ngodwana dam on Farms Roodewal 470 JT and Grootgeluk 477 JT, directly South of the N4, West of Nelspruit – see attached *Figure 1*. This facility is regarded as a water reservoir facility which has a primary function of the storage of water for SAPPI's Ngodwana factory, requiring no additional land-use approvals.

STUDY AREA

The N4 is a National road located directly North-West of the site and consists of 1 lane per direction. The cross section currently caters for 3.7m lanes and paved shoulders (2.0m each). A speed limit of 80km/hr is applicable on this section of the road. Traffic impact on section 7X of this road is the subject of this report.



DEVELOPMENT BREAKDOWN AND ACCESS

The proposed rehabilitation process will require approximately 41,000m³ of material and will be upgraded with a raised right flank to the North of the dam spillway in the Ngodwana Creek and a rock toe berm on the main section South of the spillway, which includes the left flank of the dam.

The preliminary layout of the facility with the proposed haul routes is shown in *Figure 1* below.



FIGURE 1

The material for the right flank ($\pm 11000\text{m}^3$) will be hauled from the SAPPI dumpsite area to the South-West of SAPPI (Route 1) and the rock toe material (30000m^3) will come from commercial sources to the East of Ngodwana (Route 2).

Route 1:

Access to the N4 for the material hauled for the raised right flank ($\pm 11000\text{m}^3$) will be obtained at the existing intersection at the weigh bridge ($\pm \text{km } 3.0 \text{ W}$) which provides access to SAPPI's dumpsite and material stockpiles with a right turn movement onto the N4. This material will then be hauled Eastward along the N4 in tip trucks (normal road haulers and not ADT's) up to the Kaapsehoop intersection ($\pm \text{km } 6.2 \text{ W}$), where trucks will turn right onto the Kaapsehoop road (D799), travel for $\pm 200\text{m}$ along this road and turn right towards the Ngodwana Dam onto the existing fishing club access which is a surfaced access road. A material stockpile area approximately 600m along this road is the destination of this material. Trucks returning will turn left onto Kaapsehoop road (D799), left at the Kaapsehoop N4 intersection ($\pm \text{km } 6.2 \text{ W}$) and left again at the dumpsite access ($\pm \text{km } 3.0 \text{ W}$), at the weighbridge intersection.

Route 2:

The material for the rock toe berm ($\pm 30000\text{m}^3$) will be hauled from the commercial sources situated at Alkmaar or Karino via the N4 in tipper trucks (normal road haulers). These trucks will pass through the Kaapsehoop intersection ($\pm \text{km } 6.2 \text{ W}$) and turn left opposite the existing light vehicle turn-off to SAPPI's administration area ($\pm \text{km } 5.8 \text{ W}$), on an existing gravel road. This road provides access to SAPPI's Water Treatment Works (WTW). Material will be stockpiled on a stockpile area opposite the WTW. Trucks returning will turn right at the gravel access onto the N4 ($\pm \text{km } 5.8 \text{ W}$), drive through the Kaapsehoop intersection ($\pm \text{km } 6.2 \text{ W}$) and leave towards Nelspruit.

The horizontal and vertical alignment of the N4 allows acceptable sight distances at the proposed location of access onto N4 (i.e. in excess of 300m). Good lighting exists along this section of road, which enhances safety during night-time hauling. Gravel haul roads will be treated with ligno sulphate dust suppressant and stop sign access onto the N4 will be installed. With notification from TRAC during peak periods like Easter weekend, haul activities can be suspended.

EXISTING TRAFFIC VOLUMES

The existing traffic volumes along the N4 were received from TRAC to identify the existing volumes along the section 7X of the N4 discussed in this report.

From the data provided, which stretch over a period of approximately 8 months from 9 November 2019 to 31 July 2020, it is clear that although very high hourly peaks in both directions of 713 vehicles and directional peaks of 567 vehicles Eastbound and 501 Westbound respectively were experienced during peak periods, an average day will have peaks of ± 230 vehicles Eastbound and 257 vehicles Westbound.

Under these conditions, access at the various points indicated will be easy. The access points are intersections that operate with normal daily traffic under A and B levels of service.

Table 1 provides a record of peak hour traffic on a typical day on this section of road.

Table 1 – Existing Weekday Peak Hour Traffic Volume (N4)

Date	Day	Peak Hour	Mode	Eastbound (to Nelspruit)	Westbound (to Pretoria)	Total
15/01/20	Wednesday	Weekday AM	Cars	90 veh (72%)	166 veh (70%)	256 veh (70%)
			Trucks	35 veh (28%)	73 veh (30%)	108 veh (30%)
			Total	125 veh	239 veh	364 veh
15/01/20	Wednesday	Weekday PM	Cars	176 veh (74%)	128 veh (70%)	304 veh (72%)
			Trucks	62 veh (26%)	54 veh (30%)	116 veh (28%)
			Total	238 veh	182 veh	420 veh

The existing two directional traffic volumes along the N4 are typically 230 veh/h and 257 veh/h during the weekday AM and PM peak hours respectively with approximately 30% trucks. Note directional variance between AM and PM peaks. Due to this, the average peak in both directions is less than the combined directional peaks.

REHABILITATION GENERATED TRAFFIC VOLUMES

The proposed haulage of material will happen over a two-month period. Material will be hauled over 12-hours per day in trucks. This means that the following hourly trip generations are predicted:

Table 2 – Existing Weekday Peak Hour Trip Generation: Dam Rehabilitation

Route	Day	Peak Hour	Inbound	Outbound	Total
1	Weekday	Constant Flow	2 trips	2 trips	4 trips
2	Weekday	Constant Flow	3.5 trips	3.5 trips	7 trips

It is clear from the table above that the haul routes along the N4 generates limited peak hour trips i.e. less than 11 trips per hour in both directions. (One additional 6hr shift can reduce this with one third and haul over weekends can reduce this even further).

The proposed haul route along the N4 will be a temporary facility with upgraded access roads and safe driving conditions and intersection functions. The trip generation characteristics are expected to be like these existing conditions i.e. less than 10 trips/hr during any of the peak hours. The traffic impact of these additional trips on the road network will be negligible.

INTERSECTION LAYOUT

Existing intersections along the N4 have dedicated turning lanes along the N4 – see below example of the weighbridge and Kaapsehoop intersection:

WEIGHBRIDGE INTERSECTION (\pm KM 3.0 W)

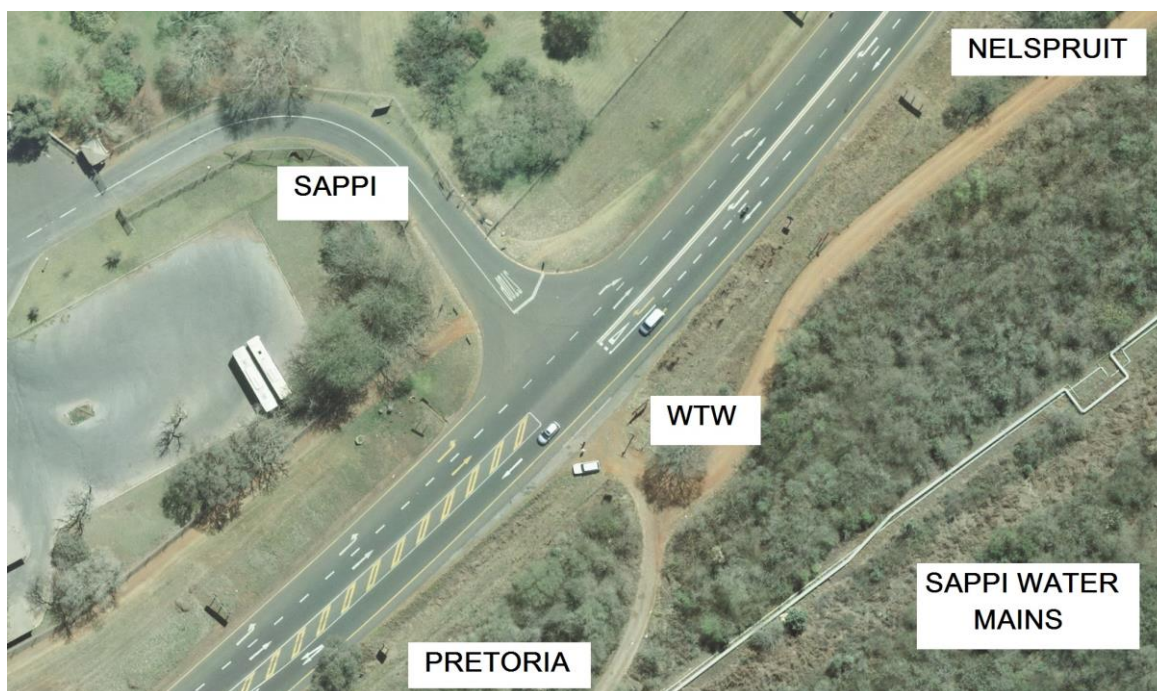


KAAPSEHOOP INTERSECTION (\pm KM 6.2 W)



The proposed access to the rock toe berm on the main section will generate low peak hour traffic and from a capacity point of view, the layout can be similar to any of the existing intersections along the N4, i.e. T-junction without turning lanes along the N4:

SAPPI ADMIN ENTRANCE INTERSECTION (\pm KM 5.8 W)



OPERATIONAL CONDITIONS

As mentioned previously, it is clear from observation that the intersections along the N4 operate under normal traffic conditions at A and B levels of service (LOS).

The LOS A and B are indicative of low delays and high capacity. The results confirm that acceptable operating conditions are expected at the intersections, especially along the N4.

Access to the stockpiles will be controlled by means of a stop signage control.

From a safety perspective, considering the restricted travel speeds along this section 7X of the N4, with right turning traffic en-route to the Route 1 stockpiling area, these movements are accommodated at existing intersections with right turn lanes or alternatively by means of a bypass lane. The left turn entry movement is less critical considering the freeflow entry and the available paved shoulder.

Traffic en-route to the Route 2 stockpiling area will also enter the abovementioned restricted travel speed areas and do a left turn entry at \pm km 5.8 W, which again is less critical considering the paved shoulder. Returning right turning traffic is sheltered by the traffic island of the intersection which provides a halfway shelter into the intersection.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are made from this study:

- It is proposed to rehabilitate Ngodwana Dam on Farms Roodewal 470 JT and Grootgeluk 477 JT, located along the N4, section 7X.
- The proposed rehabilitation process will require haulage of material along the N4.
- The proposed position of access at existing intersections will allow acceptable site distances (in excess of 300m).
- The existing peak hour traffic volumes along the N4 are low i.e. less than 500 veh/hr in both directions.
- The proposed haulage of material is expected to generate low peak hour trips (less than 10 trips/hr) and will have a negligible impact on the operating conditions along the surrounding road network.
- The proposed rock toe access should be controlled by means of a 1-way stop.
- Access to the site will be controlled (1 lane per direction) and it is recommended that a minimum of 30m queue storage space be provided.
- Dust control will be implemented on gravel haul roads.
- Haul of material be planned for the dry season.
- A risk assessment will be conducted with the relevant contractor for haul in wet conditions.
- Haul of material be suspended with notification from TRAC during peak seasonal traffic periods like Easter and start of school holidays, etc.

Considering the above, the proposed new haul route is supported from a traffic engineering point of view. Please do not hesitate to contact me should you wish to discuss any aspects of the assessment or need any additional information.

Yours faithfully



P.A. NICHOLSON PR ENG.