

1976/40. Further investigation of proposed roads near St Marys.

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At the request of the Forestry Commission, an investigation was made of further road works near St Marys. A brief inspection was made of sections of each route to determine whether geological and geomorphological factors would adversely affect road construction.

Route 1 (fig. 1) passes along the Lower German Town Road, east of Cheeseberry Hill, east of German Town and passes north around North Sister towards Dublin Town.

Route 2 passes south of Cheeseberry Hill linking the German Town and Lower German Town roads. The proposed road travels north from the German Town Road-Dublin Town Road fork, passing east of North Sister and then strikes north along a large ridge to Upper Scamander.

Route 3 has already been investigated (Sloane and Cromer, 1976).

Route 4 is the St Marys Pass section of the Tasman Highway, which may be upgraded.

GENERAL COMMENTS

The problem of instability associated with road construction along Routes 1 and 2 is largely confined to areas underlain by a sandstone-coal measures rock sequence of Triassic age. The angle of threshold natural slopes in these areas appears to be between 20° and 25°. It is therefore considered unwise to route roads across such areas. Areas underlain by Triassic rocks and with slopes of about 15° or less are considered reasonably stable but final inspection of these areas is advised. Roads should be routed to avoid all known and potential landslip areas. Such areas are marked on Figure 1.

Numerous recent landslips have been observed around the Mt Nicholas-North Sister-Cheeseberry Hill area, some of which are extensive (Sloane, 1976, in preparation). Recent 'fresh' landslips probably occurred during the winters of 1974 and 1975 when unusually heavy rainfall occurred. Several old landslips can also be seen in the area. Some landslips are reactivated older slips. This is indicated by the old landslip deposits, scarps, buried soil profiles and weathered remnants of bedrock entrained in the landslip debris.

All landslips have resulted from the failure of a dolerite talus or solifluction(?) deposit, present as a thin mantle on the sandstone and coal measures. Seepages and springs are associated with slips, the groundwater moving along the Triassic bedrock-dolerite talus interface. Failure has occurred as a result of the steep slopes and the saturation of the veneer of clayey talus material in seepage areas.

Other areas to be avoided are slopes greater than about 25° underlain by granite. This is especially so where the granite is deeply weathered. The problem is compounded in areas adjacent to St Patricks Head where periods of extremely high intensity rainfall occur. Failures have been observed in this weathered granite material along the western and eastern sides of Whites Gully (Sloane and Cromer, 1976).

NOTES ON SECTIONS OF THE ROUTES

Route 1

This route passes through a landslip area on the eastern flanks of

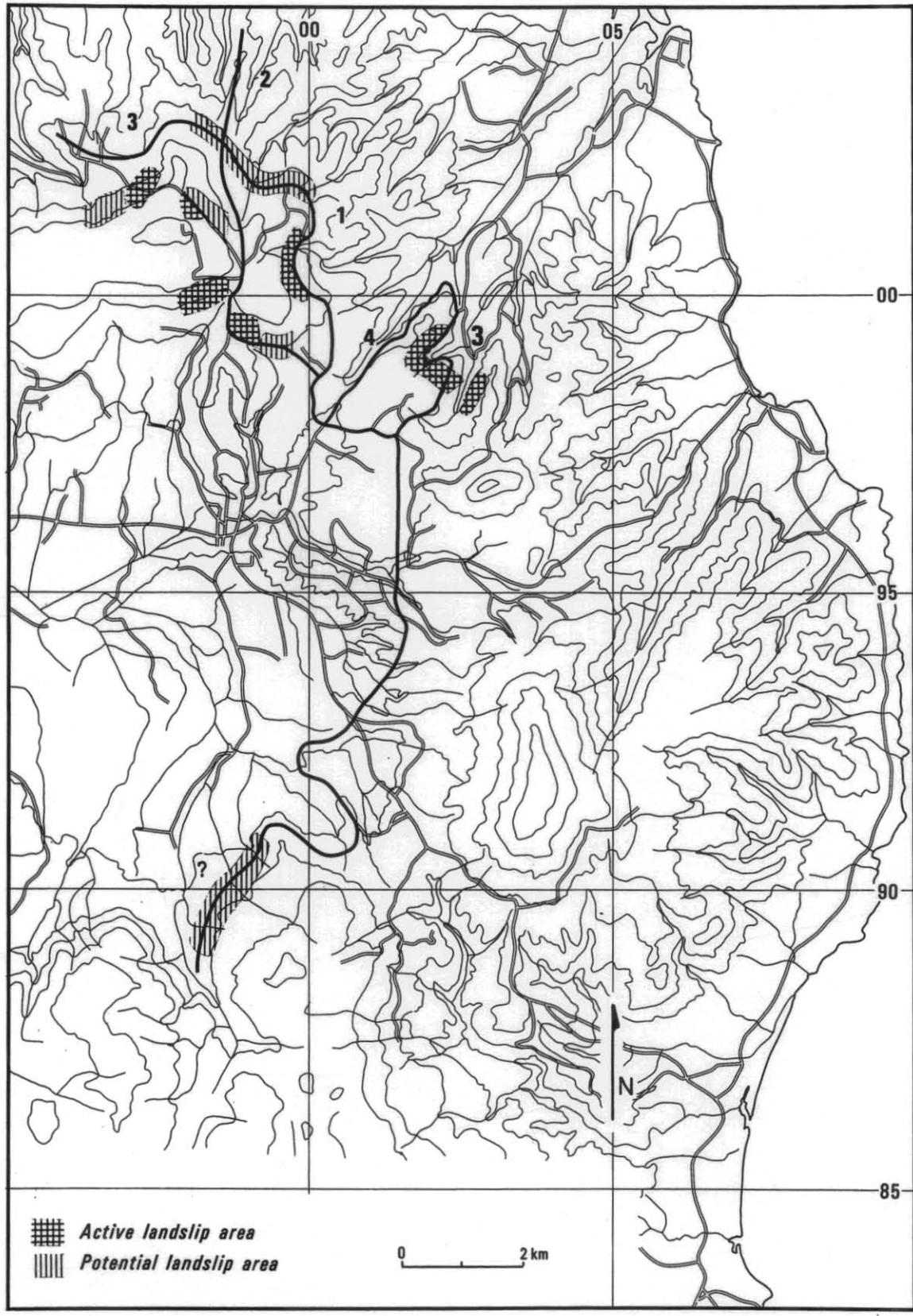


Figure 1. Road routes in the St Marys area, showing active and potential landslip areas.

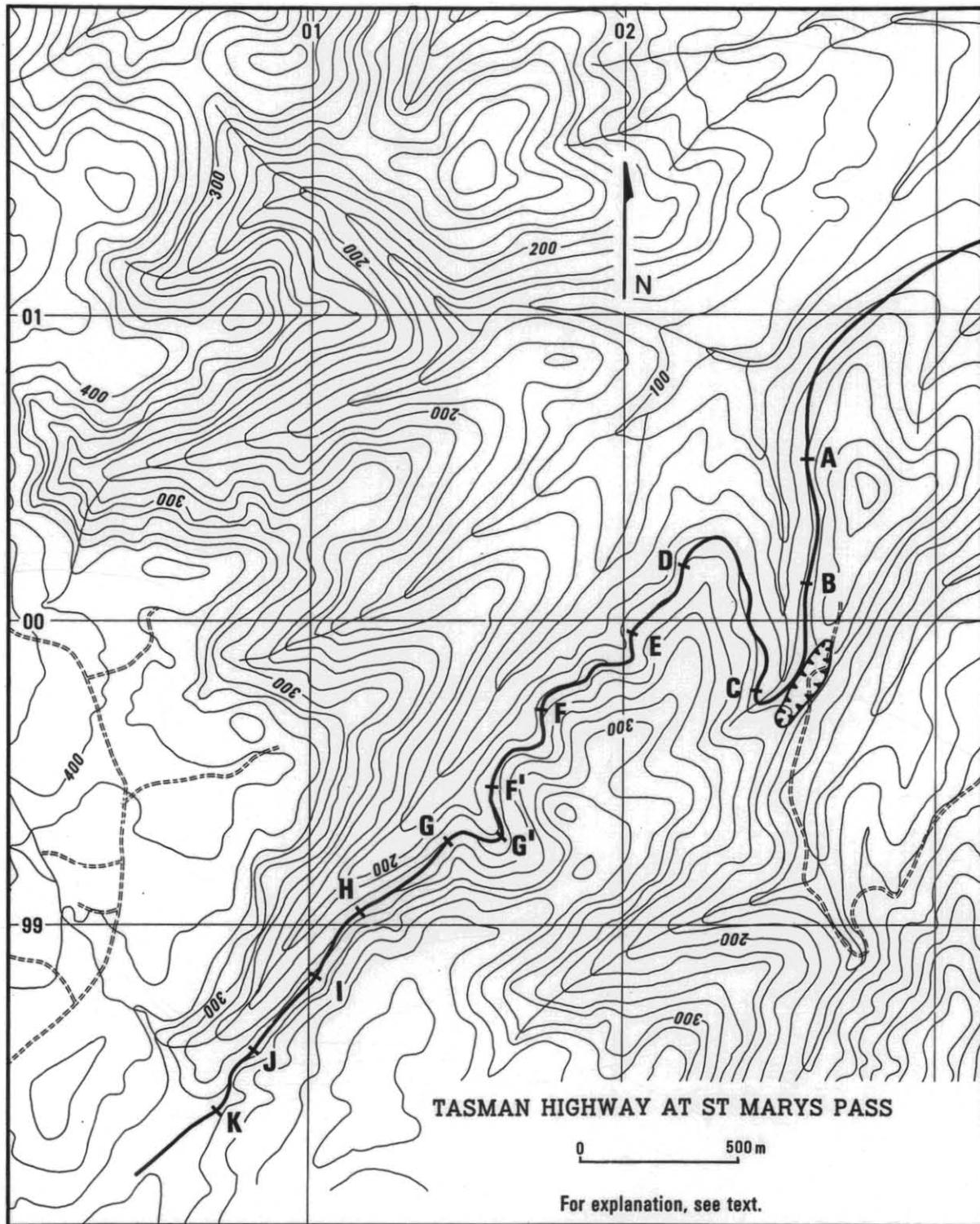


Figure 2. *Tasman Highway at St Marys Pass.*

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Cheeseberry Hill. The section of the route that passes north of German Town and North Sister, although not inspected, passes through areas considered to be of doubtful stability on the basis of rock type and slope. Route 1 seems impracticable and there is no alternative stable route in this area.

Route 2

This route passes through landslip areas on the northern and southern sides of the saddle between Cheeseberry Hill and North Sister. On the southern side of this saddle the route passes partly along the existing German Town Road. This is essential as landslip areas are present both to the west, in the Jubilee mine area, and to the east along the eastern flank of the valley that extends south-east from the saddle. The route proceeds east along the side of this gully. This section was not inspected and requires further examination to confirm its suitability. North from the Cheeseberry Hill-South Sister saddle the route passes along the downhill side of an area of possible instability. No real problems are likely here but further inspection is advisable. The route then strikes north along a ridge towards Upper Scamander. This area north of North Sister is underlain by granite and Mathinna sediments. No problems are likely along this section provided slopes steeper than 20° are avoided. Conditions will be generally similar to those found along Catos Road to the west.

Route 4. St Marys Pass

A brief examination was made of the existing section of the Tasman Highway through St Marys Pass. This section of road has been affected by major roadslips and slumps during periods of high intensity rainfall of the winters of 1974 and 1975. The following notes were made on various parts of this road section (fig. 2). The entire route passes through granite of Upper Devonian-Lower Carboniferous age.

Section A-B. The hill slopes in this section are steep (about 30-35°) and two slumps have occurred on the upper side of the road. The granite is moderately weathered and little blasting would be required during road widening.

Section B-C. The granite is deeply weathered and closely jointed in the area around the gravel pit. Slopes are not steep in this section (maximum 23° near B). Some soil creep is evident from bent and leaning trees on the upper side of the road in steeper sections.

Section C-D. Two or three small slumps and a large slip have occurred in embankments on the upper side of the road. Slope angles are generally about 28° to 30° with 37° the maximum slope angle. The granite is deeply weathered and closely jointed.

Section D-E. The granite is not deeply weathered and slopes are about 40°. Extensive exposures of granite are visible on the upper side of the road. A small quarry at D has vertical faces which appear stable. Only a thin veneer of weathered granite is visible. Blasting would be required in this region and a fairly large embankment would be required on the upper side of the road.

Section E-F. This is a steep section with slopes between 30° and 40°. No major instability is evident. Minor slumps occur on the upper embankment and are associated with small patches of more deeply weathered and closely jointed granite. Blasting would be required during road construction. Large culverts are required where gullies are crossed.

Section F-G. A slip has occurred in the gully north of F. Slopes are about 30° to 40°. The granite is not deeply weathered or closely jointed. Blasting is required during road construction. Two slumps are present in the gully near F. The gully shows evidence of having carried large volumes of water, largely responsible for previous road destruction here. Two large gullies are present at G¹ and the granite appears more deeply weathered around this gully (F¹ to G). There are several embankment slips in this area and slopes are between 25° and 30°.

Section G-H. Slopes in this section are between 35° and 40°. There are abundant granite outcrops with little evidence of close jointing. Weathering is restricted to a thin veneer over solid bedrock. One or two minor embankment failures are present. Blasting would be required in this section.

Section H-I. This section is similar to Section G to H. There is only a thin veneer of weathered and fractured granite over solid bedrock. Minor slumping of this weathered material has occurred above the road. The granite appears more deeply weathered in the gully at I and minor embankment failures have occurred. Blasting is required in this section.

Section I-J. The granite is variably weathered in this section. Embankment failures are associated with areas of deeper weathering. The two gullies at I and J require large culverts.

Section J-K. The granite is deeply weathered but no problems are envisaged as slope angles become smaller as the road passes closer to the ridge top.

SUMMARY AND CONCLUSIONS

Routes 1 and 2

Several landslips have been observed in the Mount Nicholas-North Sister-Cheeseberry Hill-Lower German Town Road area. The landslips are confined to slopes of around 20° or higher in areas where clayey dolerite or solifluction deposits mantle rocks of Triassic age. The active and potential landslip areas have been outlined (fig. 1). These sections must be avoided as slips have occurred in both pasture areas and areas under natural vegetation. Landslip problems will be compounded because of road construction which will cause artificial oversteepening of slopes with subsequent removal of support and alteration of drainage conditions. Route 2 is the better route with regard to slope stability. Further inspection of two small sections is advised. This can be conducted when the route is correctly plotted at its required grade.

Route 4

The St Marys Pass area is underlain by granite. Slope angles range generally between 25° and 40°. The granite is variably weathered showing moderate to deep weathering between A and D and I and K. The section D to I has the steepest slopes and a thin veneer of weathered and fractured granite overlies solid bedrock. Blasting would be required during road widening in this region. Embankments in the steeper slope sections will be high and benching may be required. Embankments can be steep in this section due to the solid nature of the bedrock, however, some retaining methods will be required to prevent failure of the veneer of weathered and fractured bedrock. This is especially so where patches of deeply weathered and closely jointed

bedrock are encountered. Large diameter culverts are required where the road crosses gullies. These gullies carry large volumes of water during periods of high intensity rainfall which occur in the St Patricks Head region.

OVERALL RECOMMENDATIONS ON PROPOSED ROUTES

Of these latest routes examined, Routes 2 and 4 are favoured. Route 2 is preferred because of the problems associated with stability of Route 4 at St Marys Pass. Route 2 has only two short sections through areas of potential instability. Further cursory inspection of these sections is advised.

Of all routes examined, the Chain of Lagoons to Falmouth route is considered to be the least likely to be affected by instability.

REFERENCES

SLOANE, D.J. 1976. Road routes and slope instability in the Mount Nicholas area. (in preparation).

SLOANE, D.J.; CROMER, W.C. 1976. Investigation of proposed Forestry Commission roads near St Marys. *Unpubl.Rep.Dep.Mines Tasm.* 1976/21.

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