TRANSPORT
SCOTLAND

Trunk Road Network Management Directorate

The Glasgow and the Clyde Valley Joint Structure Plan Third Alteration

Examination in Public of matters relating to the Former Royal Ordnance Site at Bishopton

Statement on Road Capacity

22 March 2007

1.

Scope of this Statement

2. This statement outlines Transport Scotland's involvement in the appraisal of the ROF Bishopton to date and highlights key milestones achieved or agreed, plus the areas of analysis which remain outstanding. The statement is split into two sections:

    - STAG Appraisal - covered by Gerard McPhillips;
    - Transport Assessment - covered by Colin Bathgate

Introduction

3. All transport projects for which Scottish Executive / Transport Scotland support or approval is required, must be appraised in accordance with the Scottish Transport Appraisal Guidance – STAG. The Executive / Transport Scotland also requires Transport Assessments, prepared in accordance with the Guide to Transport Assessment, to be submitted for developments affecting the motorway and trunk road network.

4. Further, any changes to the motorway or trunk road network require to be fully assessed to DMRB (Design Manual for Roads and Bridges) Stages 2 and 3. This normally requires a detailed traffic model analysis. The STAG, TA and DMRB processes are intended to overlap and complement each other.

5. Given the scale of the proposed development for the ROF Bishopton site, it is expected that a number of the transport interventions proposed to mitigate the associated trips will impact directly upon the motorway and trunk road network. Consequently, it is necessary for a STAG appraisal, a Transport Assessment and ultimately DMRB Stage 2 and Stage 3 assessments to be submitted to Transport Scotland.

Background to the STAG Process

6. For major transport interventions STAG requires two reports to be submitted – a Part 1 Report and a Part 2 Report.

7. The STAG Part 1 Report is intended to:

    - Present an analysis of existing and potential problems.
    - Highlight the Objectives which are attempting to be met.
    - Generate, sift and develop Options (or combinations of Options) intended to satisfy the Objectives.
    - Present an initial and broad assessment of impacts designed to determine whether Options meet the Objectives, fit with relevant transport, land use and other policies.
    - Determine whether an Option should proceed to a more detailed STAG Part 2 appraisal.

8. The STAG Part 2 analysis includes a more detailed assessment of the Options taken forward. It is not discussed further here as the ROF Bishopton assessments have not yet reached this stage.

ROF Bishopton STAG Part 1 Analysis

9. A STAG Part 1 analysis of the transport interventions associated with the ROF Bishopton was audited and approved by Transport Scotland in February 2005. The outcome from the STAG Part 1 analysis was that two Options should be taken forward to a STAG Part 2 analysis, namely:

    - Option 4: new M8 motorway junction plus associated local road improvements, public transport improvements, walking and cycling improvements.
    - Option 5: new connection to the existing M8 Junction 30 plus associated local road improvements, public transport improvements, walking and cycling improvements.

Transport Assessment

10. Faber Maunsell was commissioned to assist in the auditing of the Transport Assessment (TA) prepared for the proposed mixed-use development in Bishopton. Broadly, the TA was prepared to assess the capacity of the existing road network and to determine whether this can support the development proposals and identify what network improvements, if any, would be required.

11. This work started in 2002, is still ongoing and was progressed in parallel to the STAG process. The following is a summary of the key stages of the development of the TA:

    - June 02–Oct 02: Discussion relating to scope of TA including construction phasing, trip rates, growth rates, scope of junction assessment, threshold assessment at St James Interchange.
    - The audit of the proposed development moved to a STAG appraisal.
    - March 2005: JMP advise their intention to produce a revised TA and undertake a full scoping exercise.
    - May 2005: JMP request auditors consider the development travel characteristics prepared as part of the STAG 1 report.
    - June 2005: JMP issue revised trip generation and distribution.
    - July 2005–February 2006: FM/JMP discuss development travel characteristics, assessment years, suitability of traffic flows, availability of additional traffic flow information, committed developments, trip generation, trip distribution.
    - April 2006: Revised TA received from JMP
    - July 2006: Auditors confirm acceptance of person trip assessment but highlight some remaining issues with the TA, including PT study, mode-share targets and findings from Paramics modelling.

12. The TA as submitted can only confirm the likely development travel characteristics. The modelling assessment reported in the TA has not been approved and therefore the results cannot be used to confirm the suitability or otherwise of the surrounding network or identify any necessary mitigation measures. In discussions leading up to this EIP, JMP confirmed that a revised TA will be produced that would adopt the person trip assessment as approved but include a completely new traffic modelling section. The

traffic modelling would be used to assign development trips to the road network and enable the traffic impact to be determined. This exercise has not been completed.

13. To assist the EIP, the findings of the person trip assessment can be used to determine the likely level of trips that will be generated by the development. This quantifies trips by all modes and identifies the destinations for these trips. For these trip characteristics to be realised at Bishopton it is critical that the development is phased as a multi use site, with employment uses delivered in tandem with the housing areas. In due course Transport Scotland intends to advise a suspensive condition restricting the timing of any new junction to ensure that the delivery of the housing phases is be supported by an appropriate level of employment use. This is essential to ensure that a critical mass of local employment opportunities is available. Also, any development phases must be supported by full public transport provision to ensure the potential for non car trips is fully maximised.

Transport Scotland's Approval in Principle

14. In March 2005, based on the analysis presented in the ROF Bishopton STAG Part 1 report, the Executive agreed that the two motorway Options should proceed to a STAG Part 2 appraisal and advised that "*in principle the Executive will support a new motorway access be provided in order to facilitate the redevelopment of the Bishopton site*" (refer Executive's letter to JMP Consultants 24 March 2005).

15. However, a primary condition attached to this agreement in principle was:

    - The submission of a satisfactory STAG Part 2 including a full Transportation Assessment addressing trunk road impact and any necessary mitigation.

16. Transport Scotland is currently awaiting the submission of a satisfactory STAG Part 2 and a full Transportation Assessment.

Operational Characteristics of Road Network Including the M8

17. In addressing the capacity of the road network in and around Bishopton, a number of key areas and terms need to be highlighted:

    - With regard to the Scottish road network, Transport Scotland is responsible for only motorways and trunk roads. Local non-trunk roads are the responsibility of the relevant Local Authority.
    - In and around Bishopton, TS's responsibility is therefore confined to the M8 motorway. Responsibility for the remaining road network i.e. the A8, A726 etc. and local roads within Bishopton, lies with Renfrewshire Council.
    - "Capacity" is defined as "*the maximum sustainable hourly lane throughput*" (refer TA 46/97, DMRB Vol. 5). This relates, however, to a network unconstrained by the weaving and joining movements arising from associated junctions.
    - "Congestion" is defined as the situation when the hourly traffic demand exceeds the maximum sustainable hourly throughput of the link (road). At this point the likely impact on traffic is one or more of the following: flow breaks down with speeds varying considerably, significant drop in average speeds, reduction in sustainable throughput, and the likely formation of queues (refer TA 46/97, DMRB Vol. 5).
    - In terms of motorway capacity, an average capacity of 2,000 vehicles / lane / hour is generally accepted (refer TA 46/97, DMRB Vol. 5).

- Level of Service (LoS): is a measure of the performance of the motorway network. The US Highway Capacity Manual 2000 (used in the absence of an equivalent UK document) defines LoS as "*a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to manoeuvre, traffic interruptions and comfort and convenience.*" A general definition of each LoS is given below and are shown pictorially on last page of this statement (refer HCM2000):

  Level of Service A: Free flow.

  Level of Service B: Reasonably free flow.

  Level of Service C: Stable flow.

  Level of Service D: Approaching unstable flow.

  Level of Service E: Unstable flow.

  Level of Service F: Forced or breakdown flow.

18. Table 1 contains a summary analysis of the M8 between Junction 30 (the M898) and Junction 25 Cardonald.

Location	Dir'n	Pract'l Cap. (C)	2005 Ave. Tues-Thur Flow (V)	*2005 V/C*	*2005 LoS*	2011 Flow +21% (V)	*2011 V/C No Dev.*	*2011 LoS No Dev*	2011 Flow +50% Dev. Traffic* (V)	*2011 V/C Inc. 50% Dev. Traffic**	*2011 LoS Inc. 50% Dev. Traffic**
J28-J27	e/b	6000	5298	0.88	D	6411	1.07	**F**	6611	1.10	**F**
J27-J28	w/b	6000	3107	0.52	B	3759	0.63	C	3836	0.64	C
J27-J26	e/b	6000	5802	0.97	**E**	7020	1.17	**F**	7220	1.20	**F**
J26-J27	w/b	6000	3665	0.61	C	4435	0.74	C	4512	0.75	C
J25A-J25	e/b	6000	5511	0.92	D	6668	1.11	**F**	6868	1.14	**F**
J25A-J25	w/b	6000	4590	0.77	C	5553	0.93	D	5639	0.94	**E**

Table 1: M8 Motorway 2005 Flow Level of Service Analysis

19. The following assumptions etc. relate to the figures and analysis presented in Table 1:

- 2005 flows are based on average observed flows (Tuesday to Thursday) from TS's permanent ATCs filtered to remove any spurious flows.
- The 2011 flows assume a growth of +21%, as per the Transport Model for Scotland.
- The morning peak of 0700-0800 is presented as observed data indicates this is the busiest hour.
- Motorway capacities of 2,000veh/ln/hr (average) used.
- *50% of the full development traffic (as predicted by the developers but NOT yet audited or agreed by TS) assumed to use M8 in 0700-0800.
- LoS based on the HCM2000 with a maximum capacity of 2,000veh/ln/hr and a Design speed of 70mph. **LoS A** < 0.35; **LoS B** 0.36-0.54; **LoS C** 0.55-0.77; **LoS D** 0.78-0.93; **LoS E** 0.94-1.00 & **LoS F** >1.00.

20. The analysis presented in Table 1 is illustrative only and takes no account of any weaving, merging or diverging traffic which will impact upon the assumed capacity.

21. Table 1 suggests that by 2011, even without any development traffic, a number of sections along the M8 will experience LoS F i.e. forced or breakdown flow, formation of queues, extremely unstable flow conditions.

22. With the addition of 2500 new houses it is reasonable to expect the levels of service along the M8 to deteriorate. This is illustrated in Table 1 where 50% of the development traffic has been added to the projected flows. (Whilst the levels of development trips have been audited, the assignment of these trips to the network has not, so a degree of caution is required when interpreting the impacts of development traffic in Table 1).

23. A number of measures may be possible to mitigate the capacity issues expected along the M8 by 2011. These include:
    - Hard shoulder running;
    - Additional new lanes;
    - High occupancy lanes;
    - Automatic traffic management i.e. variable speed limits;
    - Encouraging the use of public transport;
    - Although not directly a mitigation measure, peak spreading is also likely to occur.

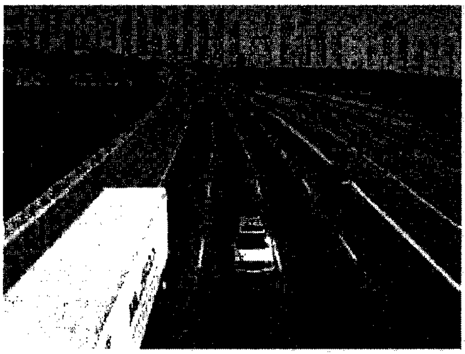
24. Transport Scotland has not yet examined these mitigation measures. Improvements of this nature are likely to be considered within the context of the ongoing Strategic Transport Projects Review (STPR) currently due to conclude in August 2008. However, it is reasonable to conclude that not all will be implementable either due to cost or corridor constraints.

25. Similar measures will undoubtedly be required to mitigate the impacts of the development trips. Transport Scotland has, however, not yet seen the measures proposed by the developers or their consultants to mitigate the impacts of the ROF Bishopton development.

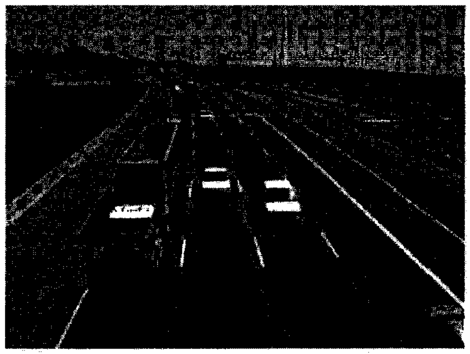
Conclusions

26. Transport Scotland considers the M8 motorway east of Junction 29 St. James currently experiences differing levels of congestion, particularly during the morning peak period. As traffic levels continue to rise, this congestion is likely to become worse even without the development of the ROF Bishopton.

27. Transport Scotland has not yet seen any detailed analysis of the ROF Bishopton traffic and therefore is unable at the present time to fully assess the impacts. A detailed assessment is not expected until the completion of the DMRB Stage 2 and Stage 3.



Level of Service A



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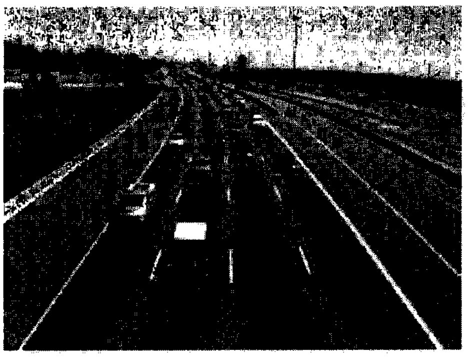

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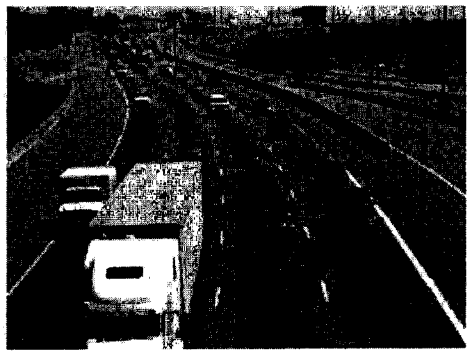

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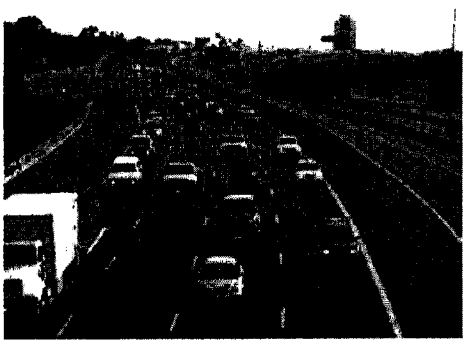
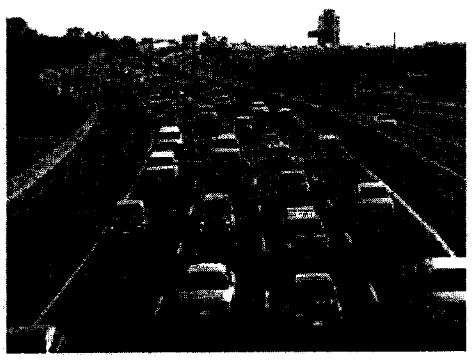


Level of Service E



Level of Service F

Illustrative Levels of Service
(Refer Highway Capacity Manual 2000)