

ASSET MANAGEMENT GUIDE FOR PROJECT DESIGN FORMAT

1. BACKGROUND

There has been an increasing awareness of design features, which produce poor whole-of-life costs. These poor whole-of-life costs manifest themselves as post-construction maintenance difficulties, insufficient space for future projects, and ongoing problems for other industry sectors such as heavy haulage and utility providers. These difficulties can produce unnecessary costs, which are initially borne by the related agency and then are a cost to the economy.

It is acknowledged that there is a cost to this process, in that closer attention to detail is needed by those involved in project management and development. However, the physical works costs are not necessarily great and much can be achieved by closer attention during planning and design.

2. OBJECTIVE

The objective of the *Asset Management Guide for Project Design* (AMGFPD), is to assist project managers to pre-identify and either eliminate or reduce post-construction problems.

3. AIM

This AMGFPD is produced as a discussion document that can be applied in a similar fashion to the safety auditing process or a stand-alone guide. Once this guide has been distributed and comment received, re-formatting this may have merit to make it easier to use.

4. STRUCTURE

The structure of this AMGFPD is firstly to identify problem areas, then targeting their solution at the appropriate phase of the project. So, once an area of concern is identified in the appropriate stage of the project, it is either resolved or referred to the next phase of the project to be dealt with.

5. PROBLEM AREAS

5.1 Landscaping

Mowing of large tracts of grass, especially in the motorway environment, is expensive. Alternatives to grass need identification, however if grassing is the chosen option, then the ability to mow it with ride-on tractor mowers needs to be maximised.

Problems with ride-on tractor-mounted mowers are gradients, access, and safety related.

Gradient

Ride-on mowers require slopes less than four horizontal to one vertical, however steeper slopes can either be mown with hydraulic arm mowers, which have limited reach, or manually with weed-eaters, but this is more expensive.

Access

Areas to be mown need to be accessible - preferably with access away from the carriageway. Access is often severed by the location of guardrail, batter slope and drainage features, or combinations of these.

Safety

Median and other areas, which are narrow or have limited space (e.g. no or little shoulder width), have to be mown with a mobile closure (i.e. attenuator vehicle trailing the mower). This is a hazard in itself and limits mowing opportunity. To identify alternative options consult Transit's *Guidelines for Highway Landscaping*.

5.2 Maintenance Access

In addition to mowing, access is needed for other maintenance activities, so severance or isolation of areas as described above can be avoided. Such maintenance activities include clearing silt ponds, drainage works, and off-carriageway parking of plant for pavement works.

5.3 Barrier Design

Barrier profiles need to accommodate lifts of thin asphalt surfaces, also the barrier type needs to be able to be repaired easily if damaged. Barrier terminal spare parts should be readily available.

5.4 Skid Resistance

Combinations of various factors can lead to premature loss of skid resistance, mainly polishing (loss of microtexture), due to a variety of factors either in isolation or more often in combination. These factors are:

- Geometry, i.e. tight radii, insufficient super-elevation, and areas that hold surface water.
- Traction demand due to geometry, heavy vehicle acceleration and braking.
- Accident migration.
- Change in driver behaviour.
- Vehicle type.

5.5 Drainage Maintenance

Drainage and other features such as sumps, manholes, culvert ends, and sub-soil drains, need to be accessed for maintenance and have their location referenced as well as marked.

Water will enter granular layers from various sources, such as the shoulders of super-elevated pavements, the sub-grade and through the surfacing. Sources need to be identified and eliminated plus layers need to be able to drain.

5.6 Landscape Plantings

Site planting should be consistent with Transit's *Regional Landscaping Strategy*. Consult with the network Outcomes Primary Supplier, or equivalent. Of particular concern, is to keep shrubs which will have trunks over 100mm in thickness, out of existing or future clearways.

Note: Uniformity of landscaping is not necessarily warranted. A particular project may have a design landscape theme, however it needs to conform to the landscaping strategy.

5.7 Bridge Design

Access for bridge maintenance and projected utility demand needs to be catered for. Also ensure that there is sufficient space for adding to both the width of and the space under bridges for future works.

The pick-up points for surface water shall normally be cesspits of a type shown to be able to catch the water without significant overshoot, and able to catch materials that would otherwise be likely to block the outlet pipes. Cleaning of the cesspits must be straightforward.

If it is not practical to use such cesspits on the bridge, it must be shown that the water will not overshoot and that the drainage pipes will not normally block. To simply provide access for unblocking pipes, although important, is not sufficient if blockages may be frequent.

5.8 Heavy Haulage

Design of structures needs to ensure that heavy haulage is not compromised in terms of weight or dimension. Design to allow loads six metres high and ten metres wide to get under or around structures.

For bridges on heavy haul routes, make provision for bridges to handle vehicle crossings, without crossing conditions such as travel Central on Beam.

5.9 Emergency Service Provision

Emergency services require areas for the like of tow-truck and Police car parking, barrier crossings, access from side streets, and median barrier gates.

5.10 ATTOMS

The development of ATTOMS will necessitate the designing of features into projects.

6. INDICATIVE BUSINESS CASE

6.1 Maintenance Cost

Given that the project concepts will begin development at this stage, consideration of identifying possible future maintenance whole-of-life cost implications, needs to be carried out.

6.2 Diamond Interchanges

These provide the advantage of being able to divert traffic via the off- and on-ramps to enable work to be carried out on the pavement between ramps, and on the bridge itself. They also provide a path for over-dimension loads to pass if the underpass height is less than six metres.

Note: The alternative (Parclo/looped) ramps have higher skid resistance demand, due to the tight radii, and are not desirable.

7. DETAILED BUSINESS CASE REPORT

7.1 Designation

Sufficient land needs to be designated to accommodate formations with mowable slopes.

7.2 Liaison

Network Outcomes Primary Supplier or equivalent liaised with, to identify existing maintenance problems to be dealt with.

7.3 Strategic Case

This provides background information, which may affect the project and should be referred to for traffic data, land use implications, and potential risk to route security.

7.4 Services

- Check with utility agencies to make provision for future services.
- Allow at least twice the capacity identified from utilities.
- Encourage utilities to jointly designate service corridors adjacent to motorway carriageway.

8. PRE-IMPLEMENTATION PHASE

8.1 Landscaping

- Batters mowable or alternatives designed.
- Site access to mown areas and silt ponds established.
- Plantings consistent with landscape regime.

Refer to the Transport Agency's Guidelines for Highway Landscaping for further guidance.

8.2 Maintenance Access

Access to areas to be mown. Maintenance access to:

- Silt ponds.
- Culvert ends.
- Sub-soil pipe ends.

- Sumps and manholes.
- Bridge inspection.
- Areas for staging of maintenance activity.
- Median gates for contra flows.

Check with Network Outcomes Primary Supplier or equivalent, over maintenance problems that need to be accommodated in the design.

8.3 Surface Drainage

- Eliminate any flat spots where water will pond.
- Surface shape that will concentrate surface water.
- Features to enable trapping of hazardous spills.
- Bridge surface drainage is effective, easy to maintain, and overflow of sumps will not cause damage.

8.4 Granular Pavement Layer Drainage

Water infiltration can be reduced and pavement layer drainage enhanced by:

- Sufficient binder film thickness.
- Sub-grade shaped to drain toward the nearest space exposed to the atmosphere.
- Sealing the high sides of super-elevated curves.
- Placing small diameter sub-soil pipes at the base of granular pavement layers.
- Separating sub-soil drainage systems from stormwater.

8.5 Graffiti Protection

- Check with Network Outcomes Primary Supplier, or equivalent regarding consistency of graffiti protection.
- Role of landscaping in deterring of tagging landscape planting screening.

8.6 Lighting

Lighting from median design cabling into median barrier.

8.7 Utilities

Allow space for projected growth of services.

8.8 ATTOMS and Emergency Response

- Is there any need to provide for fibre optic installation?
- Are facilities needed for emergency access, such as median cross-over?
- Plan for emergency service off-carriageway parking.

8.9 Skid Resistance

Careful whole-of-life analysis of reduced surfacing life is necessary if geometric standards are compromised. Refer to the Transport Agency's *Specification T/10* or Transport Agency Pavement Specialists in National Office, for aggregate performance.

8.10 Owner's Manual

Design Report to provide the Engineer of the physical works contract, with construction drawings and documentation of aspects of the design that require incorporation into the physical works contract conditions. Engineer will develop this into the equivalent of an Owner's Manual for delivery to the Transport Agency's Maintenance Contract Manager.

9. CONTRACT DOCUMENT PREPARATION

- Ensure features are covered in construction drawings and job specification.
- Drainage features are referenced with GPS and outlets marked.
- Contractor updates Owner's Manual.
- Constant attention to landscaping is carried out over the maintenance period.

10. POST-CONSTRUCTION

The Engineer to provide the Owner's Manual and deliver it to the Transport Agency's Maintenance Contract Manager, who will need to carry-out future maintenance of the finished project. This Owner's Manual will document aspects of the design that will need maintenance attention to ensure the integrity and life of the asset is preserved.