TNZ Q/3 NOTES: 1995
TNZ Q/4 NOTES: 1995

NOTES TO SPECIFICATIONS FOR NORMAL AND HIGH QUALITY ASSURANCE LEVEL CONTRACTS

These notes are for the guidance of Transit New Zealand's staff and consultants, and must not be included in the contract documents.

1. SCOPE

The quality assurance requirements covered in TNZ Specifications Q/3 and Q/4 should be applied to all contracts on state highways which involve road construction, road maintenance, and structures. The timetable for the application of the requirements is covered in clause 6 of these notes.

The requirements are to be applied to contracts which include the following activities:

Road Construction	Road Maintenance	Structures
Earthworks and Drainage Basecourse and Kerbing Seal Widening Shape Correction and Rehabilitation	Vegetation Control and Grass Mowing Sealed and Unsealed Road Repairs Drainage Maintenance Bridge Maintenance Litter & Detritus Control Snow Removal & Gritting Surface Boxes Traffic Signs and Marker Posts Reinstatement of Raised Pavement Markers	Bridge Repairs Bridge Construction Corrosion Repair Minor Structures Guard Rails and Medians

2. QUALITY ASSURANCE LEVELS

Mandatory quality assurance requirements are to be introduced for all contracts in the appropriate work categories that will continue beyond 1 July 1996. Contracts are to be assessed at one of two levels in accordance with a formula which is included as Appendix 1 to these notes. The level selected determines which quality assurance requirement shall apply to the contract. The following table explains this relationship:

Contract QA Level	Minimum QA Requirement
High	Compliance with TQS1 together with a Contract Quality Plan
Normal	Compliance with TQS2 together with a Contract Quality Plan

3. THE TWO QUALITY STANDARDS

Transit New Zealand is separately publishing two documents as TNZ standards for use on state highways. These will be known as:

- Transit New Zealand Quality Standard TQS1:1995 and Notes; and
- Transit New Zealand Quality Standard TQS2:1995 and Notes

These standards cover the minimum requirements for quality assurance systems at the two levels.

The appendices to these two standards provide examples of the various documents which make up a quality assurance system. The appendices are included in the standards for guidance only, and strict compliance with them is not a requirement of these specifications.

4. THE CONTRACT QUALITY PLAN

This is a contract specific requirement which must be accepted by the Engineer before work commences. In general it is recommended that the contract period should allow two weeks before work must commence, for the production and acceptance of the contract quality plan. The plan sets out the practices, resources and sequence of activities which are relevant to the contract, in accordance with the specified requirements of the contract documents.

Examples include: contractor's personnel, traffic control, construction plans, inspection and checklist procedures, records, and the like. The appendices to the TNZ Standards TQS1 and TQS2 contain examples which set out TNZ's minimum requirements for a contract quality plan.

5. ALTERNATIVE QUALITY ASSURANCE SYSTEMS

5.1 Normal Quality Assurance Level Contracts

Acceptable alternatives to TQS2 include the following:

- NZS ISO 9001:1987 or NZS ISO 9001:1994; or

- NZS ISO 9002:1987 or NZS ISO 9002:1994; or
- TQS1:1995

5.2 High Quality Assurance Level Contracts

Acceptable alternatives to TQS1 include all the NZS standards listed in clause 5.1 above.

It should also be noted that although evidence of system development is the minimum requirement on 1 July 1996, certification to TQS1 or any of the above alternatives should be accepted.

6. APPLICATION OF THE REQUIREMENTS

6.1 Normal Quality Assurance Level Contracts

No evidence of compliance with TQS2 or an alternative quality assurance system is required at the time of tender. The Contractor is only required to operate the specified quality system during the period of the contract.

6.2 High Quality Assurance Level Contracts

From 1 July 1996 contractors will be required to demonstrate that they have developed a system which complies with TQS1. The JAS-ANZ accredited certifying agencies have agreed to issue a statement which will confirm that the Contractor has reached that stage.

Evidence of certification to TQS1 or an alternative quality assurance system is not being introduced until 1 July 1997.

The application of the quality system requirements is dependent upon the date of advertising of the contract. If any uncertainty exists as to the date of advertising, then the Contractor should be given the benefit of the doubt.

7. QUALITY CONTROL INSPECTION AND TESTWORK

Quality Control testwork in the context of these notes and the physical works contract documents is the requirement for the Contractor to inspect and test materials and workmanship to ensure their compliance with the specified requirements.

There are two procedures by which TNZ's agents can ensure materials and workmanship are in compliance with the specified requirements, namely:

- Perusal of the contractor's quality control testing records; and
- Implementing independent quality control testing.

Particulars of the required quality control testing, such as type of test and frequency, and required result (acceptance criteria) are to be included in the relevant clauses of the contract specifications. These particulars are to be determined by the designer to give the required level of confidence that the finished project will meet the Client's requirements. It is important that compliance requirements be set for each activity and material supplied which could affect the quality of the project.

When setting a frequency of testing, consideration must be given to possible variables such as:

- Variations in conditions on site.
- Importation of material to site from different sources.

The stated test methods and frequency of testing should not constrain innovation on the part of the contractor.

Where testing is required to determine that design criteria are met, changes in the specified minimum testing could occur due to:

(a) Consistency of results for a particular test, ie a decrease of test frequency if consistent test results are obtained over a period of time or an increase if inconsistent test results are obtained.

(b) Innovation on the part of the contractor, such as a decrease in test frequency if an alternative traffic management proposal enables access to a greater proportion of the Site than originally anticipated and so removes the need for restrictions imposed within the contract documents.

(c) use of an alternative test method.

Any resulting change in test methods or test frequency should be subject to written acceptance.

Where testing is required to ensure adequate control of a process (as opposed to testing that design criteria are met), the test method and frequency should be submitted by the contractor for acceptance.

Appendix 2 to these notes gives an example of how to schedule the frequency of testing in the contract documents.

APPENDIX 1

FORMULA FOR ASSESSING CONTRACT QA LEVEL

1. Purpose

This formula is to be used to determine which quality assurance level is to be applied to each contract in order to assign the appropriate quality assurance requirement.

2. Delegation

The decision on selecting the appropriate quality assurance level for state highway physical works contracts is to be the prerogative of TNZ's Regional State Highway Manager.

3. Background

The formula has been developed by the Quality Assurance for Physical Works Project's Combined Working Party on Road Construction, Road Maintenance and Structures. TNZ has already adopted the concept of a two-level quality assurance requirement for its state highway contracts. The formula is intended to provide TNZ staff with an assessment method that can be applied consistently throughout New Zealand.

4. The Formula's Elements

Six elements have been chosen as being important in determining the assessment. Set out below are notes on those elements and their use:

4.1 Safety and Traffic Volumes

This has been simplified by using the AADT ie. Average Annual Daily Traffic Count. Where the contract area encompasses more than one road, the road carrying the highest traffic volumes should be used in the assessment.

4.2 Management Activities

This element has been graded in proportion to the number of activities identified.

These activities could include:

- development of a construction programme
- number of subcontractors engaged (eg 3 subcontractors, 3 activities or more)

- preparation of a traffic management plan
- discrete worksite activities eg:
  - excavation
  - drainage
  - backfill and compaction
  - surface preparation
  - surfacing
  - landscaping / tidy up
  - reporting
  - financial management
  - street furniture / finishing
  - emergency response

4.3 Contract Duration

Longer contracts require good record keeping not only to service the contract, but also to ensure financial stability. Longer contracts should receive a higher grade than shorter contracts, and should be subject to some form of external audit.

4.4 Contract Value

As with contract duration, contract value should provide a direct link to the grading of the element. Without financial stability, and the assurances of both a documented system and an external audit, there is a higher risk of failure.

4.5 Public Impact / Disruption

This category has been simplified by using time delays as the measure of the impact.

4.6 Specialisation / Technical Demands

This element has been graded in terms of the consequences of failure for the client. Some typical examples are set out below:

Grade 1: Normal pavement repairs, shape corrections and pavement reconstruction.

Grade 2: Specialist rock work, slip stabilisation and minor structures.

Grade 3: Large scale structures such as major bridges and tunnels.

Formula for Assessing the QA Level

1 Score each contract element on a grade from 1 to 3.

2 Multiply each grade by the element weighting

3. Add up the results to get an index

4. Maximum Index = 3 Minimum Index = 1
If the Index is greater than 2 then the contract should be classified as High QA level
If the Index is 2 or less then the contract should be classified as Normal QA level

5. It is anticipated that at least 50% of contracts would be classified as Normal QA level.

6. Examples of contracts which should be classified using this formula as High QA level include:
Major Road Maintenance contracts of 3 years duration, large scale construction works, and shape correction on highly trafficked roads.

		Guidelines for Element Grades (Grade 1 - 3)			Element Grade	Element Weighting	Product of Grade times Weighting
Element	Element Comments	1	2	3			
Safety and Traffic Volumes	High traffic volumes demand complex traffic management	<500 vpd	500 - 5000 vpd	> 5000 vpd		0.2	
Management Activities	Consider how many activities are to be managed by the Head Contractor	0 – 10	11 – 20	> 20		0.2	
Contract Duration	Longer contracts require established management systems	< 3 months	3 - 6 months	> 6 months		0.1	
Contract Value	Higher value contracts require established management systems	$0 - $0.3M	$0.3 - $1.0M	> $1.0M		0.1	
Public Impact/ Disruption	Consider the impact on the travelling public in time delays	< 2 mins	2 - 10 mins	> 10 mins		0.2	
Specialisation/ Technical Demands	What are the consequences of failure for the Principal (see notes)	Not Critical	Moderate	Significant		0.2	
						Total Index	

APPENDIX 2

EXAMPLE OF A TESTWORK SCHEDULE

Test	Frequency	Telarc lab required Yes/No
Earthworks		
Subgrade Fill Materials		
Scala Penetrometer (clay materials)	10 per placed 100m^3	No
Proof roll (granular materials)	In accordance with TNZ F/1	No
Surface Finish Levels	1 per 60m^2 (max 20m intervals)	No
Low Grade Fill Materials		
Scala Penetrometer	10 per placed 300m^3	No
Surface Finish Levels	1 per 150m^2	No
Imported Subgrade Fill Materials (each source)		
Reactivity to lime	Prior to delivery to site	Yes
Compaction curve	3 sets to determine OMC (5 points each)	Yes
CBR testing	3 sets at each of 0% 2% 4% lime at OMC	Yes
Lime Stabilisation of Subgrade Materials		
Moisture Content	1 per placed 500m^3	Yes
Spread Rate	1 per 400m^2	No
Field Density	1 per 400m^2	No
Depth of Stabilisation	1 per 400m^2	No
Surface Finish Levels	1 per 60m^2 (max 20m intervals)	No
Subbase		
Grading	1 per 250m^3 (loose)	Yes
Sand Equivalent	1 per 500m^3 (loose)	Yes
Crushing Resistance	1 per 4000m^3 (loose)	Yes
Heavy Compaction to establish densities	2 sets (5 points each)	Yes
In situ density	1 per 250m^3 (placed)	Yes
Surface Finish Levels	1 per 60m^2 (max 20m intervals)	No

Test	Frequency	Telarc lab required Yes/No
Basecourse		
Grading	1 per 250m^3 (loose)	Yes
Sand Equivalent	1 per 500m^3 (loose)	Yes
Crushing Resistance	1 per 4000m^3 (loose)	Yes
Weathering Resistance	1 per 4000m^3 (loose)	Yes
Proportion of Broken Faces	1 per 1000m^3 (loose)	Yes
Heavy Compaction to establish densities	2 sets (5 points each)	Yes
In situ density	1 per 200m^3 (placed)	Yes
Surface Finish Levels	1 per 60m^2 (max 20m intervals)	No
Chip Seal		
Size and Shape	1 per 250m^3 (loose)	Yes
Grading	1 per 250m^3 (loose)	Yes
Crushing Resistance	1 per 500m^3 (loose)	Yes
Weathering Resistance	1 per 500m^3 (loose)	Yes
Bitumen — Refer P/3 and P/4	As required by P/3 and P/4	
Asphaltic Concrete		
Refer P/9P		
Concrete (Grade 1 Concrete)		
Aggregate grading	1 per 200m^3 (loose)	Yes
Slump	Every truck	Yes
28 day crushing strength	6 cylinders per pour	Yes
Non-destructive strength testing	As directed	Yes
Drainage		
Line and level	Every line	No
Filter material grading	1 per 150m^3 (loose)	Yes
Bedding material grading	1 per 150m^3 (loose)	Yes
Manufacturers certificate of pipe strength	With delivery	No