



# TAO Authorisation Scheme

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## Document history

Revision	Effective date	Summary of changes
1.0	8 May 2017	First issued as T MU MD 00009 SP <i>AEO Authorisation Model</i>
2.0	29 August 2017	Second issue – changes to previous content include inclusion of maritime engineering disciplines.
3.0	22 January 2021	Third issue – changes to previous content include: inclusion of references to rapid assessment and updates to descriptions of the asset-specific specialist engineering disciplines particularly in rolling stock, communications, track, buildings and electrical sections.
1.0	30 March 2022	First issue as TS 06197.2:1.0 <i>TAO Authorisation Scheme</i> – changes to previous content include: change of name, updates to the maturity rating, system to provide further clarity and specificity, removal of two engineering capability areas, updates to process steps to reflect new business operations which are now online.
1.1	30 March 2022	Second issue as TS 06197.2. This issue includes reference to TS 06197.5 <i>TAO Engineering Services Matrix – Maritime</i> .

## Preface

This is a first issue as TS 06197.2:1.1 and supersedes T MU MD 00009 SP *AEO Authorisation Model*.

This specification forms part of a series of documents that describe the management of the TAO scheme.

This specification provides details of the TAO authorisation scheme and authorisation process for engineering organisations and other stakeholders, including AMB and other TfNSW business units. This process allows organisations to obtain TAO authorisation by demonstrating that they have appropriate systems, processes, resources and competencies to deliver and assure engineering services to the TfNSW transport network.

The changes from the previous version include the following:

- updates to the maturity rating system to provide further clarity and specificity
- removal of two engineering capability areas
- updates to process steps to reflect new business operations which are now online.

## Table of contents

<b>1</b>	<b>Scope</b> .....	<b>6</b>
<b>2</b>	<b>Application</b> .....	<b>6</b>
<b>3</b>	<b>Referenced documents</b> .....	<b>6</b>
<b>4</b>	<b>Terms, definitions and abbreviations</b> .....	<b>6</b>
<b>5</b>	<b>TAO authorisation arrangements</b> .....	<b>8</b>
5.1	TAO assessment method .....	8
5.2	TAO surveillance method .....	10
<b>6</b>	<b>TAO authorisation scheme</b> .....	<b>12</b>
<b>7</b>	<b>TAO authorisation scoping</b> .....	<b>14</b>
7.1	Specifying scope of authorisation in TS 06197.4 and TS 06197.5 .....	17
7.2	Scoping for third party specialist assurance services .....	17
7.3	Scoping for engineering management services .....	18
7.4	Scoping for non-asset specific specialist engineering services .....	19
7.5	Scale and complexity of authorised services .....	20
7.6	Grouping and exclusion of cells in the matrix .....	20
7.7	Arrangements for personnel .....	20
7.8	TAO organisational boundaries .....	21
7.9	Customer evidence supporting the selected scope .....	21
<b>8</b>	<b>TAO maturity</b> .....	<b>22</b>
8.1	TAO requirements .....	22
8.2	TAO maturity rating .....	23
<b>9</b>	<b>TAO authorisation assessment process</b> .....	<b>25</b>
9.1	Step one – initial engagement .....	26
9.2	Step two – scoping and self-assessment .....	27
9.3	Step three – authorisation assessment .....	28
9.4	Step four – follow-on assessment site visits (optional) .....	30
9.5	Step five – assessment finalisation .....	30

# 1 Scope

This document is part of a suite that govern the TAO scheme. This document sets out the scheme rules and administration including details of the assessment process.

# 2 Application

This document applies to organisations seeking to provide engineering services to TfNSW as well as organisations that have gained TAO status.

This document is also designed to inform TfNSW and its agencies of the authorisation process.

# 3 Referenced documents

The following documents are cited in the text. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document applies.

## **Australian standards**

AS ISO 55000 *Asset management – Overview, principles and terminology*

AS/NZS ISO 9001 *Quality management systems – Requirements*

AS/NZS ISO/IEC/IEEE 15288 *Systems and software engineering – System life cycle processes*

## **TfNSW standards**

TS 06197.1 *TAO Authorisation Requirements*

TS 06197.3 *TAO Engineering Services*

TS 06197.4 *TAO Engineering Services Matrix*

TS 06197.5 *TAO Engineering Services Matrix – Maritime*

# 4 Terms, definitions and abbreviations

The following terms, definitions and abbreviations apply in this document:

**AMB** Asset Management Branch

**applicant** an organisation that has applied to the AMB for consideration for authorisation as a TAO

**asset life cycle** stages for an asset from recognition of need through to disposal and any residual risks or liability period

**assurance** a set of structured and planned activities conducted through the asset life cycle providing progressive justified confidence that objectives are being achieved and that the asset is or will be fit for purpose

**authorisation** the conferring of authority, by means of an official instruction and supported by assessment and audit

**compliance** the state or fact of according with, or meeting, rules, requirements or standards

**conformance** compliance with a requirement, standard or procedure

**corrective action** an action imposed by the AMB on a TAO as a result of a nonconformance to implement improvements to its system, processes or procedures to achieve conformance

**EMCA** engineering management capability area

**EPCM** engineering, procurement and construction management

**noncompliance** not having the ability to operate in accordance with the TAO authorisation requirements

**nonconformance** non-fulfilment of a requirement

**review** a method to provide assurance by a competent person that an engineering output complies with relevant standards and specific requirements, is safe and fit for purpose

**SME** subject matter expert

**TAO** Technically Assured Organisation

**TfNSW** Transport for NSW

**TfNSW stakeholder** a stakeholder is any internal or external person, group or organisation that has a direct or indirect commercial, vocational or lifestyle interest in the performance of TfNSW. They can affect or be affected by the actions, objectives and policies of TfNSW

**TfNSW transport assets** transport assets vested in or owned, managed, controlled, commissioned or funded by TfNSW or a subsidiary NSW Government Agency

**transport infrastructure** infrastructure (including associated vehicles, vessels and rolling stock) used for or in connection with or to facilitate the movement of persons and freight by road, rail, sea, air or other mode of transport (including walking and cycling). It includes:

- railways and railway infrastructure
- roads and road infrastructure
- maritime infrastructure and ports
- transport safety infrastructure
- systems, works, structures, buildings, plant, machinery and equipment associated with or incidental to transport infrastructure.

## 5 TAO authorisation arrangements

The TAO scheme provides justified confidence in an entity's ability to provide self-assured services when working on TfNSW transport assets. The issue of AMB authorisation confers the status of TAO to an entity which can be a private or public sector entity.

The TAO authorisation process consists of an assessment for the defined scope of engineering services against which authorisation may be granted. Periodic surveillance of the engineering services provided by a TAO is a condition of authorisation. An entity that is already authorised may make changes to the engineering services it is recognised for through a scope expansion assessment and companies that have not worked for transport for significant period of time may be required to undergo a reassessment to maintain their authorisation.

Authorisation assessment is a process that determines if a supplier that plans to provide engineering services that affect TfNSW transport infrastructure, or the integrity of its assets over the asset life cycle, has the capabilities necessary to provide those assured engineering services. It also provides confidence that a supplier can perform those services at the necessary level of maturity.

The initial level of surveillance is based on the risk identified in the assessment. This will be adjusted depending upon further risks and issues identified as part of service delivery. This allows the AMB to ensure that surveillance levels remain appropriate to the level of demonstrated self-assurance by the TAO along with the associated risk. As the assessed risk level reduces, confidence in the supplier increases and the frequency and depth of surveillance reduces. See Section 5.2 for more details.

### 5.1 TAO assessment method

Authorisation assessment evaluates the completeness and maturity of the systems and processes that support the asset life cycle services. It also determines if a supplier has the necessary capabilities to repeatedly deliver and assure the authorised scope of engineering services in accordance with TfNSW expectations.

The assessment is conducted by examining evidence against the TAO requirements and industry best practice as applicable to the proposed scope of authorisation for a defined scope of works.

The authorisation assessment process outputs are as follows:

- approved scope of authorisation.
- organisational maturity profile
- conditions, weaknesses, improvement suggestions together with corrective actions that are to be addressed to confirm and retain the authorisation.



The approved scope of authorisation is represented in the supplier's engineering services matrix which lists the range of transport related engineering disciplines, services and activities a supplier is authorised to deliver and assure. See Section 6 for details.

The scope identification and verification is done during the assessment through verification of the applicant's record of relevant experience and the suitability of the relevant organisational processes and practices.

The scope of authorisation can be expanded through a scope expansion assessment.

The authorisation of the supplier also includes evaluation of the maturity of the organisational systems that are used to deliver the assured engineering services. The TAO maturity assessment scheme used by the AMB is based upon recognised industry frameworks and standards.

The assessment is conducted in the following two phases:

- Preliminary review – when the applicant undertakes guided self-assessment that supports definition and clarification of the scope of authorisation and compliance to the TAO requirements. This is optional for scope expansion assessments or re-assessments.
- Assessment – when the AMB assesses the maturity of organisational systems and processes through the evaluation of compliance to the relevant TAO requirements and evidence of relevant experience of service provision and assurance (including technical assurance) using own processes and systems in accordance with the expected relevant industry practices.

The assessment outcome including identified weaknesses and maturity ratings are made available for TfNSW agencies to assist them in mitigating the associated risks.

When a TAO undergoes a material change that may affect the conditions of its authorisation and may have an impact on its ability to deliver the authorised services it shall inform the AMB as soon as possible so a re-assessment can be performed. The reassessment will be determined by the AMB in collaboration with the TAO. Material changes can include, but are not necessarily limited to, changes to the following:

- TAO ownership
- scope and type of engineering services offered
- TAO organisation, including roles, responsibilities and reporting lines
- TAO engineering plans, processes and procedures.

## 5.1.1 TAO authorisation consultants

An external consultant can be used to assist an applicant in setting up their systems and processes or working through the TAO authorisation self-assessment process. However, such a consultant cannot be the key or the only communication point between AMB and the applicant organisation.

It is expected that applicant and authorised organisations establish long-term direct engagement with the AMB to ensure mutually beneficial collaboration and knowledge transfer on TAO related matters.

A member of the TAO management team shall be appointed as a TAO representative to act as a direct contact with the AMB. This role cannot be substituted by the third party consultant.

## 5.2 TAO surveillance method

TAO status is maintained through participation in the ongoing surveillance activities including audits and reviews of the engineering outputs of a TAO.

Surveillance activities aim to maintain AMB awareness and confidence in relation to TAO performance, scope of authorisation and level of maturity.

The AMB surveillance activities includes monitoring the systems, processes, procedures, tools and deliverables of TAOs.

The surveillance approach is based on the following:

- residual risk identified in the original assessment including level of maturity rating and identified weaknesses
- service delivery risks that depend on the nature and level of the TAO involvement with TfNSW works (complex high risk works or low profile low risk projects)
- TAO performance including issues of a systemic nature identified through other sources during TAO engagements with TfNSW.

The surveillance phase aims to ensure that a TAO remains compliant against its assessed level of capability within the authorised scope and to understand the impacts of major changes or incidents on an organisation's authorisation.

The following are key inputs to the surveillance process:

- agreed actions and risks arising from the assessment
- feedback on the TAO received from ongoing projects
- TAOs maturity profile.

The surveillance is aligned with TAO involvement in TfNSW works and its performance. While surveillance is an independent AMB program, it relies on communication from the TAO and the

involved TfNSW agency to provide early warning of factors or incidents that can impact on a TAO's authorisation. Surveillance activities can also be informed through the outcomes of the relevant TfNSW service delivery activities such as project or program monitoring and control events, judgement of significance events and other assurance activities.

The surveillance activities program is based upon the following:

- scheduled surveillance based on the maturity level of the TAO
- TAO diligence in managing agreed actions from assessment and surveillance audit findings and the type of findings
- risk factors such as project or contract technical risk and the TAO's maturity ratings and identified weaknesses
- notification by TfNSW of TAO performance issues indicating systemic issues with a TAO
- incidents such as project delivery or TAO organisational changes that represent a systemic issue impacting on a TAO's ability to deliver asset life cycle services.

Surveillance is performed through the following:

- collection and review of information about TAO engagements and performance on TfNSW projects
- monitoring the progress of actions arising from nominated AMB assessment and surveillance audit activities
- targeted TAO audits triggered by TAO non-performance or at the request of TfNSW
- AMB TAO technical reviews if required
- regular periodic TAO surveillance audits of the TAO performance within the existing scope of authorisation.

The initial frequency of surveillance audits is based on the level of risk associated with the TAO's maturity assessed during the authorisation phase and the results of ad hoc audits triggered by incidents, risks or nonconformances raised by a TfNSW stakeholder.

The output of these ongoing surveillance activities impacts on the consequent frequency, depth and focus of subsequent surveillance activities.

The outcomes of surveillance of a TAO can include the following:

- modification or removal of authorisation partially (scope reduction) or fully
- imposition of conditions on an authorisation
- requirement for action plans from the TAO to address all identified nonconformance.

## 5.2.1 Serious nonconformance action or incident

In the event of a serious incident or nonconformance that raises a concern, the AMB can conduct an extraordinary audit of a TAO's engineering management and assurance arrangements focusing on areas that can be the root cause of the incident or nonconformance. The AMB consults with the TAO and affected TfNSW stakeholders on the audit findings to determine the appropriate actions. Actions can include the following:

- imposition of requirements for corrective actions with prescribed implementation timescales
- imposition of requirements for immediate corrective action
- withdrawal of selected engineering service areas or disciplines from the TAO status
- withdrawal of the entire TAO authorisation pending successful completion of appropriate corrective actions
- withdrawal of the entire TAO authorisation on a permanent basis.

## 5.2.2 Withdrawal of authorisation

TAO authorisation can be either partially or completely withdrawn under the following conditions:

1. serious nonconformance affecting potential safety or integrity of TfNSW assets
2. serious incident affecting TfNSW staff, contractor, passenger or general public safety
3. repeatable (systemic) TAO (sub-standard performance) non-performance leading to additional costs to TfNSW or affecting the TfNSW transport network capability
4. TAO non-performance in managing agreed actions from assessment and surveillance audit
5. at the voluntary request of the TAO due to withdrawal of engineering services or organisational change.

Conditions one and two would normally be reported to the AMB by means of existing TfNSW contracting arrangements with the TAO.

# 6 TAO authorisation scheme

The TAO authorisation scheme allows for assessing and representing organisational capability to deliver assured engineering services through the following:

- authorised organisational engineering services scope
- organisational processes, systems and practices
- maturity rating against standard organisational engineering management capability attributes detailed in the TAO requirements.

The scope of authorised engineering services outlines the range of engineering services a TAO is recognised to be able to provide in relation to the TfNSW transport assets supporting the TfNSW asset life cycle. It is represented using TS 06197.4 or TS 06197.5, each are two dimensional representations of engineering services. The vertical columns are based on the TfNSW asset life cycle model phases to ensure consistent coverage and ease of alignment of engineering activities a TAO may offer with the TfNSW asset life cycle model. The horizontal rows are engineering disciplines and sub-disciplines that require distinctly different skills, systems, tools and processes.

When an organisation applies for TAO status it shall define the scope of engineering services it intends to deliver to TfNSW or on behalf of TfNSW using TS 06197.4 or TS 06197.5.

There is also a set of TAO requirements that represent recognised industry best practice, which need to be in place to attain TAO authorisation. TAO requirements need to be applied, as suitable, to the scope of authorisation and are grouped into nine generic EMCAs. TAO requirements and associated capabilities are used to assess and quantify organisational maturity within the selected scope of engineering services against the requirements of TS 06197.1.

Figure 1 represents an overview of the TAO authorisation scheme, showing the 9 elements of EMCA recommended to be followed. See Section 8 for further details of these TAO scheme elements.

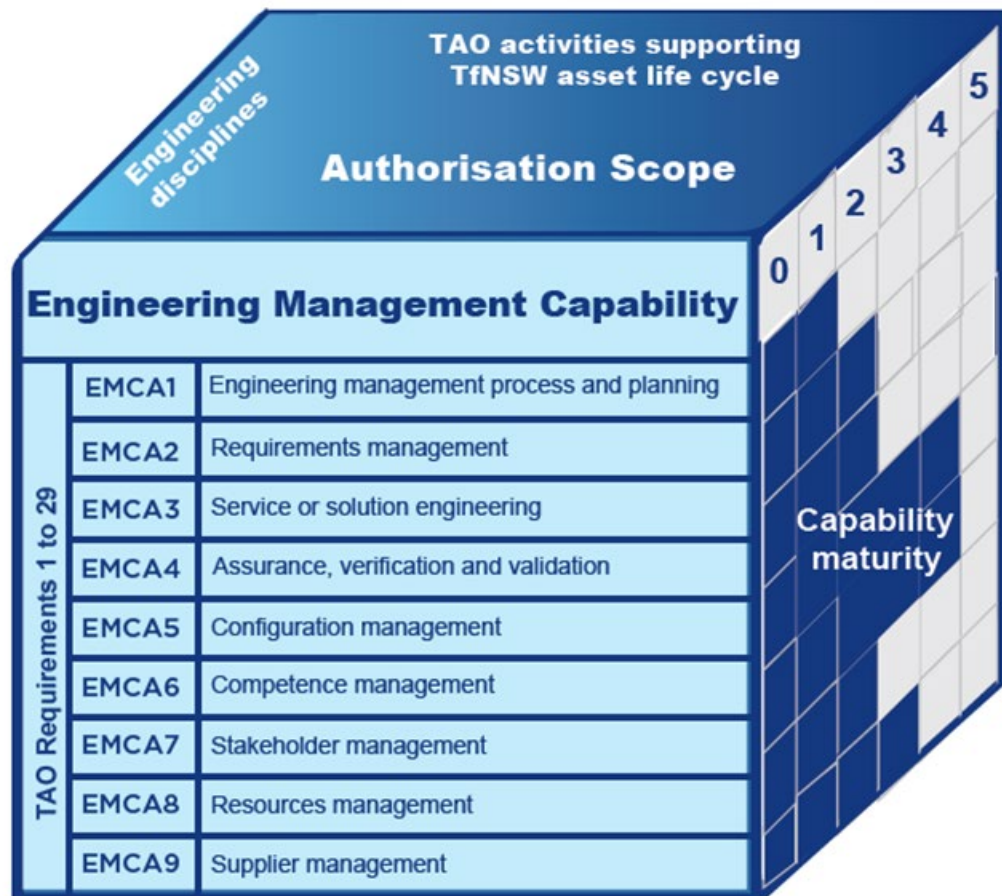


Figure 1 – TAO authorisation scheme

## 7 TAO authorisation scoping

Organisations are granted specific engineering scope when they are authorised as TAOs. This scope represents the engineering services that an organisation has demonstrated it is capable of delivering across the asset lifecycle. A TAO's authorised scope is documented in their engineering services matrix (TS 06197.4 or TS 06197.5). The matrix is used by the following parties for the accompanying reasons:

- TfNSW for scoping of the applicant organisation's services to create the individual TAO's engineering services matrix
- TfNSW to define project engineering services capability for projects
- bidding TAOs to demonstrate their combined TAO authorisation coverage against the project needs.

Sections 7.1 to 7.9 elaborate on rules for authorisation scoping identification and documentation.

Figure 2 shows TS 06197.4 elements.

The information in TS 06197.4 and TS 06197.5 is arranged as follows:

- specialist asset-specific engineering disciplines in horizontal rows related to engineering areas that share common or related principles, practices, systems, processes and skills that make this engineering discipline or area distinctly different from other engineering disciplines in terms of the following:
  - output provided
  - standards, requirements to be complied with
  - resources including systems and methodologies used
  - specialist engineering sub-disciplines used to further define and clarify the specific service an organisation can provide at the lowest level allowed by the TAO scheme
- engineering services related to the TfNSW asset life cycle activities in vertical columns that a TAO may offer which has direct reference to the systems engineering life cycle processes defined by AS/NZS ISO/IEC/IEEE 15288
- non-asset specific services provided as specialist services directly to TfNSW or in relation to other service providers for or on behalf of TfNSW.

The current list of specialist engineering disciplines covers heavy rail, metro, light rail and maritime services including Fleet Engineering, Signals and Control Systems Engineering, Telecommunications Engineering, Corridor Infrastructure and Engineering, Civil Engineering Infrastructure, Interchanges and Buildings, and Energy Networks and Systems.



**Matrix use:**

X	<p>In the version published on the TfNSW website an 'X' in a cell indicates the organisation is capable of provisioning the assured services.</p> <p>Where an 'X' appears in a cell in the 'Specialist engineering disciplines' area it relates to the asset life cycle activity for the specialist engineering sub-discipline whereas 'X' in a cell in the 'Non-asset specific engineering services' area covers the whole asset life cycle.</p> <p>Refer to TS 06197.2 and XXXXX Engineering Services for more details.</p>
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		TfNSW asset life cycle	Plan	Acquire							Operate and maintain		Dispose		
			SRS development Concept or reference design	Design	Material procurement	Manufacturing or fabrication	Construction or installation	Subsystem integration	Testing and commissioning	Acceptance services	Plan asset maintenance	Maintain or upgrade assets	Conduct asset condition surveys	Plan decommissioning or disposal	Conduct decommissioning or disposal
Correct as at: <XX XXX XXX>		TAO activities supporting TfNSW asset life cycle													
<Insert TAO or contract name or title > engineering services matrix															
Specialist engineering disciplines	Fleet Engineering	Locomotives													
		Freight vehicles													
		Heavy commuter electric multiple units or diesel multiple units													
		Rail bound infrastructure maintenance vehicles													
		Rail road vehicles													
		Trolleys and trailers													
		Light rail vehicles													
		Other rail vehicles (shall be specified in notes)													
		Rolling stock subsystems (shall be specified in notes)													
		Signals and Control Systems Engineering	Supervisory and control systems												
			Interlocking systems												
			Trackside systems (including cabling)												
		Telecommunications Engineering	Telecom routes and cables												
			Telecom systems												
			Supervisory control and monitoring systems												
			Telecom wired or fixed networks												
			Telecom wireless or mobile networks												
			Telecommunications facilities												
		Corridor Infrastructure and Engineering	Wheel and rail interface												
			Geometry and alignment												
			Components and structures												
			Roads and pavements												
			Drainage and hydrology												
			Railway surveying												
		Civil Engineering Infrastructure	Engineering surveying												
			Geotechnical												
			Combined services route												
			Tunnelling												
		Bridges and structures													
		Earthworks													
	Interchanges and Buildings	Buildings architecture													
		Buildings structure (note specific areas of specialisation if appropriate in notes)													
		Buildings services (shall be specified in the notes)													
		Certification													
		Specialist buildings expertise (shall be specified in the notes)													
	Energy Networks and Systems	High voltage aerial feeders													
		High voltage cables													
		Traction substation and sectioning huts													
		Distribution substations													
		High voltage protection systems													
		Low voltage power systems and low voltage protection													
		Earthing, bonding, electrolysis and lightning protection													
		Electrical control systems (SCADA) (shall be specified in the notes)													
		Overhead wiring													
		Electrical network planning and modelling													

<b>Non-asset specific engineering services</b>	
Provided as specialist services directly to TfNSW, or in relation to other service providers in the interest of or on behalf of TfNSW (select from definitions in TS 06197.2 if required)	
<b>Service</b>	<b>Service</b>
Asset management systems services (shall be specified in the notes)	Systems engineering and assurance (including systems and safety integration) services (shall be specified in the notes)
Engineering management services (shall be specified in the notes)	Other professional engineering services (shall be specified in the notes)

<b>Notes: specify details of the selected activity for the discipline if required:</b>	
1	

Figure 2 – TS 06197.4 elements



## 7.1 Specifying scope of authorisation in TS 06197.4 and TS 06197.5

Authorisation can be granted for a range of the engineering disciplines and activities over the full asset life cycle. These can be as follows:

6. services specific to a particular TAO asset life cycle activity for a specialist engineering sub-discipline
7. a variety of engineering management services
8. non-asset-specific specialist engineering services (for example, systems engineering or competency management) which are not necessarily life cycle specific.

An organisation is recognised by default to be fully capable of managing and assuring (including necessary technical assurance) the entire scope of its authorised services including providing specialist cross-discipline and life cycle activities of integration and interfacing and systems safety assurance integration across the entire scope of authorisation.

The authorised assured service provision, including specialist assurance, is accomplished using the organisation's own processes, tools and competency capabilities. External resources (another organisation or individual contractors) can be engaged for service delivery, that is, production of works can be by the organisation's personnel, or by a hired specialist workforce (licensed or otherwise qualified professionals) who work under the hiring organisations processes and competency management system. This specialist workforce must work under the hiring organisation's supervision and assurance and the hiring organisation is responsible for providing full progressive engineering/technical assurance activities. Arrangements for personnel explained in Section 7.7.

The scope of authorisation is specified by marking the relevant cell with an X in the matrix.

Placing an X in a cell indicates an entity is capable of provision of the assured (including technical assurance) selected life cycle activity for the corresponding specialist engineering sub discipline, or non-asset specific specialist engineering service, or to perform the specified engineering management (directing people or organisations).

The notes section at the bottom of the matrix should be used to specify details of the selection as suitable. The notes section of the matrix is also used to clarify and record any conditions or limitations to the authorised capability.

## 7.2 Scoping for third party specialist assurance services

Third party specialist assurance services are provided by an organisation that is not delivering the actual asset change or product, but is providing an independent specialist assurance service. Examples of such services include inspections, verification, certification, evaluation,

assessments, testing, design reviews, installation quality assurance inspections, and fabrication quality assurance inspections.

The authorisation option for such specialist assurance service offering is only available for disciplines or activities where this is an existing recognised industry practice. Expected processes, tools and competency capabilities for relevant specialist assurance only authorisation are assessed.

The selection in the service matrix is made by marking the relevant cell with an X and also by making a relevant comment (for example, 'does not perform the actual procurement but provide the acceptance inspection of received goods') in the notes section of the matrix.

## 7.3 Scoping for engineering management services

An entity can be recognised to be able to provide a range of engineering management services directly to TfNSW, to other service providers or on behalf of TfNSW. This is referred to as 'engineering management services' in the matrix.

This capability does not deliver an integration assurance argument or provide technical assurance or make any technical decisions rather, it delivers the following:

- performance of project engineering management
- directing people and organisations to deliver works
- management of design, construction or delivery resources.

Authorisation for engineering management within a TAO's scope indicates that it can act as a head contractor, managing contractor, prime contractor or similar. Such TAOs may act as a managing contractor, sourcing and entering into contracts with designers and subcontractors, managing, coordinating and supervising technical construction services where applicable (for example, managing building works). Such TAOs shall not provide system integrator service, or professional engineering services or consultancy services unless they hold the relevant authorisation for the relevant services. Where such TAOs do not, they shall engage other TAOs to provide these services.

For example, there exists an engineering, procurement and construction management arrangement that is a special form of contracting for some projects within the infrastructure, transport, mining, resources and energy industries. In an EPCM arrangement, the client selects a contractor who provides management services for the whole project on behalf of the client. The EPCM contractor coordinates all design, procurement and construction work and ensures that the whole project is completed as required and on time.

The EPCM contractor may or may not undertake actual site work. It depends on the contractor's specialist engineering capabilities that are scoped separately in the engineering services matrix.

Engineering management as a service offering directly to TfNSW, to other service providers or on behalf of TfNSW, is scoped by placing an X in a cell allocated for the engineering management services in the matrix and adding relevant notes. It is assessed as a service for compliance to TAO requirements as appropriate and in the same way as it has been done for other services.

Note: There is no need to select the engineering services management section in the matrix to demonstrate the ability for an organisation to manage its own authorised specialist asset or non-asset specific services scope. This includes engaging subcontractors within its own scope of authorised specialist disciplines to support its business. This is the default assessed and recognised to be an inherent capability that is detailed in TS 06197.1. Any restrictions, weaknesses in relation to this capability are documented in the matrix notes section in relation to the impacted scope of authorisation.

## **7.4 Scoping for non-asset specific specialist engineering services**

An organisation can be recognised to be able to provide a range of non-asset specific specialist services directly to TfNSW, or to other service providers or on behalf of TfNSW.

These are not internal organisational capabilities supporting its own operations, but services it can deliver externally as specialist services – although the name of those services can be identical to the internal organisational capabilities listed in the TAO requirements document.

For example, there can be a service offering to provide a specialised non-asset specific requirements management engineering, verification and validation, human factors integration, configuration management, or systems integration service (process, tools, personnel or management) to other organisations for a project or program.

Scoping is documented by placing an X in the relevant cell of the non-asset specific engineering services section of the services matrix and adding mandatory notes as detailed in this specification. The selection indicates that an organisation is capable of delivering and self-assuring (including necessary technical assurance) the selected non-asset specific specialist engineering service.

Conditions and limitations for those capabilities shall be outlined in the notes section of the matrix.

The service offering of only managing non-asset specific services that do not require specialist qualifications, tools and systems that are necessary to deliver the service are scoped in the engineering management section of the services matrix (with appropriate notes). See Section 7.3 for details.

## 7.5 Scale and complexity of authorised services

The TAO scheme does not provide explicit rules or categorisation in relation to the scale or complexity of services an organisation is recognised to be able to deliver within its authorised scope.

The notes section of the matrix is used to provide relevant comments based on the assessment findings.

## 7.6 Grouping and exclusion of cells in the matrix

Each cell represents its own unique scope defined in the TAO scheme. Some asset lifecycle activities may not be applicable for some sub-disciplines. Refer to TS 06197.3 for more details on exclusions.

Typical authorisation scope pattern or grouping of certain services capabilities in accordance with industry practice may be discussed during assessment. Guidance exists on the typical civil consultant or typical civil constructor capability profile. The scheme does not prescribe any formal rules in this regard except for the Rolling Stock Subsystems. The notes section shall be used to specify services.

Grouping of various service capabilities in the organisational matrix for the purpose of matching the requirements for a particular work package or project delivery outcome is a project or contract matter and not defined in the TAO scheme.

## 7.7 Arrangements for personnel

A commercial or financial scheme of personnel employment or engagement is not relevant as long as the organisational competency management system, tools and processes meet the TAO requirements and deliver the outcome.

There may be no in house competent personnel available for some positions all the time or at the time of assessment to cover the entire scope of authorisation. This is acceptable if an organisation can demonstrate through documentation and proven delivery history that it meets all competency management TAO requirements and can demonstrate its capability to successfully mobilise-demobilise and manage its service delivery teams using its own competency management system and necessary core permanent in house personnel. It is unlikely that an organisation will be able to demonstrate compliance with the TAO competency management requirements without having any skilled core specialist personnel in house. However, the TAO scheme does not explicitly prohibit this arrangement.

In such a scenario evidence of the organisational ability to manage the local Australian and NSW domain knowledge capability is important.

Note: Employment agencies are not authorised as TAOs.

## 7.8 TAO organisational boundaries

The term organisation within the TAO scheme means an entity that has a coherent process that it operates within as well as a coherent set of business goals, shared or common engineering services or products offered.

This can be a business entity with its own registered business name, own Australian Business Number or overseas equivalent, a subsidiary of a larger organisation, an entire multinational organisation, a distinct organisational unit or department within a larger organisation or an alliance consisting of more than one organisation. The legal details of the grouping are not relevant to the TAO scheme as long as the authorised entity boundaries can be clearly identified and processes, systems and tools ownership, integration and adherence can be demonstrated.

The agreed TAO authorisation boundaries are decided at the time of authorisation.

A change of organisational or business structures triggers the re-evaluation of a TAO to determine the potential impact on the TAO status in terms of the authorised scope, recognised maturity level and authorisation boundaries.

## 7.9 Customer evidence supporting the selected scope

An applicant organisation or an existing TAO seeking to change the scope of authorisation shall provide the AMB with the proposed scope of engineering services using TS 06197.4 or TS 06197.5.

The applicant shall demonstrate its most relevant experience in the successful delivery and assurance of the selected activities within the proposed scope life cycle activity for the specialist sub-discipline or non-asset specific service. The following evidence should be meaningful and specific for each selected activity:

- the project name and brief meaningful description of the relevant successfully delivered and assured service
- the most suitable evidence supporting the service referred to in the preceding bullet point which could be work product examples (reports and design examples), signed plans, acceptance certificates and so on – that would clearly demonstrate to the relevant TfNSW SME what work has been done, assured and successfully accepted
- evidence of appropriate engineering processes and practices implementation as it is expected for the selected scope.

Only a few of the most relevant evidences are to be demonstrated for each TAO requirement and discipline applied for. Necessary detailed guidance in relation for any particular scope or discipline will be provided by the AMB.

## 8 TAO maturity

An applicant shall demonstrate justified confidence in their own systems and processes to deliver an assured asset life cycle service in compliance with the prescribed TAO requirements as applicable.

These requirements are specified in TS 06197.1 and represent the list of necessary organisational practices that are assessed against recognised industry best practice as relevant to the scope of authorisation and allow for quantifying organisational maturity for the selected engineering services.

The assessed maturity is an indication of the level of risk associated with the delivery processes of an organisation. A higher rating indicates a greater likelihood that an organisation will repeatedly produce consistent quality outcomes for its customers. Maturity ratings are made publicly available to inform risk mitigation across the supply chain.

Where practices are not sufficiently mature, organisations are encouraged to improve their existing processes and systems using recognised industry best practice as suitable for their business.

The maturity assessment is done by verifying the evidence against industry best practice and relevant TfNSW guides and standards for TAO requirements as applicable to a particular scope.

Evidence includes project plans, organisational policies, processes, procedures and templates, relevant reports, records and evidence of actual delivery of engineering services in accordance with documented systems and processes.

### 8.1 TAO requirements

AMB requirements for TAOs, as specified in TS 06197.1, represent statements of expected activities to be in place and producing the expected outcome in accordance with the relevant industry practice as appropriate to the scope of authorisation. Those are based on the principles outlined in AS/NZS ISO 9001 and AS ISO 55000.

Fulfilment of the requirement intent, through relevant practice and producing the expected outcome, is examined during the authorisation assessment and expressed through the following:

- assessment report
- final ratings
- list of identified weaknesses (if any) in relation to the assigned rating.

TAO requirements are grouped into 9 EMCAs as follows:

1. engineering management process and planning (two TAO requirements)
2. requirements management (one TAO requirement)
3. service or solution engineering (seven TAO requirements)
4. assurance, verification and validation (nine TAO requirements)
5. configuration management (one TAO requirement)
6. competency management (six TAO requirements)
7. stakeholder management (one TAO requirement)
8. resources management (one TAO requirement)
9. supplier management (one TAO requirement).

The detailed list of requirements, including supporting guidance specific to the discipline and the life cycle phase, references to other relevant standards and examples of typical evidence to assist the applicant to self-assess are in TS 06197.1.

The AMB provides self-assessment tools, forms and guides to the applicants in relation to the TAO requirements applicability and compliance evaluation.

All EMCAs are always applicable. However, the extent of applicability and typical evidence for underlying TAO requirements will differ depending on the scope of authorisation and other limitations. For example, some requirements are applicable to entities seeking authorisation in specific areas such as design or solution engineering and are not applicable to services such as construction or technical advisory.

If a particular capability consists of only one TAO requirement this requirement is always applicable and assessed. For example, the configuration management requirement is always applicable although the method of fulfilment depends on the scope of authorisation and the nature of the TAO scope.

For each applicable TAO requirement the applicant shall provide evidence relevant to the requirement and details of key processes and activities.

## 8.2 TAO maturity rating

The TAO maturity rating quantifies the level of confidence that the AMB has that a TAO will consistently and reliably deliver and assure authorised engineering services.

Maturity ratings range from zero to five as shown in Table 1. A rating of zero demonstrates that the relevant TAO requirement is not implemented and its purpose is not achieved. A rating of five demonstrates evidence of effective and efficient fulfilment of the requirement with full control backed up with continuous measured optimisation and improvement.

**Table 1 – Maturity ratings**

<b>Rating level</b>	<b>Rating level description</b>
0	The organisation does not currently have or meet the requirement or capability.
1	The requirement or capability largely achieves its purpose, but with no plan or control as it is ad-hoc and reactive.
2	The requirement or capability is implemented in a managed fashion (planned, monitored and corrective actions are taken) on a case by case (project or service) basis.
3	The requirement or capability is implemented in a managed fashion using a defined organisational process and is tailored for projects or services accordingly.
4	The requirement or capability is implemented in a managed fashion using a defined organisational process that is measured. Results of measurement are collected, analysed and reported in order to monitor the extent to which the process achieves the business goal.
5	The requirement or capability is implemented in a managed fashion using a defined organisational process that is measured, data analysed and sources of non-performance or variations identified, improvement objectives defined considering opportunities for best practices and innovations, and in alignment with the current and projected business goals. The improvement implementation is managed and effectiveness of the change is evaluated.

Each step in the maturity rating increment is based on fulfilment of the conditions for all preceding levels and includes the additional criteria specified in that level. Identified nonconformances reduce the rating.

The rating impacts the frequency of surveillance audits. An organisation that demonstrates a high level of maturity and compliance will have a less frequent surveillance period than an organisation that demonstrates a low level of maturity.

### **8.2.1 Maturity rating scoring rules**

The maturity rating scoring rules are based on the ISO/IEC 15504 series of standards simplified and tailored for the purpose of TAO so as to achieve the following:

- ensure consistency of rating during assessments or surveillance audits
- increase visibility of where weaknesses are to encourage continuous improvement, inform scoping for surveillance audits and assurance planning for projects
- link nonconformances and their gravity with the scoring system to encourage closure of actions.

Each of the 29 TAO requirements is assessed and scored against each of the five rating descriptions in Table 1. These scores are then calculated to provide the final maturity level



score for the requirement. Major and minor findings against a TAO requirement reduce the score.

The rating description is defined as an objective characteristic of a practice or work product or achievement that is supported by evidence. It is used to confirm that certain activities have been performed in a certain way and are demonstrated through supporting evidence.

An automated tool is used to mark the TAO requirement compliance against each of five rating definitions. Markings are converted into scores and five scores for each requirement are calculated to produce the final rating (the maximum score is 5). Each EMCA and the final organisational rating is calculated by averaging scores for each TAO requirement in the EMCAs. An entity's capability maturity profile is updated through the following:

- assessment
- action management
- surveillance audit.

## 9 TAO authorisation assessment process

TAO assessment applications can be made for the following:

- new applications from organisations seeking TAO status
- renewal applications after withdrawal of TAO status
- scope expansion applications from TAOs to add service areas and disciplines.

An organisation can apply to be assessed outside the normal procurement cycle. In this case the organisation will not have a current contract. The scope of assessment will depend on the organisational business goals. The scope will be clarified during the preparation for assessment and verified during the actual assessment.

An organisation can also be required to apply for TAO status or undertake a TAO scope expansion for a particular project as part of a tendering process. In this case, the scope and the timeline for the authorisation assessment will be defined by the project needs.

The TAO assessment consists of five steps:

1. initial engagement
2. scoping and self-assessment
3. AMB assessment
4. follow-on assessment site visits (optional)
5. assessment finalisation.

Note: Preparation for assessment, including scoping and self-assessment, may take an extended time. It may take a few weeks and a few rounds of application review and

resubmission until the acceptable level of application quality has been achieved and ready for assessment. The duration may also depend on the application priority and resourcing. The actual assessment and assessment finalisation may take up to five or six weeks from the assessment commencement date. Applicants are encouraged to take these timeframes into account and commence working on their application well in advance of the expected assessment finalisation date.

Successful completion of steps one and two result in the organisation being granted pre-qualified organisation status.

Successful completion of steps three or four can result in the AMB issuing a letter of intent to recommend TAO authorisation. This option is available to support the procurement timeline if necessary.

After successful completion of the assessment the AMB issues the following to the TAO:

- TAO letter of authorisation
- authorised services matrix
- authorisation certificate
- final authorisation assessment report including the following:
  - assessment details
  - organisational strengths and weaknesses identified during the assessment
  - agreed with the applicant actions including due dates to address those weaknesses.

Further information about steps one to five is provided in Sections 9.1 to 9.5.

## 9.1 Step one – initial engagement

An applicant organisation seeking TAO status or scope expansion initiates the assessment process by following the instructions provided on the TfNSW website.

The AMB assigns an authorisation facilitator to guide the applicant through the assessment process.

The authorisation facilitator refers the applicant to the relevant forms (online or paper formats) for completion and arranges an initial meeting for new organisations. At the initial meeting the TAO process is explained in detail to the applicant.

At this stage a determination is made for new applicants, in consultation with relevant TfNSW SMEs if required, whether an applicant needs to become a TAO. This determination is based on the applicant profile and other information related to the nature of the applicant's business and services provided.

Where existing TAOs require authorisation scope expansion or re-assessment the process commences with a meeting with the authorisation facilitator who explains the process as applicable.

The priority of application and the assessment timeline is also determined and agreed at this stage.

In some circumstances, where the entity requests limited scope expansion that does not span into a new asset lifecycle phase and has a reasonable level of maturity, a rapid assessment approach is used. This approach is in line with that outlined in this document.

## 9.2 Step two – scoping and self-assessment

The applicant completes the relevant forms provided by the authorisation facilitator. The authorisation facilitator guides the applicant in the following ways:

- responding to applicant queries in relation to the forms use and expected content, TAO scheme requirements and scoping rules
- connecting the applicant with various TfNSW SME groups for detailed guidance and scoping assistance. Scoping meeting with relevant SMEs can be organised
- assisting the applicant enrolling in relevant TfNSW educational and information sessions where the applicant needs education or guidance in relation to particular TAO requirements or documents.

The AMB provides a variety of supporting materials including guides and frequently asked questions (FAQs).

The self-assessment submission requires lists of relevant evidence and brief explanations of applicable practice and processes to be completed by the entity applying for TAO authorisation and submitted to TfNSW. Only the most relevant evidence should be listed with an explanation that demonstrates the relevance to a particular TAO requirement or applied scope of services.

An excess of evidence can be considered as a demonstration of the applicant's misunderstanding of the TAO requirements or applied scope of services. TS 06197.1 provides guidance on each TAO requirement and expected evidence. TS 06197.3 provides guidance on each element of the applied scope of services that is selected in the engineering services matrix and expected evidence.

The authorisation facilitator accepts the self-assessment responses and examines the information for relevance and completeness involving relevant TfNSW SMEs. All scope related issues and any issues related to completeness of responses and relevance of listed evidence are resolved through facilitation between the applicant and the AMB.

Face-to-face meetings or an extended scoping workshop can be organised to clarify the scope and other application details based on the information submitted by the applicant.

When the self-assessment preliminary review is completed to the satisfaction of the AMB the applicant is requested to submit supporting evidence organised in a way that provides clear traceability between the relevant responses in the self-assessment tool and evidence. In some instances listed evidence could be submitted together with the self-assessment forms explaining evidence. Such instances may be agreed with the assigned authorisation facilitator in the interest of saving time for evidence upload. Once the submission is accepted and evidence validated the applicant is considered to be qualified for assessment for the entire scope.

Note: Pre-assessment evidence submission or validation may be omitted from the scope expansion rapid assessment process and the applicant proceeds to an assessment workshop following satisfactory submission of self-assessment forms.

### 9.3 Step three – authorisation assessment

The authorisation facilitator plans and manages the authorisation assessment of the applicant's submissions in accordance with the agreed assessment milestones. The authorisation facilitator works with the applicant and TfNSW SMEs to ensure the following:

- alignment and concurrency of assessment activities and information flow from an AMB perspective
- communication with the applicant including requests for clarification raised by SMEs
- additional evidence submission if necessary
- other necessary resourcing and logistic arrangements for all participants.

The TfNSW SMEs typically perform desktop assessments individually or in groups as appropriate. Necessary interactions (phone and Microsoft Teams conference, applicant visiting the AMB office, site visit as an exception) with the applicant are facilitated by the authorisation facilitator.

The authorisation facilitator ensures collaboration between systems SMEs, assessing systems and processes maturity, and TfNSW specialist SMEs, verifying suitability of systems and engineering capability against the specific engineering scope.

The rapid assessment process for scope expansions provides option of the extended assessment workshop where the assessment conclusion is expected to be achieved during the workshop.

The duration of this assessment step depends on the scope of assessment; however, it should typically take less than three weeks including the assessment week and two weeks for post assessment evidence submission and validation, assessors preparing their final assessment summary and recommendation.

In order that there are no surprises for the applicant the TfNSW SME advises the applicant of any issues identified during the assessment. The authorisation facilitator ensures the integrity of the assessment process and protocol including communication.

This stage is designed to achieve the following outcomes:

- evaluation of applicant engineering management processes maturity
- verification of applicant engineering services scope.

An organisation's process maturity evaluation is done by verifying the correctness and suitability of the applicant responses and evidence as follows:

- against TAO authorisation requirements
- against scale of maturity defined in the TAO authorisation scheme
- for adherence of those to the acceptable TfNSW and industry expectation or practice for that requirement implementation as suitable for the applied scope of engineering disciplines.

This is done by checking the following:

- relevant process framework documentation (organisational processes, project plans, procedures, tools, records and other supporting evidence)
- evidence of process execution for disciplines or services within the scope of authorisation (relevant records, deliverables and processes tailoring to the specific discipline)
- evidence that demonstrates the achievement of the expected requirement intent, outcome, samples of work product as practical and appropriate.

The assessment output provides the following:

- detailed and aggregated maturity ratings that reflect the required relevant practices maturity within the scope of authorisation
- final scope of authorisation that would only include services where the demonstrated maturity of relevant processes and practices (TAO requirements) provides justified confidence to recommend authorisation
- records of identified nonconformances and agreed actions in relation to the assigned maturity.

The AMB assessment is not an assessment of the applicant's personnel involved in the assessment unless the assessed capability depends on a particular person's expertise. In this case it will be a condition of authorisation that the person is available and that the organisation shall undertake agreed reasonable action or effort to document the process or capability.

An organisation's engineering services scope of authorisation is verified by checking the relevant evidence of experience within the applied scope.

Note: There is a provision to authorise a service capability without direct past experience in the activity based on related transferable experience and also on the maturity of relevant processes. It is up to the relevant AMB SME to accept this option on case-by-case basis.

Note: The authorisation assessment does not include detailed technical review of the work products for compliance to all applicable TfNSW engineering standards as it is limited to verification that a suitable process was applied and the presented outcome was successfully delivered or accepted by the client.

## **9.4 Step four – follow-on assessment site visits (optional)**

This stage is only required where the off site assessment phase results in the need for further clarification, submission of additional evidence or there is a need to share with the applicant the preliminary AMB conclusions before the assessment finalisation, for instance if significant risks are identified.

This can be done as face to face individual or group assessment interviews at the applicant's site if required. The efficiency in conducting the assessment shall be taken into account.

## **9.5 Step five – assessment finalisation**

The authorisation facilitator prepares a draft summary report including details of the assessment team, scope and method of assessment and findings which are circulated to the assessment team members.

After the assessment report is reviewed internally within the AMB, the applicant is consulted to obtain their commitment and timeline to address nonconformance findings with the closure of actions.

A post-assessment internal TfNSW review is conducted. This review requires the assessment team to undertake a final joint overview of the applicant's submission and the assessment outcomes. Following this the assessment team shares opinions and concerns, discusses risks and issues and identifies new concerns or risks including those that can arise as a significant area of concern. This can result in raising additional areas of concern, conditions of authorisation, or a risk-based decision to delay authorisation for a reasonable period of time to allow the applicant to address nonconformances, or a decision not to recommend TAO authorisation.

During this stage, the lessons learned and process improvement suggestions shall be discussed and documented. The review is organised as required and can be conducted by telephone, email or meetings. A post-assessment report is created by the authorisation facilitator to capture the outcome of the review.

Where the assessment identifies partial or full noncompliance against some TAO authorisation requirements this does not necessarily lead to refusal but can result in the imposition of conditions on the TAO status. The imposition of conditions occurs if the AMB concludes that identified noncompliance findings are not significant enough to refuse authorisation and agrees to accept the applicant's commitment to eliminate the noncompliance within a reasonable period. The authorisation facilitator will discuss, agree and record any actions the applicant needs to perform to achieve compliance.

After the assessment is finalised internally and reviewed with the customer the authorisation pack including TAO letter of authorisation, TAO certificate, signed and approved TAO assessment summary report and signed engineering services matrix is issued.

The new or updated TAO engineering services matrix is published on the TfNSW website.