

Technical Specification

**Transport and Main Roads Specifications
MRTS305 Dredging**

July 2017

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1 Introduction

This Technical Specification applies to the dredging of navigation channels and related areas (including moorings where required) used by recreational vessels.

This Technical Specification shall be read in conjunction with MRTS01 *Introduction to Technical Specifications*, MRTS50 *Specific Quality System Requirements* and other Technical Specifications as appropriate.

This Technical Specification forms part of the Transport and Main Roads Specifications Manual.

2 Definition of terms

The terms used in this Technical Specification shall be as defined in Clause 2 of MRTS01 *Introduction to Technical Specifications*. In addition, terms listed in Table 2 apply to this Technical Specification.

Table 2 – Terms and definitions

Term	Definition
Allowable working hours	The allowable times that productive dredging can be undertaken and is the lesser of the spread of hours defined in the: <ul style="list-style-type: none"> • General Conditions of Contract. • Statutory Approvals
Dredge areas	The areas shown on the Project Drawings with the defined coordinates, dredge depths and batter profiles
EMP (C)	The Principal's EMP amended by the Contractor to include works program and dredging equipment specific details
EMP (MP)	The Environmental Management Plan prepared by the Principal for obtaining approvals and attached as a contract document
Hard material	Material with an undrained shear strength greater than 200 kPa (for cohesive material) or a SPT "N" value greater than 50 (for essentially non-cohesive soils)
Hydrographic surveying standard	Standards for Hydrographic Surveys within Queensland Waters
Infill	Material deposited above the maximum payable dredged depth between the timing of the pre-dredge and post-dredge surveys
Maximum payable dredged depth	The maximum dredged depth for which the Contractor shall receive payment (shown on the Project Drawings) Payment will not be made for removed material below this depth
Minimum (Design) dredged depth	The minimum acceptable dredged depth (shown on the Project Drawings)
Post dredge survey	A survey undertaken after completion of dredging which will be used for: <ul style="list-style-type: none"> • Volumetric payment • Confirmation that minimum (design) dredged depth has been achieved
Pre-dredge survey	A survey undertaken prior to commencement of dredging which will be used for volumetric payment

Term	Definition
Productive dredging	The process of removing material in the defined dredge areas above the maximum payable dredged depth and transporting it to the disposal site
Productive dredging time	The time used in productive dredging (including transport to the disposal site) but does not include time positioning the dredging equipment to and from the berth or relocating between dredge areas
RHM	Regional Harbour Master (for the watercourse being dredged)
Scheduled volume	The volume shown in the Schedule of Rates and is equivalent to 90% of material to be removed from each Dredge area between the surveyed surface and the Maximum Payable Dredged Depth
Statutory approvals	The approvals and conditions attached to the relevant licences and permits including but not limited to: <ul style="list-style-type: none"> • Environmental authorities • Marine Parks Permits • Concurrence agency comments and conditions
Survey	A hydrographic survey undertaken in accordance with the Hydrographic Surveying Standard
Surveyed surface	The seabed surface detected by a 200kHz (or higher frequency) transducer
TIN	Triangulated Irregular Network (Terrain Modelling System)

3 Referenced documents

Table 3 lists documents referenced in this Technical Specification.

Table 3 – Referenced documents

Reference	Title
-	<i>Standards for Hydrographic Surveys within Queensland Waters (2007: Maritime Safety Queensland)</i>

4 Quality system requirements

4.1 Hold Points, Witness Points and Milestones

General requirements for Hold Points, Witness Points and Milestones are specified in Clause 5.2 of MRTS01 *Introduction to Technical Specifications*.

The Hold Points, and Milestones applicable to this Specification are summarised in Table 4.1. There are no Witness Points defined.

Table 4.1 - Hold Points, Witness Points and Milestones

Clause	Hold Point	Witness Point	Milestone
5.3			Submission of Works Plan (10 days)
5.5	1. Possession of Site		
5.7	2. Start of works		

Clause	Hold Point	Witness Point	Milestone
6.5			Notification of requirement for post dredge survey (five days)
7.4	3. Methodology for positional management		

5 Site Establishment

5.1 Scope of Works and extent of Contract

The scope of Works is defined in Clause 1 of the Annexure.

The Contract includes the supply of all plant, labour and materials necessary to complete the Works in accordance with the Particular and General Conditions of Contract, this Technical Specification, and the following contract documents:

Table 5.1 – Contract documents

Contract document	Reference
Project specific drawings	Drawings index on the: Site Plan, Locality Plan and Cadastral Plan
Information Drawings	Clause 2 of Annexure MRTS305.1
Statutory Approvals	
Geotechnical Investigation	
Environmental Management Plan (Marine Planning)	

Information drawings (where provided) were prepared for purposes other than the Contract Works. The currency or accuracy of the information on these drawings has not been confirmed and shall be verified by the Contractor prior to commencing the Works.

5.2 Environmental management and monitoring

The project specific requirements for responsibility for environmental management, monitoring and notifications is defined in Clause 2 of the Annexure.

5.3 Works Plan

The Contractor shall prepare and submit a Works Plan for deemed approval prior to being awarded Possession of Site. 10 business days shall be allowed for review by the Superintendent, and Extensions of Time will not be granted for delays required by amendments. **Milestone**

The Works Plan includes these elements:

- a) The Safety Plan
- b) The Works Program, and
- c) The EMP (C).

5.3.1 Safety Plan

The Safety Plan will address the following general hazards related to dredging that have been identified in the design process:

- a) undertaking activities near publicly accessible areas (including site compound and land components of pipelines)
- b) working near, in, on or under water
- c) operating plant and machinery
- d) sharing waterways with other vessels
- e) operating vessels in potentially dangerous conditions (bar crossings)
- f) conflict with site services (land components of pipelines), and
- g) dangerous marine animals (stingers, sharks, stone fish, crocodiles and so on).

5.3.2 Works Program

The Contractor shall provide a works program consistent with:

- a) the allowable working times
- b) tide cycles (when required)
- c) project specific constraints, program requirements and the Order of Dredging Works defined in Clause 3 of Annexure MRTS305.1, and
- d) the contract duration.

The Works Program shall show:

- a) establishment
- b) Hold Points and Witness Points
- c) Major works activities (where required)
- d) the programmed start and finish times for each dredge area and the defined Order of Dredging Works (if applicable)
- e) anticipated timing requests for post-dredge surveys
- f) Anticipated Date of Practical Completion, and
- g) disestablishment.

5.3.3 EMP (C)

The Contractor shall amend the Principal's EMP (Marine Planning) to reflect:

- a) their project specific equipment and works program
- b) site practices that will meet the requirements defined in the EMP (Marine Planning) and conditions attached to the Statutory Approvals defined in Clause 2 of the Annexure

- c) environmental management requirements, responsibilities, monitoring and notifications defined in Clause 2 of the Annexure. Where there are differences between the Principal's EMP and the Statutory Approvals the higher standard shall apply, and
- d) the approved EMP (C) shall be kept on site.

5.4 Site of Works

The Site of Works shall include:

- a) the dredge areas shown on the General arrangement drawing
- b) sufficient area to operate plant and machinery, and allow a delineation for safety between the Works and publically accessible areas
- c) sufficient area for a fenced site compound (if required), and
- d) temporary storage areas for materials outside the site compound (subject to implementation of a risk assessment defined in Clause 5.6).

Temporary use of unfenced publically accessible areas during transfer or delivery of materials and plant (subject to implementation of appropriate traffic control).

5.5 Possession of Site and Site establishment

Hold Point 1

Further to Clause 27.1 of the General Conditions of Contract, the Contractor shall supply the following deliverables prior to being granted Possession of Site:

- a) security calculated in accordance with the Particular Conditions of Contract with the value for this project defined in the Letter of Acceptance
- b) WorkCover Certificate of Currency
- c) evidence of insurances required under the Contract (refer to Clause 21 of the General Conditions of Contract) with the values and name of the Principal defined in the Letter of Acceptance
- d) Works Plan (including Works Program and Safety Plan), and
- e) evidence that the proposed vessels comply with registration requirements.

Establishment to site (including preparation of the site compound) shall not commence prior to being granted Possession of Site.

5.6 Site compound

This clause applies if a site compound is required in a publically accessible area for storage of plant and materials.

The site compound includes the contractor's site facilities and fencing to delineate the work area from publically accessible areas.

The Contractor shall make its own arrangements with the relevant managing authority for a site compound adjacent to the works. The site compound shall be:

- a) securely fenced to prevent public access

- b) located to minimise disruption to other activities in publically accessible areas, and
- c) used for unloading and storage of materials for the works. When materials are unloaded outside the compound, public vehicular and pedestrian traffic is to be controlled to avoid conflict with manoeuvring vehicles and loads.

Materials may be stored outside the site compound if:

- a) it is impractical to store the materials inside, and the storage area does not affect the use of facilities, and
- b) a risk assessment has identified and managed the related safety hazards.

5.7 Start of Works

Hold Point 2

Onsite Works shall not commence until all of the following activities have been completed:

- a) environmental management controls have been implemented
- b) notifications required in the Approvals and Conditions have been issued with the required timeframes
- c) limits of work areas or limits of clearing (where defined on approvals and permits) have been identified and marked
- d) traffic control (if required) has been implemented and establishment of the site compound (if required) is complete
- e) other public and worker safety management controls have been installed or implemented, and
- f) services that are part of the Works, may conflict with the Works, or will be hazardous to public or worker safety have been located and marked.

6 Surveys

6.1 Class of survey for payment purposes

Surveys for payment purposes shall be undertaken in accordance with the Hydrographic Surveying Standard. Surveys shall meet the minimum requirements of a Class C survey with a maximum line spacing of 5 m.

6.2 Format of survey data

Survey data will be provided to the Contractor in .pdf, .xyz and .dwg (paper space) formats.

Unthinned, processed survey data shall be used for volume calculations.

Thinned survey data shall be used for clearance of dredged depths.

6.3 Surveys undertaken by the Principal

The Principal shall undertake at its own cost the following surveys:

- a) one pre-dredge survey at the commencement of the project for all of the dredge areas
- b) a post dredge survey at the completion of each dredge area bundle (where bundles of areas are defined in Clause 1 of the Annexure), and
- c) one extra post dredge survey for each dredge area bundle defined in the Annexure provided that the surveyors are established on site.

6.4 Surveys undertaken by the Contractor

The Contractor may undertake surveys to the same standards as the Principal supplied surveys for their own verification of volumes and clearance of dredged depths. The costs associated for these surveys shall be included in the tendered rates.

6.5 Post-Dredge Survey

The Contractor shall give five working days written notice to the Superintendent advising the anticipated completion date of the dredging packages defined in the Annexure to arrange the post-dredge survey. **Milestone**

The Contractor may appoint an observer to be present during the survey but the Superintendent is solely responsible for the interpretation of the survey for clearance of dredged depths and calculation of dredged volumes.

The post-dredge surveys and clearance of dredged areas shall be completed within four working days of the later of:

- a) the anticipated completion date of dredging given in the Contractor's notice, or
- b) the actual completion date of dredging.

6.6 Delay in achieving the anticipated completion date

The Contractor shall be liable to the Principal for the daily standby costs of \$2800 (inclusive of GST) for the surveyors if:

- a) the surveyors are established on site for the notified anticipated completion date, and
- b) the Contractor is delayed for a reason for which they are not entitled to an Extension of Time or standby.

7 Dredging

7.1 Contractor to visit site of works

The Contractor is deemed to be fully informed as to the site of the work, facilities, transportation, storage and handling of materials, availability of labour and materials and other matters and conditions affecting the implementation of the works.

Claims for extra compensation in excess of the tendered price will not be considered on the basis of the Contractor not being aware of local site conditions or unexpected difficulty of the work with the exception of provisions defined in this Technical Specification.

7.2 Selection of plant and equipment

The Contractor is responsible for selecting suitable plant and equipment that operates within the constraints of the project requirements. Selection of plant shall consider:

- a) operating with other vessel traffic within the waterway
- b) dredging to the design depths and profiles at all tidal levels
- c) material expected to be encountered (Refer to the Sediment Sampling Report)
- d) productivity rates that consider the contract duration and allowable working times
- e) transporting the dredge spoil to the nominated disposal or nourishment area
- f) environmental considerations (noise and turbidity), and
- g) profiling the spoil to the design requirements (if required).

Project specific requirements for selection of plant and equipment are defined in Clause 4 of the Annexure.

7.3 Positional management of dredge using onboard equipment

Dredging shall be carried out to remove material only from the designated areas to the design depths and profiles shown on the drawings. The dredge shall be fitted with equipment capable of:

- a) accepting the pre-dredge survey data files (ascii .xyz format)
- b) locating it vertically and horizontally within the dredge areas
- c) controlling and maintaining the dredge head between the design and maximum depths, and
- d) recording dredging progress.

In this clause “dredge head” is a generic term to include cutter head, drag head, excavator bucket and grab bucket.

7.4 Positional management of dredge without onboard equipment

This clause applies when the Contractor is unable to satisfy the requirements of Clause 7.3.

The Contractor shall supply their methodology for management of vertical and horizontal positional location of the dredge prior to possession of site. **Hold Point 3**

7.5 Material to be dredged

This clause applies when a Sediment Sampling Report is included in the Contract documents.

The Contractor shall consider the limitations of the sediment sampling report with respect to sample spacing and depth. With the exception of hard material, the interpolation or extrapolation of the data is at the Contractor's risk.

The Contractor shall not be guided by interpretative comments, analysis or conclusions in the report. The Contractor shall be responsible for interpretation of the source data for determining the extent of material types, the difficulties in dredging and transporting spoil, and selecting suitable plant.

Sediment sampling reports are prepared for the following purposes:

- presence of contaminants
- presence of PASS and treatment requirements
- particle size and undrained shear strength analysis, and
- environmental approvals requirements.

The information provided may include bore logs, laboratory test results and other site data. This information is a description of materials encountered or conditions observed at the defined time and location.

Interpretative comments, analysis or conclusions made by the authors is not guaranteed, and these are only for the Principal's use in obtaining environmental approvals and developing the contract documents.

7.6 Tide boards

The Principal shall install and maintain one tide board. The Contractor shall be responsible for the provision and erection of any additional tide boards, gauges and bench marks which may be required to complete the works.

7.7 Placement of dredge material at disposal area

The tendered rates for dredging include transport and placement to the defined dredged material disposal area or nourishment area as shown on the drawings. The transportation method shall comply with the requirements of the approvals.

Project specific requirements for transport of spoil and requirements for placement within the disposal or nourishment area are defined in Clause 1.1 of Annexure MRTS305.1.

7.8 Use of waterways by other vessels

The Contractor shall not restrict other vessels' reasonable use of the waterway. The Contractor shall comply at all times with:

- a) Conditions imposed by the RHM attached to the environmental approvals, and
- b) Instructions or directions issued by the RHM during the course of the Works.

The master of the dredge vessel shall remain responsible for the safety of the vessel, and shall seek clarification from the RHM if the instruction or direction creates an unsafe situation.

7.9 Daily dredging logs

The Contractor shall provide a log with the following information at the completion of dredging each day:

- a) date
- b) dredge area
- c) weather and sea conditions
- d) start and stop times for vessel relocations and positioning

- e) start and stop times of productive dredging
- f) start and stop times of standby (with reasons for standby)
- g) start and stop times of events not subject to standby, and
- h) estimated production.

7.10 Infill

Infill caused by the following events is at the Contractor's risk:

- a) siltation processes due to stormwater inflows, currents, wave action, tidal processes and watercourse hydraulics (with the exception of extreme weather events)
- b) slumping and deterioration of the batters
- c) local disturbances, and
- d) movement of vessels (including the dredge, dredge support vessels and other vessels using the waterway or watercourse).

Extreme weather events shall include cyclones, the effect of cyclones, and other weather events determined by the Superintendent to have significantly changed the contours of the dredge area. The Superintendent shall consider the characteristics of the weather event and the hydraulics of the watercourse to determine whether an alternative measurement method should be used for work performed and work remaining in the dredge area.

The alternative measurements shall include:

- a) hourly rates for productive dredging based on the dredge logs, and
- b) volumetric rates based on proven performance on dredging undertaken in similar conditions on the same project.

Proven performance shall be determined from surveyed volumetric differences compared to productive dredging time.

7.11 Removal of plant

Dredge plant shall not be disestablished from the site until the post-dredge survey has confirmed that the minimum design depth has been attained throughout the area.

Areas which do not attain minimum design depth shall be re-dredged to the required depth and shall be resurveyed. The cost of the resurvey shall be carried by:

- a) the Principal if it is the first post dredge resurvey for the dredge area bundle defined in the Annexure provided that the surveyors are established on site, and
- b) the Contractor if further post dredge resurveys are required, or the surveyors need to be re-established to site.

7.12 Hourly rates for dredging hard material

If hard material is encountered, dredging at hourly rates will only be undertaken if ordered in writing by the Superintendent. A post dredge survey to calculate quantities for volume removed payment shall be undertaken prior to commencement of dredging hard material at hourly rates.

7.13 Hourly rates for standby

Payment at the standby rate shall be made if:

- a) at least one hour of productive dredging has been completed, and
- b) man-made obstructions not defined on the drawings or in Clause 5 of Annexure MRTS305.1 are encountered during productive dredging.

Examples of man-made obstructions are rope, wire, steel, timber, moorings or other items as agreed by the Superintendent which cause or may cause a blockage in the dredge plant.

Standby shall only apply to the time that the dredge is idle during repair of plant or removal of the obstructions. Separate payment will be considered for the reasonable costs associated with retrieving and disposing of obstructions or potential obstructions but will not be made for repair of damage to dredge plant.

Events excluded from standby include:

- a) mechanical breakdown and maintenance
- b) contractor caused delays
- c) delays with movement of moored vessels in the dredge area
- d) non-productive operations that are an integral part of dredging operations (including relocating dredge vessels, and shifting anchors and pipelines), and
- e) weather and effects of weather (including sea state).

7.14 Interpretation of surveys

Interpretation of the surveys for the volume calculations and depth clearances shall be undertaken by the Principal based on surveys undertaken at the defined class and line spacing. The Superintendent shall be the sole determinant of the payable volume where the Contractor has derived different results for volume or depth clearances.

8 Supplementary requirements

The requirements of MRTS305 *Dredging* are varied by the Supplementary requirements given in Clause 6 of Annexure MRTS305.1.

