CEDA
Central Dredging Association

A CEDA Information Paper

CEDA'S CHECKLIST FOR SUCCESSFUL DREDGING MANAGEMENT

- First product of CEDA's Dredging Management Commission (DMC)
- A generic but comprehensive check-list, to identify and avoid problems in an early project stage
- Shows how the same issues are sometimes experienced differently by different parties
- Improving mutual understanding and thus leading to solutions all stakeholders benefit from

START Thinking and KEEP Thinking

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START Thinking and KEEP Thinking

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This Checklist has been produced by a group of experts with various backgrounds, and perspectives, and a broad range of expertise and experience with dredging projects. The list is by no means meant to be exhaustive. It seeks to encourage/urge/inspire parties to dredging contracts to "START thinking and KEEP thinking".

Introduction:

CEDA'S CHECKLIST FOR SUCCESSFUL DREDGING MANAGEMENT

CEDA's Dredging Management Commission (DMC) was established to initiate and facilitate discussions and innovations from the dredging community on the management of dredging works in the broadest sense. This document – the first product of our new commission – is a generic but comprehensive checklist to help identify and avoid problems, with dredging projects at an early project stage, and to benefit all parties involved. The checklist should not be seen as exhaustive – its aim is to inspire project players to keep thinking.

START Thinking and KEEP Thinking

As we know, we learn the most from our own mistakes and therefore, in an ideal world, the same mistake shouldn't be made twice… With that in mind, we decided to ask CEDA members about their own experiences on the things that have gone wrong in their projects. We wanted to know what happened, when and why. In particular, we wanted to know how it could have been avoided.

With dredging projects, as we also know, it's not uncommon for the same issues to be experienced differently by different parties. CEDA's rich member composition offered an excellent opportunity to capture those differences and we took full advantage of it to fulfil our remit. By highlighting them, this document aims to help the various players get a better understanding of each other's perspectives and therefore come to mutually beneficial solutions.

We are grateful for our members' honesty, which has allowed us to collect some valuable inputs, and collate them into an undoubtedly interesting checklist of possible project 'booby traps' for you. Forewarned is forearmed. Enjoy!

The CEDA Checklist for Successful Dredging Management is an organic document. We intend to update it based on further input from CEDA members and we would like to encourage you to help us in extending this list. Please send your suggestion for further topics and/or subtopics, as well as explanations, to the CEDA Secretariat (ceda@dredging.org) and we'll get back to you.

The CEDA Dredging Management Commission

START Thinking and KEEP Thinking

Topics	Subtopics	Feasibility	Preliminary Studies	Permitting	Basis of Design	Conceptual Design	Basic Design	Detailed Design	Procurement	Execution	Project Closing	Operations	Maintenance	Owner	Consultant	Contractor	Other Stakeholders	Explanation
		Stage												Parties involved				
SCOPE OF WORKS	Definition	X	X	X	X				X	X	X	X	X	X	X		X	It is essential that the Owner, with assistance as necessary, properly identifies and defines the scope of works. This needs to be sufficiently developed prior to entering into contract (to a level dependant upon procurement method). Special attention needs to be paid to clearly define the boundaries of the scope of works (notably what is and is not included) and other factors such as setting the limits as to acceptable working criteria (e.g. resedimentation/turbidity levels).
REQUIREMENTS	General	X		X	X				X	X	X	X	X	X	X		X	Must be fixed before start of design phase. Owner must carefully consider what type of specifications are best for the project. Owner must endeavour to ensure requirements are complete (including requirements from other stakeholders who must be consulted at an early stage). Must avoid contradictions/discrepancies (e.g. between norms/standards and custom specifications). Take care requirements are realistic and feasible (e.g. unachievable tolerances, unrealistic time frames).
	Functional requirements	X		X	X				X	X	X	X	X	X	X		X	Need to be fit-for-purpose. Find right balance in high/low level detailing of expectations (Owner can benefit from leaving more freedom of choice to Contractors).
	Lifetime requirements	X			X				X	X	X	X	X	X			X	Often overlooked. Owner needs to consider CAPEX/OPEX division. Sometimes there are requirements, regarding after-delivery situation, that need to be considered during execution of the project. Consideration should be given to different lifetime-deprivations: technical, commercial, economical.
	Technical requirements / specifications	X			X				X	X	X	X	X	X	X		X	Project faces a risk if technical specifications not detailed enough. Parties must find the right balance between detail and sufficiency of specifications.
ALTERNATIVES STUDY	Location (e.g. site selection, alternative routes)	X				X								X	X		X	Broad consideration should be given to all aspects. Thinking about alternatives can bring efficiencies and considerable savings, in respect of time and money, in later stages of the project.
	Size / lay-out	X				X								X	X		X	
	Time span	X				X								X	X		X	
	Economics / funding	X				X								X	X		X	

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PRELIMINARY STUDIES	**General**			X										X	X		X	Owner must be clear about the status of the provided information: reliability, validity, completeness. Attention must be paid to the quality and integrity of the company responsible for the preliminary study/investigation. Sufficient time should be allocated for execution of possible preliminary studies. In order to deliver relevant results in time, be sure to take into account, in project planning, that certain investigations can take considerable time.
	Soil investigation (SI)	X	X		X	X	X	X	X					X	X		X	Many stages are often required in carrying out differing levels of SI, which should be determined by the project requirements. Owners must not be afraid to invest in a qualitative SI but must make sure to collect the right soil information for the project. Early Contractor involvement during preliminary SIs (e.g. witnessing, assessment of scope of tests (in situ and in laboratory)) can be very useful. Sometimes it is wise to do SI in different stages: first exploring to assess the risks, then further detailing when deemed necessary: desk top, few boreholes or CPTs, further investigation.
	Traffic	X	X	X	X	X	X	X	X					X	X		X	Proper feedback on ship traffic in the working areas (past/present/future) is important information required to asses the efficiency during execution and navigational safety. Nowadays, with AIS Live info, this data can be more easily provided as every vessel is equipped with such devices.
	Navigational	X	X	X	X	X	X	X	X					X	X		X	For safety and/or operational considerations assessments are to be performed on different levels: desktop (expert/experienced judgement), fast track simulations, real time simulations. Owner to assess the relevance/necessity at each stage of the project. The national maritime authorities must be involved early in the process. They will be the major decision-making and approving authority regarding navigational safety measures to be implemented during execution of the project.
	**UXO**	X	X	X	X	X	X	X	X					X	X		X	Different stages: 1. Desktop (historical) study to assess risks on occurrence. If identified with high risk. 2. Site investigation (usually magnetometry, sonar). Decision on removal of anomalies if found. Owner to decide which party responsible for what stage, sometimes this is imposed by local/national regulations. Who takes responsibility of giving 'clearance' to working zone? Possibly addressed by Contractor's site risk management systems.

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PRELIMINARY STUDIES (cont.)	**Wrecks / archaeological values**	X	X	X	X	X	X	X	X					X	X		X	Different stages: 1. Desktop (historical) study to assess risks on occurence. If identified with high risk. 2. Site investigation (usually magnetometry, sonar). Decision on removal of anomalies if found. Owner to decide which party responsible for what stage, sometimes this is imposed by local/national regulations. Who takes responsibility of giving 'clearance' to working zone? Owner may appoint archaeologist to oversee and provide input and sign-off on area to be worked. The national authorities must be involved early in the process. They will be the major decision-making and approving authority regarding handling/protection of wrecks and other archaeological findings.
	Existing (underwater) infrastructure or installations	X	X	X	X	X	X	X	X					X	X		X	Inventory check with local infrastructure Owners. Sometimes missing information needs to be collected on site (e.g. exact position, dimensions). Be aware that sometimes only 'planned' coordinates and alignment are mapped and these may not have been updated after construction or installation. Often no accurate 'as-built' files available (e.g. only xy and no z information on cable or pipeline). In such instances if accurate details cannot be determined this information needs to be communicated within the contract tender. In this respect supplementary site surveys also may be needed at an early stage.
	Environmental state	X	X	X	X				X					X	X		X	Chemical state, fauna/flora, marine mammals, natural turbidity levels, etc. Check whether available information is sufficient or extra investigation is needed. Does the available information cover a sufficiently long time period to be relevant?
	Hydrodynamic conditions	X	X	X	X				X					X	X		X	Water levels, currents, waves, etc. Check whether available information is sufficient or extra investigation is needed. Does the available information cover a sufficiently long time period to be relevant? (Statistical analysis requirements are different for design and operational conditions. Very important in relation to weather delay discussions).
	Meteorological conditions	X	X	X	X				X					X	X		X	Wind, rainfall, visibility, temperature, etc. Check whether available information is sufficient or extra investigation is needed. Does the available information cover a sufficiently long time period to be relevant?

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PRELIMINARY STUDIES (cont.)	**Seismics / tsunamis / other natural disasters**	X	X	X	X				X					X	X		X	Risk in the project area needs to be evaluated properly (usually desktop study). Probability of occurence of seismic activity during execution of the works as well as during lifetime of the infrastructure. Required safety factors in designs often vary significantly (allowed acceleration factors) which can lead to substantial cost impacts. In high seismic risk areas the involvement of specialised, experienced parties at an early stage is essential.
	Disposal sites / borrow areas	X	X	X	X	X	X	X	X					X	X		X	Always consider beneficial re-use options first. Permits should be obtained in time, preferably by Owner unless conditions dictate otherwise. Site investigations should be adapted to what is required for obtaining the permit. Information that might be required includes: bathymetry, soil characteristics, environmental state, local hydrodynamic conditions (e.g. current, available water depth). Seasonal restrictions should be identified and addressed.
	Bathymetry / topography	X	X	X	X	X	X	X	X	X				X	X	X	X	Bathymetry may be very dynamic. Selection of reference level and coordinates should take place as early as possible. Definition of the bathymetry can depend on the type of soil (e.g. nautical depth in mud/silt environments) and needs to be carefully defined. Depending on the type of project, different information on bathymetry might be relevant (e.g. in nautical issues), usually high spots are of interest. Sometimes only actual bathymetry is relevant, sometimes historical evolution is necessary (e.g. for determination of foundation levels for wind turbine foundations). Appropriate equipment and survey frequencies must be used, depending on the required outcome: single, dual frequency, multibeam, etc.
STATUTORY RULES & REGULATIONS	**Impact studies: environmental / social / economic**	X		X	X	X	X	X	X	X	X	X	X	X	X		X	Owner, or sometimes the Contractor, is responsible for execution of impact studies (or have this effectively contracted). These studies will bring environmental/social/economic requirements to the project that willl need to be adequately addressed in the subsequent contract.

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STATUTORY RULES & REGULATIONS (cont.)	**Permitting**	X		X					X	X	X	X	X	X	X		X	Owner should consider, in the early stages, which permits need to be obtained and which party will be responsible for this. The complete permit application process needs to be taken into account in the project planning as this can take a considerable time and additional preliminary studies might be necessary to obtain these permits. It is important to think carefully about what is included within the application for a permit, in particular in respect of dredging techniques and equipment that are described within the application. This is often decisive for the requirements that are included in the resulting permit.
CODES & STANDARDS / GUIDELINES	**National / international / industry**	X	X		X				X	X	X	X	X	X	X		X	Standards: BS, NEN, etc.. Industry guidelines: PIANC, DNVGL, etc.. Owner, advised by Consultant, to consider which to apply and decide/be clear on priorities if any overlap. Choice must be made before start of design phase (usually part of a Basis of Design), independently of party responsible for design. Avoid ambiguity and contradictions with Owner-made specifications or requirements.
	Precedence / priority of codes				X				X	X	X	X	X	X	X		X	
PROJECT RISK / OPPORTUNITY ASSESSMENT	**General**	X						X	X	X	X	X	X	X	X	X	X	Preferably all parties (Owner, Consultant, Contractor, other stakeholders) should be involved, at different stages, in studying the risks and opportunities of a project. In early stages: high level exercise. In later stages: detail review where appropriate. Opportunities can follow from creativity (allowing some freedom within the project performance), that should be stimulated throughout all phases of the project by, for example, early Consultant/Contractor involvement, clever choice of procurement strategy, allowing some flexibility (variants) in choice of concept/design/method, etc.
	Technical	X						X	X	X	X	X	X	X	X	X	X	A balance should be sought between established 'proven' and new solutions. The latter may identify opportunity but can bring extra risk to the project, if unsufficiently tested in practice before, or may not be included in legislation. It can be beneficial to the project to communicate new and innovative solutions with authorities beforehand.
	Financial	X						X	X	X	X	X	X	X	X	X	X	Both risks and opportunities have, in almost all cases, financial consequences. The financial value of risks and opportunities needs to be estimated by experienced personnel. This is essential for Owner budgetary control as well as for the appropriate identifcation, and allocation, of commerical risk during the contract procurement phase.
	Timing	X						X	X	X	X	X	X	X	X	X	X	The importance of a timely execution of the project should be weighed against the higher cost that may be experienced in the event of a need to accelerate the project to achieve the desired date for completion.

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PROJECT RISK / OPPORTUNITY ASSESSMENT (cont.)	**Social**	X						X	X	X	X	X	X	X	X	X	X	The risks and impacts on both the local population, as well as the personnel working on the project, should be carefully considered to avoid deterioration of the local living circumstances and to prevent harm to personnel due to bad working conditions.
	Environmental	X						X	X	X	X	X	X	X	X	X	X	Always consider beneficial re-use options and the applicable balance of risks and opportunities. Spill control options to be part of the risk assessment as well.
	HSE							X	X	X	X	X	X	X	X	X	X	E.g. toxic or explosive environment. Acknowledge in time and follow the correct procedures. Initial investigatory procedures should be set up to identify such issues.
EXECUTION METHODS	**Local content (resources)**	X		X		X	X	X	X	X		X	X	X	X	X		Consideration should be made of the use of local resources and may be incorporated into project requirements (e.g. human resources, equipment, energy sources). May have commerical consideration which could impact project cost.
	State-of-the-art equipment	X				X	X	X	X	X		X	X		X	X		Methods and technology are permanently evolving. Ideally all stakeholders (Owners, permitting authorities, Consultants, etc.) may or may not be aware of the latest developments in the industry. As a result it is important that all stakeholders are at least aware of their specific (lack of) knowledge and do not hesitate to consult other parties in time, if necessary, in order to benefit from their knowledge and expertise in the domain.
	Allowed / imposed / prohibited methods			X			X	X	X	X		X	X	X	X	X	X	The application for permits is frequently decisive as to which dredging methods and equipment are allowed to be used, imposed or prohibited. This may result in undesirable limitations being applied at a later stage. It is important, therefore, to find a good balance in the level of detail that methods, techniques and equipment, are described. This is needed at every stage of a project. The tender and subsequent contract must clearly set out any constraints to the Contractor's working methods. Alternatively, the Contractor may propose a method that will be incorporated into the contract. In such an arrangement, any change to the contractually defined method not due to a Contractor's risk, will entitle the Contractor to a variation.
PROJECT PREREQUISITES	**Land ownership/rights**	X	X	X		X			X	X	X	X	X	X			X	Owner to ensure respective rights and entitlements for work, access, disposal etc. have been made and are in place. Changes post-contract may have significant commerical and programme implications for the project.
	Royalties	X							X	X	X	X	X	X		X		Check if any royalties need to be paid.
	Taxes	X							X	X	X	X	X	X	X	X		Check if any taxes need to be paid and by which party.

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CHOICE OF PROJECT DELIVERY METHOD	Early contractor involvement	X						X	X	X				X	X	X		Investigate practical and therefore commerical benefits and efficiencies in obtaining knowledge and experience from Contractors
	Employer / contractor designed	X					X	X	X	X	X	X	X	X	X	X		Careful selection of procurement method dependant on many factors: EPC, Turnkey, D&B, Traditional, etc.. Specific advice should be sought. Decide which party bears the risk of design. Does the Owner want to retain control (do they have sufficient in-house knowledge to do this properly?)? How developed is the design prior to contract award? May be determined by funder risk constraints.
TYPES OF CONTRACTING ALLIANCES		X							X	X	X	X	X	X	X	X		Does the project warrant a contracting alliance/joint venture (e.g. due to scale or a mix of specialisms)? What are the risks related to such arrangements? Different types of arrangements (e.g. joint ventures, consortia).
TENDER INFORMATION	Correctness and completeness of provided data		X		X	X	X	X	X	X				X	X	X		Where does liability for correctness of the data lay? Is the Owner able to remove any liability for incorrectness? Do they need to give a 'status' to the provided data to clearly indicate the quality of it (e.g. 'for indicative purposes only')? Lots of data might need to be provided for use in the project, and will form part of the dataset. Consultants/Contractors need to review this data carefully, to assess their quality and completeness, and identify if and where there are any gaps. If further information required, the available data can eventually be supplemented by further project-specific investigation/surveys/studies. For this process of data verification, sufficient time should be allowed to Consultants/ Contractors. Often projects are planned for many years and Contractors are confronted with tendering periods of a few weeks only. Short procurement periods will inevitably lead to higher prices, which include provisions for unknown risks, or to disputes later on because of unclear data. A proper dialogue between Owner, Consultant and Contractor during the tendering stage can also avoid misunderstanding of the parties' liabilities at a later stage.
	Responsibility of Owner / Consultant / Contractor	X	X	X		X	X	X	X	X	X	X	X	X	X	X		Critical to establish respective responsibilities. Perhaps develop clear matrix for all parties to use and refer to.
	Interpretation of provided information		X			X	X	X	X	X	X	X	X	X	X	X		Does Owner supply just raw data or does information include analysis and interpretation? Who owns the liability for such interpretative reports and analyses? Often Contractor judges they need more qualitative data, in order to carry out an effective interpretation, but tender periods do not allow for the organisation of much additional soil investigation. In case of offshore drilling, and laboratory testing, several months are required and should be duly considered in the initial planning.

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TENDERING PROCEDURE	**Constraints (e.g. OJEU)**								X					X	X			Are there any constraints to the tender process (e.g. the European procurement regulations)? Is there a requirement (or obligation) to publish and if so, on which platforms? EU tendering does not allow the selection of a Contractor solely on price. EU tendering requires the application of multiple evaluation criteria to come to the 'so-called' best technical/economical proposal. When applied correctly, it can be effective and allows sufficient transparency on how the evalution is performed.
	Formalities								X					X	X	X	X	Formalities to tender process may be determined by company protocols, outside constraints, or the project type itself.
	Contractor selection method / offer evaluation								X			X	X	X	X	X		Award based solely on cost? Consideration of quality or other marker of measurement? Abandon highest and lowest? ECI competition? Design competition? Carefully consider the evaluation criteria and whether or not to allow alternatives. Requirements must be explicit enough so that offers from different bidders stay comparable (e.g. freedom in materials used). If alternative proposals are allowed, it's best to ask for pricing for a basic design that is provided, and well described, in the tender docs to allow fair comparison. For any alternative/deviating proposals, normalising will have to be applied and this can be a very complicated procedure.
	Post-tender meetings / correspondence								X					X	X	X	X	Ensure accurate and comprehensive records kept and then the relevant parts scheduled, agreed and incorporated into the formal contract.
	Additional information collection (e.g. mutual site investigation)		X						X	X		X	X	X	X	X	X	Collaborative working can bring mutual benefits, even if not ECI method, in defining and setting SI parameters and others, so the Owner appreciates the practical requirements of the Contractor. Consideration should be made to allow sufficient time and budget for this process. In order to achieve completion dates, a parallel approach can be taken into account, with the tendering period running in parallel with the site investigations and the completion of the design. However, this will need careful follow-up and good interface management.
	Prequalification								X					X	X	X	X	A prequalification strategy will generally be implemented where it is necessary to restrict the quality of tenderers due to the complexity, risk and/or highly technical nature of the contract package. Prequalification requirements can include technical, commercial or track record requirements and forms a pre-vetting of potential Contractors.

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TENDERING PROCEDURE (cont.)	Competitive dialogue								X					X	X	X	X	Organising a competitve dialogue can be an effective tool for project developers to take into consideration new ideas, reconsider certain conditions etc., and assist negotiations in order to find the most suitable contract arrangement. Downside for the Contractor is that these are often very lengthy, and costly, procedures. Therefore Contractors can be motivated by offering them a loser's fee in case their tendering is not succesful. At the end, due to the dialogues with all bidders, the client will often get a better product, as they will extract their particular expertise and experience, from the bidders, and bring it to the project. A strict procedure should be followed, for example attention should be paid to issues, such as intellectual property (sharing ideas from one Contractor should not occur and will open the Owner to challenge in awarding a contract).
	Handling of non-compliant offers (normalising procedure)								X					X	X			A choice can be made to reject all non-compliant offers but bidders can also be asked explicitly to list any general or particular conditions they want to exclude from their offer. A normalising procedure should then be applied. The process for this must be established and communicated to the tenderers prior to submission of bids.
TYPE OF CONTRACT SELECTION	Standard forms (e.g. FIDIC, NEC)								X	X	X	X	X	X	X	X		Critical to select the appropriate form based on project type, risk allocation etc..
	Client standard								X	X	X	X	X	X	X	X		Client standard forms may need review and amendment to suit specific job constraints, allocation of risk etc..
	Valuation and payment terms								X	X	X	X	X	X	X			Quantity based, milestone based, time based, currency, etc.. Very important in defining the manner and method of assessment of amounts due, including timescales and budget liabilities. This section will contain the appropriate conditions for remuneration under the contract, typically comprising of a preamble, a schedule of prices, and a payment schedule. Also see topic on 'Quantities'.
	Penalties for defaults								X	X	X	X	X	X	X			Inclusion of liquidated damages appropriate to project and financial risk? Risk of commercial claims from others? Owner to consider and pre-evaluate risk of non-performance by the Contractor.
	Warranty conditions								X	X	X	X	X	X	X	X	X	Funders and other stakeholders may require collateral warranties. Has Owner defined warranty requirements? How can Contractor payment be secured? Can the Contractor also request payment warranties from the Owner? SPV (special purpose vehicles companies) are created for dedicated project development where financial structures are to be developed, sometimes in conjunction with the bidding.

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QUANTITIES (CONTRACTUAL)	**Definition**					X	X	X	X	X	X		X	X	X			A proper and clear definition of quantities is essential. These can be m3 in situ / m3 in hopper / tonnes / tds. Also, when applicable, the status of historical data needs to be specified.
	Determination					X	X	X	X	X	X		X	X	X	X		During the execution of the project, the actual quantities need to be determined. The contract must specify the method of measurement (e.g. by hand or by an automated system) A project can also be paid on the basis of lump-sum, in that case determining the quantities can be used as quality control and also for interim payment applications.
	Payment								X	X	X		X	X	X	X		Which quantities are, and are not, paid needs to be specified (e.g net actual quantities). Is any over-measurement allowed? In addition, the payment terms, as well as an eventual retention, need to be specified. What if actual quantities differ a lot (>10%?) from presumed quantities? Does the contract provide for related commerical or planning impact?
CONTRACT AWARD	**Letter of intent**								X	X				X	X			Significant risk in commencing work, or mobilisation, prior to full formal contract. Is contractual relationship entered into under letter of intent? What are constraints and limits of letter of intent?
	Finalisation of the contract								X	X				X	X	X	X	Formal vs. Deemed Acceptance of (all) terms and conditions. Has formal agreement been entered into? Has a party entered into contract due to the commencement of work? Need to ensure clarity of contract terms between parties.
TRANSITION BETWEEN CONTRACTS		X							X	X	X	X	X	X	X	X		When there is a transition from one contract to another, for example for maintenance work, the end situation of the first contract needs to be carefully surveyed and presented to serve as input for the new contract. When there is a change in scope, what goes in or out of scope needs to be identified and prescribed.
INTERFACE MANAGEMENT	**Planning**	X				X	X	X	X	X	X	X	X	X	X	X	X	Effective planning, properly managed and with a workable baseline schedule, is vital to the efficient delivery of projects and will greatly assist the parties in understanding causes and effects of delay events.

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INTERFACE MANAGEMENT (cont.)	**Scope definition**	X				X	X	X	X	X	X	X	X	X	X	X	X	A clear scope definition is one of the, if not the most important, driving factors in ensuring clarity between the parties and the reduction of contractual claims (Also see topic 'Scope of Works'). Especially in multi-disciplinary complex projects, with different contract packages and different Contractors working in same area, and sometimes in the same time period, it is of utmost importance to have clearly defined responsibilities concerning interface management. In such cases it is advisable to set up a clear and comprehensive interface matrix that is carefully managed by the project Owner/Consultant.
	Coordination agreements								X	X	X	X	X	X	X	X	X	It is important that all parties fully understand all project coordination requirements and that these are formally agreed as appropriate. Preferably coordination/interface meetings are scheduled before, and on a weekly basis, during execution of the works. These must be attended by the Owner (or one of their representatives), the Consultants and all Contractors involved.
PROJECT PREPARATION	**Mob / demob**			X					X	X	X	X	X	X	X	X		Owner to give consideration of limitations, or constraints, in respect of mobilisation and/or demobilisation.
	Site preparation	X		X					X	X		X	X	X	X	X		There may exist local, regulatory, environmental or other considerations in respect of the scope and extent of site preparation.
	Client obligations and provisions	X				X	X	X	X	X	X	X	X	X	X	X	X	What is the extent of Owner supplied facilities and utilities?
PROJECT MANAGEMENT / SUPERVISION	**Responsibilities**			X				X	X	X	X	X	X		X	X		Clear role descriptions for project manager and site supervisors / Owner reps: what can they approve, stop, etc.? Agreement on organisation chart, responsibilities and communication lines, before start of works.
	Administration			X				X	X	X	X	X	X	X	X			Effective administration, on all sides, is critical to successful contract delivery and should therefore be set up from the start.
	Document management			X				X	X	X	X	X	X	X	X	X	X	A proper way to take care of all project's administration (see previous topic) should also be set up from the start and any requirements of the Contractors related to this issue should be clearly described in the tender documents.

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		Stage												Parties involved				
PROJECT MANAGEMENT / SUPERVISION (cont.)	**Monitoring & transfer of results**			X					X	X	X	X	X		X			Agree between parties which results will be shared and when. These results can originate from monitoring and supervision, ranging from Contractor submittal review, such as pre-qualifications for suppliers and materials, received materials, plant and equipment, issued shop drawings, test reports, reporting, permitting, etc., to the execution of works on site to monitor compliance with the contract, regulatory and statutory as well as other applicable standards and building codes.
	Progress reporting			X					X	X		X	X		X	X		To provide clarity and transparency to the Owner and stakeholders, a reporting programme will be put in place covering the elements related to the construction activities. The site progress reporting comes from the Contractors to the Consultant, and from the Consultant to the Owner and stakeholders. The reports can cover various topics as per the requirements set by the scope of services within the contract, and/or as requested by the recipient of the report. These reports can be ad hoc, but are mostly as per set intervals such as daily, weekly, bi-weekly, monthly and quarterly, depending on the set requirements of the contract.
	Kick-off meeting (project start up)									X				X	X	X	X	At project start up, a kick-off meeting, to be attended by the Owner, the Consultant, the Contractor and the main stakeholders, is absolutely necessary.
	Variation orders & delays									X	X			X	X	X		Sufficient records should be made and maintained by all concerned parties on variation order instructions/requests and (associated) delays in project performance.
WEATHER DELAY / STANDBY	**Operational limits**			X	X		X	X	X	X	X	X	X		X	X		Operational limits of the whole spread of equipment used during construction to be clearly defined and incorporated into the contract.
	Standby rates						X	X	X	X	X	X	X		X	X		Every construction contract should always contain standby rates, for all equipment and spreads, and under which conditions they will be applied. It is also of utmost importance to agree on the method of measurement to make sure limiting conditions can be unambiguously established.
	**Basis of design**		X		X		X	X	X	X	X	X	X	X	X	X		As the basis of design forms part of the tender documents, and the Contractor will use the data provided in it to estimate downtime, care should be taken with the quality and, if present, the interpretation of the relevant data. To estimate downtime, usually 'normal' or statistical weather and hydrodynamic conditions are relevant, so present these parameters for a 1- to 5-yr return period. If interpretation of this data is left to the bidders, Owner/Consultant should pay attention to their assumptions in order to be able to properly compare and assess their downtime estimates and, as a consequence, the accuracy of the planning they provide.

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WEATHER DELAY / STANDBY (cont.)	**Evaluation base**		X		X		X	X	X	X	X	X	X	X	X	X		Wave buoys, meteorological data, transformation to site, etc. As stated before, unambiguous measurement methods must be agreed on beforehand. Often there is no measurement equipment readily available on the site of works itself, but info has to be derived from measurements coming from measurement equipment nearby. In these cases the methods for transformation of this data should also be clearly described.
MONITORING DURING WORKS	**General**			X	X		X	X	X	X	X	X	X	X	X	X		Clearly specify the procedures that need to be followed when monitoring results exceed treshold values. Different treshold values can be specified in order to allow gradual implementation of remediate actions.
	Turbidity			X	X		X	X	X	X			X	X	X	X	X	Over recent years a combination of spot measurements and hydrodynamic modelling has been deployed to achieve an optimised monitoring program – in order to save expensive measurement time. The level and detailing of monitoring required, during the works execution, will depend on the scale of the project and on the results of the EIA – maybe combined with some local national legal requirements. The actual monitoring of turbidity may range from: 1) spot measurements of suspended sediments, in the overflow (of a TSHD), or measurements around the dredger; to 2) more sophisticated monitoring programs, involving a fleet of fully-equipped survey vessels, operating 24/7 and delivering their input to a continuously running hydrodynamic model, providing a complete overview of turbidity within a specified area; (e.g. the Øresund spill monitoring program).
	Hydrodynamic conditions	X	X		X	X	X	X	X	X			X	X	X	X		The monitoring of hydrodynamic conditions may range from spot measurements of the various hydrodynamic data to the establishment of a full hydrodynamic model covering the project implementation area itself - plus any potential far field impact areas.
	Noise	X		X	X	X	X	X	X	X			X	X	X	X	X	Underwater noise generated by the dredging fleet is becoming an issue in confined areas like a bay (e.g. Fehmarnbelt) or an inlet, due to the impact on migration of sea animals (e.g. harbour porpoise). Monitoring may be a combination of noise measurements in selected locations and modelling of the noise distribution in the area (e.g. to establish a map showing the distribution of threshold values).

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MONITORING DURING WORKS (cont.)	**Meteorological conditions**	X	X		X	X	X	X	X	X			X	X	X	X	X	Nowadays a number of international, and professional, weather forecasting services are available around the world providing accurate and reliable results. However in this respect the project organisation may decide to supplement the monitoring with a few locally installed weather measurement stations. In specific cases parties can establish their own weather forecasting and monitoring tool in terms of a tailor-made hydrodynamic model covering the project area.
	(Intermediate) Inspection of works			X					X	X		X	X	X	X	X	X	The Owner may decide to supplement the monitoring with their own spot checks, mainly of critical operations, but always based on the approved management plans/execution methods. In addition the Owner is to ensure that the site conditions in general are in good order with respect to HSE and orderliness.
	Ecological monitoring			X					X	X		X	X	X	X	X	X	Ecological monitoring may be a combination of spot measurements/observations of the seabed vegetation being affected by increased turbidity levels over a certain period. Consideration should be made of hydrodynamic modelling of the turbidity distribution.
	Air quality			X					X	X		X	X	X	X	X	X	Due to recent restrictions being implemented on the use of heavy fuel with a high sulphur content, some national authorities may be implementing actual measurements of the exhaust from the dredging fleet as part of their monitoring programme. Alternatively this can be addressed by monitoring the type/specification of bunker oil used by the dredger.
PROJECT CLOSE-OUT	**Acceptance tests**							X	X	X	X	X	X		X	X		Final out-surveys (acceptance tests) will be executed when works are completed, or part of the work (see 'Sectional Completion/Milestone Definition') is completed and its quality and completion need to be verified before works can continue (e.g. bearing capacity / compactness of a newly reclaimed area). These tests must be either clearly described in the tender documents (and thus put forward by the Owner and their Consultant), or left to be proposed by the bidders and then, upon agreement by the Owner and Consultant, clearly described in the contract with the winning Contractors.
	Final account / evaluation								X	X	X			X	X	X		Effective management, administration and project control by all parties will assist and facilitate effective resolution of the contract's final account.
	Sectional completion (milestone definition)						X	X	X	X	X			X	X	X		Should be carried out in consultancy with maintenance department/Contractor, or make sure temporary maintenance is taken care of in the contract.

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PROJECT CLOSE-OUT (Cont.)	As-Built file / Operation & Maintenance Manual								X	X	X		X	X	X	X		Any requirements, with regard to As-Built file and/or Operational & Maintenance Manual, should be clearly defined in the tender documents and the contract.
	Site reinstatement								X	X	X		X	X	X	X	X	Extent of site reinstatement should be set out and prescribed within the tender documents and contract. Consideration to be given to stakeholder requirements.
OPERATIONS	Asset management								X	X	X	X	X	X	X	X	X	Project management and delivery should fit with the client's Asset Management System and Warranty Management System. Provide sufficient historical maintenance data to estimate the amount of siltation during execution. Predict or model future maintenance load. Consult maintenance department/ Contractor for interface, make sure responsibilities are made clear.
MAINTENANCE	Maintenance after/during works							X	X	X		X	X			X		Maintenance should be well thought through by the Owner right from the beginning (and even before the start) of the project. The Owner should decide whether they prefer a lower CAPEX at cost of maybe a higher OPEX or vice versa. This decision can have a major impact in the design phase of the project and all maintenance requirements should be very clearly described in the tender docs, even if maintenance does not form part of the scope of works of the Contractor. In project delivery methods, where the Contractor is responsible for the design, attention should already have been paid to maintenance in tendering (Contractor selection) phase, as an at first sight 'cheaper' design (lower CAPEX) may lead to higher maintenance costs later (higher OPEX) and this should be carefully considered during the evaluation.
	Over-period dredging / landslides							X	X	X		X	X			X		See comments above re: maintenance during works
	Maintenance consequential of project works							X	X	X		X	X			X		Prediction/modelling of changing siltation patterns in project area (or vicinity) should be considered. For example a deepening or widening of a berth or fairway could easily lead to higher siltation over following years.
THIRD PARTIES INVOLVEMENT	Classification company								X	X	X		X	X	X			For all third parties relevant to the project, consider one rule: involve them as early as possible. For good communication it is advisable to appoint a liaison officer for each party.
	Marine warranty surveyor								X	X	X		X	X	X			

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CONFIDENTIALITY	**Technical details**									x	x	x	x	x	x	x		Within a project a large amount of technical information is shared. The intellectual property of this information needs to be specified as well as the restriction to make use of the information
	Information about productions									x	x	x	x	x	x	x		For an Owner it is important to know the productions of dredging equipment. If this information can be shared, under restriction if necessary, this needs to be specified.
	Information about innovations									x	x	x	x	x	x	x	x	The intellectual property of innovations should be made clear within the contract.

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