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Reference Material



Temporary Works Management Plan

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FOREWORD

Temporary works are construction elements needed to facilitate the installation and erection of permanent works. They are required for almost every construction project in Hong Kong. However, the particulars of temporary works and the way they should be controlled and managed are often not adequately understood by the personnel involved in the works. This lack of understanding can and has resulted in failures of temporary structures during construction and dismantling, causing major accidents that result in serious injury and fatalities, damage to adjacent property and works and delays to the project.

It is crucial to put the process of control and management of temporary works in perspective, and document the procedure in a plan, to ensure that the personnel involved in the works are fully aware of their responsibilities in the management mechanism.

A Temporary Works Management Plan has been prepared and is given in this publication. The aims of the Plan are to promote awareness and knowledge of the importance of managing temporary work, improve the contractors' management arrangement of temporary works, enhance the competence of those engaged in temporary works management and design, and help reduce accidents arising from temporary works failures.

The Plan was prepared by the Hong Kong Temporary Works Forum (HK-TWf) in collaboration with the CIC. The Plan presents a recommended good practice procedure for the design and control of temporary works in Hong Kong construction projects. The intended scope of application is geared towards civil, building and foundation projects. However, it can also be applied to Mechanical & Electrical (M&E) and Architectural Builders Works & Finishes (ABWF) projects that include components of temporary works.

Contractors may consider making use of this document as a basis for setting up a systematic control framework to manage risks in temporary works within their construction projects. Clients may consider encouraging the use of this document as a standard of best practice on their projects.

Copies of a draft version of this document had been circulated amongst industry members of the HK-TWf (including contractors and consultants) and to local professional bodies, clients and government departments. Many individuals and organisations had made useful comments, which have been taken into account in finalising this publication. All contributions are gratefully acknowledged.

Practitioners are encouraged to comment at any time to the CIC on the contents of this publication, so that improvements can be made in future editions.

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Construction Industry Council

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CONTENTS

FOREWORD	3
WORKING GROUP ON DESIGN for SAFETY	4
DISCLAIMER	5
ENQUIRIES	5
PREFACE.....	8
ABBREVIATIONS	9
1. OBJECTIVE.....	10
2. SCOPE OF PROCEDURE.....	10
3. EXEMPTIONS OF PROCEDURE.....	10
3.1 Worker Access Scaffolds	10
3.2 Plant and Equipment	11
3.3 Lifting Appliances and Lifting Gear	11
3.4 Tunnelling / Mining	11
3.5 Landslip Prevention and Mitigation Works and Ground Investigation Works.....	11
4. TW CHALLENGES.....	11
5. PARTIES INFLUENCING TEMPORARY WORKS	12
5.1 Client / Owner	12
5.2 Permanent Works Designer.....	13
5.3 Teamwork and Cooperation	13
6. DESIGN AND RISK CATEGORY OF TEMPORARY WORKS.....	15
6.1 Temporary Works Design	15
6.2 Design for Safety for Temporary Works.....	15
6.3 Risk Category of Temporary Works	16
7. RESPONSIBLE PERSONS IN CONTROL AND MANAGEMENT OF TEMPORARY WORKS.....	16
7.1 General	16
7.2 Contractor’s Representative	16
7.3 Engineering Manager	17
7.4 Temporary Works Supervisor	18
7.5 Temporary Works Coordinator	18
7.6 Temporary Works Designer.....	19
7.7 Independent Checking Engineer	20
8. TEMPORARY WORKS PROCEDURE	20

8.1	Temporary Works Lifecycle	20
8.2	Planning and Risk Allocation.....	21
8.2.1	Appointment of Qualified Persons.....	21
8.2.2	Training.....	22
8.2.3	Temporary Works Master Schedule and Risk Categories	22
8.2.4	Kick-off Meeting and Regular Review Meetings	23
8.3	Design and Verification	24
8.3.1	Design Brief and Package-specific Workshops.....	24
8.3.2	Task Review Workshop.....	25
8.3.3	Design and Risk Assessment	26
8.3.4	Design Review, Approval and Certification	26
8.3.5	Drawings Released for Construction	27
8.4	Procurement and Construction	27
8.4.1	Procurement	27
8.4.2	Construction Method Statement	27
8.4.3	Inspection and Test Plan	28
8.4.4	Site Works.....	28
8.4.5	Site Inspections/Checking.....	29
8.5	Management of Change	29
8.5.1	Design Change and Changes During Construction	29
8.5.2	Form T3 Released for Construction.....	31
8.6	Verification of As-builts and Safe Removal	31
8.6.1	Temporary Works Installation / Erection and Permit to Load.....	31
8.6.2	Permit to Remove and Temporary Works Dismantling	33
Appendix A – Guidance on Design Brief		34
Appendix B – TW Risk Categories		35
Appendix C – Sample TW Forms.....		36

PREFACE

The Construction Industry Council (CIC) is committed to seeking continuous improvement in all aspects of the construction industry in Hong Kong. To achieve this aim, the CIC forms Committees, Task Forces and other forums to review specific areas of work with the intention of producing Alerts, Reference Materials, Guidelines and Codes of Conduct to assist participants in the industry to strive for excellence.

The CIC appreciates that some improvements and practices can be implemented immediately whilst others may take more time for implementation. It is for this reason that four separate categories of publication have been adopted, the purposes of which are given as follows:

- | | |
|---------------------|---|
| Alerts | The Alerts are reminders in the form of brief leaflets produced quickly to draw the immediate attention of relevant stakeholders to the need to follow some good practices or to implement some preventive measures in relation to the construction industry. |
| Reference Materials | The Reference Materials provide standards or methodologies generally adopted and regarded by the industry as good practices. The CIC recommends the adoption of the standards or methodologies given in the Reference Materials by industry stakeholders where appropriate. |
| Guidelines | The Guidelines provide information and guidance on particular topics relevant to the construction industry. The CIC expects all industry stakeholders to adopt the recommendations set out in the Guidelines where applicable. |
| Codes of Conduct | The Codes of Conduct set out the principles that all relevant industry participants should follow. Under the Construction Industry Council (Cap 587), the CIC is tasked to formulate codes of conduct and enforce such codes. The CIC may take necessary actions to ensure compliance with the codes. |

This publication belongs to the category of Reference Materials and provides standards or methodologies generally adopted and regarded by the industry as good practices.

To allow us to further enhance this publication, we encourage you to share your feedback with us, after you have read this publication. Please take a moment to fill out the Feedback Form attached to this publication and send it back to us. With our joint efforts, we believe our construction industry will develop further and will continue to prosper in the years to come.

ABBREVIATIONS

CDM	Construction Design and Management
CMS	Construction Method Statement
CR	Contractor's Representative
DfS	Design for Safety
EM	Engineering Manager
GI	Ground Investigation
ICE	Independent Checking Engineer
ITP	Inspection and Testing Plan
LPMit	Landslip Prevention and Mitigation
RFC	Released for Construction
RPE	Registered Professional Engineer Temporary Works
TW	Temporary Works Coordinator
TWC	Temporary Works Designer
TWD	Temporary Works Supervisor
TWS	

1. OBJECTIVE

- 1.1 This Plan provides a framework of project controls for the purpose of minimising the risk of Temporary Works (TW) failure throughout the TW lifecycle. The objective is to set out procedures for controlling the planning, design, construction and removal of temporary works, such that the potential for serious or fatal injury is identified, mitigated and eliminated.

The TW lifecycle can be extended back in time during the permanent works design where design decisions directly impact safe methods of construction. However, the scope of this TW procedure purposefully focusses on the TW processes after the permanent works design has already been finalised.

This document does not replace or substitute any design or construction standards or project-specific requirements.

2. SCOPE OF PROCEDURE

This Plan is intended to be applicable to all TW regardless of complexity other than those described in Section 3. When imposing this Plan, project teams may consider supplementing the procedure with project-specific requirements. However, such project-specific requirements should not be less onerous than the minimum procedures specified in this Plan, nor should they depart from the underlying objectives to achieve the safe TW outcomes.

Electronic document management systems are implemented in most construction projects. It is recommended to tailor such systems to facilitate the implementation of the TW control framework in this Plan. A design package number associated with the TW documents, including drawings, sketches, TW forms, etc., should be provided to make it easy to locate all relevant documents in a given TW design package. Establishing document linkages between the TW forms and associated drawings / documents will greatly enhance traceability and ease of use for end users.

3. EXEMPTIONS OF PROCEDURE

3.1 Worker Access Scaffolds

If worker access scaffolds, including access stairways and access platforms, are constructed for the purpose of worker access only, with a maximum controlled allowable loading of 1.5 kPa or 2 kN point load, they are exempt from this procedure provided that they are duly checked and certified safe by a competent person using Form 5, in accordance with the Construction Sites (Safety) Regulations (Cap. 38F).

The exemption shall not apply to:

- (i) worker access scaffolds subjected to a loading greater than the normal worker access loading (max 1.5 kPa), including scaffolds supporting formwork / falsework for concreting, scaffolds supporting material stockpiles or scaffolds supporting construction plant or equipment;

- (ii) scaffolds subjected to loading from public pedestrian traffic; and
- (iii) non-typical or high-risk scaffolds used for worker access only with unusually large unsupported span or cantilever, unique connection details or requiring special design consideration.

3.2 Plant and Equipment

This procedure does not apply to proprietary plant and equipment. However, this procedure does apply to all temporary structures that provide support to such equipment.

3.3 Lifting Appliances and Lifting Gear

This procedure does not apply to proprietary lifting appliances and lifting gear. However, special purpose temporary lifting frames and storage racks shall be subjected to the full application of this procedure. An example would be a purpose-designed lifting frame attached to a building for lifting E&M equipment, but not including elements that form part of the rigging gear.

3.4 Tunnelling / Mining

This procedure does not apply to temporary works associated with tunnelling or mining processes. Temporary works procedures for such processes should be specifically addressed as part of project-specific tunnelling control procedure document.

3.5 Landslip Prevention and Mitigation Works and Ground Investigation Works

This procedure does not apply to temporary works associated with Landslip Prevention and Mitigation (LPMit) and Ground Investigation (GI) works. Most of the temporary works involved in the LPMit and GI works are scaffolding works for access and erection of working platforms, lifting of small-scale plant and equipment onto the platforms and minor formworks, which are exempted from this procedure. Temporary works procedures for LPMit and GI works should be addressed as part of the project-specific control procedure document.

4. TW CHALLENGES

The TW procedure and framework of project controls contained within this document provide a tool to manage the TW lifecycle and introduces mechanisms that trigger necessary actions by responsible persons. However, the procedure alone is insufficient to achieve successful and safe TW outcomes.

TW dynamics are in constant flux from the planning and design stages through to the construction and dismantling stages of the TW lifecycle. These TW dynamics, which inevitably influence safe or unsafe TW outcomes, include but are not limited to the following challenges:

- lack of design of temporary works
- lack of project specific risk assessment
- lack of detailed construction method statement

- lack of safety precautionary measures
- lack of coordination of work among subcontractors
- temporary works built from experience rather than an engineered solution
- unforeseen obstructions and or unpredictable or unforeseen constraints
- changes in construction programme, including complexities introduced when interfacing with other construction activities
- variations in project requirements
- short-term changes in the interim stages of the temporary works erection / dismantling resulting in unforeseen changes in load path or increments in loading
- staff turnover and loss of historical perspective
- differences of opinion on TW methodology amongst various project stakeholders
- subcontractor capabilities and past experience on specialist construction methods
- reliance on competence and experience of workers
- changes in construction equipment or construction material
- additional loadings on temporary works not assumed in the design

It is impossible to foresee every eventuality during a given TW lifecycle. There is added complexity due to multiple overlapping of TW lifecycles interacting with each other, giving rise to the need for continuous re-evaluation throughout each individual TW lifecycle. The above TW challenges can easily be underestimated as this may result in a loss of clarity in the original TW objectives. The TW procedure alone is insufficient to manage such dynamic complexities in the planning and execution of TW. Such complexities can only be mitigated by constant vigilance by the responsible persons who need to be sufficiently competent and with the sufficient experience and initiative to action on the dynamic changes.

The TW procedure should be implemented taking into account of the above human factors. It is important to promote awareness amongst the project team via TW training, policies and culture change to ensure that the overall TW lifecycle objectives will not be overwhelmed by the short-term decisions during the day-to-day construction activities.

5. PARTIES INFLUENCING TEMPORARY WORKS

5.1 Client / Owner

Temporary works are often a significant part of a project's construction cost. Even for simple schemes, efficient design, management and installation will radically improve project delivery.

A temporary works failure on a project is almost always a high-consequence event. A significant failure may be catastrophic to budget, programme and reputation, as well as to safety.

One of the purposes of this procedure is to assist clients, client representatives, programme managers and other senior leaders in the construction industry in the improvement of temporary works risk control and performance on their projects.

This procedure is written to provide clients, and all those with the responsibility for construction, with a framework of project controls for the design, management and implementation of temporary works. It is hoped that it is of use to all clients and senior managers, of both large- and small-scale works, whether they are involved in construction, including those whose normal work is not in construction but in procurement of construction works.

5.2 Permanent Works Designer

Permanent works designers need to eliminate, reduce or control the risks in their design (DEVB, 2006¹). Where it is not possible to eliminate the risks, they should provide information on the significant residual risks that could not be designed out to the contractors and other designers who could be affected by those residual risks. Permanent works designers are expected to:

- (i) understand how the structure can be constructed and the requirement for temporary works;
- (ii) determine if, by altering or supplementing the permanent works design in some way (so far as is reasonably practicable), temporary works risks arising from construction, use or dismantling of temporary works can be eliminated or reduced; and
- (iii) consider what useful information should be passed on to the contractor (i.e. the pre-construction information).

Although this procedure does not cover permanent works design, it is recommended that temporary works and construction method specialists are engaged in the early stages of the design development of the permanent works. In areas where there is a high risk in the temporary conditions or temporary works, permanent and temporary works designers could then consider at the early stage the heightened risk profile and work together to develop a better scheme which will produce lesser risks.

5.3 Teamwork and Cooperation

Safe TW outcomes require contributions from multiple project stakeholders, including clients, supervising engineers, contractors, subcontractors, designers, checkers, etc. The common interest amongst all stakeholders to achieve safe TW outcomes needs to be encouraged and fostered amongst project teams despite the existence of conflicting underlying interests. The TW lifecycle can only be achieved through teamwork because it is impossible for any one individual to cover the full spectrum of responsibilities in the TW lifecycle.

Failures in the TW lifecycle can often be attributable to human behaviour, including misunderstanding, miscommunication or unauthorised shortcuts, such as

- unrealistic timeframes or insufficient time provided for TW design and checking
- inadequate communication of construction sequence, methodology, loading, etc., prior to the commencement of design
- failure of designers to understand or accommodate construction difficulties

¹ DEVB (2006). Guidance Notes on Construction Design and Management.
https://www.devb.gov.hk/filemanager/en/content_29/CDM-Guidance%20Notes.pdf

- construction teams failing to understand underlying engineering design requirements
- inadequate understanding of the construction programme relative to design deliverables
- inflexibility in the design and construction process to check and change assumptions or to modify assumptions should they change
- construction teams overly optimistic expectations for change
- underlying mistrust and/or lack of respect for individuals empowered under the TW procedure
- overly unrealistic expectations of individuals empowered under the TW procedure to enforce standards resulting in impasse or stalemate of criterion to proceed
- appearance of key construction details of the same TW in different drawings requiring tedious and cumbersome referral by frontline construction personnel
- deviation from designed safe working procedures due to failure of frontline construction personnel to understand the rationale behind

Teamwork, empathy and understanding of fellow members within the project teams are essential ingredients to achieve safe TW outcomes. There is a fine balance between keeping an open mind to change whilst recognising the limitations of how much change can be accommodated when meeting tight construction programmes. The right balance between these competing human behaviours can only be fully understood by those individuals with sufficient TW experience and a wider understanding of the overall TW lifecycle. TW failures are sometime attributable to decisions made on the basis of short-term objectives without fully understanding the over-riding TW lifecycle objectives. Safe TW outcomes are more likely to be achieved on projects where teamwork is actively fostered and where individuals act within a team environment and understand and respect the authority given to those competent individuals who are empowered under the TW procedure to enforce standards.

It is worthwhile to emphasise how “upstream” TW planning and design stages can greatly impact the “downstream” TW construction stages with regard to TW safety, environmental impact, programme, and cost. Designers should be encouraged to foresee adverse constructability issues downstream of their TW design, and construction teams should be encouraged to allow sufficient time and provide greater input during the earlier planning and design stages of TW. If all individuals involved in the TW lifecycle can recognise the value of pre-emptive upstream action, this will greatly increase the likelihood of successful TW outcomes and also minimise abortive upstream and downstream works. Individual responsible persons should be encouraged to recognise the needs of others and contribute to the TW lifecycle both upstream or downstream of their own direct involvement.

Enforcement of project controls via the TW procedure without an underlying understanding of the overriding TW lifecycle objectives will not provide assurance of safe TW outcomes. Achieving success in TW requires buy-in amongst responsible persons regarding the procedure objectives and constant re-evaluation of TW dynamics throughout the TW lifecycle.

6. DESIGN AND RISK CATEGORY OF TEMPORARY WORKS

6.1 Temporary Works Design

The design of temporary works should be based on the agreed design brief. This is an engineering solution adopting a Design for Safety (DfS) approach to eliminate the risks at source, and comprising design calculations, drawings and specifications based on a set of given parameters and limitation for expected loads.

The aspects that should be considered in a temporary works design are (i) safety, (ii) site logistics; (iii) sequence of works; (iv) method of construction; and (v) selection and use of appropriate technology.

A design brief is a formal document prepared for each item of temporary works to convey the design requirements of the temporary works to the designer. It should include all relevant and sufficient data and information to facilitate the design. The brief may be relatively simple for smaller scale schemes, but for complex works, more information will need to be collected and collated before the design can commence. A guidance on the type of information that should be included in a design brief is given in Appendix A.

6.2 Design for Safety for Temporary Works

The Design for Safety (DfS) for temporary works is the process in which safety is enshrined in the design process at the onset to ensure that the temporary works so designed can be installed, used and removed in the safest possible manner. This is achieved by first preparing schematic temporary works solutions, followed by an evaluation of the options among the project team to arrive at the most appropriate option, before proceeding to the detailed design. In the detailed design, both the competing DfS objectives and temporary works optimization objectives should be addressed.

The DfS process should be reviewed continuously throughout the evaluation stage, even after the design has been completed, and whenever there is a change in circumstances, such as changes in the method of construction, erection/installation, access, maintenance, removal/dismantling, etc. In the DfS process, designers, contractor and subcontractors should continuously question and identify further risks, and where appropriate, implement changes and improvements to mitigate the risks. The DfS process should be re-assessed when:

- (i) the design is completed before the subcontractors come on board who may have different skillset, different preferred technology and potentially different construction technology as compared with the original design intent; or
- (ii) existing constraints disappear or new constraints arise (e.g. programme, interfacing works, or other external factors) such that existing residual risks can be eliminated or new residual risks arise.

In the above circumstances, a revised design brief or a design change request should be issued, as needed.

6.3 **Risk Category of Temporary Works**

A task-specific risk assessment should be conducted prior to commencement of works to identify the risks inherent in the TW works construction as well as those from adjacent activities, and then devise measures to avoid those hazards. Where the risks are significant, appropriate safety measures should be put in place to eliminate or reduce the risks. Based on the risk assessment, Construction Method Statement and Inspection and Test Plan shall be developed. The risk assessment shall be chaired by the Project-in-charge, and attended by the safety officer, relevant subcontractors and the construction team.

Based on the task-specific risk assessment, and taking into account of the scale and complexity of the design and works, the risk level of the temporary works is determined, as follows:

- Risk Category A: Major/Complex Temporary Works
- Risk Category B: Medium Temporary Works
- Risk Category C: Minor/Simple Temporary Works

All TW shall be allocated a risk category: A, B or C, subject to the size and complexity of the specific item of TW. The purpose of allocating TW risk categories is to ensure those responsible for TW design, TW verification, and TW compliance checking on site provide an appropriate level of competence and scrutiny commensurate with the TW risk and consequence.

The TW risk category will determine the required qualified persons for design, checking and inspection of the works, as specified in Table B1 (Appendix B).

Typical examples of each type of TW risk category are provided in Table B2 (Appendix B). This is to be used for guidance only.

7. **RESPONSIBLE PERSONS IN CONTROL AND MANAGEMENT OF TEMPORARY WORKS**

7.1 **General**

The responsible persons in the control and management of this Plan are Contractor's Representative (CR), Engineering Manager (EM), Temporary Works Coordinator (TWC), Temporary Works Supervisor (TWS), Temporary Works Designer (TWD) and Independent Checking Engineer (ICE).

7.2 **Contractor's Representative**

The Contractor's Representative (CR):

- (i) is the most senior person on site within the contractor's organisation; on large-scale projects, this role may be split amongst a wider area-based construction management team;

- (ii) has overall jurisdiction and responsibility to promulgate policies which ensure the implementation of this TW procedure which he does by allocating sufficient time and competent resources for completion and checking of all identified TW at the planning, construction, use and removal stages;
- (iii) is responsible for appointing the EM, TWSs, TWCs, TWDs and ICEs, and ensuring that they have the right capability and capacity to fulfil the requirements for these roles;
- (iv) provides adequate support and delegation of authority to the TWS, EM and TWC in accordance with this procedure to ensure the independence and objectivity required of their respective roles;
- (v) in the event of differences in opinion on the appropriate TW solution to achieve the DfS objectives, to take responsibility for deciding amongst available TW design alternatives offered by the TWD prior to detailed design based on a holistic and balanced evaluation of competing decision making criteria;
- (vi) will take appropriate disciplinary action including replacing resources where non-compliance with the TW procedure is observed;
- (vii) ensures clear policies are promulgated amongst the project team of the importance of this TW procedure; and
- (viii) when requested, is responsible for supporting the enforcement duties of the EM / TWS(s) / TWC(s) regarding TW compliance on site.

7.3 Engineering Manager

The Engineering Manager (EM):

- (i) has sufficient seniority and competence to manage overall TW design and compliance for the project including overall implementation of this TW procedure; for large-scale projects involving complex Risk Category A and B TW, 10 years' experience is a recommended minimum requirement; for small-scale projects, this role may be covered by a TWC with 7 years' experience;
- (ii) has sufficient knowledge and experience in the design of TW for the project and is responsible to provide effective co-ordination between designers and construction teams to achieve optimised and safe TW solutions;
- (iii) proactively explores proposals and work in progress to identify real and potential risks such that threats and potential disruption to safe and efficient working are eliminated;
- (iv) proactively participates in task reviews to evaluate and reach consensus amongst alternative TW design options offered by the TWD to achieve the DfS objectives, and if unable to reach consensus to defer to the CR to make a clear decision;
- (v) has overall accountability for the timely delivery of the optimised and safe TW design solutions in line with the construction programme by encouraging and fostering teamwork, empathy and understanding from designers, construction teams, and all other stakeholders involved in the TW lifecycle;
- (vi) is a good facilitator who encourages discussion and seeks consensus among different parties involved in temporary works design, checking and construction;

- (vii) is a planner and forward thinker who allows sufficient time in the temporary works process for parties to exercise and discharge their duties (Notes: He will remind on the need to make decisions to ensure smooth progression of deliverables in a timely and controlled manner.);
- (viii) is responsible for supporting the enforcement duties of the TWC(s) regarding TW compliance on site; and
- (ix) shall possess qualification of appropriate stream of membership of HKIE or equivalent standard.

7.4 Temporary Works Supervisor

The Temporary Works Supervisor (TWS):

- (i) is based full time on site and reports directly to the CR but with functional reporting to the EM on engineering matters; dependent on the size of the project, multiple TWSs may be required on a single project with appointments made on an area or discipline basis;
- (ii) is of sufficient calibre and competence to take responsibility for detailed implementation of TW construction on site for the nature and complexity of the TW for which he is responsible; for Risk Category A and B TW, 7 years' relevant construction experience is recommended as a minimum requirement;
- (iii) is the responsible site person for the safe delivery of all aspects of TW execution including procurement, control, erection, use and dismantling of elements of TW whilst ensuring the safety of all of those working on or adjacent to these operations;
- (iv) shall prepare the construction method statement based on the TW design drawings;
- (v) has the authority and responsibility to stop the work if it is not being carried out satisfactorily or not in compliance with approved construction method statement, safety precautionary measures and requires suitable rectification measures;
- (vi) has sufficient experience to determine, make decisions and give direction regarding the preferred construction methodology that will result in an optimised and safe TW solution;
- (vii) proactively participates in task reviews to evaluate and reach consensus amongst alternative TW design options offered by the TWD to achieve the DfS objectives, and if unable to reach consensus to defer to the CR to make a clear decision;
- (viii) is intimately aligned with the TW construction programme but also has sufficient awareness and initiative for the timeframe for the overall TW lifecycle including TW planning and design stages;
- (ix) recognises the need and co-operates with the TWC during the planning and design stages to provide necessary information, responds to designer's queries and makes timely decisions prior to site execution;
- (x) shall have received appropriate training and qualification of university graduate of appropriate stream of engineering or equivalent standard; and
- (xi) is fully aware of his responsibilities under this procedure.

7.5 Temporary Works Coordinator

The Temporary Works Coordinator (TWC):

- (i) is based full time on site and reports to the EM;

- (ii) has sufficient experience in the relevant nature and complexity of TW for which he is responsible; for Risk Category A and B TW, 7 years' relevant experience is a recommended minimum requirement;
- (iii) assists the EM to coordinate the planning and design stages of the TW lifecycle including the effective co-ordination between designers and construction teams to achieve optimised and safe TW solutions;
- (iv) proactively participates in task reviews to evaluate and reach consensus amongst alternative TW design options offered by the TWD to achieve the DfS objectives, and if unable to reach consensus to defer to the CR to make a clear decision;
- (v) is responsible for monitoring the erection, use, maintenance and dismantling of temporary works in accordance with the approved design drawings and procedures;
- (vi) has a role that provides an additional (as opposed to alternate) layer of protection to that of the TWS's direct responsibility for the safe execution of all aspects of the works; his/her decisions on the acceptability of the temporary works must be based on safety and quality only and not on achieving the construction programme;
- (vii) has the authority and responsibility to stop the work if it is not being carried out satisfactorily or not in compliance with approved construction method, safety precautionary measures and require suitable rectification measures;
- (viii) may not be an expert in technical details behind the temporary works design although he must have a fundamental understanding of the major design constraints;
- (ix) shall have personal attributes to stand up to pressure and take an independent view to ensure work can progress safely;
- (x) takes initiative to question and to challenge things that do not seem quite right;
- (xi) is reasoned and aware of the realities and practicalities of design and construction but does not turn a blind eye and will action on non-compliances;
- (xii) shall have received appropriate training and and qualification of university graduate of appropriate stream of engineering or equivalent standard; and
- (xiii) is fully aware of his/her responsibilities under this procedure.

7.6 Temporary Works Designer

The Temporary Works Designer (TWD):

- (i) has sufficient competence and experience in temporary works design which is commensurate with the nature and complexity of TW design for which he is responsible to deliver; for Risk Category A and B TW, the TWD is normally a reputable engineering design consulting firm² or specialist subcontractor; for Risk Category C TW, the TWD can be a qualified engineer of appropriate stream of membership of HKIE or equivalent or a competent design engineer with relevant working experience;
- (ii) is aware of buildability limitations and is flexible to suit the needs of the construction team;
- (iii) considers the safety of the temporary works and conducts risk assessment when evaluating and choosing amongst alternative methods of construction;

² These include firms which are member firms of the Association of Consulting Engineers of Hong Kong, The Association of Registered Engineering Consultants Limited, etc.

- (iv) as part of the TW design process, will initiate task reviews in consultation with the TWC, TWS, EM and CR by presenting available alternatives to achieve the DfS objectives to ensure the works can be constructed, used and removed in the safest possible manner, and to incorporate the agreed task review outcome into the TW design;
- (v) recognises when changes are necessary throughout the TW lifecycle and shall modify the design or detailing to suit revised site conditions, site requirements and/or suggestions to improve buildability; and
- (vi) is fully aware of his/her responsibilities under this TW procedure.

7.7 Independent Checking Engineer

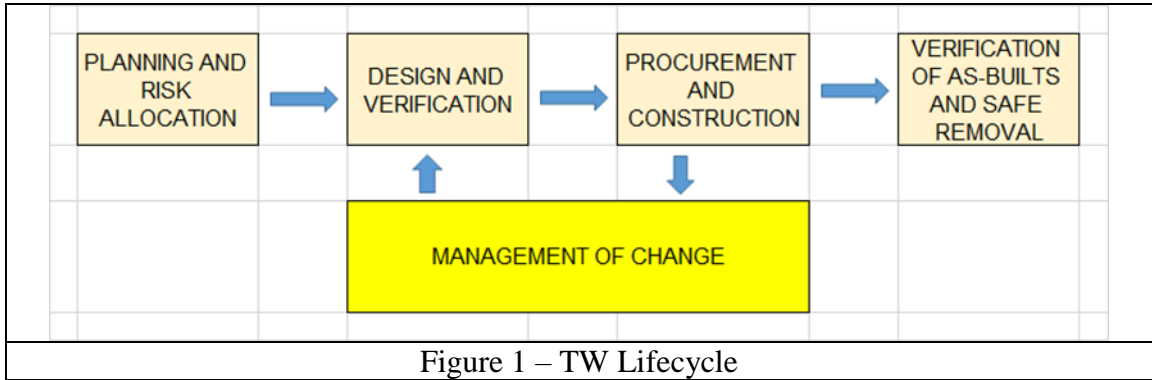
The Independent Checking Engineer (ICE):

- (i) has sufficient competence and experience in temporary works design which is commensurate with the nature and complexity of TW design for which he is responsible to verify and certify; for Risk Category A and B TW, the ICE shall be a reputable engineering design consulting firm² independent of the TWD; for Category C TW, the ICE can be a registered professional engineer (civil, structural or geotechnical as appropriate) with relevant working experience who is independent of the TWD, unless otherwise specified by the Client;
- (ii) is responsible to check and review all designs, check the risk assessment, and endorse them when satisfied;
- (iii) when required under the project, normally for high Risk Category A TW only, the ICE will also inspect the works and confirm construction in accordance with the design drawings and specifications which provides an additional (as opposed to alternate) layer of protection to that of the TWS and TWC roles in ensuring TW compliance (Notes: This will not change the responsibility of the TWS and TWC to carry out their own checking to verify as-built compliance of the temporary works to both the design and the material and workmanship requirements.); and
- (iv) is fully aware of his/her responsibilities under this TW procedure.

8. TEMPORARY WORKS PROCEDURE

8.1 Temporary Works Lifecycle

The TW lifecycle follows the workflow shown in Figure 1. It begins with the planning of works and allocation of risk to the works, followed by design and verification of the design, procurement of materials and construction, and finally verification of the as-builts and safe removal. This lifecycle forms an integral part of the TW procedure and significantly influences the safe day-to-day activities and tasks on construction sites.



Achieving optimised TW solutions with safe outcomes should be a straightforward process if the above TW flowchart is followed whilst giving due consideration to the underlying TW objectives. Default in execution of duties in any step above can give rise to failure in TW lifecycle. However, divergence from the above flowchart during day-to-day construction activities is not an uncommon occurrence, and often arises due to the overly long timeframe over which the TW lifecycle occurs, which can be measured in months or even years. It is a natural human tendency to focus on short-term objectives, often losing sight of the overall TW objectives, and this often gives rise to misunderstanding, miscommunication and unauthorised shortcuts. The failures in the above TW lifecycle can lead to many injuries and fatalities within the construction industry.

8.2 Planning and Risk Allocation

8.2.1 Appointment of Qualified Persons

ACTION	BY
As early as practically possible after the contract has been awarded, CR shall appoint a sufficient number of qualified persons to the roles of EM, TWS and TWC who meet the required accountabilities and competencies described in Section 7, using Form T0 (Appointment of Qualified Persons). The CR shall periodically review the sufficiency of resources throughout the project duration to adequately support the TW needs of the project.	CR

As early as practically possible after the contract has been awarded, CR shall appoint a sufficient number of qualified persons to the roles of EM, TWS and TWC who meet the required accountabilities and competencies described in Section 7, using Form T0 (Appointment of Qualified Persons). The CR shall periodically review the sufficiency of resources throughout the project duration to adequately support the TW needs of the project.

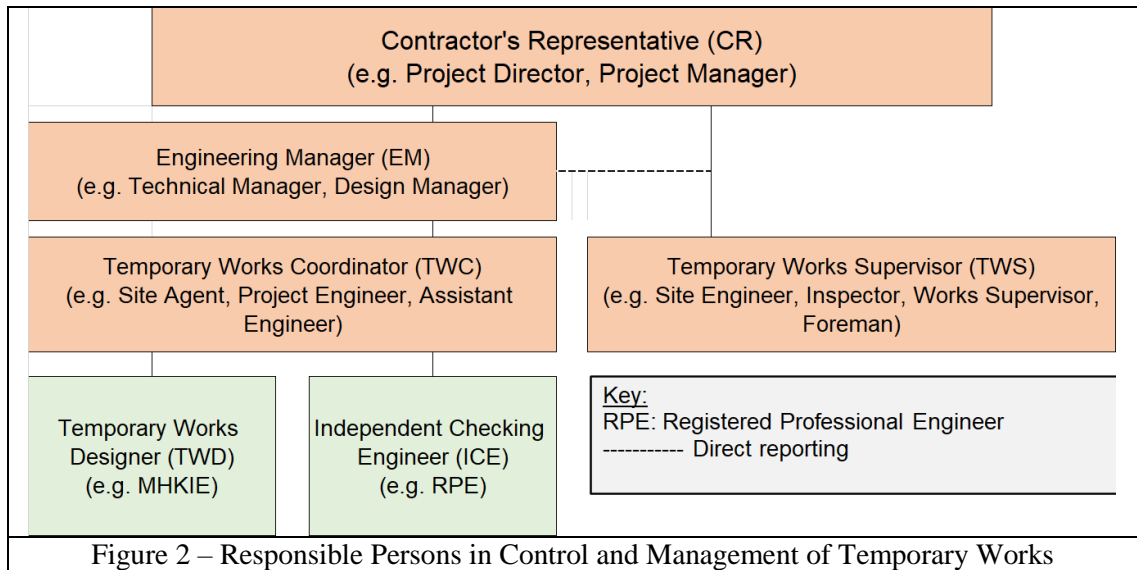
Form T0 is given in Appendix C, which is a live document to be maintained current and up to date throughout the life of the project. The form shall be acknowledged and endorsed by the appointee.

CR and EM shall appoint a sufficient number of qualified and competent TWD and ICE (via consultancy agreements or otherwise) to deliver and verify safe and optimised TW designs for the project.	CR EM
---	----------

CR and EM shall appoint a sufficient number of qualified and competent TWD and ICE (via consultancy agreements or otherwise) to deliver and verify safe and optimised TW designs for the project.

Form T0 shall be used when individuals to the role of TWD or ICE for Risk Category C TW are appointed. The form shall be acknowledged and endorsed by the appointee. The appointee is the person engaged.

An organization chart of the responsible persons in the control and management of temporary works is given in Figure 2.



8.2.2 Training

ACTION	BY
EM shall circulate the TW procedure to all appointed persons who shall read and understand their respective accountabilities and responsibilities.	EM + All
EM shall provide training to all appointed TWS, TWC, TWD and ICE, and the relevant frontline staff involved to ensure that they are fully aware of their responsibilities in accordance with this TW procedure.	EM + TWC

8.2.3 Temporary Works Master Schedule and Risk Categories

ACTION	BY
EM and TWC shall review all the TW required for the project and, taking into account of the scale and complexity of the design and works arrangement, determine the risk category for the TW, and hence the level of the engineering design input, and the qualified person for the design, checking and compliance on the site, as shown in Figure 3.	EM TWC
EM and TWC shall prepare the Master Schedule, which gives information of all the envisaged design packages identified on site, and for each TW item, the risk category, the qualified persons for the design and checking, delivery date for each design package, etc. Form T1 (Master Schedule) shall be used. The following fields and columns should be included in Form T1 as a minimum:	
(i) a unique and systematic T1 package number for each TW design package to facilitate auditing and traceability (Notes: The number can be grouped geographically by area within the project but there should be flexibility to add future packages if identified later.);	
(ii) risk categories applicable to each item of TW (see Appendix B); and	

- (iii) allocation of TWS, TWC, TWD, and ICE for each TW design package (Notes: The competence of the appointed responsible persons for each package must be commensurate with the respective risk category applied.).

The following fields and columns in Form T1 may be omitted if they can be audit traceable against unique T1 package numbers via other project systems (e.g. separate tracking schedules and / or electronic document management systems):

- (i) the required approval date with adequate provision in the programme for design, approval, procurement and construction; and
(ii) tracking register of T2, T3 and T4 forms.

EM and TWC shall maintain and update the information in the Master Schedule, including addition of any newly identified TW design packages, throughout the project and the responsible persons for respective TW design packages shall be notified promptly of the update.

**EM
TWC**

If a separate project document control system is not used, then TWC (with administrative support) shall also use Form T1 to track and trace the status of T2, T3 and T4 forms associated with any given package.

Form T1 (Master Schedule) is given in Appendix C.

Risk Category	TW Complexity	Temporary Works Designer	ICE Verification	Temporary Works Site Inspection and Form T4 Sign Off
A	MAJOR/ COMPLEX	A reputable and competent engineering design consulting firm or specialist subcontractor	A reputable and competent engineering design consulting firm independent of TWD	TWC (and ICE - required only if specified in the contract)
B	MEDIUM			TWC
C	MINOR/ SIMPLE	A qualified engineer of appropriate stream of membership of HKIE or equivalent or a competent design engineer with relevant working experience	A registered professional engineer (civil, structural or geotechnical as appropriate) with relevant working experience independent of TWD	TWC

Figure 3 – Level of Design and Design Verification Based on Risk Category of Temporary Works

8.2.4 Kick-off Meeting and Regular Review Meetings

ACTION

EM shall hold a TW kick-off meeting at project commencement inviting CR, EM, TWS, TWC and TWD to discuss and agree on the risk categories, responsible persons, and the required delivery dates for each TW design package listed in the T1, especially the urgent packages required for project mobilisation.

BY
EM
+
CR
TWS
TWC
TWD



ACTION	BY
Thereafter, TW regular review meetings shall be held periodically to review the TW design progress during the remainder of the project. The TW regular review meetings shall be attended by EM, TWC and TWD (meeting frequency to suit the project requirements). Where the design delivery requires input from TWS or others in the construction team or subcontractors, they shall also be invited to attend, where appropriate.	EM + TWC TWD + TWS

8.3 **Design and Verification**

8.3.1 **Design Brief and Package-specific Workshops**

ACTION	BY
TWS, in collaboration with TWC, shall prepare and issue Form T2 Design Brief to convey the requirements of the design to TWD. The Information provided in Form T2 should be unambiguous and as complete as possible to ensure the TW design will meet the expectations of the construction team. In all cases, the design brief must include: <ul style="list-style-type: none"> (i) provision of adequate access, working space, etc., to all work faces throughout the TW erection and dismantling process; (ii) proposed installation / erection / removal methodology including the method for the removal of the TW off-site; (iii) provision of detailed construction procedure with safety precautionary measures; and (iv) ensuring all fatal and major risks have been fully identified so they will be eliminated in the design. 	TWS + TWC

Form T2 is given in Appendix C. A guidance on the type of information that might be included in a design brief is given in Appendix A.

For specific design packages where TWD already has sufficient information to proceed the design (e.g. detailed design following a tender design) and no additional requirements from TWS and TWC are needed, then Form T2 may not be needed and the design may proceed without a T2.



ACTION	BY
<p>For Risk Category A/B TW design packages, EM and TWC shall hold focussed package-specific TW workshops to communicate requirements of the Form T2, brainstorm risks and clarify any queries therein. TWS and other key members from the construction team and/or subcontractors shall attend to agree on the content of the T2. The objectives of the workshops are to:</p> <ul style="list-style-type: none"> (i) identify specific TW risks to be eliminated in the design that are likely to arise throughout the full life usage of the TW covering all phases of erection, use and dismantling; and (ii) evaluate the likelihood and consequence of unforeseen scenarios (e.g. unforeseen underground obstructions, uncertainty in interfacing construction sequence, etc.) and any particular scenarios for change that should be accommodated in the design. <p>Notes: If multiple scenarios are to be considered, this should be made clear in Form T2 as designers will by default, design for a single scenario.</p> <p>TWS shall revise, update and re-issue Form T2, if there are changes in the design requirements during the design development stage. In cases where major change is required in the design drawings but the drawings have already been certified and released for construction, a new T2 (with new T2 document no.) should be issued.</p> <p>Notes: T3 forms should NOT be issued to change designs during the initial design development stage of the TW lifecycle. Only update of the T2 is needed.</p>	<p>EM TWC + TWS TWD</p> <p>TWS + TWC + TWD</p>

8.3.2 Task Review Workshop

ACTION	BY
<p>TWD, upon receiving Form T2, shall prepare alternative TW design options to address the following competing objectives:</p> <ul style="list-style-type: none"> (i) DfS objectives to ensure the works can be installed, used and removed in the safest possible manner; and (ii) optimisation objectives of the contractor, in terms of cost, materials, reuse, method and programme. <p>After preparing schematic concepts of available alternative TW design solutions, TWD shall coordinate with TWC to arrange a task review with the contractor’s project-based team.</p> <p>TWC shall arrange and participate in the task review workshop to agree and reach consensus on the appropriate TW design solution amongst the options presented by TWD considering a balanced view of competing DfS objectives and TW optimisation objectives.</p>	<p>TWD</p> <p>TWC + TWD TWS EM CR</p>

ACTION	BY
<p>Holding a task review workshop prior to proceeding to the TWD detailed design is intended to minimise the chances of abortive design work. In the event that consensus cannot be reached amongst the project team, CR shall make the ultimate decision on the appropriate TW design solution amongst the available options.</p>	
<p>TWS shall record the outcome of the task review workshop in Form T2, which is to be endorsed by TWS or CR to indicate clear decision to TWD on the appropriate TW design solution taking into account the competing DfS objectives and TW optimisation objectives.</p>	TWS CR
<p>In the case that the TW design solution is obvious and options are not required; or circumstances where TWS expressly requests a particular TW design solution without the need for a task review workshop, TWS should provide an indication in Form T2 that a task review workshop is not required.</p>	

8.3.3 Design and Risk Assessment

ACTION	BY
<p>TWD shall prepare the TW design according to details given in Form T2 and the task review outcome addressing the following:</p> <ul style="list-style-type: none"> (i) provision of adequate access, working space, etc., to all work faces throughout the erection and dismantling process; (ii) co-ordinated installation, maintenance and removal methodology including the method for the removal of the TW off-site; (iii) provision of detailed construction procedure with safety precautionary measures; and (iv) fatal and major risks and their elimination in the design meeting the DfS objective. <p>Risks shall be mitigated as far as possible by TWD during the detailed design process. Residual design risks shall be identified on drawings in concise and easily understandable terms clearly stating contingencies and actions to be taken in the event of the risk becoming evident.</p>	TWD
<p>EM and TWC shall circulate the draft design development drawings to TWS and other key members from the construction team and/or subcontractors, and coordinate the process of review, comment and update of the design until the TW design sufficiently satisfies the requirements of Form T2.</p>	EM TWC + TWS TWD

8.3.4 Design Review, Approval and Certification

ACTION	BY
<p>TWC shall ensure all designs are checked in accordance with the requirements of this TW procedure by the appointed ICE. TWC shall coordinate circulation of the design to relevant parties for input/comment and to ICE for comment and</p>	TWC + TWD



		ACTION	BY
		agreement. TWC shall keep TWS informed of design revisions which occur during the review stage to ensure the construction team are kept informed and aware.	TWS
		ICE shall review, comment and when the design is found satisfactory, certify the design. ICE shall chop each certified design drawing.	ICE
		Notes: There may be other contract requirements for the design to be approved by the Client, the Engineer or other Government Authorities. However, in no case should approval by the Client or Engineer or other Government Authority relieve any of the persons identified under this TW procedure from their responsibility to comply with this TW procedure.	
8.3.5	<u>Drawings Released for Construction</u>		
		ACTION	BY
		TWC shall chop and sign each ICE certified drawing or sketch as “Released for Construction” (RFC), and distribute them to all relevant departments. The risk category of TW that has been allocated and the date should be clearly indicated in the RFC chop.	TWC
8.4	<u>Procurement and Construction</u>		
8.4.1	<u>Procurement</u>		
		ACTION	BY
		TWS shall ensure all materials (whether new or used) comply with the design requirements at the time they are used. TWS shall consult TWC, if there is doubt, in particular in situation where specialist subcontractors engaged to carry out the works wish to propose changes to the sequence, construction method, or material sizes / composition.	TWS
		Notes: Any request for change after the design certification by ICE, including substitution or relaxation in materials or change in construction sequence or methodology must be referred to TWD using Form T3 (see Section 8.5.1).	
8.4.2	<u>Construction Method Statement</u>		
		ACTION	BY
		TWS shall prepare a safe Construction Method Statement (CMS) that is consistent and compatible with the RFC design drawings, highlighting the residual risks identified by the permanent works designer at the permanent works design stage, including contingencies and actions to be taken in the event of the risk becoming evident. The Safety Officer should be consulted on the CMS for any safety precautionary measures required for the works, e.g. the requirements for PPE in erecting, using and dismantling of the TW.	TWS
		EM and TWC shall review the CMS and check that it complies with the RFC design drawings.	EM TWC

8.4.3 Inspection and Test Plan

ACTION	BY
<p>TWS shall prepare a comprehensive task-specific Inspection and Test Plan (ITP) indicating the hold points³ required during the installation, erection and dismantling of the TW, frequency of inspections (including those required under the Supervision Plans, responsible personnel, required records and acceptance criteria). Hold points are particularly needed for the following:</p> <ul style="list-style-type: none"> (i) after completion of TW installation/erection and prior to loading; (ii) prior to each interim stage of loading or change of loading where the loads are applied in stages or repetitive cycles (e.g. strutted cofferdam, climbing form for high rise structures, segment launching girders, or other partial TW construction with loading applied in stage); (iii) after partially completing “critical elements” of TW installation/erection where further construction works will otherwise obscure inspection of the as-built condition (e.g. critical structural connections for which future access will be impeded by the completed TW installation/erection); (iv) falsework supporting reinforced concrete construction (in this case, two-stage hold points shall be implemented: the first sign-off prior to the commencement of rebar fixing and the second sign-off prior to concreting); (v) checking of temporary supports for dismantling of the TW (only if Form T4 is required); and (vi) other specified hold point specified by TWD in the drawings. 	<p>TWS</p>
<p>EM and TWC shall review the hold points identified in the ITP and coordinate with the TWS to update the ITP where necessary to ensure it is consistent and compatible with the design expectation and this procedure. If there is any uncertainty, EW and TWC shall seek clarification from TWD to check whether the ITP reflects controls and the needs for some particular hold points, etc.</p>	<p>EM TWC + TWD</p>

8.4.4 Site Works

ACTION	BY
<p>TWS shall proceed the work on site only after the RFC drawings have been received.</p>	<p>TWS</p>
<p>TWS shall review the quality and type of TW materials delivered against the requirements, and if in any doubt, separate them to avoid unintended use until resolved. For any uncertainties relevant to the design, TWS shall refer the case to TWC for assessment and coordination with TWD for comment.</p>	

³ At hold point, work cannot proceed further without the signing off by TWS and TWC in Form T4.



ACTION

**BY
TWS**

TWS shall brief the construction team, including the foremen, subcontractors, and other relevant staff on the agreed methods for access, installation and removal, the risks identified and the engineering aspects of the design highlighting those areas that are critical to the safety and performance of the TW.

TWS shall ensure daily activities are planned and implemented to identify, evaluate and control any new risks arising at each and every work shift using daily control mechanisms such as task specific reviews and risk assessments coordinated with the installation crews.

TWS shall check and ensure all plant, vehicles, lifting appliances or equipment used in the TW erection, operation and dismantling are operated by competent persons in accordance with pre-planned and safe construction method statements.

8.4.5 Site Inspections/Checking

ACTION

**BY
TWS**

TWS shall carry out inspections/checking as specified in the CMS and ITP. In addition to the hold point inspections, TWS shall carry out formal inspections at least once in a week when the temporary works are in service to ensure they remain compliant.

Notes: The inspections shall be recorded and retained in the TW file. The defects identified shall be reported to TWC, rectified and re-tested/inspected, in compliance with the design.

TWS shall conduct inspections of temporary works, in particular falsework and scaffolds, immediately after adverse weather conditions, such as heavy rain, high winds, etc., and record the inspection details in the TW file.

TWS

TWS, in collaboration with TWC, shall conduct regular site checks to identify if there is any TW that is being used on site but not registered in the Master Schedule or not yet properly designed, and take appropriate action to prohibit the use of un-registered TW.

8.5 Management of Change

8.5.1 Design Change and Changes During Construction

ACTION

**BY
TWS**

In case of a need for design change⁴ during the works after the RFC drawings have been issued, TWS shall initiate the design change process at the earliest opportunity,

⁴ The design change could be due to (i) unforeseen circumstances or obstructions; (ii) construction carried out not in accordance with the design; (iii) changes in construction sequence or methods; or (iv) any other divergence from the RFC drawings.



ACTION	BY
and issue it to TWC for follow-up checking and coordination. Form T3 (Design Change) shall be used.	
Notes: Changes to the temporary works design should only be accepted only after a risk assessment and a review of the safety and compatibility with the initial design have been made, and involvement of TWD and ICE is needed in this respect.	
TWS shall identify design changes that are required after RFC drawings have been issued. The design change could be due to	TWS
(i) unforeseen circumstances or obstructions;	+
(ii) construction carried out not in accordance with the design;	TWC
(iii) changes in construction sequence or methods; or	
(iv) any other divergence from the RFC drawings.	
TWS shall initiate Form T3 Design Change and issue to TWC for follow-up checking and coordination.	TWS
	+
	TWC
Form T3 should be prepared and issued at the earliest opportunity as soon as the change is identified, and the change should not proceed on site until the T3 has been confirmed. The risk category of the T3 form shall usually match that in Form T1. However, in exceptional circumstances, when approved by EM, the T3 risk category may be lower (or higher) than the T1.	
TWC shall review the completeness of Form T3, and once satisfied, coordinate the process of checking, review, commenting and certification of Form T3 amongst TWD and ICE as well as ensuring:	TWC
(i) TWS is satisfied with the proposed solution to address the change; and	+
(ii) CMS and ITP for the works are reviewed and updated (as required) to reflect the change.	TWD ICE +
	EM TWS
If TWD or ICE does not agree to modify the design, then EM and TWC shall work with TWD and ICE to develop solutions that are mutually acceptable with TWS.	
TWD shall review the proposed change contained in Form T3 and deliver the proposed design solution to address the change. The proposed design solution shall be documented by either of the following methods:	TWD
(i) attaching the proposed design solution, in form of hand mark-up on the drawings and/or supplementary sketches, notes & details, to Form T3 and endorsing Form T3 for onward ICE verification and counter-signing; or	
(ii) revising the original design drawings and issuing an amendment design submission for review, checking and approval (in this case, Form T3 will	

ACTION	BY
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lapse and become redundant after the change has been incorporated into the revised RFC drawings).

Notes: There is no strict guidance which of the above methods should be adopted. Simple changes are usually best addressed via T3 whilst more complex comprehensive changes are better addressed by amendment drawings.

ICE shall review and comment the proposed design solution, and when satisfied, certify Form T3. ICE shall chop every page of the certified Form T3, and the relevant sketched / marked-up plans.

ICE

8.5.2 **Form T3 Released for Construction**

ACTION	BY
--------	----

TWC shall put the chop “Released for Construction” (RFC) on the front page of the ICE certified Form T3, with the risk category of the temporary works and the date clearly marked.

TWC

TWC shall chop every page of the ICE certified Form T3, showing clearly the Form T3 ref. no. and total number of pages. TWC shall then distribute the RFC Form T3 to those who require them. The completed RFC Form T3 will be treated in a similar manner to the approved RFC drawings.

TWC

TWC shall check that the concerned parties are notified appropriately of the design change and issue the RFC Form T3, using the project electronic document control system or distributing the hard copy with a notification chop on the affected drawings.

TWC

8.6 **Verification of As-builts and Safe Removal**

8.6.1 **Temporary Works Installation / Erection and Permit to Load**

ACTION	BY
--------	----

TWS shall inspect and check the TW during installation/erection at the required hold points identified in the ITP (Section 8.4.3) to ensure they are constructed in accordance with the RFC drawings and RFC Form T3(s), and bring up any matters of concern to TWC/EM and CR, as necessary.

TWS

TWC shall keep abreast of the progress of the TW construction on site by:

TWS

- (i) communicating with TWS and the construction team;
- (ii) visiting the site during the critical stages of the TW installation/erection;
- (iii) carrying out inspections in advance of the hold points for new TW construction activities or when a new subcontractor or other new staff are employed on site;
- (iv) engaging TWS and other responsible persons in the construction team including, where appropriate, the subcontractors in face to face discussion to



ACTION	BY
<p>understand their concerns and convey to them the critical TW design assumptions, TW knowledge, critical elements of the TW under construction (e.g. critical connection details, major TW load path, etc.); and</p> <p>(v) forewarning the construction team of the elements of the TW that will be closely scrutinized during the inspection for the Permit to Load to ensure that the TW installation/erection standards are met.</p>	
<p>TWS shall initiate the Permit to Load application when the TW construction or a stage of the TW construction is substantially completed and is ready for loading. Form T4 (Permit to Load/Remove) shall be used.</p>	TWS
<p>TWS shall check that the completed TW are constructed in accordance with the RFC TW drawings and RFC Form T3(s) (if any), and visualise the forthcoming changes in the load path (both vertical and lateral loads) through the as-built TW structure and foundation and pay particular attention to the critical elements of the as-built TW construction. When satisfied, TWS shall endorse Form T4 and issue it to TWC for checking. If there are elements of the as-constructed TW that TWS is not satisfied, TWS shall communicate with the responsible persons within the construction team and/or subcontractors to rectify the TW.</p>	TWS
<p>Notes: Where appropriate, TWS shall raise Form T3 in accordance with Section 8.5.1, if the identified deficiencies cannot be rectified in accordance with the RFC design.</p>	
<p>TWC shall, upon receipt of Form T4, check the completed TW are constructed in accordance with the RFC TW drawings and RFC Form T3(s) (if any), and visualise the forthcoming changes in load path (both vertical and lateral loads) through the as-built TW structure and foundation and pay particular attention to the critical elements of the as-built TW construction. When satisfied, TWC shall endorse Form T4 and keep the records properly in a centralised filing system. If there are element of the as-constructed TW that TWC is not satisfactory, TWC shall communicate with TWS and the construction team and/or subcontractors to rectify the TW.</p>	<p>TWC + ICE (required if specified in the contract and for Risk Cat A only)</p>
<p>Notes: In some cases, it may be necessary to impose an expiry date on Form T4 beyond which a new Form T4 is needed and the TW shall be re-inspected. Some examples are: (i) TW subjected to corrosive environments over a very long lifespan;(ii) falsework scaffolds with removable tube and fitting bracing where the bracing may be inadvertently removed over time; or (iii) interfacing activities which could potentially cause instability of the as-built TW (e.g. demolition of adjacent structures which may be supporting TW lateral loads).</p>	



ACTION

**BY
TWC**

TWS shall proceed loading of the TW and/or the next stage of construction only after Form T4 has been approved. TWS shall display and maintain a hard copy of the approved Form T4 on the TW (unless this is impractical).

8.6.2

Permit to Remove and Temporary Works Dismantling

ACTION

**BY
TWS**

TWS shall identify whether a Permit to Remove is required based on the following rules:

Permit Required	Permit Not Required
TW are still loaded at the time of removal and the removal will result in a change in load path to other structures (e.g. soffit formwork, excavation struts).	TW are no longer loaded at the time of removal and the removal will not result in a change in load path to other structures (e.g. wall and column formwork, temporary decks).
Certain criteria or conditions need to be satisfied before TW removal as stated in the design drawing.	

TWS shall initiate the Permit to Remove application, if it is required, before the TW is removed. Form T4 (Permit to Loads/Remove) shall be used. TWS shall **visualise the forthcoming changes in load path (both vertical and lateral loads) and pay particular attention to the adequacy and stability of other structures during and after removal of the TW structure.** If there are elements of the forthcoming TW removal that TWS is not satisfied, TWS shall communicate with the responsible persons within the construction team and/or subcontractors to rectify the situation. When satisfied, TWS shall endorse Form T4 and issue it to TWC (Risk Category C TW only) for further checking.

TWS

TWC shall, upon receipt of Form T4, check that the TW are ready for removal. TWC shall **visualise the forthcoming changes in load path (both vertical and lateral loads) and pay particular attention to the adequacy and stability of other structures during and after removal of the TW structure.** If there are elements of the forthcoming TW removal that TWC is not satisfied, TWC shall communicate with TWS and the construction team and/or subcontractors to rectify the situation. When satisfied, TWC shall endorse Form T4, and keep the records in the centralised filing system.

TWS

Notes: The TW dismantling process covers removal of the TW off-site, including the disassembling/dismantling the TW into small components to facilitate the removal, if needed.

--- end of TW Lifecycle --

APPENDIX A – GUIDANCE ON DESIGN BRIEF

The following indicates the type of information that might be included in a design brief

- appropriate drawings of the permanent works;
- appropriate clauses from the specification for the permanent works;
- statement of any requirement to design the temporary works in accordance with a particular standard or guidance document;
- information on any significant risk associated with the design of the permanent works;
- programme for the construction of the permanent works;
- programme for the various phases of the design, design check, any external approvals, procurement, erection and removal of the temporary works;
- requirements for access onto, under, or around the permanent works;
- requirements for access for erection, maintenance, use and dismantling of the temporary works and for other site activities;
- any requirements for public access, for example a requirement to keep a public footpath open;
- method for erection, maintenance and dismantling and arrangement for the removal of the dismantled TW off-site
- equipment and materials available for use in the temporary works;
- equipment loading information;
- proposals for any moving and re-use of temporary works;
- environmental information such as the location and topography of the site;
- site investigation data and reports relating to the areas under and adjacent to the foundations of the temporary works; this should include information on all underground and over-head services;
- any limitations on the staged construction of the works due to positioning of construction joints, sequence of separate pours, rate of successive pours, timing of post-tensioning and removal of supports;
- loads that may be induced in the temporary works by permanent works that have been completed, such as the application of staged post-tensioning, load re-distribution and any movements of significance including any settlements or deflections that can be anticipated from the permanent works as load is progressively increased;
- any limitations stated by the designer of the permanent works on the position and extent of loads imposed by the temporary works onto elements of the permanent works which have been constructed such as loads imposed by successive floors of multi-storey construction onto lower floors or loading of permanent foundations required to support the temporary works;
- any limitations on the positioning of loads from temporary works over underground services or adjacent to excavations or retaining walls forming part of the permanent works;
- proposals for the protection of the temporary works, including its foundations, against disturbance or impact;
- limitations imposed by various authorities in relation to working within or adjacent to railways, highways, water-courses, etc;
- details of obstructions that might preclude or influence the position of the temporary works.

APPENDIX B – TW RISK CATEGORIES

TABLE B1 – Determination of Qualified Persons According to TW Risk Category

Risk Category	TW Complexity	TW Designer	ICE Verification	TW Site Inspection and T4 Sign Off
A	MAJOR / COMPLEX	TWD is normally a reputable and competent engineering design consulting firm or specialist subcontractor	ICE is normally a reputable and competent engineering design consulting firm independent of TWD	TWC (and ICE - required only if specified in the contract)
B	MEDIUM			TWC
C	MINOR / SIMPLE	TWD can be a qualified engineer of appropriate stream of membership of HKIE or equivalent or a competent design engineer with relevant working experience	ICE can be a registered professional engineer (civil, structural or geotechnical as appropriate) with relevant working experience independent of TWD	TWC

TABLE B2 – Risk Category Typical Examples

Typical TW	Examples		
	Risk Category A	Risk Category B	Risk Category C
	MAJOR / COMPLEX	MEDIUM	MINOR / SIMPLE
General	<ul style="list-style-type: none"> Tower crane bases and other support (e.g. wall ties) Propping of existing structures Bridge erection schemes Batching Plant Any works adjacent to operational railways 	<ul style="list-style-type: none"> Warehouses / sheds Temporary site compound facilities Noise enclosures / Temporary roofs 	<ul style="list-style-type: none"> Reinforcement stability checks Minor temporary site compound facilities
Falsework / Formwork	<ul style="list-style-type: none"> Complex falseworks systems or any proprietary falsework system > 20m high Falsework supporting inclined loads Mechanised formwork systems Single sided formwork > 6m high Inclined formwork systems (except minor stairs/cranked beams) Suspended scaffolds / platforms 	<ul style="list-style-type: none"> Any proprietary falsework system 10m-20m high (or >2 storeys) Any proprietary falsework system supporting > 1.4m thick slab Scaffold supporting loading platforms (>5kPa) Working platform (>5kPa) Cantilever scaffold (>0.9m) and 'bridge over' scaffolds > 3m using proprietary system Double sided formwork > 3m high Single sided formwork 3-6m high Column forms > 10m high Complex back-propping systems 	<ul style="list-style-type: none"> Any proprietary falsework system < 10m high (or 2 storeys) Table forms or repetitive formwork systems Scaffold supporting loading platforms (>1.5kPa and < 5kPa) General duty working platform (>1.5kPa and < 5kPa) 'Bridge over' scaffolds using proprietary system < 3m Column forms < 10m high Double sided formwork > 0.4m and < 3m high Single sided formwork > 0.4m and < 3m high Scaffolding access on slopes Weather retaining scaffold structure or subject to high wind loads Simple back-propping systems
Platforms / Ramps / Covers	<ul style="list-style-type: none"> Traffic Decks and vehicle parapets Working platforms for plant / cranes / piling rigs Barging points / Marine loading ramps Steelwork platforms supporting mobile / crawler cranes Temporary steelwork structures over public areas 	<ul style="list-style-type: none"> Earth platforms and ramps (on sloping sites) for construction traffic or crawler crane 	<ul style="list-style-type: none"> Small span platforms with light loading Drilling rig shallow platforms Covers to protect utilities / openings Earth platforms for cranes < 120T
Excavation and Lateral Support	<ul style="list-style-type: none"> Ground support schemes > 4.5m deep Strutted excavations > 4.5m deep Excavations with complex strutting schemes Excavations adjacent to sensitive structures Excavations with strutting imposing high loads on other structures 	<ul style="list-style-type: none"> Ground support schemes 2m – 4.5m deep Strutted excavations 2m – 4.5m deep Open cut excavations > 4.5m deep Major temporary support to utilities suspended over excavations 	<ul style="list-style-type: none"> Ground support schemes < 2m deep Strutted excavations < 2m deep Open cut excavations 1.2m - 4.5m deep (Open cut < 1.2m are exempt unless adjacent to slope or sensitive receivers) Vertical blinding < 3m deep Minor temporary support to utilities suspended over excavations
Geotechnical	<ul style="list-style-type: none"> Deep dewatering and re-charge schemes Loading on existing sea walls Ground improvement schemes Pipe jacking 	<ul style="list-style-type: none"> Pump test design reviews Pile load tests Ground support for mobile crane outriggers 	<ul style="list-style-type: none"> Earth haul roads / platforms < 3m high
Hoardings / Fences / Barriers	<ul style="list-style-type: none"> Catch fans over public areas Catch fans adjacent to operational railways Vehicle parapets 	<ul style="list-style-type: none"> Hoardings / fences > 3m high Catch fans over site area 	<ul style="list-style-type: none"> Hoardings / fences < 3m high Internal hoardings / partitions Non-proprietary edge protection systems / fences / gates
Lifting / Falling Objects	<ul style="list-style-type: none"> Heaving lifting and hoisting schemes > 25T Jacking or underpinning schemes 	<ul style="list-style-type: none"> Temporary lifting and hoisting systems (5-25T) Man cages / general lifting receptacles / cages Hoists Complex lifting frame with complex CoG Complex lifeline systems 	<ul style="list-style-type: none"> Temporary lifting and hoisting systems (<5T) Simple life line systems Scaffolding / tower lifting
Mechanical Works	<ul style="list-style-type: none"> Temporary Ventilation Systems 	<ul style="list-style-type: none"> Support frames for E&M equipment lifts 	<ul style="list-style-type: none"> Temporary drainage systems and diversions Temporary support of miscellaneous temp. E&M equipment (<1T)

APPENDIX C – SAMPLE TW FORMS

Form T0 (Appointment of Qualified Persons)

Form T1 (Master Schedule)



Form T2 (Design Brief)

Form T3 (Design Change)

Form T4 (Permit to Load/Remove)

T0 APPOINTMENT OF QUALIFIED PERSONS

Job No.:	J584	Project:	Contract No. MRE855 Mountain Rail Extension Peak Station and Eastern Approach Tunnels
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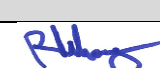
Details of Appointee	Name	Years of Experience	Other Relevant Qualifications / Evidence of Experience (eg. attach CV)						
	Adam Ho	9	see attached CV						
Appointment to the position of	Responsible Person		Accountabilities and Competencies						
	<input type="checkbox"/>	TW Engineering Manager EM	<ul style="list-style-type: none"> has sufficient seniority and competence to manage overall TW design and compliance for the project including overall implementation of this TW procedure; for large scale projects involving complex Category A and B TW, 10 years' experience is a minimum requirement; for small scale projects, this role may be covered by a TWC with 7 years' experience has sufficient knowledge and experience in the design of TW for the project and is responsible to provide effective co-ordination between designers and construction teams to achieve optimised and safe TW solutions 						
	<input checked="" type="checkbox"/>	TW Supervisor TWS	<ul style="list-style-type: none"> is based full time on site and reports directly to the CR but with functional reporting to the EM on engineering matters is of sufficient calibre and competence to take responsibility for detailed implementation of TW construction on site for the nature and complexity of the TW for which he is responsible; for Category A and B TW, 7 years relevant construction experience is a minimum requirement; 						
	<input type="checkbox"/>	TW Coordinator TWC	<ul style="list-style-type: none"> is based full time on site and reports to the EM has sufficient experience in the relevant nature and complexity of TW for which he is responsible; for Category A and B TW, 7 years relevant experience is a minimum requirement 						
	<input type="checkbox"/>	TW Designer TWD	<ul style="list-style-type: none"> has sufficient design competence and design experience which is commensurate with the nature and complexity of TW design for which he is responsible to deliver; for Category A and B TW, the TWD is normally a reputable engineering design consulting firm or specialist subcontractor; for Category C TW, the TWD can be a qualified engineer of appropriate stream of membership of HKIE or equivalent or a competent design engineer with relevant working experience 						
	<input type="checkbox"/>	Independent Checking Engineer ICE	<ul style="list-style-type: none"> has sufficient design competence and design experience which is commensurate with the nature and complexity of TW design for which he is responsible to verify and certify; for Category A and B TW, the ICE is normally a reputable engineering design consulting firm independent of the TWD; for Category C TW, the ICE can be a registered professional engineer (civil, structural or geotechnical as appropriate) with relevant working experience independent of TWD 						
<i>NOTE: Please refer to Section 7 for elaboration of required accountabilities and competencies for Responsible Persons.</i>									
Permitted Temporary Works Risk Categories	<input type="checkbox"/>	Risk Categories (specify which risk categories)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">A</td> <td style="width: 20px; text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	A	<input type="checkbox"/>	B	<input type="checkbox"/>	C	<input type="checkbox"/>
A	<input type="checkbox"/>								
B	<input type="checkbox"/>								
C	<input type="checkbox"/>								
<i>NOTE: Responsible Persons shall only be appointed as responsible for TW risk categories for which they are competent.</i>									
Permitted Types of Temporary Works Covered by Appointee	<input type="checkbox"/> All Types of Temporary Works								
	OR (specify below limitations on Temporary Works coverage) <i>NOTE: Refer Appendix B Table B2 for typical Types of Temporary Works</i>								
	<input type="checkbox"/>	Limited Types of Temporary Works	<input type="checkbox"/>	Falsework / Formwork					
			<input type="checkbox"/>	Platforms / Ramps / Covers					
			<input type="checkbox"/>	Excavation and Lateral Support					
			<input type="checkbox"/>	Geotechnical					
<input type="checkbox"/>			Hoardings / Fences / Barriers						
<input type="checkbox"/>			Lifting / Falling Objects						
<input type="checkbox"/>	<input type="checkbox"/>	Mechanical Works	<input checked="" type="checkbox"/> Other (specify below)						
<i>NOTE: Responsible Persons shall only be appointed as responsible for types of TW for which they are competent.</i>									
Additional Training Needs	Safety Leadership Training, Scaffold Appreciation Course								
Nominated and Appointed by CR	Contractor's Representative	Signature	Date						
	Thomas Li		6 Mar 2017						
Agreed and Endorsed by Appointee	The above appointment is agreed by me. I have read the TW procedure and fully understand my accountabilities under the procedure.								
	Appointee	Signature	Date						
	Adam Ho		6 Mar 2017						

T1 MASTER SCHEDULE

Job No.:	J584	Project:	Contract No. MRE855 Mountain Rail Extension Peak Station and Eastern Approach Tunnels
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T1 Package No.	TW Package Description	TW Risk Cat	TWD	ICE	TWC	TWS	Date Design Required	Related T2	Related T3	Related T4
A Contract Wide TW Packages										
A01	TW Geological Drawings	A	Consultant 1	ICE 1	Cecilia Singh	Paul Green	-	n/a	-	-
A02	Contract Wide ELS General Notes & Details	A	Consultant 1	ICE 1	Adam Ho	-	-	n/a	T3-0008	-
A03	Instrumentation and Monitoring Drawings	A	Consultant 1	ICE 1	Cecilia Singh	Kai Tak Chan	20 Mar 17	n/a	T3-0005	-
B Site Establishment										
B01	Works Area Plans & Site Utilisation Plans	C	Site Eng Team	CK Hau	Cecilia Singh	Andrew Pang	13 Mar 17	T2-0001		-
B02	Project Site Office	B	Specialist Subcon 1	ICE 1	Cecilia Singh	Andrew Pang	13 Mar 17	T2-0003		T4-0001
B03	Hoarding / Fencing	C	Specialist Subcon 2	ICE 1	Cecilia Singh	Andrew Pang	20 Mar 17	T2-0002		T4-0002
B04	Project Signboard	C	Specialist Subcon 2	ICE 1	Cecilia Singh	Andrew Pang	20 Mar 17	T2-0005		T4-0019
C Station										
C01	ELS & Strutting - Station	A	Consultant 1	ICE 1	Adam Ho	James Steel	1 May 17	T2-0009	T3-0003 T3-0007 T3-0013 T3-0018	T4-0012 T4-0014
C02	ELS & Strutting – Entrance A+B	A	Consultant 1	ICE 1	Adam Ho	James Steel	18 Dec 17	T2-0017		
C03	Construction Decking - Station	A	Consultant 1	ICE 1	Adam Ho	James Steel	11 Sep 17	T2-0012	T3-0014 T3-0019	T4-0020
C04	Temporary Underpinning of Footbridge	A	Consultant 1	ICE 1	Adam Ho	James Steel	17 Apr 17	T2-0007 T2-0015	T3-0012	T4-0006
C05	Settlement Reducing Pretreatment Grouting	A	Specialist Subcon 3	ICE 1	Cecilia Singh	Paul Green	24 Apr 17	T2-0008		T4-0010
C06	Formwork - Station In-Situ Walls	B	Specialist Subcon 4	ICE 1	Adam Ho	James Steel	16 Apr 18			
C07	Steel Shutters - Station Column Moulds	B	Specialist Subcon 4	ICE 1	Adam Ho	James Steel	16 Apr 18			
C08	Formwork & Falsework - Station Slabs	B	Specialist Subcon 4	ICE 1	Adam Ho	James Steel	21 May 18			
C09	Formwork & Falsework – In-situ Staircases	B	Specialist Subcon 4	ICE 1	Adam Ho	James Steel	4 Jun 18			
D Approach Tunnels										
D01	Demolition – Hay Road Flyover	A	Specialist Subcon 5	ICE 1	Tom West	Rachel Wong	31 Mar 17	T2-0004	T3-0001 T3-0002 T3-0004	T4-0003 T4-0005 T4-0008
D02	Temporary Worker Access Footbridge – Hay Road Flyover	C	Site Eng Team	CK Hau	Tom West	Rachel Wong	31 Mar 17	T2-0006		T4-0004
D03	D-Wall Guidewall	C	Specialist Subcon 3	ICE 1	Cecilia Singh	Paul Green	10 Jul 17	T2-0011		T4-0015 T4-0016 T4-0018
D04	ELS & Strutting – Approach Tunnels	A	Consultant 2	ICE 1	Tom West	Rachel Wong	10 Jul 17	T2-0013	T3-0006 T3-0009 T3-0010 T3-0011 T3-0017	T4-0011 T4-0012
D05	ELS – Shallow Utility Diversions	C	Site Eng Team	CK Hau	Tom West	Rachel Wong	12 Jun 17	T2-0012	T3-0008	T4-0007 T4-0009
D06	ELS – Box Culvert Diversion	B	Consultant 2	ICE 1	Tom West	Rachel Wong	28 Aug 17	T2-0014	T3-0015 T3-0016	
D07	Traffic Decking - Tunnels	A	Consultant 2	ICE 1	Tom West	Rachel Wong	20 Nov 17	T2-0016		
D08	Construction Decking - Tunnels	A	Consultant 2	ICE 1	Tom West	Rachel Wong	22 Jan 18	T2-0018		
D09	Formwork – Tunnel In-Situ Walls	B	Specialist Subcon 4	ICE 1	Tom West	Rachel Wong	23 Jul 18			
D10	Formwork & Falsework – Tunnel Roof Slab	B	Specialist Subcon 4	ICE 1	Tom West	Rachel Wong	17 Sep 18			
E Traffic										
E01	TTM1 – Hay Road Flyover Demolition	A	Consultant 3	ICE 2	Cecilia Singh	Andrew Pang	20 Mar 17	n/a		n/a
E02	TTM2A – Stack Street Stage A	A	Consultant 3	ICE 2	Cecilia Singh	Andrew Pang	15 May 17	n/a		n/a
E03	TTM2B – Stack Street Stage B	A	Consultant 3	ICE 2	Cecilia Singh	Andrew Pang	13 Nov 17	n/a		n/a
E02	TTM3 – Box Culvert Diversion	A	Consultant 3	ICE 2	Cecilia Singh	Andrew Pang	7 Aug 17	n/a		n/a
E04	TTM4 – Entrance A+B	A	Consultant 3	ICE 2	Cecilia Singh	Andrew Pang	18 Dec 17	n/a		n/a

Note: As stated in Section 8.2.3, these fields and columns below may be omitted from the T1 if they can be audit traceable against unique T1 package numbers via other project systems (eg. separate tracking schedules and or electronic document management systems).

T2 DESIGN BRIEF										
Job No.:	J584		Project:	Contract No. MRE855 Mountain Rail Extension Peak Station and Eastern Approach Tunnels						
T1 Ref.No.	D06	Design Package	ELS – Box Culvert Diversion				Design Brief No.	T2-0014		
Brief Description of the Works to be Designed	<p>Please deliver the ELS design for the box culvert diversion following the tender scheme but with changes as follows:</p> <ul style="list-style-type: none"> construction sequence to be amended to suit revised TTM3 sequence (details attached) as well as the revised construction sequence of interfacing contract MRE854 which will now excavate after MRE855 instead of before designer to review the list of available second hand steel sections as attached and where possible make use of them in the design change the sheet piles at the eastern area marked in the attached sketch to pipe piles in order to overcome the large boulder encountered in post contract award GI boreholes for the vertical bracing restraint, the designer is requested to specifically develop a safe solution to avoid the need for workers to use cherry pickers or scaffold at the upper connection and instead adopt bolted connection which can be accessed by workers from the S1 strut. take into account the attached updated information 									
Information Attached to Facilitate the Design		Documents / Information	Attached	Not Applicable	Remark					
	A	Construction Method	<input checked="" type="checkbox"/>	<input type="checkbox"/>						
	B	Risk Information	<input type="checkbox"/>	<input checked="" type="checkbox"/>	same as tender					
	C	Loading Criteria	<input type="checkbox"/>	<input checked="" type="checkbox"/>	same as tender					
	D	Relevant Boreholes / Trial Pits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	New GI boreholes attached					
	E	Other Ground Information	<input type="checkbox"/>	<input checked="" type="checkbox"/>	same as tender					
	F	Survey / Ground Levels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	see attached survey					
	G	Utilities Information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	see attached as-built survey					
	H	Materials	<input checked="" type="checkbox"/>	<input type="checkbox"/>	please reuse steel as per attached					
	I	As-Built Record Drawings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	unchanged since tender					
	J	Other Relevant Drawings	<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	K	TTM Information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	attached updated TTM proposal					
	L	Others (specify)	<input type="checkbox"/>	<input checked="" type="checkbox"/>						
<i>NOTE: All information necessary to enable TWD to produce the design without need to request further details must be included.</i>										
Initiated by TWS	Temporary Works Supervisor			Signature			Date			
	Rachel Wong						11 Jun 2017			
Temporary Works Risk Category	A	<input type="checkbox"/>	Design allocated to	Consultant 2	Required design delivery date	31 Jul 2017	Working days notice given	10		
	B	<input checked="" type="checkbox"/>								
	C	<input type="checkbox"/>								
Reviewed and Issued by TWC	Temporary Works Coordinator			Signature			Date			
	Tom West						13 Jun 2017			
Received and acknowledged by TWD	Temporary Works Designer			Signature			Date			
	James Chan (Consultant 2)						14 Jul 2017			
Task Review Workshop Outcome	Based on the T2 request, TWD to prepare available TW options which address competing DfS objectives and TW optimisation objectives and hold a task review workshop with the Contractor's project team. The agreed TW option is as follows:						Task Review Workshop Date			
	It was agreed to adopt Option 2 presented by the TWD (attached for reference)						27 Jul 2017			
Agreed by TWS or CR	Temporary Works Supervisor or Contractor's Representative			Signature			Date			
	Rachel Wong						27 Jul 2017			



T3 DESIGN CHANGE

Job No.:	J584	Project:	Contract No. MRE855 Mountain Rail Extension Peak Station and Eastern Approach Tunnels
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T1 Ref.No.	D06	Design Package	ELS – Box Culvert Diversion		Change No.	T3-0016
Location	TTM2 Stage B at Site Area WA6a		RELEASED FOR CONSTRUCTION 批准作建造用途			
Element of Works	Strut Layer 2 Knee Brace		T1 No.: D06	Risk Cat. 風險類別: B		
Details of Proposed Change	<div style="border: 1px solid red; padding: 5px; display: inline-block;"> <small>(Signature)</small> TWC: Tom West Date: 20/9/2017 </div>					
	Due to the change in TTM2 Stage A and B, the extent of temporary Box Culvert Diversion completed during Stage A now clashes with the Stage B knee brace. The designer is requested to adjust the knee brace to avoid clash with completed Stage A temp culvert diversion structure					
Design Drawings Affected	Drawings / Sketches Released for Construction	Drawing / Sketch No.	Rev	Drawing / Sketch No.	Rev	
		MRE855/EAT/CON2/TW/3001	C			
		MRE855/EAT/CON2/TW/3004	A			
Initiated by TWS or TWD	Temp Works Supervisor or Designer		Signature		Date	
	Rachel Wong				11 Sep 2017	

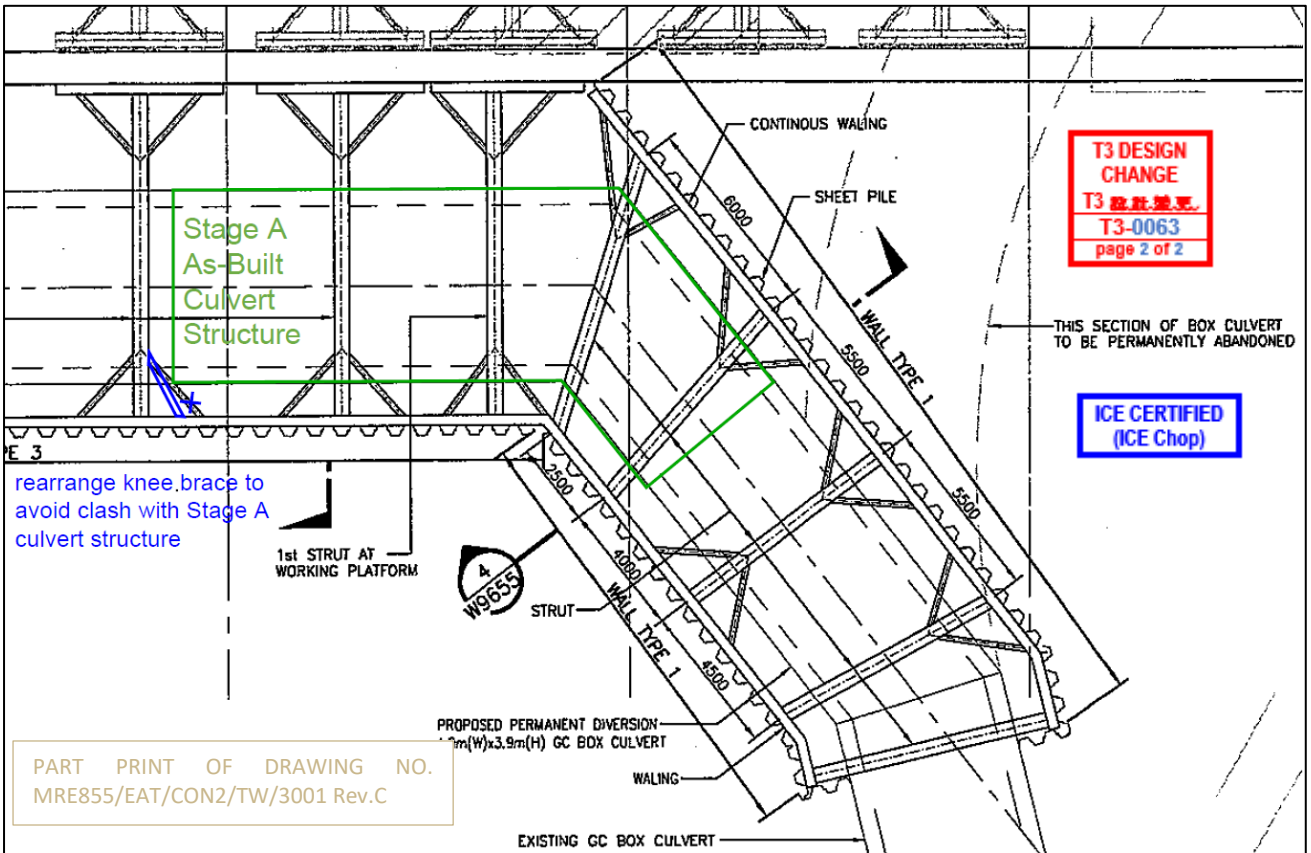
T3 Risk Category	A	<input type="checkbox"/>	Reason for Change	Obstruction caused by completed temp culvert structure during TTM2 Stage A			
	B	<input checked="" type="checkbox"/>					
	C	<input type="checkbox"/>					
Change to be endorsed by	TWD	<input checked="" type="checkbox"/>	ICE	<input checked="" type="checkbox"/>	Required design delivery date	18 Sep 2017	
Issued by TWC	Temporary Works Coordinator			Signature		Date	
	Tom West					13 Sep 2017	

Reviewed / Approved by TWD	Approved	<input checked="" type="checkbox"/>	Designer's Remarks (if any)	Checked and found satisfactory.		
	Rejected	<input type="checkbox"/>				
Change Agreed by TWD	Temporary Works Designer			Signature		Date
	James Chan (Consultant 2)					18 Sep 2017

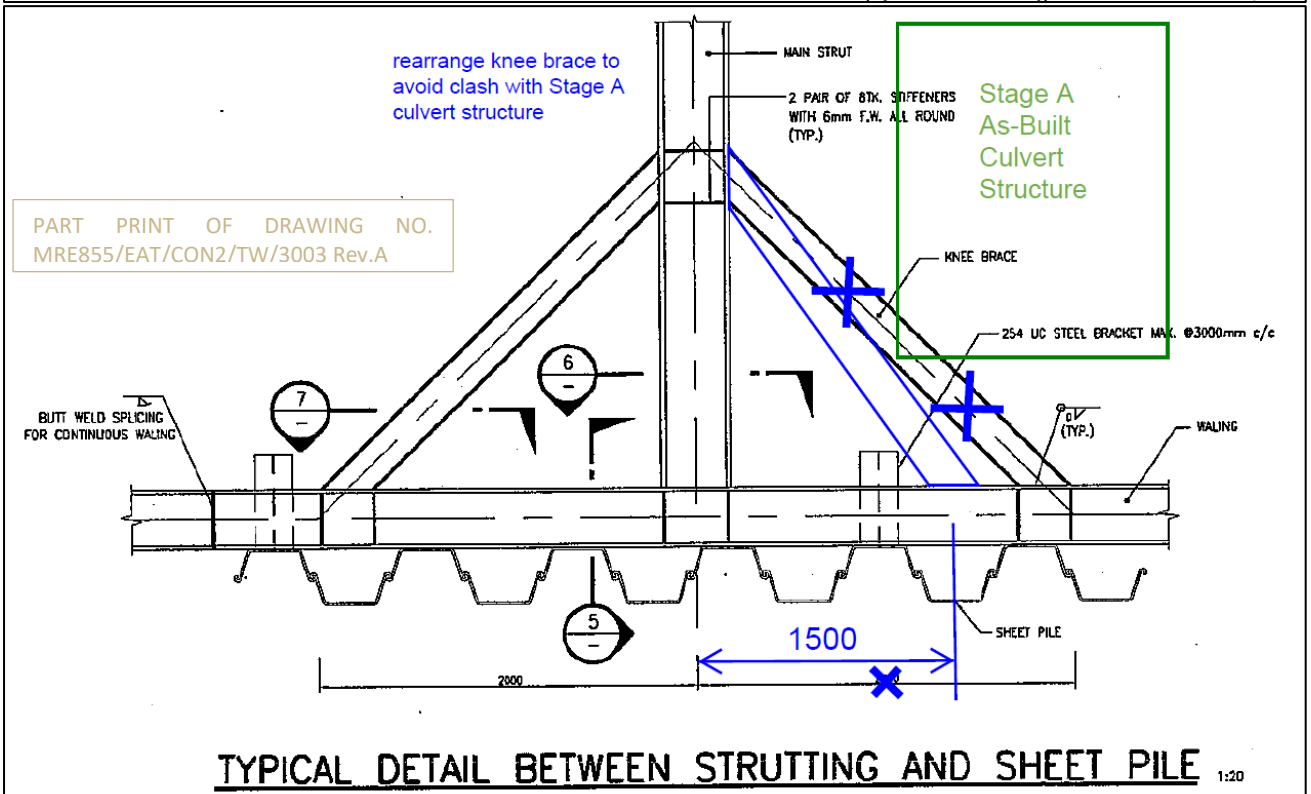
Reviewed / Approved by ICE	Approved	<input checked="" type="checkbox"/>	ICE's Remarks (if any)	The proposed change is found satisfactory.		ICE CERTIFIED (ICE Chop)
	Rejected	<input type="checkbox"/>				
Change Certified by ICE	Independent Checking Engineer			Signature		Date
	William Tsang (ICE1)					19 Sep 2017

T3 DESIGN CHANGE

Job No.:	J584	Project:	Contract No. MRE855 Mountain Rail Extension Peak Station and Eastern Approach Tunnels
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PART PRINT OF DRAWING NO. MRE855/EAT/CON2/TW/3001 Rev.C





PART PRINT OF DRAWING NO. MRE855/EAT/CON2/TW/3003 Rev.A


TYPICAL DETAIL BETWEEN STRUTTING AND SHEET PILE

1:20

T4 PERMIT TO LOAD / REMOVE			
Job No.:	J584	Project:	Contract No. MRE855 Mountain Rail Extension Peak Station and Eastern Approach Tunnels

T1 Ref.No.	C03	Design Package	Construction Decking - Station	Permit No.	T4-0020	
Location	Construction Decking – Station					
Element of Works	Construction Deck B at Eastern Portion of WA6a					
Extent of Operation and Construction Activity	Partially completed construction deck B as demarcated in the attached markup plan.					
Constructed in accordance with documents	Drawings / Sketches Released for Construction	Drawing / Sketch No.		Rev	Drawing / Sketch No.	Rev
		MRE855/EAT/CON1/TW/6101		C		
		MRE855/EAT/CON1/TW/6111		B		
		MRE855/EAT/CON1/TW/6112		C		
		MRE855/EAT/CON1/TW/6121		A		
	MRE855/EAT/CON1/TW/6122		A			
T3 Design Changes	T3 No.		T3 No.	T3 No.	T3 No.	
	T3-0014					
Other Reference Documents		Construction Method Statement for Construction Decking (Station)				
Permit to Load Initiated by TWS	The above temporary works have been checked by me and as far as I can ascertain they are in accordance with the documents listed above.					
	Temp Works Supervisor		Signature		Date	
	James Steel				28 Sep 2017	
Permit to Remove Initiated by TWS (if required)	Permit to Remove Required? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>					
	The above temporary works have been checked by me and may be safely removed.					
	Temp Works Supervisor		Signature		Date	

Permit to Load endorsed by TWC	TWC remarks (if any)	Checked and found satisfactory	Permit Valid Until Date	
			n/a	
	The above temporary works have been checked by me and as far as I can ascertain they are in accordance with the documents listed above.			
Permit to Load endorsed by TWC	Temporary Works Coordinator		Signature	Date
	Adam Ho			2 Oct 2017
Permit to Remove endorsed by TWC (if required)	The above temporary works have been checked by me and may be safely removed.			
	Temporary Works Coordinator		Signature	Date

Permit to Load Certified by ICE (required if specified in the contract and for Risk Cat A only)	ICE remarks (if any)	Checked and found satisfactory	ICE CERTIFIED (ICE Chop)
	The above temporary works have been checked by me and as far as I can ascertain they are in accordance with the documents listed above.		
	Independent Checking Engineer		Signature
William Tsang (ICE1)			2 Oct 2017

Feedback Form

Temporary Works Management Plan (March 2023)

Thank you for reading this publication. To help us improve our future versions, we would appreciate your suggestions/feedback on the publication.

(Please put a “ ✓ ” in the appropriate box)

1. As a whole, I feel that this publication is:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Informative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comprehensive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Useful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Practical	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Does this publication enable you to understand more about the management of temporary works?	Yes	No	No Comment		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3. Have you made reference to this publication in your work?	Quite Often	Sometimes	Never		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. To what extent have you incorporated the recommendations of this publication in your work?	Most	Some	None		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. Overall, how would you rate this publication?	Excellent	Very Good	Satisfactory	Fair	Poor
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Other comments and suggestions (please specify and use separate sheets if necessary).					
Personal Particulars (optional):*					
Name:	<u>Mr. / Mrs./ Ms./ Dr./ Prof./ Ir / Sr ^</u>				
Company:	_____				
Tel:	_____				
Address:	_____				
E-mail:	_____				

* The personal data collected will be used only for this survey. Your data will be kept confidential and dealt with only by the Construction Industry Council.

^ Circle the appropriate option.

Please send this feedback form to :

CIC, Construction Safety-Industrial Development; Email: enquiry@cic.hk; Address: 38/F, COS Building, 56 Tsun Yip Street, Kwun Tong, Kowloon; Fax no.: (852) 2100 9090.

Enquiries

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56 Tsun Yip Street,

Kwun Tong, Kowloon

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