



Planning and Lands Branch
Development Bureau
Government Secretariat

Study for Enhancing the Design of Cycle Track within Waterfront Promenades - Feasibility Study

Meeting with Task Force on Harbourfront Developments on Hong Kong Island

07 May 2018





1. Background
2. Examples in Other Cities & Preliminary Design Options
3. Evaluation of Alternatives
4. Programme of the Subsequent Works of the Study



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Background



Project Boundary





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Examples in Other Cities & Preliminary Design Options



Examples in Other Cities

- Research on various other experiences on provision of cycle track within open space;
- Shared-use approach (i.e. same space to serve as both footway and cycle track) is widely adopted in many other cities.



Hangzhou



Taipei



London



Preliminary Design Options

A few options are identified to be compared through an evaluation mechanism for adopting at different sections of the waterfront.



Example of Elevated Option



Example of Tunnel Option



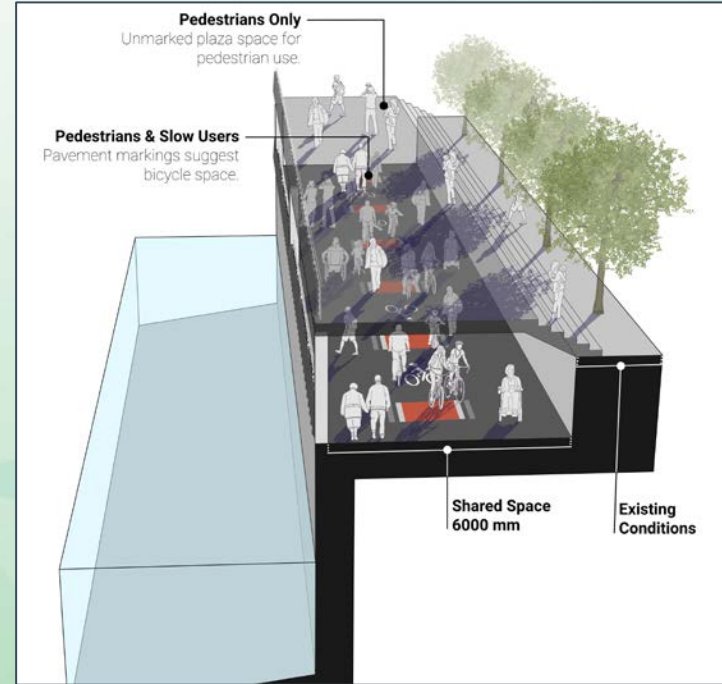
Design Options



Example of Edge Option



Example of Inland Option



Topology of Stacked Option



Example of Boardwalk Option



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Evaluation of Alternatives



HONG KONG HARBOURFRONT EVALUATION & PRIORITIZATION METHODOLOGY

PREPARED BY:
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with ATKINS



WHERE IS THE BEST ROUTE?

QUALITATIVE ANALYSIS

APPROACH

- The qualitative evaluation is rooted in the **experience, knowledge, and professional judgment** of the design team.
- Beginning with a qualitative approach allows for **creative, outside the box thinking** that pushes the envelope to envision **bold, world-class facilities** and landscape spaces.

QUALITATIVE EVALUATION METHODOLOGY



TIER 1: Is it Responsible?

Does the segment meet the safety, economic, and user experience expectations for the project?



TIER 2: Is it Balanced?

Does the segment balance fiscal responsibility with Hong Kong Transportation Department (TD) and Hong Kong Leisure Cultural Services Department (LCSD) requirements?



TIER 3: Is it Bold?

Does the segment meet the long-term bold vision for the harbourfront? How does this vision impact the Protection of the Harbour Ordinance (PHO)?

QUALITATIVE EVALUATION METHODOLOGY



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TIER 2: Is it Balanced?

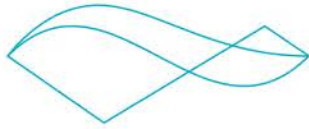
Does the segment balance fiscal responsibility with Hong Kong Transportation Department (TD) and Hong Kong Leisure Cultural Services Department (LCSD) requirements?



TIER 3: Is it Bold?

Does the segment meet the long-term bold vision for the harbourfront? How does this vision impact the Protection of the Harbour Ordinance (PHO)?

QUALITATIVE EVALUATION METHODOLOGY



TIER 1:

Is it Responsible?

- Safety
- User Experience
- Connectivity
- Natural Environment



Evaluation Criteria Definitions

- **Optimal:** Meets or surpasses minimum requirements and best achieves project goals
- **Suitable:** Meets minimum requirements
- **Deficient:** Meets most, but not all requirements



TIER 2:

Is it Balanced?

- Order of Magnitude Cost
- LCSD - Ease of Permitting
- TD - Ease of Permitting



Evaluation Criteria Definitions

- **Optimal:** Meets or surpasses minimum requirements and best achieves project goals
- **Suitable:** Meets minimum requirements

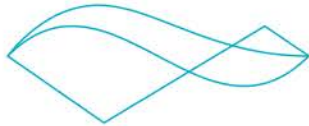


TIER 3:

Is it Bold?

- Harbour Ordinance Impacts
- Bold vision for a world-class facility

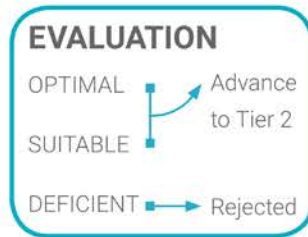
QUALITATIVE EVALUATION METHODOLOGY



TIER 1:

Is it Responsible?

- Safety
- User Experience
- Connectivity
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Evaluation Criteria Definitions

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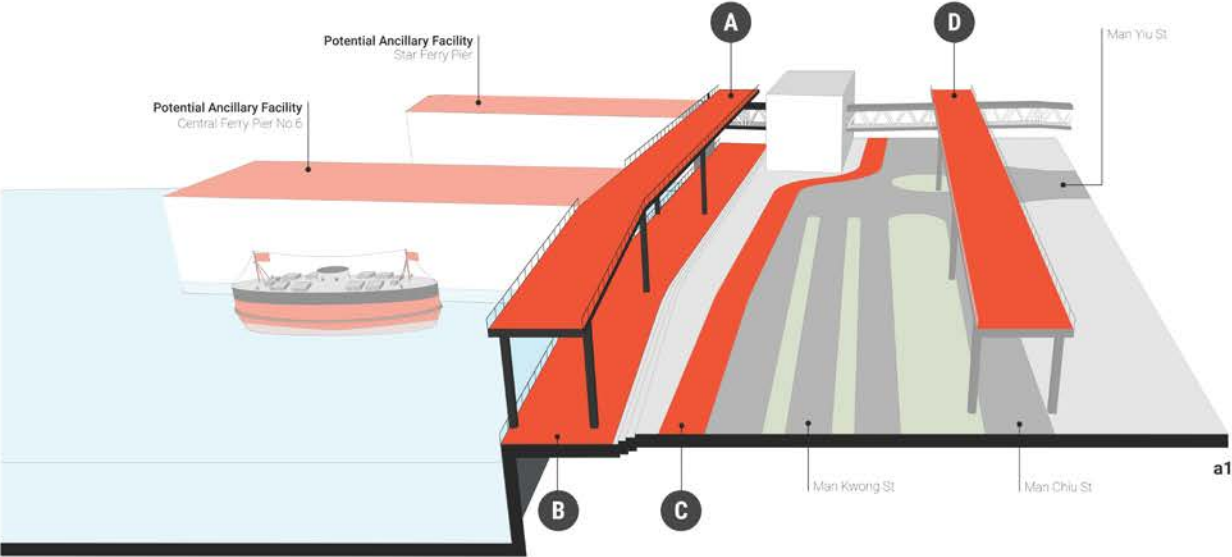
CRITERION	DEFINITION
Safety Related to User Conflicts	Some physical constraints of the corridor may prove challenging for the Harbourfront path concept. Paths require sufficient space, otherwise conflicts arise between user groups.
User Experience	The quality of the proposed path, from the perspective of the user, will affect how people value the path as part of the community. This criterion identifies the ability of the segment option to accommodate groups of people traveling together and to provide opportunities for enjoyment and interpretation of the surroundings. It considers potential views as well as characteristics of the alignment context such as noise and air quality.
Connectivity	The location of the segment, combined with access points, determines whether the path will serve the leisure needs of the project.
Natural Environment	Paths provide an opportunity to address the human need to experience nature in order to have a physically and mentally healthy life. Even small encounters with water and street trees are an asset to the health of a community.

1. For each criterion, the proposed alternatives are measured using the best available tool, which may include GIS data, local staff knowledge, and in-field observation. Rankings are listed from least suitable to most suitable using a range of criteria.

An Example of Applying the Proposed Evaluation



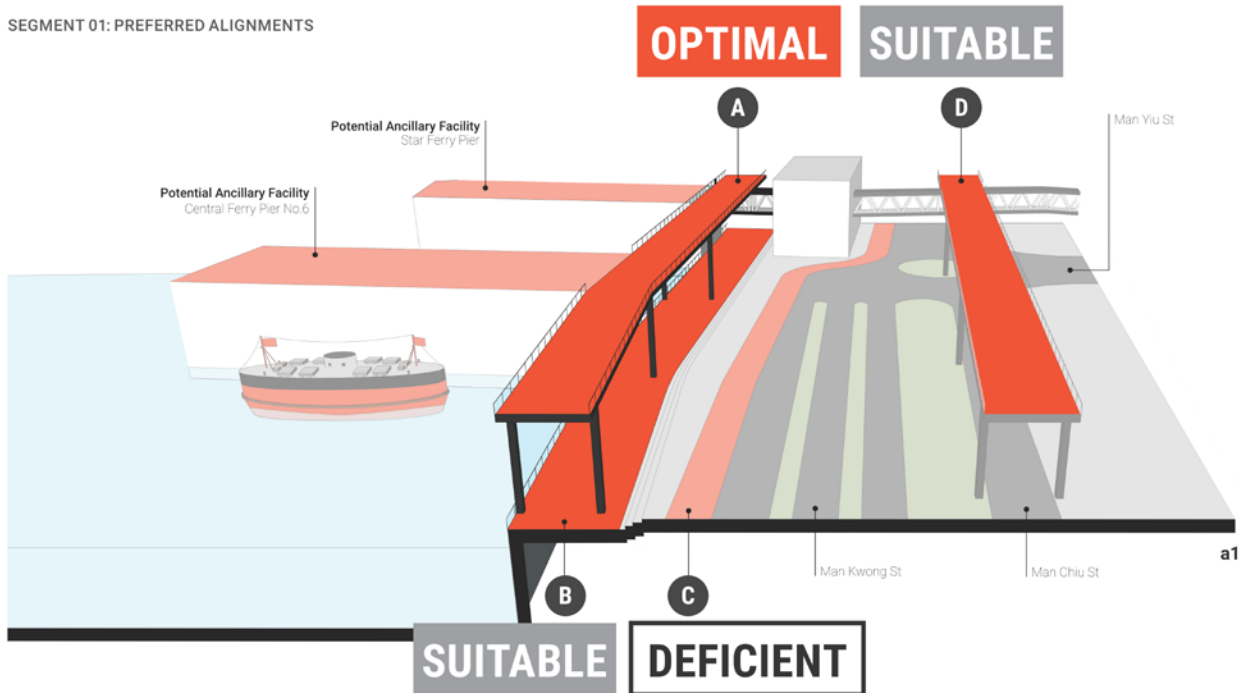
SEGMENT 01: PREFERRED ALIGNMENTS



An Example of Applying the Proposed Evaluation



SEGMENT 01: PREFERRED ALIGNMENTS



QUALITATIVE EVALUATION METHODOLOGY



TIER 1:

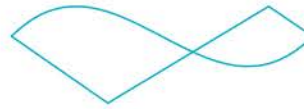
Is it Responsible?

- Safety
- User Experience
- Connectivity
- Natural Environment



Evaluation Criteria Definitions

- **Optimal:** Meets or surpasses minimum requirements and best achieves project goals
- **Sustainable:** Meets minimum requirements
- **Inform:** Meets some, but not all requirements



TIER 2:

Is it Balanced?

- Order of Magnitude Cost
- LCSD - Ease of Permitting
- TD - Ease of Permitting



Evaluation Criteria Definitions

- **Optimal:** Meets or surpasses minimum requirements and best achieves project goals
- **Sustainable:** Meets minimum requirements



TIER 3:

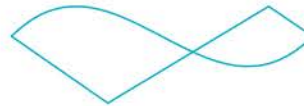
Is it Bold?

- Significant Disturbance to Study
- Risk Impact to Natural Resource Base

QUALITATIVE EVALUATION METHODOLOGY

CRITERION	DEFINITION
Order of Magnitude Cost	Even before beginning design, planners can identify elements of a harbour path that will be more expensive to construct. Reconstructing walkways, constructing piles, or cantilevered structures may prove to be more costly than those designed along level grades.
Ease of Permitting Leisure and Cultural Services Department (LCSD)	Balancing the needs of each agency is important. In many instances a segment may be favorable to one agency but put strain on another. Based on level of service, user demand, and spatial constraints, these criteria evaluate the impact of a proposed alignment on LCSD controlled facilities.
Ease of Permitting Transportation Department (TD)	Balancing the needs of each agency is important. In many instances, an alignment may be favorable to one agency but put strain on another. Based on level of service, user demand, and spatial constraints, these criteria evaluate the impact a proposed segment may have on TD controlled facilities.

1. For each criterion, the proposed alternatives are measured using the best available tool, which may include GIS data, local staff knowledge, and in-field observation. Rankings are listed from least suitable to most suitable using a range of criteria.



TIER 2:

Is it Balanced?

- Order of Magnitude Cost
- LCSD - Ease of Permitting
- TD - Ease of Permitting



TIER 3:

Is it Bold?

- High Level Performance in Goals
- Bold Impact (Innovative) - Green Building



Evaluation Criteria Definitions

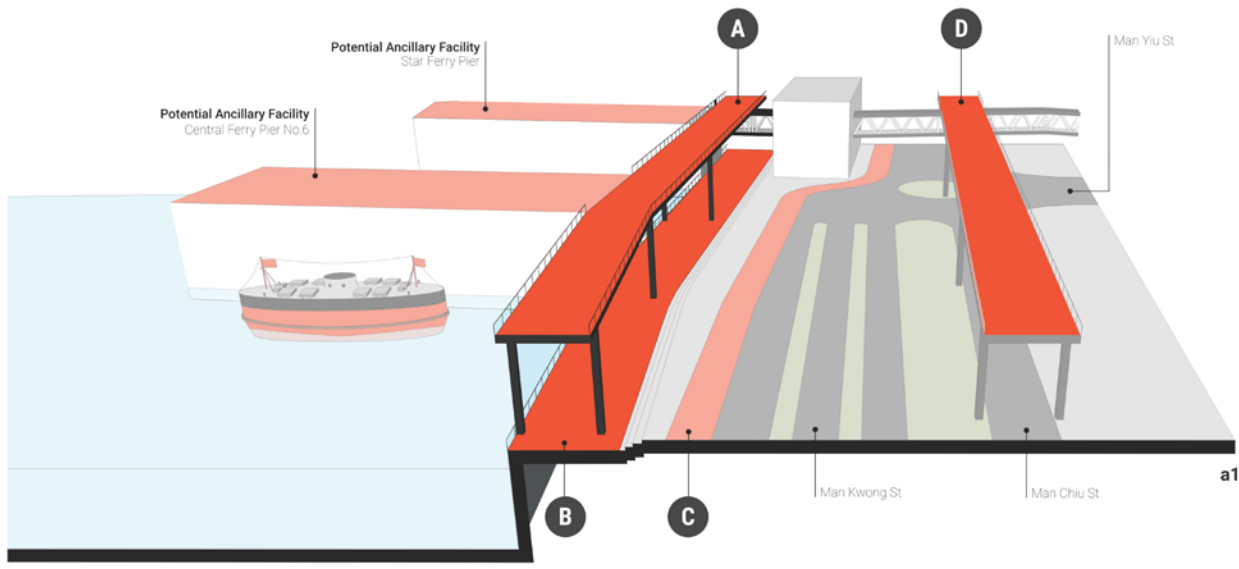
- **Optimal:** Meets or surpasses minimum requirements and best achieves project goals
- **Suitable:** Meets minimum requirements

An Example of Applying the Proposed Evaluation

	Safety Related to User Conflicts	User Experience	Connectivity	Natural Environment	Order of Magnitude Cost	Ease of Permitting - Leisure and Cultural Services Dept.	Ease of Permitting - Transportation Dept.	Does it impact the Protection or Harbour Ordinance?	Does it provide a long-term and bold vision for a World Class path in Hong Kong?
ALIGNMENT 1	●	●	●	●	○	●	●	○	●
ALIGNMENT 2	○	●	●	●	●	○	●	○	●
ALIGNMENT 3	●	○	○	○	●	●	○	○	○
ALIGNMENT 4	●	○	●	○	○	●	○	○	○

TIER 1: Is it Responsible?
TIER 2: Is it Balanced?
TIER 3: Is it Bold?

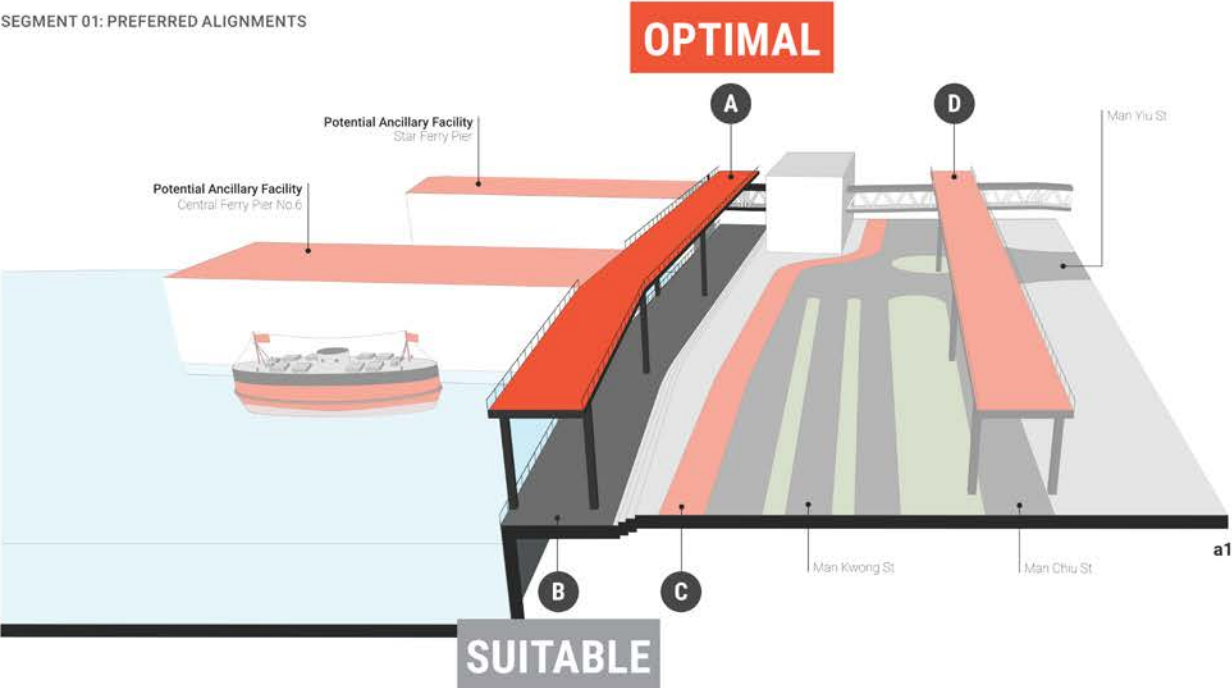
SEGMENT 01: PREFERRED ALIGNMENTS



An Example of Applying the Proposed Evaluation



SEGMENT 01: PREFERRED ALIGNMENTS



QUALITATIVE EVALUATION METHODOLOGY

CRITERION	DEFINITION
<p>Does the segment impact the PHO? (Protection of the Harbour Ordinance)</p>	<p>The Protection of the Harbour Ordinance is an overriding constraint for construction on or over the Harbour. While the overarching rationale for the PHO is appropriate, it may restrict a big and bold long-term vision for the Harbour path project. The purpose of this criterion is to evaluate the level of impact the proposed segment may have on the PHO and whether an overriding public need may be established to justify the proposal.</p>
<p>Does the segment provide a bold vision for a world-class harbour path in Hong Kong?</p>	<p>Does the segment provide an iconic vision for shared use on the harbourfront? Does it provide a vision that promotes economic development, community pride and active recreation?</p>

1. For each criterion, the proposed alternatives are measured using the best available tool, which may include GIS data, local staff knowledge, and in-field observation. Rankings are listed from least suitable to most suitable using a range of criteria.



TIER 3:

Is it Bold?

- Harbour Ordinance Impacts
- Bold vision for a world-class facility

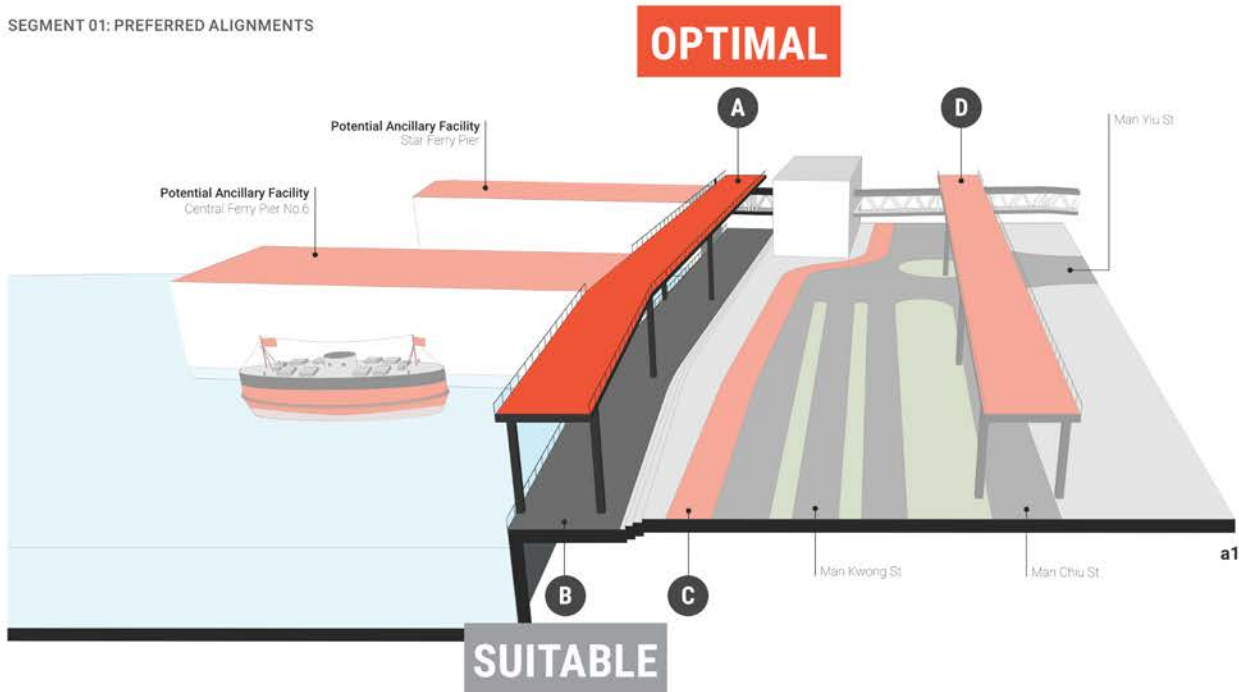
An Example of Applying the Proposed Evaluation

	Does it impact the Harbour Ordinance?	Does it provide a long-term and bold vision for a World Class path in Hong Kong?
Alignment 1	●	●
Alignment 2	○	●
Alignment 3	○	○
Alignment 4	●	○

TIER 1: Is it Responsible?	TIER 2: Is it Balanced?	TIER 3: Is it Bold?
Alignment 1	○	●
Alignment 2	●	○
Alignment 3	○	○
Alignment 4	○	○

- = Deficient
- = Suitable
- = Optimal

SEGMENT 01: PREFERRED ALIGNMENTS



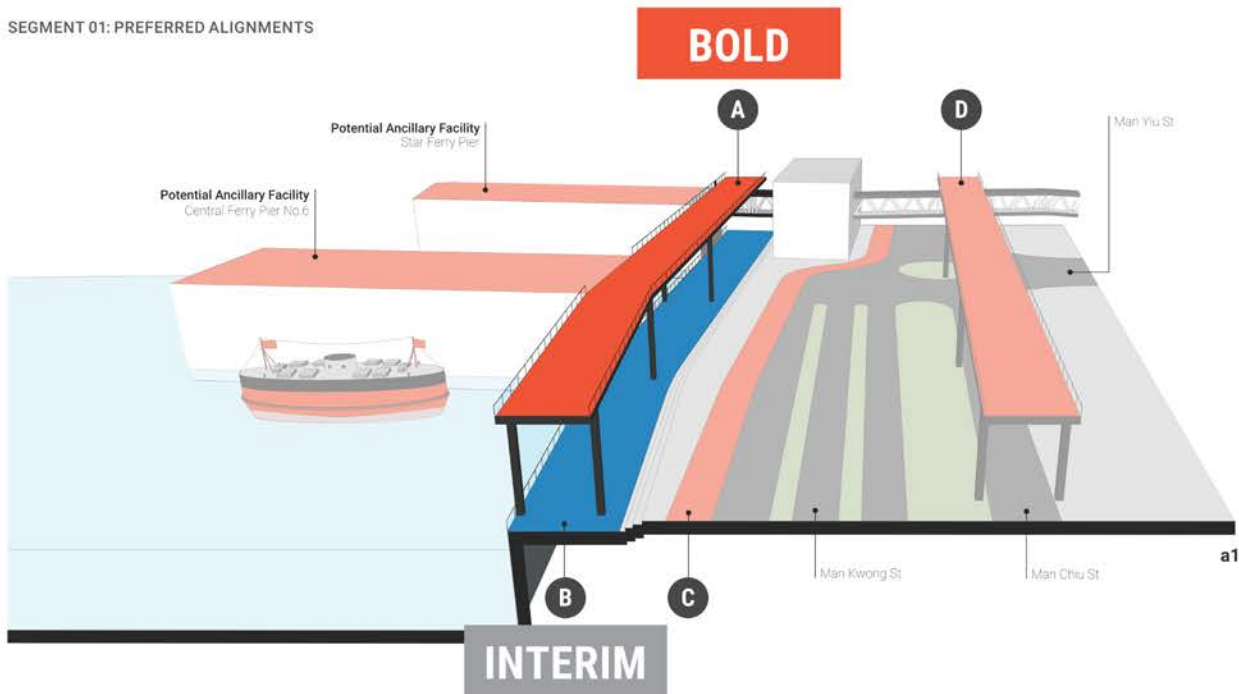
An Example of Applying the Proposed Evaluation

	Does it impact the Protection or Harbour Ordinance?	Does it provide a long-term and bold vision for a World Class path in Hong Kong?
Option 1	●	●
Option 2	○	●
Option 3	●	○
Option 4	●	○

TIER 1: Is it Responsible?	TIER 2: Is it Balanced?	TIER 3: Is it Bold?
○	○	●
○	○	●
○	○	●
○	○	●

- = Deficient
- = Suitable
- = Optimal

SEGMENT 01: PREFERRED ALIGNMENTS





WHERE IS THE BEST ROUTE?

QUANTITATIVE ANALYSIS

APPROACH

- The quantitative evaluation **represents a shift** from high level planning to **Preliminary Engineering**.
- This careful level of analysis includes **detailed studies** of on the ground conditions, utilities and infrastructure, regulatory constraints, existing land uses and stakeholders, and looks at how constraints or concerns can be overcome through **creative design thinking** and **engineering**.

An Example of Applying the Proposed Evaluation



- 1** **QUESTION:** There may be **high pedestrian volumes** at the beginning of the Harbourfront path alignment at the entrance for Central Government Pier.
- RESPONSE:** *The Bold alignment is **elevated to reduce conflicts** with pedestrians in this high traffic area.*

- 2** **QUESTION:** At Piers 2 and 3, the **path will conflict** with the elevated walkway.
- RESPONSE:** *The Bold alignment will compliment this planned design by providing a **continuous connection to the Pier roofs**. Where the alignment crosses the proposed elevated structures, appropriate **facility transition design** will be employed to reduce conflicts at crossings.*

- 3** **QUESTION:** At Piers 4 through 6, the proposed **commercial facilities will conflict** with the proposed alignment.
- RESPONSE:** *The Bold alignment will provide a **continuous connection to the Pier roofs**. Where the alignment crosses the proposed elevated structures, **facility transition design** will be employed to reduce conflicts at crossings.*

LEVEL OF SERVICE EVALUATION

DEFINITION:

The U.S. Highway Capacity Manual (HCM) defines LOS as a *"quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience."*

HCM uses letters A to F to rank LOS from best to worst.

Roupail et al, 2000. Capacity Analysis of Pedestrians and Bicycle Facilities: Recommended procedures for the "Bicycles" chapter of the Highway Capacity Manual, FHWA-RD-98-108, Federal highway Administration.,)



LEVEL OF SERVICE EVALUATION

HCM (2000) LEVEL OF SERVICE

The U.S. Highway Capacity Manual (HCM) 2000 model is based on the frequency of conflicting events that might limit the free flow of movement from the perspective of cyclists in both separated and shared use facilities. This is determined based on the pedestrian / bicyclist mode split, number of users, and fixed assumptions about path width.

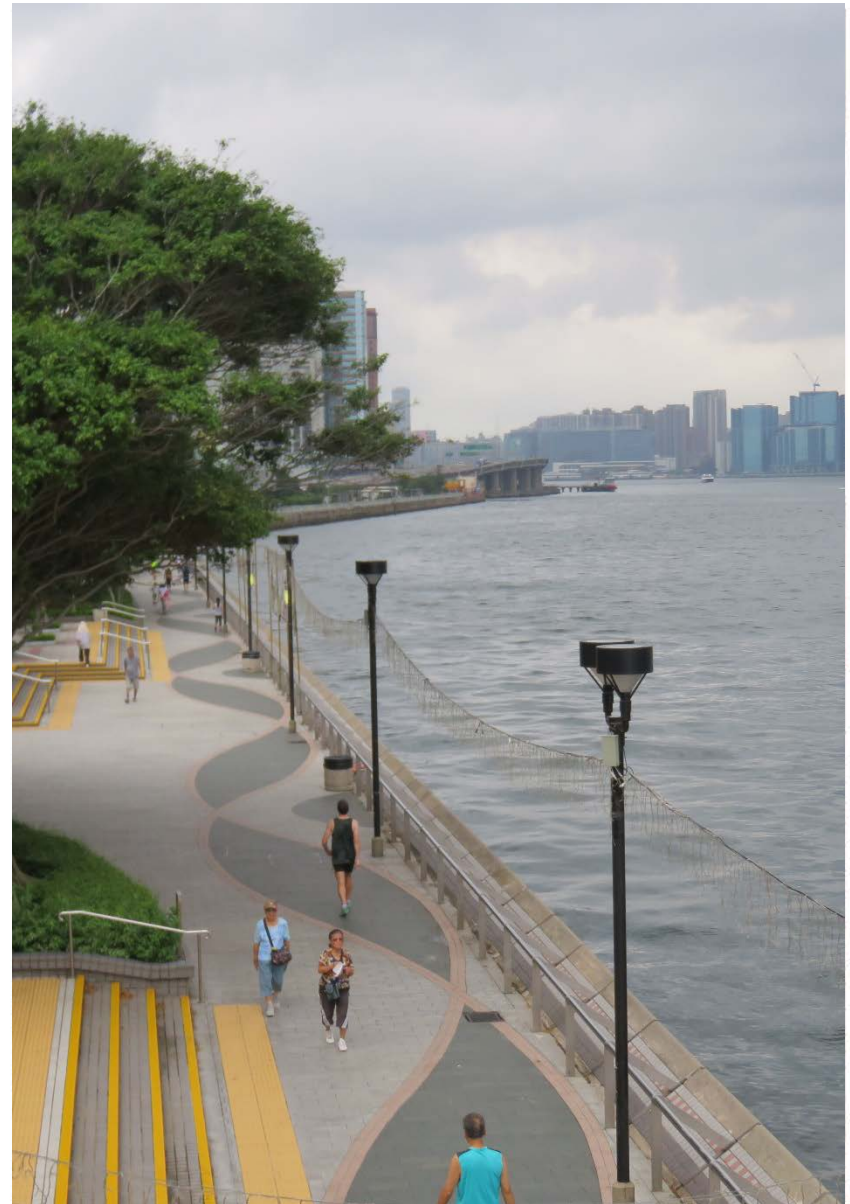


LEVEL OF SERVICE EVALUATION

FHWA LOS CALCULATOR

The U.S. Federal Highway Administration (FHWA) LOS Calculator determines LOS based on 1) one-way user volume, 2) mode split percentages, 3) path width, and 4) the presence or absence of a centerline.

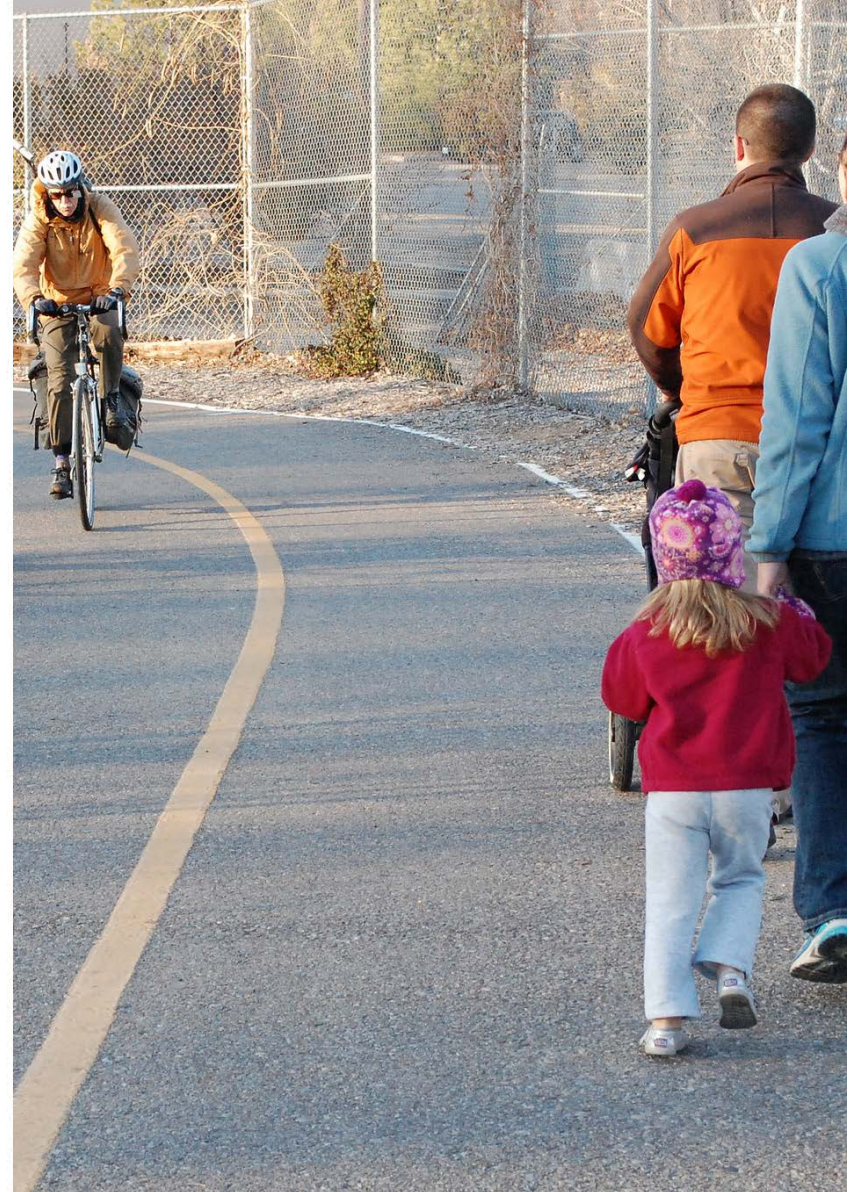
A big advantage over the HCM 2000 model is that the FHWA model allows for a variable path width.



LEVEL OF SERVICE EVALUATION

ALTA LEVEL OF COMFORT TOOL

Alta's Level of Comfort Tool builds on the FHWA LOS Calculator but adds an additional set of user weighted, quantitative and qualitative factors that are not accounted for in the FHWA model.



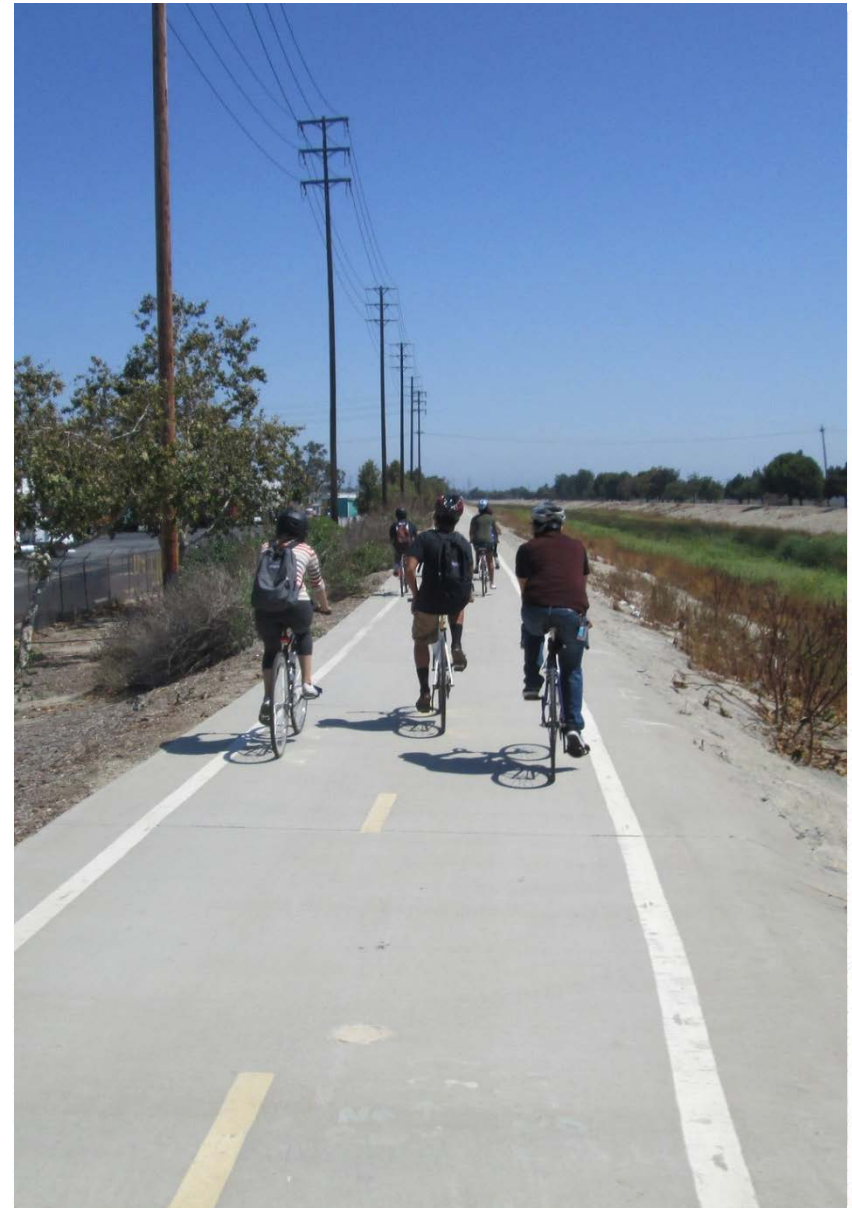
LEVEL OF SERVICE EVALUATION

METHOD ADOPTION FOR PROJECT

The HCM LOS model is limited by 2.4 m and 3.0 m **width assumptions** making the model a poor fit for the project.

The Alta LOC tool offers a comprehensive approach but its **emphasis on qualitative factors** did not meet project needs.

Therefore, the **FHWA LOS Calculator model was adopted** to determine the Bicycle Level of Service for Harbourfront alignment corridor.





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Programme of the Subsequent Works of the Study



Programme of the Subsequent Works of the Study

Task of the Study	Target Completion Period
Cycle Track Network Proposal (Consultation with HC)	Q3 in 2018
Implementation Strategy Study	Q4 in 2018
Management Option and Market Research Study	Q4 in 2018
Public Consultation (Consultation with HC, DCs, publics and relevant stakeholders)	Q1 in 2019



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Thank You