

# EXPAND Construction's Safety Transformation: Leveraging Technology & Innovation to Build Safety Culture

**Richard Tan**

Corporate Senior EHS Manager,  
Head of Department (EHS)  
EXPAND Construction Pte Ltd



*World-class Builder. World-class Professionals*



# Our Presence (Infrastructure)



Construction Of NS Square at Marina Bay

NS Square: A Future Iconic Venue located at Marina Bay Singapore which is currently built by EXPAND CONSTRUCTION PTE LTD, NS Square is set to become a landmark in Singapore's Downtown Core area.

- Client: Ministry of Defense
- Contract Period: 27 Sep 2023 - 2027



Lion Grove SuperTrees - Completed



Marina Bay Promenade - Completed



Esplanade Waterfront Theatre - Completed



# Our Presence (Infrastructure)



**Mandai Stormwater & Boardwalk - Completed**

The Mandai Stormwater & Boardwalk (MSB) showcases Expand Construction's excellence across multiple fronts—safety, innovation, productivity, and community impact.

MSB achieved:

- WSH SHARP Award for Year 2022 to 2024
- WSH Innovation Award 2024 for Dynamic Glider System
- SCAL Productivity & Innovation Award 2023



**Lee Kong Chian Natural History Museum - Completed**



**Tuas Electrical Substation - Completed**



# Our Presence (Residential)



HDB Punggol East 48 - Completed

Constructed during the COVID-19 pandemic, EXPAND pushed through amidst unprecedented challenges — including manpower shortages, material supply disruptions, and heightened safety protocols — to successfully complete the HDB Punggol East C48 project.

The team's unwavering commitment to progress and resilience was recognized with the prestigious **HDB Construction Resilience Award**.



HDB AWARDS  
2024

CONSTRUCTION RESILIENCE  
RECOGNITION

Expand Construction Pte Ltd

Waterway Sunrise II  
(Housing)

A handwritten signature in black ink, likely belonging to Tan Meng Dui.

Tan Meng Dui  
Chief Executive Officer





# Our Presence (Residential)



HDB Hougang Citrine N1 C15 - Completed

The HDB Hougang Citrine N1C15 project—The construction site upheld exemplary health and safety standards, earning the prestigious **WSH SHARP Award Recognition 2024** and hosted Senior Minister of State for Ministry of Manpower **Mr Zaqy Mohamad** & Senior Minister of State for Ministry of National Development **Mr Tan Kiat How**, showcasing some of our best WSH Technology.



# Core Values & Pillars of Foundation



Expand is dedicated to providing value for every client.

“*Safety is our Business. Expand continues to promote, provide and propagate our 4 Pillars for Safe Operational Culture:*

- 1. Providing a sustainable, safe and beautiful site at all times as No Work is more urgent or important than Working Safely.*
- 2. Providing a Safe culture and environment where everyone comes to work happy, works safely, goes home happy and looks forward to work the next day.*
- 3. Inspiring all to drive 1A.Active Management, 2S. Sustainable Solutions and 3E.Expands Efficiency & Effectiveness in our Business approach.*
- 4. Applying our 3R Safety Principles (Remind, Reward & Remove) in Resources management.*

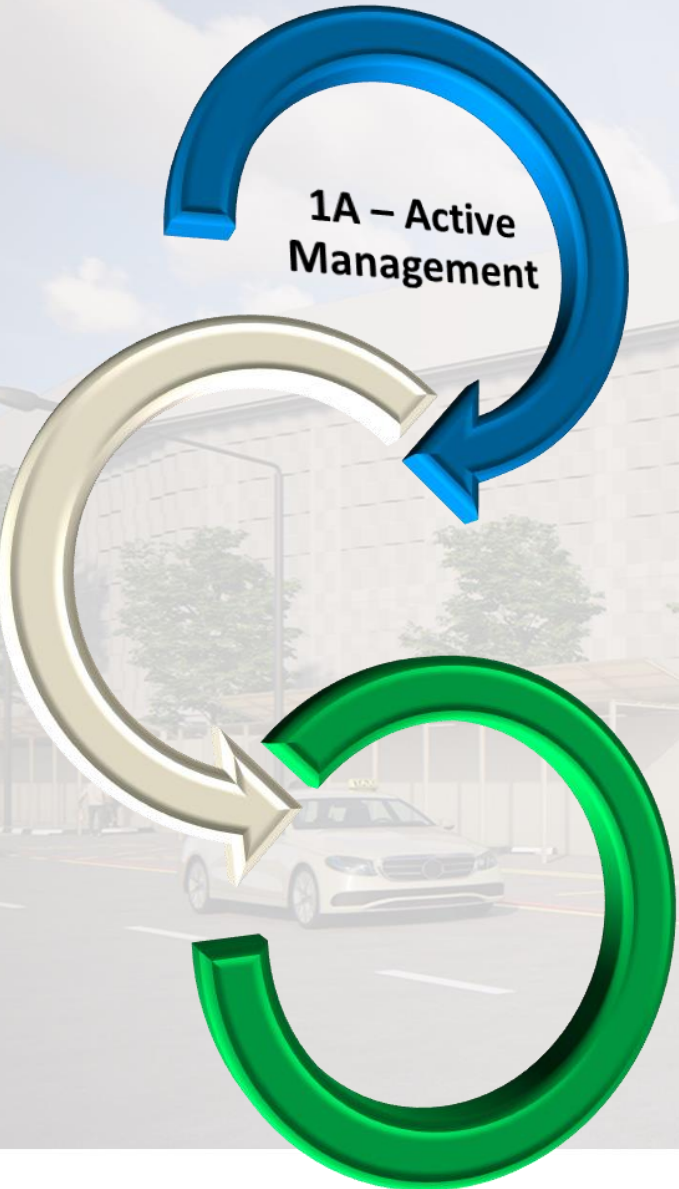
**Von Lee**

Chairman and CEO  
Expand Group of Companies





# 1A – Active Management (Policy & Initiative)



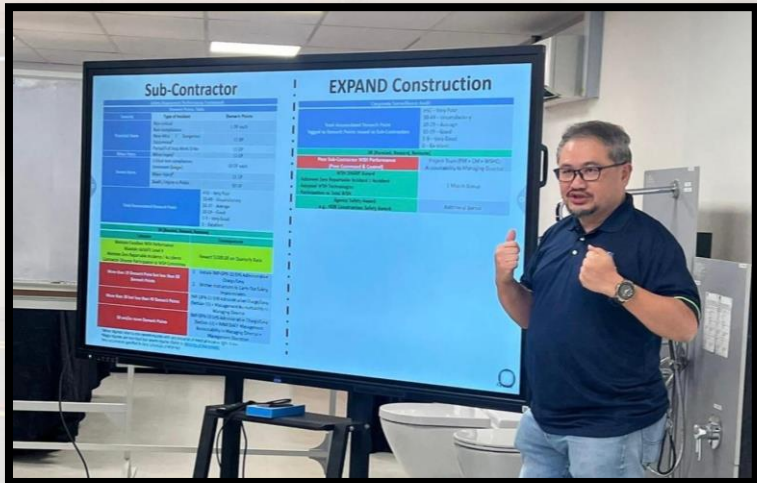
Managing Director Safety Walk-the-Talk



Virtual Reality (VR) Application



Project Quarterly WSH Committee with Sub-Contractors' TOP Management



Corporate Surveillance - S.A.P. Framework



# 2S – Sustainable Solution (Embracing Technology)



2S – Sustainable Solution



## Maximise Productivity

Zero recharging downtime and near-zero annual maintenance downtime

## Minimise Carbon Footprint

Up to 85% carbon reduction & zero direct NO<sub>x</sub>, PM & SO<sub>2</sub> fumes



## Ultra Low Noise Footprint

30 times quieter, enabling use during noise sensitive hours

## Enhance On-Site Safety

Eliminate diesel fire hazards & reduce on-site diesel storage quantity



Green Energy Enabler e.g. BESS

Environmental
FY 2024 Progress
Total Energy Consumption
137,569 kWh
Total absolute GHG emissions of Scope 1 and Scope 2
2441.517 tCO <sub>2</sub> e
Total Water Consumption
158,629 m <sup>3</sup>

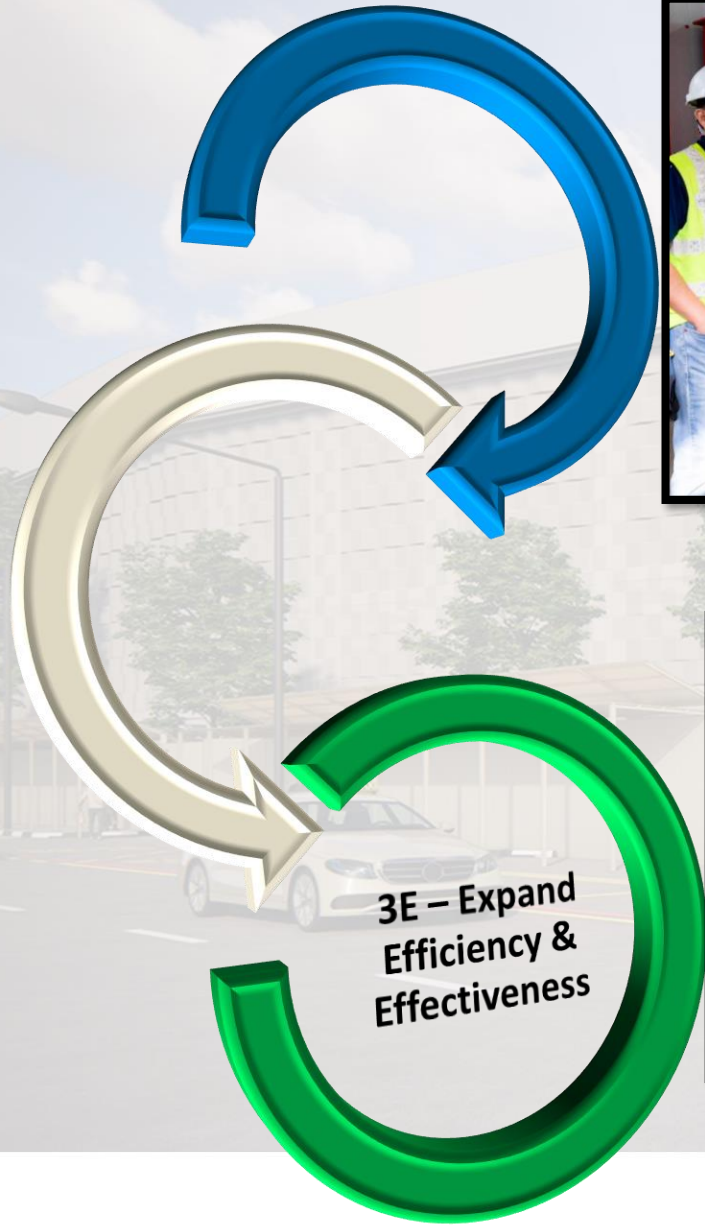
Carbon Footprint Tracking

	Conventional	Trolley in Drain Type A	Trolley on Rails Type B
Production	8 men yield 4m/day	4 men yield 12m/day	4 men yield 12m/day
Operating Cost (\$97/manday)	\$194/m	\$32/m	\$32/m
Trolley Cost (incl. design)	-	\$2,500	\$2,000
Implementation Cost	-	-	\$72.1/m (Rail material: \$52.7/m) (Rail instal'n: \$19.4/m)
Total Costs	\$194/m (97mdx8men/4m)	\$32/m + \$2,500 sunken cost (recoverable after 20m of transfers)	\$104/m + \$2,000 sunken cost (recoverable after 22m of transfers)
		Savings of \$162/m i.e. reduction by 5x	Savings of \$90/m i.e. reduction by 0.8x

Cost Benefit Analysis



# 3E – Expand Efficiency & Effectiveness with Technology



Drone



Robotic Concrete Leveler



VSS AI



Robotic Spray Painter



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# Core Values & Pillars of Foundation – 3R Principle




## **3R** Safety Principle

**Remind All Personnel**  
**Reward All Good Practices**  
**Remove All Hazards**




# Culture – Top-Down Principles




Board of Directors



Project Directors / Assistant Project Directors



Project Managers / Construction Managers



Workforce

Top-Down Approach

**CHANGE REQUIRES  
TOP-DOWN  
LEADERSHIP ACTIONS  
WITH VISIBILITY AND  
COMMUNICATION –  
EMPOWER THE TEAM**



# Culture – Implementation



## Annual WSHO Conference





# Culture – Implementation



**EXPAND**  
CONSTRUCTION PTE LTD

**Safety Assessment Performance (SAP) Framework**



# Culture – Implementation

## Safety Assessment Performance (SAP) Framework

### Sub-Contractor

#### 3R System

Corporate Surveillance Audit			
Demerit Points Table			
Severity	Type of Incident	Demerit Points	Accumulated Demerit Points
Potential Harm	Non-critical Non-compliances	1 DP each	
	Stop Work Order	15 DP	
Severe Harm	Critical non-compliances (Imminent Danger)	10 DP each	
	Dangerous Occurrences	20 DP	
	Death / Injury to Public	50 DP	
Total Accumulated Demerit Point		>50 – Very Poor 30-49 – Unsatisfactory 20-29 – Average 10-19 – Good 1-9 – Very Good 0 – Excellent	
3R Scheme			
Reviewed on Quarterly Basis			
Accumulated Points		Consequences	
Maintain Excellent WSH Performance Maintain bizSAFE Level 4 Maintain Zero Reportable Incidents / Accidents		Reward \$2000.00 on Quarterly Basis	
More than 19 Demerit Point but less than 30 Demerit Points		1. Initiate IMP-OPN-11 EHS Administrative Charge/Levy 2. Written Instructions to Carry Out Safety Improvements	
More than 30 but less than 49 Demerit Points		IMP-OPN-11 EHS Administrative Charge/Levy (Section 11) + Management Accountability to Managing Director	
50 and/or more Demerit Points		IMP-OPN-11 EHS Administrative Charge/Levy (Section 11) + IMMEDIATE Management Accountability to Managing Director + Management Discretion	

### EXPANDians

#### 3R System

Corporate Surveillance Audit	
Total Accumulated Demerit Point Tagged to Demerit Points issued to Sub-Contractors	
>50 – Very Poor 30-49 – Unsatisfactory 20-29 – Average 10-19 – Good 1-9 – Very Good 0 – Excellent	
3R Scheme	
Poor Sub-Contractor WSH Performance (Poor Command & Control)	Project Team (PM + CM + WSHO) Accountability to Managing Director
WSH SHARP Award - Achieved Zero Reportable Incident / Accident - Adopted WSH Technologies - Participation to Total WSH	1 Month Bonus
Agency Safety Award e.g. HDB Construction Safety Award	Additional Bonus



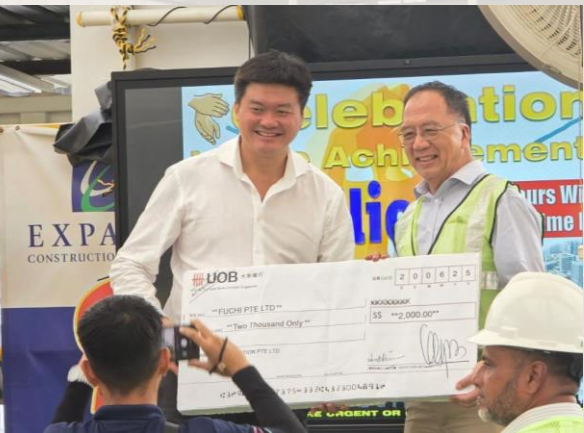
Rewarding our Staffs & Sub-Contractors with Excellent Safety Performance SAP's Award



# Culture – Implementation



Safety Assessment  
Performance (SAP)  
Framework



S.A.P. REWARD

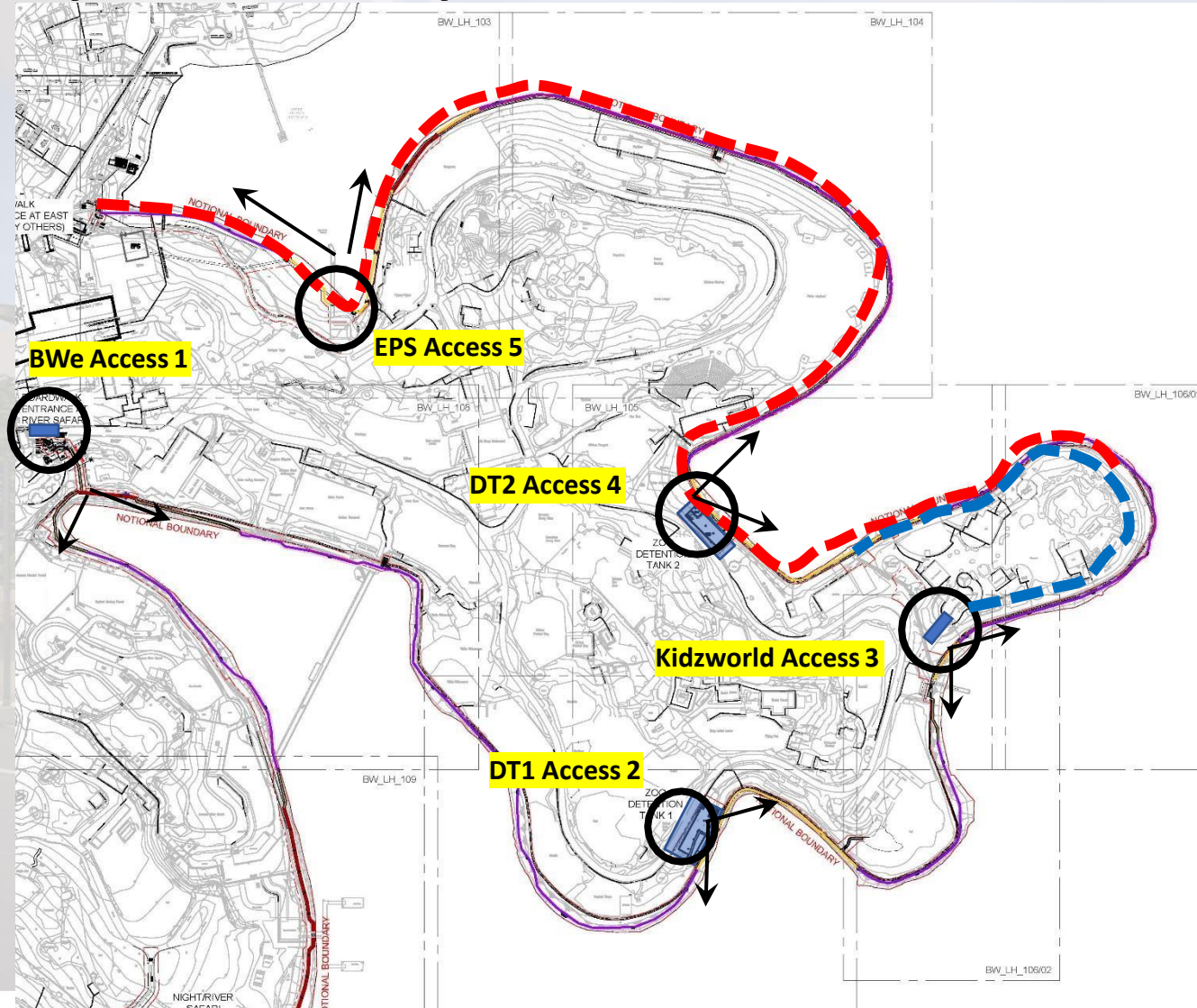


S.A.P. Corporate  
Surveillance Audit on  
Site by HQ



# INNOVATIVE – Implementation

## Dynamic Glider System



--- Boardwalk Phase 3  
--- Service road  
Total distance: 3.3Km

### Site Constraints:

- As part of the Environmental Management & Monitoring Plan (EMMP) and public safety interfacing requirements for the Mandai Rejuvenation Project, the use of machinery for transporting and delivering construction materials is significantly restricted.
- Consequently, the construction of the boardwalk relies heavily on the efficiency of manual material transfers and labour-intensive methods.
- This constraint demands meticulous planning and coordination to ensure uninterrupted progress while maintaining compliance with environmental and public safety standards.



# INNOVATIVE – Implementation

## Dynamic Glider System – Challenges



### TIME SCHEDULE FOR DELIVERY OF MATERIALS

Day	Time	Remarks
Monday	08:00 am to 06:00 pm	NO NEED ANY PRIOR PERMISSION
Tuesday	08:00 am to 06:00 pm	
Wednesday	08:00 am to 06:00 pm	
Thursday	08:00 am to 06:00 pm	SPECIAL PERMISSION NEED TO BE TAKEN IN ADVANCE
Friday	07:00 am to 08:00 am	
Saturday	07:00 am to 08:00 am	
Sunday	07:00 am to 08:00 am	

- Interface with live parks' operation (Zoo & Night Safari)
- Locations selected with minimal impact to guest experience and animal welfare



# INNOVATIVE – Implementation

## Dynamic Glider System – Challenges



Weight of Footing: 120 to 140 kg

Manpower Required: 6 to 8 workers





# INNOVATIVE – Implementation

## Dynamic Glider System – PE ENDORSEMENT ON DESIGN



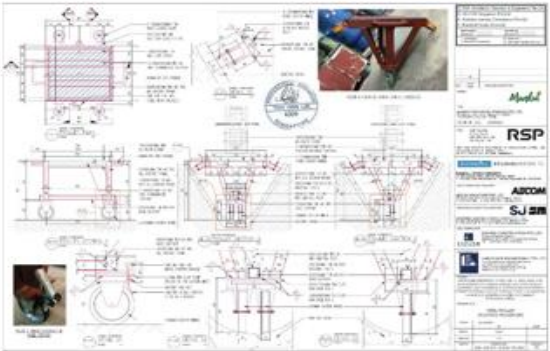
Steel trolley



Shifting of Rock-rolls

PE endorsement on design

### Type A trolley



Engineering Innovation 1



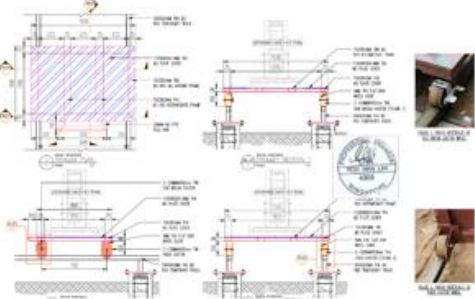
Steel trolley 02



Shifting of materials

PE endorsement on design

### Type B trolley



Engineering Innovation 2

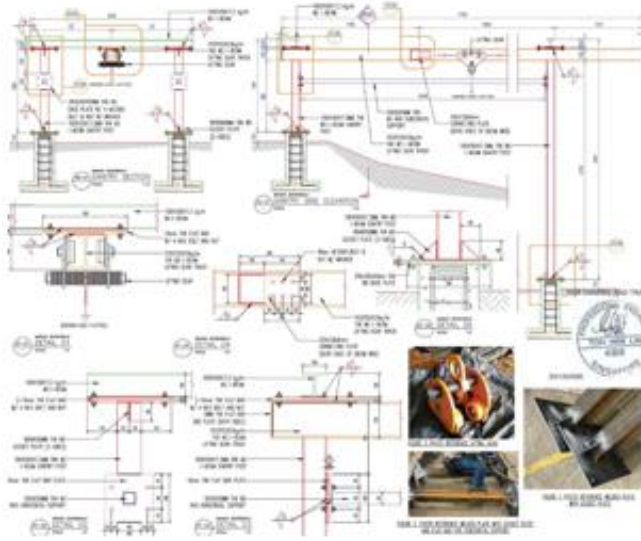


Unloading of footings



Unloading of footings on a slope area

PE endorsement on design



Engineering Innovation 3



# INNOVATIVE – Implementation

## Dynamic Glider System – Sustainable Solutions



Gantry & Chain Block (Pulley System) only used at localized terrain



- There is **Type A trolley** which is deployed to transfer materials, on existing C7 V-drain, from unloading station to the necessary positions alongside the drain.
- This method only required the investment on a trolley and **one person** is needed to pull the trolley.



- Along the corridor **without C7 V-drain**, **Type B trolley** is deployed.
- Temporary rails are fitted onto installed footings, and trolley placed on the rails and glides from the unloading point to the placement location.



# INNOVATIVE – Implementation

## Dynamic Glider System – Implementation



**Fabrication of Trolley in  
V-Drain**



**Actual Implementations**



**Gantry Implementation**



# Implementation of Dynamic Glider System

## Dynamic Glider System

[Mechanical Handling Device – Trolley, Pulley & Roller]

**Mandai Rejuvenation Project  
Boardwalk Construction along Reservoir**

**for  
WSH Innovation Awards 2024**

Main Contractor:



Co-Confidential



# INNOVATIVE – Implementation

## Dynamic Glider System – Advantages

### Innovation

- Transferring heavy materials over **3.3km** made easier and safer
- Mitigate labour intensive process
- Accessing difficult terrains along shoreline simplified via drains and rails

### Impact of Solution/Technology:

- The adopted solution has **improved the productivity** of materials transportation by 500%.
- And most importantly **enhance the safety** of the personnel mitigating the ergonomic hazards due to prolonged handling of heavy weights undertaking the manual handling.

### Productivity

- Reduction in workforce
- Savings to operating costs
- Time savings



# Safety Milestones & Achievements

## BCA CONSTRUCTION EXCELLENCE AND BCA CONSTRUCTION PRODUCTIVITY (GOLD) AWARDS 2019



**Project : Sembawang N1C2  
EastBrook@Canberra  
(Excellence)**



**Project : Hougang N9C19  
Buangkok Edgeview  
(Gold)**



# Safety Milestones & Achievements

## BCA CONSTRUCTION EXCELLENCE AWARDS 2020

### Project: Hougang N9 C16&17 [Buangkok Square]

### Project : Hougang N9C19 [Buangkok Edgeview]

### Project: Mediapolis 66/22KV Substation at OneNorth

### Project: Ayer Merbau 66KV Electrical Sub-Stn at Jurong Island

#### HOUGANG N9 C16 & 17 (BUANGKOK SQUARE) RESIDENTIAL BUILDINGS - BELOW \$1800/M<sup>2</sup> CATEGORY



##### CONSTRUCTION EXCELLENCE AWARD | MERIT



<b>Builder</b>	Expand Construction Pte Ltd
<b>Developer</b>	Housing & Development Board
<b>Architect</b>	Surbana Jurong Consultants Pte Ltd
<b>C&amp;S Consultant</b>	Surbana Jurong Consultants Pte Ltd
<b>M&amp;E Consultant</b>	Surbana Jurong Consultants Pte Ltd

#### HOUGANG N9C19 (BUANGKOK EDGEVIEW) RESIDENTIAL BUILDINGS - BELOW \$1800/M<sup>2</sup> CATEGORY



##### CONSTRUCTION EXCELLENCE AWARD | MERIT



<b>Builder</b>	Expand Construction Pte Ltd
<b>Developer</b>	Housing & Development Board
<b>Architect</b>	Surbana Jurong Consultants Pte Ltd
<b>C&amp;S Consultant</b>	Surbana Jurong Consultants Pte Ltd
<b>M&amp;E Consultant</b>	Surbana Jurong Consultants Pte Ltd
<b>Project Management Consultant</b>	Surbana Jurong Consultants Pte Ltd

#### MEDIAPOLIS 66/22KV SUBSTATION WITH ECO DECK AT ONE NORTH UTILITY, ADDITIONS & ALTERATIONS AND UPGRADING BUILDING PROJECTS CATEGORY



##### CONSTRUCTION EXCELLENCE AWARD | MERIT



<b>Builder</b>	Expand Construction Pte Ltd
<b>Developer</b>	JTC Corporation
<b>Architect</b>	Interconsultants Pte Ltd
<b>C&amp;S Consultant</b>	Consultant United Pte Ltd
<b>M&amp;E Consultant</b>	Mott MacDonald Singapore Pte Ltd
<b>Quantity Surveyor</b>	JIA Quantity Surveyors & Project Managers Pte Ltd

#### 66KV ELECTRICAL SUB-STATION AT AYER MERBAU, JURONG ISLAND UTILITY, ADDITIONS & ALTERATIONS AND UPGRADING BUILDING PROJECTS CATEGORY



<b>Builder</b>	Expand Construction Pte Ltd
<b>Developer</b>	JTC Corporation
<b>Architect</b>	Architects Vista Pte Ltd
<b>C&amp;S Consultant</b>	Mott MacDonald Singapore Pte Ltd
<b>M&amp;E Consultant</b>	Mott MacDonald Singapore Pte Ltd



# Safety Milestones & Achievements



## 2023

- SCAL Productivity & Innovation Award (PIA) – Silver**
- WSH SHARP Award** - Mandai Stormwater & Boardwalk at Mandai Lake
- WSH SHARP Award** - Changi Naval Base Project (Package 2)
- WSH SHARP Award** - 230kV / 66kV Electrical Substation for Integrated Waste Management Facility
- WSH SHARP Award** - Sengkang N4C22 & 23 at Fernvale Road
- WSH SHARP Award** - HDB D&B HIP G29K @ Simei & Serangoon North
- WSH SHARP Award** - Integrated Park & Underground Reservoir Project
- NEA ECO (SCS) Merit Awards** (2 EXPAND employees)

## 2022

- WSH SHARP Award** - HDB Punggol North Contract 11 & 12
- WSH SHARP Award** - Mandai Stormwater & Boardwalk at Mandai Lake
- WSH SHARP Award** - Changi Naval Base Project
- WSH SHARP Award** - 230kV / 66kV Substation for IWMF

## 2025

- WSH SHARP Award** –NSSQ
- WSH SHARP Award** –UPGRADING WORKS FOR TOILETS
- WSH SHARP Award** - Hougang Citrine N1C15
- WSH SHARP Award** - Changi East Package 2,D2012-00180-40

## 2024

- NEA Recognition Award 2024** for Achieving Zero Accident at IWMF
- HDB Construction Safety Award** - Upgrading Projects at G29K
- HDB Construction Safety Award (Merit)** - Sengkang N4C22 & 23
- bizSAFE Partner Awards**
- Innovation Award** for Dynamic Glider System at Mandai Lake
- WSH SHARP Award** - Mandai Boardwalk at Mandai Lake
- WSH SHARP Award** - Bidadari Park with Underground Reservoir
- WSH SHARP Award** - Hougang Citrine N1C15
- WSH SHARP Award** - Changi East Package 2, D2012-00180-40



# BUILDING SAFETY AS OUR BUSINESS



**CLOSURE SHARING**





**THE END**