Inventory of Adopting Highly-Effective Construction Robots (HECR) in Capital Works Contracts For Technical Circular (Works) No. 9/2025

Ref. No.	Type of HECR	Contract Type adopting HECR	Frequency of Adoption	Baseline Technical Requirements	Productivity Measurement
HECR-1	Remote Control Tower Crane System	Contracts requiring the use of tower crane(s)	At least one tower crane is remotely controlled per contract	1. Comply with the latest version of "Technical Specification for Remote Control Tower Crane System" issued by Building Technology Research Institute (BTRi).	Number of lifting operation per manhour.[1]

[1] Manhour refers to the manhour of the operator of the tower crane.

Issue Date: 24 August 2026

Inventory of Adopting Highly-Effective Construction Robots (HECR) in Capital Works Contracts For Technical Circular (Works) No. 9/2025

Ref. No.	Type of HECR	Contract Type adopting HECR	Frequency of Adoption	Baseline Technical Requirements	Productivity Measurement
HECR-2	Drilling Robot	Contracts with over 500 drilling holes on site	>50% of holes to be drilled by robot on site per contract	1. Perform drilling operations through self-navigation or remote control capabilities. 2. Achieve precise drillings offset from a reference point, without the need to mark every individual hole. 3. Equip the robot with force sensors to detect hitting rebar, proximity sensors to detect obstacle collision, a dust collection system to maintain work environment, a depth feedback system to ensure accuracy of hole depth, and an emergency button for safety. 4. Ensure the robot controller is internet accessible and BIM compatible. 5. Attain a drilling accuracy of not more than +/- 5mm. 6. Include an auto-stop function that activates when a system anomaly is detected. 7. Ensure site tidiness for robotic movement[2].	Number of holes drilled per manhour[3]

[2] The work zone shall have an inclination less than 1:10 and no obstacle taller than 20mm.

[3] Manhour refers to the total manhour of the operator of the drilling robot and direct supporting workers

Issue Date: 24 August 2026

Inventory of Adopting Highly-Effective Construction Robots (HECR) in Capital Works Contracts For Technical Circular (Works) No. 9/2025

Ref. No.	Type of HECR	Contract Type adopting HECR	Frequency of Adoption	Baseline Technical Requirements	Productivity Measurement
HECR-3	Welding Robot	Contracts with total weld length of over 250m on site (single run equivalent)	>30% of total weld length by robot on site per contract	1. Provide adequate working space for the 3D movement of the robotic welding arm. 2. Equip the robot with sensors to stop the robot upon collision. 3. Ensure the welding robot is capable of performing welds with an accuracy tolerance of +5% / -0% on all dimensions. 4. Follow a pre-set welding path with consistent welding speed to produce welds with uniformity. 5. Require the operator to possess a Certificate for Gas Welding Safety Training Course. The operator should be assessed/tested in accordance with BS EN ISO 14732.	Length of weld done (single run equivalent) per manhour[4]

[4] Manhour refers to the total manhour of the operator of the welding robot and direct supporting workers.

Issue Date: 24 August 2026

Inventory of Adopting Highly-Effective Construction Robots (HECR) in Capital Works Contracts For Technical Circular (Works) No. 9/2025

Ref. No.	Type of HECR	Contract Type adopting HECR	Frequency of Adoption	Baseline Technical Requirements	Productivity Measurement
HECR-4	Drone (Progress Monitoring)	All contracts except for works could not be viewed by drones	Biweekly submission of 3D photo-grammetry models of construction site	1. Comply with Cap. 448G. 2. Perform aerial photography (48MP resolution), 720 panorama images, fly through videos (4K resolution) and real time live streaming. 3. Provide 3D photogrammetry models (2cm resolution and geo-referenced) in OBJ format with image overlap ratio exceeding 80%. 4. Equip the drone with geofencing, altitude and distance limitation functionality and a real-time kinematic (RTK) positioning system with accuracy better than 5cm. 5. Allow users to visually track and compare the progress of a project over time by 3D photogrammetry model chronologically. 6. Equip the drone with an omnidirectional obstacle avoidance system. 7. Equip the drone management system to be internet accessible and BIM compatible. Allow automatic data transfer of 3D photogrammetry model to Digital Works Supervision system (DWSS).	N.A.

Issue Date: 24 August 2026