

Announcement regarding the installation work of Fukushima Daiichi Nuclear Power Station ALPS treated water dilution/discharge facility and related facilities

TEPCO

November 24, 2022

Tokyo Electric Power Company Holdings, Inc.

1. Outline

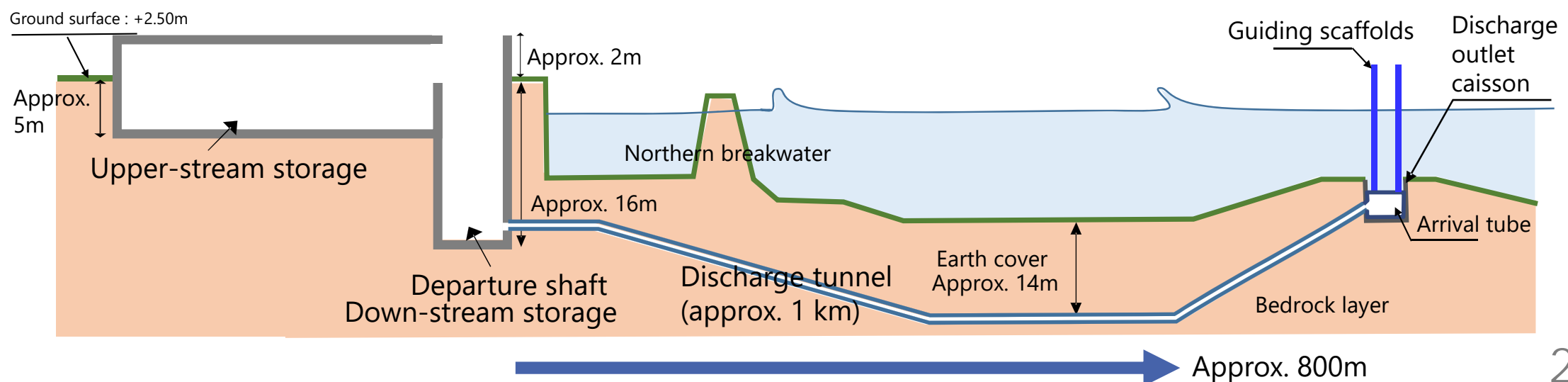
- On December 21, 2021, TEPCO submitted the "Application Documents for Approval to Amend the Implementation Plan for Fukushima Daiichi Nuclear Power Station Specified Nuclear Facility" regarding the design of ALPS Treated Water Dilution/Discharge Facilities, etc. to the Nuclear Regulation Authority (NRA), and on July 22, 2022, these application documents were approved by the NRA.
- On December 20, 2021, TEPCO also submitted a "Request for Prior Consent " to Fukushima Prefecture, Okuma Town, and Futaba Town regarding the installation of ALPS treated water dilution/discharge facilities, etc. based on the "Agreement to Ensure Safety in Surrounding Areas Related the Decommissioning of Fukushima Daiichi Nuclear Power Station (hereinafter the Agreement to Ensure Safety in Decommissioning)". On August 2, 2022, municipalities granted us prior consent after confirming the state of the necessary safety measures.
- Construction of ALPS treated water dilution/discharge facilities, etc. has begun sequentially since August 4, and installation of the discharge tunnel also began on the same day, with safety as the top priority.

< Announced as of October 27 >

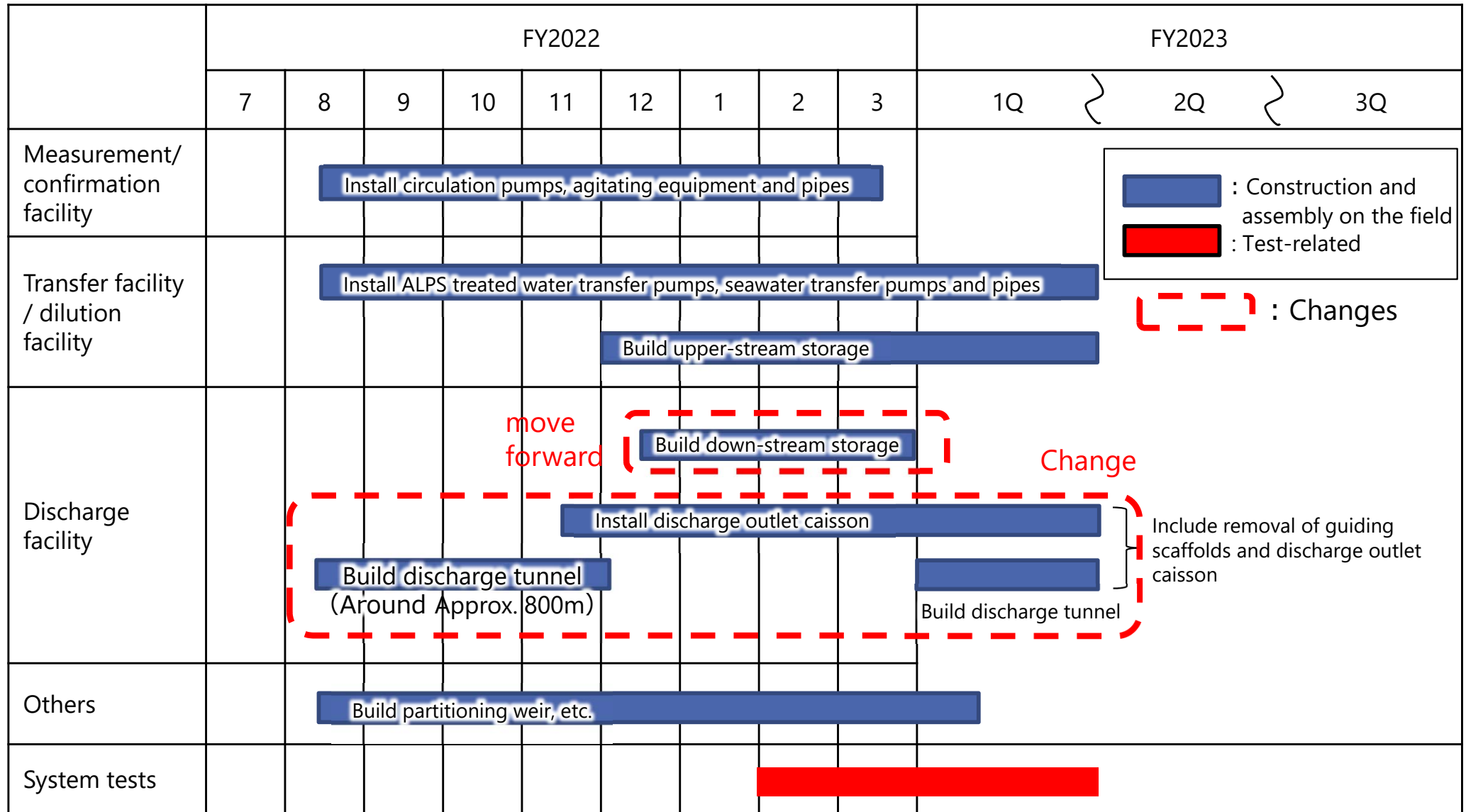
- Installation of the discharge outlet caisson was completed on November 18. Next, mortar and concrete will be poured around the caisson, during which the shield machine will be placed at a safe location in front of the caisson. During this backfilling, the down-stream storage will be also installed ahead of schedule for effective use of the period.
- The shield machine is expected to progress to 800 m from the discharge tunnel entrance by the end of November. The discharge tunnel driving work will be halted there. Preparations for down-stream storage work will start in around early December, and the down-stream storage frame construction work will start in around mid-December.
- We will continue to work with safety as the top priority aiming for completion of the installation work in around spring of 2023.

2. Change in construction order of discharge facility

- Installation of the discharge tunnel, which started on August 4, is progressing smoothly with the shield machine digging, and there have been no leaks (656 m out of 1,030 m <as of November 21>). Discharge outlet caisson installation was completed on November 18, and mortar and concrete will be poured around the caisson.
- The shield machine will be placed at a safe location in front of the caisson in order to carry out the backfilling. During this backfilling, the down-stream storage will be also installed ahead of schedule for effective use of the period.
- The shield machine is expected to progress to 800 m from the discharge tunnel entrance by the end of November. The discharge tunnel driving work will be halted there. Preparations for down-stream storage work will start in early December, and the down-stream storage frame construction work will start in mid -December.
- After the down-stream storage is installed, the discharge tunnel installation work will be restarted.



3. Review of the process due to the change in construction order of discharge facility

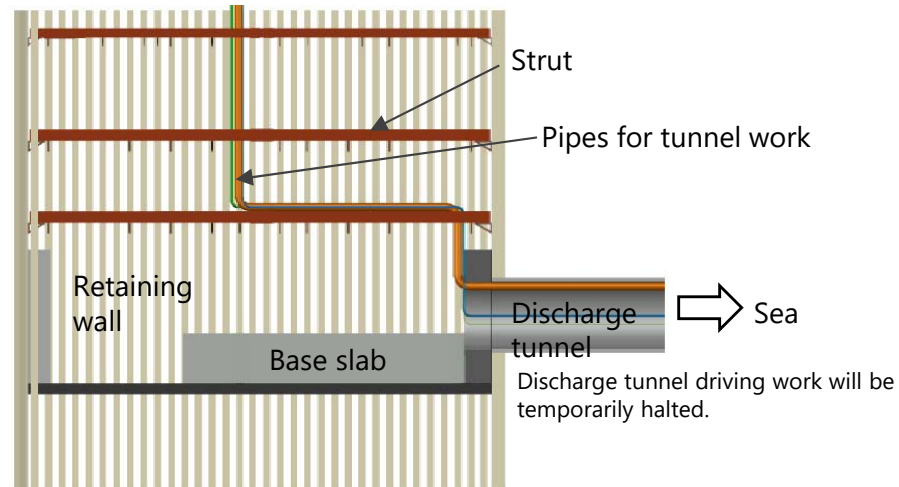
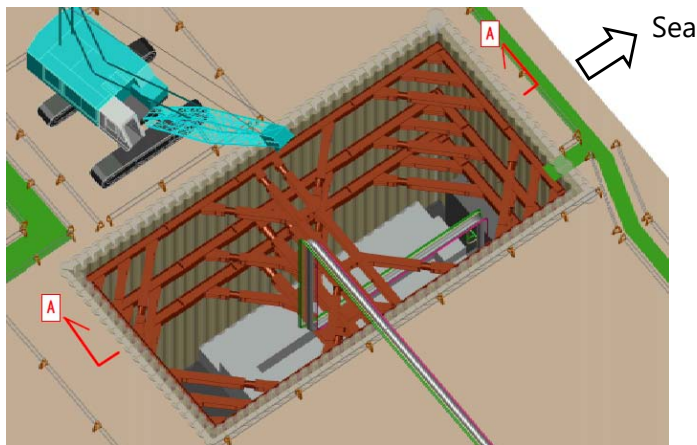


※The schedule may be revised based on progress made and other factors.

【Reference】 Installing the down-stream storage

- The down-stream storage will be installed while the discharge tunnel driving work is halted.
- After the down-stream storage is installed, the discharge tunnel installation work will be restarted.

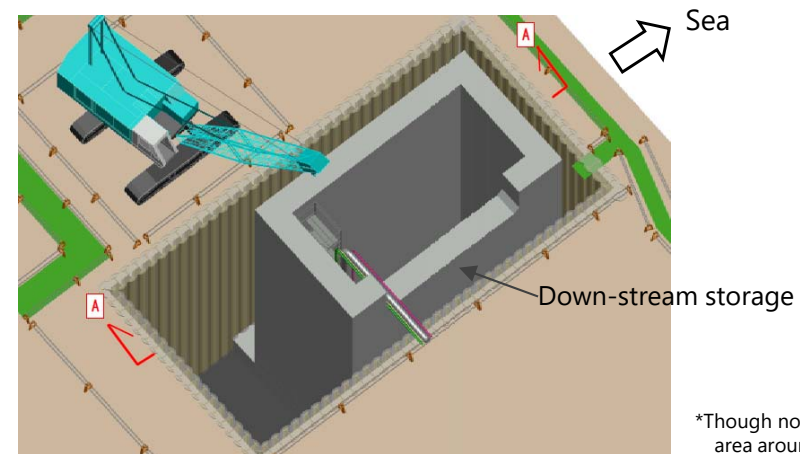
Beginning of construction



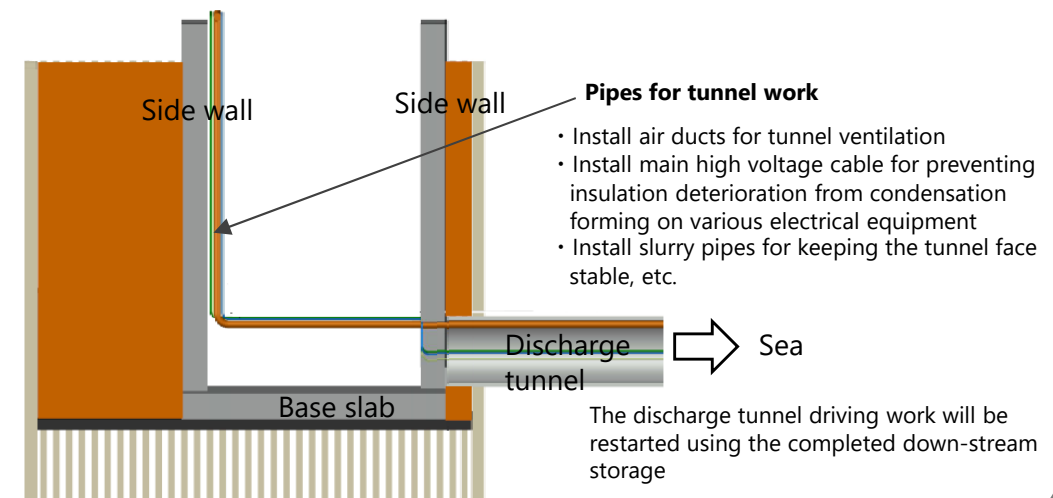
A - A cross section

*Subject to change on the ground

When completed



*Though not shown in the figure, the area around the down-stream storage will be backfilled.



A - A cross section

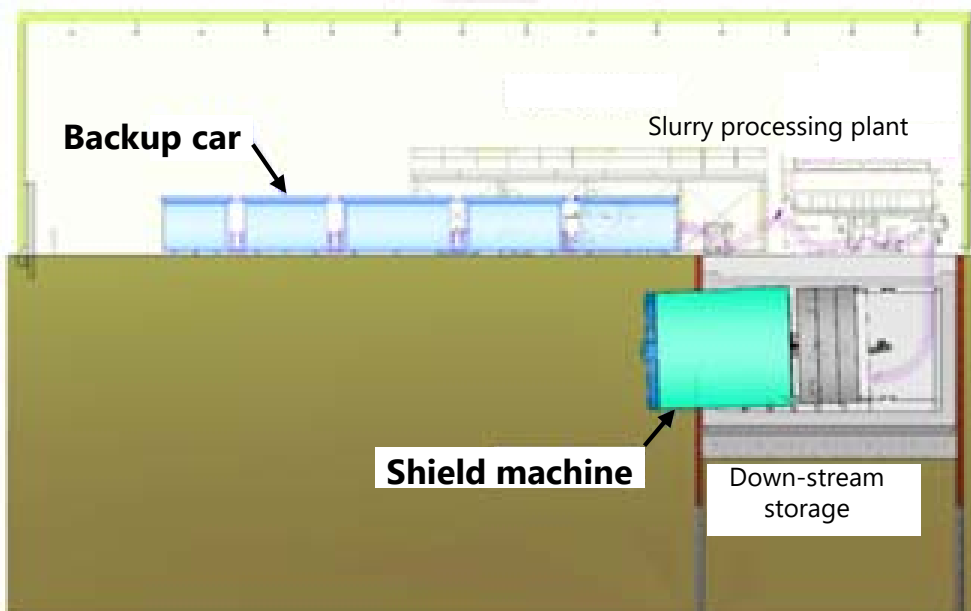
* Subject to change on the ground

【Reference】 Initial drive, main drive, arrival drive (1)

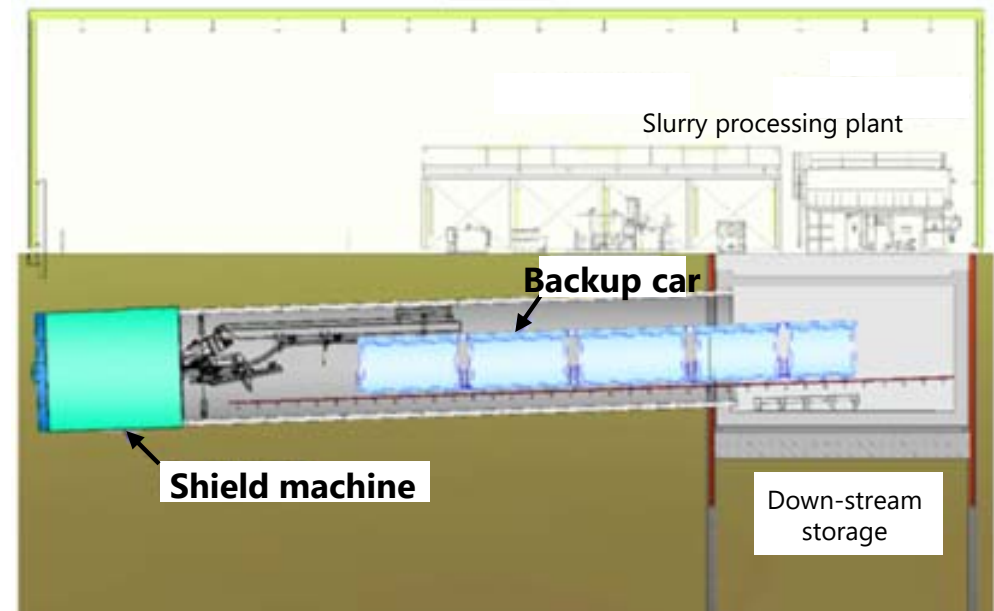
- Discharge tunnel driving will progress in the following order: ①initial drive, ②main drive, ③arrival drive up to the discharge outlet caisson.
- In the initial drive, shield machine driving will alternate with connecting equipment necessary for shield machine driving from the back end (backup car*1). This will continue for approx. 150 m until the backup cars are all connected*2.
- The main drive comes after the initial drive and the tunneling will be conducted in earnest. It will be tunneled 860 m during the main drive.

* 1 : 7 cars necessary to drive the shield machine (includes field operation panels etc.), 13 cars for transporting and exhausting the slurry, and 6 cars for electrical equipment and instrumentation.
* 2 : The tunneling rate during the initial drive is slower than that of the main drive as it is conducted alternately with work to connect the backup cars.

【Initial drive】



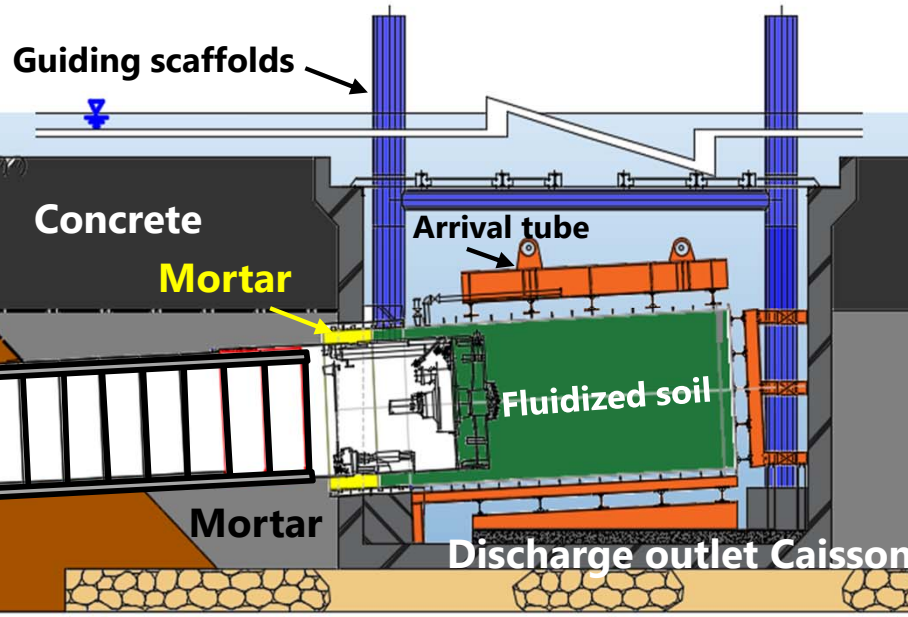
【Main drive】



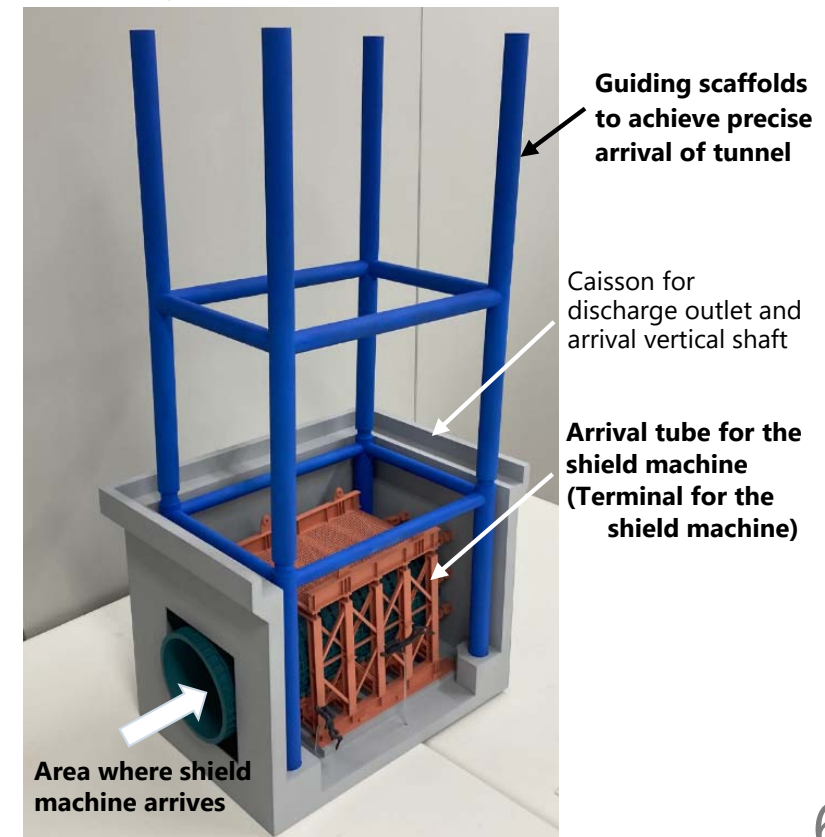
【Reference】 Initial drive, main drive, arrival drive (2)

- In the arrival drive, the shield machine arrives at the arrival tube that has already been installed at the discharge outlet caisson. The shield machine will drive the 20 m from the backfilled mortar around the discharge outlet caisson on the sea floor to the tip of the fluidized soil on the inner part of the arrival tube during this period.
- The discharge outlet caisson has guiding scaffolds that can obtain accurate location information to guide the shield machine to the arrival tube accurately. There is GPSs at the top of the guiding scaffolds (sticks out 3 m above sea level) that can control the arrival location of the shield machine and guide the shield machine to the arrival tube with high accuracy.

【Arrival drive】



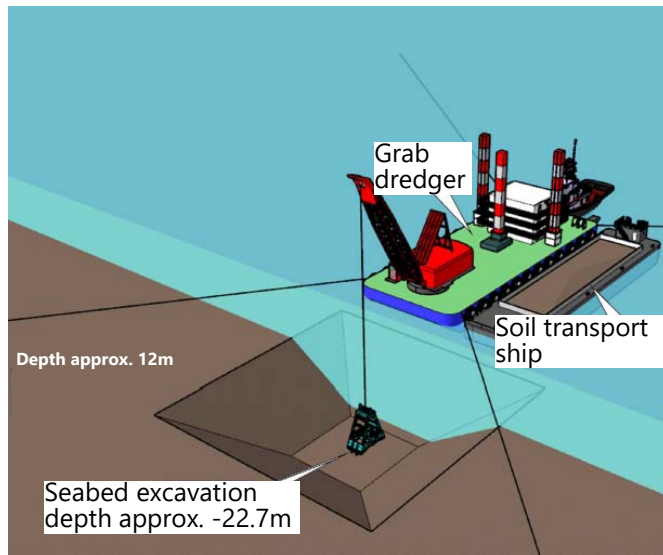
【Guiding scaffolds・Arrival tube】



[Reference] Discharge Outlet Caisson (General Project Overview)

- Seafloor excavation and depositing/covering of rubble work at the discharge outlet of the discharge tunnel and its confirmation have been completed on July 22th. The caisson (a large concrete box) made of reinforced concrete will be installed on the seafloor using large crane ship after tomorrow as soon as preparations are completed while watching the weather and sea conditions. The area around the caisson will then be back filled with concrete.
- After the shield machine drilling the discharge tunnel reaches the caisson, a crane ship will be used to extract the shield arrival tube (containing the shield machine) from the outlet caisson.

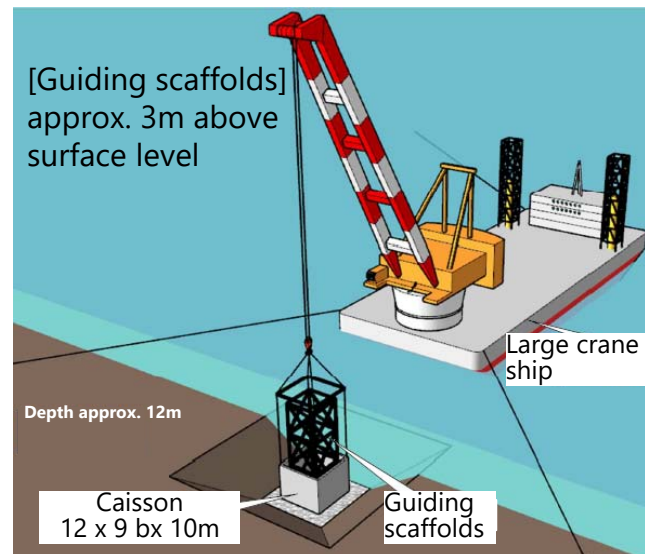
— Improvements in the Surroundings (completed) —



[Bedrock excavation, caisson fabrication]

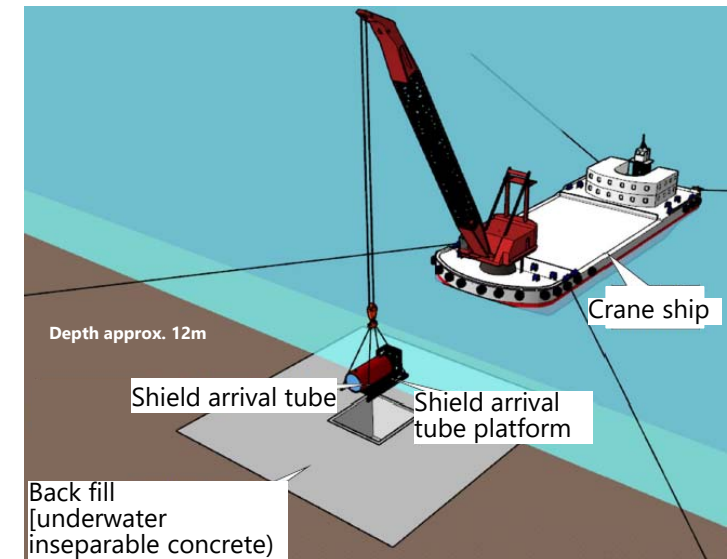
1. Use grab dredger (seafloor excavation ship) to excavate bedrock
2. Carry excavated soil to power station site
3. Deposit foundation rubble

— Project to install discharge outlet caisson —



[Install caisson]

1. The caisson transported by sea from outside the power station is installed using a large crane ship
2. Refill the area around the caisson with concrete
3. In preparation for the arrival of the shield machine, manage locational information of the discharge outlet by using the metal guiding scaffolds connected to the caisson



[Remove excavator, install lid]

1. After the shield machine arrives inside the shield arrival tube in the caisson, fill the inside of tunnel with seawater
2. Separate the collector and the tunnel, and collect the shield machine from the vertical shaft using a crane ship
3. Finally, install the caisson lid

[Reference] Discharge Outlet Caisson (Installation of Discharge Outlet Caisson)

- Fix crane ship to the pre-installed sinker blocks (110t) and anchors using mooring wire.
- Guide crane ship to the installation location using GPS installed on the crane ship and surveying the guiding scaffolds installed on the caisson from the ground side (from two locations on the South seawall and North seawall). Fine adjustments for the positioning of the subject crane ship will be performed by winding and releasing the mooring wire using the crane ship's winch. Discharge caisson will be installed after moving the ship to the point of installation.

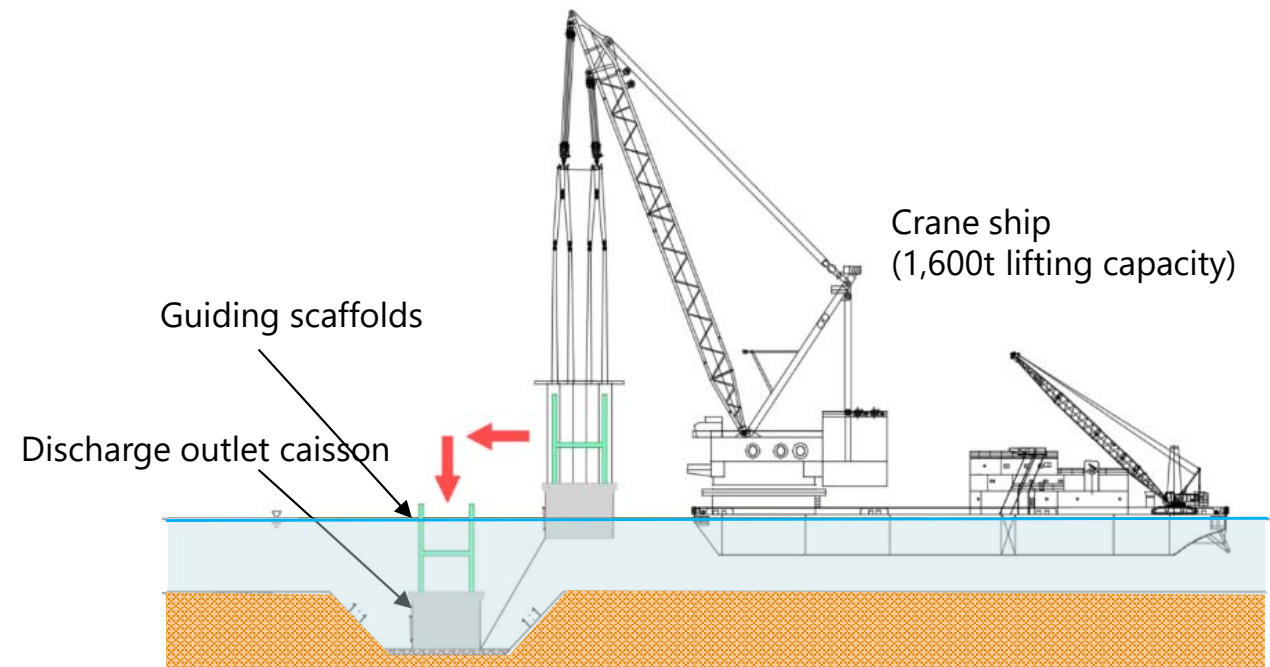
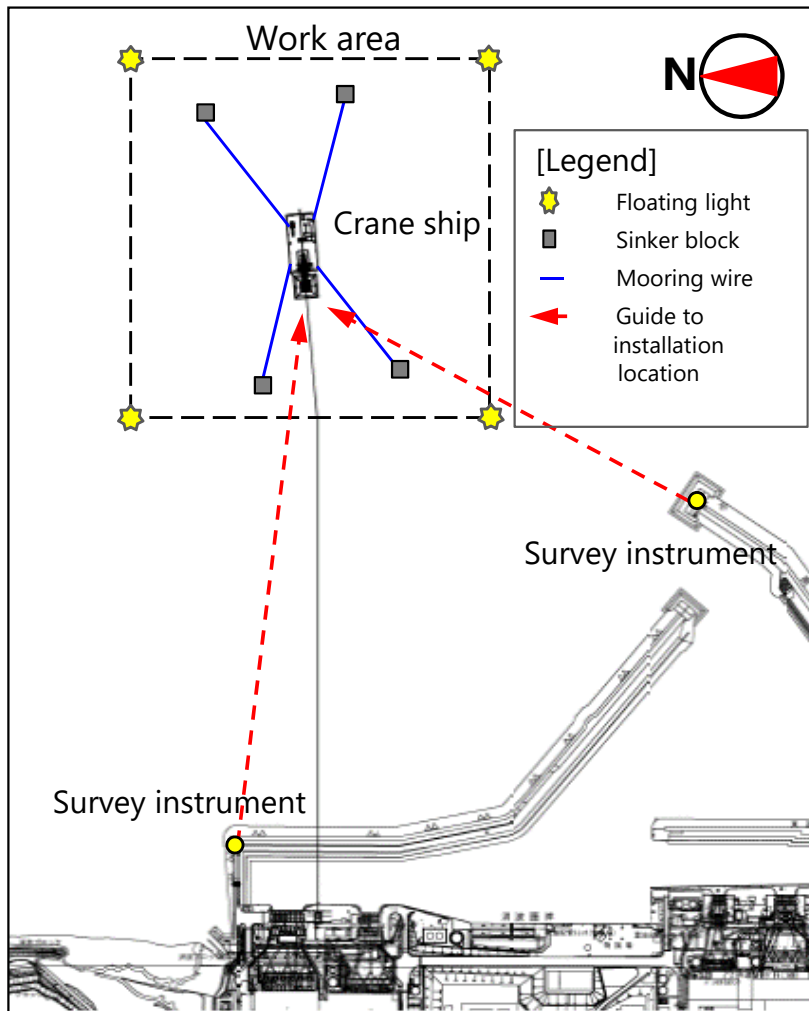


Figure of Work to Install Discharge outlet Caisson (cross section)

Figure of Work to Install Discharge outlet Caisson (plan view)

【Reference】 Construction of installing discharge outlet caisson

- Installation of the outlet caisson was completed on November 18, 2022.
- Seawater monitoring conducted in the sea area has not found any significant fluctuations under construction.



Construction of installing discharge outlet caisson ①



Construction of installing discharge outlet caisson ③



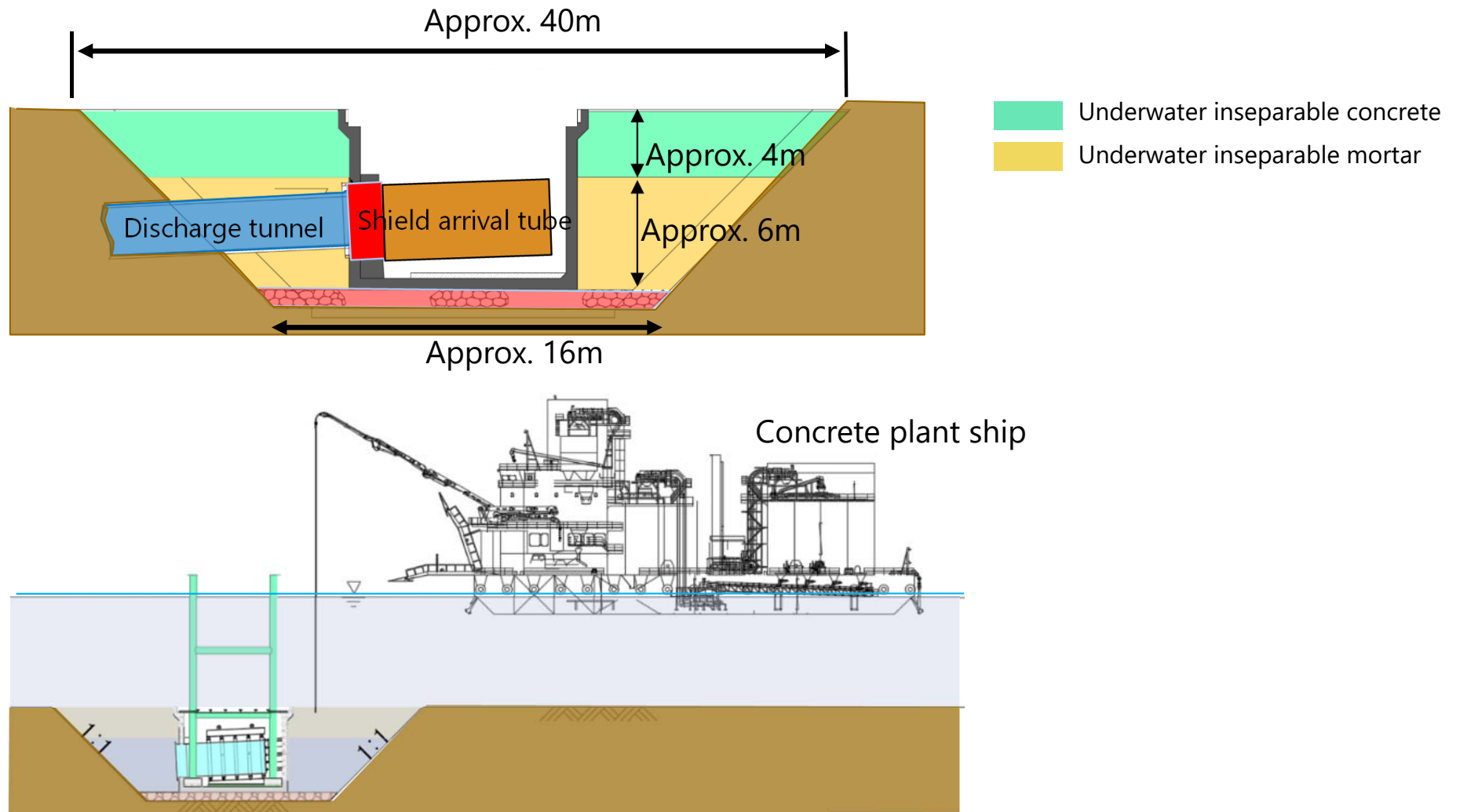
Construction of installing discharge outlet caisson ②



Construction of installing discharge outlet caisson ④

【Reference】 Discharge Outlet Caisson (Back Fill)

- After installing the discharge outlet caisson, underwater inseparable mortar (area where the shield machine passes) and underwater inseparable concrete are poured using a concrete plant ship for back filling.



Cross section figure for back filling work