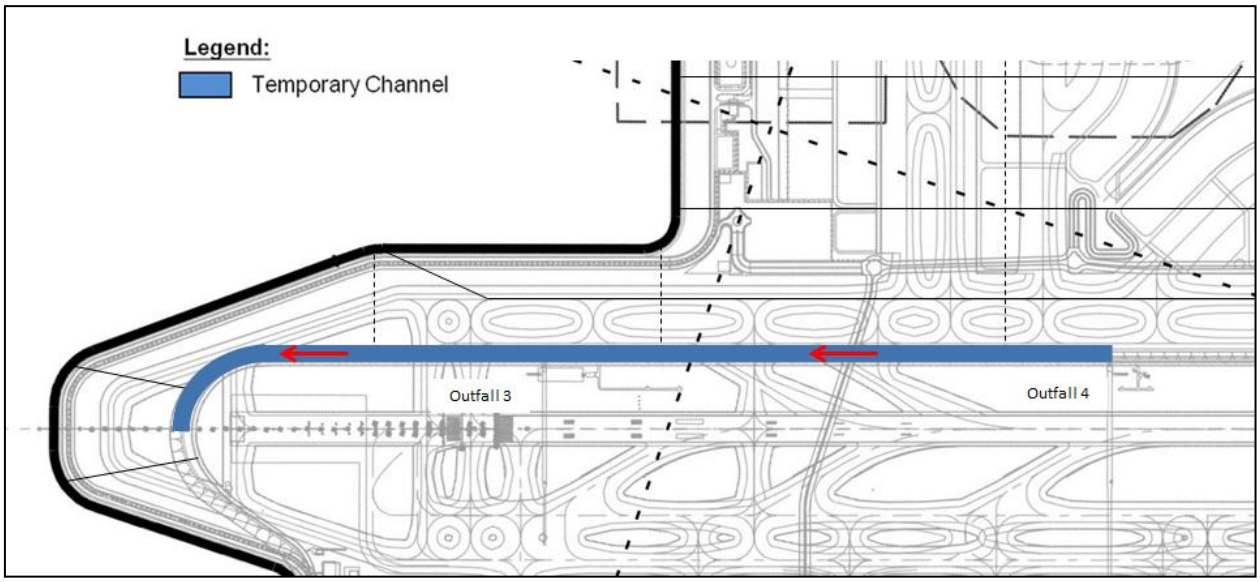
Indicative Construction Sequence for Diversion of Stormwater Culverts

1. Construction Sequence of Outfall Nos. 3 & 4

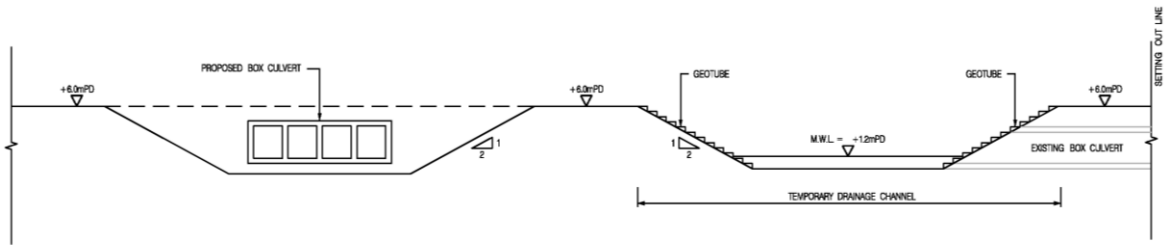
Step 1 - Temporary drainage channel to be constructed

The provision of the temporary channel will be carried out in phases depending on the land formation programme. During the construction of the culvert extension, the temporary channel is used to maintain the drainage flow path to sea. The temporary channel is therefore initiated between the existing sea wall and the new land formation. The overall temporary channel is shown below.



A temporary channel will be provided to allow for the land formation phasing. When the material is filled up to +2.50 mPD, a channel trench will be left between the existing seawall and the land formation. A typical section of the temporary channel is shown below.

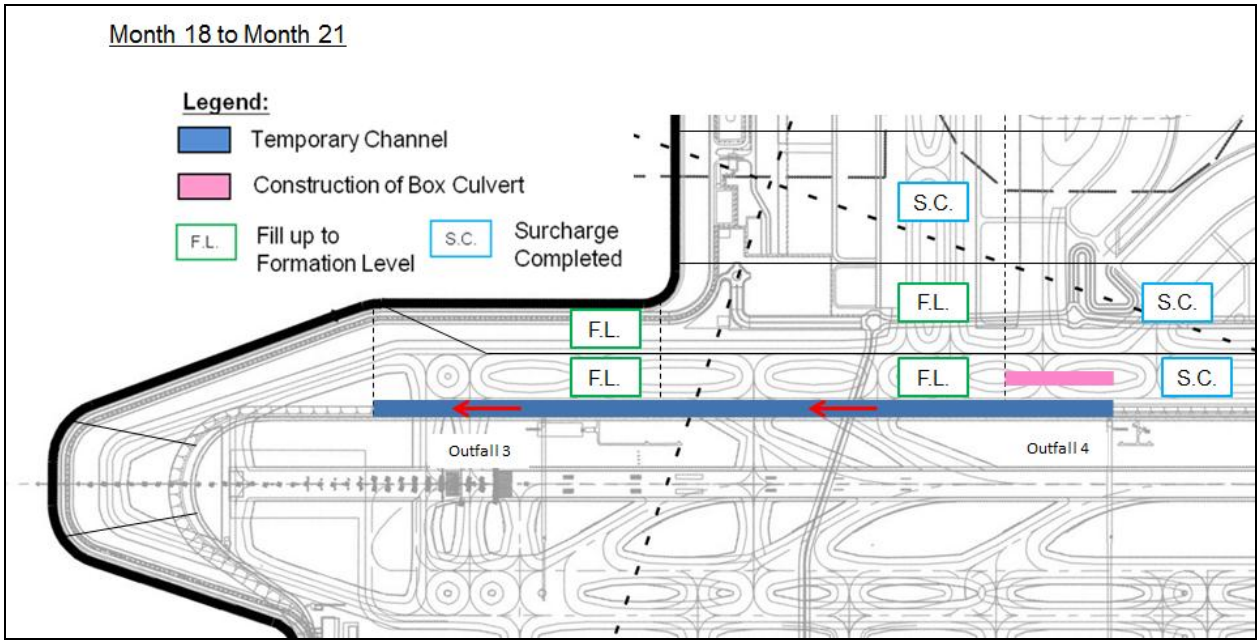
Typical Temporary Channel and Proposed Culvert Section



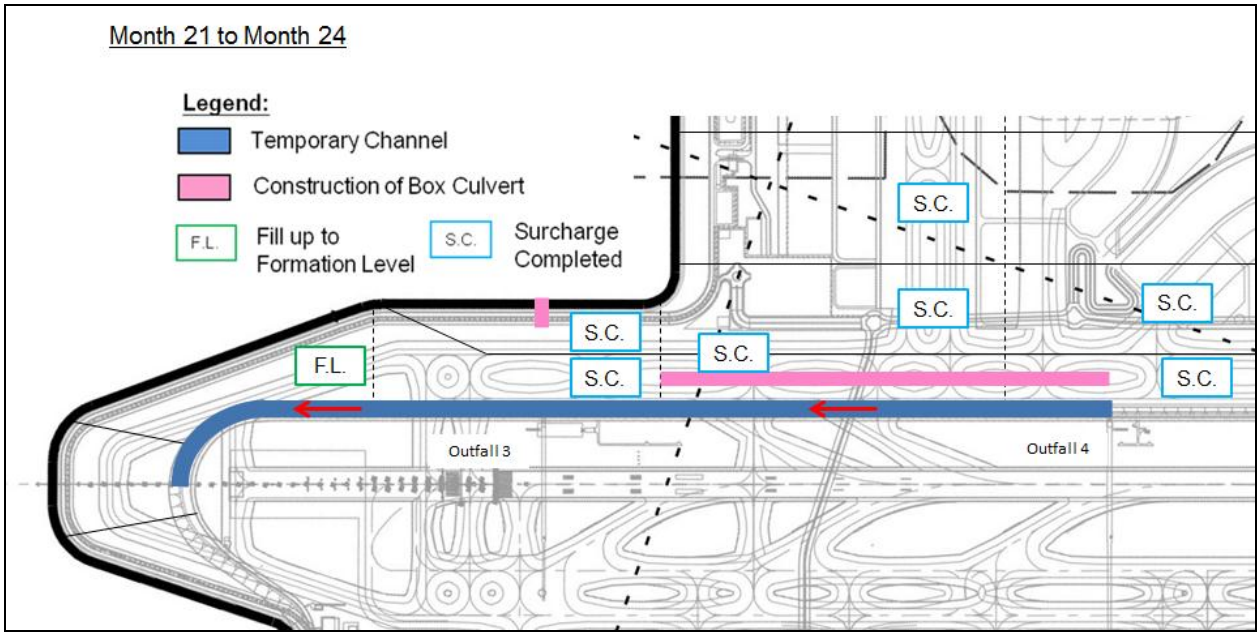
Step 2 – When land formation surcharge completed, construct box culvert

In Month 18 to 21, when the land formation surcharge portion directly north of existing Outfall No. 4 is completed, a section of the culvert extension can be constructed.

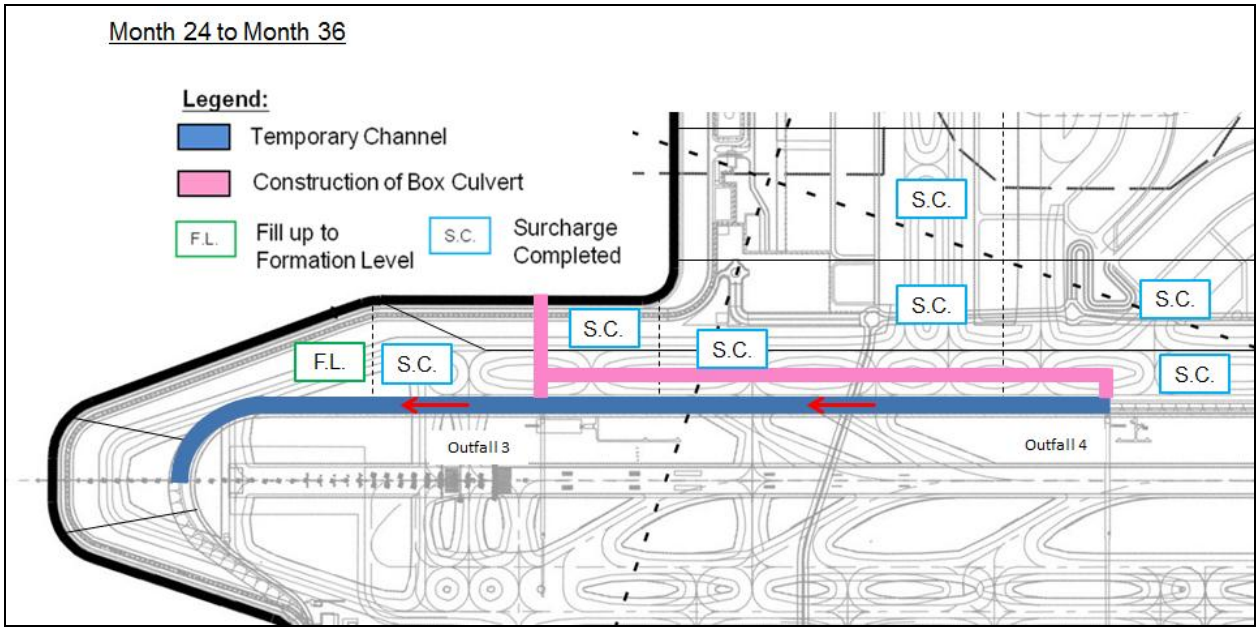
This section would be approximate 300 m in length. Tranditional open trench excavation and cast in-situ concrete construction methods would be adopted.



In month 21 to 24, another approximately 650 m section of the culvert extension including the outfall structure will be built after the surcharge process is completed. Installation of the outfalls would form part of the new sea wall construction works, with temporary bulkheads fitted in the outfall openings in order to prevent the seawater coming into the landform area, and to facilate the temporary drainage diversion works at a later stage (i.e. the inter-connection construction works).

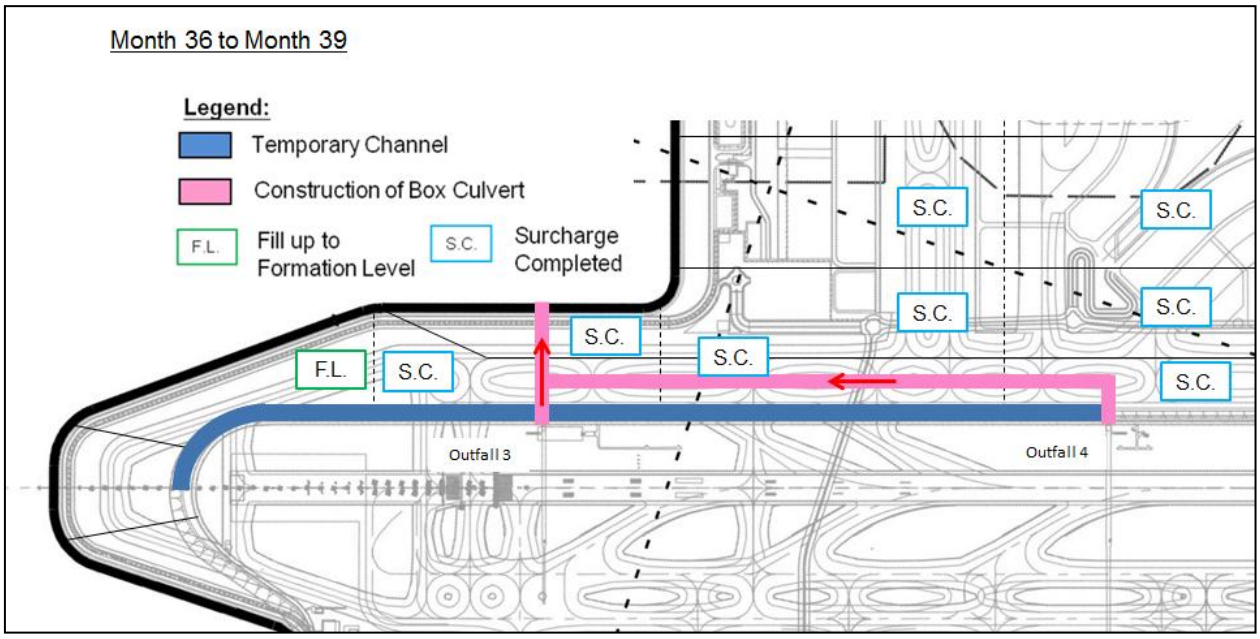


In month 24 to 36, a further approximately 500 m section of the culvert extension will be built after the surcharge process is completed, connecting the culvert extension to the outfall, apart from the interconnections to the existing outfalls.



Step 3 – After the construction of box culvert and connection section are completed, divert the flow from the temporary channel to the new box culvert

The two interconnecting sections between the exsitng outfalls and the culvert extension will be completed in month 36 to 39, while allowing a drainage flow path via the temporary channel to discharge. This stage of the construction works would be carried out during the dry season in a stage-wise manner (cell by cell). Common methods of temporary bulkheads and dividing walls would be used, with the corresponding temporary bulkheads in the new outfalls removed at appropriate stages to establish drainage flow paths.



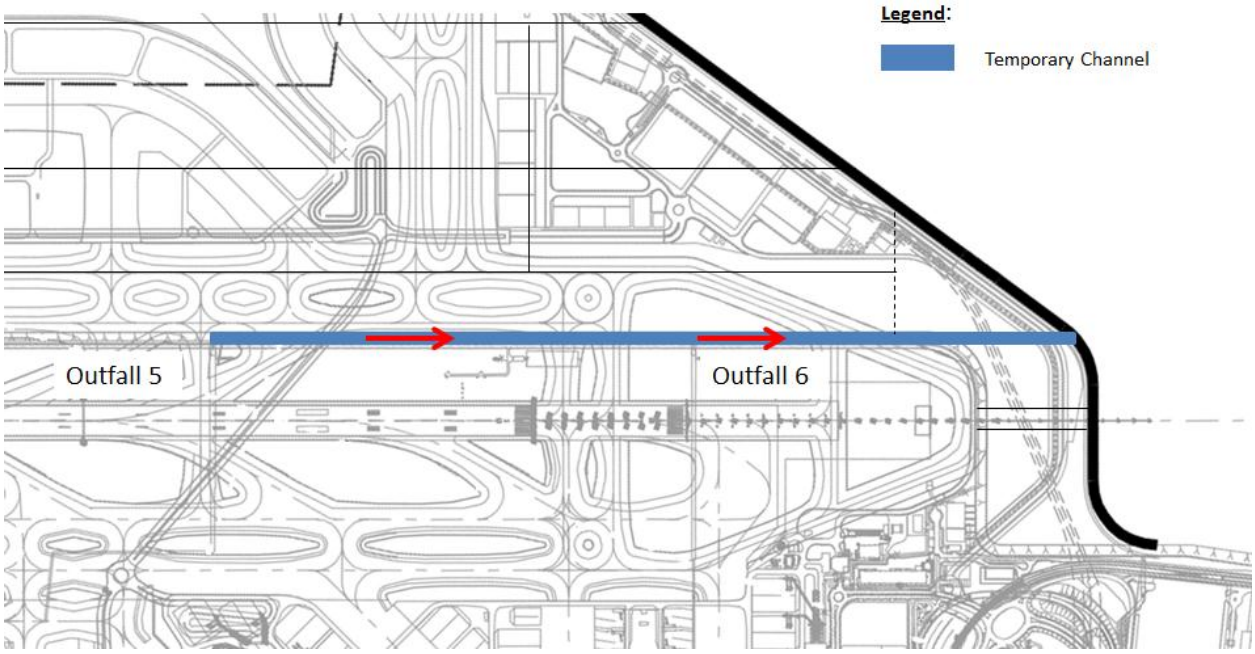
Step 4 – Fill the temporary channel and allow in surcharge process

After completion of all interconnections between the existing outfalls, new culvert extension and new outfall, the temporary drainage channel along the existing sea wall can be filled in and compacted in stages as necessary to complete the land formation works in this area.

2. Construction Sequence of Outfall Nos. 5 & 6

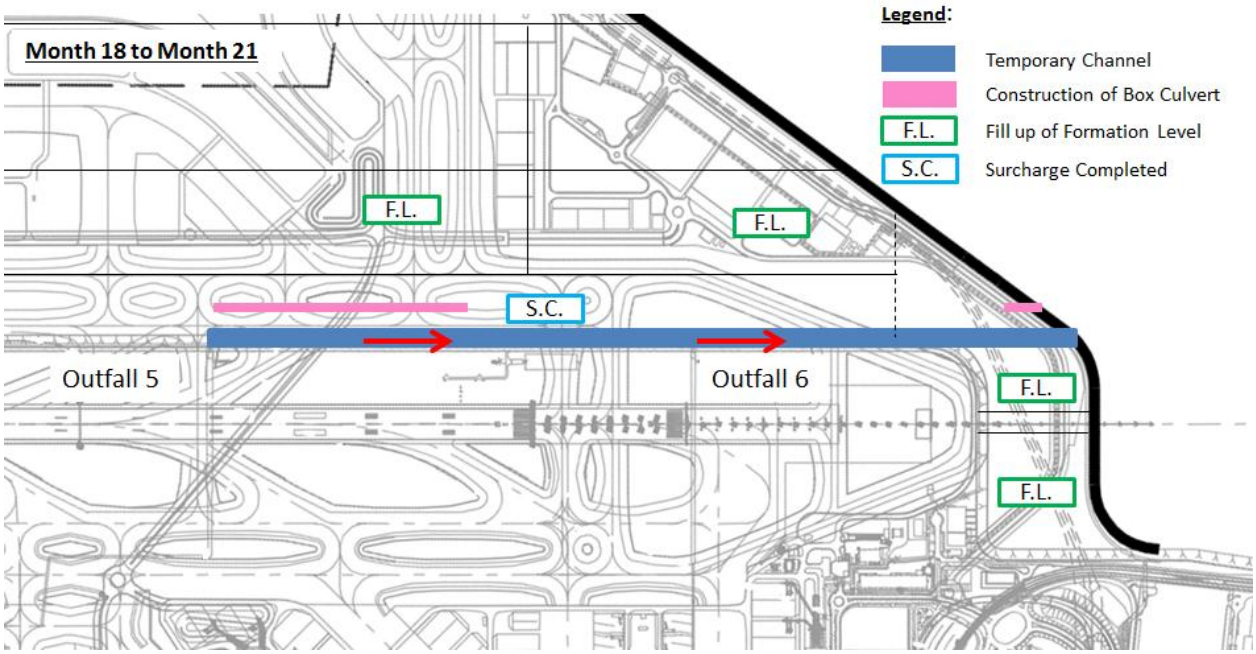
Step 1 - Temporary drainage channel to be constructed

Similar to the temporary channel provided to facilitate the construction works of the culvert extensions of Outfalls 3 & 4, the provision of the temporary channel will be carried out in phases depending on the land formation programme. At the time of the start of the culvert construction, the channel trench between the existing seawall and the land formation shall be in service.

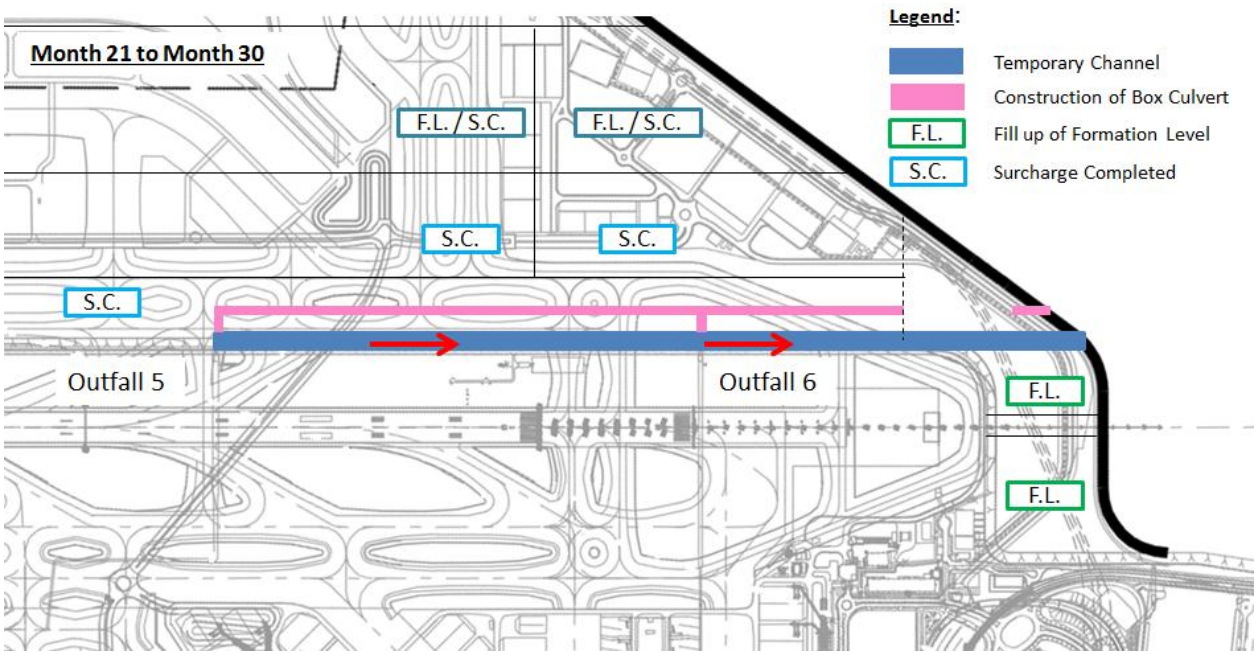


Step 2 – When land formation surcharge completed, construct box culvert

In month 18 to 21, upon the completion of the land formation and surcharging, a section of culvert extension north of existing Outfall No. 5, and the outfall strucuture in the new sea wall, can be commenced via. excavation trench and traditional cast in-situ methods. Approx. 350 m of the culvert would be installed at this stage.

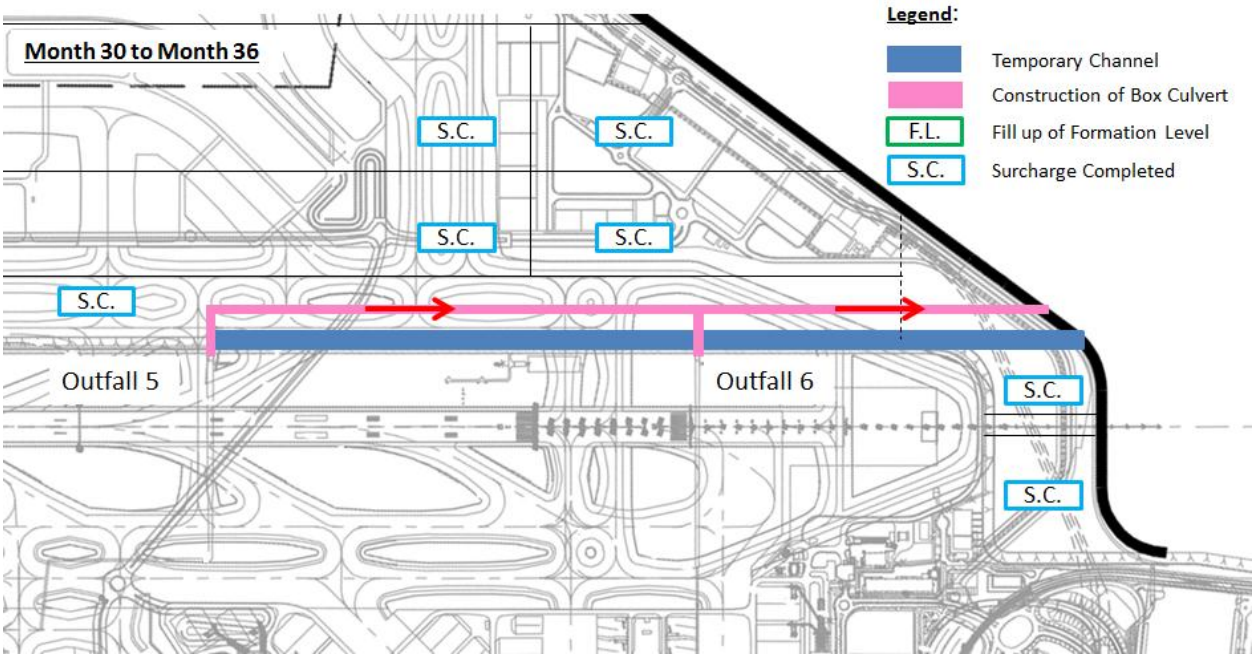


As the land formation areas to the north of the existing northern sea wall are completed, construction of the culvert extension would continue towards the new sea wall towards the east end of the runway, including the outfall in the new seawall itself, during months 21 to 30.



Step 3 – After the construction of box culvert and connection section are completed, divert the flow from the temporary channel to the new box culvert

When the end land formation areas are completed, construction of the culverts can be continued to connect to the temporarily closed outfalls in the new sea wall, in month 30 to 36. Similar to the construction approach of Outfall nos. 3 & 4 extension, the stage-wise (cell by cell) manner during dry season is also adopted, by using temporary bulkheads and dividing walls to divert flows and maintain the drainage flow path.



Step 4 – Fill the temporary channel and allow in surcharge process

After the completion of the interconnections between the existing outfalls, new culvert extension and new outfalls, the temporary drainage channel along the existing sea wall can be filled in and compacted in stages as necessary to complete the land formation works in this area.