Girder Assembly and Installation for Diamond-II

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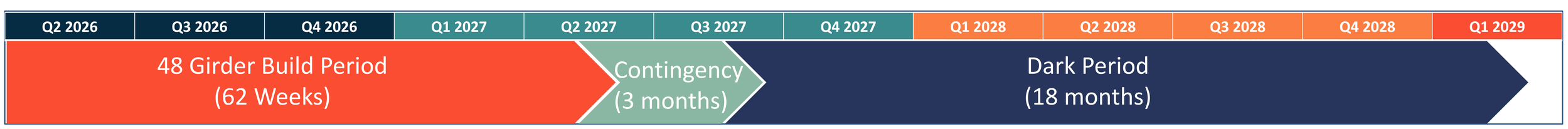
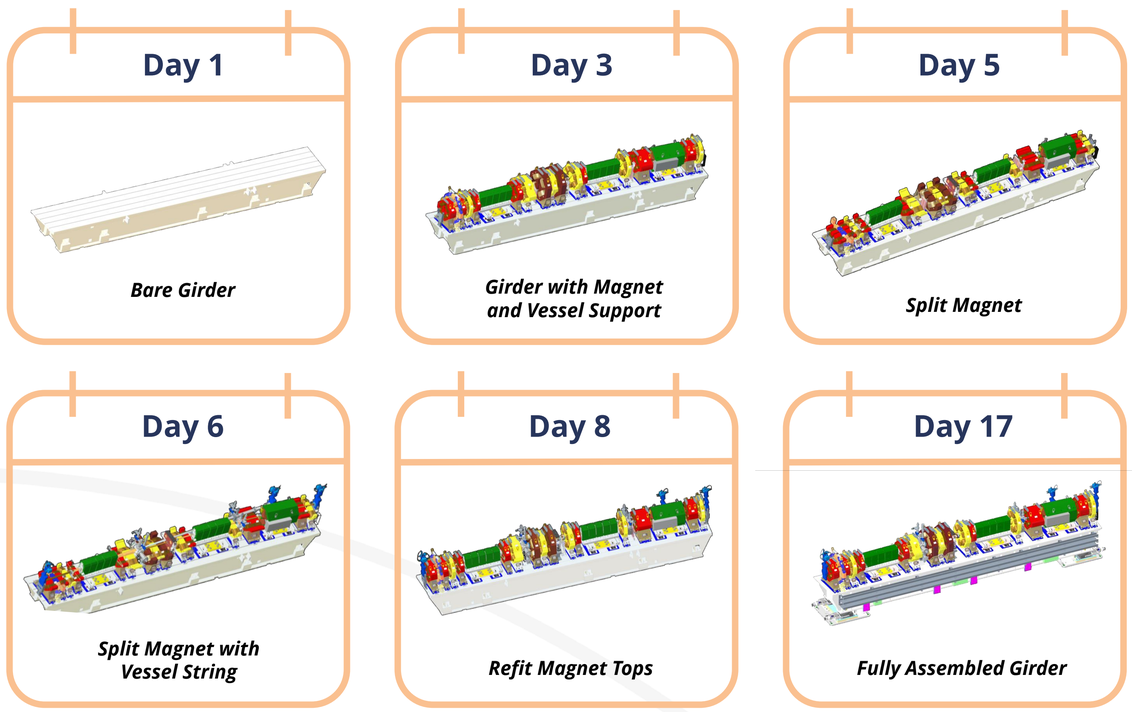
Abstract

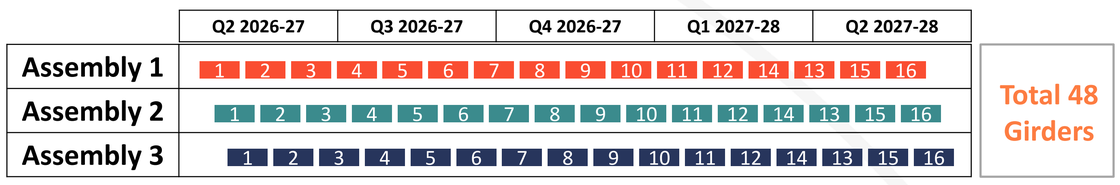
The Diamond-II upgrade's new machine lattice is based on Double Triple Bend Achromats (DTBAs) which will deliver increased brightness and coherence. The girder assembly will be onsite in the specifically developed Diamond Extension Building which will have lab space and storage for the new girders. Once the girder assembly is completed, they will be installed during the Dark Period running from December 2027 through to June 2029. Plans are being created and revised for before the Dark Period with the girder assembly and during the Dark Period to ensure we efficiently use our resources.



Girder Assembly

We have started ordering magnets in March 2024 with vacuum vessels and girders to follow. We will have a Mock Up of the girder assembly in the Diamond Extension Building from November 2025 through to January 2026 to familiarise staff with the girder. The main girder assembly will start from July 2026 and will be completed by end of August 2027. This will give a clear three-month contingency period before the start of the Dark Period in December 2027.





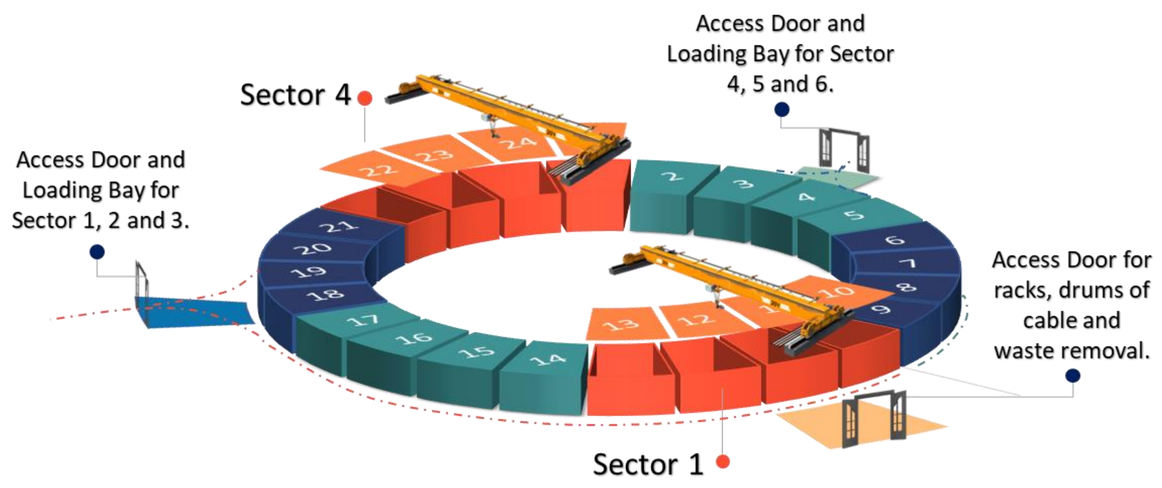
Dark Period Installation

The girders will be installed during the Dark Period from January 2028 through to June 2028. The roof will be removed for 2 opposing sectors, each composed of 4 cells, starting with Sectors 1 and 4 in December 2027. The roof beams will be stored on the closed roof of the neighboring cells.

Each sector will have a dedicated crane and loading bay to avoid clashes in the cranes path. Once the last lifting task to install the cell platforms and ladders is completed then the roof is closed and the next cell in sequence has its roof lifted. The cell will then complete its cabling and systems commissioning with the roof on.

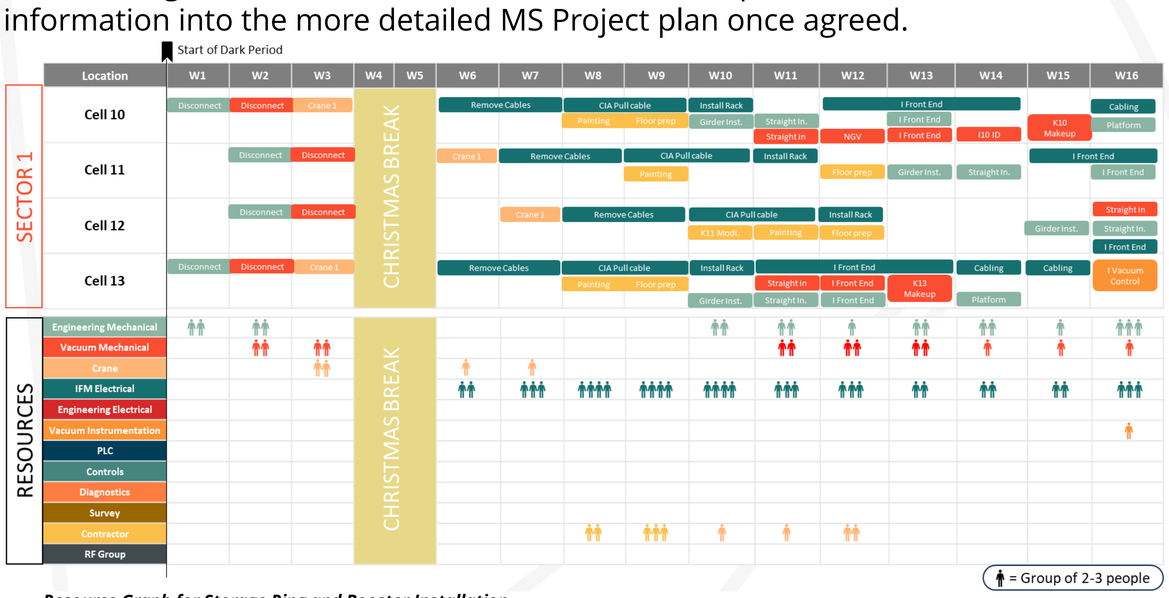
In preparation Sectors 2, 3, 5, and 6 will have everything dismantled with the roof on as soon as resources are available from Sectors 1 & 4. They will then have items lifted out of the cell as soon as the roof is lifted.

Diamond-II Cell Installation Sequence

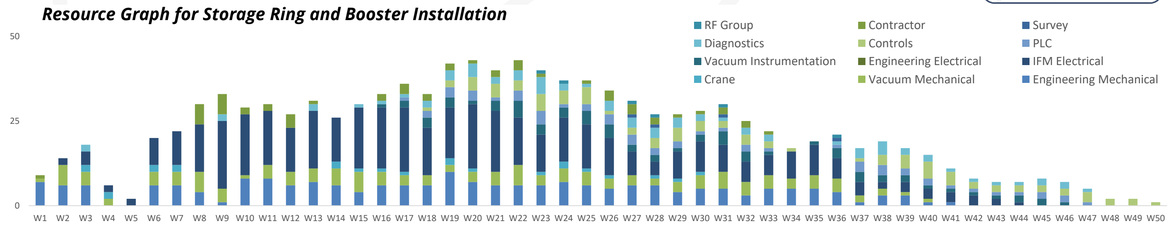


Resources

We are currently analysing how many resources we need at key times and scheduling work so we can smooth the resourcing requirements. We have used data from the MS Project plan and exported it to excel to demonstrate at a one-week resolution what our resource peaks are. We can shift tasks to demonstrate what changes we can make to reduce these peaks and then move this information into the more detailed MS Project plan once agreed.

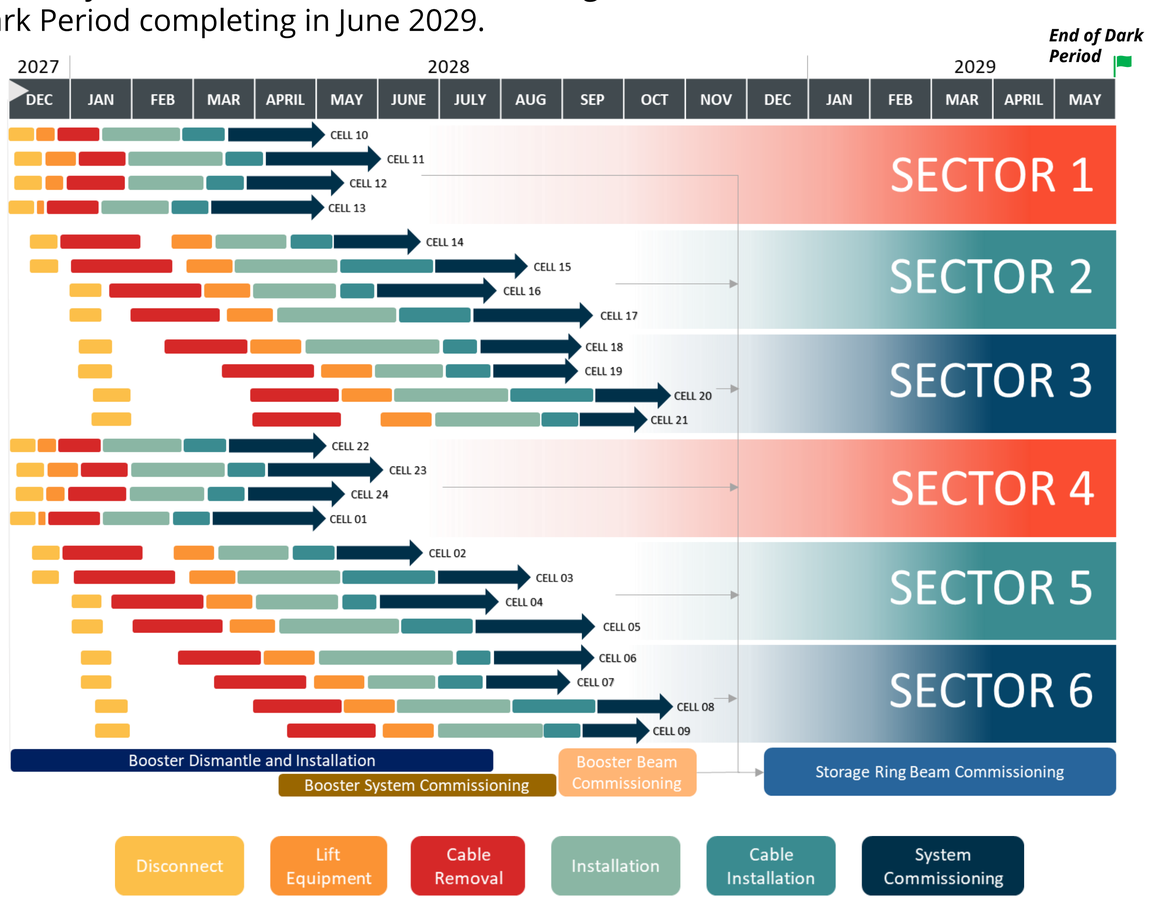


Resource Graph for Storage Ring and Booster Installation



Dark Period Installation Timeline

Work in the storage ring is staggered across the sectors so that our resources are efficiently used. This enables commissioning to start in November 2028 with the Dark Period completing in June 2029.



Discussion

Our current plan for the Dark Period is over 8,000 tasks across the storage ring and booster, however we need to include beamline work requiring the same resources as the machine during the Dark Period. We have also identified we need to understand all the site assembly tasks e.g. Front Ends happening at the same time as the girder assembly, to ensure we have sufficient technicians. A detailed task list is being created with Dark Period tasks broken down to ~1hr duration so they can be given to the contractors.

We are looking for ideas on the best way to track progress during the Dark Period and how to best alter plans and communicate changes when the unexpected happens.

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