

Using Data and Simulation to support the Planning of Hospital Inpatient Bed Resources

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INTRODUCTION

Tan Tock Seng Hospital (TTSH) is a very busy hospital, running at more than 90% bed occupancy rate on most occasions. As a result, we manage patient flow via 3 key thrusts: a) minimise admission, b) optimize resources and c) maximize discharges. Every change of capacity, be it upstream, within TTSH, or downstream stepdown facilities, will have an impact on the Bed Waiting Time (BWT) of our patients.

OBJECTIVE

To have a clear understanding of the impact of bed loss, and to come up with optimal mitigating measures, such as i) optimising ward renovation schedule or ii) determining buffer capacity required to compensate for facility closure.

METHODOLOGY

Impact of Buffer Stepdown Unit (BSU)* Closure

- Develop different simulation scenarios to understand the impact of change in Cabin capacity and increasing patient discharge to NH, to the number of Nursing Home (NH) bounded patients staying in TTSH main ward or sub-acute wards due to lack of BSU capacity.

Impact of Ward Renovation

- Perform simulation and regression to estimate P50 and P75 BWT, and project the number of patients waiting for more than 10 hours at ED.
- Compare different renovation plans to find out the optimal schedule that has the minimum impact to BWT.

*Buffer Stepdown Unit (BSU) is the facility to house stable patient awaiting Nursing Home placement.

RESULT

Impact of BSU Closure

It was concluded that a 40-bed Cabin Capacity was required with a higher NH discharge rate will be key to minimizing the impact of BSU Closure on acute and sub-acute resources.

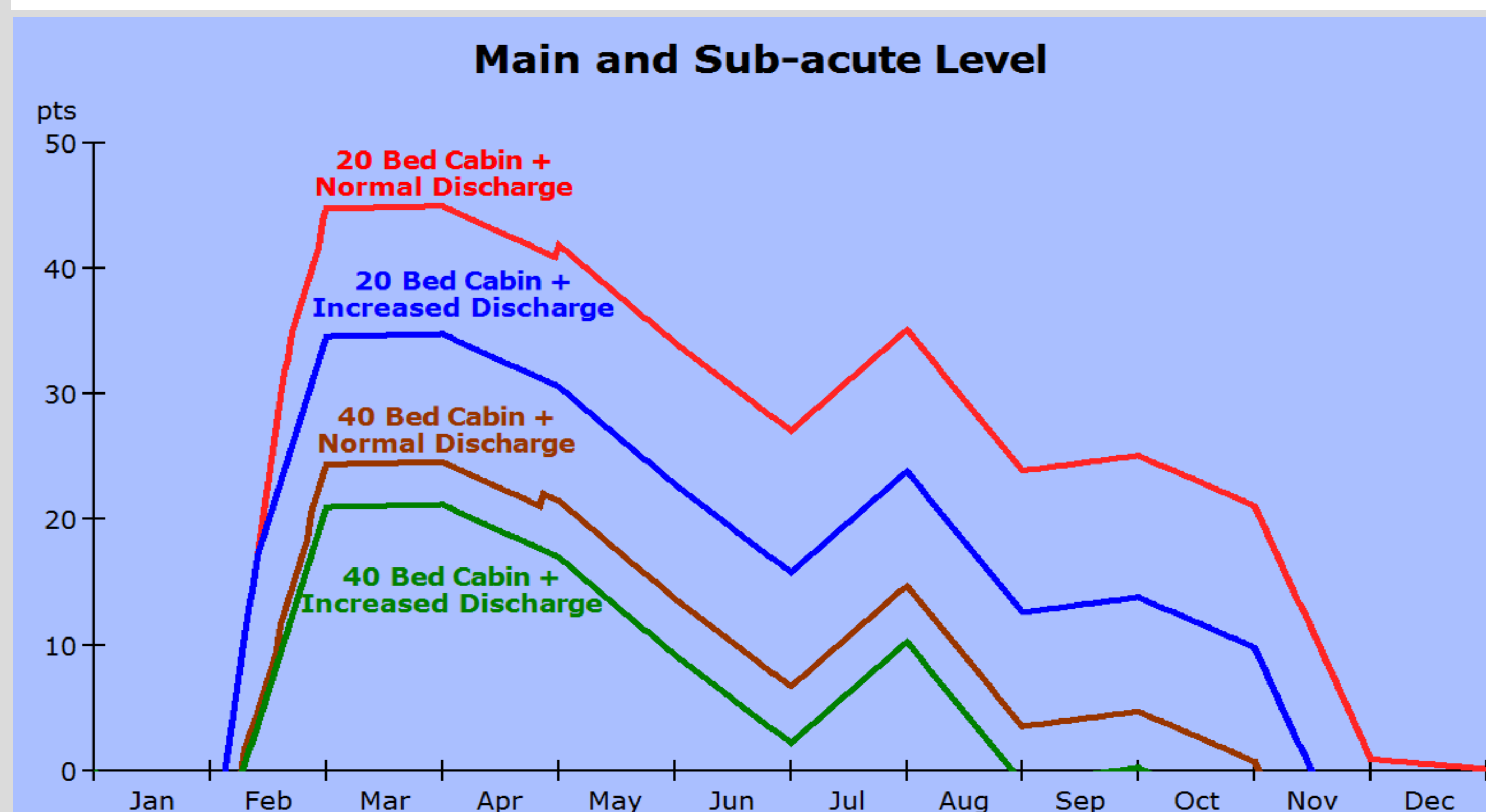


Figure 1: No. of NH bounded patient remain in TTSH Main Ward and Sub-acute Ward

Impact of Ward Renovation

The impact of acute bed loss on P50, P75 BWT as well as number of patients waiting for more than 10 hours at ED was studied. The optimal solution was proposed to the Inpatient Operations team, to facilitate their renovation plans with minimal impact to patient's bed waiting time.

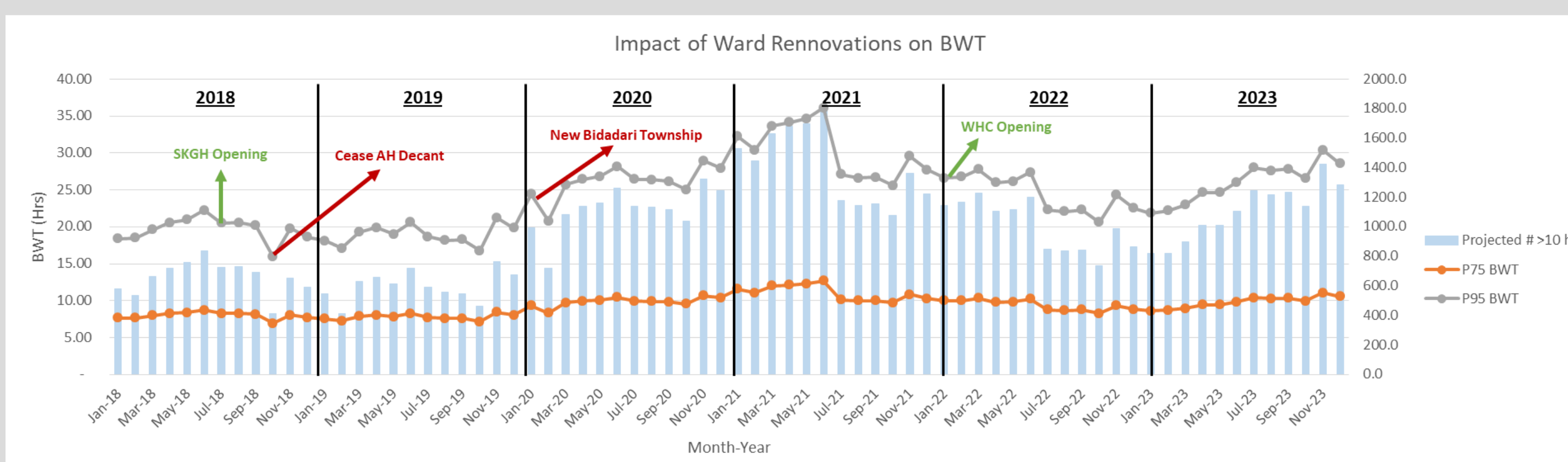


Figure 2a: Ward renovation plan that has a significant impact on BWT

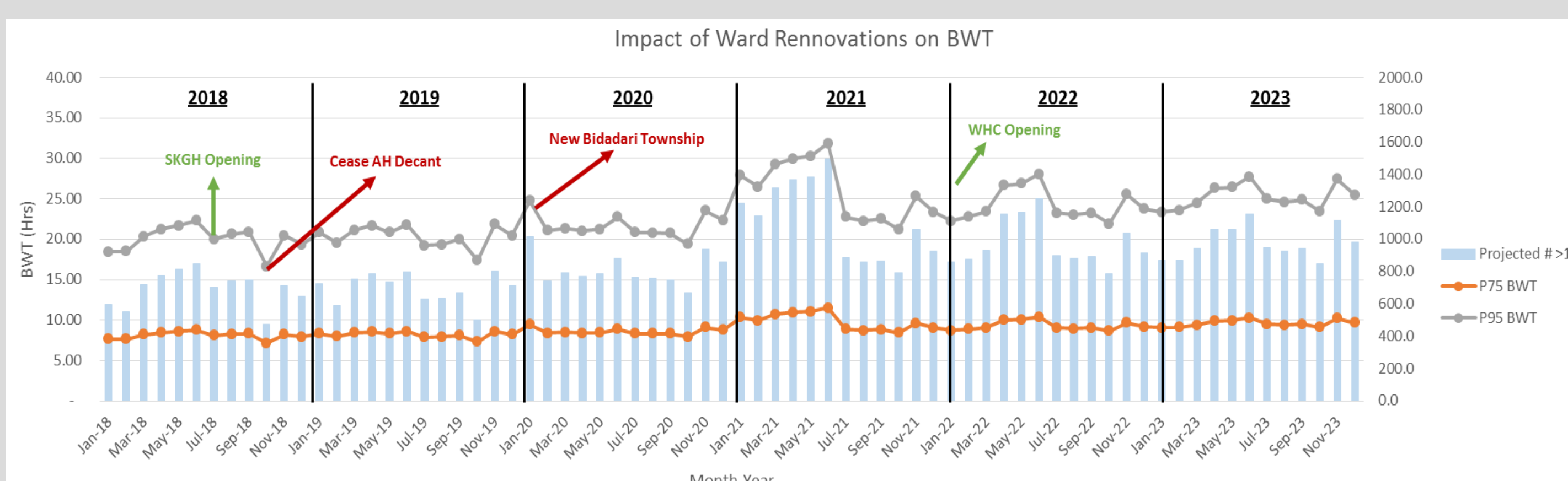


Figure 2b: Proposed ward renovation plan that has the least impact on BWT

CONCLUSION

- Clearer visibility of the impact of loss in bed resources and ability to better plan for the closure/renovation schedule to optimise resource utilisation and relieve tight bed situation.
- This model will also facilitate future capacity planning if there is other ward closure/renovation plan.

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