

Designing a PET/CT Facility integrated within the General Nuclear Medicine Department at Groote Schuur Hospital.



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INTRODUCTION

Positron Emission Tomography (PET) integrated with Computer Tomography (CT) is the imaging modality that is rapidly becoming the standard of care in the management of both oncology and infection. We at Groote Schuur Hospital dreamt for years about having our own PET/CT Facility. Groote Schuur Hospital was one of the only state hospitals in South Africa that did not have a PET/CT Facility onsite that is required to support clinical work which includes planning for theragnostic applications. As a state hospital, there was a great need for having PET/CT as an imaging modality as part of the routine management of patients who would greatly benefit from a PET/CT scan.

AIM & OBJECTIVE

The aim of this project was to implement a PET/CT facility within the general NM department at Groote Schuur Hospital, with an efficient workflow optimizing patient care, with optimal shielding to minimize radiation exposure to staff, patients and the general public.

METHODS

Reference to the IAEA documents [1,2] was used to assist in the planning of the operational requirements as we as a department only had 8 months for implementation vs a much longer time period.

- A commissioning team was formed (August 2021) that included internal, external and ancillary stakeholders.
- Initial specifications meeting was held to ascertain the minimum requirements of the PET/CT camera and radiopharmaceutical laboratory.
- Infrastructure within the department required repurposing to accommodate the new camera and facility.
- Meetings were planned meticulously with key stakeholders on a weekly basis to make sure target end points were met.

We used the target date of 31 March 2022 internally for completion of the entire project.

We also used the target date recommended by the IAEA of 64 months [1] to ascertain if we would be within target against international recommendations.

RESULTS

The existing infrastructure within the department (Fig. 1 and 3) had to be restructured to accommodate the layout of the new PET/CT facility (Fig. 2), Radiopharmacy (Fig. 4), and all the required equipment.

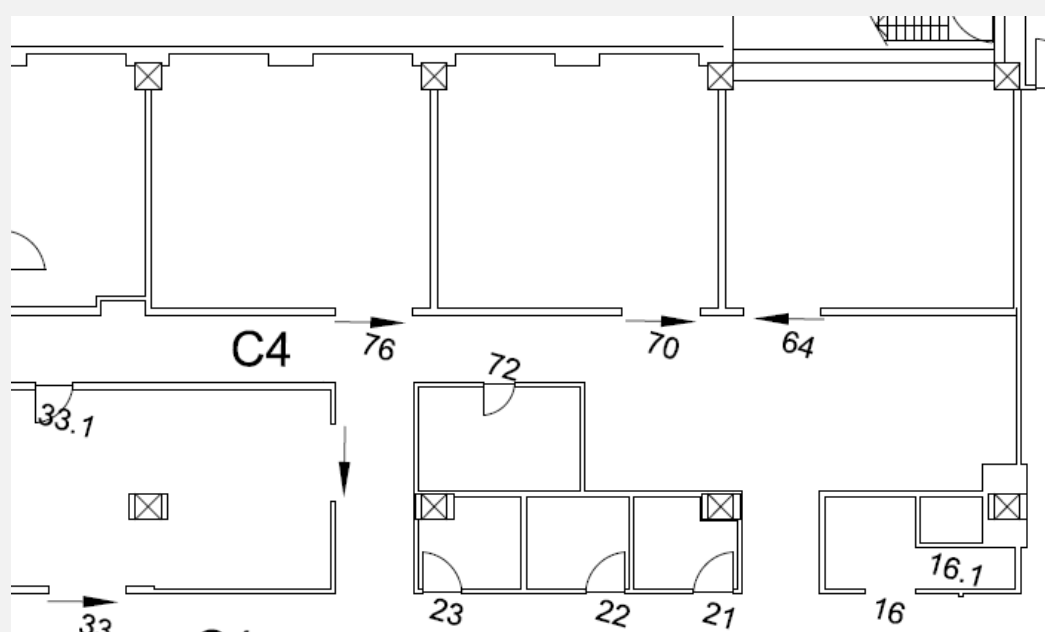


Fig. 1. Floor plan of the existing layout within the Nuclear Medicine department that was allocated for the new PET/CT facility.

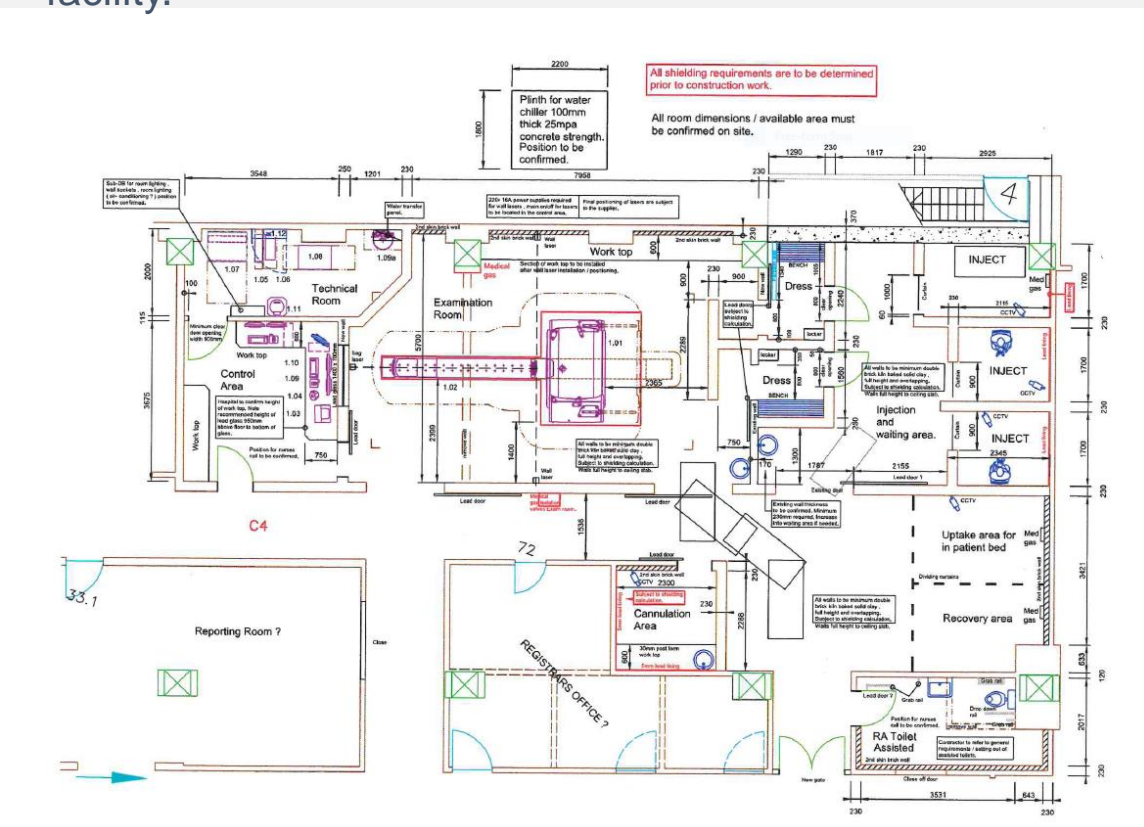


Fig. 2. Floor plan of new PET/CT facility rendered by the awarded contractor.

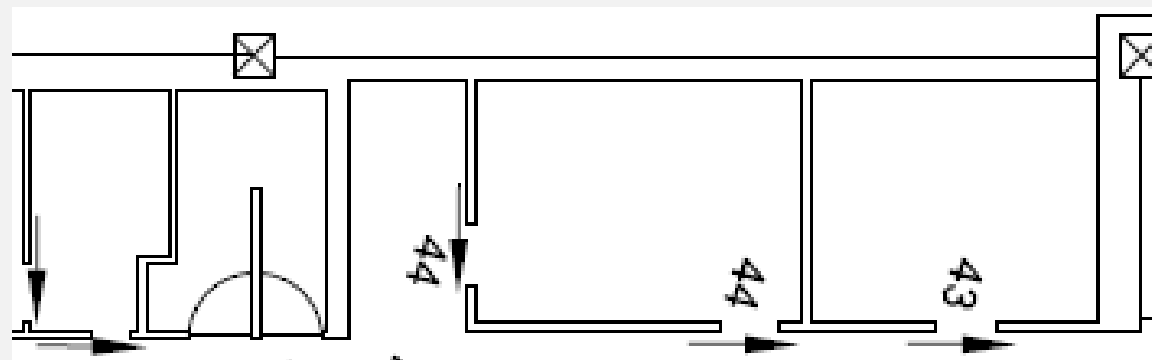


Fig. 3. Floor plan of the existing layout within the Nuclear Medicine department that was allocated for the new Radiopharmacy.

RESULTS (continues)

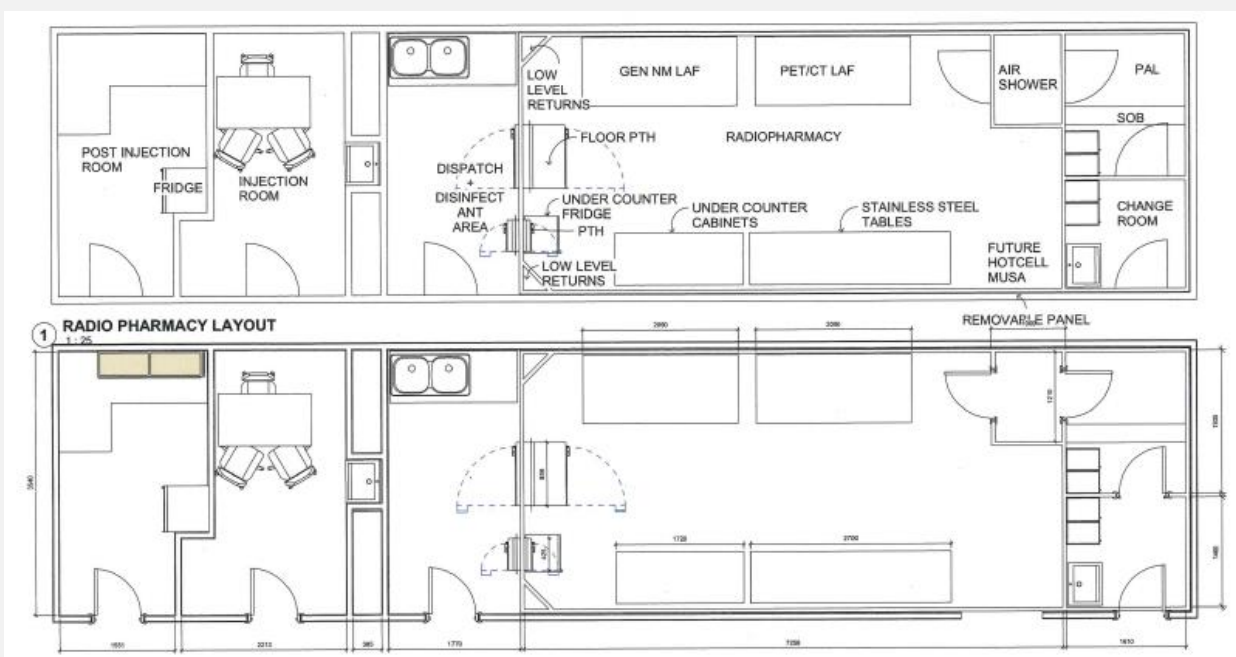


Fig. 4. Floor plan of the new Radiopharmacy rendered by the awarder contractor.

Table 1. Timeline of major milestones

DATE	MILESTONE DESCRIPTION
01-Aug-21	Specifications & Evaluation Committee
Aug 2021–Nov 2021	Internal Stakeholder Meetings
04-Oct-21	PET/CT facility Site Meeting & Briefing Session with bidders
01-Nov-21	Evaluation & Signing of Bid Documents
18-Jan-22	Site Handover Meeting, PET/CT Facility Reconstruction commenced
14-Feb-22	Radiopharmacy Reconstruction commenced
07-Mar-22	PET/CT Camera delivery and Installation commenced
01-May-22	Delivery and Installation of Airshower and Dynamic Passboxes in Radiopharmacy
13-Sep-22	South African Health Product Regulatory Authority (SAHPRA) Radiation Control PET/CT application
01-Nov-22	SAHPRA PET/CT Pre-inspection
07-11 Nov 2022	PET/CT Camera Training
09-Nov-22	First PET/CT patients scanned
15-Feb-23	Delivery of Laminar Airflow Cabinets (LAFs)
27-Feb-23	Installation of LAFs commenced
02-Mar-23	LAF training
Nov 2021-10 March 2023	Continuous meetings with Internal & External Stakeholders, Snags completed

Scan the QR code to view more photos of the milestones during the project.



DISCUSSION

The entire project took 19 months to complete in comparison to suggested internal target date.

- At March 2022, 80% of the overall project was complete.
- At 10 March 2023, 100% was complete.

Key challenges identified during the project:

- Defining clinical needs of the department and hospital for the next 10 years that would be used by PET/CT (e.g., paediatrics and radiotherapy planning).
- COVID-19 pandemic as well as conflict in Europe which impacted severely on delivery of necessary equipment.

CONCLUSION

The whole design of the PET/CT Facility was executed within a reasonable time frame according to international standards. We hope the utilization of the facility will have great value for the patients of GSH.

ACKNOWLEDGEMENT

We would like to thank all stakeholders involved, who helped made a dream, a reality, for the C3/C4 Nuclear Medicine department at Groote Schuur Hospital.

REFERENCES

- [1] International Atomic Energy Agency. (2010) *IAEA HUMAN HEALTH SERIES, No. 11: Planning a Clinical PET Centre*. Vienna, Austria: International Atomic Energy Agency. Available at: https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1457_web.pdf
- [2] International Atomic Energy Agency. (2008) *IAEA OPERATIONAL GUIDANCE ON HOSPITAL RADIOPHARMACY: A SAFE AND EFFECTIVE APPROACH*. Vienna, Austria: International Atomic Energy Agency. Available at: https://www-pub.iaea.org/mtcd/publications/pdf/pub1342/pub1342_web.pdf