

The formulae $\frac{\partial \rho U_i}{\partial x} + \frac{\partial}{\partial x_j} (\rho v_j U_i) - \frac{\partial P}{\partial x_i} + \frac{\partial}{\partial x_j} \left(\mu \frac{\partial U_i}{\partial x_j} \right) + g_i (\rho - \rho_s)$ for building $\frac{\partial}{\partial x_j} (\rho U_j U_i) - \frac{\partial P}{\partial x_i} + \frac{\partial}{\partial x_j} \left(\mu \frac{\partial U_i}{\partial x_j} - \rho v_j U_i \right) + g_i (\rho - \rho_s)$ state of the art $\frac{\partial}{\partial x_i} (\rho U_i H) - \frac{\partial}{\partial x_j} \left(\rho v_j H \right)$ biomedical research facilities.

The Design Review Process

Research facilities play a significant role in supporting scientific advances to improve the health of the Nation. The main objective when designing these facilities is to ensure that the research is conducted in a safe, efficient and functional facilities. Facility designs must be reviewed by technical professionals and institutional stakeholders before construction begins to verify and validate project compliance with applicable building codes, standards and guidelines.

Designers must take into consideration that facilities are institutional assets that function beyond the tenure of the current occupant. They must think ahead and consider all factors involved for a facility to function properly and be flexible to allow changes in research protocols without major disruption. Throughout the years renovations must be made to accommodate changing needs or new users who may move into the space. Maintenance must also be taken into account so spaces can be maintained and serviced to provide for minimal disruptions to research.

NIH's Division of Technical Resource (DTR) Intake Center provides a design review process that is systematic, comprehensive and documented. Each project submitted for design review is tracked and managed by the Intake Center throughout the design review phase. This office utilizes the following tools to manage each project and ensure the review process meets high standards.

- Design Review Requirements Checklist – A PDF questionnaire checklist determines the required NIH review offices, and calculates the number of hard copy drawings the A/E will need to submit for review based on the project scope. This checklist is submitted to the Intake Center and serves as the first requirement in creating a project in the DTR Permit Review site for tracking.
- DTR Permit Review Site – A SharePoint site designed as a central location for all design documents, comments and responses during the design review process. Its automated notification features allow this site to assist in keeping track of due dates for submissions and review comments in order to follow project schedules. An external website, for outside A/E firms, is part of the DTR Permit Review site to submit documents and responses to comments. Projects approved for construction are archived in this same site for record and future reference.
- Permit Review Coordinators (PRC) – As one of the main key components during the design review process, the PRC manages the DTR Permit Review site. They provide technical support to Project Officers, A/E's and Reviewers in order for projects to move forward and issue the appropriate construction permit.

The NIH Permit Review Board (PRB) consists of NIH Divisions and Offices, each one which provide important key aspects for all technical reviews that are vital to the success of the project. The makeup of the PRB review for a particular project is based on the Design Review Requirements Checklist and project scope.

The PRB consists of the following offices and their main objectives:

Division of Technical Resources (DTR): Provides technical support through comprehensive design reviews of documents ensuring that NIH facility design conform to applicable regulations, codes, standards, policies, and guidelines.

Division of Facilities Planning (DFP): Coordinates and manages all planning related to NIH owned and leased facilities.

Division of Environmental Protection (DEP): Works to protect and enhance the NIH environment through the management of the environmental quality, compliance and waste management.

Division of Facilities Stewardship (DFS): Serves as technical experts and is charged with assessing and understanding the condition of NIH real property assets and their systems.

Division of Facilities Operations and Maintenance (DFOM): Responsible for the safe, efficient, and effective operation and maintenance of NIH real property.

Division of Occupational Health & Safety (DOHS): Evaluates compliance with occupational safety and health policies and procedures.

Division of Radiation Safety (DRS): Specialize in radiation safety, regulatory compliance and risk management for research efforts.

Division of the Fire Marshal (DFM): Verifies all NIH facility design projects meet applicable fire code requirements and addresses the fire protection and life safety needs.

Division of Physical Security Management (DPSM): Reviews and manages the physical security requirements for all NIH Facilities to provide the most secure environment possible for NIH.

Center of Information Technology (CIT): Provide the NIH community with a secure and reliable IT infrastructure.

Office of Hospital Physical Environment (OHPE): Oversees and facilitate compliance to provide a safe physical environment for patient treatment, biomedical research and occupant safety for the Clinical Center/Hospital.

Clinical Center Office of Space and Facility Management (CCOSFM): Supports the highest quality of patient safety and research support for the Clinical Center/Hospital.

As stated in Chapter 1 Section 1.5.2 Design Submissions in the DRM, Construction of a facility should only be approved after the Government (Permit Review Board) reviews the Final submission and all review comments have been satisfied. The Intake Center will issue a construction permit when all the requirements of the design review process have been met.

Through these tools and the technical expertise of staff, NIH is able to produce facilities that meet the highest level of safety, functionality, and innovation; allowing them to advance scientific research for the benefit of the world.

'Design Requirements Manual (DRM) News to Use' is a monthly ORF publication featuring salient technical information that should be applied to the design of NIH biomedical research laboratories and animal facilities. NIH Project Officers, A/E's and other consultants to the NIH, who develop intramural, extramural and American Recovery and Reinvestment Act (ARRA) projects will benefit from 'News to Use'. **Please address questions or comments to:** shawm@nih.gov

Further details on this month's topic are available on the DRM website DRM Chapter 1 Section 1.5.2

<https://www.orf.od.nih.gov/PoliciesAndGuidelines/BiomedicalandAnimalResearchFacilitiesDesignPoliciesandGuidelines/Pages/DesignRequirementsManual2016>