The National Institutes of Health | Division of Technical Resources | Office of Research Facilities

Design Requirements Manual **News to Use**

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The formulae $\frac{\partial \rho U_i}{\partial t}+\frac{\partial}{\partial x_j}(\rho U_j U_j)=-\frac{\partial P}{\partial x_i}+\frac{\partial}{\partial x_j}\left(\mu\frac{\partial U_i}{\partial x_j}\right)+g_i(\rho-\rho_0)$ for building $\frac{\partial}{\partial x_j}(\rho\overline{U}_i\overline{U}_j)=-\frac{\partial P}{\partial x_i}+\frac{\partial}{\partial x_j}\left(\mu\frac{\partial \overline{U}_i}{\partial x_j}-\rho\overline{u_i'u_j'}\right)+g_i(\rho-\rho_0)$ state of the art $\frac{\partial}{\partial x_i}(\rho\overline{U}_i\overline{H})=\frac{\partial}{\partial x_i}\left(\lambda\frac{\partial \overline{H}}{\partial x_i}-\rho\overline{u_i'h'}\right)$ biomedical research facilities.

Existing Conditions Investigations for Renovation Projects

An essential first step for all renovation projects is for the Designer of Record to conduct a thorough existing conditions investigation of the site. The purpose of the investigation is to document, survey, and assess the site's existing constraints, requirements, and opportunities, including all services and utilities. Some of these features will be common to all projects (e.g., basic conditions, geometry, floor loading, MEP services, fire ratings) and some will be specific to the requirements of the project (e.g., noise, vibration, EM and RF interference), though all may affect the use of the site. The results of the investigation must be documented in the project Basis of Design.

Existing Conditions Investigations

It is essential to obtain all available existing documentation from the NIH Electronic Document Management System (EDMS) or other sources. Documentation shall include construction and record documents from the original construction as well as any subsequent renovations, including those for all supporting systems and utilities. Existing documentation shall be used for information only and shall not be considered factual until verified by an existing conditions survey. Facility managers and current occupants should be interviewed to obtain information about operational and performance issues, leaks, deficiencies, and any other observed facility problems that may have to be addressed or may otherwise limit or impact the project.

Existing Conditions Surveys

A physical survey must be conducted to confirm and document both site parameters (dimensions, locations, clearances, thicknesses, and other physical characteristics) and site conditions (signs of water, mold, cracks, and other deficiencies). Surveys shall include surrounding room occupancies and uses to determine their compatibility with the proposed renovation (e.g., use, condition, sensitivities to noise and vibration, etc.) and whether mitigation is required. The survey shall document improperly sealed penetrations, damaged or malfunctioning equipment, and other defects that must be brought to the attention of the Project Officer, even if they are outside of the scope of the current project.

Site surveys must also include the full extent of the site, including adjacent and peripheral areas (such as electrical and mechanical rooms, IT closets, etc.) that may require work to support the project. Surveys shall include building MEP utilities and other services, including all utility locations, capacities, and routing, both upstream and downstream, which may impact (or be impacted by) the work. Surveys and resulting assessments shall confirm their availability, capacity, condition, and limitations, including each service's adequacy to support new demands and usage.

A site survey shall review all above-ceiling spaces, penthouses, roofs, and similar spaces, which may include plenums and other inaccessible spaces. Include shafts to and from mechanical rooms and roofs. Consult with the Project Officer regarding site access requirements and permits required for surveys and ceiling access in the Clinical Center and other critical areas. The use of x-ray imaging and disruptive or destructive testing will require additional approvals.

As a design develops and the full extent of work becomes known, additional surveys may be required to encompass all impacted areas and systems.

Conclusion

Accurate and complete existing conditions documentation is a requirement for all renovation projects to mitigate the risk of complications and re-design during construction (and resulting delays and change orders). Investigations must include both review of historical documentation and in situ existing conditions surveys for both the area to be renovated and all surrounding impacted areas and systems.

'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/Es 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 2, Planning and Programming
https://www.orf.od.nih.gov/PoliciesAndGuidelines/BiomedicalandAnimalResearchFacilitiesDesignPoliciesandGuidelines/Pages/DesignRequirementsManual2016