DIVISION 31 – EARTHWORK

31 01 00 MAINTENANCE OF EARTHWORK

A. Design Considerations

RESERVED

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

RESERVED

31 05 13 SOILS FOR EARTHWORK

A. Design Considerations

RESERVED

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. On-Site Fill:

    a. The reuse of on-site fill shall be evaluated by the design team's geotechnical engineer.

    b. Material containing rock, stone or masonry debris greater than 4-inches in its largest dimension is unacceptable as backfill for pavement or building subgrade elevation.

    c. On-site fill shall not be reused if the fill contains organics, timber, steel, brick, refuse, and other debris.

    d. Excavated on-site fill containing deleterious materials, debris, and other materials deemed geotechnically unsuitable for reuse as on-site fill by Geotechnical Engineer

shall be segregated from usable material and disposed of off-site in accordance with all applicable regulations.

e. In some circumstances, asphalt millings generated by milling of existing asphalt pavement can be temporarily stockpiled on-site and reused as sub-base material for new asphalt pavement construction if deemed acceptable by the design team's geotechnical engineer and Rutgers University. Milled asphalt proposed for use as asphalt pavement sub-base material shall be broken into pieces having dimensions less than 2 inches in any direction. Stockpile material must be stored on a plastic lined base pad and must be completely covered with a plastic liner if not being utilized.

2. Export of On-Site Fill:

a. The design team shall prepare a cut/fill plan to estimate the required export volume of fill material (if applicable).

b. If export of on-site fill material is anticipated, preliminary in-situ testing of the material shall be coordinated with Rutgers University during the design phase, prior to bidding of a project.

3. Off-Site Imported Fill:

a. Off-site fill (when required) shall be clean (meeting NJDEP residential standards), well graded granular soil which is non-expansive and non-collapsible and shall have less than 15% by weight passing the #200 sieve. The portion passing the #200 sieve shall be non-plastic. Off-site fill shall be free of organics and other deleterious materials.

b. A sample of any off-site fill material shall be provided to University and the design team along with laboratory testing results and a certificate of clean fill. Approval of off-site fill material shall be obtained from Rutgers University and the design team prior to delivery of any proposed imported fill to the site.

c. Imported fill shall be free of all hazardous substances as listed by the New Jersey Department of Environmental Protection in New Jersey Administrative Code, Title 7; Chapter 1E, Appendix A. Certification of compliance and test results substantiating compliance shall be furnished to

University and design team by the Contractor not less than two weeks prior to its delivery to the site and intended use.

d. Rutgers University reserves the right to test off-site fill material for conformance with these design standards on campus or at the fill site.

31 05 16 AGGREGATES FOR EARTHWORK

A. Design Considerations

RESERVED

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. Proposed aggregate shall be approved by Rutgers University and shall meet the requirements of the State of New Jersey Department of Transportation Standard Specifications for Roads and Bridges Construction (Sections 200, 300, and 400).

31 05 19 GEOSYNTHETICS FOR EARTHWORK

A. Design Considerations

RESERVED

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. Geosynthetics including geotextiles, geomembranes, geogrids, geosynthetic clay liners, geocomposites, and geonets may be proposed by the design team. The University will evaluate the use of geosynthetics on an individual project basis.

31 06 00 SCHEDULES FOR EARTHWORK

A. Design Considerations

RESERVED

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. A schedule of proposed earthwork operations shall be submitted to Rutgers University at least two weeks prior to the start of construction. The schedule shall include at a minimum detail general work areas, work hours, pedestrian safety measures, soil erosion compliance, and compliance with a project's Stormwater Construction General Permit (RFA).

31 06 10 SCHEDULES FOR CLEARING

RESERVED

31 06 20 SCHEDULES FOR EARTH MOVING

RESERVED

31 08 00 COMMISSIONING OF EARTHWORK

A. Design Considerations

1. The design team (geotechnical engineer) is responsible for providing detailed testing procedures and testing criteria within the project specifications for necessary geotechnical construction items. Geotechnical items may include, but are not limited to pile load testing, dynamic pile load testing, static pile load testing, compaction, tie-back anchor testing, settlement, adjacent building monitoring, underpinning monitoring, etc.

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

RESERVED

31 09 00 GEOTECHNICAL INSTRUMENTATION AND MONITORING OF EARTHWORK

A. Design Considerations

1. The design team (geotechnical engineer) is responsible for providing instrumentation and monitoring requirements within the project specifications.

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

RESERVED

31 11 00 CLEARING AND GRUBBING

A. Design Considerations

RESERVED

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. Clearing and grubbing shall be performed in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey.

2. Clearing and grubbing shall include the removal of trees, shrubs, grass, other vegetation, improvements, or obstructions interfering with installation of new construction. Removal includes digging out stumps, roots, and organic materials. Depressions caused by clearing and grubbing operations are to be filled to subgrade elevation to avoid ponding of water. Features to remain shall be protected throughout clearing and grubbing work.

31 12 00 SELECTIVE CLEARING

RESERVED

31 13 00 SELECTIVE TREE AND SHRUB REMOVAL, TRIMMING, AND REPLACEMENT

A. Design Considerations

1. The Contractor, while working the site, is responsible for protecting all existing trees to remain such that they will be free from any damage. If damage is done, the Contractor shall be responsible for replacement of damaged trees. All existing trees to remain affected by construction activities shall be protected with temporary chain link fencing per the detail in Part IV, to the drip line of the tree.

2. Tree replacement and protection is as follows, and at the direction of the University Landscape Architect or the Office of Planning and Development:

    a. Contractor shall take all precautions necessary to protect existing trees scheduled to remain against injury or damage, including cutting, breaking, or skinning of roots, trunks or branches; smothering by stockpiled construction materials, excavated materials or vehicular traffic within branch spread.

        1) Interfering branches of trees scheduled to remain may be removed when acceptable to the University Architect and University Landscape Architect. It cannot be assumed that permission will be granted. The Contractor must obtain permission from University Facilities prior to such activities.

        2) Repair trees scheduled to remain and damaged by construction operations in a manner acceptable to University Facilities. Repair damaged trees promptly to prevent progressive deterioration caused by damage.

    b. Should an existing tree be damaged to the extent that it is deemed to be a complete loss by University Facilities, or if, due to the Contractor's negligence, a tree on the construction site dies within one year of project completion, the Contractor shall replace the tree according to the following requirements:

1) Tree Replacement Formula: One square inch of caliper lost will equal one square inch of caliper replaced. This formula is based on tree trunk diameter at breast height. Example: loss of one 12" caliper (same as 6" radius) tree would require replacement with nine (9) 4" caliper trees. [Area of Circle = 3.14 x r^2= 3.14x(6^2)= 3.14x(36)= 113.04 sq. in. Assuming 4" caliper trees (same as 2" radius) will be planted as replacements, calculate the area of a 4" caliper tree: 3.14 x (2^2)= 12.56 sq. in. Divide the area of the 4" caliper tree into the area of the 12" caliper tree to determine the number of 4" caliper trees required to replace the loss of the 12" caliper tree. 113.04/12.56= 9 trees.]

3. Installation: Contractor will be responsible for planting the replacement tree(s) at a location designated by University Facilities. Installation practices and a one-year guarantee shall hold as per the landscaping section of these design standards.

4. Materials: The replacement tree(s) shall be of the same species and variety as the tree(s) lost, or of a species and variety identified by the University Landscape Architect. If the species and variety is not available, a substitute must be proposed in writing to University Facilities and approved by University Facilities. The Contractor will be notified of approval of substitution within seven days. Minimum caliper of replacement tree(s) shall be 2 ½ - 3".

   a. Repair and replacement of trees scheduled to remain and damaged by construction operations or lack of adequate protection during construction operations shall be at Contractor's expense.

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

RESERVED

31 14 00 EARTH STRIPPING AND STOCKPILING

A. Design Considerations

RESERVED

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. Pending approval from the design team's geotechnical engineer and Rutgers University, stripped topsoil may be reused on-site in landscaped areas. Reusable topsoil shall be segregated from other cleared materials and shall be stockpiled in accordance with the requirements in the Standards for Soil Erosion and Sediment Control in New Jersey Chapter 251.

2. Topsoil shall consist of organic surficial soil found in depth of not less than 6 to 8 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2-in. in diameter, weeds, roots, and other objectionable material. Topsoil shall be approved by Rutgers University prior to final site placement.

3. Soil stockpiling must be in conformance with the current version of the New Jersey State Soil Erosion and Sediment Control Act, Chapter 251.

31 21 00 OFF-GASSING MITIGATION

RESERVED

31 22 00 GRADING

A. Design Considerations

RESERVED

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. For setting and establishing finish elevations and lines, contractor shall secure the services of a licensed land surveyor acceptable to Rutgers University and the design team.

2. Contractor shall provide elevation grade stakes and any other surveying necessary for the layout of the work. The work shall be conducted in such a manner that the survey stakes will be protected as long as their need exists. Grade stakes which are damaged or stolen, shall be replaced by contractor's surveyor at contractor's expense.

3. Graded areas shall be uniform, hard and smooth, free from rock, debris, or irregular surface changes. Finished subgrade surface shall not be more than 0.10 feet above or below the design finished subgrade elevation; any deviation shall not result in changes in drainage areas or ponding. All ground surfaces shall vary uniformly between indicated elevations. Graded areas shall also be protected from compaction unless the site is specifically called upon for a designed compaction level.

4. Areas having drainage slopes of one-quarter inch per foot or more shall have grade stakes, set with an instrument, at grid intervals of fifty (50) feet.

5. Areas having drainage slopes of one-quarter inch per foot or less shall have grade stakes, set with an instrument, at grid intervals of twenty-five (25) feet.

6. Graded areas shall be temporarily and permanently stabilized in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey, Chapter 251 unless otherwise requested and/or approved by University Facilities.

31 22 13 ROUGH GRADING

RESERVED

31 22 16 FINE GRADING

RESERVED

31 22 16.13 ROADWAY SUBGRADE RESHAPING

RESERVED

31 22 19 FINISH GRADING

RESERVED

31 22 19.13 SPREADING AND GRADING TOPSOIL

RESERVED

31 23 00 EXCAVTION AND FILL

A. Design Considerations

1. Based on the results of the design team's geotechnical investigation, the team shall provide project specific specifications for the items listed below. At a minimum, the following requirements shall be included:

   A. Finished subgrades shall be protected from excessive construction traffic and wheel loading including concrete and dump trucks.

   B. Areas of finished subgrade deemed unacceptable by the project's geotechnical engineer or University Facilities shall be removed and replaced.

   C. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and at the proper elevation.

   D. Where existing grades are above proposed subgrade elevation, excavate materials to the lines and grades shown on the Construction

Drawings. Excavation work shall be in accordance with all local, state, and federal safety requirements.

E. When excavating for footings, footing bottoms shall be level and shall be kept clean and free of debris and deleterious materials. Exposed building footing subgrades shall be proof rolled/compacted using, at a minimum, a double drum walk-behind vibratory roller or other compactor approved by the Geotechnical Engineer. Deleterious materials present at footing subgrade level and any soft areas identified by proof rolling shall be removed and replaced with approved compacted fill as directed by the Geotechnical Engineer. All footing subgrades shall be subject to inspection and approval by the Geotechnical Engineer prior to footing construction by the Contractor. No footings shall be placed in areas of standing water, in areas of frozen or thawing ground, or in areas that have not been approved by the Geotechnical Engineer. Footing excavations shall be of sufficient width to allow for forming the footing and for compacting the backfill adjacent to the footing.

F. The design team shall prepare a project specific dewatering specification based on field investigations and local, state, and federal regulations. The dewatering specification shall be submitted to Rutgers University for approval during the design process.

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

1. No fill materials shall be placed during unfavorable weather conditions. When work is interrupted by heavy rains, fill operations shall not be resumed until all saturated surficial soils are returned to a satisfactory moisture content as determined by Geotechnical Engineer.

2. Place and compact approved fill materials in 12 inch maximum loose lifts using a minimum of 6 passes with the a 6-ton compactor and achieve the minimum in-place density specified above. Smaller compaction equipment, together with thinner lifts, may be necessary at areas of limited maneuverability and shall be as directed by Geotechnical Engineer.

3. Visual confirmation of fill quality, lift thickness and compaction procedures, together with density testing, shall determine the acceptability of fill. Any unsatisfactory material or soft areas

exhibiting excessive weaving shall be immediately removed, replaced and re-compacted as stated above to the satisfaction of Geotechnical Engineer.

4. No fill material shall be placed in areas of standing water, in areas of frozen or thawing ground, or in areas that have not been approved by Geotechnical Engineer.

31 24 00 EMBANKMENTS

RESERVED

31 25 00 EROSION AND SEDIMENTATION CONTROLS

All Rutgers earth disturbance projects, regardless of size, must comply with all applicable State of New Jersey and Federal environmental permitting regulations. University Facilities Office of Planning and Development (Planning) is the designated liaison between the Federal and New Jersey State environmental review agencies and the University and its assigns. All projects must be submitted to Planning for review at the designated phases. Planning will conduct an environmental review of the project to determine the necessary environmental compliance requirements. Planning will assist in the application submission and/or will request an environmental consultant in some instances. Planning is the official signature for Rutgers and as such must approve and sign the application forms, submit the application package and act as the liaison with the appropriate environmental review agency(‘s). University review procedures and criteria checklists have been developed to facilitate environmental permitting. Planning staff is available to the University community for consultation.

Environmental compliance is required on all earth disturbance activities on Rutgers owned or leased lands including, but not limited to:

1. Construction projects by campus personnel and outside contractors

2. Operations and maintenance activity by campus personnel and outside contractors.

3. All earth disturbance including:

   A. New Construction

   B. Renovations

   C. Utility Projects

D. Landscape Projects

A. Design Considerations

1. The State of New Jersey enacted the Soil Erosion and Sediment Control Act, Chapter 251 in order to prevent and/or eliminate non-point source pollution from construction projects. Specific design guidelines can be obtained through the appropriate soil conservation district or through the University Facilities Office of University Planning and Development (Planning). Projects on Rutgers owned or leased lands disturbing greater than 5,000 square feet of earth must have a soil erosion and sediment control certification prior to construction start, however, all Rutgers construction projects regardless of their size must comply with this Act. Projects less than 5,000sf do not need certified plans prior to construction start, but still must be reviewed by Planning for compliance. Failure to comply with this regulation can result in fines and or work stoppage.

B. Special Documentation Requirements

1. Rutgers requires that the A/E (Consultant) provide the University Facilities Office of University Planning and Development (Planning) the necessary documents to file with the appropriate Soil Conservation District (SCD) at least 90 days prior to any land disturbance. By law the SCD has 30 days to review the project. If the project requires additional information, the SCD has an additional 30 days. This process can continue until the SCD is satisfied with the submitted documents. The documents required for permitting include soil erosion and sediment control plan(s), soil erosion and sediment control details and runoff calculations. The specific requirements can be obtained through the appropriate soil conservation district. In order to ensure a timely and expeditious certification process, Planning strongly encourages its involvement throughout the entirety of the project. The Consultant will be responsible for any changes required by Rutgers or the soil conservation district if the plans are deemed not in compliance with the soil erosion and sediment control standards. Once the Consultant completes the final 100% soil conservation district application submission package, it shall be remitted to Planning who will file the certification package and be the prime contact with the respective soil conservation district. Construction can only proceed after the soil conservation district issues a certification of compliance. If the project is changed for any reason after the project is certified by the SCD, the plans must be recertified through a revision process led by Planning. All submissions to the SCD's must

be signed and sealed by a New Jersey State Licensed Professional Engineer.

C. Materials and Methods of Construction

1. 48 hours prior to any soil disturbance, the contractor shall notify the SCD. The certified soil erosion and sediment control plans must be kept at the construction site at all times. The SCD and Rutgers makes random site inspections to ensure soil erosion and sediment control compliance. The contractor must allow the SCD and/or Rutgers access to all construction site areas. If the inspection reveals a violation of the soil erosion and sediment control standards, a notification will be issued by the SCD and/or Rutgers detailing the site deficiencies or violation(s). Upon receipt of the letter, the contractor will have 5 working days to remediate that violation or the SCD and/or Rutgers may suspend any work, issues fines or other penalties until the deficiencies are corrected. If the project is a building construction or renovation, a temporary certificate of occupancy can only be issued after the SCD issues a temporary report of compliance. The project is not completed until the SCD issues a complete report of compliance. This is issued when permanent stabilization has been established (usually after one complete growing season) and all details on the certified soil erosion and sediment control plans are properly installed.

1. If the project does not require a SCD certification, the project must at a minimum include the following measures:

    A. Silt fences on the downslope side

    B. Tracking pad to prevent soil on construction vehicles' wheels from leaving the site

    C. Storm sewer inlet protection

    D. Street cleaning

    E. Tree Protection

2. Upon construction completion, the area must be at a minimum:

    A. Mulched

    B. Tacked

C. Reseeded with perennial grasses or as directed by The Office of University Planning and Development or the University Landscape Architect

31 25 01 NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION (NJDEP) PHASE II STORMWATER MANAGEMENT REGULATIONS

As a requirement of the U.S. Environmental Protection Agency's Phase II rules, the NJDEP developed a stormwater regulatory program to establish minimum design and performance standards to address stormwater runoff from new development and redevelopment projects. The Phase II rules require that Rutgers incorporate minimum control measures into their designs for new development and redevelopment projects. The purposes of these rules are to promote the health, safety and welfare within the University and its watershed by minimizing the harm to the environment by stormwater from campus through provisions designed to:

1. Manage stormwater runoff impacts at their source by regulating activities that cause the problems by using minimum structural controls, relying on natural processes.

2. Provide review procedures and performance standards for stormwater planning and management.

3. Utilize and preserve the existing natural drainage systems to the maximum extent practical.

4. Focus on infiltration of stormwater, to maintain groundwater recharge, to prevent degradation of surface and groundwater quality and to otherwise protect water resources.

5. Meet legal water quality requirements under N.J.A.C. 7:8.

6. Maintain existing flows and quality of streams and watercourses

7. Provide for proper operations and maintenance of all permanent stormwater management best management practices that are implemented on University property.

8. Prevent scour and erosion of stream banks and stream beds.

A. Design Considerations

1. The design shall comply with the applicable design and performance standards established under N.J.A.C. 7:8 for major development at a public complex (Rutgers University) unless determined exempt by the Facilities Office of University Planning and Development. The stormwater design shall incorporate to the maximum extent practical Best Management Practices-Low Impact Development Techniques as stipulated in the New Jersey Stormwater Best Management Practices Manual, most current addition. The stormwater design shall be incorporated into the project's site design at the earliest possible design phase. Rutgers Planning shall ensure the design's compliance with all applicable rules, laws, regulations and master planning guidelines.

2. Low Impact Development-Best Management Practices are:

   A. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss

   B. Minimize impervious surfaces and break-up and disconnect the flow of runoff over impervious surfaces

   C. Maximize the protection of natural drainage features and vegetation

   D. Minimize the decrease in "time of concentration" from pre-construction to post construction. "Time of Concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of interest within the watershed.

   E. Minimize land disturbance including clearing and grading

   F. Minimize soil compaction

   G. Provide low-maintenance landscaping that encourages retention of planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides

   H. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas.

I. Provide other source controls to prevent or minimize the use of exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff.

1) Site design features that help to prevent accumulation of trash and debris in drainage systems

2) Site design features that help to prevent discharge of trash and debris from drainage systems

3) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants

B. Special Documentation Requirements

1. Several documents are required for individual projects that trigger the Phase II stormwater rules. These include:

A. A signed and sealed public complex low impact development checklist shall be submitted as part of the project's deliverables.

B. Stormwater narrative showing reductions in stormwater runoff on the 2-10-100 storm events (review section N.J.A.C. 7:8 for more detailed information)

C. Maintenance plan if best management practices-low impact development techniques are utilized

D. Other documentation as determined by the University Facilities Office of Planning and Development

C. Materials and Methods of Construction

1. Construction methods and materials should be consistent with the N.J.A.C. 7:8 stormwater regulations, Rutgers Stormwater and Landscape Management Master Plan, recommendations by the Rutgers University Facilities Office of Planning and Development and others as designated by Rutgers. The plant palette and related materials should be consistent with the project site's soil type as determined by a soil analysis and the United States Department of Agriculture Natural Resources Conservation Service.

2. Construction materials will be determined by NJDEP stormwater guidelines, including the standard storm drain the University Design

Standards, and as determined by the project's site conditions. Final review and approval of all construction methods and materials will be done by Rutgers.

31 25 02 NEW JERSEY POLLUTION DISCHARGE ELIMINATION SYSTEM (NJPDES) GENERAL PERMIT NO. NJG0088323 STORMWATER DISCHAGE ASSOCIATED WITH CONSTRUCTION AND MINING ACTIVITY

The Statewide stormwater permitting program for construction and mining activity, regulated by the NJDEP, is intended to improve the State's water quality of streams, rivers, etc, by regulating construction practices. Its purpose is to prevent or reduce waste and waste handling. The permit is enforced by a joint effort of the soil conservation district and the NJDEP The construction general permit authorization regulates all construction site activities on sites greater than 1 acre of disturbance, including clearing and grading, material storage, waste handling. The construction site waste requirements include material management to prevent or reduce waste and waste handling. Construction site waste includes waste building material and rubble, chemical waste, litter, sanitary sewage and septage, contaminated soils, and concrete truck washout. Waste handling will also include spill and discharge control and reporting.

A. Design Considerations

1. The permit must be filed at least 90 days prior to land disturbance in conjunction and along with the soil conservation district's soil erosion and sediment control certification. The project's design and construction site management must keep in mind all roll-off dumpsters and/or other waste containers must be at least 50 feet from any stormwater day lighted conveyance system, must be covered and all waste must be separated by type and to the maximum extent practical recycled. If this permit is required the A/E shall prepare all necessary documentation such that the permit can be obtained at 90% design completion. See Soil Erosion and Sediment Control Plan section above for details on sequencing this work.

B. Special Documentation Requirements

1. The contractor or their designate will be required to fill out a report of compliance on a weekly basis and at the project's completion. At project's end, the weekly compliance reports and final compliance reports must be submitted to Rutgers, signed by the contractor signifying that all permit requirements have been fulfilled.

C. Materials and Methods of Construction

RESERVED

31 25 03 ENVIRONMENTAL PERMITTING (OTHER)

Regulatory compliance reviews shall be completed in conjunction with Rutgers University Facilities Office of Planning and Development on all projects with a potential for any environmental impacts to the outdoor (natural) environment regardless of project size. Projects requiring such reviews include, but are not limited to, those involving wetlands issues; coastal or waterway impacts during or following construction; or projects that will significantly change land use. During the review, Rutgers Facilities Department Office of Planning and Development or its designee will:

- Ensure compliance with all Federal and State environmental regulations
- Ensure protection of natural resources, including wetlands, waterways and open space
- Review all plans and projects with potentially significant impacts to the natural environment
- Act as the liaison between Federal and State Environmental review agencies and Rutgers.
- Act as the liaison with environmental consultant, design team and Rutgers.

All construction projects, regardless of size, must be reviewed by Planning for a determination of regulatory requirements.

Regulations include, but are not limited to:

- Freshwater Wetlands Protection Act:

New Jersey's Freshwater Wetlands Protection Act was enacted in 1987 and is codified at NJSA 13:9B-1et seq. If a freshwater wetland is suspected, a licensed surveyor and environmental consultant will be retained to provide all plans and documentation necessary for compliance approvals. Design will accommodate found wetlands and their attendant transition areas and appropriate permit applications and mitigation plans will be applied for and secured prior to bid of project.

- Flood Hazard Control Act:

The Flood Hazard Control Act (NJSA 58:16A-50 et seq.) These rules set forth uses permitted and prohibited in flood plains. All watercourses, no matter how small, have a flood plain. Rutgers desires to limit the development in a floodplain. If development of a flood plain is determined necessary, a licensed surveyor and environmental consultant will be retained to provide all plans and documentation necessary for compliance approvals. Design will limit impervious cover within the flood plain and flood fringe and appropriate permit applications and or mitigation plans will be applied for and secured prior to bid of project.

- Stream Encroachment Permit:

If the project will impact a stream or drainage swale, a stream encroachment permit issued by the New Jersey Department of Environmental Protection may be required. If a stream is encountered, then the attendant stream encroachment permit application shall be made using the services of a licensed surveyor and or environmental consultant. The permit shall be secured prior to bid of the project.

- Coastal Area Facilities Review Act:

The Coastal Area Facilities Review Act (CAFRA, NJSA 13:19-1 et seq.) CAFRA is the legal foundations for implementation of the state's coastal zone management program federally mandated under the Coastal Zone Management Act (16 USC 1451 et seq.) CAFRA regulates construction activities on or near a beach or dune in certain counties in New Jersey. If a construction project is proposed on or near a beach or dune a licensed surveyor and environmental consultant will be retained to provide all plans and documentation necessary for compliance approvals.

Under certain circumstances, a project will require permits from multiple agencies, including the Army Corps of Engineers, Coast Guard, NJDEP, EPA, and others. If these permits are required the application(s) shall be made using the services of a licensed surveyor and or environmental consultant. The permit(s) shall be secured prior to bid of the project.

31 25 04 STORMWATER DRAINAGE SYSTEMS

A. Design Considerations

1. The design for all stormwater systems should meet all State and Federal laws, rules and regulations. The storm drainage system should be designed for positive drainage away from all surface

structures that are not intended to receive drainage, such as building foundations, manholes, cleanouts, fire hydrants, valve boxes, light poles, junction boxes, conduit, etc. Volume and velocity calculations for stormwater running onto the site in addition to the anticipated runoff from the site must be prepared early in the design process. These calculations are a requirement as part of the environmental rules, laws and regulations as stated elsewhere in this section and are required by Rutgers for any project that will alter the existing drainage patterns. Additionally, Rutgers may require a survey with topography to better understand the existing drainage patterns. All projects must also conform to the Stormwater and Landscape Management Master Plan. Projects that alter drainage include curbing, sidewalk installation, paving projects, etc.

2. Designs should incorporate, to the maximum extent practical, best management practices-low impact development as indicated by the New Jersey Department of Environmental Protection's Phase II stormwater rules and the BMP guidelines.

3. Drywells shall only be used when they can be connected to an existing stormwater conveyance system.

4. Stormwater systems shall at no time be connected to a sanitary system.

5. All stormwater systems shall be designed to the 100-year storm unless otherwise indicated by a New Jersey licensed professional engineer.

6. All catch basins, storm manholes, inlets, and all other structural stormwater collection systems shall be designed in accordance with industry standards or the recommendations by Rutgers Utilities, The Office of the University Architect, the Facilities Office of University Planning and Development or other University department.

7. Storm drain design and retrofit shall be in accordance with Attachment C of the NJPDES Master General Permit.

8. No stormwater drainage system shall have standing water lasting longer than 72 hours unless specifically designed to accommodate ponding and if determined desirable by Rutgers University.

B. Special Documentation Requirements

1. All projects that disturb more than 1 acre of increase impervious cover by a quarter acre or more must complete a low impact development checklist at the project's design development phase.

C. Materials and Methods of Construction

1. The storm drainage system shall be constructed in accordance with the aforementioned rules and regulations and as determined by Rutgers Facilities.

2. Where down spouts are utilized, these should be tied into adjacent storm drainage.

3. Road grates shall be Campbell Foundry Company #2617, or approved equal. These grates are bicycle safe grates.

4. Materials and methods of construction will be dictated by the rules and regulations that govern stormwater management and soil erosion and sediment control. If there are ambiguities with regard to the methods and materials, Rutgers Facilities will review proposed solutions and have final decision on any construction method or material used.

31 30 00 EARTHWORK METHODS

A. Design Considerations

1. When applicable, project specific earthwork methods shall be detailed by the design team on the project drawings and specifications.

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

RESERVED

31 41 00 SHORING AND UNDERPINNING

A. Design Considerations

1. When applicable, shoring and underpinning methods shall be detailed by the design team on the project drawings and specifications.

2. Shoring and underpinning shall be designed by a Professional Engineer licensed in the state of New Jersey.

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

RESERVED

31 50 00 EXCAVATION SUPPORT AND PROTECTION

A. Design Considerations

1. Excavation support shall be designed by a Professional Engineer licensed in the state of New Jersey.

B. Special Documentation Requirements

RESERVED

C. Materials and Methods of Construction

RESERVED