

## Chapter Six Development Guidelines





## **6 Development Guidelines**

### **6.1 Introduction**

Development guidelines are included in this Master Plan to quantify or further define the general concepts and planning intentions set forth in Chapter 5. Although there is flexibility within the Master Plan, certain key relationships, patterns, and standards should be adhered to or considered when developing site or building projects to ensure that the desired functional characteristics and campus character are achieved. The Development Guidelines define these key elements and provide recommendations for their implementation.

Subjects addressed in this chapter include issues of building size and scale, definition of open spaces, site character and quality, as well as access and circulation. Considerations for implementation of the Master Plan are also included.

### **6.2 Building Siting and Open Space Guidelines**

#### **6.2.1 Standoff and Setback**

This Master Plan includes separations, known as “standoffs”, between occupied buildings and potential threats from explosives and separations for aesthetic and other reasons called “setbacks”.

At the perimeter of the site, the standoff should be acknowledged by excluding new buildings within this area. Buildings located toward the perimeter of the site facing spaces where unscreened vehicles might be located with explosive devices could be parked must be designed to mitigate potential blast effects by a combination of distance and construction designed to resist the blast. The National Institutes of Health (NIH) will conduct a threat and risk assessment to establish design assumptions for blast charge weight for any new construction project. Standoff design criteria should adhere to NIH Security Guidelines. Owing to the relatively small size of the Rocky Mountain Laboratories (RML) campus, the typical standoff of 250 feet cited in the Guidelines is prohibitively restrictive for future development of the campus. The standoff for RML should therefore be maintained at 100 feet throughout the campus perimeter, and all new construction with this standoff should be designed with sufficient hardening to be in compliance with the Guidelines. The Interpretive Center anticipated for the property to the northeast of the existing campus is envisioned to be open to the public and is therefore considered outside the secure perimeter and not subject to the standoff requirements.

On a campus-wide basis, the Master Plan proposes general patterns of setbacks for buildings from the loop road to control density, ameliorate the scale of buildings, and ensure the development of a "campus" character to the site. Along the loop road, new buildings of two or more stories should generally not be any closer than 50 feet from roadway curb lines, and single-story buildings should generally not be any closer than 25 feet from roadway curb lines.

Within the campus there is a proposed open public space, or Central Pedestrian Concourse, which is described in greater detail in Chapter 5. The dimensions of this area, approximately 80 feet by 1000 feet, are defined by existing Buildings 1, 6, 7, 13 and 22 to the south and 30, 31 and 26 to the north. Buildings 28 and 25 mark the western boundary of the space while to the east it is open to the Grove Street approach to the campus in the east. Exterior modifications to or replacement of the buildings that define this space should strive to enhance the public nature of the plaza and enhance the character it provides for the campus. New buildings would not be sited inside the area, existing mechanical equipment within the plaza must be screened or

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relocated, and the existing covered walk at Building 13 should be enhanced and extended along the southern border of the concourse.

A second open public space that links the site entry to the Pedestrian Concourse is proposed between Buildings 30 and 31. As with the Pedestrian Concourse, new building construction should not be considered inside this area, and future modifications to Buildings 30 and 31 should strive to enhance the public nature of the concourse.

### **6.2.2 Building Heights**

#### ***General Campus Height Plan***

Heights have been arranged to create a coherent pattern among all campus buildings and to give a sense of hierarchy or prominence to the most important structures. As noted in Chapter 4, Building 28 and the Quad are the tallest buildings on campus, at 52' and 50', respectively. New construction generally should be no higher than these buildings to maintain their prominence as centers of campus research.

#### ***Critical Areas***

The Master Plan minimizes the effects of new construction on neighboring areas off campus.

Within the campus, special attention has been given to creating appropriately scaled open spaces and relationships between new and existing buildings. Areas of significant attention to scale issues include: The Central Pedestrian Concourse; development near the Historic Core; the Campus Entry; the Interpretive Center; the Floodplain Trail; and the areas within the campus setbacks or standoffs.

### **6.2.3 Ground Level Activity and Use**

In all areas of the campus buildings should present an accessible appearance at ground level. Building entries should be oriented to address streets or major spaces.

In particular, ground level activities and uses are encouraged around the Central Pedestrian Concourse. This area should become the campus' central meeting place for large outdoor gatherings. Creating new or enhancing existing building entries and ground level activities which open to the Concourse will aid in creating this sense of vitality and centrality.

Pedestrian movement can also add to the vitality of public spaces on campus. Spaces should be designed to accommodate and encourage pedestrians comfortably. Walkways within the major open spaces should be of high quality materials, shaded where practical, and equipped with seating and furnishings where appropriate. Buildings around the major open spaces should also include arcades to shelter pedestrian movement in inclement weather.

### **6.2.4 Density and Bulk**

Maintaining a "campus" character and image for the site is an important aspect of the Master Plan and the manner in which open space is arranged on the campus is critical in establishing the image. To ensure that an appropriate proportion of open space and landscape is maintained, it is important to control the density of buildings on campus. Infilling central open spaces shown in the Master Plan is discouraged as this may diminish the character and quality of prime open spaces, as well as impede views and light available to other buildings. An exception may be made for the site immediately west of the proposed Rocky Mountain Veterinary Branch expansion (Building B). In the event unforeseen programmatic needs arise this site could be considered for new construction.

## **6.2.5 Rooftop Elements**

Rooftop elements such as parapets, penthouses, and antennas should be carefully designed to ensure architectural compatibility and minimize their visual impact on the skyline. Mechanical and elevator penthouses should create visually attractive rooflines for the campus. These elements should be integrated into the architectural expression of the building, and may be articulated as an attic story or hidden within the roof form of the structure. All rooftop equipment should be screened from view using materials consistent with the major building facades.

Installation of rooftop antennas, including satellite and microwave dishes, should be carefully considered for location and visual impact. Antennas should be installed at the lowest possible elevation above the roofline, and screened to the extent practicable from public view. Antennas should be set back as far as possible from all edges of the roof. Rooftop antennas which cannot be screened should be placed in association with penthouse structures so as to avoid the appearance of a freestanding object on the roof. Antenna and mounting materials should be unobtrusive and of a color that blends with surrounding buildings. Antennas should be protected against corrosion, securely mounted, and secured from unauthorized access.

Consideration should be given to developing on site solar capacity to accommodate portions of the campus power requirements. Rooftops provide an excellent location for the installation of solar collectors. As with other rooftop elements, the installation of solar collectors should be carefully considered for location and visual impact.

## **6.3 Historical and Archeological Guidelines**

### **6.3.1 Historical Guidelines**

The Quad, comprised of Buildings 1, 2, 3, 5, 6, 7 and A, dates back to 1928, when Building 1 was completed. As discussed in Section 4.7, Buildings 1, 2, 3, 5, 6, 7, A, 8, 9 and 11 and certain elements of these buildings' sites comprise the Rocky Mountain Laboratories Historic District which is listed in the National Register of Historic Places.

It is possible that other buildings, upon reaching 50 years of age, will be eligible for listing. (Under Section 110 of the National Historic Preservation Act, federal agencies are required to identify and evaluate historic resources and to ensure that the resources are managed and maintained in a manner that is sensitive to their historic, archaeological, architectural, and cultural values.) The NIH is committed to continuing to evaluate the potential historic significance of buildings that are approaching 50 years of age. Until these evaluations are complete, the NIH acknowledges that cultural resource investigations will be necessary for individual undertakings to be submitted for Section 106 review. (Under Section 106 of the National Historic Preservation Act, government agencies are required to take into account the effects of planned undertakings on historic resources prior to approving funding for the undertaking.)

The Secretary of the Interior's Standards for Rehabilitation provide basic principles to guide work undertaken on historic buildings. The Standards are as follows:

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

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4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of distinctive features, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that can cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

### **6.3.2 Archeological Guidelines**

To date no archeological sites have been encountered on the RML campus.

If a sensitive area is encountered, the site must be evaluated and recommendations for appropriate sampling, recovery of artifacts, or protection in place must be prepared as necessary. It is possible, but not probable, that an alternative building site would have to be chosen or construction delayed if the archeological site were determined to be of great importance. In general, artifact recovery is preferable to avoidance since the historic and archeological value of most sites lies in the information obtainable from the artifacts.

The survey, evaluation and mitigation work (if required) should be completed during the planning of individual building projects and prior to the start of any construction. This releases the site for construction and avoids delays and additional costs once construction is underway.

## **6.4 Circulation Guidelines**

### **6.4.1 Vehicular**

Vehicular access to the RML Campus is currently achieved by means of two existing entrances; the staff and visitor entrance located along 4<sup>th</sup> Street near Grove Street and the service vehicle entrance adjacent to the intersection of 5<sup>th</sup> and Baker Streets. The Master Plan Proposed Action calls for two emergency vehicle exits, one where 6<sup>th</sup> Street terminates at the northern boundary of the site and the other at 4<sup>th</sup> Street extended where the roadway terminates in the southeast corner of the campus, to facilitate evacuating vehicles if necessary.

None of these entrances are anticipated to require traffic signals to control traffic flow to and from the campus.

The Master Plan proposes a new two-way campus loop road around the north, west and south portions of the campus, where it meets the existing parking area at the Quad. A one-way northbound exit lane connects this parking area to the staff and visitor entrance and the loop road. There are also several two-way service lanes to permit access from the loop road to existing building service entries.

The locations of these roadways are presented in Figure 6.4.1-a. The loop road and most service lanes are proposed to be 24 feet wide. The exit lane is proposed to be 15 feet wide. Cross sections through the loop road and exit lane are illustrated in Figure 6.4.1-b.

### **6.4.2 Parking**

Under NIH Security Guidelines, the existing parking areas at the southeast side of the Quad and south of the ARMCO buildings are permitted to remain, but new parking areas should not be planned adjacent to campus buildings. In the future, additional parking will be accommodated in the setback area on the north side of the campus. The use of multi-story parking structures is discouraged; surface lots are preferred. Consequently, parking for the campus population anticipated by the Master Plan should be accommodated in the properties that are planned to be acquired to enhance security stand off to the north of the campus. Planting areas should be located between parking rows and interspersed between parking spaces to provide visual relief and create shade where possible. Premium parking spaces will be allocated for compact cars, low emission cars, hybrid electric cars and car pooling vehicles.

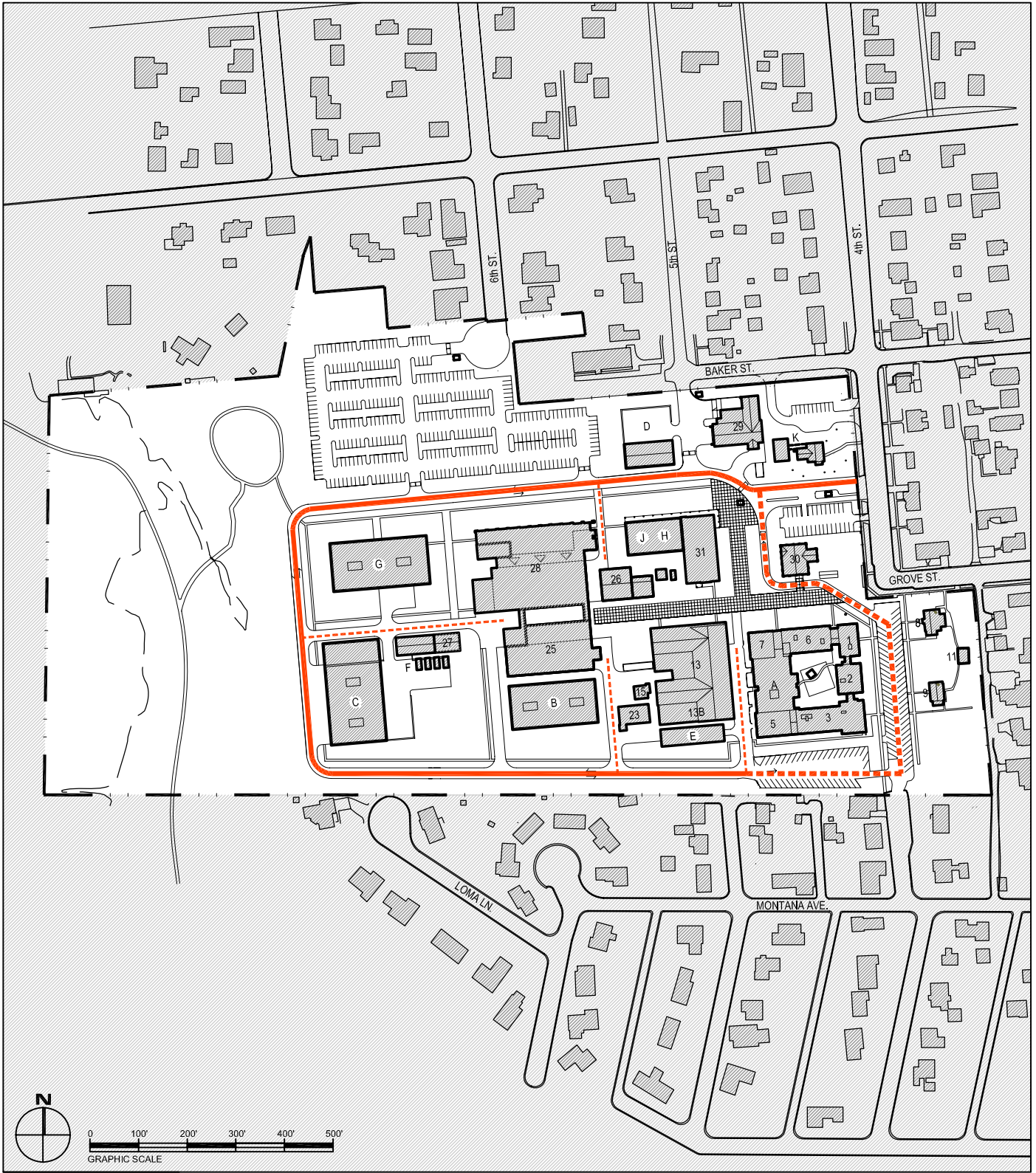
RML will incorporate Best Management Practices (BMP) and Low Impact Development (LID) in its approach to parking lot construction, including 'hybrid' paving such as hard surface access roads and permeable paving for parking spaces, natural vegetated separation strips and use of recycled materials. Other examples of LID practices that may be incorporated in parking areas include, but are not limited to, bioretention cells to filter storm water, infiltration trenches, sumps, and bioswales incorporating native vegetation.

### **6.4.3 Service**

With few exceptions, all commercial trucks would continue to enter the site through the service entrance, where they would drop off deliveries and/or pick up materials from Building 29 or the Solid Waste Management Facility. On-campus service vehicles would distribute delivered materials from Building 29 to campus buildings and carry deliveries, recyclables, or waste from the campus to Building 29 or the Solid Waste Management Facility.

The number of access driveways on the internal loop road has been limited by providing shared service/delivery areas for groups of buildings. This consolidation of the service/delivery areas would minimize conflicts in the internal road system.

The design of the access driveways from the internal loop road system should be provided with adequate sight distances and proper turn-around areas for service vehicles within the access drive layout. In general, access driveways for service/delivery vehicles and employee or visitor passenger vehicles should be separated. Although these criteria may not be feasible in all cases, the objective should be to reduce the possibility of the access driveway being temporarily blocked by a service/delivery vehicle.



**NIH-RML  
Master Plan**  
Hamilton, Montana

- Two Way Loop Road
- - - One Way Exit Drive
- · · Two Way Service Drive

Figure 6.4.1-a

**Roadway  
Types**



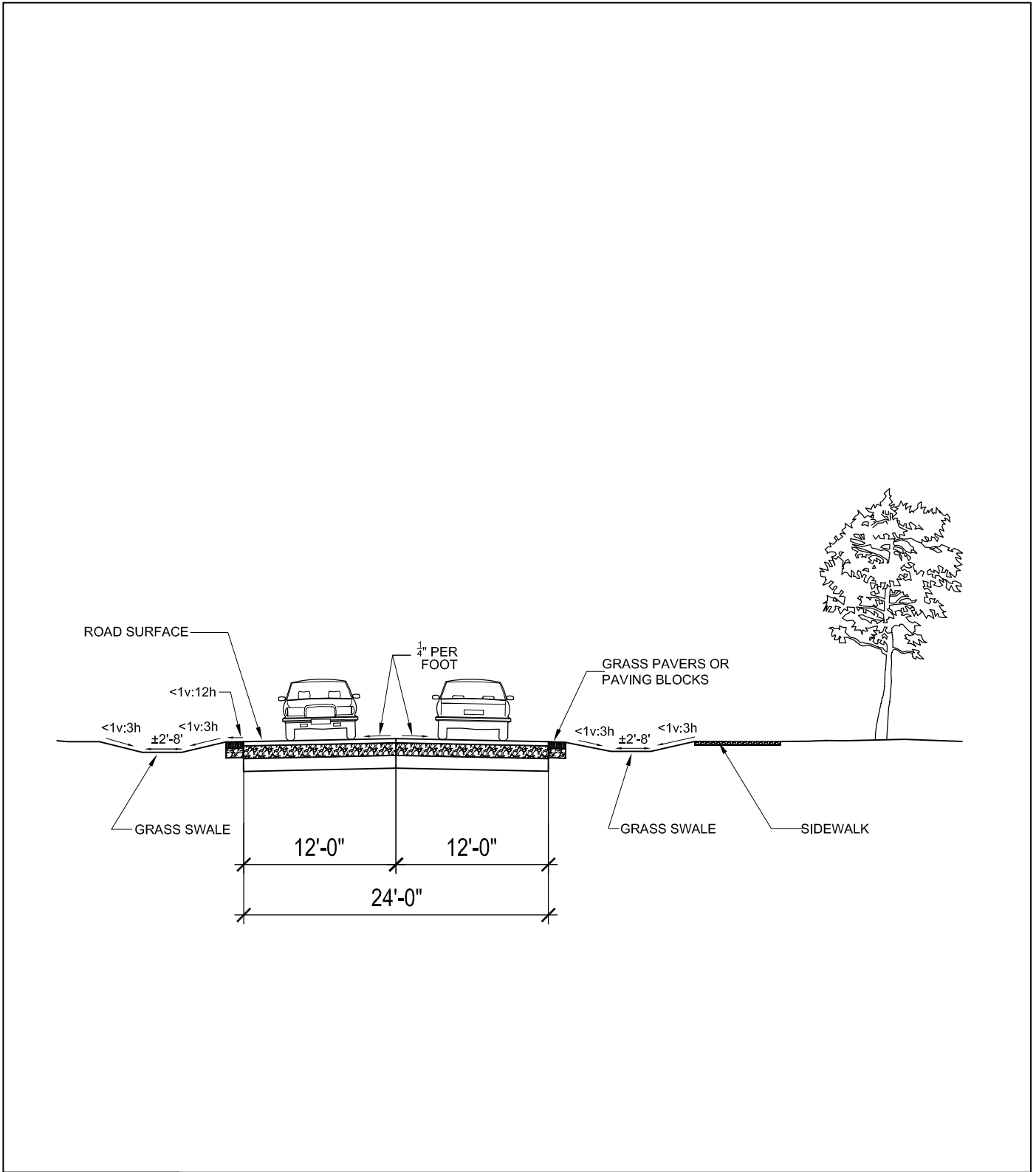
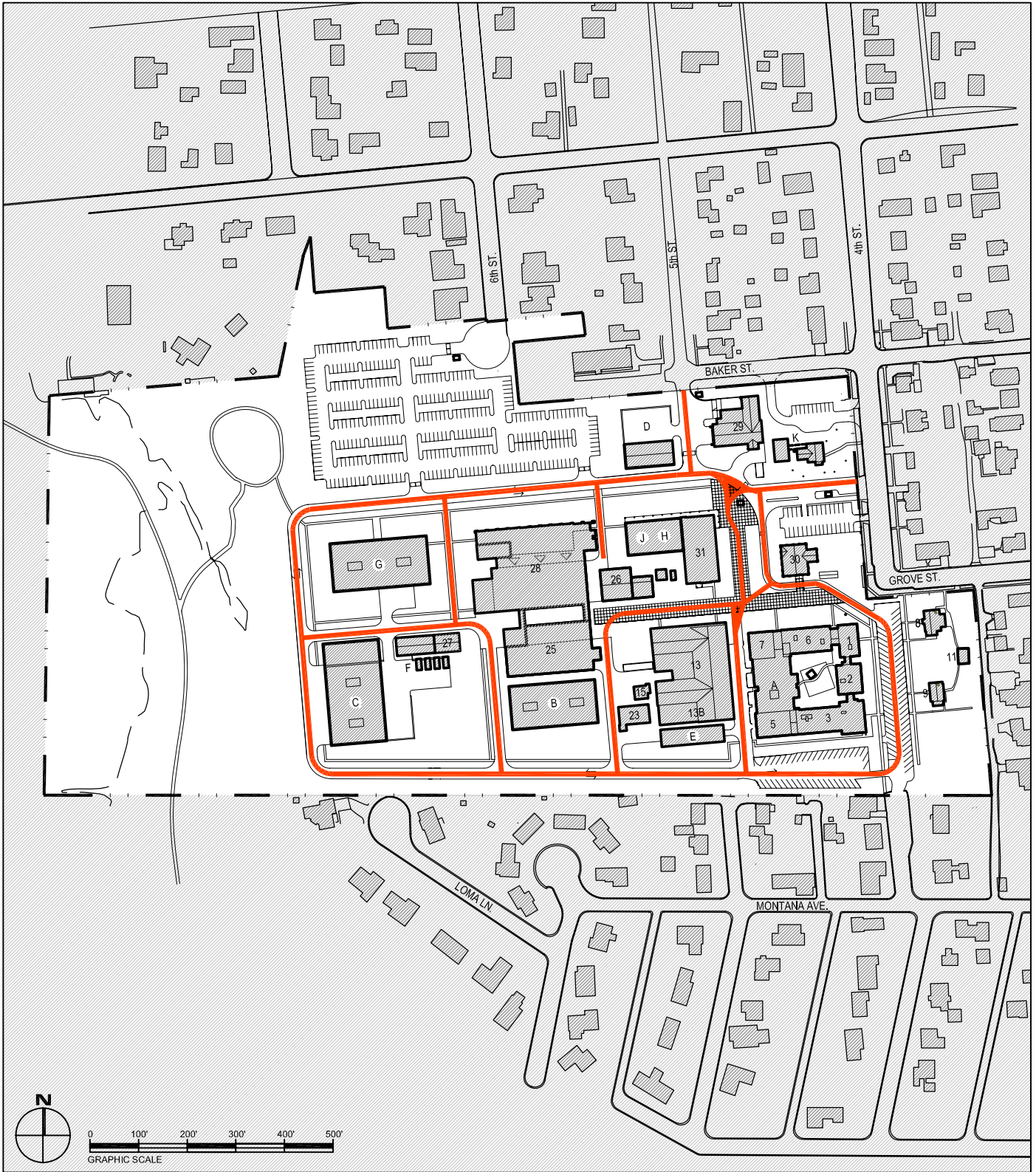


Figure 6.4.1b

## Typical Roadway Section



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— Access Route

Figure 6.4.4

**Emergency Vehicle  
Access**

#### **6.4.4 Emergency Vehicle Access**

Access to all campus buildings for emergency vehicles, especially fire department vehicles, must remain a priority in building, road and parking design. To facilitate this, the Pedestrian Concourse shall be designed to carry emergency vehicle traffic. Landscape elements or covered walks shall not impede emergency vehicle access. The proposed emergency vehicle access routes are shown on figure 6.4.4.

#### **6.4.5 Pedestrian/Bicycle**

##### ***Pedestrian Pathways***

Pedestrian access to the site is currently limited to the staff entrance along 4<sup>th</sup> Street. Formal pedestrian pathways within the site are currently limited to the sidewalks within the Historic District. Pedestrian circulation outside of this area takes place without a planned system or formal pathways. The planned Central Pedestrian Concourse provides an internal focal point that links pedestrian access for most of the research and administrative campus buildings. Perimeter pedestrian paths are also planned to be adjacent to the loop road. It is anticipated that a system of public trails through the western portion of the site adjacent to the Bitterroot River is to be planned by the County. Access from the campus to these trails is planned from the perimeter pedestrian path.

##### ***Bikeways***

Bicycle facilities are an important element in the promotion of alternative transportation modes for employees of the RML campus to encourage healthful exercise and reduce carbon emissions. A significant amount of bicycle use occurs on the campus today. Under the Master Plan, bicycle access would be provided for employees at all vehicular entrances and at pedestrian/bicycle employee-only gates in the perimeter fence. Bicycle access for visitors to the RML campus would be through the Visitor Center, Building 30. Access to the public trails noted above should allow for bicycle traffic as well.

Bicyclists should be encouraged by signage and policy to walk their bikes in congested areas. In general on the RML campus it is expected that bicyclists would utilize the campus roads to circulate around the campus. However, it is important that these roadways are regularly maintained and cleared of debris, snow and ice and that drainage grates are designed flush to the surface with narrow grid openings so that bicyclists do not get trapped as with conventional parallel, widely spaced grates.

#### **6.4.6 Access for Persons With Disabilities**

For implementation of access standards, see the ABAAS (42 U.S.C. §§ 4151 et seq. Architectural Barriers Act Accessibility Standard (ABAAS)).

### **6.5 SITE PERFORMANCE GUIDELINES**

#### **6.5.1 Building Character/Materials**

As noted in Section 4.6, consistent architectural character is currently lacking on the RML campus. Future development on the campus should strive to reinforce the academic institutional quality of the most prominent campus buildings, the Quad and Building 28. New construction near the perimeter should also remain compatible with the scale and character of the surrounding

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residential neighborhood. Red brick masonry should be included as a prominent exterior feature in the design of new buildings.

An exception should be made for the development of the Interpretive Center in the northeast corner of the campus. The existing “log cabin” residence on this property shall be retained, along with its landscaping, to the extent practical for the development of the Center. New construction associated with the Interpretive Center should be consistent with the residential scale and character of the adjacent residential neighborhood.

Future development should exclude prefabricated buildings and exterior metal siding, as these promote an industrial impression that is contrary to the academic institutional setting noted above.

### **6.5.2 Landscape Design and Planting Criteria**

Figure 6.5.2-a shows the proposed Landscape Concepts and Planting Patterns for the RML Campus. Landscaping for the campus should be developed to enhance the basic goals of the Master Plan described in Chapter 1.5.

#### ***Planting Patterns and Scale***

The size of trees, shrubs, and plant beds should be considered with respect to their scale relationship to the RML campus buildings, roads, and spaces. In general, plantings should be simple and conceived in broad masses. In addition, there should be a hierarchy of plantings, ranging from tree and/or shrub massings along roads, entries and in parking areas, down to small garden scale plantings and floral display beds in courtyards and pedestrian gathering areas.

Plants can also serve to punctuate and reduce the scale of walls and building facades, through the use of hanging, twining, or climbing plants, which can help the buildings and spaces become part of the landscape. Similar techniques can be used for screening mechanical equipment. Flower beds should be used to soften the edges of buildings, paths, and outdoor areas. The selection of plant materials should keep security in mind as well. Plants should not provide potential intruders a means to scale perimeter barriers nor obscure security surveillance, including CCTV.

Plants selected for use on the RML campus should be of indigenous or native species, possess appropriately long-lived characteristics and have visual traits that offer refined intrinsic beauty to reflect the enduring quality of the institution. The overall design of the campus planting should be simple and seek to evoke a mood of tranquility to complement the existing natural and surrounding plantings. It is also recommended that the use of annuals and perennials be encouraged to create an uplifting campus environment for visitors and employees.

Minimizing water consumption should remain a primary concern in landscape planning for the RML Campus. Principles of xeriscaping, landscaping in ways that do not require supplemental irrigation, should be applied wherever possible. If supplemental irrigation systems are determined to be necessary for the establishment of any new planting, the installation of these systems should be temporary and, to the extent possible, utilize grey water from existing campus operations, so as not to require additional campus water consumption.

Care should be exercised in the use of ornamental plants. As a general rule, these should not be used in the more natural perimeter landscape. They should only be used in the central core areas, in enclosed courtyards and internal landscape spaces between buildings. Simple refined patterns would yield a campus that is unique, dignified, and practical to maintain.

The natural forms of plants should be retained through proper pruning techniques. This is most important when considering shrubs. Shrubs should be planted in arrangements that allow for their natural shape to be retained through periodic renewal pruning.



Figure 6.5.2-a

**NIH-RML  
Master Plan**  
Hamilton, Montana

- Street/Parking Planting
- Formal Planting
- Buffer Planting
- Pedestrian Concourse
- Undisturbed

**Campus Planting  
Patterns**

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The natural forms of plants should be retained through proper pruning techniques. This is most important when considering shrubs. Shrubs should be planted in arrangements that allow for their natural shape to be retained through periodic renewal pruning.

Adequate space must be allowed for plants to grow, particularly near paths and buildings, in order to avoid the heavy shearing of these plants which often renders them unnatural and unattractive. Planting should also be located so that they are protected from piled snow and from salt.

Tree pruning should start early in the life of campus trees to ensure that a proper form is established and that the canopy is promoted and trained to a sufficient height to provide clear visibility beneath trees for autos and pedestrians and adequate light to lawn areas.

### ***Buffers and Perimeter Screening***

The long term objective for improving the perimeter landscape areas should be to enhance the campus' relationship to the surrounding residential neighborhoods. Perimeter shrubs and grasses can help to mediate the uninviting qualities of perimeter fences and crash barriers required by current security standards. At the same time these plantings would provide environmental benefits including enhanced storm water management, erosion control and increased species diversity.

Any landscaping in the perimeter areas would require careful study to ensure that campus safety and security is maintained.

### ***Special Landscape Areas and Features***

Additional attention should be given to the landscape character in critical campus areas, based on the following recommendations.

**Central Pedestrian Concourse:** Utility lines run beneath the concourse area. Planting in this area should be limited to native species with shallow root structures that would not threaten existing utility lines and that could be readily replaced if removed for maintenance purposes. Paving should be patterned to emphasize the pedestrian character of the concourse. Paving should also be designed to allow service and emergency vehicle access. Where practical, paving should be designed to permit access to utility lines for maintenance.

**Historic Core:** Existing planting, particularly old growth trees, shall be retained and protected within the historic district. As these plants die they should be replaced in kind, unless disease is suspected, in which case similar, disease resistant species should be used in replacement. New landscaping in this area should reinforce existing landscape patterns, including the allee of trees lining the extension of 4<sup>th</sup> Street, the entry plantings at Buildings 1, 2 and 3 and the lawn area defined between Buildings 8, 9 and 11.

**Interpretive Center:** The existing landscaping, particularly old growth trees, of the "log cabin" property should be retained. Formal planting as well as paving should be added to present a welcoming appearance and guide visitors from the parking to the Interpretive Center entrance. Landscaped links should also be provided between the log cabin and accessory building. Landscape screening should be added between the parking area and 4<sup>th</sup> and Baker Streets.

**Site Entry:** The existing old growth trees in front of the Visitors Center (Building 30) shall be retained and protected. Formal plant beds should be developed for the area between the Visitors Center and 4<sup>th</sup> Street. Landscape screening should be added around the water pumping structure recently installed adjacent to the Center.

**Floodplain Trail:** The floodplain is generally defined by existing wetlands. Landscaping in the wetlands area is generally discouraged. The Master Plan recommends an RML trail link to a public trail system, should one be developed.

### 6.5.3 Streetscape/Pathscape

#### ***Street Tree Recommendations***

The primary planting objective for the loop road system should be to create a uniform appearance, through the use of a uniform tree type and spacing, that assists in defining the road as a continuous corridor. As a general rule, the Master Plan recommends the use of large deciduous trees along the loop road in order to form a continuous canopy that will provide foliage at a height from 10 to 15 feet above the ground allowing open views below the branches. Trees along the loop road should be selected from those recommended by the City of Hamilton.

#### ***Detailed Streetscape Layout Recommendations***

Roadways should be bounded by swales designed to capture and filter surface runoff in keeping with the Low Impact Development practices described in Section 6.4.2. There should be occasional paved areas for access to the street. Streetlight posts and roadway regulatory and directional signage should be accommodated outside of the swales.

Pedestrian walkways, located adjacent to the planting strips, should be at least six feet wide to accommodate service vehicles if needed. Paths and walkways should generally be constructed of concrete. Special paving patterns and materials should be used to highlight key areas such as the Pedestrian Concourse and major building entrances. These areas should also include seating areas, solid waste and recycling receptacles, pedestrian lighting, landscaping and above grade planters. The Master Plan recommends using a standardized paving material throughout the campus to facilitate maintenance and enhance campus coherence.

Currently site furnishings on campus are not well coordinated either by style or location. The Master Plan recommends adopting a standard palette of street furniture including seating, receptacles, bicycle rack, and kiosks, which are functional, easily maintained, and aesthetically compatible for use throughout the campus. The use of durable wood and natural materials for site furnishings is encouraged. These elements will not only provide pedestrian scale and comfort, but also visually unify the campus environment.

### 6.5.4 Exterior Signage

Most buildings on the RML campus are identified by a sign bearing their building number. Beyond this the campus lacks consistent signage for information and wayfinding. A comprehensive signage and wayfinding plan should be developed for the campus, including recommendations for the upgrade or replacement of the existing signage system according to sign type, location, graphic quality, physical condition and maintenance, accuracy of information and adequacy of the amount of signage. The categories of signage which should be addressed include the following:

**Orientation** - site maps near the campus entry and area maps in the core of the campus.

**Direction** - to major campus buildings and areas, both for vehicles and pedestrians. Notations of accessible routes for persons with disabilities.

**Identification** - campus entry signage and exterior building and place signage.

**Regulatory/Safety** - traffic and parking control, safety, and warning signage.

**Information** - public announcements, etc.

**Interpretive** - campus tour signage, plant species signage, etc.

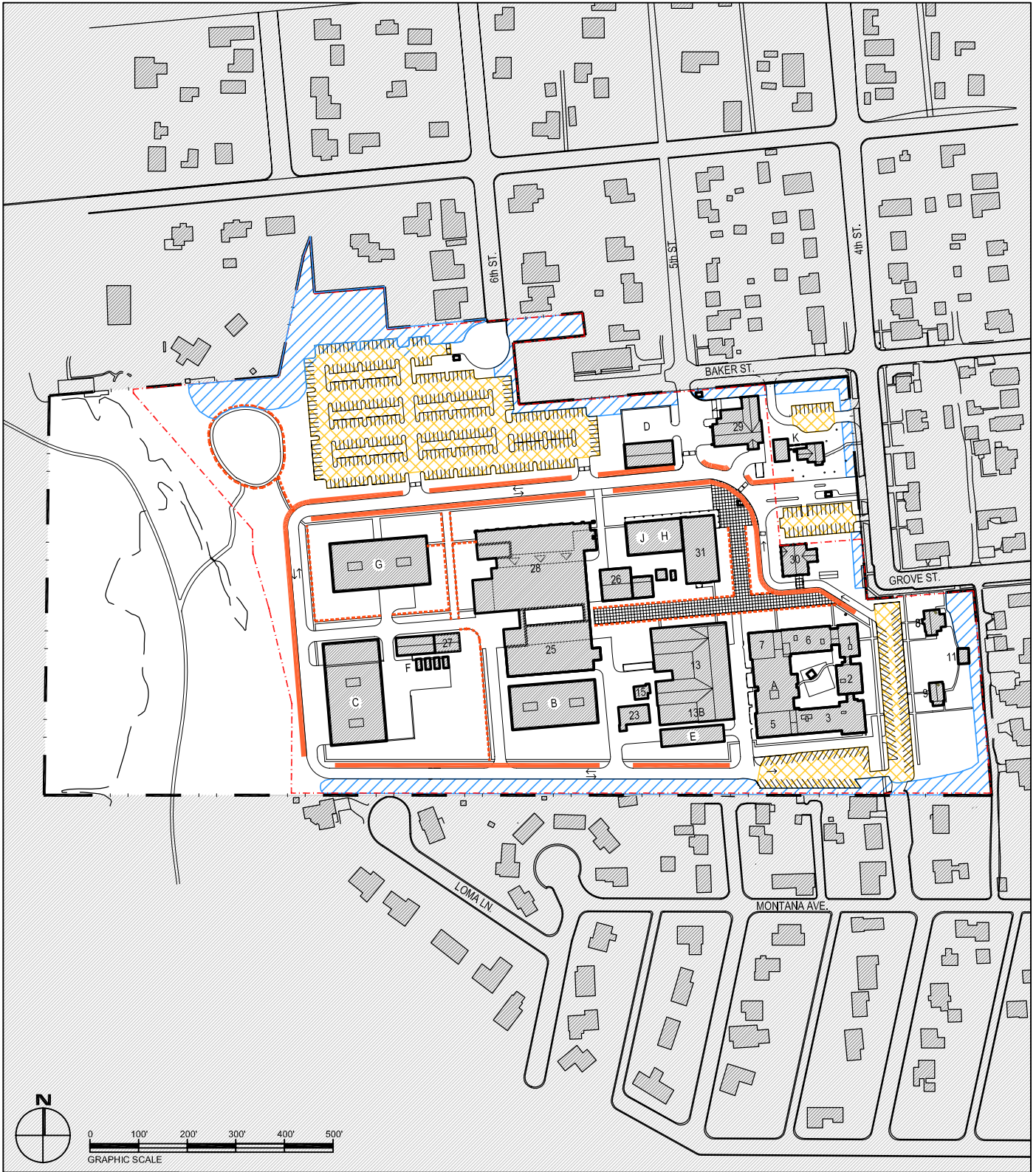


Figure 6.5.5

**NIH-RML  
Master Plan**  
Hamilton, Montana

- Loop Road Lighting
- - - Pedestrian Path Lighting
- ▨ Parking Lighting
- ▨ Light Control Zone
- - - Fenceline

**Lighting Concept  
Plan**



Visitor and staff entries should be clearly and coherently signed to both identify the RML campus and create a positive first impression of the institution. Along the loop road, signage should be consistent and a clear orientation tool. Directional kiosks bearing a campus map should be included at key pedestrian locations.

Signage character should be clearly legible and should be of a quality appropriate to a world renowned institution. There should be design consistency between all campus sign types. Signage placement should also be carefully considered to avoid visual clutter. Regulatory and traffic signage should be reviewed to determine if more compatible signage designs can be implemented rather than the standard uniform roadway signs which are now used.

A Signage and Wayfinding Master Plan is currently under development for the Bethesda campus of the NIH. The standards developed by this document should be reviewed for applicability at RML.

### 6.5.5 Exterior Lighting

The campus lacks a coordinated lighting scheme with a family of lighting fixtures. Site lighting on the campus is mostly limited to the Historic District and site entry. Building lighting, where it exists, is generally limited to utility fixtures. A consistent, comprehensive lighting scheme should be developed for the campus, including recommendations for fixture type, location, and light quality. All general campus lighting (at the loop road, major pedestrian framework, primary entries, etc.) should be of a single fixture type. Individual building projects may continue to differentiate fixture types for buildings and surrounding area lighting, within a style complementary to other campus lighting. Consideration should be given to including solar powered fixtures where practical.

Categories of lighting which should be addressed include the following.

**Street** - *for vehicular safety and general campus illumination-* The NIH Design Policy and Guidelines specifies a level of 50 lux, or 2-5 footcandles for roadways

**Pedestrian** - *for pedestrian safety and path marking-* The NIH Design Policy and Guidelines specifies a level of 10 lux, or 1-2 foot candles for pedestrian areas.

**Building** - *to identify building entries and provide security.*

**Safety/Security** - *for areas of the campus that pose danger or require surveillance.*

**Signage** - *at major entry locations and for key directional and orientation signage.*

**Special Features** – *for building or landscape highlighting at special outdoor spaces or monuments.*

Figure 6.5.5 illustrates the primary Master Plan lighting concept recommendations. Loop road lighting should be of a distinct character to help define the road as a continuous vehicular corridor. Parking area lighting must conform to security requirements. Lighting for the Central Pedestrian Concourse should enhance the significance of this area as a principal circulation and gathering space. Lower intensity pedestrian lighting should be provided for secondary pedestrian routes. Parking areas must be lighted in accordance with security requirements.

At the campus perimeter special attention should be given to avoiding spillover lighting into adjacent neighborhoods. Full-cutoff light fixtures, which allow no light to be emitted above a designated horizontal plane, should be used for roadways, walkways, parking, and buildings. Increased landscape screening should also be considered where practical.

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Fixture lamps should be selected for energy savings, light quality, and maintenance characteristics. Metal halide, high-pressure sodium, or compact fluorescent lamps are preferred, and mercury vapor lamps are discouraged. Additionally, it should be recognized that simply increasing or decreasing lamp wattage is not always the correct solution to a perceived lighting problem. Other factors such as light direction, light quality, surface reflectance, and contrast with surrounding areas can affect perceptions of security and character.

### **6.5.6 Storm water Management and Erosion and Sediment Control**

Storm water Best Management Practices (BMPs) that can effectively slow the rate of runoff from the campus while removing pollutants from surface drainage should be incorporated into campus development. BMPs such as grassed swales, filter strips adjacent to new parking areas, porous pavement, and infiltration trenches in areas of concentrated runoff have been shown to be effective in improving water quality if properly maintained. RML should regularly inspect and maintain its future BMPs to ensure their long-term effectiveness. In addition, all new development projects on the campus should include erosion and sediment control plans designed to minimize erosion and release of unfiltered runoff from the site and into adjacent waterways. Low Impact Development (LID) principles should also be incorporated into campus development. LID is a design strategy that uses natural and engineered infiltration and storage techniques to control storm water. Examples of LID technologies include; engineered filtration systems such as bioretention cells, infiltration trenches, and sumps; low tech use of native vegetation for rain gardens and bioswales; reducing impervious surface areas recycled materials such as porous concrete or permeable pavers; and infrastructure improvement such as curbless and gutterless roadways.

### **6.5.7 Noise Control**

Campus Noise Level Criteria Standards were developed for RML in 2003. Based on these standards the noise levels at the property line of the RML site are to be maintained at or below 55 decibels adjusted (dBA) during the day and at or below 50 dBA at night. RML is in the process of bringing existing campus activities into compliance with these standards. All new projects undertaken under the Master Plan are required to comply with these standards. Noise levels in the vicinity of new campus projects should be measured prior to the start of work to establish a baseline condition. Compliance should be demonstrated during the design phase through modeling and prediction of noise levels. Following completion of construction work, noise should be measured again to determine if noise levels are within the predicted range. If noise outside the campus exceeds pre-construction levels, mitigation measures should be implemented to lower noise to the pre-construction level. Where possible, the potential for new construction projects to reduce or contain existing campus noise should be explored.

