ATTACHMENT A

AREA OF POTENTIAL EFFECTS DELINEATION

An APE for the NLX Corridor has been determined by FRA and MnDOT pursuant to 36 CFR 800.4(a)(1) and taking into account statements by stakeholders and interested parties. MnDOT, using Principal Investigators (PIs), is responsible for describing and establishing the APE in accordance with the APE defined for the corridor (see attached) and the APE delineation guidelines described below, and will sign any maps or plans that define or redefine an APE. The APE may be further refined in connection with future site specific studies.

As defined in 36 CFR 800.16(d), an APE is "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking."

Different APEs may be established for archeological properties and historic architectural properties:

Archaeological Properties

For archeological properties, an APE is typically established based on an undertaking's potential for direct effects from ground-disturbing activities. On occasion, archeological sites may also have qualities that could be affected indirectly.

The APE for archaeological properties is the area of ground proposed to be disturbed during construction of the undertaking, including grading, cut-and-fill, easements, staging areas, utility relocation, borrow pits, and biological mitigation areas, if any.

Traditional cultural properties and cultural landscapes are more likely to be subject to indirect, as well as direct effects; thus, in order to include the potential for such effects, the APE for such properties is usually broader than the archeological APE. For instance, the first row of potential properties beyond the right-of-way may be subject to such effects and thus included in an indirect APE when warranted.

Historic Architectural Properties

The APE for historic architectural properties includes all properties that contain buildings, structures or objects more than 50 years of age at the time the intensive survey is completed by the PIs, as follows:

1. Properties within the proposed right-of-way;
2. Properties where historic materials or associated landscape features would be demolished, moved, or altered by construction;
3. Properties near the undertaking where railroad materials, features, and activities *HAVE NOT* been part of their historic setting and where the introduction of visual or audible elements may affect the use or characteristics of those properties that would be the basis for their eligibility for listing in the National Register; and
4. Properties near the undertaking that were either used by a railroad, served by a railroad, or where railroad materials, features, and activities *HAVE* long been part of their historic setting, but only in such cases where the undertaking would result in a substantial change from the historic use, access, or noise and vibration levels that were present 50 years ago, or during the period of significance of a property, if different.

For the NLX Project, a key phrase in the APE definition in the Section 106 regulations contained within 36 CFR 800.16(d) is "may...cause alterations in the character or use of historic properties" because many of

the undertakings involve the construction of additional, relocated, and/or high speed rail alongside existing railroads. In such cases, potential historic properties near the proposed undertaking historically had railroad features, materials, and activities within their setting that contributed to their character, or may even have been used by or served by the railroad. For example:

- The character and use of a historic railroad passenger or freight depot or railroad bridge *would not change* unless it would be put out of service, destroyed, altered, or moved for the undertaking;
- The character and use of an industrial building next to existing railroad tracks *would not change*, unless freight railroad service was an important association and the spur lines or loading areas would be removed by the undertaking;
- The character and use of buildings *would not change* if they would be separated from the undertaking by an existing railroad; however,
- The character of a non-railroad or non-industrial building *would likely change* if the building is visually sensitive and the proposed undertaking introduces an elevated grade separation or other large building or structure;
- The use of a non-railroad or non-industrial building *would likely change* if the building is sensitive to noise, like a school, museum or library, and the frequency of noise or vibration events from passing trains is increased over historic-era railroad events.

When delineating the APE, the PIs shall follow the identification methodology in Stipulation VI.B., which are different for archaeological properties and historic architectural properties. The PIs shall take into account the nature of the proposed undertaking and whether or not it has the potential to affect the characteristics that might qualify the property for eligibility to the NRHP. Whenever an individual phase is revised (e.g., design changes, utility relocation, or additional off-site mitigation areas), the PIs will determine if changes require modifying the APE. If an APE proves to be inadequate, MnDOT is responsible for informing consulting parties in a timely manner of needed changes. The APE should be revised commensurate with the nature and scope of the changed potential effects.

NORTHERN LIGHTS EXPRESS PROJECT
AREA OF POTENTIAL EFFECT RATIONALE

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The Northern Lights Express (NLX) project is a proposed high-speed passenger railroad from the Twin Cities to the Duluth/Superior area. The proposed project is receiving funding from the Federal Railroad Administration (FRA); therefore, it must comply with the National Environmental Policy Act; Section 106 of the National Historic Preservation Act of 1966, as amended; and with other applicable federal and state mandates such as the Minnesota Historic Sites Act, Minnesota Private Cemeteries Act, and the Wisconsin Burial Sites Preservation Law. The purpose of this document is to conduct preliminary analysis concerning the potential effects the NLX project may have on historic resources and develop a rationale to assist the federal and state agencies in developing an appropriate area of potential effect (APE) for this project (see attached maps for current APE).

The construction and operation of the proposed NLX project will result in a variety of potential effects to historic properties; therefore, for the development of an APE, potential effects from various possible construction and operation activities were examined. A preferred alternative, Route No. 9, has been chosen for the NLX project and approved by the FRA. The route follows the existing Burlington Northern Santa Fe (BNSF) Railway from Minneapolis (MTI) northeast to Duluth (Depot). This rail line represents the only railroad connection currently in full active service between Minneapolis and Duluth/Superior. The corridor roughly parallels State Highways 65 and 23 through Hennepin, Anoka, Isanti, Pine, Carlton, Douglas (Wisconsin), and St. Louis counties and terminates in Duluth.

This route will utilize portions of six historic railroad corridors. These existing railroad lines contain intact tracks that will be upgraded from a class 3 to a class 5 line. FRA's track safety standards establish nine specific classes of track (Class 1 to Class 9). The difference between each Class of Track is based on progressively more exacting standards for track structure, geometry, and inspection frequency. Each Class of Track has a corresponding maximum allowable operating speed for both freight and passenger trains. The higher the Class of Track, the greater the allowable track speed and the more stringent track safety standards apply. The maximum allowable speed for passenger trains is 60 mph for a Class 3 track and 90 mph for a Class 5 track. The upgrades to a Class 5 line can be accomplished through tie replacement and ballast improvements, which can be done as maintenance on these line utilizing tie replacement trains and ballast placement trains. All work will be performed from the track and will have no impacts outside the existing track bed (FRA 2008).

For this project, the project area is defined as the proposed construction footprint, which can be bigger or smaller than the existing right-of-way (ROW) depending on the nature of the proposed improvements for the project. In addition, the proposed preferred alignment includes construction of new parallel track, new bridges associated with new parallel track, and improving/upgrading existing bridges. Therefore, the activities examined in developing the APE include the following:

- New track parallel to existing track (e.g., sidings and second mainlines with both tracks operational);
- New bridge associated with new parallel track;
- Replacing an existing bridge/underpass;
- Improving/upgrading an existing bridge;
- Using an existing alignment (possible replacement of existing rails, etc.); and
- Operation of the line.

Discussion of the potential effects to specific resources types are described below.

ARCHAEOLOGY

For the proposed NLX project, the APE for archaeology will include all areas of proposed construction activities or other potential ground disturbing activities associated with the project, including equipment storage areas and borrow areas. For construction of the railroad corridor itself, it is assumed that the construction footprint will not extend beyond the existing railroad ROW and that the only construction activity that may be located outside existing ROW may be borrow areas or equipment storage areas, if required; however, the location of borrow areas and storage/laydown areas is currently unknown and environmental review of these areas will be completed at a later date.

It is assumed that any modification to the existing railroad grade or to transition to a new alignment (i.e., adding new parallel track) will not extend below the existing railroad grade. Therefore, unknown archaeological sites that may be located below the existing railroad grade will not be impacted and survey of the existing railroad grade will not be required. If Native American burials are known to exist below existing grade or within the larger APE then the project will need to comply with Minnesota Private Cemeteries Act, 1975 (M.S. 307.08) or the Wisconsin Burial Sites Preservation Law (Wis. Stats. 157.70) and the specific situation will be addressed as part of consultation obligations under Section 106 of the National Historic Preservation Act.

The design of the proposed NLX project is continuing to be refined. As the design of the project progresses, if any of the assumptions above should change, then the proposed APE rationale would need to be adjusted accordingly.

ARCHITECTURAL HISTORY

For the proposed NLX project, the APE for architectural history needs to account for any physical, auditory, atmospheric, or visual impacts to historic properties. The potential effects from each component of the proposed project are different and, therefore, a different APE may be needed. The proposed project components are still being refined so the purpose of this discussion is to detail the APE associated with each component, which will then be combined into one APE based on the nature of the components proposed.

The types of effects anticipated may include direct physical and/or vibratory effects, as well as potential indirect visual, auditory, and atmospheric effects. Effects may be temporary or permanent. To aid in identifying the potential effects the proposed elements of the project may have on architectural history properties in order to define an appropriate APE for architectural history, the following was assumed based on current project information:

- Construction of the project will not exceed a time period of five years;
- Construction along the project corridor will generally be intermittent and not continuous at any one point along the corridor for the duration of construction;
- Construction activity will be limited to daytime hours, generally between 6:00 a.m. and 6:00 p.m., when higher noise levels are more acceptable;
- The construction and operation of depots (stations) and other facilities such as parking lots will be included in a separate National Environmental Policy Act (NEPA) process;
- The centerline of any new parallel track will be, at most, 30 feet (ft.) off-set from the centerline of the existing railroad track within a corridor;
- According to the *Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan (December 2007)* by Transportation Economics & Management System, Inc. the number of freight trains that currently operate along the railroad corridors (Route No. 9) with active tracks range from 12 to 60 trains per day. A portion of one corridor also sees two intercity passenger trains per day. The maximum number of high-speed passenger trains (HSTs) that are proposed to be operated daily along the potential

railroad corridors is eight, which would increase the number of trains along the active lines (Route No. 9) by 7 to 25 percent per day. If project assumptions change, portions of this APE rationale may need to be revisited and potentially revised;

- The length of the proposed passenger trains will generally be much shorter than the freight trains that are currently operated along the proposed corridors with active tracks. According to the *Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan* the proposed passenger trains will not exceed 600 ft. in length, whereas the freight trains that currently operate along the active corridors generally range from several hundred ft. to over one mile (mi) in length;
- The proposed passenger trains will be considerably lighter than freight trains and will therefore produce considerably less vibrations than freight trains and for shorter durations given their shorter lengths and higher speeds; and
- Except for the noise produced by the horns on the locomotives, which will be the same as freight trains, the proposed passenger trains will generally produce less noise and for shorter durations in a location compared to a freight train since they will have fewer locomotives and cars, less weight, better tracking, and will be shorter in length and operating at higher speeds.
- The proposed HSTs will travel at speeds of up to 110 miles per hour (mph), which is much faster than a freight train, so they will have a higher onset rate (approach rate due to their much higher speed) compared to freight trains that currently utilize the proposed NLX route.

The proposed project would traverse a wide array of areas, ranging from densely developed urban areas, to small towns, to open prairie and farmland, to forested areas. Similarly, the topography along the line will also vary from flatlands to rolling hills. Given the diversity of these areas and their respective conditions, the APE may need to vary, depending on the actual circumstances of a place and the activity proposed for that particular location. The following sections will describe a rationale for the development of an APE for each anticipated construction or operation activity, as detailed earlier in this document. Since the design of the project is still being refined, the discussion will generally focus on identifying the maximum limits of an APE, rather than a minimum which would need to be increased in places to address unique conditions. There may be locations where conditions may allow for a reduced APE from the maximum described below (e.g. more dense vegetation reducing visibility); however, this will be confirmed based on visual inspection of the viewshed during field survey.

New Track Parallel to an Existing Track

This action would entail laying new track(s) parallel to existing tracks within an existing railroad ROW (operation of the line is discussed under the heading: *Operation of the Line*). This alternative could potentially result in both temporary and permanent indirect and direct effects.

Temporary indirect effects would include increases in noise and dust during the construction of the new tracks. Noise associated with the construction of a new parallel track within the existing ROW would include noise from construction activities, and from increased vehicular traffic to deliver, load, and unload construction materials. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a new parallel track within an existing alignment will exceed acceptable levels as established by the State of Minnesota in areas more than 500 ft. on either side of the project area.

Construction of new parallel tracks would also result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading of materials, earth, and ballast dumping and storage. Dust levels in the air would be intermittent and would vary according to construction activity and atmospheric conditions. Any potential increase in dust associated with construction of parallel track within an existing alignment would be temporary and amounts generated would not likely be any greater than dust generated by wind storms in rural areas. In urban areas, the existing built environment (e.g. buildings and structures) would block and disrupt winds and further dissipate any dust generated during

construction. Therefore, the area that could potentially be adversely affected by increases in dust should be limited to no more 500 ft. and effects, if any, would be temporary.

Permanent effects would include direct physical and/or vibratory effects and potential indirect visual effects to the corridor and other historic properties as a result of changes to the existing corridor. Direct physical effects would be limited to the project area and alterations to the existing roadbed. Vibrations associated with new track(s) parallel to existing tracks within an existing railroad ROW could include vibrations from ground disturbing activity and from trucks, heavy equipment, rail-based equipment, and from the loading and unloading of materials in the project area. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. Therefore, an APE of 500 ft. on either side of the project area would be sufficient to address vibrations associated with the construction of new track(s) parallel to existing tracks within an existing railroad ROW.

Permanent indirect visual effects may vary; however, provided that the grades, elevations, and profiles of the parallel track are similar to the existing roadbed in the corridor, the construction of a parallel track within an existing ROW would have a relatively minor affect on the visual character of the corridor, especially in relatively flat areas where the alignment cannot be viewed from above. As a result, the area that would be visually affected would be somewhat limited. Since the track will be placed parallel to the existing track offset no more than 30 ft. from the existing, and it is assumed that the height, grades, and profile of the new parallel track are not significantly different from the existing roadbed (e.g. height of the new and rebuilt roadbed is not changed more than a 2.5 ft. from the height of the existing roadbed), based on other railroad projects in Minnesota, an APE of 500 ft. on either side of the project area would be sufficient to account for potential visual effects.

However, if grades, cuts, and fills are modified, the associated changes in these elements of the existing corridor may alter, and increase the visual prominence of the corridor and would thereby impact a larger area. If the construction of a parallel track results in height and profile differences between the existing roadbed that exceeds 5 to 10 ft., depending on the location and terrain of the area (10 ft. in hilly and/or heavily forested areas and 5 ft. in generally flat and/or open areas), a larger APE would be required to account for the increased visual effect. In these instances, an APE of 0.125 (one-eighth) mi (660 feet) is recommended to account for changes to views of the corridor and the landscape.

In summary, the APE for laying new track(s) parallel to existing tracks should include 500 ft. on either side of the project area, assuming that the grade change of the new alignment is within 2.5 ft. of the height of the existing track. If the proposed alignment will have a grade change more than 2.5 ft. from the height of the existing track, an APE of 0.125 mi around the project area is recommended.

New Bridge Associated with New Parallel Track

This action would entail the construction of a new bridge(s) associated with a new parallel track(s) located adjacent to existing bridges within an existing railroad ROW. This alternative could potentially result in both temporary and permanent indirect and direct effects.

Temporary indirect effects would include increases in noise and dust during the construction of the proposed bridge. Noise associated with bridge construction would include noise from construction activities, increased vehicular traffic bringing materials to the site, loading and unloading construction materials, and potentially pile driving. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a new bridge will exceed acceptable levels as established by the State of Minnesota in areas more than 0.125 mi from the project area.

Construction of a new bridge would result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading materials, and storage of construction

materials and equipment. Dust levels in the air would be intermittent and vary according to atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Therefore, the area that could potentially be adversely affected by increases in dust should be limited to no more than 0.125 mi from the project area.

Permanent effects would include potential direct effects from vibrations and indirect visual effects to the corridor and other historic properties as a result of changes to the existing corridor. Vibrations associated with new bridge construction could include vibrations from rail-based equipment, trucks and heavy equipment, and from loading and unloading materials. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. However, pile driving associated with new bridge construction would result in greater vibrations that would have a wider area of impact.

Vibrations from pile driving can result in two types of potential effects: (a) real damage to property and (b) perception by humans (Transportation Research Board [TRB] 1997:1). For the development of an APE for architectural history properties related to the construction of the proposed NLX line, the primary consideration is real damage to historic properties as a result of vibrations, which can take the form of structural damage, including cracking and breaking of structural elements or ground settlement. Structural damage from impact driving can be minimized or eliminated by alternatives such as vibratory driving, or changing to auger cast (TRB 1997:1). However, for the development of an architectural APE for pile driving, it was assumed that the project will utilize impact driving.

A number of studies have been conducted on the impacts of vibrations and pile installations on adjacent structures, including historic buildings. Studies have been done to determine (a) the maximum safe limits of vibrations that will not result in damage to adjacent structures, including historic buildings, during construction projects, and (b) the area of influence for pile driving that falls within these maximum acceptable vibration limits. Many agencies have established maximum safe limits for vibrations as described below.

Based on its own studies, the non-extant U.S. Bureau of Mines recommended a “safe blasting limit” of 50 millimeters(mm)/second (sec) (2 inches[in]/sec) peak particle velocity (ppv) for mining activity (CTC & Associates and WisDOT RTD Program 2003:2). Given the many inherent similarities in terms of ground-borne vibrations between blasting and pile driving, over time, this maximum limit has also been commonly applied to construction vibration and is widely viewed by many engineers as being stringent enough to prevent damage to most surrounding structures, regardless of age or fragility (CTC & Associates and WisDOT RTD Program 2003:2).

While 50 mm/sec (2 in/sec) is a commonly used, a number of federal agencies and state transportation departments across the country have established significantly lower (more conservative) thresholds for projects subject to their oversight. The National Park Service (NPS) for example has set a maximum limit of 0.2 in/sec (5 mm/sec) ppv for structures that exhibit significant levels of historic architectural importance, or that are in a poor or deteriorated state of maintenance, which is one tenth of 50 mm/sec, and a slightly higher limit of 0.5 in/sec (12 mm/sec) ppv for all other historic sites (Sedovic 1984:59). The Federal Transit Administration (FTA) has established criteria for assessing potential vibration damage to structures based on the type of building construction (Table 1) (FTA 2006).

FIGURE 1. FTA CONSTRUCTION VIBRATION DAMAGE CRITERIA

Building Category	Maximum PPV
I. Reinforced-concrete, steel or timber (no plaster)	0.5 in/sec (12 mm/sec)
II. Engineered concrete and masonry (no plaster)	0.3 in/sec (7 mm/sec)

III. Non-engineered timber and masonry buildings	0.2 in/sec (5 mm/sec)
IV. Buildings extremely susceptible to vibration damage	0.12 in/sec (3 mm/sec)

A number of state departments of transportation have also established standards for projects they build or fund. For example, the California Department of Transportation (Caltrans) has set an "architectural damage risk level" for continuous vibrations (peak vertical particle velocity of 5 mm/sec (0.2 in/sec). For ruins, ancient monuments, and historical buildings and structures in poor condition, Caltrans recommends an even lower upper limit of 2 mm/sec (0.08 in/sec) for continuous vibrations (CTC & Associates and WisDOT RTD Program 2003:2).

Given the geographic area the proposed NLX line will traverse and its developmental history, it is highly probable that a significant percentage of the architectural history resources along the proposed NLX project corridor are non-engineered timber and masonry buildings that are also likely to contain plaster. Since these types of structures are more susceptible to damage from vibrations than engineered and reinforced structures, it is recommended that the APE for architectural history include all areas subject to a ppv of 5 mm/sec (0.2 in/sec) or greater as a result of vibrations related to construction activity, including pile driving to encompass the greatest range of potential vibration impacts to historic structures. This number corresponds with both (a) the NPS's recommended maximum for both deteriorated historic resources and resources with architectural significance, and (b) the FTA's standard for non-engineered timber and masonry buildings. However, in the event that the architectural history survey for the proposed project identifies extremely deteriorated, highly fragile architectural history properties that are eligible for the National Register of Historic Places, it is recommended that a vibration study be completed for these resources and attempts made to limit vibrations in these isolated locations to 3 mm/sec (0.12 in/sec).

When looking at the correlation between distance from the point of impact of pile driving and the potential for damaged to adjacent structures, according to the TRB, experience has shown that "direct damage to structures is not likely to occur at a distance from the pile of (a) more than 15 meters for piles 15 meters long or less, or (b) one pile length for piles longer than 15 meters" (TRB 1997:1). However, the TRB does note that "in few cases has there been direct damage to a structure when the pile driving was done at a distance of at least one pile length from the target (TRB 1997:43). The main exception to the one pile length distance "rule of thumb" guideline is typically related to the settlement of soils densified by vibrations, resulting in settlement that can take place at distances greater than one pile length (TRB 1997:43). To account for the potential presence of loose, clean sands in the zone of influence, the TRB recommends using a zone of influence of up to 400 meters from the pile driving. This distance translates to 1,312.34 ft., or approximately 0.25 mi.

Based on this analysis, it is recommended that an APE of 0.25 mi from the project area be used to account for all potential types of vibrations associated with bridge construction. In areas with sound soil, where a soil survey confirms there is no soil prone to settlement, the APE to account for impacts to architectural resources can be reduced to the length of the longest pile used in this particular area.

Permanent indirect visual effects may vary; however, it is assumed that if the new bridge(s) will be of a similar type, scale, height, and proportion, and constructed of similar materials as the existing parallel bridge, although the new bridge(s) may be visible from some distance, the area that would be significantly affected visually would be somewhat limited. Therefore, an APE of 0.125 mi is recommended. If the design of the new bridge(s) will be out of scale and proportion from the existing parallel bridge(s) and/or is a significantly different type, or constructed of different materials, its visual prominence would affect a larger area and a larger APE may be required.

In summary, the APE for the construction of a new bridge(s) associated with a new parallel track(s) located parallel to existing bridges within an existing railroad ROW assumes that the proposed bridge(s) would be of similar type, design, scale, height, and proportion and constructed of similar materials as the existing parallel bridge(s). Therefore, the APE should include a 0.25 mi buffer around the project area to account for all potential visual effects, as well as account for potential effects to historic properties from potential vibrations related to pile driving during construction. Specific details relating to the construction of new bridges are still being developed and if the design for a proposed new bridge(s) is not of a similar type, scale, height, and proportion, or constructed of similar materials as the existing parallel bridge, a larger APE may be required to account for potential increased indirect visual effects.

Replacing an Existing Bridge/Underpass

This action would entail removal of an existing bridge or underpass and replacing it with a newly constructed bridge or underpass. This alternative would result in both temporary and permanent direct and indirect effects.

Temporary indirect effects would include increases in noise and dust during the construction of the proposed bridge/underpass. Noise associated with bridge/underpass replacement would include noise from demolition and construction activities, increased vehicular traffic bringing materials to the site, and loading and unloading construction materials. While the exact dB levels associated with replacing an existing bridge/underpass has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a replacement bridge/underpass will exceed acceptable levels as established by the State of Minnesota in areas more than 0.125 mi from the project area.

The demolition of the existing bridge/underpass and the construction of a new bridge/underpass would result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading materials, and storage of construction materials and equipment. Dust levels in the air would be intermittent and vary according to atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Therefore, the area that could potentially be adversely affected by increases in dust should be limited to no more than 0.125 mi from the project area.

Permanent effects would include direct physical effects to the existing bridge/underpass due to its removal and to the existing corridor and railroad roadbed, as well as direct vibratory effects to the corridor and other historic properties as a result of changes to the existing corridor. Vibrations associated with replacement bridge/underpass construction could include vibrations from rail-based equipment, trucks, heavy equipment, and from loading and unloading materials, which based on similar projects would be limited to an area 500 ft. from the project area. The demolition of the existing bridge/underpass would result in greater vibrations that would have a wider area of impact; an APE of 0.125 mi from the project area for this action is therefore recommended. However, as indicated in the section above for new bridges, pile driving associated with new bridge/underpass construction would result in greater vibrations that would impact a wider area; therefore, if pile driving is required for construction of the replacement bridge/underpass, an APE of 0.25 mi from the project area is recommended to account for all potential types of vibrations associated with bridge construction.

Permanent effects would also include permanent indirect visual effects; however, the area affected may vary. It is assumed that any replacement bridge will be constructed along the same alignment as the existing bridge and will be of a similar type, scale and design, and utilizes similar materials as the existing bridge and, therefore, the area that would be significantly affected visually would be somewhat limited. Based on similar projects, an APE of 0.125 mi is recommended. However, where a new design is used, its visual prominence could potentially affect a larger area and in these instances a larger APE may be required to account for potential increased indirect visual effects.

In summary, the APE for the removal and replacement of an existing bridge/underpass with a new bridge/underpass within an existing railroad ROW, provided the new bridge/underpass is of a similar

type, scale and design and utilizes similar materials as the existing bridge/underpass, should include a 0.25 mi buffer around the project area to account for all potential direct and indirect effects. Specific details relating to the construction of new bridges are still being developed and if a new design is used for the replacement bridge/underpass, a larger APE may be required to account for potential additional indirect visual effects.

Improving/Upgrading an Existing Bridge

This action would entail improvements and upgrades to existing bridge(s) within a railroad corridor. This alternative could potentially result in both temporary and permanent indirect and direct effects.

Temporary indirect effects would include increases in noise and dust during the construction of the proposed project. Noise associated with bridge improvement/upgrades would include increased noise from construction activities, increased vehicular traffic bringing materials to the site, loading and unloading construction materials, and potentially pile driving. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with bridge improvements/upgrades will exceed acceptable levels as established by the State of Minnesota in areas more than 0.125 mi from the project area.

Improving/upgrading a bridge would also result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading materials, and storage of construction materials and equipment. Dust levels in the air would be intermittent and vary according to atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Since the proposed improvements will not include pier adjustments or pile driving, the area that could potentially be adversely affected by increases in dust should be limited to no more than 0.125 mi from the project area.

Permanent effects would include direct physical effects to the railroad corridor and the improved/upgraded bridge(s) and potential direct vibratory and indirect visual effects to the corridor and other historic properties as a result of changes to the existing corridor. According to information provided by SRF in March 2011, physical changes to the existing bridge(s) within the corridor will not include alterations to the approaches, abutments, cuts, the bridge piers, or to the railroad roadbed. In addition, it is assumed that any changes to the bridge spans will allow the bridges to maintain their appearance and retain a similar type, scale, height, proportion, and materials. Therefore, direct physical effects would be limited to the project area. Vibrations associated with bridge improvements/upgrades could include vibrations from trucks, heavy equipment, rail-based equipment, and from the loading and unloading of materials in the project area. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. However, if pile driving is associated with bridge improvement/upgrades, vibrations from it could potentially result in greater vibrations and impact a wider area than other construction activities. According to information provided SRF in March 2011, proposed bridge improvements would not require significant pier adjustments, if any, and no pile driving is anticipated; therefore, an APE of 500 ft. on either side of the project area is recommended to account for all vibratory effects.

Indirect visual effects may vary; however, it is assumed that the improvements/upgrades to the bridge(s) will allow the bridge to maintain its appearance and retain a similar type, scale, height, proportion, and materials. Therefore, although the improved/upgraded bridge(s) may be visible from some distance in certain locations, the area that would be significantly affected visually would be somewhat limited. In this case an APE of 0.125 mi would be recommended, assuming that the improvements/upgrades to the bridge(s) are in scale and proportion and material types to the existing bridge(s). If the proposed improvements/upgrades include replacement spans that will be of a different type, design, scale, materials, or proportions that the existing spans, a larger APE may be required.

In summary, the APE for improvements and upgrades to existing bridge(s) within a railroad corridor should include a 0.125 mi buffer around the project area, and assumes the existing spans will be improved/upgraded with in-kind materials that would be consistent with the existing bridge(s). If the proposed improvements/upgrades include replacement spans that will be of a different type, design, scale, materials, or proportions that the existing spans, a larger APE may be required.

Using an Existing Alignment

This action would entail utilizing existing tracks along an existing railroad corridor (operation of the line is discussed under the heading: *Operation of the Line*). According to information provided by SRF in March and August 2011, the existing railroad lines contain intact tracks that will be upgraded from a class 3 to a class 5 line. The upgrades can be accomplished through tie replacement and ballast improvements, which can be done as part of line maintenance, utilizing tie replacement trains and ballast placement trains. All work will be performed from the track and would have no impacts outside the existing track bed will be required. This alternative may result in both temporary and permanent direct effects.

Temporary indirect effects would include increases in noise and dust during potential replacement or improvement of existing tracks. Noise associated with potential new tracks may include noise from construction activities; however, since the upgrades will be accomplished using tie and ballast replacement trains, noise effects associated with delivering, loading, and unloading construction materials should be minimal. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a new tracks on an existing alignment will exceed acceptable levels as established by the State of Minnesota in areas more than 500 ft. from the project area.

The use of an existing alignment may result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading of materials. Dust levels in the air associated with this potential activity would be intermittent and would vary depending upon atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Since the repair/replacement of existing tracks will be completed using tie and ballast replacement trains from the existing rail corridor and no changes to grade profiles is proposed, the area that could potentially be adversely affected by increases in dust should be limited to no more than 500 ft. from the project area.

According to information provided by SRF in March and August 2011, the proposed upgrade of the existing alignment will not include any changes to the existing grade or height and profile of the existing track; therefore, permanent visual effects should be relatively minimal and, based on other railroad projects in Minnesota, should be confined to an area within 500 ft. of the project area. Permanent vibratory effects associated with repair or replacement of existing tracks could include vibrations from ground disturbing activity and from rail-based equipment loading and unloading materials in the project area. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. Given the potential range of vibrations, an APE of 500 ft. on either side of the project area would be sufficient to address vibrations associated with the repair or replacement of existing tracks.

In summary, the APE for utilizing existing tracks along an existing railroad corridor should include a 500 foot buffer on either side of the project area.

Operation of the Line

Operation of the line could potentially result in permanent direct and indirect effects to historic properties. Potential permanent direct effects associated with an increase in vibrations from the trains and associated vehicular traffic include impacts to historic properties that could potentially result in their structural degradation and compromise overtime. However, as stated in the assumptions section, the vibrations caused from the operation of high-speed passenger trains, which will have fewer cars and will be lighter in weight, will be less than the existing freight trains. While the operation of the proposed line

will result in increases of train traffic and a slight increase in the frequency of train vibrations, the overall increases will be minimal.

Permanent indirect effects associated with operation of the line include noise due to increased train traffic, and increased vehicular traffic associated with the trains. Additional noise resulting from individual trains (operation and horns), and associated noise such as crossing signals may also potentially result in permanent indirect effects. Noise is typically defined as unwanted or undesirable sound, where sound is characterized by small air pressure fluctuations above and below the atmospheric pressure. The basic parameters of environmental noise that affect human response are (1) intensity or level, (2) frequency content and (3) variation with time (Johnson et al. 2011).

Several federal and state agencies have developed standards for evaluating noise impacts; however, since this project is subject to FRA approval, its criteria were used to determine an APE for noise. The FRA has established allowable noise levels for trains and train horns. The maximum allowed noise level for locomotives manufactured after December 31, 1979 and for moving trains is 90 decibels (dB) (FRA 2000). The minimum noise level for train horns is 96 dB and the maximum is 110 dB (FRA n.d.). As traditional diesel powered train sets, the HSTs will need to adhere to these standards. As noted in the assumptions section, the HSTs will be shorter, lighter and faster than the freight trains that currently utilize the line, so noise from their movement typically will not be greater than existing higher speed freight trains on the proposed line. However, a noise and vibration impact study for the proposed project prepared by Harris Miller Miller & Hanson (HMM&M) in April 2011, notes that an important characteristic of the noise from HSTs is the onset rate of the sound signature, which is the average rate of change of increasing sound pressure level in decibels per second (dB/sec) during a single noise event (Johnson et al. 2011:2). The rapid approach of an HST is accompanied by a sudden increase in noise for a receiver near the tracks. Sounds that have faster onset rates can cause more annoyance than sounds with slower variation or steady noise with the same noise level. The relationship between speed and distance defines locations where the onset rate for high-speed train operations may cause surprise or startle (Johnson et al. 2011:2-3).

According to the study, the maximum speed of the HSTs along the NLX corridor is 110 mph. Based on this speed, the area for potential for surprise or "startle" includes all areas within 22 ft. of the track centerline (Johnson et al. 2011:3).

This study also looked at overall noise impacts using the FRA's criteria, which are "based on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale" (Johnson et al. 2011). The FRA criteria rely on the noise sensitivity levels of different land uses to determine impacts (Table 2). FRA criteria also include two levels of impact: severe impact and moderate impact. A severe impact is when project-generated noise is expected to cause a significant percentage of people to be highly annoyed by the new noise and normally requires mitigation. A moderate impact is when the change in the cumulative noise level is noticeable to most people, but may not be sufficient to cause strong, adverse reactions from the community. In these areas mitigation may or may not be required, depending on other factors, including existing noise levels, predicted level of increase over existing noise levels, the types and numbers of noise-sensitive land uses affected, the noise sensitivity of the properties, the effectiveness of the mitigation measures, community views and the cost of mitigating noise to more acceptable levels (Johnson et al. 2011:6-7).

TABLE 1. LAND USE CATEGORIES AND METRICS FOR HST NOISE IMPACT CRITERIA

Land Use Category	Description of Land Use Category
1	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with

	significant outdoor use.
2	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios and concert halls fall into this category, as well as places for meditation or study associated with cemeteries, monuments and museums. Certain historical sites, parks and recreational facilities are also included.
Source: Johnson et al. 2011, from Federal Railroad Administration, 2005	

Using FRA criteria, the HMM&M study assessed the overall impacts from HST noise using a "source-path-receiver" framework where the "source" generates noise levels that depends on the type of source (e.g., HSTs) and its operating characteristics (e.g., speed), the "receiver" is the noise-sensitive land use (e.g., a house or school) exposed to noise from the source, and the "path" between the source and the receiver is where the noise is reduced by distance, intervening buildings and topography (Johnson et al. 2011). During the study representative sites in sensitive land use areas along the proposed NLX line were monitored to (a) characterize existing baseline noise conditions and (b) determine the level of impact from the proposed project. Monitoring sites ranged from 10 ft. to 474 ft. from the proposed NLX tracks (Johnson et al. 2011). While the study did not specifically look at historic properties, it identified a total of 61 severe noise impacts and 289 moderate noise impacts to sites up to 459 ft. from the proposed NLX tracks (Johnson et al. 1011). Based on this study, at a minimum, the APE should include areas within 459 ft. of the centerlines of the proposed NLX tracks. However, since this study did not specifically consider impacts to historic properties where lower noise levels may be important aspects of their significance and historic integrity, a slightly larger APE is recommended. Therefore, an APE of 500 ft. on either side of the project area is recommended to account for potential impacts from noise related to operation of HSTs to architectural history resources.

In summary, the operation of the line would be a compatible use with the historical and current function of the area and associated rail corridors. Therefore, the APE for operation of the line, separate from the associated new construction, is recommended as 500 ft. on either side of the project area.

Other Associated Features

As noted previously the construction and operation of the proposed line would necessitate the construction of additional facilities such as repair and maintenance buildings; passenger stations; ticket booths; and parking lots. The construction of these associated facilities and their potential effect(s) will be addressed through a separate NEPA process.

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ATTACHMENT B

NLX DOCUMENTATION AND FORMAT GUIDELINES

PURPOSE

The purpose of the NLX program method for evaluation of cultural resources is to describe, in greater detail, how the FRA and MnDOT will implement the Section 106 process for the NLX Corridor and each site specific project and ensure that the identification and evaluation of cultural resources is conducted in accordance with the Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation (Standards and Guidelines) (48 CFR 44716-44742) and 36 CFR 800.4. Historic Properties Surveys conducted in the State of Minnesota will adhere to professional guidance provided in MnSHPO's Manual for Archaeological Projects in Minnesota and Guidelines for History/Architecture Projects in Minnesota, and MnDOT's Cultural Resources Unit Project and Report Requirements, as appropriate. Historic Properties Surveys conducted in the State of Wisconsin will adhere to professional guidance in WisSHPO's Historical and Architectural Survey Manual and the Wisconsin Archaeological survey's Archaeological Survey Guidelines, as appropriate. Historic Properties Surveys that include archaeological investigations in Minnesota and Wisconsin on non-federal publicly owned land shall be conducted under a State Archaeologist's Permit (Minnesota § 138.31-.42 and WIS. § 44.47).

The historic properties that should be identified include any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP) maintained by the Secretary of Interior. This includes artifacts, records, and remains which are related to such district, site, building, structure, or object (16 U.S.C. Section 470(w)(5)). The term includes properties of traditional religious and cultural importance to an Indian Tribe or organization that meet the National Register criteria. Properties eligible for inclusion in the National Register can be properties that are formally determined as such in accordance with regulations of the Secretary of Interior and all other properties that meet the National Register criteria. The level of identification needed varies depending on the nature of the property or property type, the nature of the agency's authority, and the nature of the proposed undertaking's possible effects on the property.

METHODOLOGY FOR IDENTIFICATION OF HISTORIC PROPERTIES

The Area of Potential Effects (APE) would be delineated as described in Stipulation VI.A and Attachment A, using the best professional judgment of the PIs and taking into account historic property sensitivity and the effects that would occur from construction and operation of the undertaking. An APE Map showing the most current engineering available for the undertaking and the boundary delineated by PIs would be submitted to MnSHPO for projects with the potential to affect historic properties in Minnesota, and to WisSHPO for projects with the potential to affect historic properties in Wisconsin. The APE maps will be sent along with the Survey Report (SR). The APE maps would be on an aerial base at an appropriate scale and indicate whether the project is at-grade, elevated, or in tunnel configuration.
In consultation with the MnSHPO, WisSHPO and other parties to the Section 106 process, including Native American tribes, FRA and MnDOT will identify resources, determine eligibility, and treat any adverse effects, as outlined in 36 CFR Part 800 following guidance developed by the National Park Service and in conformance with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation 1983 (48 FR 44716, as amended) as enumerated below:

- To identify known locations of historic properties within the APE, review the records for previously recorded archaeological properties and historic architectural properties at MnSHPO and WisSHPO. Review previous survey technical reports conducted within the APE for historic contexts, bibliography, and determination of significance of sites. Review historic USGS maps. Review properties listed in the National Register of Historic Places and the respective State Registers of Historic Places.

- Review survey findings conducted by local governments, historical societies, or historic preservation organizations, local historic landmark or monument designations, and any other inventories that may help identify or establish the significance of historic properties.
- Review subdivision maps, assessor maps, county/city directories, utility records, building permits, photographs, newspapers, diaries/journals, architectural drawings, Agency Records, Residential- and Commercial-Building Records, oral histories, thesis/dissertations, and preferred local and credible history studies. Research should be conducted with the appropriate agencies, knowledgeable individuals, local and regional historical societies, archives, and libraries.
- Develop relevant historic themes and contexts for the identification and evaluation efforts of historic properties within the APE. Use National Register Bulletin No. 15 for guidance.
- Employ standard archaeological inventory methods. Conduct presence/absence testing, if necessary, in areas where subsurface remains may be present. For resources that cannot be avoided conduct test excavations to determine resource significance in accordance with the research design.
- Consult with interested Native American Tribe(s) and other cultural groups to identify and evaluate any potential TCPs and cultural landscapes that could be affected by the project following the methods outlined in the National Register Bulletin 38 and the Secretary of the Interior's Standards for the Treatment of Historic Properties, respectively.
- Perform an intensive survey to identify, record, and evaluate architectural properties adjacent to the proposed alignment, stations and support facilities built within the time period identified in the plan to document and inventory all historic buildings, structures, objects, districts, and cultural landscapes in sufficient detail to permit evaluation for the NRHP (per Section 106 of the NHPA). Use field maps at an appropriate scale that have delineated parcel boundaries, APE boundaries, Assessor Parcel Numbers (APNs), street names, prominent natural and man-made features, and previously recorded sites. Documentation and evaluation efforts will follow the guidelines of National Register Bulletin No. 15. Private spaces (i.e., building interiors), suburban backyards, and restricted areas will not be surveyed. Surveys will occur from public vantage points, and if access is infeasible, then the property will be evaluated solely on available information or right-of-entry will be coordinated by MnDOT.

TECHNICAL REPORTS

- After completion of the archaeological and historic architectural research, inventories and evaluations, and tribal consultations prepare reports to document the findings and identification effort, and if any historic properties are identified for an undertaking, prepare a report to analyze the effects of the undertaking. Technical reports will be submitted to MnSHPO for undertakings with the potential to affect historic properties in the State of Minnesota. Technical Reports will be submitted to WisSHPO for undertakings with the potential to affect historic properties in the State of Wisconsin. All submittals to MnSHPO and WisSHPO shall be in paper format

ATTACHMENT C

REQUESTS FOR TRIBAL CONSULTATION

Mr. Mike Wiggins, Jr., Chairperson
Bad River Band of Lake Superior Chippewa

Ms. Edith Leoso, THPO
Bad River Band of Lake Superior Chippewa Indians of Wisconsin

Mr. Kevin Leecy, Chairman
Bois Forte Reservation Tribal Council

Mr. Anthony Reider, President
Flandreau Santee Sioux

Ms. Karen Diver, Chairwoman
Fond du Lac Band of Lake Superior Chippewa

Mr. Mike Alloway, Tribal Office
Forest County Potawatomi Community of Wisconsin

Mr. A.T. Stafne, Tribal Chair
Fort Peck Tribes

Mr. Curley Youpee, Director
Cultural Resources Department
Fort Peck Tribes

Ms. Vicky Raske, THPO
Grand Portage Band of Chippewa Indians

Mr. Norman Des Champe, Chairman
Grand Portage Band of Chippewa Indians

Mr. Warren Swartz, President
Keweenaw Bay Indian Community

Mr. Gordon Thayer, Chairperson
Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin

Mr. Jerry Smith, THPO
Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin

Mr. Tom Maulson, President
Lac du Flambeau Band of Lake Superior Chippewa Indians of Wisconsin

Ms. Melinda Young, THPO
Lac du Flambeau Band of Lake Superior Chippewa Indians of Wisconsin

Ms. giiwegiizhigookway Martin, THPO
Lac Vieux Desert Band
Ketegitigaaning Ojibwe Nation

Mr. Arthur LaRose, Chairman
Leech Lake Band of Ojibwe

Mr. Gabe Prescott, Chairman
Lower Sioux Indian Community

Mr. Dave Grignon, THPO
Menominee Indian Tribe of Wisconsin

Ms. Marge Anderson, Chief Executive
Mille Lacs Band of Ojibwe

Ms. NatalieWeyaus, THPO
Mille Lacs Band of Ojibwe

Mr. Leroy Spang, Chairperson
Northern Cheyenne Tribe

Ms. Victoria Winfrey, President
Prairie Island Community Council

Mr. Steve Ortiz, Chairman
Prairie Band Potawatomi Nation

Ms. Rose Gurnoe-Soulier, Chairperson
Red Cliff Band of Lake Superior Chippewa Indians

Mr. Larry Balber, THPO
Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin

Mr. Floyd Jourdain Jr., Chairman
Red Lake Band of Chippewa Indians

Mr. Jonathan Buffalo, NAGPRA Rep.
Sac and Fox of the Mississippi in Iowa

Ms. Jane Nioce
Sac and Fox Nation of Missouri in Kansas and Nebraska

Ms. Sandra Massey, NAGPRA Rep.
Sac and Fox Nation of Oklahoma

Mr. Roger Trudell, Chairperson
Santee Sioux Nation

Mr. Stanley Crooks, Chairperson
Shakopee Mdewakanton Sioux Community

Mr. Robert Shepherd, Chairperson
Sisseton-Wahpeton Oyate of the Lake Traverse Reservation

Cultural Resource Director
Sokaogon Chippewa Community
Mole Lake Band

Mr. Garland McGeshick, Chairman
Sokaogon Chippewa Mole Lake Band

Mr. Roger Yankton, Sr., Chairperson
Spirit Lake Tribe Nation

Waste'Win Young, THPO
Standing Rock Sioux Tribe

Mr. Stuart Bearheart, Chairman
St. Croix Chippewa Indians of Wisconsin

Wanda McFaggen, THPO
St. Croix Band Chippewa Indians of Wisconsin

Tex G. Hall, Chairman
Three Affiliated Tribes

Mr. Kade Farres, THPO
Turtle Mountain Band of Chippewa

Kevin Jensvold, Chairman
Upper Sioux Indian Community

Burney Tibbetts, Director of Transportation
White Earth Band of Minnesota Chippewa

Dr. Erma Vizenor, Chairwoman
White Earth Band of Minnesota Chippewa

Tom McCauley, THPO
White Earth Band of Minnesota Chippewa

Ms. Rosemary Berens, THPO
Bois Forte Band (Nett Lake) of the MN Chippewa Tribe

Mr. James B. "JB" Weston, THPO
Flandreau Santee Sioux

Mr. LeRoy DeFoe, THPO
Fond du Lac Band of Lake Superior Chippewa

Mr. Harold “Gus” Frank, Chairman
Forest County Potawatomi Community of Wisconsin

Ms. Summer Sky Cohen, THPO
Keweenaw Bay Indian Community

Ms. Gina M. Lemon, THPO
Leech Lake Band of Ojibwe

Mr. Anthony Morse, THPO
Lower Sioux Indian Community

Mr. Conrad Fisher, THPO
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