Basic Sheet 4
Environmental Factors Matrix

FACTORS	EFFECTS				
	Adverse	Benefit	None Identified	Factor Sheet Attached	Note: Comments should be of a summary nature and should not extensively duplicate information contained in an attached factor sheet. If an "adverse" effect is permanent, a factor sheet must be attached. If an "adverse" effect is temporary, it must be explained on this sheet under "comments". If "None Identified" is indicated, explain why. **Comments**
A. ECONOMIC FACTORS					
A-1 General Economics	☐	☐	☐	☐	
A-2 Business	☐	☐	☐	☐	
A-3 Agriculture	☐	☐	☐	☐	
B. SOCIAL/CULTURAL FACTORS					
B-1 Community or Residential	☐	☐	☐	☐	
B-2 Indirect Effects	☐	☐	☐	☐	This factor sheet is currently being developed. At this time, address these issues in other factor sheets.
B-3 Cumulative Effects	☐	☐	☐	☐	This factor sheet is currently being developed. At this time, address these issues in other factor sheets.
B-4 Environmental Justice	☐	☐	☐	☐	
B-5 Historic Resources	☐	☐	☐	☐	
B-6 Archaeological Sites	☐	☐	☐	☐	
B-7 Tribal Issues	☐	☐	☐	☐	
B-8 Section 4(f) and 6(f) or Other Unique Areas	☐	☐	☐	☐	
B-9 Aesthetics	☐	☐	☐	☐	
C. NATURAL SYSTEM FACTORS					
C-1 Wetlands	☐	☐	☐	☐	
C-2 Rivers, Streams and Floodplains	☐	☐	☐	☐	
C-3 Lakes or Other Open Water	☐	☐	☐	☐	
C-4 Groundwater, Wells, and Springs	☐	☐	☐	☐	
C-5 Upland Wildlife and Habitat	☐	☐	☐	☐	
C-6 Coastal Zones	☐	☐	☐	☐	
C-7 Threatened and Endangered Species	☐	☐	☐	☐	
D. PHYSICAL FACTORS					

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D-1 Air Quality	☐	☐	☐	☐	
D-2 Construction Stage Sound Quality	☐	☐	☐	☐	
D-3 Traffic Noise	☐	☐	☐	☐	
D-4 Hazardous Substances or Contamination	☐	☐	☐	☐	
D-5 Stormwater	☐	☐	☐	☐	
D-6 Erosion Control	☐	☐	☐	☐	
E. OTHER FACTORS					
E-1	☐	☐	☐		
E-2	☐	☐	☐		

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Basic Sheet 8
Environmental Commitments

Identify and describe any commitments made to protect the environment. Indicate when the commitment should be implemented and who in WisDOT will have jurisdiction to assure fulfillment for each commitment. Note if the commitment will be recorded in the plans, "special provisions", "notes to construction" or some other written format. Note if the commitment is mandated by law, and therefore legally binding.

Commitments on Basic Sheet 8 supplement environmental commitments incorporated in WisDOT's Standard Specifications for Highway and Bridge Construction.

ATTACH A COPY OF THIS PAGE TO THE DESIGN STUDY REPORT AND THE PS&E SUBMITTAL PACKAGE

Factors	Commitments
A-1 General Economics	
A-2 Business	
A-3 Agriculture	
B-1 Community or Residential	
B-2 Indirect Effects	
B-3 Cumulative Effects	
B-4 Environmental Justice	
B-5 Historic Resources	
B-6 Archaeological Sites	
B-7 Tribal Issues	
B-8 Section 4(f) and 6(f) or Other Unique Areas	
B-9 Aesthetics	
C-1 Wetlands	
C-2 Rivers, Streams & Floodplains	
C-3 Lakes or other Open Water	
C-4 Groundwater, Wells and springs	
C-5 Upland Wildlife and Habitat	
C-6 Coastal Zones	
C-7 Threatened and Endangered Species	
D-1 Air Quality	
D-2 Construction Stage Sound Quality	Check all that apply: _ (box) WisDOT Standard Specification 107.8(6) and 108.7.1 will apply. _ (box) Special construction stage noise abatement measures will be required. Describe:
D-3 Traffic Noise	
D-4 Hazardous Substances or Contamination	
D-5 Stormwater	
D-6 Erosion Control	
E Other	

CONSTRUCTION STAGE SOUND QUALITY EVALUATION

Wisconsin Department of Transportation

Factor Sheet D-2

Alternative	Total Length of Center Line of Existing Roadway Length of This Alternative
Preferred ☐ Yes ☐ No ☐ None Identified	

1. **Identify and describe residences, schools, libraries, or other noise sensitive areas near the proposed action and which will be in use during construction of the proposed action. Include the number of persons potentially affected:**

2. **Describe the types of construction equipment to be used on the project. Discuss the expected severity of noise levels including the frequency and duration of any anticipated high noise levels:**

   The noise generated by construction equipment will vary greatly, depending on equipment type/model/make, duration of operation and specific type of work effort. However, typical noise levels may occur in the 67 to 107 dBA range at a distance of 50 feet.

3. **Describe the construction stage noise abatement measures to minimize identified adverse noise effects. Check all that apply:**
   - ☐ WisDOT Standard Specifications 107.8(6) and 108.7.1 will apply.
   - ☐ WisDOT Standard Specifications 107.8(6) and 108.7.1 will apply with the exception that the hours of operation requiring the engineer's written approval for operations will be changed to _____ P.M. until _____A.M.
   - ☐ Special construction stage noise abatement measures will be required. Describe:

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TRAFFIC NOISE EVALUATION

Wisconsin Department of Transportation

Factor Sheet D-3

Alternative	Total Length of Center Line of Existing Roadway Length of This Alternative
Preferred ☐ Yes ☐ No ☐ None Identified	

1. Need for Sound Level Analysis:

Is the proposed action considered a Type I project or WisDOT Retrofit Project per FDM 23-10-1?

☐ No – Complete only Factor Sheet D-2, Construction Stage Sound Quality Evaluation.

☐ Yes – Complete Factor Sheet D-2, Construction Stage Sound Quality Evaluation, and the rest of this sheet.

2. Traffic Data:

Indicate whether traffic volumes for sound prediction are different from the Design Hourly Volume (DHV) on Basic Sheet 6, Traffic Summary Matrix:

☐ No

☐ Yes – Indicate volumes and explain why they were used:

Automobiles	Veh/hr
Trucks	Veh/hr
Or Percentage (T)	%

3. Sound Level Analysis Technique

Identify and describe the noise analysis technique or program used to identify existing and future sound levels: (See attached receptor location map as Exhibit). A receptor location map must be included with this document.

4. Sensitive Receptors

Identify sensitive receptors, e.g., schools, libraries, hospitals, residences, etc. potentially affected by traffic sound: (See attached receptor location map – Exhibit).

5. Noise Impacts

If this proposal is implemented will future sound levels produce a noise impact?

☐ No

☐ Yes - The impact will occur because:

- ☐ The Noise Level Criteria (NLC) is approached (1 dBA less than the NLC) or exceeded.
- ☐ Existing sound levels will increase by 15 dBA or more.

6. Abatement

Will traffic noise abatement measures be implemented?

☐ Not applicable – Traffic noise impacts will not occur.

☐ No – Traffic noise abatement is not reasonable or feasible (explain why). In areas currently undeveloped, local units of government shall be notified of predicted sound levels for land use planning purposes. **A COPY OF THIS WRITTEN NOTIFICATION SHALL BE INCLUDED WITH THE FINAL ENVIRONMENTAL DOCUMENT.**

☐ Yes – Traffic noise abatement has been determined to be feasible and reasonable. Describe any traffic noise abatement measures which are proposed to be implemented. Explain how it will be determined whether or not those measures will be implemented:

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			Sound Level L_{eq}[1] (dBA)			Impact Evaluation		
Receptor Location or Site Identification (See attached map) (a)	Distance from C/L of Near Lane to Receptor in feet (ft.) (b)	Number of Families or People Typical of this Receptor Site (c)	Noise Level Criteria[2] (NLC) (d)	Future Sound Level (e)	Existing Sound Level (f)	Difference in Future and Existing Sound Levels (Col. e minus Col. f) (g)	Difference in Future Sound Levels and Noise Level Criteria (Col. e minus Col. d) (h)	Impact[3] or No Impact (i)

[1] Use whole numbers only.
[2] Insert the actual Noise Level Criteria from FDM 23-30, Table 1.
[3] An impact occurs when future sound levels exceed existing sound levels by 15 dB or more, **or**, future sound levels approach or exceed the Noise Level Criteria ("approach" is defined as 1 dB less than the Noise Level Criteria, therefore an impact occurs when Column (h) is –1 dB or greater). I = Impact, N = No Impact.

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Typical A-Weighted Sound Levels

Sound Source	Sound Level	Subjective Response
	140 dBA	(Threshold of Pain)
Military Jet Takeoff with after-burner at 50'	130 dBA	
Rock and Roll Band	120 dBA	(Uncomfortably Loud)
Jet Fly-Over at 1000'	110 dBA	
Power Lawn Mower Operator	100 dBA	(Very Loud)
Diesel Truck (55 mph) at 50'	90 dBA	
High Urban Ambient Sound Automobile (55 mph) at 50'	80 dBA	(Moderately Loud)
TV-Audio, Vacuum Cleaner	70 dBA	
Normal Conversation	60 dBA	
	50 dBA	(Quiet)
Lower Limit Urban Ambient Sound	40 dBA	
Unoccupied Broadcast Studio	30 dBA	(Very Quiet)
	20 dBA	
	10 dBA	
	0 dBA	(Threshold of Hearing)

Sources: Noise Assessment Guidelines Technical Background, HUD Report No. TE/NA 172

Handbook of Noise Control, C.M. Harris, 1979.

FHWA Highway Traffic Noise Prediction Model, FHWA-RD-77-108, 1978.