

for water supply replacement. The replacement will include re-drilling new water wells or providing public water supplies where possible.

4.2.3 Surface Water Quality

4.2.3.1 Methodology

A characterization of the existing conditions of project area streams has been accomplished through a combination of existing data compilation and field observation. Initial streams inventory mapping was prepared using USGS quadrangle mapping and project area mapping, as well as SPC and PADEP stream inventories. These data sources were evaluated and combined into a Phase I stream inventory in GIS.

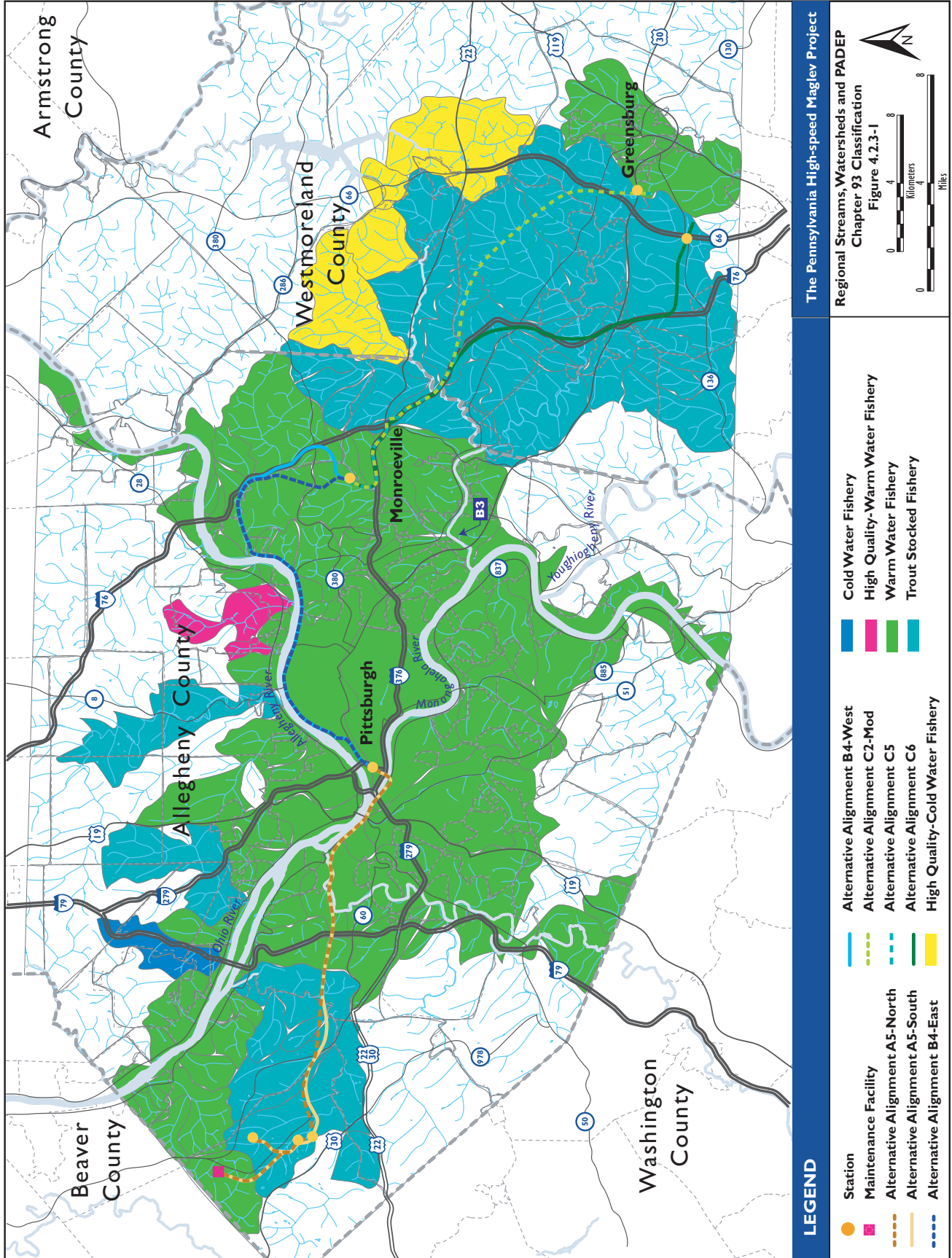
Figure 4.2.3-1 presents the PADEP *Chapter 93 Water Quality Standards* classifications for the project region streams. *Chapter 93* sets forth water quality standards for surface waters of the Commonwealth that are based upon water uses that are to be protected and will be considered by PADEP in its regulation of discharges.

Following the Phase I stream inventory, field investigations were conducted to update, refine, and supplement existing data. Field investigations were conducted within a 91-meter (300-foot) corridor for each alternative centerline, any preliminary cut areas that extended beyond the 91-meter (300-foot) corridor, all station locations, and roadway improvement areas.

Field investigations included mapping watercourses not identified in the Phase I stream inventory and collecting physical and biological data on all watercourses within the study area. Data forms were prepared for each stream during the field investigations. Physical characteristics recorded during the field investigations included substrate types, average depths and widths, flow conditions, pollution, pools and riffles, and bank conditions. Biological characteristics recorded during the field investigations included visual observation of fish species and benthic macroinvertebrates. Additionally, macroinvertebrates, identified to the order level and their relative abundance, were recorded on the data forms.

Perennial and intermittent watercourses were classified according to the definitions set forth in the *PA Code Title 25, Chapter 87 Surface Mining of Coal*. According to *Chapter 87*, an intermittent stream is defined as “a body of water flowing in a channel or bed composed primarily of substrates associated with flowing waters” and at certain times of the year “is below the local water table and obtains its flow from both surface water runoff and groundwater discharge.” A perennial stream is defined as “a body of water flowing in a channel or bed composed primarily of substrates associated with flowing waters” and “in the absence of pollution or other man-made stream disturbances, is capable of supporting a benthic community composed of two or more recognizable taxonomic groups of organisms.” Additionally, all streams were mapped and included in a Phase II stream inventory.

Field investigations for the project were performed from February to August of 2002. As a result of these field investigations, several hundred stream segments were identified and evaluated within the project study area. A stream segment is the portion of a stream that exists within the project study area. Due to the large number of streams and the potential for multiple crossings of the same stream by the same alignment or different alignments, stream investigations have been conducted on a stream segment basis and not by watercourse. When a



stream was crossed by an impact zone more than once and the distance between the stream crossings was greater than 10 meters (32 feet), two stream segments were recorded in the impact assessment. When a stream was crossed twice by an impact zone and the distance between the two stream crossings was less than 10 meters (32 feet), the impacts were addressed as one stream segment. The impact analysis addresses the stream impacts by discussing the stations and alignments together and roadway improvements separately.

4.2.3.2 Impact Analysis

Based on the nature of this project, stream impacts are not expected to be extensive. The vast majority of the streams would be spanned because the guideway is elevated, although stream impacts are expected to occur from pier placement and infrastructure development. Temporary impacts from construction are also expected. Exact locations of piers and engineering cuts for roadway infrastructure are not known at this time but will be identified during final design (after approval of the FEIS and identification of a selected alternative). Due to the size of the corridor and magnitude of the project, specific locations of piers cannot be identified until final design. Various pier and beam configurations, however, would be possible as a means of avoidance and minimization. Consequently, the potential impact zone is being used to provide a consistent means to describe potential stream involvements in these areas.

Construction activities associated with the project may either temporarily or permanently impact surface waters within the project impact zones. Impacts to surface waters would be minimized to the extent possible. The following paragraphs present the types of impacts surface waters could incur as a result of the project.

Within Sections A, B, and C surface waters would be permanently impacted as a result of construction activities. Headwater streams within proposed cut areas would be permanently impacted by excavation activities for the project. Surface waters originating above cut areas would be directed into top-of-slope diversion ditches that parallel cut areas to the extent possible. Pier placement would permanently occupy surface water and benthic habitat. Although pier locations are not available at this stage of the project, permanent impacts resulting from in-stream pier placement would be avoided to the extent possible. Surface water hydraulics and existing habitat types may be permanently altered by culvert placement, diversion ditches, stream relocations, and storm water management facilities for the project.

Within Sections A, B, and C temporary surface water impacts may include, but would not be limited to: in-stream construction activities, installation of temporary cofferdams, and creation of diversion channels. Silt from the construction site has the opportunity to migrate into surface waters, thereby elevating turbidity and sedimentation within the affected streams. Temporary surface water impacts would be minimized to the extent possible by implementing best management practices and an approved Erosion & Sedimentation (E&S) Plan.

No-Build Alternative

The No-Build Alternative would not result in any immediate impacts to the region's streams and surface waters. In the past, however, few major transportation projects have avoided the area's stream courses altogether because the entire Pittsburgh area is located in the dissected Appalachian Plateau. The Appalachian Plateau is a physiographic province characterized by angular ridges and broad stream valleys. As a result of the area's underlying geology

and dissected topography, future transportation improvements would likely have an impact on area streams.

Build Alternatives

Section A

The impact zone for Alternative Alignment A5-North contains 49 stream segments. These stream segments include 44 perennial stream segments totaling 2,666 meters (8,747 feet) and five intermittent stream segments totaling 162 meters (530 feet). The impact zone for the Alternative Alignment A5-North roadway improvements contains 5 stream segments. These stream segments are all perennial stream segments. They total 145 meters (475 feet).

The impact zone for Alternative Alignment A5-South contains 47 stream segments. These stream segments include 40 perennial stream segments totaling 2,037 meters (6,684 feet) and seven intermittent stream segments totaling 156 meters (513 feet). The stream impacts for the Alternative Alignment A5-South roadway improvements are the same as those for Alternative Alignment A5-North.

Table 4.2.3-1 presents a breakdown for perennial and intermittent streams by alignment, including the PIA and Steel Plaza stations and roadway improvements, in accordance with PADEP *Chapter 93 Water Quality Standards* for perennial and intermittent streams.

Table 4.2.3-1 Stream Impacts: Section A

Stream Classification	A5-North		A5-South	
	Alignment and Stations	Roadway Improvements	Alignment and Stations	Roadway Improvements
Perennial				
Number of Segments Impacted	44	5	40	5
Length of Impact in m (ft)	2666 (8747)	145 (475)	2037 (6684)	145 (475)
Intermittent				
Number of Segments Impacted	5	0	7	0
Length of Impact in m (ft)	162 (530)	0 (0)	156 (513)	0 (0)

Section B

The impact zone for Alternative Alignment B4-East contains 19 stream segments. These stream segments include 16 perennial stream segments totaling 426 meters (1,398 feet) and three intermittent stream segments totaling 99 meters (325 feet). The impact zone for the Alternative Alignment B4-East roadway improvements contains 12 stream segments. These stream segments include nine perennial stream segments totaling 801 meters (2,627 feet) and three intermittent stream segments totaling 86 meters (283 feet).

The impact zone for Alternative Alignment B4-West contains 15 stream segments. These stream segments include 14 perennial stream segments totaling 337 meters (1,105 feet) and one intermittent stream segment totaling 2 meters (6 feet). The stream impacts for the Alternative Alignment B4-West roadway improvements are the same as those for Alternative Alignment B4-East.

Table 4.2.3-2 presents a breakdown for perennial and intermittent streams by alignment, including the Thompson Run station and roadway improvements, in accordance with PADEP *Chapter 93 Water Quality Standards* for perennial and intermittent streams.

Table 4.2.3-2 Stream Impacts: Section B

Stream Classification	B4-East		B4-West	
	Alignment and Station	Roadway Improvements	Alignment and Station	Roadway Improvements
<i>Perennial</i>				
Number of Segments Impacted	16	9	14	9
Length of Impact in m (ft)	426 (1398)	801 (2627)	337 (1105)	801 (2627)
<i>Intermittent</i>				
Number of Segments Impacted	3	3	1	3
Length of Impact in m (ft)	99 (325)	86 (283)	2 (6)	86 (283)

Section C

The impact zone for Alternative Alignment C2-Mod contains 43 stream segments, which include 34 perennial stream segments totaling 1,274 meters (4,181 feet) and nine intermittent stream segments totaling 233 meters (765 feet). The stream impacts for the Alternative Alignment C2-Mod roadway improvements consist of one intermittent stream segment totaling 74 meters (244 feet).

The impact zone for Alternative Alignment C5 contains 50 stream segments. These stream segments include 38 perennial stream segments totaling 1,639 meters (5,377 feet) and 12 intermittent stream segments totaling 439 meters (1,441 feet). The stream impacts for the Alternative Alignment C5 roadway improvements are the same as those for Alternative Alignment C2-Mod.

The impact zone for Alternative Alignment C6 contains 43 stream segments. These stream segments include 29 perennial stream segments totaling 1,581 meters (5,188 feet) and 14 intermittent stream segments totaling 476 meters (1,563 feet). The stream impacts for the Alternative Alignment C6 roadway improvements include one stream segment. This stream segment is a perennial stream segment totaling 38 meters (125 feet).

Table 4.2.3-3 presents a breakdown for perennial and intermittent streams by alignment, including the Greengate Mall and Toll Route 66/PA Route 136 stations and roadway improvements, in accordance with PADEP *Chapter 93 Water Quality Standards* for perennial and intermittent streams.

Table 4.2.3-3 Stream Impacts: Section C

Stream Classification	C2-Mod		C5		C6	
	Alignment and Station	Roadway Improvements	Alignment and Station	Roadway Improvements	Alignment and Station	Roadway Improvements
<i>Perennial</i>						
Number of Segments Impacted	34	0	38	0	29	1
Length of Impact in m (ft)	1274 (4181)	0 (0)	1639 (5377)	0 (0)	1581 (5188)	38 (125)
<i>Intermittent</i>						
Number of Segments Impacted	9	1	12	1	14	0
Length of Impact in m(ft)	233 (765)	74 (244)	439 (1441)	74 (244)	476 (1563)	0 (0)

4.2.3.3 Summary

Impact zone tabulations for all three sections have been defined for the portions of stream segments potentially affected but could not account for pier placements to avoid/minimize potential stream impacts. Therefore, it should be noted that the potential stream impacts presented are “worst case” and would not be as extensive as presented or as extensive as impacts from a comparable highway project.

The No-Build Alternative would not result in any immediate impacts to the region’s streams and surface waters. For Section A, Alternative Alignment A5-South would impact the least amount of surface water, which includes 2,037 meters (6,684 feet) of perennial streams, 156 meters (513 feet) of intermittent stream, and 145 meters (475 feet) of perennial streams in the roadway improvement areas. For Section B, Alternative Alignment B4-West would impact the least amount of surface water, which includes 337 meters (1,105 feet) of perennial streams and 2 meters (6 feet) of intermittent streams, and 801 meters (2,627 feet) of perennial streams and 86 meters (283 feet) of intermittent streams in the roadway improvement areas. For Section C, Alternative Alignment C2-Mod would impact the least amount of surface water, which would include 1,274 meters (4,181 feet) of perennial streams, 233 meters (765 feet) of intermittent streams, and 74 meters (244 feet) of intermittent streams in the roadway improvement areas.

4.2.3.4 Mitigation

Avoidance and minimization measures have been considered during the development of the preliminary project design. In order to further reduce or avoid potential impacts to water quality and aquatic biota, the following recommendations will be considered and undertaken, where applicable, during final design and construction. Continued coordination with the PFBC, PADEP, USEPA, USFWS, and the USCOE regarding these recommendations will be on-going throughout the course of the project.

- Locate project structures out of streams and floodways to the extent possible;
- Minimize the linear distance of streams impacted at each crossing;
- Implement an approved E&S Plan that would prevent sediment deposition to aquatic habitats;
- Native, noninvasive species will be used to re-vegetate all disturbed areas to prevent accelerated erosion;
- Construct all cofferdams, causeways, and temporary crossings from rock fill and other approved materials;
- Minimize the need for in-stream work by heavy equipment;
- Develop project sequencing to facilitate in-stream work during periods of seasonal low flow;
- Designate and construct all storm water management facilities to prevent or minimize runoff resulting in erosion and sedimentation;
- Coordinate design and construction of relocated channels with agency personnel; and
- Develop a stream mitigation plan through coordination with the PFBC, PADEP, and USCOE. Measures to be included within the plan may include, but are not limited to: bank stabilization, water quality improvements, and habitat improvement projects.

- Best Management Practices (BMPs) for avoiding and minimizing stream impacts (temporary and permanent) will be developed in coordination with the appropriate resource agencies. The BMPs will be implemented during construction.

4.3 Noise

The FRA procedures and guidance used for assessing potential noise impacts from high-speed ground transportation projects are found in the FRA report, *High-Speed Ground Transportation Noise and Vibration Impact Assessment* (U.S. DOT, December 1998). Additional guidance is provided in the *Transit Noise and Vibration Impact Assessment* (USDOT, April 1995).

The assessment of potential noise impacts found in this section includes a quantitative analysis of noise sources associated with proposed maglev operations and a qualitative assessment of the noise influence from fixed facilities such as storage/maintenance yards, passenger stations, terminals, parking facilities, and substations.

4.3.1 Methodology

The noise analysis began with the initial noise evaluation. During this phase of the analysis, all noise-sensitive land uses within the project area were identified and characterized within one of three specific land use categories. Complete descriptions of these categories are shown on Figure 4.3.1-1.

Following the identification of noise-sensitive land uses within the 212-meter (700-foot) study corridor, the analysis continued with a general noise evaluation. Noise monitoring was conducted at approximately 300 representative locations along the alternative alignments to establish existing noise levels throughout the study area. In accordance with FRA procedures, Land Use Categories 1 and 3

were monitored for 15-minute periods during peak noise hours to estimate existing peak-hour average noise levels (L_{eq}). Category 2 land uses were monitored for 1-hour periods and noise levels were projected to represent existing 24-hour levels (L_{dn}).

Projections of future noise levels were developed from field data, estimated maglev noise emission rates, and likely operating conditions. Estimates of the likely operating conditions were based on schedule, peak-hour volumes for a three-vehicle consist, daytime/night-

Land Use Category	Noise Metric* (dBA)	Description of Land Use Category
1	Outdoor $L_{eq}(h)$ **	Tracks of land where quiet is an essential element in their intended purpose (e.g., outdoor amphitheaters, concert pavilions, and National Historic Landmarks).
2	Outdoor $L_{dn}(h)$	Residences and buildings where people normally sleep (e.g., homes, hospitals, and hotels).
3	Outdoor $L_{eq}(h)$ **	Institutional land uses with primarily daytime and evening use (e.g., schools, libraries, churches, medical offices, conference rooms, recording studios, concert halls), cemeteries, monuments, museums, certain historical sites, parks, and other recreational facilities
<p>*Onset-rate adjusted sound levels (L_{eq} and L_{dn}) are to be used where applicable. **L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity. SOURCE: High-Speed Ground Transportation Noise and Vibration Impact Assessment (FRA, 1998).</p>		
<p>The Pennsylvania High-speed Maglev Project</p>		
<p>Land Use Categories for High Speed Rail Noise Impacts Figure 4.3.1-1</p>		