



# **Potential Impacts to the Natural Environment**

**December 10, 2002**

**Partners' Roundtable Meeting  
West Windsor Senior Center  
West Windsor, New Jersey**

# Presentation Outline

- **Overview & Description of Objectives & Performance Measures (J. Carnegie)**
  - Question & Answer
- **Summary of Findings & Observations by Objective & Performance Measure (L. Roche)**
  - Question & Answer
- **Summary of Findings & Observations by Major Component (L. Roche)**
  - Question & Answer
- **Discussion**

The background image shows a street scene with a railroad crossing sign on the left, a bus, and a car. The scene is slightly faded. The railroad crossing sign has the text 'RAILROAD' and 'CROSSING' on it. The bus has a sign that says 'Tickets 4'.

# ***OVERVIEW***

# Critical Questions

1. How would the alternatives affect traffic and circulation patterns?
2. How would the alternatives affect the natural environment?
3. How would the alternatives affect the built environment?

# DEIS Areas of Impact

## Traffic & Circulation

Growth in congestion

Travel delay

East-west traffic flow

Balance of east-west traffic

Change in traffic patterns

Change in truck traffic

## Natural Environment

Wetlands

Flood plains

Upland vegetation habitat

Groundwater recharge

Underlying geology

## Built Environment

Cultural resources

Residential neighborhoods

Preserved open space,  
parks & recreational areas

Institutional & business  
communities

# Purpose of Presentation

- To review preliminary findings and observations relative to how the alternatives would impact the natural environment.
  - Findings & observations by objective (performance measures)
  - Findings & observations by major component

# Presentation Tools

- **Table 1:** Summary of Potential Impacts to the Natural Environment -- (*Comparative symbols*)
- **Table 2:** Summary of Potential Impacts to the Natural Environment -- (*Data*)
- **Other:**
  - List of project Goals and Objectives
  - Alignment graphics for each alternative with wetlands, waterbodies, flood plains and upland vegetation
  - Glossary of Terms
  - Table of Alternative Major Components




# Presentation Tool Design

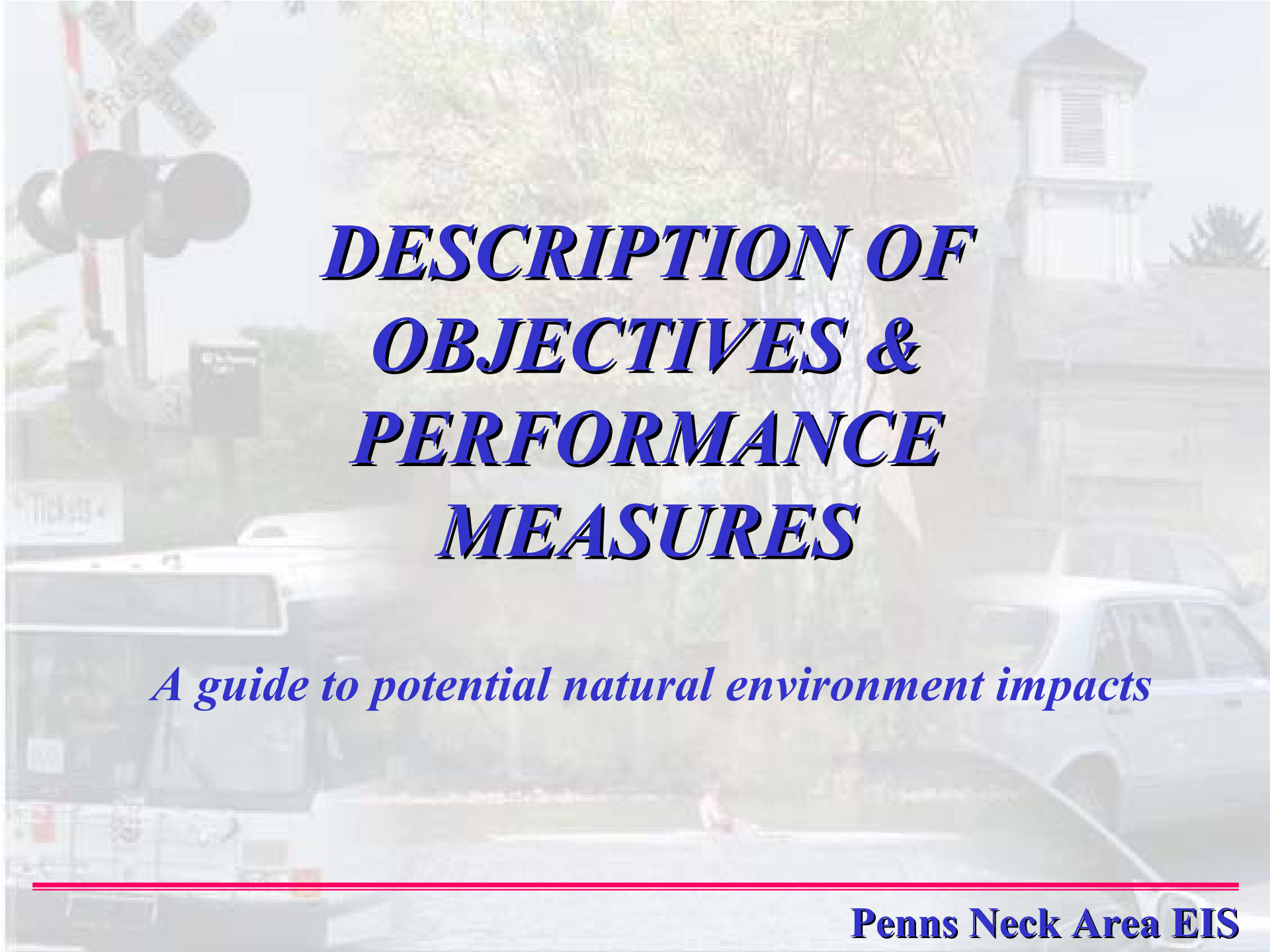
**Project Goals & Objectives**

**Performance Measure**  
(e.g., acres of wetlands disturbed)

**Data**  
(Table 2)

**Comparative Scale**

				
<b>Best</b>	<b>Better</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>



***DESCRIPTION OF  
OBJECTIVES &  
PERFORMANCE  
MEASURES***

*A guide to potential natural environment impacts*




# **Objective 1: Protects wetlands and avoids habitat fragmentation**

- **Performance Measures:**

- Potential changes to aquatic habitat
  - Acres of permanent wetlands disturbance
  - Percent reduction in study area wetlands
  - Acres of shading of the Millstone River and Little Bear Brook
- Potential changes to upland vegetation habitat, including permanent disturbance to:
  - Upland forest
  - Agricultural fields
  - Landscaped lawn/athletic fields
- Potential for habitat fragmentation
- Potential impacts to threatened and endangered species

## Objective 1: Protects wetlands and avoids habitat fragmentation (cont)






- Performance Scale for Objective 1a, wetlands disturbance:

SCALE FOR OBJECTIVE 1a		
Acres of disturbance		
		
<b>Best</b> <b>&lt; 0.5</b>	<b>Good</b> <b>0.5 - 1.0</b>	<b>Poor</b> <b>&gt; 1.0</b>

- Raw data presented for percent reduction in study area wetlands and acres of shading of the Millstone River and Little Bear Brook.

## Objective 1: Protects wetlands and avoids habitat fragmentation (cont)

- Performance Scale for Objective 1b, upland vegetation disturbance:

SCALE FOR OBJECTIVE 1b & 2a				
Acres of disturbance				
				
<b>Best</b>	<b>Better</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
<b>&lt; 1</b>	<b>1-2</b>	<b>2-4</b>	<b>4-6</b>	<b>&gt; 6</b>

## **Objective 1: Protects wetlands and avoids habitat fragmentation (cont)**

- **Performance Scale for Objective 1c, potential for habitat fragmentation:**
  - **YES** – The alternative would bisect or fragment a wetland and/or area of high quality upland wildlife habitat.
  - **SOME** – The alternative would impact a wetland or upland habitat; however, the impact would occur on the periphery of the habitat, in an isolated area, or in an area not considered high quality wildlife habitat.
  - **NO** – The alternative would be constructed within or adjacent to existing developed areas and/or in an area that provides low quality wildlife habitat.

## **Objective 1: Protects wetlands and avoids habitat fragmentation (cont)**

- **Performance Scale for Objective 1d, potential for impact to threatened and endangered species:**
  - **YES** – Documented presence of threatened or endangered species and/or potential habitat for threatened or endangered species.
  - **NO** – No documented presence of threatened or endangered species and no potential habitat for threatened or endangered species.






## **Objective 2: Protects against flooding and encourages groundwater recharge**

- **Performance Measures:**

- Acres of permanent flood plain disturbance
  - Percent reduction in study area flood plains
- Potential reduction in study area groundwater recharge capability
  - Increase in impervious surface
  - Percent reduction in study area groundwater recharge capability
- Whether a stormwater management plan to control the volume and rate of runoff is required by statute or regulation

## Objective 2: Protects against flooding and encourages groundwater recharge (cont)

- Performance scale for 2a, flood plain disturbance:

SCALE FOR OBJECTIVE 1b & 2a				
Acres of disturbance				
				
<b>Best</b> < 1	<b>Better</b> 1-2	<b>Good</b> 2-4	<b>Fair</b> 4-6	<b>Poor</b> > 6

- Raw data presented for percent reduction in study area flood plains.

## **Objective 2: Protects against flooding and encourages groundwater recharge (cont)**

- **No Performance Scale for 2b, increase in impervious surface and reduction in study area groundwater recharge – Raw data presented.**
- **Performance Scale for Objective 2c, stormwater management plan required:**
  - **YES** – Stormwater management plan required.
  - **NO** – No stormwater management plan required.



## **Objective 3: Preserves/improves water quality in the Millstone River watershed and D&R Canal**

- **Performance Measure:**

- *Hold pending results of local area water quality sampling study.*

- **Performance Scale:**

- *Hold pending results of local area water quality sampling study.*

The background of the slide is a faded photograph of a street scene. On the left, a school bus is partially visible with a license plate that reads "TICK 4134". In the center, there are trees and a fence. On the right, a large, multi-story building with a prominent tower or steeple is visible, likely a school building. The overall scene is slightly out of focus and has a light, hazy appearance.

## **Objective 4: Considers impacts to underlying geological conditions**

- **Performance Measure:**

- Volume of rock (cubic yards) material that would have to be excavated and removed to accommodate construction of Route 1 in-a-cut.

- **No Performance Scale – Raw data presented**

The background image shows a street scene with a railroad crossing sign on the left, a bus in the foreground, and a car on the right. The scene is slightly faded and serves as a backdrop for the title text.

# ***PRELIMINARY FINDINGS & OBSERVATIONS***

# Analysis Methods

- Wetland, flood plain, and upland vegetation impacts were derived by overlaying each alternative on maps with these parameters delineated, and calculating the impact areas in the AutoCad drafting system.
- Groundwater recharge quantities were derived using NJDEP's *Method for Evaluating Groundwater Recharge Areas in New Jersey*. This method involves overlaying the alternatives on land use, vegetation, and soil cover maps, and applying NJDEP-specified calculations based on these composite overlays to estimate recharge capability.
- Rock excavation quantities were calculated based on conceptual engineering estimates of roadway width and depth. The depth to bedrock was taken from existing soil boring records.



***Findings summarized by:***

***Objective/Performance  
Measure***

# Objective 1: Protects wetlands and avoids habitat fragmentation

- **Aquatic habitat (wetlands & waterbodies)**

- There are 245 acres of wetlands located within the study area. Wetlands within the study area are likely to be categorized as having intermediate resource value according to NJDEP freshwater wetlands rules.

- All alternatives would result in permanent wetlands disturbance ranging from 0.06 acres (C-series) to 0.51 acres (Alts. A.3 & A.4). This represents a 0.02% to 0.21% reduction in study area wetlands.

- C and G-series alternatives are the best performers with 0.06 and 0.10 acres of disturbance respectively.
- Alternatives A.3 and A.4 are the worst performers with 0.51 acres of disturbance.

## **Objective 1: Protects wetlands and avoids habitat fragmentation (cont)**

- **Aquatic habitat (wetlands & waterbodies)**
  - All alternatives would increase shading of the Millstone River aquatic habitat by 0.08 acres.
  - All alternatives, except the C and G-series alternatives, would introduce 0.08 acres of new shading to the aquatic habitat of Little Bear Brook.

## **Objective 1: Protects wetlands and avoids habitat fragmentation (cont)**

- **Upland vegetation habitat**
  - There are three primary types of upland vegetation habitat present within the study area:
    - **Upland forest** – High quality
    - **Agricultural fields** – Moderate quality
    - **Landscaped lawn/athletic fields** – Low quality

# Objective 1: Protects wetlands and avoids habitat fragmentation (cont)

- **Upland vegetation habitat**

- All alternatives would result in permanent disturbance to upland vegetation habitat ranging from 1.34 acres (Alt. G.2) to 19.54 acres (Alt. B.2).

- Upland Forest - Alternative G.2 is the best performer with zero acres of disturbance. Alternatives E and F.1 are the worst performers with 5.8 and 5.83 acres of disturbance respectively.
- Agricultural fields - The G-series and Alternative C.1 are the best performers with 0.36 and 0.76 acres of disturbance respectively. Alternative B.2 is the worst performer with 5.61 acres of disturbance.
- Landscaped lawn/athletic fields - The G-series alternatives are the best performers with 0.98 acres of disturbance. Alternatives B and B.1 are the worst performers with 9.44 acres of disturbance.

## **Objective 1: Protects wetlands and avoids habitat fragmentation (cont)**

- **Habitat fragmentation**

- The A, B, D, and F-series alternatives and Alternative E would bisect the Little Bear Brook wetland corridor and the adjacent upland forest. As such, these alternatives would fragment comparatively high quality wildlife habitat.
- Given the configuration of Alternative C, it would result in some fragmentation to moderate quality wildlife habitat.
- Given the configuration of Alternative C.1 and the G-series alternatives, these alternatives are not likely to result in habitat fragmentation.

## **Objective 1: Protects wetlands and avoids habitat fragmentation (cont)**

- **Threatened and endangered species**
  - According to the U.S. Fish and Wildlife Service and the NJ Department of Environmental Protection, there are no known threatened or endangered species located within or near the study area.
  - Field investigations indicate that areas directly impacted by the alternatives do not appear to contain unique or suitable habitat for threatened or endangered species.

## **Objective 2: Protects against flooding and encourages groundwater recharge**

- **Flood plains**

- There are 821.2 acres of flood plains in the study area.
- All alternatives would result in permanent flood plain disturbance ranging from 0.63 acres (Alt. G.2) to 4.1 acres (Alts. B & B.1). This represents a reduction of between 0.08% and 0.5% in total study area flood plains.
  - The C-series, and Alternatives G and G.2 are the best performers with less than 1 acre of flood plain disturbance.
  - Alternatives A.3 and A.4 and the B and F-series alternatives are the worst performers with approximately 4 acres of flood plain disturbance.

## **Objective 2: Protects against flooding and encourages groundwater recharge (cont)**

- **Impervious surface and groundwater recharge**
  - The study area contains a total of 3,060.5 acres. Current groundwater recharge capability within the study area is estimated to be 530.5 million gallons per year (mgy).
  - The alternatives would result in 3.24 acres (Alt. G.2) to 32.77 acres (Alt. B.2) of new road-related impervious surface in the study area.
  - All alternatives would reduce study area groundwater recharge capability by 0.90 (Alt. G) to 9.19 (Alt. B.2) mgy. This represents a 0.17% to 1.73% reduction in annual groundwater recharge potential.

## **Objective 4: Considers impacts to underlying geological conditions**

- Preliminary soil boring investigations in the vicinity of Washington Road indicate that:
  - Depth to bedrock averages 16 feet below grade.
  - Depth to groundwater level averages 21 feet below grade.
  - Bedrock materials are fractured and weathered, which would facilitate excavation and removal.

## **Objective 4: Considers impacts to underlying geological conditions (cont)**

- Based on preliminary soil boring data:
  - The A and F-series alternatives and Alternatives E and D.1 would require the excavation and removal of approximately 48,400 cubic yards of rock material.
  - Alternative D would require the excavation and removal of approximately 87,700 cubic yards of rock material.
  - The B, C and G-series alternatives would not impact underlying geological formations.



***Findings summarized by:***

***Major Component of the  
Alternatives***

## Route 1 in-a-cut

- Those alternatives that include Route 1 in-a-cut would result in disturbance of underlying geological formations in the vicinity of Washington Road.
  - The A and F-series alternatives and Alternatives E and D.1 would require the excavation and removal of approximately 48,400 cubic yards of rock material.
  - Alternative D would require the excavation and removal of approximately 87,700 cubic yards of rock material.

## East-side connector road

- Those alternatives that include an east-side connector road would result in the following impacts to wetlands and flood plains associated with the Little Bear Brook stream corridor and adjacent contiguous upland forest:
  - 0.11 acres of permanent wetlands disturbance;
  - 0.08 acres of new shading of the Little Bear Brook aquatic habitat;
  - 2.38 acres of permanent flood plain disturbance; and
  - Fragmentation of contiguous upland forest in the vicinity of the Little Bear Brook stream corridor.
- Given the impacts to wetlands and upland forest in the vicinity of Little Bear Brook, it appears that those alternatives that include an east-side connector road would fragment comparatively high quality wildlife habitat.

## West-side connector roads

- All west-side connector road options, except the indirect connector road to Harrison Street included in Alternative E would impact wetlands and flood plains associated with the Millstone River in the vicinity of Harrison Street where it crosses the D&R Canal.
- The indirect connector road to Harrison Street included in Alternative D.1 would impact wetlands and flood plains associated with the Millstone River in the vicinity of Logan Drive.
- Potential impacts to upland vegetation caused by the west-side connector road options, including the connector between Washington Rd and Alexander Rd, would be limited to permanent disturbance of moderate to low quality wildlife habitat including, peripheral/isolated upland forest, agricultural fields, and/or athletic fields.

## Vaughn Drive connector road

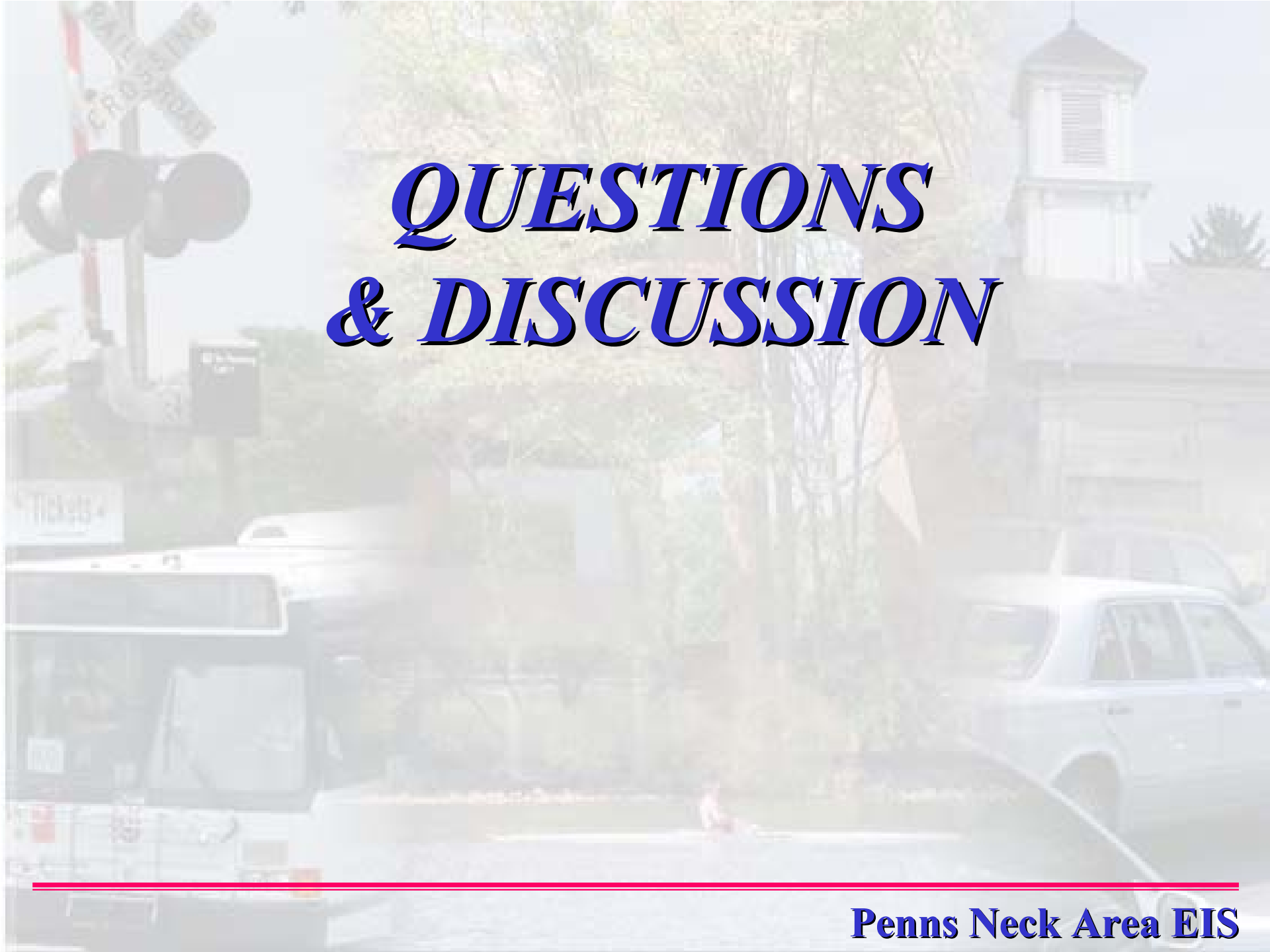
- The Vaughn Drive connector road (VDC) alignments would result in no impact to wetlands, waterbodies, or flood plains.
- VDC 1 would:
  - increase impervious surface by 7.33 acres;
  - reduce study area recharge by 1.99 mgy; and
  - impact 2.74 acres of peripheral upland forest adjacent to CR571. This would not result in habitat fragmentation.
- VDC 2 would:
  - increase impervious surface by 8.61 acres;
  - reduce study area recharge by 1.76 mgy; and
  - impact 2.80 acres of peripheral upland forest adjacent to CR571. This would not result in habitat fragmentation.

## Vaughn Drive connector road (cont)

- VDC 3 would:
  - increase impervious surface by 9.15 acres;
  - reduce study area recharge by 1.92 mgy; and
  - impact 3.23 acres of peripheral upland forest adjacent to CR571. This would not result in habitat fragmentation.

## Additional qualitative assessments

- The configuration of the diamond interchange included in Alternatives A.3 and A.4 would result in comparatively greater impacts to the Millstone River and associated wetlands and flood plains in the vicinity of the Route 1 – Harrison Street intersection.
- Those alternatives that include eastern and/or western frontage road(s) increase impervious surface in areas identified as having moderate to high groundwater recharge capability.

The background of the slide is a faded, light-colored photograph of a street scene. On the left, a railroad crossing sign is visible with the text 'RAILROAD CROSSING' and 'CR 100 ROAD'. Below the sign, a white bus is partially visible. In the center, there are trees and a brick building. On the right, a white car is parked. The overall scene is bright and somewhat washed out.

# ***QUESTIONS & DISCUSSION***