

# WILL THE TRAINS RUN AND THE TOILET FLUSH IN TIMES OF ACUTE STRESSES AND SHOCKS. HOW TO INCREASE RESILIENCY A SYSTEMS APPROACH.

2017 APWA – Fredericksburg Conference

Scott A. Smith, PE, LS

## Learning Objectives

- Define resilience in the context of the service that is being provided. Not just the what but the why.
- Understand the human equation, it is about the people.
- What are the alternatives to delivering service.

## Overview

Resiliency is the ability of a system to respond to acute stresses and shocks. Resiliency measures for mass transit and utilities require an examination of what services are provided, why are the services needed and what are the alternatives in case of disruption.

## What are the purposes of the systems?

### Transit

- Move people from point A to B

### Utilities (Water and Sewer)

#### Water

- Deliver clean, safe drinking water.
- Provide for fire protection

#### Sewer

- Provide adequate capacity in the system to take waste out of the home.

## Why do we need these systems?

### Transit

- Affordable reliable transportation
- Environmentally friendly
- Reduces congestion

### Utilities (Water and Sewer)

- Convenience
- Public Health
- Public Safety

## Are there Alternative Delivery Methods.

### Transit

- Clearly Identify Emergency Service routes that will operate in inclement weather.
- Safe pedestrian corridors along routes.
- Buses to back up trains
- Communication system – alert people in advance of disruption of service. Identify alternatives if available.
- Alternate pick up/drop off sites.

### Utilities (Water and Sewer)

- Identify conservation plans.
- Provide redundancy in power and pumping.
- Build in storage to the system.
- Communication – alerts to when the system is stressed. Identify water quality safety concerns. Identify measures to help through the crisis.
- Provide bottled water or sites where safe water is available.
- Pump & Haul.

## In summary

- Define resilience in the context of the service that is being provided. Not just the what but the why.
  - Resiliency is the ability of a system to respond to acute stresses and shocks.
- Understand the human equation, it is about the people.
  - Where are people going, why is the system important to them.
- What are the alternatives to delivering service.
  - Alternate routes
  - Alternate supply/disposal

## Questions?

### Contact information

Scott A. Smith, PE, LS  
Coastal Resiliency Manager  
Office of Resiliency  
501 Boush Street  
Norfolk, VA 23510  
757-449-2602 ext. 228  
Scott.smith@Norfolk.gov