Haxton Way Pedestrian Pathway Solar Lighting Project

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Lummi Nation
Lummi Reservation

- 13,000 upland acres
- 43% of the reservation
- 105 roads totaling 65 miles
- 90% of reservation roads are County owned and maintained
Haxton Way

- Rural Major Collector
- 6.6 mile long primary access route
Haxton Way Pedestrian Pathway

- Eastside
- Separated from main roadway

Comprised of:
- 1600 ft. raised boardwalk
- 7000 ft. asphalt/limestone trail
- 1000 ft. concrete path w/ curb and gutter
- Two bridges (93 ft and 58 ft)

Total Length - Approx. 9751 lineal ft
Why was the pathway constructed?

- Safety
- No shoulders, sidewalks, or bike lanes in project area
- High rate of pedestrian/bicyclist/motor vehicle accidents
- Access to destinations
- Exercise
- Kwina Rd/Haxton Wy Master Planning
- 16 fatal accidents on Haxton Way
  - 7 pedestrians
  - 7 driver/passengers
  - 2 bicyclists
- 7 fatalities in project area
- 76 property damage accidents on Haxton Way during this same time period
2007 Interlocal Agreement between Whatcom County and Lummi Nation

- Phase 1:
  - 8-inch pavement edge striping
  - Rumble strips

- Phase 2:
  - Separated pedestrian/bicycle pathway
Funding Sources

- USDOT Federal Highways- IRR
- USDOT Federal Highways-ARRA
- WSDOT-Highways and Local Programs
- WSDOT- Highways and Local Programs-ARRA
- Bureau of Indian Affairs-IRR
- Whatcom County
- Lummi Indian Business Council

Total Project Costs- Approx. $4.2 million
The original speed limit on Haxton Way in the vicinity of the pathway was 50 mph.

Without a speed reduction guardrails would be required.

The ROW acquisition and design did not include guardrails.

Reduction of speed from 50 to 35 mph required County Council approval—Passed in May 2009.
Project Cost Impacts

- Redesigns
- Stream Mitigation - WA Dept of Fish and Wildlife
- Wetland Mitigation - Army Corps of Engineers
Construction Timeline

- 8 month construction project (March-November 2010)
Construction Timeline

- Two bridges were installed over existing waterways
- Weathering steel material designed to minimize maintenance
Raised boardwalk and helical anchor foundation system installed to minimize impacts to wetland areas
Installation of concrete, curb, gutter, and asphalt/limestone pavement occurred along different sections of the pathway.
Solar Lighting

- Final piece of the puzzle
- Ensure pedestrians feel safe during dusk to dawn hours
- Not to interfere with main roadway users
Solar Lighting Specifications

- 70 solar lights installed by Late January 2011
- 100 foot intervals
- Posts to resist wind speeds of 110 miles/hr
- Lights were required to provide a minimum 0.2 foot-candles average from dusk to dawn and meet IESNA (Illuminating Engineering Society of North America) guidelines
Why Solar Lighting?

- Lower initial installation costs compared to hard wired lighting
  - Environmental Constraints
  - Distance from grid
  - High trenching costs
- Lower lifetime costs
  - Less Maintenance
  - No monthly electric bills
- Environmentally Friendly
- Availability of government funding for renewable technology
- Copper theft is a concern
Solar Lighting Costs

Cost Comparison of Solar vs. Hardwired Street Lights

- **Total Haxton Solar Lighting Cost:** $527,000
- **Per Unit Cost:** $7529

Based on (1) Light Unit

- **Equipment Purchase/Installation:**
  - Street Light w/high trenching cost: $9,800
  - Street Light w/average trenching cost: $6,150
  - Carmanah EverGEN 1700: $5,500

- **Maintenance & Electricity/10 Yr:**
  - Street Light w/high trenching cost: $7,500
  - Street Light w/average trenching cost: $5,500
  - Carmanah EverGEN 1700: $150
Solar Panels

- Solar panel efficiency - the percentage of power converted from absorbed light to electrical energy. The performance and dependability of the entire system relies upon the energy collected from the panel.

- There are three types of solar panels:
  1) Monocrystalline: 14-19% efficient
  2) Polycrystalline: 10-14% efficient
  3) Thin Film: 5-11% efficient

- EverGEN 1700 are monocrystalline panels with an efficiency of 19%

- Both solar panels and LED’s estimated to last 20+ years
Operating Profile

- Allows owner to specify how and when light should be applied to reduce size and cost of solar lighting system
- Operating profiles can be either:
  - Conservative - dimming light during times the facility usage is less
  - Progressive - using occupancy sensing to apply light as needed

* Haxton Way utilized a combination of both types
Advanced Occupancy Sensing

- **Types:**
  - *Full Network Activation:* One light senses motion triggering all the other lights in the network to switch from low to high, or from on to off
  - *Set Distance Activation (utilized on Haxton Way Path):* One light senses motion triggering other lights within a specified distance to switch from low to high, or from off to on, to follow motion through a site
    - 100% lumen output when motion detected, otherwise on at 25% during dusk to dawn

- **Self-contained unit which utilizes GPS and wireless radio waves to communicate**

- **Benefits**
  - Conserves energy when lights do not need to remain on for long durations
  - Increases lifespan of solar lighting system
Batteries

- The most important characteristic of the battery is the number of charge-discharge cycles it can deliver rather than the initial battery capacity.

- The number of cycles a battery can provide is determined by:
  - Depth of discharge-determined by how lighting system is configured including the operating profile
  - Ambient Temperature-high temperatures overcharge the battery while low temperatures undercharge

- EverGEN 1700 utilizes (2) batteries that are rated for 4,000 cycles to 20% depth of discharge regulated at 20 degrees C.

- Batteries estimated to last 10 years
Installation

1) Stage and assemble

2) Lift into place

3) Orient and adjust
Miscellaneous Benefits

- All components of solar lighting unit are recyclable including battery
- LED’s are “Dark-Sky friendly” helping to reduce light pollution
Public Satisfaction

- Since the new pathway has opened there overwhelming support.
- The end result has been a highly used, multi-purpose trail system which provides safe travel for pedestrians and bicyclists and eliminates the source of much of the accident history along Haxton Way.
Awards

- Awarded “Best Safety Project 2010” by the Northwest Region Bureau of Indian Affairs Indian Reservation Road Program

- Nominated for the 2011 Federal Highway Administration (FHWA) and Washington State Department of Transportation (WSDOT)- Best Special Project Award
Hy'shqoe, Thank You
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