Description
- CTDOT inspects 5,394 roadway bridges, 1,795 of which are National Bridge Inventory (NBI) structures on the National Highway System (NHS).
- 4,028 of these bridges are state maintained; the remaining 1,366 are maintained locally or under another jurisdiction.
- CTDOT defines a bridge as a crossing of at least six feet in length, including culverts.
- The Federal Highway Administration (FHWA) defines an NBI bridge as a structure measuring more than 20 feet in length.
- CTDOT has a distinct Major Bridge Program for large or expensive-to-replace bridges. 60 structures are currently categorized as Major Bridges.

State of Good Repair (SOGR)
A bridge for which the condition rating for each of the three major components for a span bridge (Substructure, Deck, and Superstructure) or the structural condition of a culvert is rated at least a 5 on a 0-9 condition scale is classified as being in a SOGR.

Bridge Age
The average NHS-NBI bridge in Connecticut is 53 years old, which is 9 years older than the national average of 44 years. The state has a high percentage of Poor bridges (by deck area) compared to the national average.

NHS-NBI Inventory and Condition
Federal Requirements
- Good 3,862,580 ft²
  14.7% of deck area on NHS-NBI bridges is in good condition (393 bridges).
  [NBI condition ratings of 7, 8, or 9]
- Fair 19,439,639 ft²
  73.7% of deck area on NHS-NBI bridges is in fair condition (1,329 bridges).
  [NBI condition ratings of 5 or 6]
- Poor 3,054,816 ft²
  11.6% of deck area on NHS-NBI bridges is in poor condition (73 bridges).
  [NBI condition ratings of 0, 1, 2, 3, or 4]
As of 1/1/18, Poor=SD

CTDOT-Maintained Inventory and Condition
State Goals
- State of Good Repair 3,844 bridges
  95.4% of CTDOT-maintained state bridges are in good or fair condition
  [NBI condition ratings of 5 or higher]
- Poor 184 bridges
  4.6% of CTDOT-maintained state bridges are in poor condition
  [NBI condition ratings of 4 or lower]

History
Based on National Data available from FHWA LTBP InfoBridge
Connecticut Transportation Asset Management Plan

Bridge

NHS-NBI Bridge Performance Projections

Federal Requirements for deck area for 1,795 NHS-NBI bridges

<table>
<thead>
<tr>
<th>End of Year</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHS Good (by deck area)</td>
<td>14.3%</td>
<td>15.0%</td>
<td>14.9%</td>
<td>14.9%</td>
<td>14.9%</td>
<td>&gt;20.0%</td>
</tr>
<tr>
<td>NHS Poor (by deck area)</td>
<td>7.5%</td>
<td>6.7%</td>
<td>6.2%</td>
<td>5.4%</td>
<td>4.7%</td>
<td>&lt;10.0%</td>
</tr>
</tbody>
</table>

CTDOT-Maintained Bridge Performance Projections

State Goals by number of bridges for 4,028 CTDOT-maintained bridges

<table>
<thead>
<tr>
<th>End of Year</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOGR</td>
<td>96.8%</td>
<td>97.0%</td>
<td>97.4%</td>
<td>97.8%</td>
<td>98.0%</td>
<td>95.0%</td>
</tr>
</tbody>
</table>

Performance Projections

The chart on the left depicts bridge condition for various funding scenarios. These were developed through an analysis program using CTDOT bridge condition data, as of May 2020.

Asset Valuation

$14,945,774,020

Asset value is estimated using the replacement value. For bridges, replacement value is the product of deck area and unit construction cost. For 4,028 bridges: 34,757,614 sqft * $430/sqft = $14.9 billion.

Measures and Targets

CTDOT has set the following bridge condition goals:

Federal Requirements:
- 10% or less Poor by deck area on NHS-NBI bridges (Federal minimum is less than 10% Poor)
- 20% or more Good by deck area on NHS-NBI bridges

State Goal:
- 95% or more of State-Maintained bridges in a SOGR (State target)
Description

- There are 3,719 centerline miles of state-maintained routes and roads in Connecticut, 1,405 of which are on the National Highway System (NHS), including 346 Interstate miles.
- There are another 17,419 centerline miles of town maintained roads, 56 of which are on the NHS.
- 70.9% of CTDOT maintained roadways are flexible (asphalt) pavements, 28.7% are composite pavements (asphalt over concrete), and 0.4% are rigid (concrete) pavements.

State of Good Repair (SOGR)

A pavement section for which the Pavement Condition Index (PCI) is 6 or greater is classified as being in a State of Good Repair (SOGR). The PCI is based on cracking, rutting, drainage disintegration, and ride. FHWA uses different condition measures for NHS pavements.

Pavement Age

The average Connecticut NHS pavement structure was constructed 44.8 years ago, and the average surface age is 7.8 years old.
NHS Pavement Performance Projections

Federal Requirements by lane miles for 4,964 lane miles of NHS pavement

Interstate Roadways
Non-Interstate NHS Roadways

% Good (by lane miles)
- Preferred Funding ($450M)
- Current Funding ($130M)
- No Funding ($0M)
- Actual Conditions

% Poor (by lane miles)
- Preferred Funding ($450M)
- Current Funding ($130M)
- No Funding ($0M)
- Actual Conditions

Performance Projections at Current Funding Level ($130M Budget)

End of Year | 2020 | 2021 | 2022 | 2023 | 2024 Goal
--- | --- | --- | --- | --- | ---
 Interstate Good | 74.2% | 75.1% | 73.9% | 72.8% | 52.2% | 75.0%
 Interstate Poor | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | <5.0%
 Non-Int NHS Good | 38.1% | 36.4% | 33.1% | 27.0% | 15.2% | 50.0%
 Non-Int NHS Poor | 1.5% | 1.7% | 2.1% | 2.4% | 3.0% | <8.0%

CTDOT-Maintained Pavement Performance Projections

State Goals by centerline miles for 3,719 centerline miles

Performance Projections at Current Funding Level ($130M Budget)

End of Year | 2020 | 2021 | 2022 | 2023 | 2024 Goal
--- | --- | --- | --- | --- | ---
 SOGR | 66.7% | 62.3% | 58.7% | 53.9% | 49.4% | 80.0%

Performance Projections

The charts on the left depict pavement condition for various funding scenarios. These were developed through an analysis program using CTDOT pavement deterioration curves as of 2019.

Asset Valuation

$10,972,500,000

Asset value is estimated using the replacement value. For pavements, replacement value is the product of pavement area (SY) and unit construction cost. For 3,719 centerline miles of pavement: 104.5 million SY * $105/SY = $10.97 Billion

Measures and Targets

CTDOT has set the following pavement condition goals:

Federal Requirements:
- Interstate: 75% good condition and less than 5% poor condition (Federal minimum is less than 5% poor)
- Non-Interstate: 50% good condition and less than 8% poor condition

State Goal:
- 80% or more of State-maintained pavements in a SOGR (State)
**Description**

- CTDOT is currently responsible for maintaining 2,786 State-owned traffic signals:
  - 2,560 Traditional Traffic signals
  - 226 Overhead flashing beacons
- Of the 2,560 traditional traffic signals, 958 are part of 111 computerized traffic signal systems.
- CTDOT defines a traffic signal unit as all traffic control equipment at a given intersection or location.
- There are an additional 278 independent signs with flashers that are managed as part of the sign asset.

**State of Good Repair (SOGR)**

The State of Good Repair for traffic signals is determined to be 25 years of life based on expectations of controller and signal head life. Major component upgrades improve operation and safety of traffic signals but are not reflected in SOGR calculations.

**Traffic Signal Age**

- 31.7% of traffic signals are older than 25 years
- 1.4% of traffic signals are older than 50 years

**Traffic Signal Inventory and Condition**

**State Goals**

- **Good**
  - 884 Locations
  - 31.7% are in Good condition (0-15 years old)
- **Fair**
  - 1,018 Locations
  - 36.6% are in Fair condition (16-25 years old)
- **Poor**
  - 884 Locations
  - 31.7% are in Poor condition (26+ years old)

Based on CTDOT 3/26/20 Snapshot

**History**

**Distribution of Traffic Signal Locations by Year Installed or Replaced**

- 0.4% of traffic signals were installed or replaced in the 1950's
- 1.0% in the 1960's
- 3.2% in the 1970's
- 10.4% in the 1980's
- 36.6% in the 1990's
- 29.6% in the 2000's
- 18.8% in the 2010's

*Note that numbers do not include major upgrades such as 98 accessible pedestrian signals added in the 2010's.

Based on CTDOT 2020 Snapshot
Connecticut Transportation Asset Management Plan

Traffic Signals

Traffic Signals Performance Projections
State Goals by traffic signal for 2,786 traffic signals

Projected Performance at Current Funding Level ($16M Budget thru 2021, $46M after)

<table>
<thead>
<tr>
<th>End of Year</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOGR</td>
<td>70.1%</td>
<td>66.3%</td>
<td>64.0%</td>
<td>62.3%</td>
<td>61.2%</td>
<td>80.0%</td>
</tr>
</tbody>
</table>

Note: $10M of budget in 2022, 2023, and 2024 is designated for safety upgrades to existing equipment that do not affect SOGR rating.

Performance Projections

In order to maintain a State of Good Repair, roughly 160 traffic signals need replacement each year. Currently, approximately 55-75 traffic signals are replaced each year. Of those, 45-60 signals are programmed under the signal replacement program and 10-15 signals are replaced under other state projects annually.

Asset Valuation

$676,900,000

Asset value is estimated using the replacement value. For traffic signals, replacement value is the product of traffic signal and unit construction cost. For 2,560 traffic signals: 2,560 * $260,000 = $665,600,000 For 226 Overhead flashing beacons: 226 * $50,000 = $11,300,000

Measures and Targets

There are no Federal requirements at this time. CTDOT has set the following traffic signal condition goal:

State Goal:
• 80% or more of state owned traffic signals in a SOGR
Description

- CTDOT is responsible for maintaining approximately 248,000 signs (regulatory, warning, and guide) that are located on State owned and maintained roadways.
- CTDOT defines a sign as a panel attached to a post(s) or sign structure and a sign assembly as the combination of sign panel(s) and their post(s), support, or sign structure at a single location.
- Overhead sign supports and foundations are managed as a separate asset.

State of Good Repair (SOGR)

A sign installed within 17 years is classified as being in a State of Good Repair. This is based on expectations of retroreflectivity life. Retroreflectivity is a measure of the amount of light reflected by a surface back to the source of the light.

Sign Age

- Nearly 60% of all signs have exceeded their expected sign life or effective service life.
- 36% of signs on limited access roadways are older than 25 years.

Sign Inventory and Condition

State Goals

<table>
<thead>
<tr>
<th>Category</th>
<th>Total Signs</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited Access</td>
<td>48,015</td>
<td>21,825</td>
<td>1,455</td>
<td>24,735</td>
</tr>
<tr>
<td>Non-Limited Access</td>
<td>199,985</td>
<td>53,987</td>
<td>23,472</td>
<td>122,526</td>
</tr>
</tbody>
</table>

Note: revised inventory to remove duplicates from route overlaps – inventory validation still in progress.

History

Distribution of Limited Access Signs by Year Built

- 10% of signs are in Good condition (0-12 years old).
- 27% of signs are in Fair condition (13-17 years old).
- 15% of signs are in Poor condition (18+ years old).

Based on CTDOT 2013 inventory, with 2019 updates.

Based on CTDOT 2020 Snapshot.
Limited Access Signs Performance Projections

State Goals by limited access roadway sign for 48,015 signs

<table>
<thead>
<tr>
<th>End of Year</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOGR</td>
<td>39.4%</td>
<td>42.4%</td>
<td>51.5%</td>
<td>57.6%</td>
<td>69.7%</td>
<td>80.0%</td>
</tr>
</tbody>
</table>

Non-Limited Access Signs Performance Projections

State Goals by non-limited access roadway sign for 199,985 signs

<table>
<thead>
<tr>
<th>End of Year</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOGR</td>
<td>38.70%</td>
<td>40.40%</td>
<td>42.00%</td>
<td>43.70%</td>
<td>45.30%</td>
<td>70.0%</td>
</tr>
</tbody>
</table>

Performance Projections

In order to maintain a State of Good Repair, nearly 14,600 signs need replacement each year. Currently, approximately 5,000 signs are replaced each year.

Asset Valuation

$171,356,290

Asset value is estimated using the replacement value. For signs, replacement value is the product of square footage and unit construction cost.

Note: This value does not include the cost of overhead sign supports and foundations.

Measures and Targets

There are no Federal requirements at this time. CTDOT has set the following sign condition goals:

State Goals:
- 80% or more of signs on limited access roadways in a SOGR
- 70% or more of signs on non-limited access roadways in a SOGR
Description

- CTDOT is responsible for maintaining about 1,688 overhead sign supports on state maintained roadways.
- Sign supports are made up of three categories:
  - 677 Cantilevers
  - 624 Full-Span
  - 387 Bridge Mounted
- CTDOT defines a sign support as the structure (horizontal member(s), post(s) and foundation) carrying sign panels or variable message boards at a single location.
- Sign panels attached to the sign support are managed as a separate asset.

State of Good Repair (SOGR)

Sign supports with an overall rating of at least a 5 on a 0-9 condition scale are classified as being in a State of Good Repair.

Support Age

- Overhead sign supports have an estimated 34-year life expectancy.
- 22.7% of sign supports are older than 34 years.

Sign Support Inventory and Condition

State Goals

- **Good**
  - 729 Sign Supports
  - 43.2% are in Good condition [Condition ratings of 7, 8, or 9]
- **Fair**
  - 933 Sign Supports
  - 55.3% are in Fair condition [Condition ratings of 5 or 6]
- **Poor**
  - 26 Sign Supports
  - 1.5% are in Poor condition [Condition ratings of 0, 1, 2, 3, or 4]

History

Distribution of Sign Supports By Decade Built

- Based on CTDOT 4/8/20 Snapshot
Connecticut Transportation Asset Management Plan
Sign Supports

Sign Support Performance Projections
State Goals by sign support for 1,688 sign supports

Performance Projections
Sign support projections use deterioration curves for the overall structure condition rating. These curves are based on the 34 year service life expectancy of sign supports.

Asset Valuation
$270,130,000

Asset value is estimated using the replacement value. For sign supports, replacement value is based on the average unit construction cost by type:
- Cantilever $140,000 * 677 = $94,780,000
- Full Span $250,000 * 624 = $156,000,000
- Bridge Mount $50,000 * 387 = $19,350,000

Note: This value does not include the cost of the sign panels.

Measures and Targets
There are no Federal requirements at this time. CTDOT has set the following sign support condition goal:

State Goal:
- 90% or more of sign supports in a SOGR

Projected Performance at Current Funding Level ($4M Budget)

<table>
<thead>
<tr>
<th>End of Year</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOGR</td>
<td>96.3%</td>
<td>97.8%</td>
<td>97.9%</td>
<td>97.0%</td>
<td>96.9%</td>
<td>90.0%</td>
</tr>
</tbody>
</table>
Description

- CTDOT is responsible for maintaining pavement markings on approximately 3,719 centerline miles of State maintained roadways.
- Pavement Markings include:
  - Line Striping
  - Symbols & Legends (arrows, crosswalks, etc.)
- CTDOT pavement marking applications are either water-based by State forces and Epoxy by Contractor.

State of Good Repair (SOGR)

In-laid epoxy pavement markings installed within 6 years, epoxy pavement markings installed within the past 3 years and water-based pavement markings installed within 1 year are classified as being in a SOGR. This is based on expectations of retroreflectivity life and wear. Retroreflectivity is a measure of the amount of light reflected by a surface back to the source of the light.

Marking Age

- Nearly 63% of all line striping and 36% of all symbol and legend pavement markings have exceeded their expected service life.

Pavement Markings Inventory and Condition: Line Striping and Symbols & Legends

State Goals

<table>
<thead>
<tr>
<th>State of Good Repair</th>
<th>Total</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>59.6 million linear feet</td>
<td>36.6%</td>
<td>Good</td>
</tr>
<tr>
<td>103.4 million linear feet</td>
<td>63.4%</td>
<td>Poor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State of Good Repair</th>
<th>Total</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3 million square feet</td>
<td>61.0%</td>
<td>Good</td>
</tr>
<tr>
<td>0.9 million square feet</td>
<td>39.0%</td>
<td>Poor</td>
</tr>
</tbody>
</table>

History

Line Stripping and Symbols & Legends Installed Annually 2013 – 2019

Based on CTDOT 2019 Snapshot
In order to maintain a State of Good Repair, nearly 54 million linear feet of line striping and 735,000 square feet of symbols & legends epoxy pavement markings need to be remarked each year. Currently, approximately 35 million linear feet and 700,000 square feet are remarked each year.

**Asset Valuation**

$90,828,000

Asset value is estimated using the replacement value method. For pavement markings, replacement value is the product of square footage and unit construction cost considering epoxy only. Line striping: 163 million LF * $0.50/LF = $81,500,000 Symbols: 2.2 million SF * $4.20/SF = $9,328,000

**Measures and Targets**

There are no Federal requirements at this time. CTDOT has set the following pavement marking condition goals:

- 75% or more of line striping pavement markings in a SOGR
- 75% or more of symbols & legends pavement markings in a SOGR
Description
- CTDOT defines a highway building as a relatively permanent structure to house persons or property
- CTDOT owns 495 highway buildings classified into four Tiers:
  - Tier 1: significant structures normally occupied by employees or the public
  - Tier 2: significant structures not normally occupied by employees or the public
  - Tier 3: storage and portable office type structures
  - Tier 4: no asset management plan; portable storage containers, buildings managed by other entities or scheduled for demolition or sale

State of Good Repair (SOGR)
- Buildings with an overall rating of 3 or better on a scale of 1-5 are classified as being in a SOGR
- Building ratings are a combinations of age-based and condition-based component ratings

Building Age
- Building age is based on the date CTDOT acquired the asset or the date of the last (like new) renovation
- Tier 1 buildings have a 60-year life cycle with a 30-year mid-life SOGR upgrade
- Life cycles and the need for mid-life SOGR upgrades vary for Tier 2 & 3 buildings

CTDOT-Maintained Inventory and Condition

<table>
<thead>
<tr>
<th>Tier 1</th>
<th>Tier 2</th>
<th>Tier 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>103 Tier 1 buildings</td>
<td>98 Tier 2 buildings</td>
<td>141 Tier 3 buildings</td>
</tr>
<tr>
<td>State of Good Repair: 85.4%</td>
<td>State of Good Repair: 94.9%</td>
<td>State of Good Repair: 57.4%</td>
</tr>
<tr>
<td>- 73 Maintenance &amp; Repair Facilities</td>
<td>- 94 Salt Sheds</td>
<td>- 96 Storage Structures</td>
</tr>
<tr>
<td>- 17 Rest Area / Weigh Station Facilities</td>
<td>- 4 Specialty Facilities</td>
<td>- 45 Portable Office Structures</td>
</tr>
</tbody>
</table>

History

Distribution of Highway Buildings By Decade Built, Renovated, or Acquired

Based on CTDOT 4/19/20 Snapshot
# Highway Buildings Performance Projections

## State Goals by Tier 1 highway building for 103 buildings

<table>
<thead>
<tr>
<th>End of Year</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOGR</td>
<td>86.4%</td>
<td>87.4%</td>
<td>88.5%</td>
<td>87.5%</td>
<td>87.5%</td>
<td>80.0%</td>
</tr>
</tbody>
</table>

## State Goals by Tier 2 highway building for 98 buildings

<table>
<thead>
<tr>
<th>End of Year</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOGR</td>
<td>94.9%</td>
<td>97.9%</td>
<td>99.0%</td>
<td>97.9%</td>
<td>95.8%</td>
<td>80.0%</td>
</tr>
</tbody>
</table>

## State Goals by Tier 3 highway building for 141 buildings

<table>
<thead>
<tr>
<th>End of Year</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOGR</td>
<td>60.4%</td>
<td>59.8%</td>
<td>59.2%</td>
<td>62.3%</td>
<td>60.7%</td>
<td>50.0%</td>
</tr>
</tbody>
</table>

---

## Performance Projections

Performance projection funding levels are based on the replacement value and include a 1.6 factor to account for non-building related project administration costs for engineering, rights-of-way, and construction incidentals and contingencies.

## Asset Valuation

$852,000,000

- Tier 1 Buildings: $675M
- Tier 2 Buildings: $165M
- Tier 3 Buildings: $12M

Asset valuation is the replacement cost of the asset in current year dollars. For buildings, the replacement costs includes any site work necessary for the building to function such as water and sewer systems, generators, and fuel stations as applicable, etc.

## Measures and Targets

Federal targets for buildings have not yet been established. The following State Goals have been set:

- Tier 1 Buildings: Maintain 80% in a SOGR
- Tier 2 Buildings: Maintain 80% in a SOGR
- Tier 3 Buildings: Maintain 50% in a SOGR