

# Infrastructure Condition Evaluation (ICE) Tool

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## Presentation outline

- Project objective
- Data analysis & evaluation structure
- Planning report overview
- ICE webtool demo
- Annual timeline & future enhancements
- Applications

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## Infrastructure Condition Evaluation (ICE) objectives

- Evaluate the entire Primary Highway System, independent of current financial constraints, using a select group of criteria weighted in terms of relative significance.
  - Will provide the department with an initial screening and prioritization of Primary highway corridors.
  - These corridors would then represent those areas that could be considered for further study and possible programming.

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## Data analysis

- Multiple datasets, available in Oracle Spatial
  - Geographic Information Management System (GIMS)
    - Traffic Counts, Structure Sufficiency Rating, Boundaries, etc.
  - Pavement Management Information System (PMIS)
    - PCI & IRI
  - Data provided for all roadway directions (dual segment)
- Linear Referencing Systems (LRS)
- Linear Overlay process
- Structured Query Language (SQL)

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## Evaluation structure

- Seven evaluation criteria (next slide)
- Normalized to common scale (1-10)
- Determined appropriate weighting (percentage)
- Applied corresponding multipliers
- Maximum composite score = 100
- Low score indicates poorer conditions

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## Evaluation criteria

• Pavement Condition Index (PCI)	25%
• Structure Sufficiency Rating	25%
• International Roughness Index (IRI)	15%
• Combination Truck AADT	15%
• Single-Unit Truck AADT	5%
• Passenger AADT	5%
• Congestion (V/C)	<u>10%</u>
	100%

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# Corridor breakouts

Corridors segmented at:

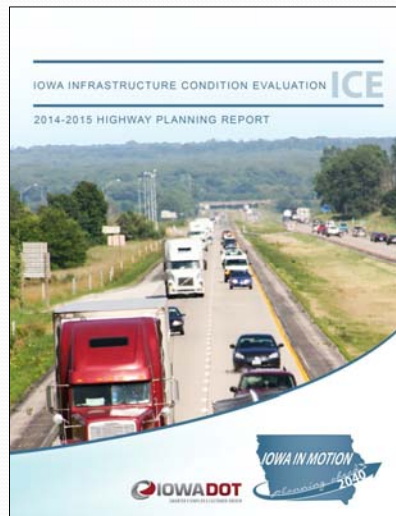
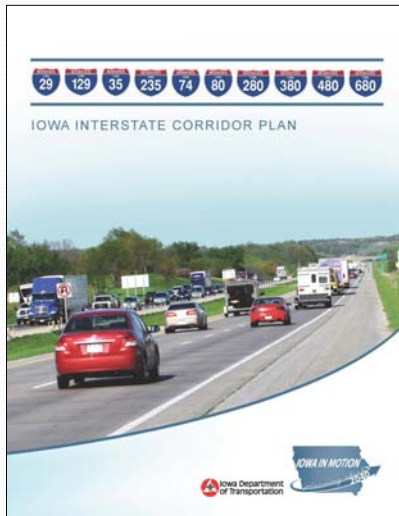
- 1) Interstate
- 2) NHS routes
- 3) City with a population of 20,000 or greater (consistent with CIN definition)
- 4) Transition from two-lanes to four-lanes or vice versa
- 5) Duplicate routes (appropriate precedence assigned)

ICE Corridors by route type

Route system	Number of corridors
NHS	122
Interstate	21
Non-interstate divided	39
Non-divided	62
Non-NHS	161
Divided	3
Non-divided	158
Total	283

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# Highway Planning Report



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## Table summaries

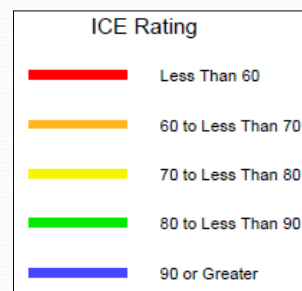
- Corridors summarized by ICE rating and individual criteria
- Also, District and system-level summaries

Rank	Corridor	Route type	ICE RATING									
			All	N/E	S/W	PCI	IRI	Suff	Pass AADT	Single AADT	Combo AADT	V/C
1	US 30 (beginning of two-lane near jct of IA 1 to north jct of US30/US 61)	ND	58.58	-	-	5	3	9	5	4	4	8
2	I-380 (jct of US 30 to jct of IA-100) <sup>1</sup>	I	59.83	59.95	59.71	3	3	10	1	1	6	5
3	I-35/80 (east jct of I-80/235 to west jct of I-80/235)	I	59.85	61.05	58.61	8	5	10	1	1	2	4
4	IA 136 (jct of US 20 to jct of IA 3/US 52)	ND	60.51	-	-	4	2	10	5	1	7	8
5	IA 136 (jct of US 151 to jct of US 20)	ND	60.87	-	-	4	2	9	8	4	6	9
6	US 69 (beginning of NHS on US 69 near Ankeny city limits to Ames south city limits)	ND	61.41	-	-	4	2	9	2	5	9	7
7	US 169 (jct of I-80 to east jct of US 30/US 169)	ND	62.77	-	-	5	4	9	5	4	6	9

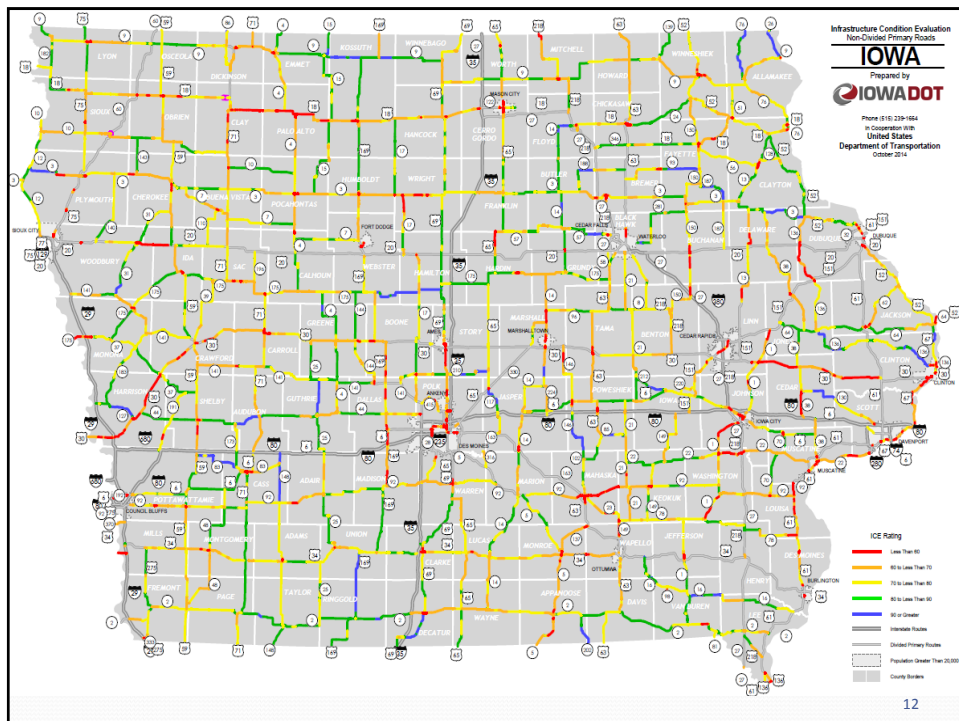
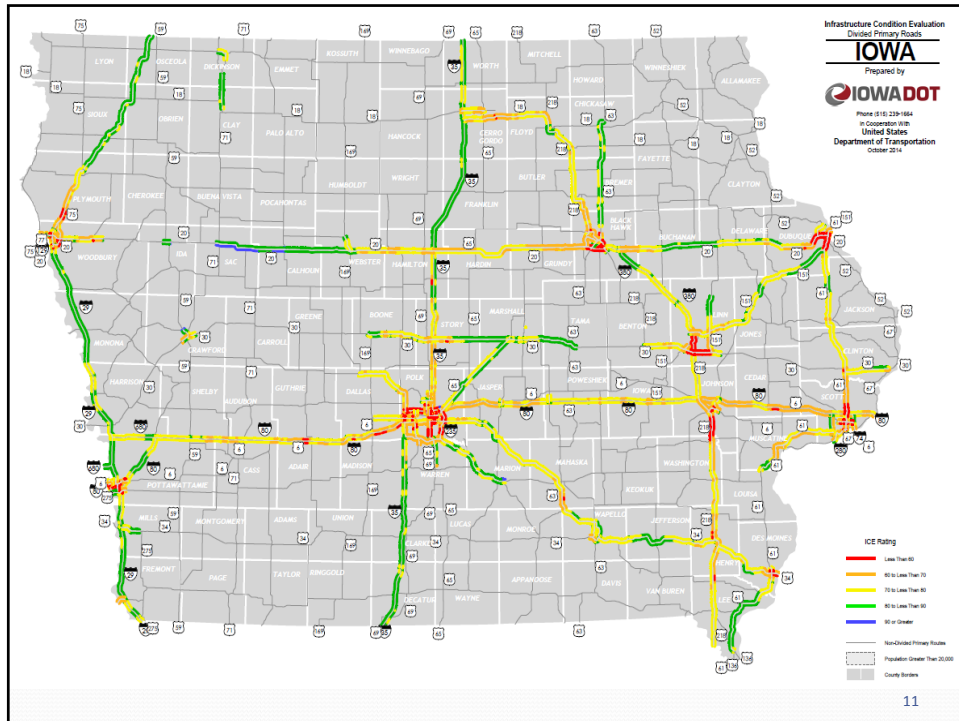
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## Map summaries

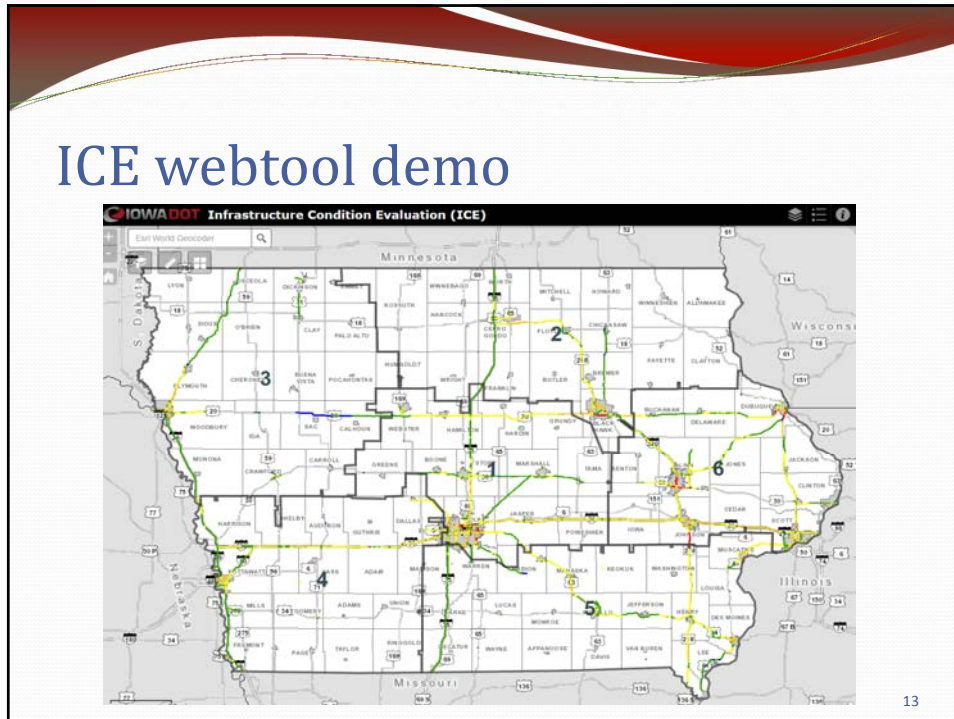
- Statewide and individual District maps
- Displayed by divided and non-divided



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## ICE webtool demo



## Timeline & future enhancements

### Annual update cycle

- Internal stakeholder outreach
- Conduct linear overlay and re-run data analysis
- Annual ICE planning report by end of calendar year

### Potential Enhancements

- Forecast future conditions
- Incorporate possible safety, operations, environmental components
- Trend analysis in report and through ICE dashboard

## Additional applications

- State Freight Plan
  - “VCAP” project evaluation matrix
  - Examines:
    - iTRAM statewide truck VHT impact (value)
    - ICE ratings (condition)
    - INRIX travel speed/bottlenecks (performance)
- Transportation Systems Management & Ops (TSMO) Plan
  - ICE-OPS: Using ICE-like evaluation structure, tailored to operations
  - Bottlenecks, incident frequency, crash rate, planning time index, major event locations, weather-sensitive corridors, & ICE
- State Long-Range Transportation Plan development

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## Evaluation strengths

- Flexible tool that allows for quick custom analysis
- Easy access to all input data and processed output data
- Provides a single composite rating for all Primary Highway System segments, in addition to individual criteria
- Evaluation results easily summarized in table and map form, consumed via web-based tool
- Useful input to DOT decision-making process

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# Questions?

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Criteria	Value Range	Interstate	Non-interstate divided	Non-divided	Normalized Value	Weighting	Multiplier	Max Score
		Range	Range	Range				
Combination Truck AADT	0 - 5000+	>5050	>860	>240	1	15%	1.5	15
		4489-5050	764-860	213-240	2			
		3928-4489	669-764	187-213	3			
		3367-3928	573-669	160-187	4			
		2806-3367	478-573	133-160	5			
		2244-2806	382-478	107-133	6			
		1683-2244	287-382	80-107	7			
		1122-1683	191-287	53-80	8			
		561-1122	96-191	27-53	9			
		0-561	0-96	0-27	10			
Single-Unit Truck AADT	0 - 1200+	>860	>350	>120	1	5%	0.5	5
		764-860	311-350	107-120	2			
		669-764	272-311	93-107	3			
		573-669	233-272	80-93	4			
		478-573	194-233	67-80	5			
		382-478	156-194	53-67	6			
		287-382	117-156	40-53	7			
		191-287	78-117	27-40	8			
		96-191	39-78	13-27	9			
		0-96	0-39	0-13	10			
Passenger AADT	0 - 35000+	>27050	>10610	>2680	1	5%	0.5	5
		24044-27050	9431-10610	2382-2680	2			
		21039-24044	8252-9431	2084-2382	3			
		18033-21039	7073-8252	1787-2084	4			
		15028-18033	5894-7073	1489-1787	5			
		12022-15028	4716-5894	1191-1489	6			
		9017-12022	3537-4716	893-1191	7			
		6011-9017	2358-3537	596-893	8			
		3006-6011	1179-2358	298-596	9			
		0-3006	0-1179	0-298	10			

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