# Visualizing Ownership and Maintenance Responsibilities through GIS

## Application to the Railroad Industry

Presented by
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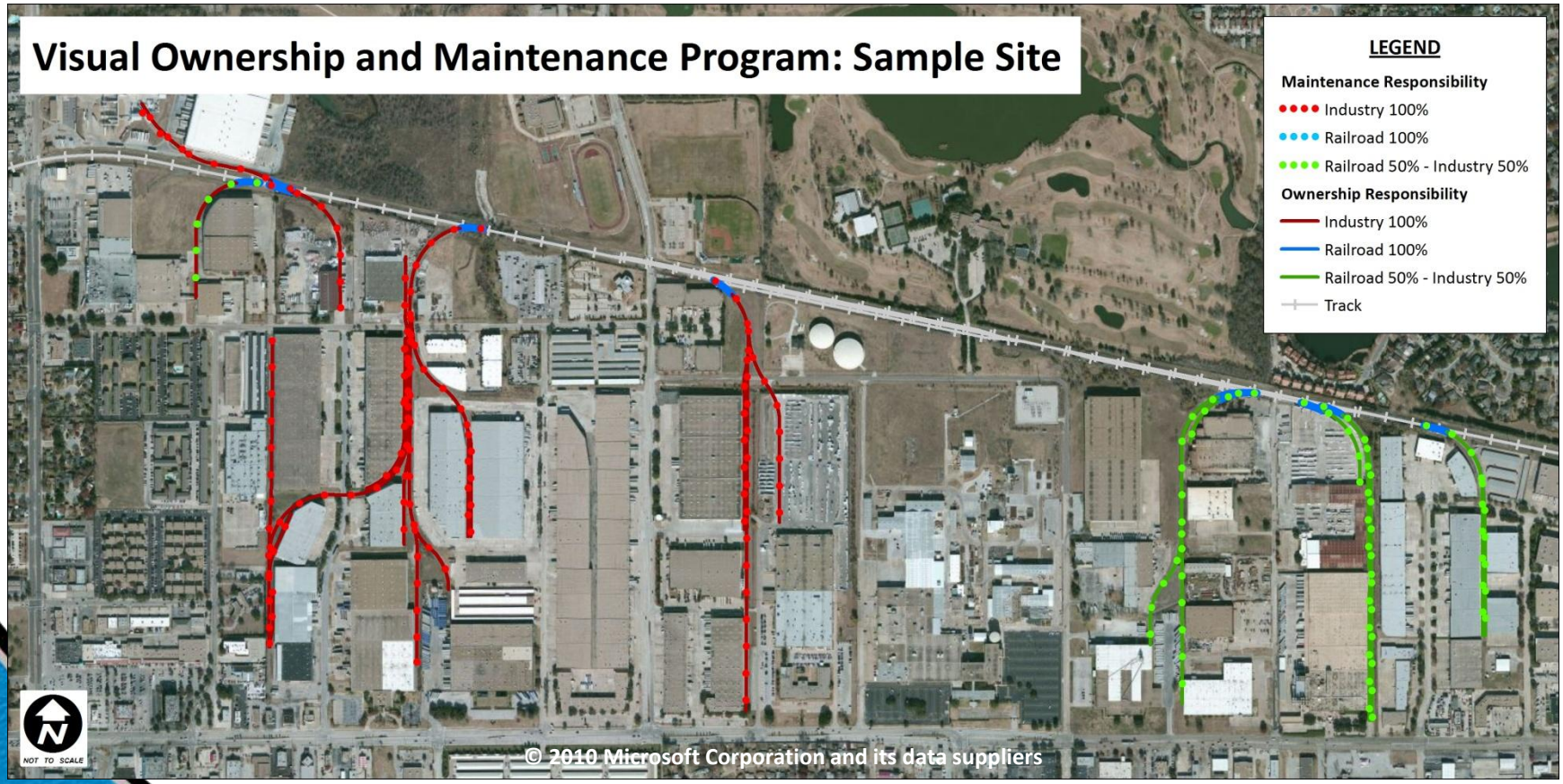
# AGENDA

- Visual Ownership and Maintenance Program
- Contract Types
- Role of GIS
- Tracking Historical Contracts
- Benefits to Current Contracts
- Proposing Future Contracts

# VISUAL OWNERSHIP AND MAINTENANCE PROGRAM

- Visual Ownership and Maintenance (VOM)
  - Displays and maintains data of ownership and maintenance for assets as they change over time
  - Quick and understandable response to the current "show me, don't tell me" world

# VISUAL OWNERSHIP AND MAINTENANCE PROGRAM



# AGENDA

- Visual Ownership and Maintenance Program
- ***Contract Types***
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# CONTRACT TYPES

- Variety of contracts based on specific situations between Railroad and Industry (or other Railroad)
  - Industrial Track Agreement (ITA)
    - Contract between Railroad and Industry for rights to use a Railroad track, private track, or lease track

# EXAMPLE ITA CONTRACT

**INDUSTRY TRACK AGREEMENT**

THIS AGREEMENT ("Agreement") is made _____, 20____ ("Effective Date"), between [redacted] ("Railroad"), and **XXXXX**, a XXXXX corporation ("Industry").

**RECITALS:**

Industry desires the construction, maintenance and operation of XXXXX (hereinafter "Track") to establish rail service at or near Milepost XXXXX, XXXXX, in XXXXX, as shown on the drawing dated XXXXX, marked **Exhibit A**, hereto attached and hereby made a part hereof, to which Railroad is agreeable to subject to the terms and conditions of this Agreement.

**AGREEMENT:**

**Section 1.** **TRACK IDENTIFICATION**.

1.1. For the purpose of this Agreement, the following segments of the Track shall be identified as follows:

Engineering Station 0+00 - the initial switch connection or sometimes referred to as the point of switch, which is the beginning of the Track ("Point of Switch").

**Section 6.** **OWNERSHIP OF THE TRACK**.

6.1. Railroad shall own the portion of the Track from the Point of Switch to the Clearance Point ("Railroad Track Portion").

6.2. Industry shall own the portion of the Track from the Clearance Point to the end of the Track ("Industry Track Portion").

**Section 11.** **MAINTENANCE BY RAILROAD**.

Railroad, at Railroad's expense, shall inspect and maintain the Railroad Track Portion (including, without limitation, rail, ties, ballast and other track material and all track appurtenances, including any automatic signal system activated by rail operations on the Track).

**Section 12.** **MAINTENANCE BY INDUSTRY**.

12.1. Industry, at Industry's expense, shall inspect and maintain the Industry Track Portion (including, without limitation, rail, ties, ballast and other track material, and all track appurtenances). This obligation shall include, without limitation, maintenance required as a result of normal wear and tear, repairs, and track reconstruction as necessary. All track maintained by Industry hereunder shall be maintained to at least Federal Railroad Administration Class 1 track standards pursuant to 49 C.F.R. Part 213 or such replacement standards as in effect from time to time.

*Sample Industrial Track Agreement – www.uprr.com/customers/ind-dev/attachments/sample_itc.pdf*

# AGENDA

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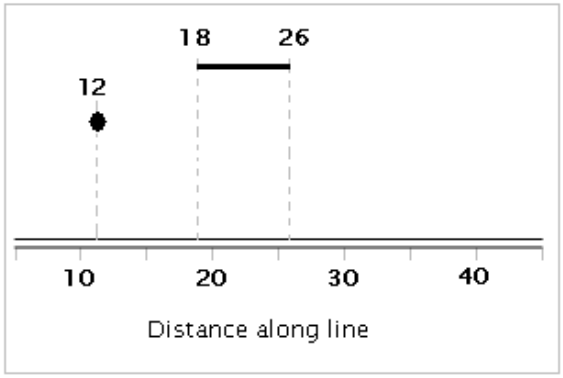
# ROLE OF GIS

- Geographic Information System[1]
  - Integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information
  - View, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends

[1]*Details from ESRI on "What is GIS?" – www.esri.com/what-is-gis/overview*

# ROLE OF GIS

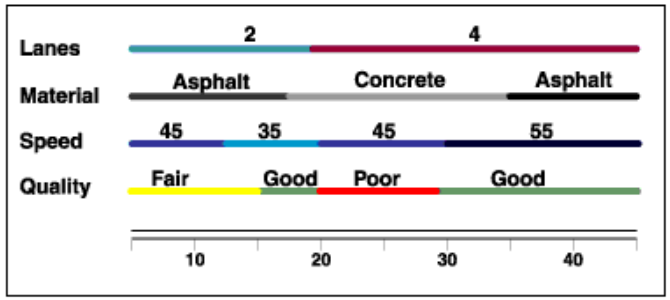
- Linear Referencing[2]
  - Method of storing geographic locations by using relative positions along a measured linear feature
  - Associate multiple sets of attributes to portions of linear features without requiring that underlying lines be segmented




[2]*Details from ESRI's ArcGIS Resource Center – "What is Linear Referencing?" http://help.arcgis.com/en/arcgisdesktop/10.0/help/index.html#/What_is_linear_referencing/003900000001000000/*

# ROLE OF GIS

- Dynamic Segmentation[3]
  - Process of computing the map locations of events stored and managed in an event table using a linear referencing measurement system and displaying them on a map
  - Multiple sets of attributes can be associated with any portion of an existing linear feature independently of where it begins or end
  - These attributes can be displayed, queried, edited, and analyzed without affecting the underlying linear feature's geometry




[3]*Details from ESRI's ArcGIS Resource Center – "What is Linear Referencing?" http://help.arcgis.com/en/arcgisdesktop/10.0/help/index.html#/What_is_linear_referencing/003900000001000000/*

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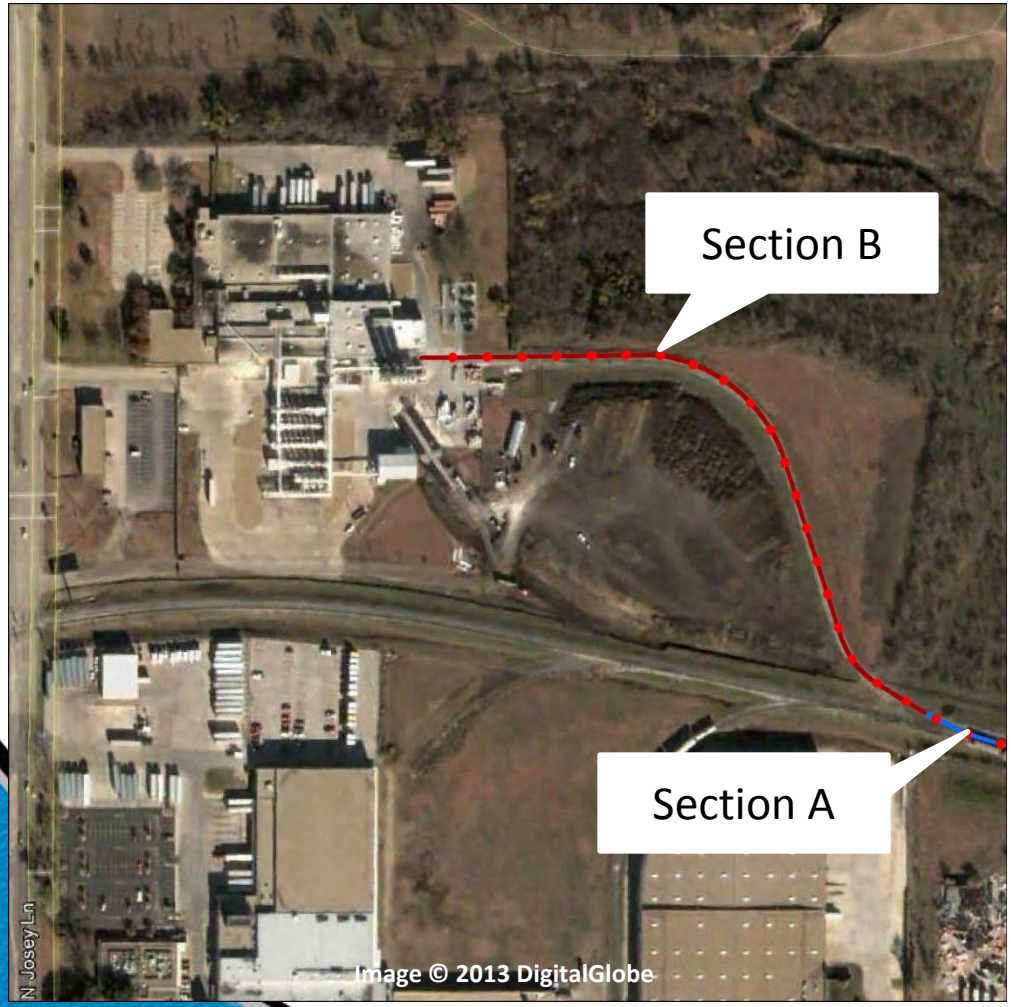
# HISTORICAL INDUSTRY ORIGINAL SITE LAYOUT


- Original site layout with single industry receiving rail service (prior to 2003)

# HISTORICAL INDUSTRY ORIGINAL VOM DETAILS



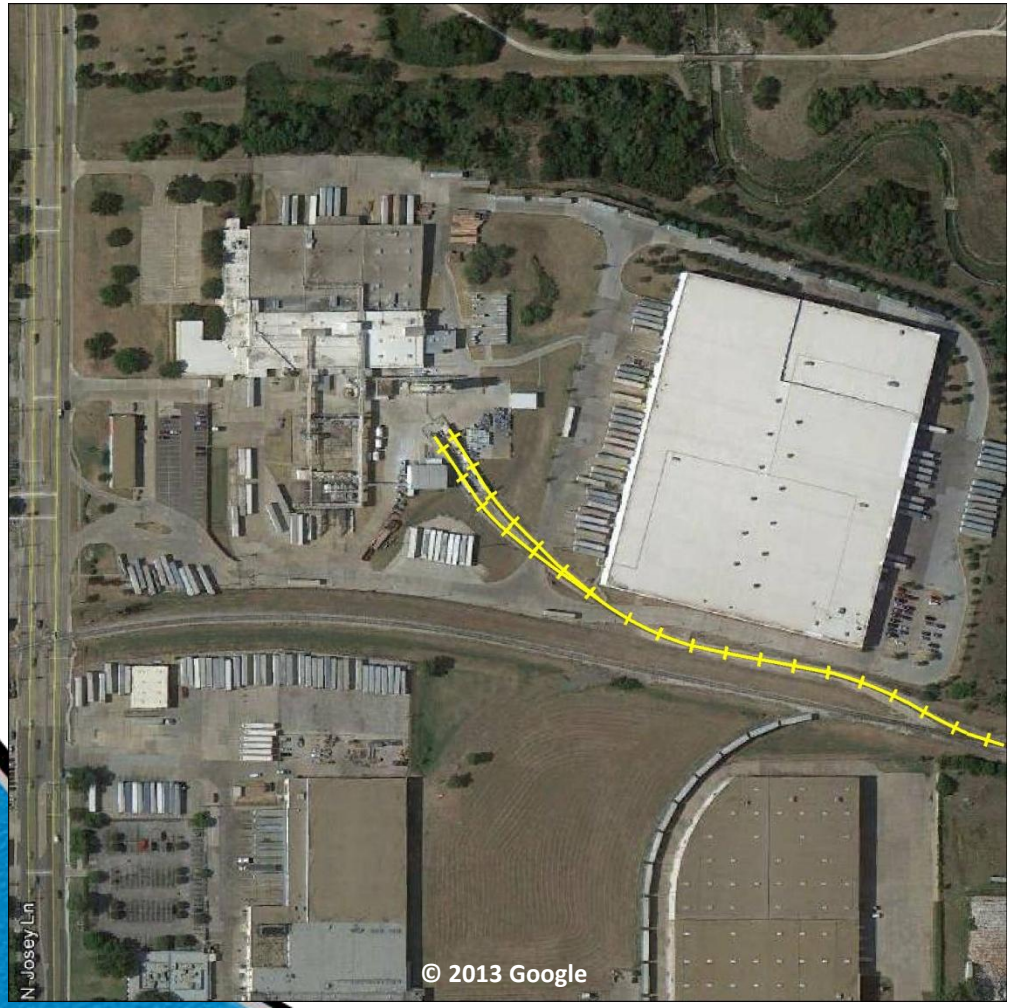

- ITA: Industrial Track Agreement
  - Railroad owns portion that ties to other Railroad track
  - Industry owns portion
  - Industry maintains 100%

| | Section A | Section B |
|---|---|---|
| **Length** | 150 ft | 1,250 ft |
| **Ownership** | RR 100% | IND 100% |
| **Own Cost*** | $7,500 | $62,500 |
| **Maintenance** | IND 100% | IND 100% |
| **Maint Cost**** | $15,000 | $125,000 |

* Scenario Ownership cost - $50/ft
** Scenario Maintenance cost - $100/ft

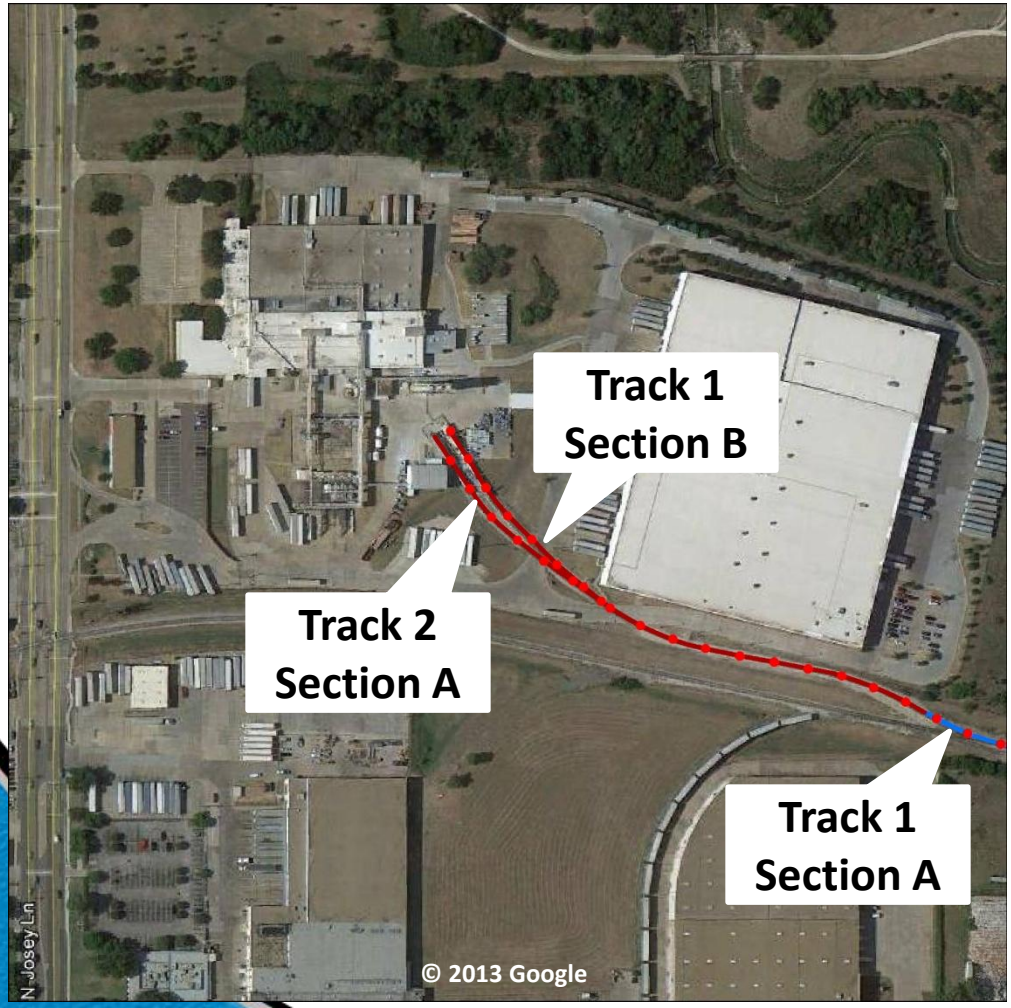
| Cost | Railroad | Industry |
|---|---|---|
| **Ownership** | $7,500 | $62,500 |
| **Maintenance** | $0 | $140,000 |
| **Grand Total** | ***$7,500*** | ***$202,500*** |

# HISTORICAL INDUSTRY UPDATED SITE LAYOUT




- Site expanded in 2003
- Old track removed
- New track layout to continue rail service to existing industry
- New industry facility built

# HISTORICAL INDUSTRY UPDATED VOM DETAILS




- New site, new track, new ITA

| | Track 1 Section A | Track 1 Section B | Track 2 Section A |
|---|---|---|---|
| **Length** | 150 ft | 1,010 ft | 420 ft |
| **Ownership** | RR 100% | IND 100% | IND 100% |
| **Own Cost*** | $7,500 | $50,500 | $21,000 |
| **Maintenance** | IND 100% | IND 100% | IND 100% |
| **Maint Cost**** | $15,000 | $101,000 | $42,000 |

* Scenario Ownership cost - $50/ft
** Scenario Maintenance cost - $100/ft

| Cost | Railroad | Industry |
|---|---|---|
| **Ownership** | $7,500 | $71,500 |
| **Maintenance** | $0 | $158,000 |
| **Grand Total** | ***$7,500*** | ***$229,500*** |

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# BENEFITS TO CURRENT CONTRACTS

- Visualization and spatial analysis
  - View contracts geographically
    - No longer confined to interpreting descriptions in legal documents when researching contracts or specific tracks
  - “Big picture” view of geography and nearby track layout
- Accurate measurements for ownership and/or maintenance costs
  - Track length, ROW acreage, or other measures

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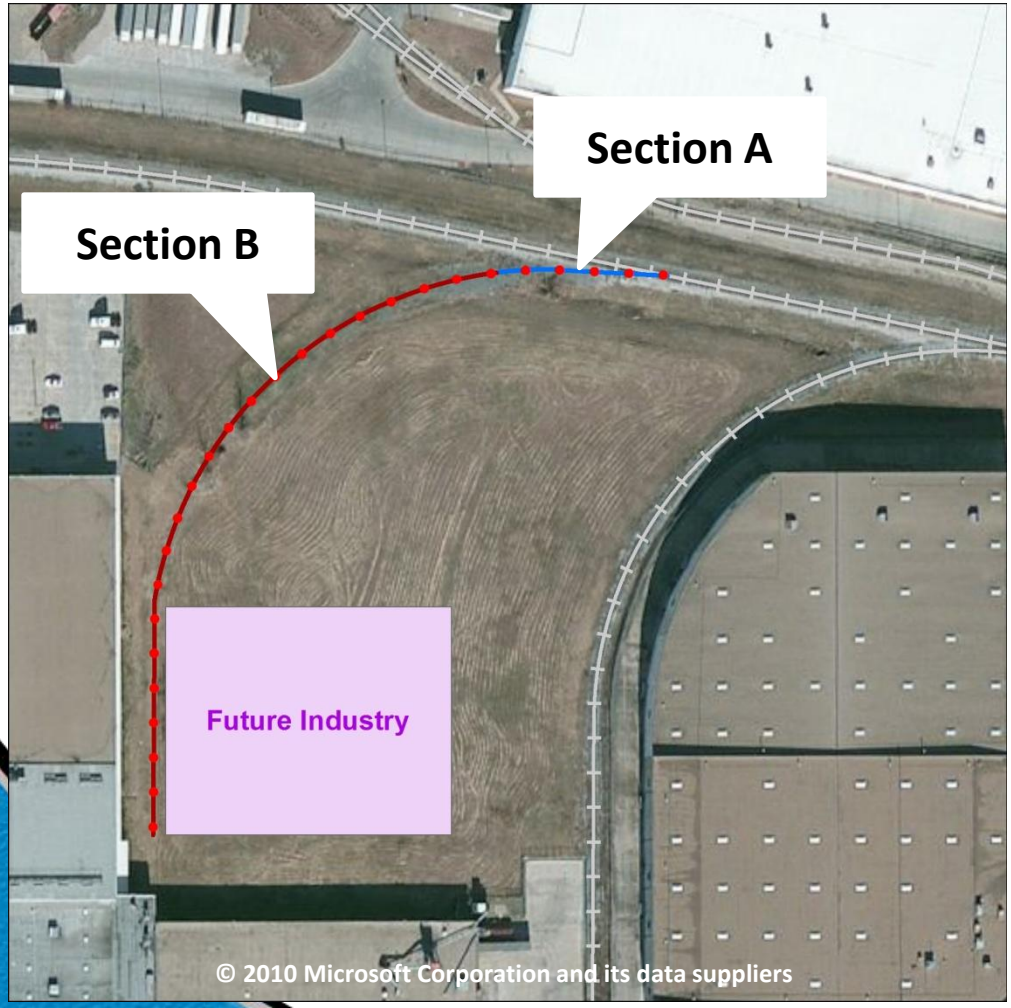
# FUTURE INDUSTRY


- New industry wants to build facility where rail service can be provided
- Site selection and analysis
  - Key market indicators
  - Zoning restrictions
  - Environmental impact
  - Rail operation impact
  - Variety of other criteria

# FUTURE INDUSTRY OPTION A - ITA



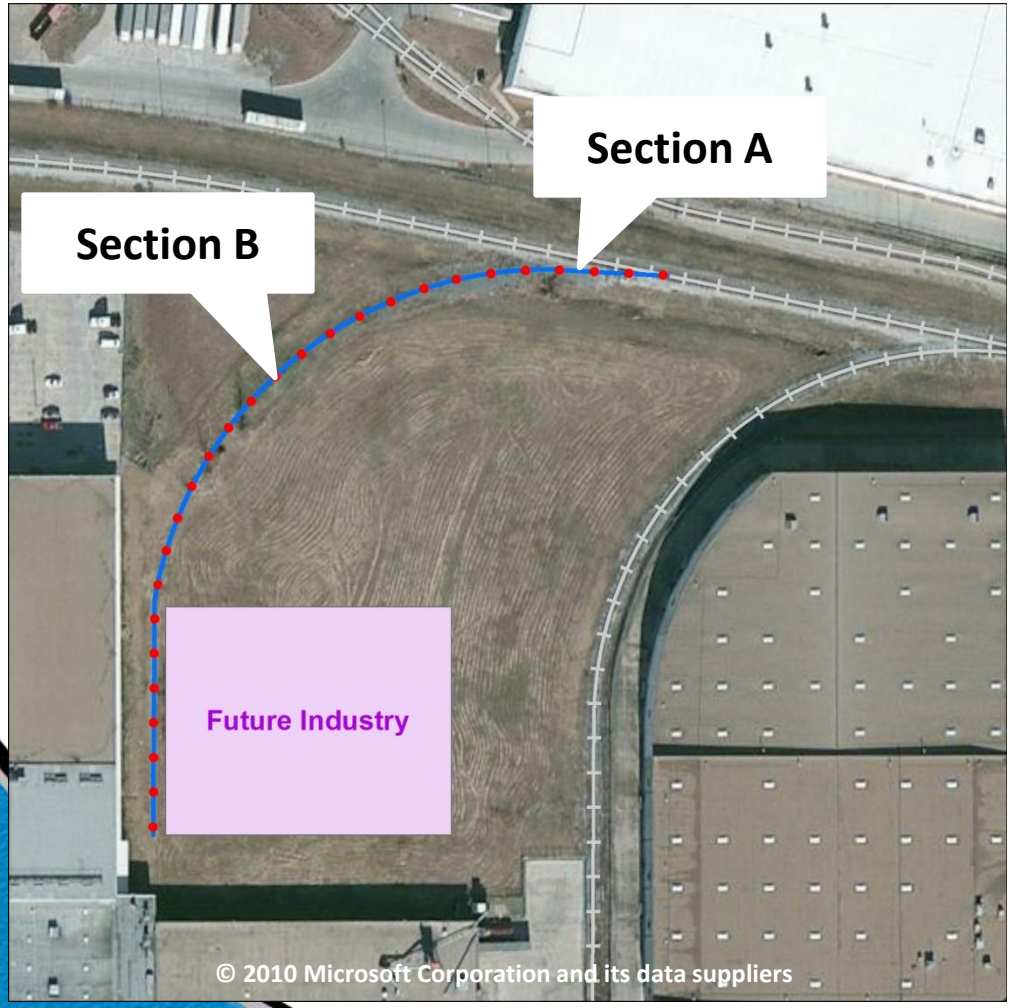

- ITA: Industrial Track Agreement
  - Railroad owns portion that ties to other Railroad track
  - Industry owns portion
  - Industry maintains 100%

| | Section A | Section B |
|---|---|---|
| **Length** | 150 ft | 650 ft |
| **Ownership** | RR 100% | IND 100% |
| **Own Cost*** | $7,500 | $32,500 |
| **Maintenance** | IND 100% | IND 100% |
| **Maint Cost**** | $15,000 | $65,000 |

* Scenario Ownership cost - $50/ft
** Scenario Maintenance cost - $100/ft

| Cost | Railroad | Industry |
|---|---|---|
| **Ownership** | $7,500 | $32,500 |
| **Maintenance** | $0 | $80,000 |
| **Grand Total** | ***$7,500*** | ***$112,500*** |

# FUTURE INDUSTRY OPTION B - ITL

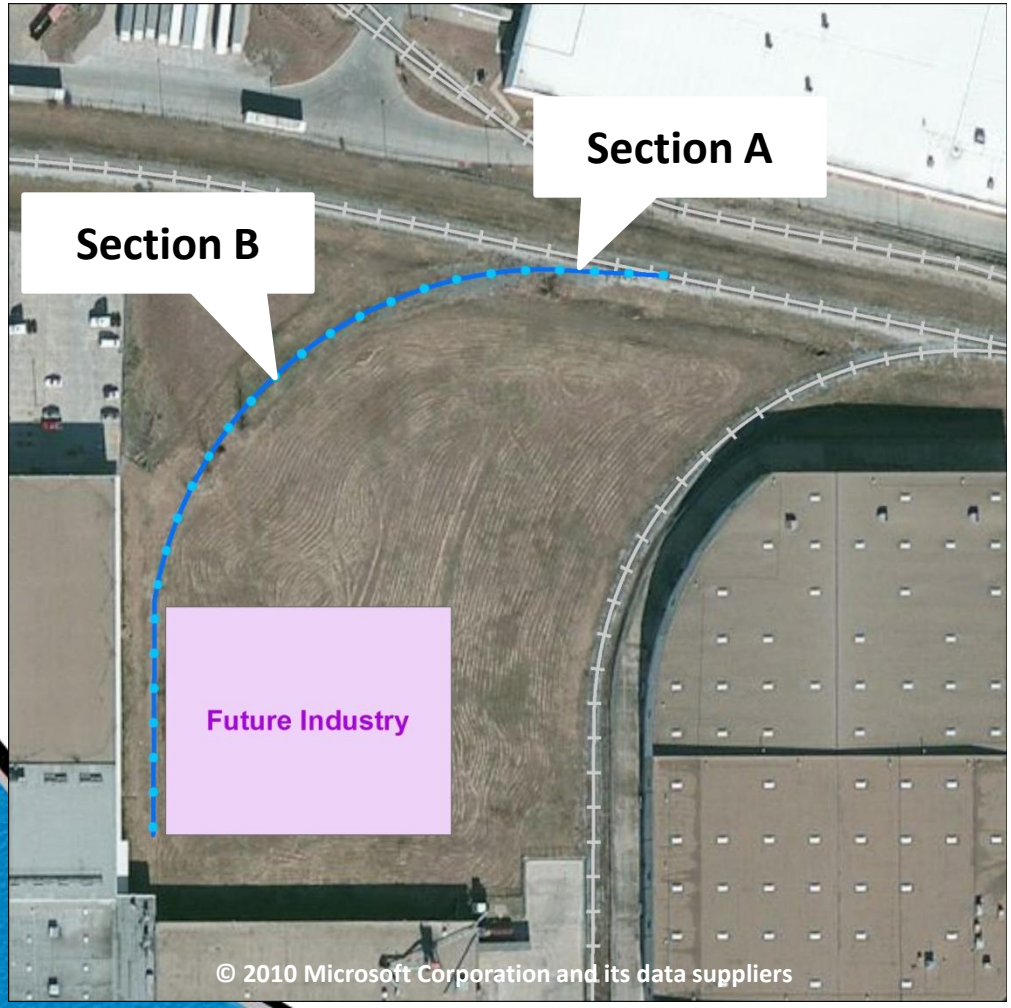



- ITL: Industrial Track Lease
  - Railroad owns 100%
  - Industry maintains 100%

| | Section A | Section B |
|---|---|---|
| **Length** | 150 ft | 650 ft |
| **Ownership** | RR 100% | RR 100% |
| **Own Cost** | $7,500 | $32,500 |
| **Maintenance** | IND 100% | IND 100% |
| **Maint Cost** | $15,000 | $65,000 |

| Cost | Railroad | Industry |
|---|---|---|
| **Ownership** | $40,000 | $0 |
| **Maintenance** | $0 | $80,000 |
| **Grand Total** | ***$40,000*** | ***$80,000*** |

# FUTURE INDUSTRY
# OPTION C – ITA PHASE OPTION 1



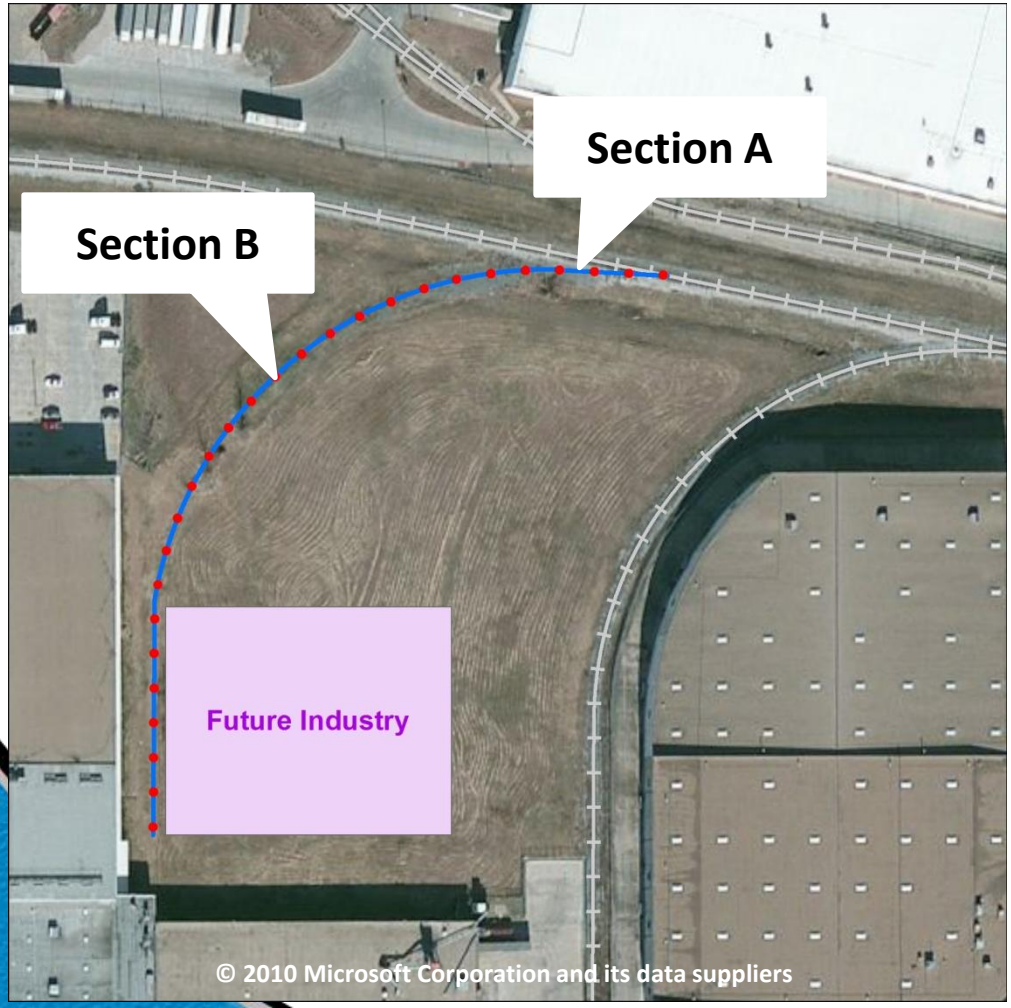

PHASE I

- Railroad builds track
- Railroad fully owns and maintains until Industry is ready to utilize rail service

| | Section A | Section B |
|---|---|---|
| **Length** | 150 ft | 650 ft |
| **Ownership** | RR 100% | RR 100% |
| **Own Cost** | $7,500 | $32,500 |
| **Maintenance** | RR 100% | RR 100% |
| **Maint Cost** | $15,000 | $65,000 |

| Cost | Railroad | Industry |
|---|---|---|
| **Ownership** | $40,000 | $0 |
| **Maintenance** | $80,000 | $0 |
| **Grand Total** | ***$120,000*** | ***$0*** |

# FUTURE INDUSTRY
# OPTION C – ITA PHASE OPTION 1



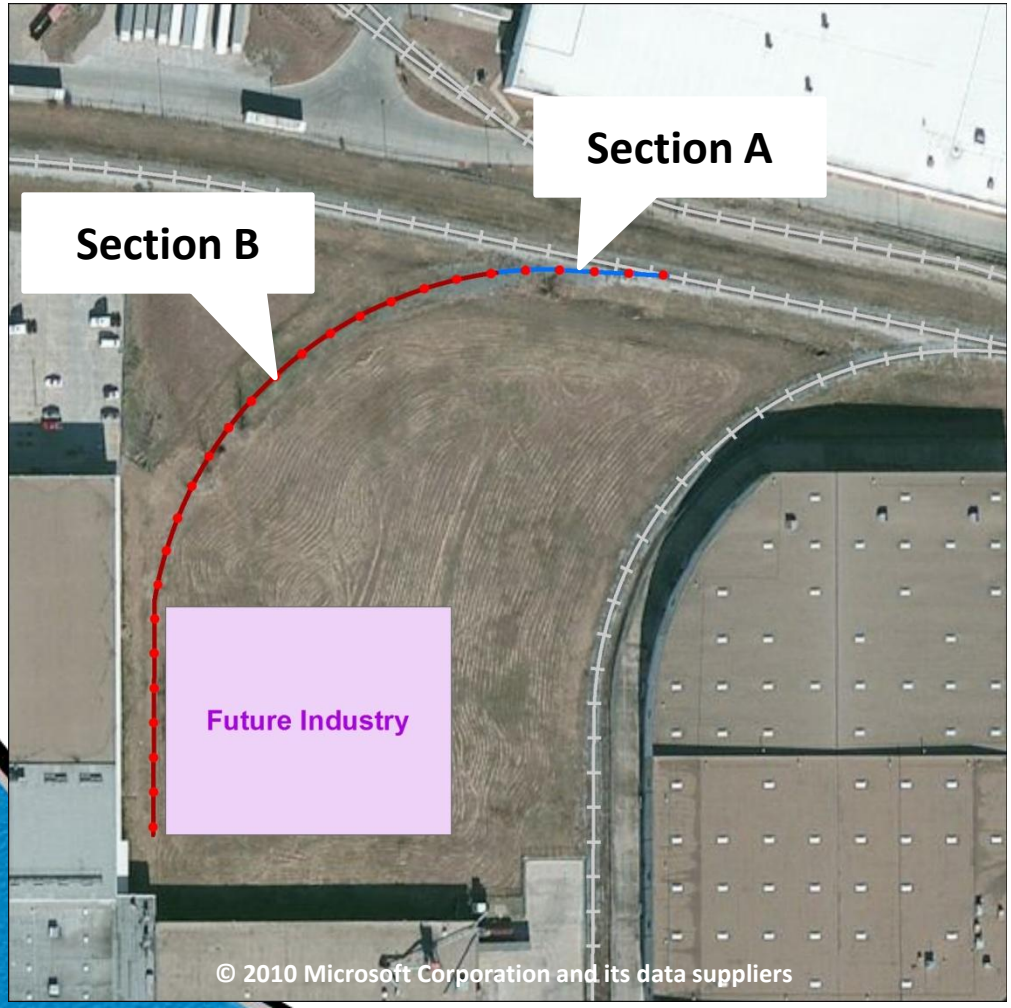

PHASE II

- Railroad transfers full (100%) maintenance responsibility to Industry

| | Section A | Section B |
|---|---|---|
| **Length** | 150 ft | 650 ft |
| **Ownership** | RR 100% | RR 100% |
| **Own Cost** | $7,500 | $32,500 |
| **Maintenance** | IND 100% | IND 100% |
| **Maint Cost** | $15,000 | $65,000 |

| Cost | Railroad | Industry |
|---|---|---|
| **Ownership** | $40,000 | $0 |
| **Maintenance** | $0 | $80,000 |
| **Grand Total** | ***$40,000*** | ***$80,000*** |

# FUTURE INDUSTRY
# OPTION C – ITA PHASE OPTION 1



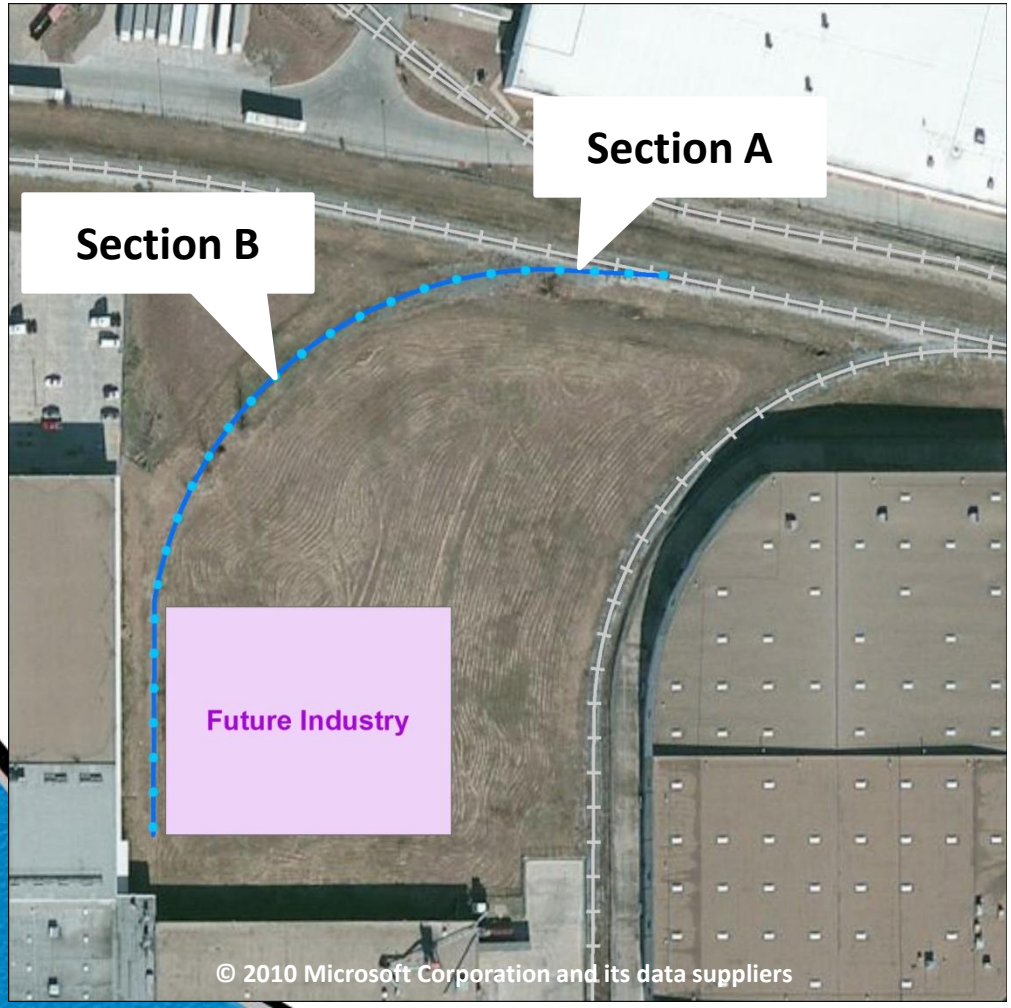

PHASE III (final)

- Railroad transfers full (100%) ownership responsibility to Industry for specified portion of track

| | Section A | Section B |
|---|---|---|
| **Length** | 150 ft | 650 ft |
| **Ownership** | RR 100% | IND 100% |
| **Own Cost** | $7,500 | $32,500 |
| **Maintenance** | IND 100% | IND 100% |
| **Maint Cost** | $15,000 | $65,000 |

| Cost | Railroad | Industry |
|---|---|---|
| **Ownership** | $7,500 | $32,500 |
| **Maintenance** | $0 | $80,000 |
| **Grand Total** | ***$7,500*** | ***$112,500*** |

# FUTURE INDUSTRY
# OPTION C – ITA PHASE OPTION 2



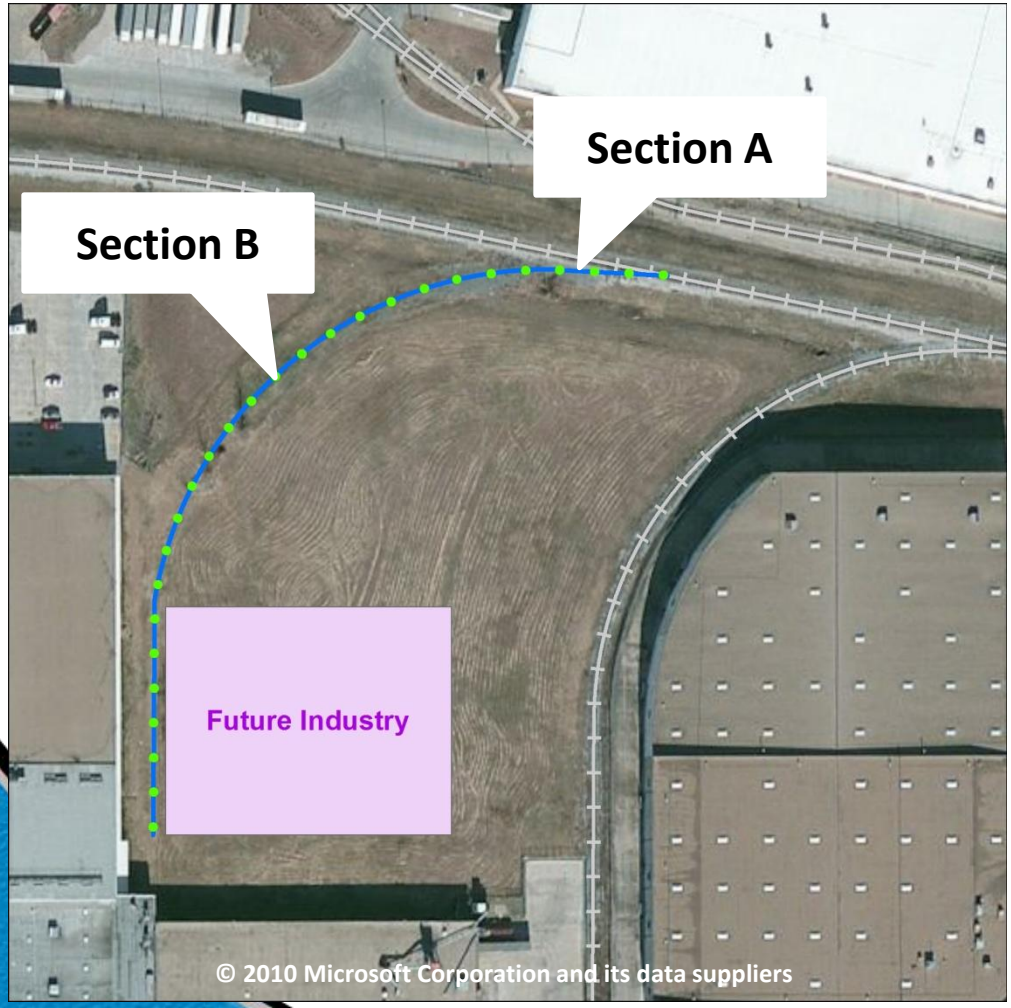

PHASE I

- Railroad builds track
- Railroad fully owns and maintains until Industry is ready to utilize rail service

| | Section A | Section B |
|---|---|---|
| **Length** | 150 ft | 650 ft |
| **Ownership** | RR 100% | RR 100% |
| **Own Cost** | $7,500 | $32,500 |
| **Maintenance** | RR 100% | RR 100% |
| **Maint Cost** | $15,000 | $65,000 |

| Cost | Railroad | Industry |
|---|---|---|
| **Ownership** | $40,000 | $0 |
| **Maintenance** | $80,000 | $0 |
| **Grand Total** | ***$120,000*** | ***$0*** |

# FUTURE INDUSTRY
# OPTION C – ITA PHASE OPTION 2



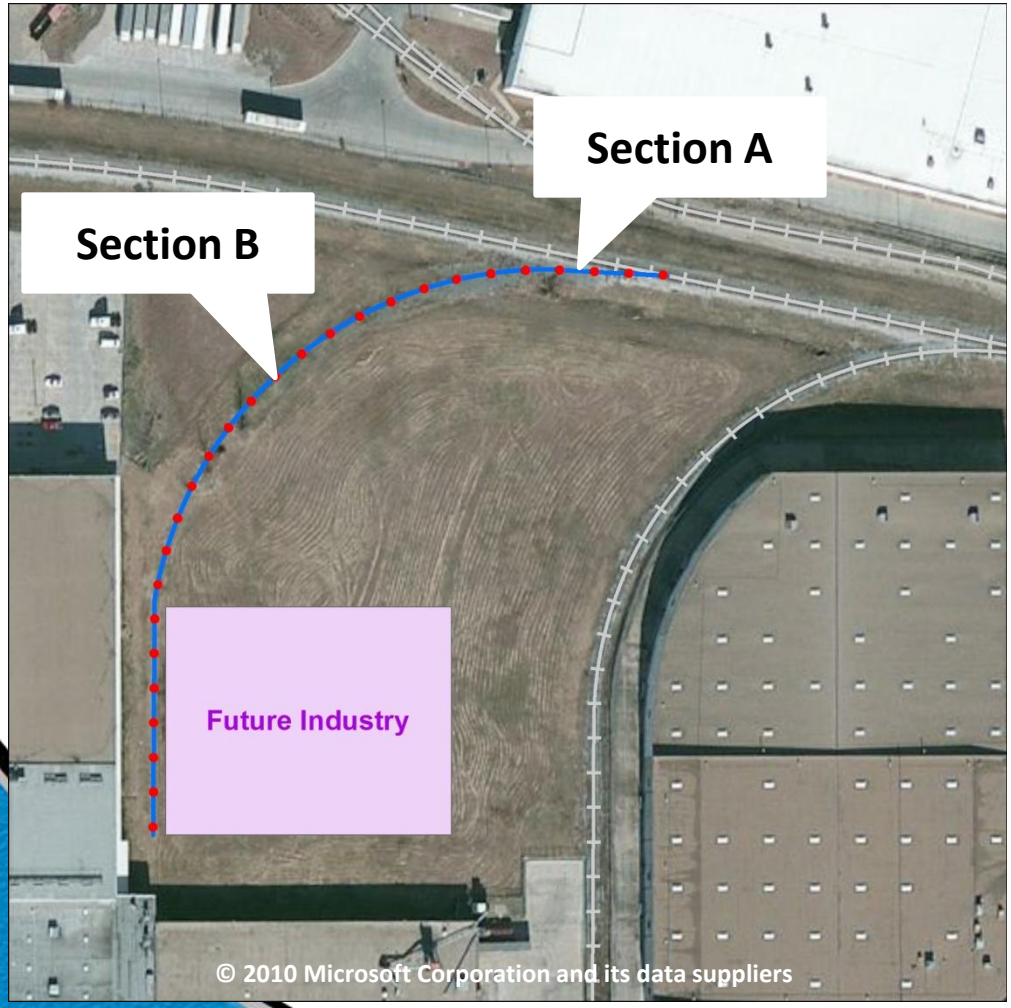

PHASE II

- Railroad transfers partial (50%) maintenance responsibility to Industry

| | Section A | Section B |
|---|---|---|
| **Length** | 150 ft | 650 ft |
| **Ownership** | RR 100% | RR 100% |
| **Own Cost** | $7,500 | $32,500 |
| **Maintenance** | RR 50%, IND 50% | RR 50%, IND 50% |
| **Maint Cost** | $15,000 | $65,000 |

| Cost | Railroad | Industry |
|---|---|---|
| **Ownership** | $40,000 | $0 |
| **Maintenance** | $40,000 | $40,000 |
| **Grand Total** | ***$80,000*** | ***$40,000*** |

# FUTURE INDUSTRY
# OPTION C – ITA PHASE OPTION 2



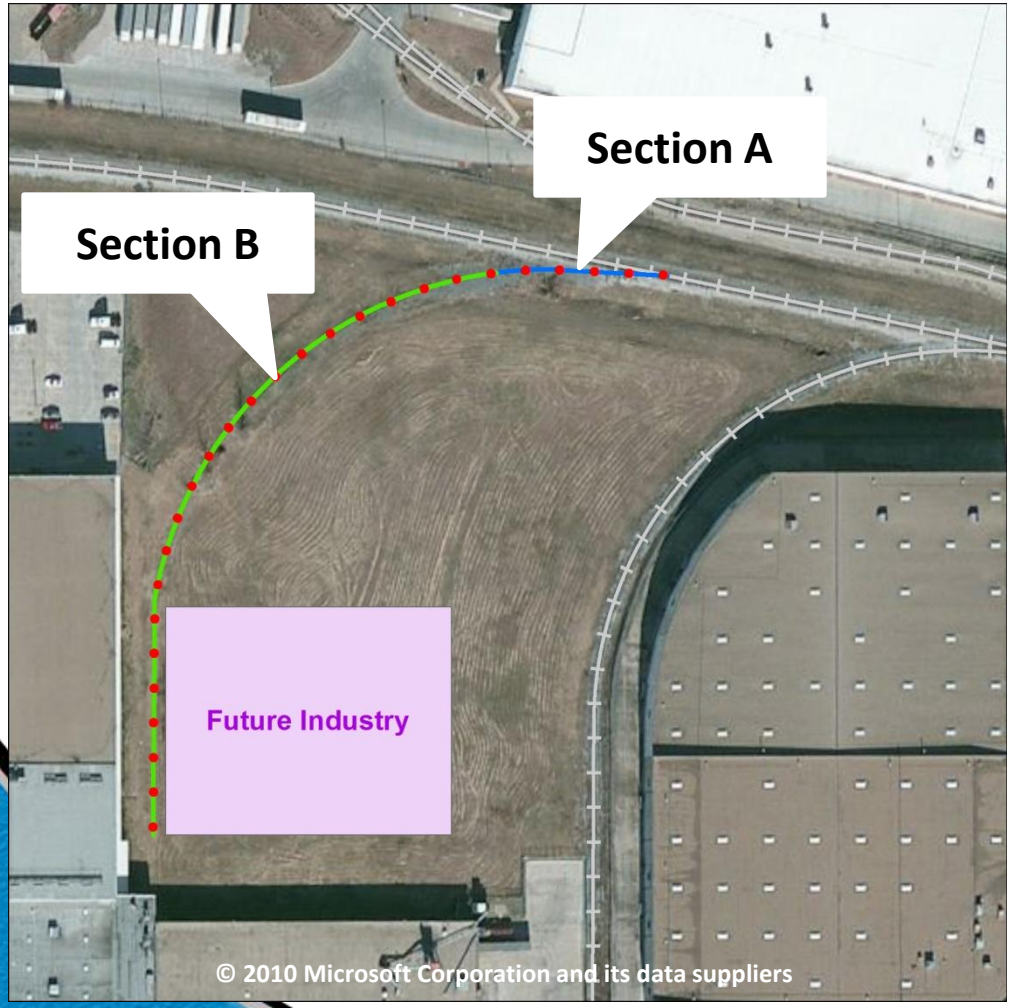

PHASE III

- Railroad transfers full (100%) maintenance responsibility to Industry

| | Section A | Section B |
|---|---|---|
| **Length** | 150 ft | 650 ft |
| **Ownership** | RR 100% | RR 100% |
| **Own Cost** | $7,500 | $32,500 |
| **Maintenance** | IND 100% | IND 100% |
| **Maint Cost** | $15,000 | $65,000 |

| Cost | RR | IND |
|---|---|---|
| **Ownership** | $40,000 | $0 |
| **Maintenance** | $0 | $80,000 |
| **Grand Total** | ***$40,000*** | ***$80,000*** |

# FUTURE INDUSTRY
# OPTION C – ITA PHASE OPTION 2



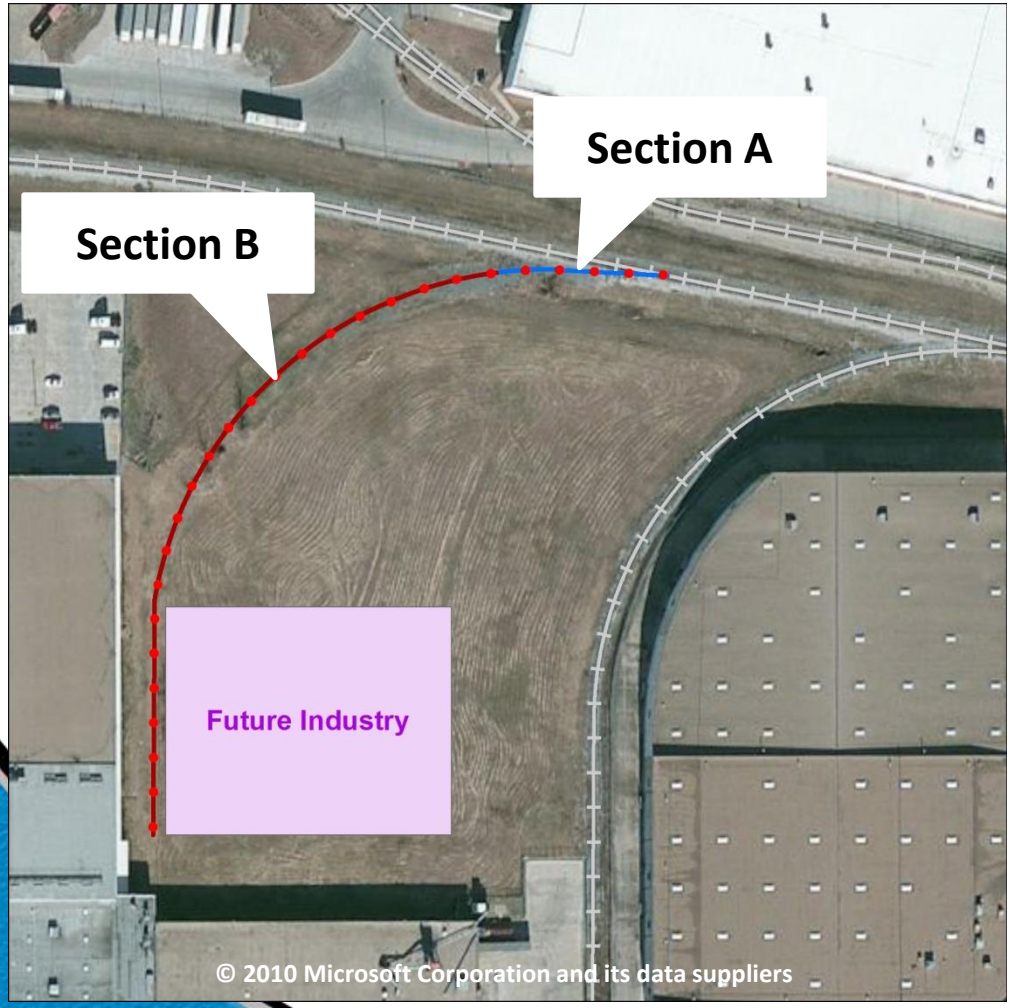

PHASE IV

- Railroad transfers partial (50%) ownership responsibility to Industry for specified portion of track

| | Section A | Section B |
|---|---|---|
| **Length** | 150 ft | 650 ft |
| **Ownership** | RR 100% | RR 50%, IND 50% |
| **Own Cost** | $7,500 | $32,500 |
| **Maintenance** | IND 100% | IND 100% |
| **Maint Cost** | $15,000 | $65,000 |

| Cost | RR | IND |
|---|---|---|
| **Ownership** | $23,750 | $16,250 |
| **Maintenance** | $0 | $80,000 |
| **Grand Total** | ***$23,750*** | ***$96,250*** |

# FUTURE INDUSTRY
# OPTION C – ITA PHASE OPTION 2




PHASE V (final)

- Railroad transfers full (100%) ownership responsibility to Industry for specified portion of track

| | Section A | Section B |
|---|---|---|
| **Length** | 150 ft | 650 ft |
| **Ownership** | RR 100% | IND 100% |
| **Own Cost** | $7,500 | $32,500 |
| **Maintenance** | IND 100% | IND 100% |
| **Maint Cost** | $15,000 | $65,000 |

| Cost | RR | IND |
|---|---|---|
| **Ownership** | $7,500 | $32,500 |
| **Maintenance** | $0 | $80,000 |
| **Grand Total** | ***$7,500*** | ***$112,500*** |

# SUMMARY

- Visual Ownership and Maintenance Program
- Contract Types
- Role of GIS
- Tracking Historical Contracts
- Benefits to Current Contracts
- Proposing Future Contracts

# QUESTIONS?

Jenni Moore

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