Iowa Interstate Railroad, Ltd.

Typical Specifications and Criteria
For Construction of Industrial Tracks

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Typical Specifications and Criteria for Construction of Industrial Tracks

These Specifications are provided as a guide for design purposes *only* and should not be taken as the final authority for construction of industrial trackage without prior review and approval by Iowa Interstate Railroad (IAISRR) Engineering staff. These Specifications supersede all previous editions and are subject to revision without notice. It is the responsibility of User to verify they are using the most current information.

All track construction shall be governed by these Specifications, IAISRR Standards and Common Standards. Any item not covered specifically herein shall be, in accordance with American Railway Engineering and Maintenance of Way Association (AREMA) Manual of Recommended Practices, subject to the approval of IAISRR Vice President of Engineering or his authorized representative. Where conflict exists between the AREMA Manual and the Specifications contained herein, these Specifications shall govern. In addition, all construction shall adhere to all relevant Federal Railway Administration (FRA), State, and Local requirements.

All industrial trackage constructed shall require switchman's walkways to comply with current and applicable federal, state or local laws. All walkways shall conform to the Iowa Interstate's Specifications, **Exhibit "E"**, and/or the Federal, State or local regulations, whichever is the most protective from a safety standpoint. Industries shall be responsible for the proper construction and maintenance of all walkways. Submitted plans will be reviewed per IAISRR Guidelines, Specifications, Standards, and rail operations. No approbation, concurrence or recommendation is herein made by IAISRR with regard to the Industry's facility construction design and use of said facility by the Industry. It is the responsibility of the Industry and its Contractor(s) to ensure that construction of the project is performed in accordance with the Project's design specifications.

Engineered Drawings of Proposed Track Design

The first step in the process of constructing industrial track begins with the selection of a qualified Consultant or Railroad Contractor. They prepare detailed engineering drawings for the proposed track layout based on the specifications contained in this publication. Details of the required information are included in **Section 2.00**; the **Industrial Track Standard Checklist** is included as **Exhibit "A-1".**

The preliminary submission, consisting of two (2) prints of the preliminary plans **(Exhibit "A")**, and two (2) sets of preliminary construction drawings and specifications shall be made to:

Iowa Interstate Railroad
Attn: Stephen J. Stoakes
5900 6th Street SW
Cedar Rapids, IA 52404

After preliminary submission, the IAISRR Engineering staff will review, recommend changes, or approve the preliminary plans. After all corrections have been made, the final submittal, consisting of AutoCAD 2004 or greater version files of the **Exhibit "A"** and construction plans, two (2) printed sets of **Exhibit "A"** and construction plans with a completed Design Checklist. Printed plans shall be formatted to 11" x 17" paper at 1 inch to 100 foot scale.

All calculations and detailed engineering drawings for all structures supporting railroad tracks (i. e., culverts, bridges, under-track pits, scale-pits, shoring, etc.) shall be included.

Depending on the location of the proposed track, construction of signal facilities to control the turnout may be required. Determination of the necessary signal facilities (including any required improvements or modification for automated crossing signals) required to operate the industry track safely shall be made at the time of final approval of track design and outlined in the terms of the Industry Track Contract. Any signal work necessary will be considered incidental to the project and shall be performed at Industry's expense.

Proposed drawings will be reviewed for field approval and then submitted to IAISRR for final Engineering approval, cost estimates and preparation of an Industry Track Contract containing all the terms and provisions for track construction, operation and maintenance. Only after all parties sign the Industry Track Contract, may track construction be scheduled. **No construction on IAISRR property may begin before an Industry Track Contract is signed by all parties and is in effect.**

Construction Guidelines

The designated IAISRR representative shall be notified in writing **at least fifteen** working days **prior to beginning construction** so appropriate safety precautions may be taken. All flagging protection provided by IAISRR is considered incidental to the project and will be provided at Industry's expense.

Costs Associated with Track Construction

All design, engineering, and construction, including flagging protection, shall be performed at the Industry 's expense. Construction includes, but is not necessarily limited to overhead or underground utility adjustments, the installation of drainage facilities and/or structures under or along the proposed trackage, clearing, grubbing, any required fill or excavation, compaction, stabilization, and placement of subballast both on and off IAISRR property. Private track construction costs include, but are not limited to rail, ties, ballast, turnouts, road crossings, miscellaneous track material, and the labor.

Connection of Industry Track to IAISRR Track

The connection of the Industry Track to IAISRR Track shall be by the Industry's contractor, at the Industry's expense, and shall be performed under the direction, coordination, and protection as provided by IAISRR personnel.

Road Crossings

As a general policy the IAISRR discourages the construction of new public or private roadways across its tracks. If a project requires the construction of a new grade crossing across IAISRR-owned tracks, it will require written approval from IAISRR management and any applicable State Regulatory Agency. If approved, a separate crossing agreement shall be required. The industry shall be responsible for obtaining all permits. Crossings may require the installation of automated crossing signals. All cost for both the crossing surfaces and signals are considered incidental to the project and shall be performed at the Industry's expense.

Track Construction Materials

All materials used for construction of the proposed industry track shall meet IAISRR standards as outlined in **Section 10.00**. Once the IAISRR approves the track design, track materials may be purchased from an IAISRR-approved vendor, and installed by an IAISRR-approved contractor.

1.00 Minimum Safety Requirements for Contractors

Safety of personnel, property, rail operations and the public is of paramount importance in the prosecution of the work. **If a Contractor will be working within 25' of Active Track, his employees must be trained and certified in FRA Track Worker Safety.** As reinforcement and in furtherance of overall safety measures to be observed by the Contractor (and not by way of limitation), the following special safety rules shall be followed:

1.01
The Contractor shall keep the job site clean and free of safety and health hazards and ensure that its employees are competent and adequately trained in all safety and health aspects of the job. The Contractor shall have proper first-aid supplies available on the job site so that prompt first-aid services can be provided to any person that may be injured on the job site. The Contractor shall promptly notify the Railroad of any injuries occurring to any person that may arise during the work performed on the job site.

The Contractor shall have a non-delegable duty to control its employees and subcontractors. Anytime Contractor employees, subcontractors and their employees who are on the job site or any IAISRR property the Contractor shall exercise a diligent effort to assure that none of the afore mentioned personnel are under the influence of, or have in their possession, alcoholic beverages, illegally obtained or illegally used drug, any narcotic, or any illegal substance, or are in possession of any weapon.

1.02
All employees and subcontractors of the Contractor shall be suitably dressed to perform their duties safely and in a manner that will not interfere with their vision, hearing, or free use of their hands or feet. Only waist length shirts with sleeves and trousers that cover the entire leg are to be worn. If flare-legged trousers are worn, the trouser bottoms shall be tied to prevent catching. All employees and subcontractors shall wear sturdy protective footwear. Employees shall not wear boots (other than prescribed work boots), sandals, canvas-type shoes, or other shoes with thin soles or heels that are higher than normal. In addition, the Contractor shall require its employees and sub contractors to wear personal protective equipment as specified by IAISRR rules, regulations, or as directed by IAISRR officials overseeing work at the job site. In particular, protective equipment to be worn shall be:

1.03
Protective headgear that meets American National Standard 289.1 - latest revision. It is suggested that, for ease of identification, all hard hats bear the Contractor's or subcontractor's company emblem, logo or name.

1.04
Eye protection that meets American National Standard for occupational and educational eye and face protection, 287.1 - latest revision. Additional eye protection shall be provided to meet specific job situations such as welding, grinding, burning, etc..

1.05
Hearing protection, which affords adequate attenuation of excessive noise levels that will be encountered on the job site.

1.06
Safety footwear, lace-type with safety toes and defined heel, are recommended.

1.07
All heavy equipment provided or leased by the Contractor shall be equipped with audible backup warning devices. The Contractor's name and phone number shall be clearly displayed on said equipment.

1.08
If in the opinion of the IAISRR representative, any equipment is deemed unsafe for use on IAISRR right-of-way, the Contractor shall immediately remove such equipment from the Railroad's right-of-way at the request of the IAISRR representative.

1.09
If the Railroad's representative has given the Contractor permission to use certain equipment on any trackage at the job site, Contractor shall ensure that each and all of its employees responsible for operating any motive power including, without limitation, any high-rail equipment (such equipment hereafter being referred to as "Motive Power") on any trackage of Railroad shall be trained to know and understand, and shall comply with Railroad's operating rules applicable to the operation and use of such Motive Power.

1.10
In the event Contractor's employees use any such Motive Power to move any railcars or other railbound equipment equipped with air brakes, Contractor shall further ensure that its employees are trained to know and understand and shall comply with Railroad's rules for handling such Motive Power, cars and equipment, and that Contractor's employees perform all required tests of the operating systems of any Motive Power, cars and other equipment, before and after movement.

1.11
In the vicinity of active track operations, a clearance of 25 feet from track shall be maintained unless the contract necessitates working in close proximity of the track. (25 feet means anything working within 25 feet of the centerline of an active track, or has the potential to foul an active track, such as a crane working outside of 25 feet, but having a boom that could foul the track). When doing so, the Contractor and subcontractor, their employees and equipment must first have authorization of IAISRR. When Contractor is authorized for work in close proximity of tracks, an IAISRR flagperson shall be present. Any flagging protection provided by IAISRR shall be considered incidental to the project and will be provided at the Industry's expense.

1.12

The Contractor, subcontractors and their employees shall be familiar with procedures to clear workers and equipment from track area for approaching trains. In addition, the following safety procedures shall be adhered to:

a. Always be on the alert for moving equipment while working near any Railroad tracks or facilities.
b. Do not step or walk on the top of the rail, frog, switches, guardrails, or other track components.
c. In passing around ends of standing cars, engines, railroad machinery, and other on-track equipment, leave at least one railcar length (50 feet) between yourself and the end of the equipment.
d. Avoid walking or standing on track at any time except when performing required work.
e. When it is necessary to walk or work on track, always keep a sharp lookout in both directions for approaching trains.
f. Before stepping or crossing tracks, look in both directions first. The same is true when walking around machinery and equipment on and about the tracks.
g. Do not sit on, lie under, or cross between cars except as required in performance of your duty and only when track and equipment are under proper protection.
h. In multiple track territory, do not stand on one track while a train is passing on another.
i. **Always expect movement -at any time -on any track -in either direction**.
j. Always keep in mind that a split second of inattention can result in a serious accident.

2.00 Required Information for Submittals

2.01
Plan View of track arrangement including all existing, proposed and future tracks. All tracks shall be labeled and total length from Point of Switch (P.S.) to Point of Switch (P.S.) or Clearance Point of each track shown. All existing tracks shall be designated by a track identification number. All proposed and future tracks shall be designated as Track "A", Track "B", Track "C", etc.. Use a plan scale of 1 inch to 100 feet. **(See Exhibit "A")**

2.02
The submittals shall include the Industrial Track Standard Checklist, design plans, and any other required information. **(See Exhibit "A-1")**

2.03
Geometry for all horizontal curves shall be shown on both the **Exhibit "A"** and the detailed Construction Plans (with complete curve data including engineering stations). Calculations for horizontal curves are defined using the 100-foot chord definition method. A top of rail profile with complete vertical curve information is to be shown on the detailed Construction Plans only.

2.04
Size of turnouts, weight of rail of all existing track and weight of rail of proposed track. Show the centerline spacing between the centerline of parallel tracks and the usable length of each track.

2.05
The location (Engineering Station) for the Point of Switch on all single ended tracks will be labeled as 0+00. If the track is double ended, the turnout closest to mainline milepost 0.00 will be labeled as Engineering Station 0+00. The locations (Engineering Stations) of the 13-foot clear point and the derail shall also be shown.

2.06
Proposed type of end of track device (bumping post or earthen bumper). Show the Engineering Station of end of track. A minimum distance of one half car-length of vacant space shall be provided beyond the last car spot to the end of track device.

2.07
Horizontal clearances shall be labeled from right angles to any obstruction within 12 feet of centerline of proposed or existing tracks.

2.08
Show Engineering Stations at all locations of utilities in the vicinity of the proposed track. Typical utilities may include, but are not limited to:

a. Overhead wire line crossings: label vertical clearance relative to top of rail and voltage of line.

b. Underground utility lines: label type of line, depth relative to base of rail, proposed encasement details, and commodity of pipe.

c. All parallel lines (underground or overhead) in the vicinity of the existing or proposed track, especially FIBER OPTIC CABLES.

2.09
Site Drainage Plan shall show location, (Engineering Station) type, size and length of all drainage structures, both existing and those to be installed under and around proposed tracks. Locations shall include invert elevations relative to the top of rail. Direction of water flow and surface elevations shall be shown in the immediate project area in a manner that accurately describes post construction storm water control measures, including all existing drainage structures in the immediate vicinity. **(See Sec. 7.00 & Exhibit "K")**

2.10
Fences in vicinity of tracks including location of all gates crossing track (Engineering Station and typical gate section required). Show the clearance from centerline of track when gate is open. All gates and fences must be installed to meet IAISRR minimum clearances of nine (9) feet. All gates over railroad tracks must have gatekeepers. Gates shall have the capability of being locked with two locks, a Railroad-supplied lock and an industry-supplied lock. Inspection of fences and gates shall be done on an ongoing basis.

2.11
Location (Engineering Station) and clearance to any car-pulling devices to be installed along proposed track or other type of car-moving equipment to be used. Sheave blocks within 9 feet of track centerline shall not extend beyond the top of rail.

2.12
Location (Engineering Station) of under-track unloading structure along or load-bearing reinforced concrete structures with three sets of detailed structural plans which shall show type of construction, placement of reinforcing steel in concrete, thickness of walls and floors, type and size of rail supporting beams, weight of rail to be used over the structure, and method of fastening the rail to the beams. Designs shall conform to the most recent edition of AREMA Manual of Railway Engineering, Chapter 15, Section 8.4. All structural plans shall be certified and signed by a Registered Professional Engineer who is currently licensed in the state the project is within. All structures shall be designed to carry at least Cooper E80 live load in addition to all other loads.

2.14
Show locations (Engineering Station) and details of all overhead loading devices, and side-unloading racks with drop platforms. Details shall include size and location of supports, footings, vertical and horizontal clearance. Show clearance envelope relative minimum clearances of devices when in use and when retracted for train movement.

2.15
Iowa Interstate Railroad standard rail and tie configurations are to be used. **(See Section 10.00)** If any other type of track support system is to be used, detailed structural plans and calculations shall be provided for engineering review and approval.

2.16
All tracks used for loading or unloading of flammable commodities shall be equipped with provisions for track grounding. The section of track on which any part of a tank car may stand during loading or unloading of a flammable liquid or flammable compressed gas shall be bonded and electrically grounded at each rail.

2.17
Industry shall provide electrical service if the proposed track project requires power for any facilities including, but not limited to, wayside signals, active warning devices, site illumination, impaired clearance signs, or any facilities that require electrical power.

2.18
Location (Engineering Station) of existing and proposed buildings, including unloading docks, ramps or unloading doors.

3.00 Track Alignment Specifications

3.01
Tracks shall be designed with the minimum degree of curvature that is practicable and attainable. Horizontal curves of 10° 00' (Chord Definition) (Radius = 573.69 feet) or less, are preferred, with a maximum of 12° 30' (Radius = 459.28 feet) acceptable if a lesser degree of curvature is not attainable. Curves greater than 12° 30' require prior approval of IAISRR Chief Engineer.

Design objectives shall minimize the degree of curvature in order to minimize Industry maintenance expense.

3.02
Permissible tangent distance shall be a minimum one car length (60 feet to 100 feet) between reverse curves. **(Exhibit "A-3")**

3.03
Track center minimums are as follows:

a. 14 feet minimum, 15 feet preferred on tangent track.

b. 15 feet if spur is adjacent to a lead track or on a curve track.

c. 20 feet if spur is adjacent to a switching lead.

d. 25 feet if spur is adjacent to a main or branch line track.

3.04
Horizontal curves shall not begin on the long ties of a turnout.

3.05
Turnouts shall conform to Iowa Interstate Railroad Common Standards for Turnout Design.

No. 11 turnouts (minimum) are required out of all main tracks and located not closer than 300 ft. to a main line curve or bridge. Main line turnouts shall use minimum 115# rail unless otherwise specified and/or approved by IAISRR Chief Engineer or a designated representative. **(Exhibit "F11-1" Though "F11-7")**

No. 9 turnouts are recommended for industrial lead and spur track installation and not for main track. Turnouts maintained by Iowa Interstate Railroad shall use minimum 115# rail unless otherwise specified and/or approved by IAISRR Chief Engineer or a designated representative. **(Exhibit "F9-1" Through "F9-6")** All mainline turnouts shall be welded in track, including frogs.

All turnouts in IAISRR-owned or maintained track shall be equipped with a standard switch stand supplied by an IAISRR approved vendor. Type of switch stand shall be

designated by IAISRR Chief Engineer or a designated representative. Mainline switches shall have high targets of green and red color. Switches in industrial tracks may have low targets of green and yellow color designated by IAISRR Chief Engineer or a designated representative. **(See Exhibits "J-1" Through "J-3")**

All turnouts in IAISRR-owned or maintained track will be constructed of new material supplied by an IAISRR-approved vendor. Turnouts in IAISRR-owned or maintained track may be required to be insulated.

For new turnouts located within 500 feet of a bridge not so equipped, construction of a footwalk with handrails on both sides for the length of the bridge shall be required.

For new turnouts located within 300 feet of a public grade crossing, a switch point lock shall be required.

3.06
Stationing of each track shall begin with 0+00 at the proposed point of switch for each new track.

4.00 Track Profile Specifications

4.01
Vertical curves shall have a minimum length of 100 feet and be designed for the longest curve practicable, with a V/L not to exceed 1.2 for Sags and 2.00 for Summits, in which V = (Grade 1) minus (Grade 2) and L = Length of Curve in Stations. Rate of change V/L = Algebraic difference in grades divided by the length of the vertical curve in 100 foot stations (degree of curve). The track should be designed to minimize the number of grade changes and use the smallest V/L as practical. **(Exhibit "A-3")**

4.02
Track Grade shall be designed for the least grade practicable, but shall not exceed 2.00%. Grades on track locations used for spotting rail cars shall not exceed 0.4%.

4.03
Vertical curves shall not begin on the long ties of a turnout. The grade from the point of switch through the long switch ties shall be equal to the existing track the turnout is coming out of.

4.04
Top of rail of existing track shall be shown for a minimum of 200 feet ahead of the proposed point of switch to 200 feet beyond the last long switch tie.

4.05
Specific description and location of benchmark(s) used to determine project elevations.

4.06
All drainage devices, new and existing, shall be shown. Type, size, length and invert elevations referenced to top of rail. **(Exhibit "K" and Section 7.00)**

4.07
All utility crossings, new and existing, under the proposed track shall be shown. Type of utility, size of casing/pipeline and relative elevations referenced to top of rail shall be shown on the profile.

4.08
Typical cross section showing subgrade, walkway and ditch details.
(Exhibit "A-2" & Exhibit "E")

4.09
Stationing of proposed track shall begin with 0+00 at the proposed point of switch for each new track. **(Exhibit "A")**

5.00 Track Clearance Requirements

5.01
Horizontal: Clearance measured at right angles to tangent track centerline shall be minimum 9 feet to nearest obstruction, including car floor height loading docks. Clearances are to be increased a minimum of (1 1/2") per degree of curve where facility is located adjacent to, or within 80 feet of a turnout or curve limits. **(Exhibit "C")**

5.02
Vertical: Clearance shall be a minimum 23 feet from top of rail to nearest overhead obstruction. Overhead wirelines shall comply with the most current edition of the National Electric Safety Code (NESC).

5.03
Liquified Petroleum Gas (LPG) and anhydrous ammonia handling clearances:
Loading and unloading devices for LPG and anhydrous ammonia facilities shall be no closer than 9 feet from centerline of tangent track. Loading and unloading tracks, storage tanks and other permanent installations are be permitted no closer than 100 feet to nearest main, branch, or running track. Exceptions to this clearance requirement require the prior written approval of IAISRR Vice President of Engineering or designated representative.

7.00 Drainage Systems Requirements

IAISRR Hydraulic Design Criteria: A complete hydrological study shall be performed any time drainage improvements are made to the IAISRR right of way, or anytime a drainage structure is added, removed or modified.

7.01
The hydrological study shall include, but is not limited to:

a) Top of rail elevations.

b) 50-year and 100-year water surface elevations for existing and proposed conditions.

c) Flow rates for 50-year and 100-year events.

d) Vicinity map of drainage area including railroad mileposts and engineering stations.

e) A detailed drawing showing the size and extents of the drainage area.

f) Locations of water flowing along the right-of-way.

g) Locations where water leaves the right-of-way.

7.02
The following IAISRR criteria for sizing bridges and culverts is used to determine the adequacy of the existing structure and proposed structure:

a) The 50-year flood elevation should not come into contact with the crown of the culvert or the low chord of the bridge, whichever is applicable.

b) The 100-year flood elevation should not exceed the track subgrade elevation at the structure.

c) If the Replacement Bridge or culvert is located in an urban or developed area, the railroad's criteria and the local criteria shall both be evaluated, and the more restrictive of the two shall be utilized.

d) If an existing structure-opening satisfies hydraulic design criteria and permits a smaller section, a smaller section that satisfies design criteria may be suggested.

7.03
If the existing bridge or culvert does not meet current hydraulic design criteria, an enlarged opening may be considered. To the extent possible, any enlargement shall be made laterally. If it is not possible to meet the criteria with maximum widening, the railroad shall be contacted to review alternatives such as relief bridges on the overbank floodplain, raising track grades, or other options. All structural designs shall meet or exceed the most current design standards of the American Railway Engineering and Maintenance-of-Way Association (AREMA). Web Site: **www.a**rema.org

8.00 Track Roadbed Specifications

8.01 Width:
On IAISRR-owned or maintained track, the 24-ft. minimum width is required. 22 feet may be used only with permission of IAISRR Engineering Department. **(Exhibit "A-2")** Additional roadbed width sufficient for placement of walkways is required along all turnouts and derails. **(Exhibit "E")**

8.02 Slopes:
Fills shall be 2H:1V unless conditions warrant flatter slopes. Cuts shall be 3H:1V in sand; not less than 1-1/2H:1V in common material with 2H:1V slopes recommended; 1H:1V in fractured rock; and 1/2H:1V in solid rock.

8.03 Compaction:
The construction subgrade shall be stabilized to a minimum depth of 6 inches and compacted to minimum 95% of the maximum density, and to within ± 2% of the optimum moisture content, as determined by ASTM D 1557, or latest revision, (Modified Procter Testing Procedures). A minimum of 95% Proctor compaction is required in the top 3 feet of subgrade and minimum 90% Proctor compaction for all remaining subgrade. Where soil conditions require, the use of lime, soil cement, or other soil stabilization per recommendations of a geotechnical soil analysis may be required.

8.04 Subballast:
Subballast will be considered fill and will not reduce the amount of ballast required for track structure. Iowa Interstate Railroad's minimum specifications for subballast are shown in **Section 9.00** and in **Exhibits "H"** & **"H-1"**. Crushed stone subballast shall consist of a minimum of 75% of the material having multiple fractured faces. Less subballast may be allowed by IAISRR Engineering Department as permitted by a geotechnical soil analysis in accordance with **Exhibit "H"**.

8.05 Side Ditches:
Side ditches along the industrial track shall consist of minimum 2'-wide, flat-bottom ditches with flowline a minimum of 2' below the finished subgrade as shown in **Exhibit "A-2"**. Larger ditches may be required, based on the hydrological analysis.

8.06 Embankments:
Material be used in the construction of embankments shall be clean and free of debris. Compaction shall meet the criteria as outlined in **Section 8.03**. The embankment shall be protected from erosion as required by the state Department of Natural Resources and local government agencies. The new embankment shall be seeded in accordance with current Chapter 7 of IaDOT Construction Standards to provide for a vegetative cover.

8.07 Rip-rap:
If flow calculations necessitate, or if suggested by IaDOT Construction Standards or local governmental rules or codes, embankments, ditches, stream channels, culvert inlets and outlets shall be protected with rip-rap.

9.00 Industrial Subballast/Base Material Requirements

9.01 Subballast:
This item shall consist of a foundation course of railroad ballast and shall be constructed in one or more courses conforming to typical sections shown on plans.

9.02 Material Requirements:
Materials shall be 100% crushed stone produced from oversized quarried aggregate, sized by crushing and produced from a naturally occurring single source. Aggregate retained on a No. 10 sieve shall consist of hard, durable particles or fragments of stone. The subballast material shall have:

(a) No more than approximately 10% freeze-thaw loss when tested in accordance with ASTM C 88-90, Standard Test Method for Soundness of Aggregate by Use of Sodium Sulfate (under 5 cycles of freeze-thaw with sodium sulfate solution).

(b) No more than 50% loss when tested in accordance with ASTM C 131-89, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

9.03 Gradation:
Subballast shall consist of gradations set forth in the following table and **Exhibit "H-1"**:

SIEVE SIZE	2"	1"	3/8"	No. 10	N0. 40	No. 200
% passing (opt.)	100	95	67	38	21	7
% passing (perm.)	100	90-100	50-84	26-50	12-30	0-10

9.04 Design Requirements:
Subballast and minimum depths are indicated on the following tables and **Exhibit "H"**:
SUBBALLAST WILL NOT BE REQUIRED WHERE SUBGRADE MATERIAL SIZES ARE NOT SMALLER THAN THE FOLLOWING GRADATIONS:

PERCENT PASSING (BY WEIGHT)	SIEVE SIZE NO. OF MESH PER / IN	GRAIN SIZE IN MM
0	200	.08
20	100	.16
38	60	.26
64	40	.42
89	20	.85
100	10	1.08

A MINIMUM OF 6” OF SUBBALLAST IS REQUIRED WHEN SUBGRADE MATERIAL SIZES ARE SMALLER THAN LISTED ABOVE, BUT NO FINER THAN THE GRADATIONS LISTED BELOW:

PERCENT PASSING (BY WEIGHT)	SIEVE SIZE NO. OF MESH PER / IN	GRAIN SIZE IN MM
19	200	.08
74	100	.16
92	60	.26
100	40	.42

A MINIMUM OF 12" OF SUBBALLAST IS REQUIRED WHEN SUBGRADE MATERIALS HAVE A GRADATION SMALLER THAN THOSE LISTED ABOVE.

9.05 Construction Methods:

A. Preparation of Subgrade: The roadbed shall be shaped to conform to the typical sections shown on plans and to the line and grades provided/approved by the IAISRR Engineer. All unstable or otherwise objectionable material shall be removed from the subgrade and replaced with approved material at the discretion of the IAISRR Engineer. The subgrade shall be properly prepared to receive subballast material.

B. Lift Thickness: Subballast shall be constructed in two or more lifts of approximate equal thickness. The maximum compacted thickness of any one lift shall not exceed 6 inches and shall be compacted to not less than 95% of the maximum density and to within ± 2% of the optimum moisture content, as determined by ASTM D 1557, or latest revision. (Modified Proctor Testing Procedures)

B. Compaction: The Contractor shall plan and coordinate his work in a manner that allows the previously placed and compacted lifts to be allowed ample time for curing and development of sufficient stability before vehicles hauling materials for subsequent lifts or any other heavy equipment is permitted on the subballast. Prior to placing the succeeding lifts of material, the surface of the lower lift shall be sufficiently moist to assure a strong bond between the lifts. The edges and/or edge slopes of the subballast shall be bladed or otherwise dressed to conform to the lines, grades and dimensions shown on the plans.

9.06 Ballast

Under **light traffic** (<2000 cars/yr.) crushed rock ballast or equivalent material shall meet AREMA Standard 5 gradation. Under **heavy traffic** (>2000 cars/yr.) crushed rock ballast, shall conform to main line quality, AREMA Standard 4A gradation. **(Exhibit "H-1")** The allowable wear, based on the Los Angeles Abrasion Test, shall be no greater than 35% per ASTM C-535. **(Exhibit "G")**

A minimum ballast depth of 15" is required between top of subballast ant top of timber ties. The full ballast section extends 9" beyond ends of tie for jointed rail, and 12" for welded rail and thence to subgrade on a slope of 3:1 or greater. Ballast shall be quarried rock, crushed to proper gradation, with full fractured faces.

10.00 Track Materials Requirements

10.01 Rail:
112-lb., 115-lb. or 119-lb. controlled cooled relay rail is required. Rail shall meet or exceed AREMA Class I Specifications.

Recommended Rail Grading Classifications

Rail Weight	Maximum Rail Wear (Inches)	
(Class I)	Top	Gage
119-115#	1/8	1/4
112#	1/8	1/4

10.02 Fastenings:

a) **Angle or Joint Bars**, new, to match rail section used. Industry to provide compromise joint bars or compromise welds to match IAISRR rail section at 13-foot clearance point. **(See Exhibit "O" and Exhibit "O-1")**

b) **Tie Plates**, new or secondhand, and double shouldered with plates with a length no smaller than 2 times the base of the rail. Track to be fully plated.

c) **Track Bolts**, new or second-hand, appropriately sized for the bolt holes in the rail section with length sufficient for a full nut and heavy-duty spring washers (new).

d) **Track Spikes**, new 5/8" x 6" or 5/8" x 6 1/4" installed per **Exhibit "O-4" and Exhibit "O-5"**.

e) **Rail Anchors**, new or reformed, box-anchored every other tie. All switch ties shall be completely box-anchored. For crossties that use elastic fasteners, rail anchors are not required. Rail Anchors shall be drive-on.

f) **Compromise Joint Bars or Compromise Field Welds** shall be utilized when rails of dissimilar rail sections are connected. Turnouts shall use the same rail section on the running rail, closure rails, and turnout components through the body of the turnout. It is the Industry's responsibility to furnish, install and maintain 6-hole compromise joint bars connecting to IAISRR owned track. All rail joints and welds should be kept out of grade crossings, where possible. **(See Exhibit "O-1")**

g) **Insulated Joints/I Bonds** to be furnished by Industry and shall be all new material. Insulated joints/I bonds will be installed by industry at locations designated by an Iowa Interstate Railroad authorized representative. **(See Exhibit "O-2")**

10.03 Timber Ties:

Medium Traffic	<2000 cars per year	7” x 9” x 8’-6” Ties @ 21” on center
Heavy Traffic	>2000 cars per year	7” x 9” x 8’-6” Ties @ 19½” on center

a) New creosoted hardwood ties only for new construction.

b) Only new timber-creosoted switch ties shall be used to accommodate turnout pattern.

10.07 Turnout Components:

All turnout components shall be new. All turnout components in IAISRR-owned or maintained track shall be new material supplied by IAISRR or an IAISRR approved vendor.

12.00 Track Construction Specifications

12.01
Experienced personnel skilled in railroad track construction shall supervise track laying and surfacing.

12.02
Ties shall be uniformly spaced center to center of tie. Ties shall be laid at right angles to the rail and at least one shall be located at the joint location as required in the FRA track standards for the class of track to which it is intended.

12.03
When handling or spacing ties, care shall be taken not to damage them with picks or hammers. Tie tongs shall be used for this purpose.

12.04
The pulling of spikes, once driven, shall be avoided insofar as is possible. When spikes are pulled, the holes shall be plugged immediately with creosoted tie plugs of proper size to completely fill the hole, or an approved form of plugging compound may be used.

12.05
The bottom of the rail, the tie plate and the wearing surface of the tie shall be cleaned before the rail is laid.

12.06
Tie plates shall be applied at the time the rail is laid to avoid unnecessary spiking. Plate shoulder shall bear against the outside base of the rail. No plate having wear of more than one fourth (1/4) of an inch over standard tie plate design shall be used.

12.07
Rails shall be unloaded, stored or distributed along the roadbed in such a manner as to prevent damage.

12.08
For jointed track, rails shall be laid with a minimum 12 foot staggered joint arrangement.

12.09
If a determination is made to stagger rail, then rails of miscellaneous lengths less than 39 feet shall be used at suitable intervals for maintaining the proper stagger of joints on curves.

12.10
Rails of less than 15 feet in length shall not be used except for temporary closures.

12.11
Expansion shims of hardwood or fiber shall be used to control expansion. The following table prescribes the correct thickness of the expansion shim for various ambient temperatures:

RAIL TEMPERATURE	33 FT. RAIL OPENING	39 FT. RAIL OPENING	78 FT. RAIL OPENING
Below 25° F.	1/4"	1/4"	1/2"
25° to 50° F.	1/8"	3/8" every other joint	3/8"
51° to 75° F.	1/8" every other joint	1/8"	1/4"
76° to 100° F.	1/8" every third joint	1/8" every other joint	1/8"
Above 100° F.			1/8" every other joint

12.12
Rails shall be laid to ensure good alignment and the rail ends shall be brought squarely together against expansion shims and shall be bolted before spiking.

12.13
Rails shall be cut square and cleanly by means of rail saws. Holes for complete bolting of cut rails shall be drilled according to IAISRR Specifications. Under no circumstances shall new holes be drilled between two holes already drilled. Cutting rails or drilling holes in cut rails by means of acetylene or electric torch shall not be permitted.

12.14
The appropriate number of bolts shall be applied according to the rail joint used. The nuts of all bolts shall alternate uniformly inside and outside of each joint. Every bolt shall be equipped with a new spring washer, appropriately sized to the diameter of the bolt used.

12.15
The right-hand rail going away from the switch points or the outside rail on curves shall first be spiked in position in its proper relation to the lined end of ties. The opposite rail shall then be spiked to true gage (4'-8 1/2”). Curved track shall be gauged as follows:

a) Lay track to standard gauge on tangents and curves of less than 6 degrees.

b) Lay track to a gauge of 56-3/4” on curves of 6 degrees or greater. In any case, no gage less than 56-1/2” shall be allowed.

12.16
On tangent track and on curves of up to 6 degrees, two spikes (one inside and one outside the base of rail) shall be used to fasten each rail to each tie. On curves of 6 degrees, two inside and one outside, shall be used on each tie plate.

12.17
Spikes shall be staggered so that the outside spikes shall be on the same side of the tie and the inside spikes shall be on the opposite side. **(See Exhibit "O-5")**

12.18
Rail shall not be struck with maul or heavy tool when spiking, gauging or lining.

12.19
Spikes shall be started vertically and square and be driven straight with full bearing against the base of the rail. Straightening with maul of spikes started crooked shall not be permitted. Spikes started crooked shall be pulled, the holes plugged and spikes re-driven. Immediately after completion of track surfacing, spikes shall be settled in place with the underside of the head of the spike contacting the top of base with a minimum of pressure.

12.20
When the track has been raised to within 4 inches of final grade and properly compacted, the final lift shall be made by jacking the track up to the exact elevation indicated by the grade stakes. The ballast shall then be tamped under the ties. The space extending from 15 inches inside either rail to the ends of the ties shall be thoroughly tamped. The tie centers shall be left un-tamped. Unless otherwise authorized, this final lift shall be tamped with tamping bars, tamping picks or by approved tamping machines. In making the finishing lift, the spot board and level board shall be used with care and the track brought to a true surface and indicated elevation.

12.21
After track has been brought to true surface, elevation and grade, it shall be given a final lining and placed in true alignment.

12.22
Turnouts shall be constructed of all new rail and other track material. Unless otherwise approved in writing by the Office of the Vice President - Engineering, all turnouts shall be fabricated to IAISRR standards. Turnouts in IAISRR owned or maintained track shall be constructed using all new rail and other track material supplied by an IAISRR-approved vendor using welded-rail construction.

12.23
Road crossings on industry-owned trackage may be constructed with plank and asphalt or entirely with asphalt. Maintain the flangeway opening along the gage side of the running rail at no less than 3 inches. All crossings on Iowa Interstate Railroad-owned trackage shall be constructed with IAISRR approved precast concrete crossing material. **(See Exhibit "L-3")**

12.24
Timber crossing materials shall conform to **Exhibit "L"** and shall be square-edged and of sound creosoted planks of fir or hemlock, or equal, with the height of plank equal the distance from top of tie to top of rail. The planks shall be fastened with countersunk 3/4" x 12" galvanized Lewis washer head drive spikes, in predrilled holes.

12.25
Each crossing location will be evaluated individually by the Railroad (and Road Authority if applicable) to determine minimum crossing surface material requirements. Crossings may necessitate the use of precast concrete materials. Determination of type of warning devices on public roadways will be made by a joint recommendation of Railroad, road authority, and/or government regulatory body.

12.26
Earthen bumpers shall be used whenever possible. If bumping posts are used, they shall be Hayes heavy-duty type, or approved equal. **(See Exhibit "D")**

13.00 Derail Requirements

13.01
Derails shall be clearly visible. Derails are required for all new construction and modification of any existing trackage, and shall be appropriately sized for the designated rail section, complete with proper-length connecting rod and operating stand. The type of derail required, its placement, and type of switch stand to be used shall be determined by the Office of the Vice President -Engineering or his authorized representative, and will be dependent on track gradient, independent movement of cars by the Industry, and anticipated track use**.** Derails in signaled territory or near crossing circuitry shall be placed at a point sufficiently ahead of the insulated joints so equipment is derailed before fouling track circuit. Derails may require signal insulation material as required by Railroad. If insulation material is required, it shall be installed by industry at locations designated by the Railroad. Walkways conforming to **Exhibit "E"** shall be installed around all derail switch stands.

13.02
Placement of derails shall be made in such a manner as to avoid conflicts with adjacent tracks, railroad signal installations, communication lines, power lines, pipelines (overhead or underground), roadways, ditches, waterways, storage tanks, buildings, or other structures.

14.00 Walkway Requirements

14.01 Safety:
Walkways shall be constructed and maintained to provide a reasonable regular surface and shall be maintained in a safe condition clear of vegetation, debris, standing water, and other obstruction, which constitute a hazard.

14.02 Grades and Slopes:
Walkway grades shall not exceed 8:1 in any direction. Slopes of greater than 8:1 are permissible where the proximity of adjacent tracks make an 8:1 grade impracticable, as long as the slope between tracks is held constant.

14.03 Construction:
For walkway standards refer to **Exhibit "E".** Walkways shall be constructed to a minimum width of 8' 6", as measured from the centerline of track. Walkways shall be constructed and maintained in such a manner that the elevation of its surface is at least level with the top of ties, but not higher than the top of rail. Walkways are to be constructed per AREMA Standard 57 ballast unless prior approval for alternate size material is granted by Railroad's Chief Engineer or his authorized representative.

14.04 Requirements:
Walkways shall be located along both sides of the track for a minimum distance of 125 feet on each side of every switch stand or other trackside switch-throwing mechanism. Walkways are required around all derail switch stands.

14.05 Minimum Distances:
Walkways shall be continuous and maintained from the switch stand through the switch frog and along the diverging track. An additional 3 feet of walkway width shall extend for a minimum distance of 4 feet in each direction from the switch stand or other trackside switch-throwing mechanism on the side of the track where said mechanism is located. This additional 3 feet of width shall be gradually tapered back to the 8' 6" minimum width, as measured from the centerline of track, within a distance of not less than 20 feet.

14.06 Guideline:
These Specifications are provided only as a guideline for design and should not be taken as authority to construct walkways. All walkway construction shall conform to IAISRR, Federal, State or Local specifications whichever is the most protective from a safety standpoint. All walkway construction shall comply with current and applicable Federal, State and Local laws. Contractors shall be responsible for the proper construction of all walkways.

15.00 Bridge Footwalk and Handrail Requirements

Any bridge located within 500 feet of a proposed point of switch shall have footwalk and handrail on both sides of the structure.

16.00 Field Welding

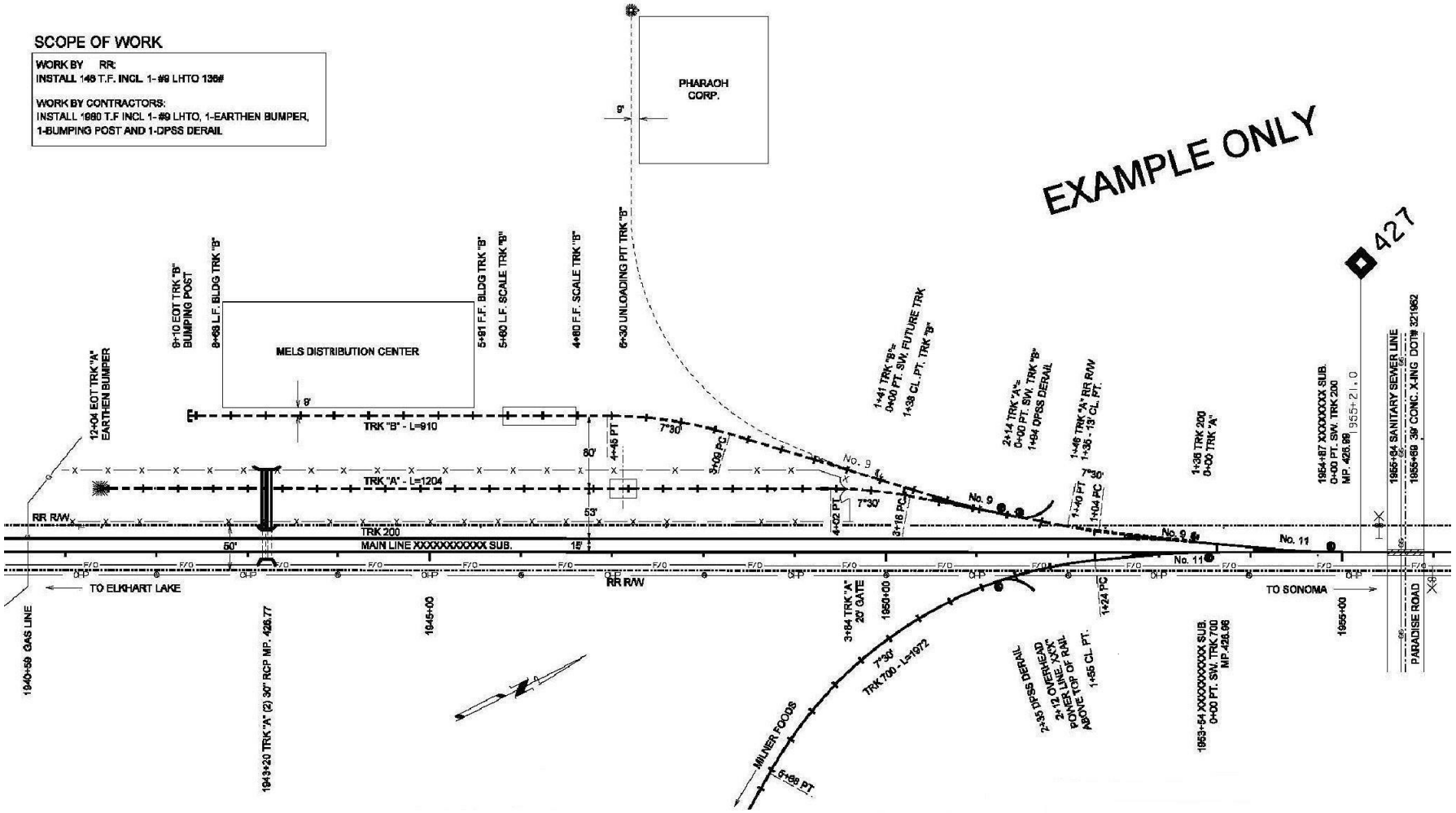
Make Field Welds in accordance with current procedures as prescribed by AREMA and IAISRR CWR Policy. IAISRR CWR Policy information is available upon request from the IAISRR Engineering Office, located in Cedar Rapids, Iowa.

It is the Policy of IAISRR that all Field Welds made on Railroad-owned or maintained track shall be inspected by the Roadmaster or his designated representative.

SCOPE OF WORK

WORK BY RR:
INSTALL 149 T.F. INCL 1- #9 LHTO 136#

WORK BY CONTRACTORS:
INSTALL 1980 T.F INCL 1- #9 LHTO, 1-EARTHEN BUMPER, 1-BUMPING POST AND 1-DPSS DERAIL



LEGEND:
- Existing Railroad Owned Trackage
- Proposed Railroad Owned Trackage
- Existing Industry Owned Trackage
- Proposed Industry Owned Trackage
- Future Industry Owned Trackage
- Fiber Optic Cable (F/O)
- Railroad Right Of Way
- Fence (X)

Exhibit "A"

FIBER OPTIC CABLE! CALL BEFORE YOU DIG 1-800-336-9193

REVISION #	BY	DATE	DESCRIPTION
12/1/2007	SJS	12/1/2007	ADDED FUTURE TRACK CONCEPT

IOWA INTERSTATE RAILROAD

Your Company Name

Milepost xxx.xx, Subdivision #
City(or Sec. Twp, Rng), County, State
Serving: Mel's Corporation

Drawn By: I. M. Drafter Date: 12/1/2007

Iowa Interstate Railroad, Ltd.

Plan Review Checklist for Industry Track Standards

Check	Item	Required Information	Min. Req. for Plans	
			Exhibit A	Const Plans
☐	1	Curve Data (D, PC, PT, Stationing)	Required	Required
☐	2	Location (Stationing) and milepost of existing & proposed Turnouts, including corresponding location of new connection to IAIS-Owned tracks.	Required	Required
☐	3	Location (Stationing) of the 13-foot clearance point (s) for new and existing industrial track (s).	Required	Required
☐	4	ROW Lines & dimensions to the Main Track or Lead Track	Required	Required
☐	5	Stationing at CL of track where it crosses the ROW	Required	Required
☐	6	Stationing of Point of Derail & type of derail	Required	Required
☐	7	Centerline Station of end-of-track Device & Type	Required	Required
☐	8	Station of any fixed Car Pulling Devices	Required	Required
☐	9	Station of all Unloading Pits and Track Scales	Required	Required
☐	10	Station of proposed Docks, Platforms, etc. (Incl. length & clearance)	Required	Required
☐	11	Station of all Fences & Gates	Required	Required
☐	12	Station of existing and proposed Road Crossings (Incl. Surface type & length)	Required	Required
☐	13	Station of any impaired Horizontal or Vertical Clearances	Required	Required
☐	14	Station of existing & proposed Drainage Structures (Incl. Size & Type)	Required	Required
☐	15	Stationing of Railroad Bridges within 500' of a Turnout (Incl. type & length)	Required	Required
☐	16	2 Sets or Printed Plans and a CD of AutoCAD files in version 2004 or greater	Required	Required
☐	17	Existing and Proposed tracks use IAIS standardized symbology	Required	Required
☐	18	Overhead Structures (Cross Sections with all Clearances to Track)	Required	Required
☐	19	Plan Size of not larger than 11"x17" (Multiple Pages are acceptable)	Required	Required
☐	20	Show North Arrow and Terminal Directions along any existing IAIS track	Required	Required
☐	21	Plan Scale of 1"=100' (No smaller than 1"=200')	Required	Required
☐	22	Existing and proposed weight of rail noted	Required	Required
☐	23	Stationing of existing and proposed Pipes on Plans and Profiles (Type, size, Inverts, etc.)	No	Required
☐	24	Vertical Curves and Stationing of all Cardinal Points	No	Required
☐	25	Top-of-Rail profiles for a minimum of 200', each way of Switch on existing track	No	Required
☐	26	Detailed Plans and Shop Drawings for any proposed Track-Supporting Structure including Rail-Fastening system	No	Required
☐	27	Typical Cross Section of Side Ditches	No	Required
☐	28	Location of all RR Signal Signs, Utilities, (above or below grade) and all fiber optic lines buried on IAIS ROW (Incl. stationing, type and clearances)	No	Required
☐	29	Typical Track Cross Section	No	Required
☐	30	Walkway Detail	No	Required
☐	31	Track Grounding detail for loading & unloading of flammable or explosive commodities	No	Required

12/1/2007

Exhibit "A-1"

Typical Specifications & Criteria for Construction of Industrial Tracks

Drawn By: SJ Stoakes

Date: 12/1/2007

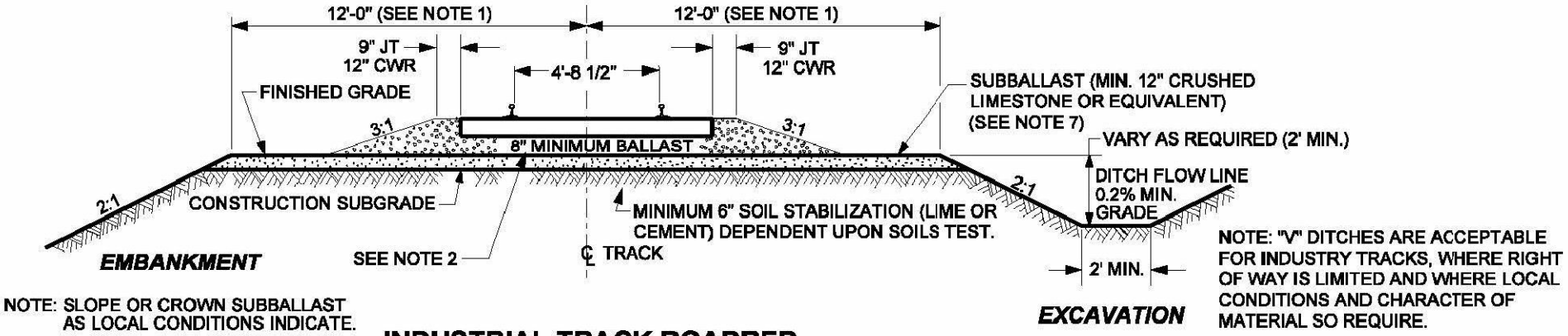
IOWA INTERSTATE RAILROAD

IOWA IAIS INTERSTATE

CALL BEFORE YOU DIG 1-800-336-9193

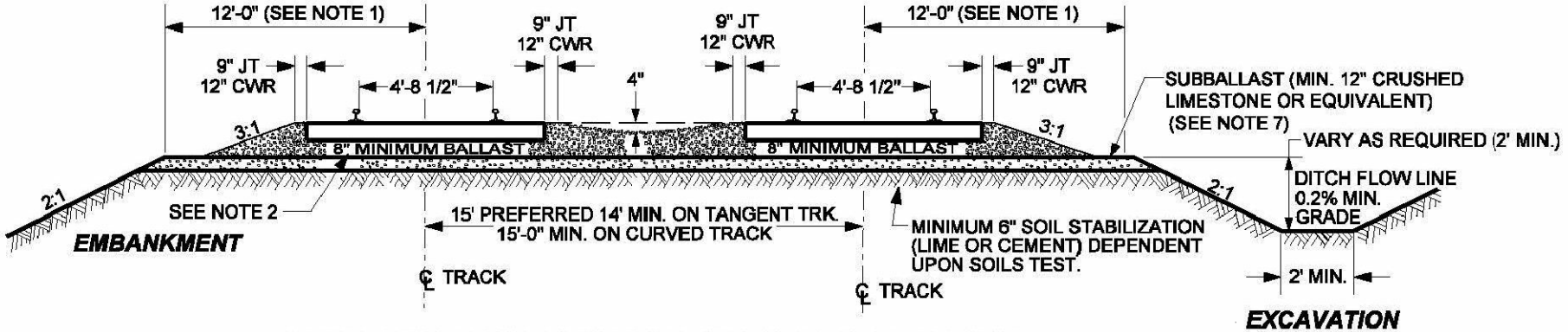
FIBER OPTIC CABLE!

REVISION # | BY | DATE | DESCRIPTION



INDUSTRIAL TRACK ROADBED

TYPICAL SECTION



INDUSTRIAL ROADBED FOR TWO OR MORE TRACKS

TYPICAL SECTION

NOTES:

1. 12' SHOULDER WIDTH STANDARD. 11 'SHOULDER MUST BE APPROVED BY CHIEF ENGINEER.
2. IF USING CONCRETE TIES - 10" MINIMUM BALLAST UNDER TIES.
3. PREFERABLY TRACKS WILL NOT BE DEPRESSED BELOW GROUND LEVEL PARTICULARLY IN SNOW AND HIGH RUNOFF TERRITORIES, TRACKS CONSTRUCTED AT OR BELOW GROUND LEVEL MUST HAVE FULL STANDARD ROADBED DITCHES.

NOTES:

4. ALL NECESSARY DRAINAGE FACILITIES TO DIVERT RUNOFF WATER AWAY FROM TRACKS ARE TO BE PROVIDED AS APPROVED BY IOWA INTERSTATE RAILROAD'S VICE PRESIDENT OF ENGINEER OR HIS DESIGNATED REPRESENTATIVE.
5. WALKWAYS WILL BE CONSTRUCTED TO COMPLY WITH STATE REQUIREMENTS.
6. THESE STANDARDS DO NOT APPLY TO ORE AND COAL LINES OR OTHER HEAVILY USED TRACKS. REFER TO EXHIBIT "H" IF LESS THAN 12" OF SUBBALLAST IS TO BE USED.

FIBER OPTIC CABLE! CALL BEFORE YOU DIG 1-800-336-9193

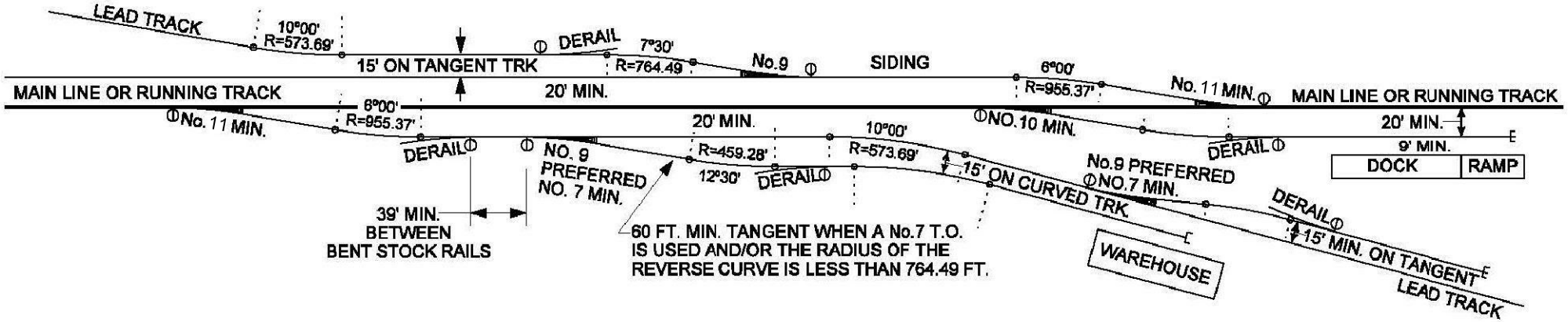
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

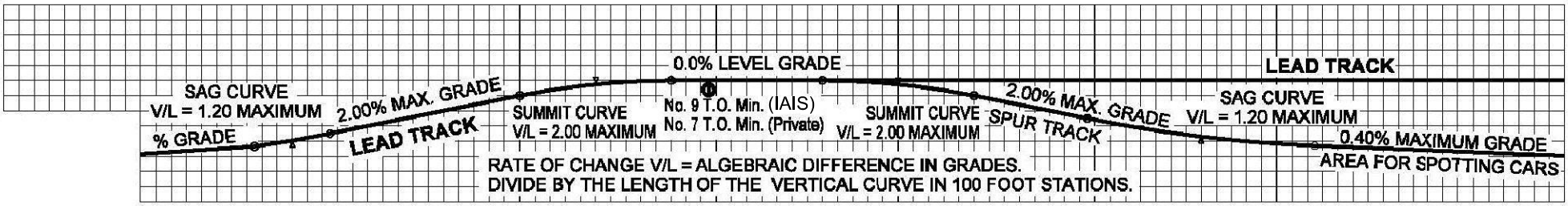
Exhibit "A-2"

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



TURNOUTS, TRACK CENTERS, CURVES AND DERAILS



GRADES AND VERTICAL CURVES

NOTES:

1. THE PREFERRED MINIMUM RADIUS OF CURVE IS SHOWN ON THIS TYPICAL LAYOUT DRAWING. WHERE POSSIBLE THE MINIMUM RADIUS SHOULD BE 573.68 FEET FOR INDUSTRIAL LEAD TRACKS, EXCEPT THAT THE RADIUS OF THE REVERSE CURVE FOR ANY TRACK ADJACENT AND PARALLEL TO A MAIN LINE, RUNNING TRACK OR SIDING TRACK SHOULD CORRESPOND TO THE THEORETICAL CURVE FOR THE TURNOUT USED FOR THE TRACK.
2. IN ALL CASES THE MINIMUM ALLOWABLE RADIUS OF A CURVE IS 459.25 FEET, EXCEPT THAT THE RADIUS ON A LEAD OR SPUR TRACK MUST BE INCREASED BY THE TRACK CENTER DISTANCE FOR EACH ADDITIONAL TRACK WHERE IT IS PLANNED TO CONSTRUCT ADDITIONAL TRACKS AS CONCENTRIC CURVES ON THE INSIDE OF A LEAD OR SPUR TRACK.
3. DERAILS SHALL BE INSTALLED TO PROTECT MAINLINE, SIDING, RUNNING OR LEAD TRACKS WHERE GRADE AND OTHER LOCAL CONDITIONS JUSTIFY THE INSTALLATION AS DETERMINED BY THE CHIEF ENGINEER.
4. THERE MUST BE AT LEAST 60 FEET OF TANGENT BETWEEN REVERSE CURVES.
5. TRACK CENTERS MUST BE AT LEAST 17-FEET WHERE NO. 7 CROSSOVERS ARE INSTALLED. MEASUREMENT FROM THE HEEL OF FROG IS PREFERRED FOR TANGENT TRACK BETWEEN TURNOUT AND REVERSE CURVE OR TANGENT CROSSOVERS, BUT MEASUREMENT FROM TOE OF FROG IS ALLOWABLE.
6. A NEW CURVE MUST BEGIN AT THE HEEL OF FROG OR BEYOND FOR ADDITIONAL CURVATURE IN THE SAME DIRECTION. BUT OF A DIFFERENT RADIUS OF CURVE THAN THE THEORETICAL CURVE OF THE TURNOUT.

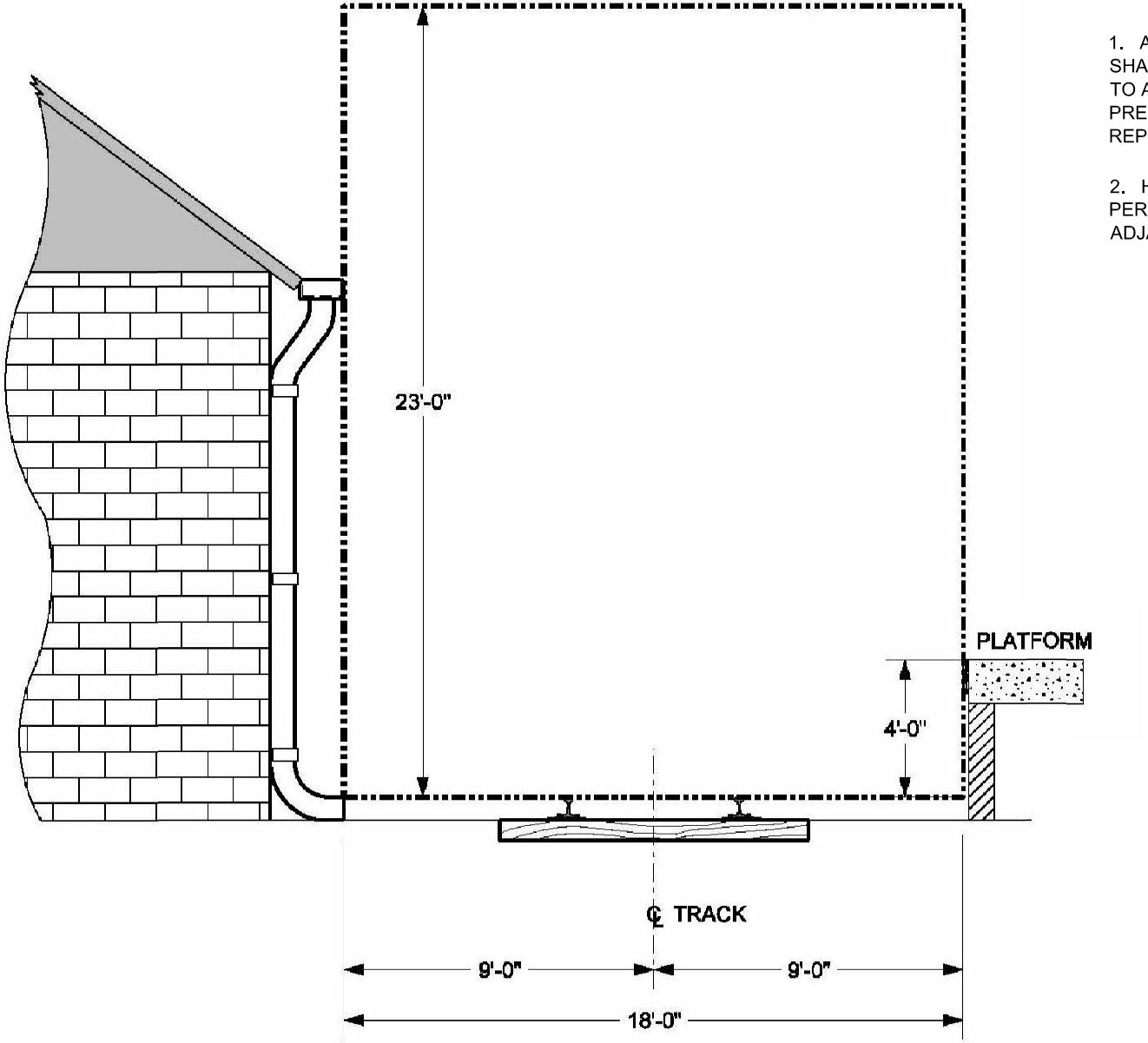
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

Exhibit "A-3"

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



NOTES:

1. ANY FACILITIES FALLING WITHIN THESE DIMENSIONS SHALL BE CONSIDERED IMPAIRED CLEARANCE AND SUBJECT TO AGREEMENT REQUIRING PRIOR APPROVAL BY IAISRR VICE PRESIDENT - ENGINEERING OR DESIGNATED REPRESENTATIVE.

2. HORIZONTAL CLEARANCES ARE TO BE INCREASED 1-½" PER DEGREE OF CURVE WHERE THE FACILITY IS LOCATED ADJACENT TO, OR WITHIN 80' OF TURNOUT OR CURVE.

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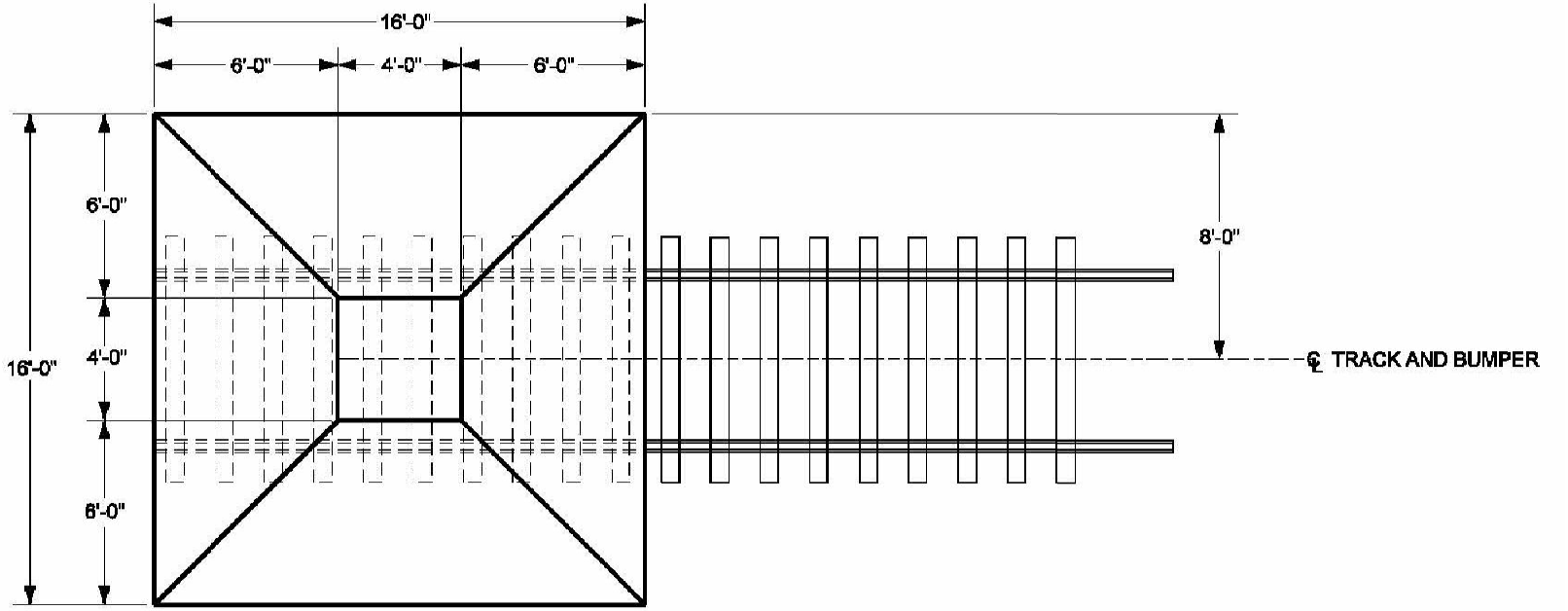
REVISION #	BY	DATE	DESCRIPTION

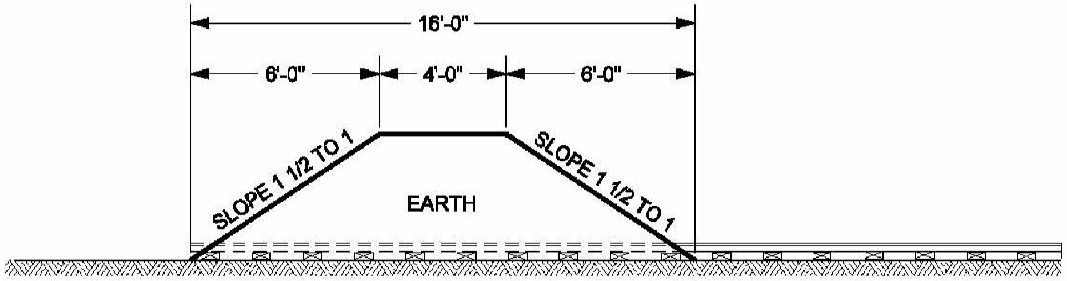
IOWA INTERSTATE RAILROAD

Exhibit "C"

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007





NOTES:

1. EARTHEN BUMPER AS SHOWN SHALL BE USED AT ALL LOCATIONS WHERE BUMPER IS REQUIRED. EXCEPTIONS MAY BE MADE ONLY BY THE VICE PRESIDENT - ENGINEERING OR APPROVED DESIGNATE WITH PRIOR WRITTEN APPROVAL.

2. SIZE OF BASE MAY BE REDUCED WHEN THE PRESCRIBED WIDTH OF THE EARTHEN BUMPER CANNOT BE ACCOMMODATED DUE TO REDUCED ROADBED WIDTH.

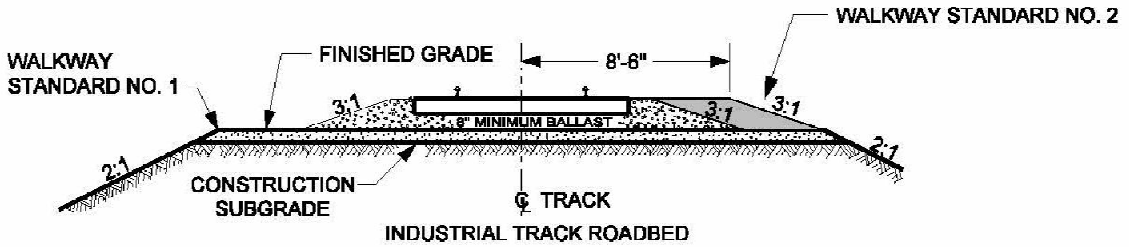
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

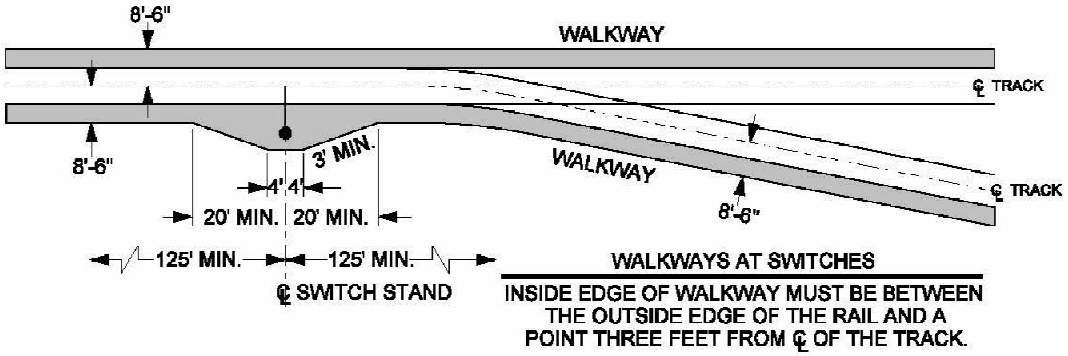
Exhibit "D"

Typical Specifications & Criteria
for Construction of Industrial Tracks

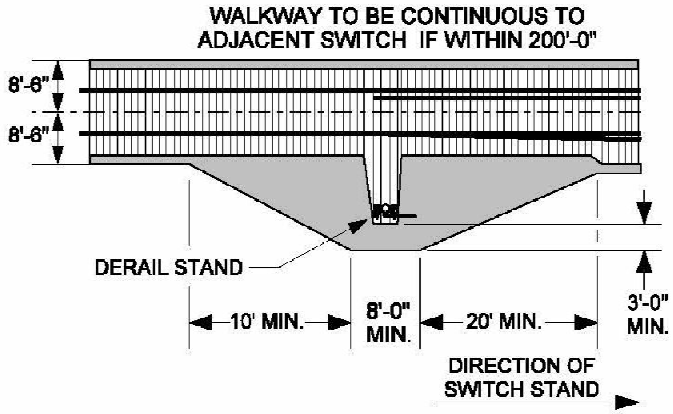
Drawn By: SJ Stoakes Date: 12/1/2007



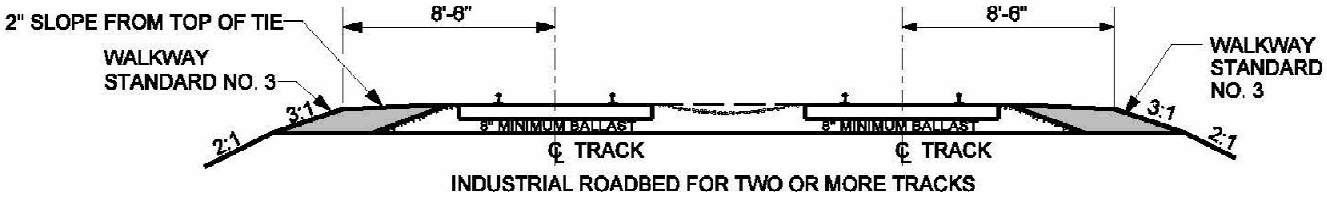
WALKWAY STANDARDS NO. 1 AND 2



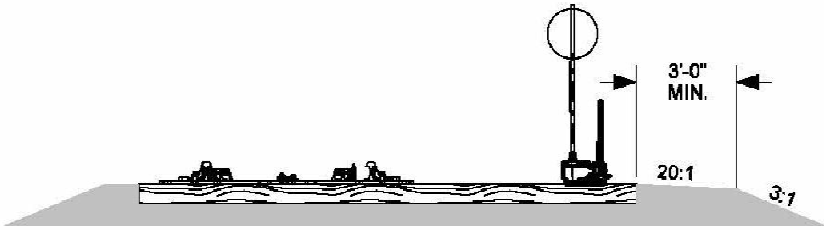
WALKWAY STANDARD NO. 3



WALKWAY STANDARD NO. 4



WALKWAY STANDARD NO. 5



TYP. SWITCH STAND SECTION

FIBER OPTIC CABLE! CALL BEFORE YOU DIG 1-800-336-9193

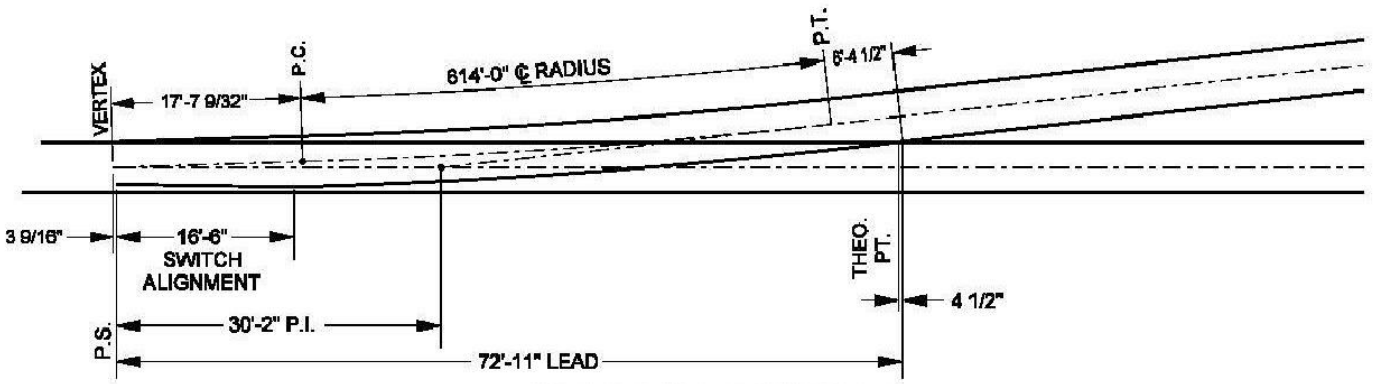
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

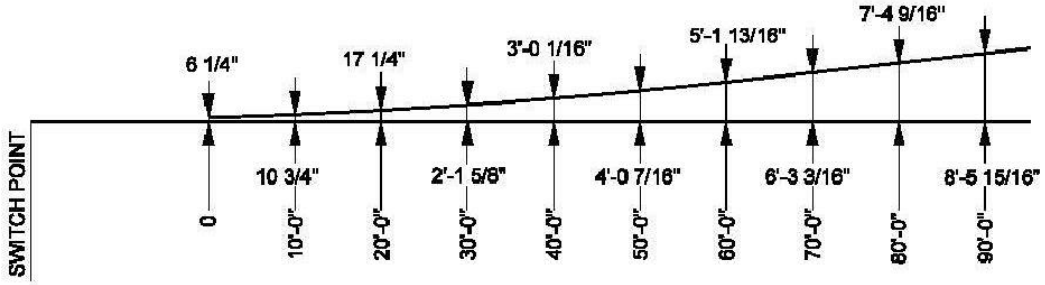
Exhibit "E"

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



GENERAL LAYOUT



SPREAD LAYOUT

SWITCH DATA		
	SWITCH LENGTH	16'-6"
	HEEL SPREAD	6 1/4"
	HEEL ANGLE	1°-46'-22"
	SWITCH ANGLE	1°-46'-22"
	THROW AT ROD #1	4 3/4"
TURNOUT POINT	THICKNESS AT POINT	0"
	RADIUS (CLOSURE CURVE)	616.3542'
	VERTEX DISTANCE	7 1/16"

FROG DATA	
ANGLE	6°-21'-35"
LENGTH	VARIES

TURNOUT DATA	
RADIUS OF CENTER LINE	614'
T =	24.59'
CENTRAL ANGLE - CLOSURE CURVE	4°35'13"
DEGREE OF CURVE	9°20'31"

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REVISION #	BY	DATE	DESCRIPTION

IOWA IAIS INTERSTATE

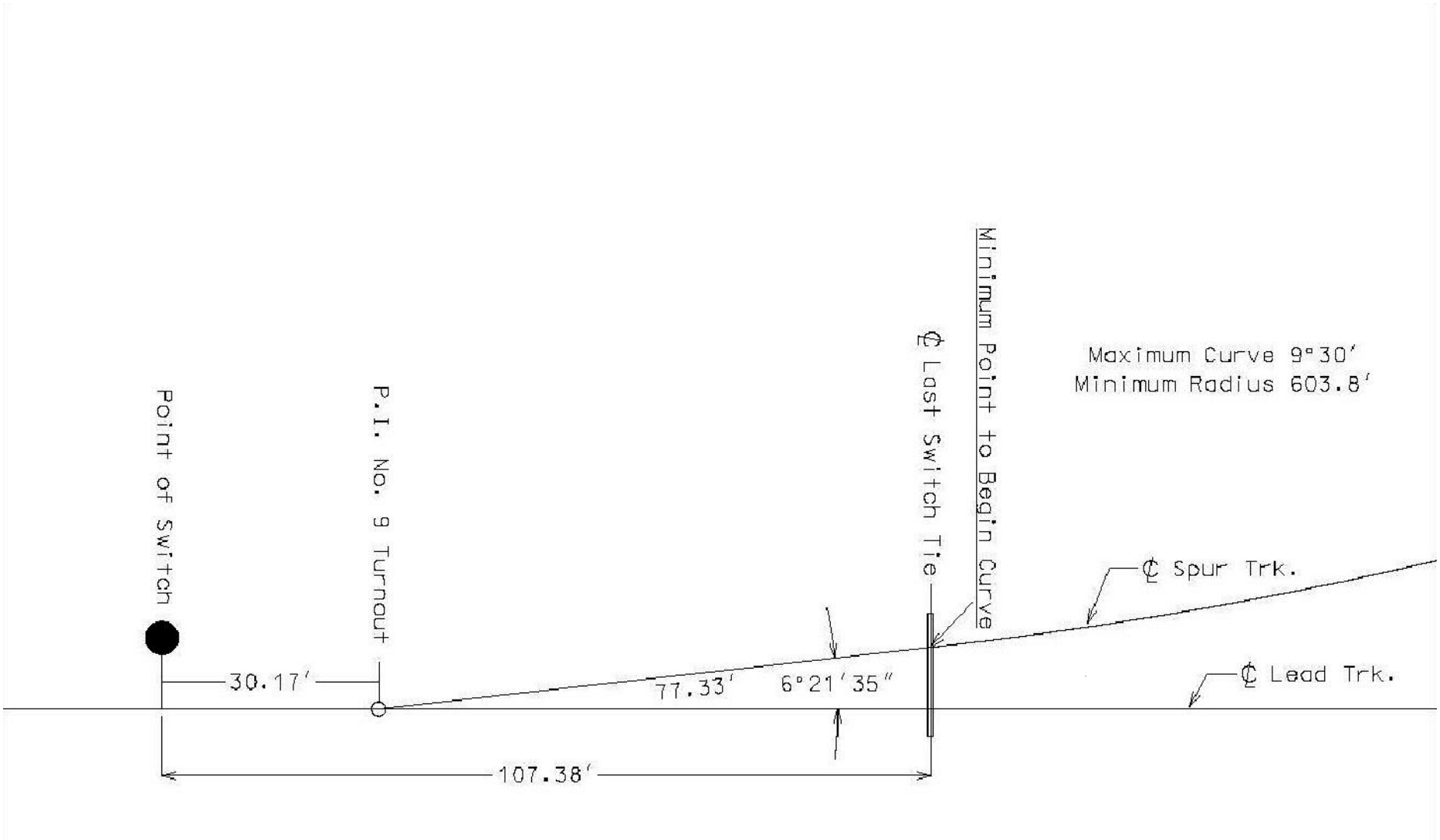
IOWA INTERSTATE RAILROAD

No. 9 Turnout

Exhibit F9-1

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



FIBER OPTIC CABLE! CALL BEFORE YOU DIG 1-800-336-9193

REVISION #	BY	DATE	DESCRIPTION

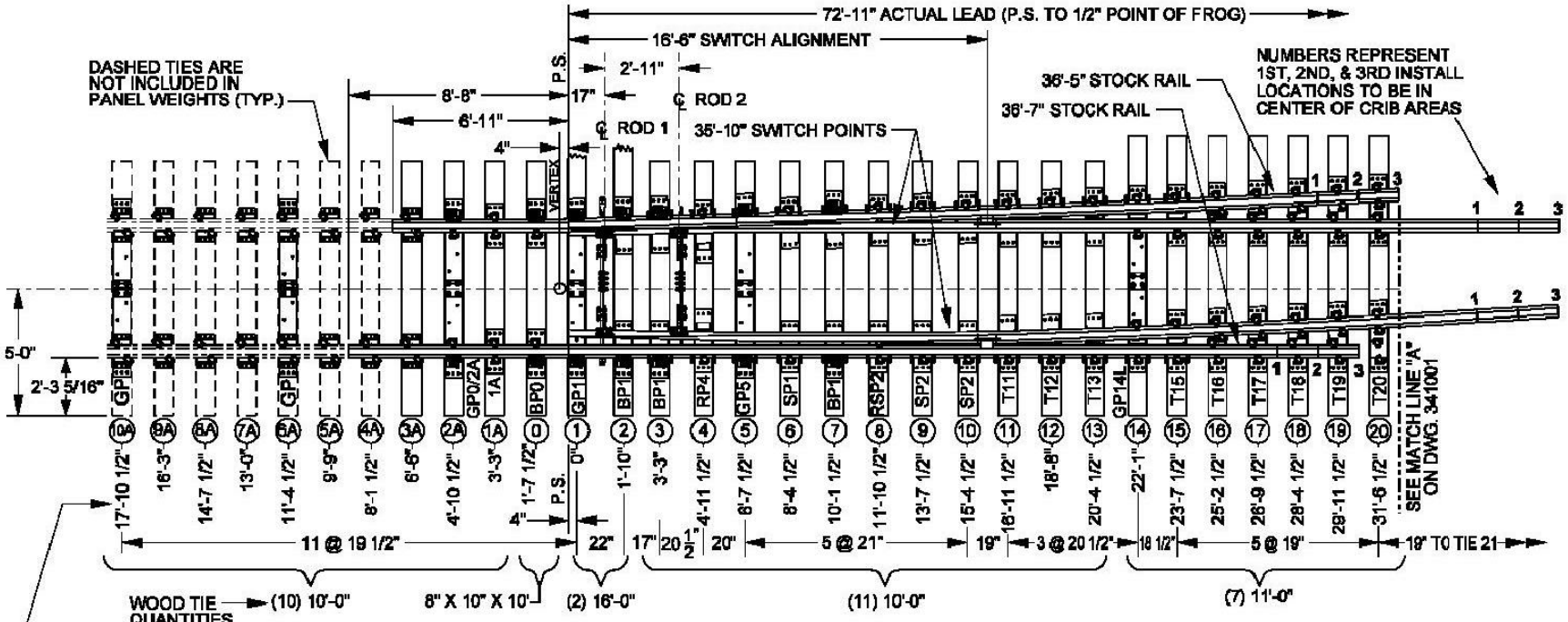
IOWA INTERSTATE RAILROAD

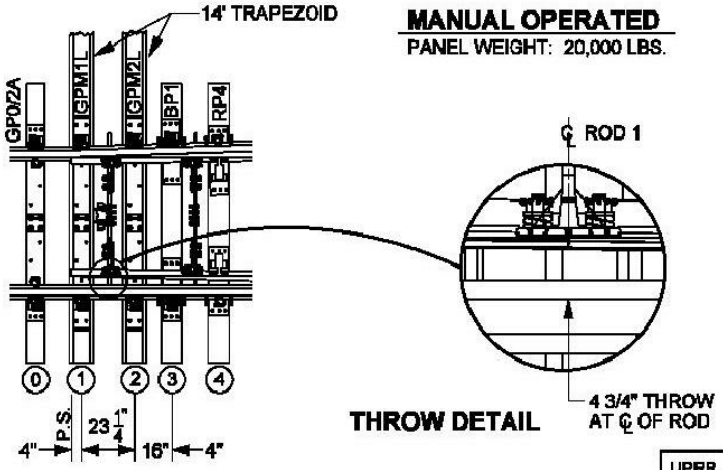
No. 9 Turnout

Exhibit F9-2

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007





MANUAL OPERATED
PANEL WEIGHT: 20,000 LBS.

POWER OPERATED
PANEL WEIGHT: 20,000 LBS.

NOTES:
1. SEE DWGS 341001, 341002, AND 341003 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 341100 FOR TURNOUT GEOMETRY.
4. SEE DWG 341200 FOR TURNOUT BILL OF MATERIAL.
5. FULLY BOX ANCHOR STOCK RAILS, TIES 3-15 FOR SHIPPING OF PANELS ONLY.
6. APPLY 5" SAFE BOND WIRES ONE CRIB AHEAD OF HEEL OF SWITCH ON STOCK AND SWITCH POINT RAILS.

	UPRR	BNSF RH	BNSF LH
POWER	N/A	518030061	518030073
MANUAL	N/A	518030074	518030075

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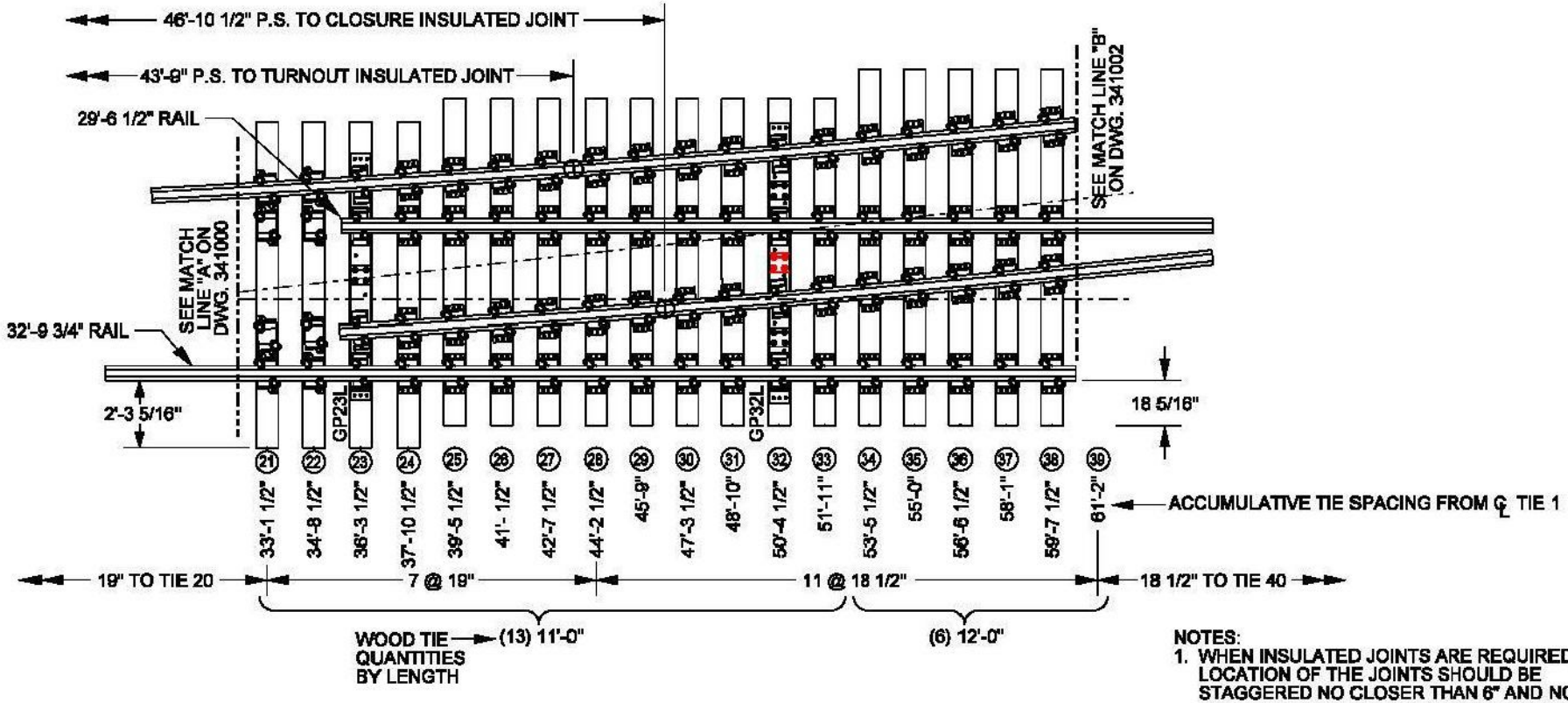
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

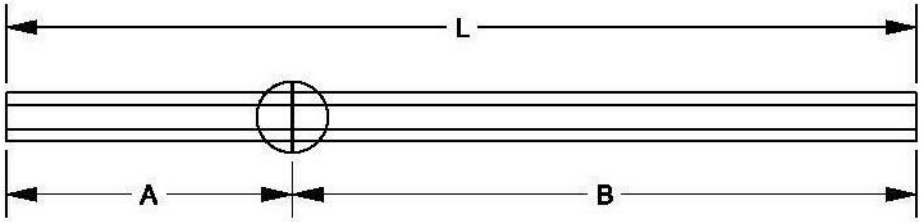
No. 9 Turnout
Exhibit F9-3

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



NOTES:
1. WHEN INSULATED JOINTS ARE REQUIRED, THE LOCATION OF THE JOINTS SHOULD BE STAGGERED NO CLOSER THAN 6" AND NOT MORE THAN 4'-6" APART, MEASURED ALONG THE TURNOUT.
2. SEE DWGS 341000, 341002, AND 341003 FOR THE BALANCE OF LAYOUT PLANS.
3. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
4. SEE DWG 341100 FOR TURNOUT GEOMETRY.
5. SEE DWG 341200 FOR TURNOUT BILL OF MATERIAL.
6. PANEL WEIGHT = 14,500 LBS.



	A	B	L
TURNOUT INSULATED JOINT RAIL	14'-3 1/4"	17'-0 3/4"	31'-4"
CLOSURE INSULATED JOINT RAIL	11'-0 1/2"	18'-7"	29'-7 1/2"

REVISION #	BY	DATE	DESCRIPTION

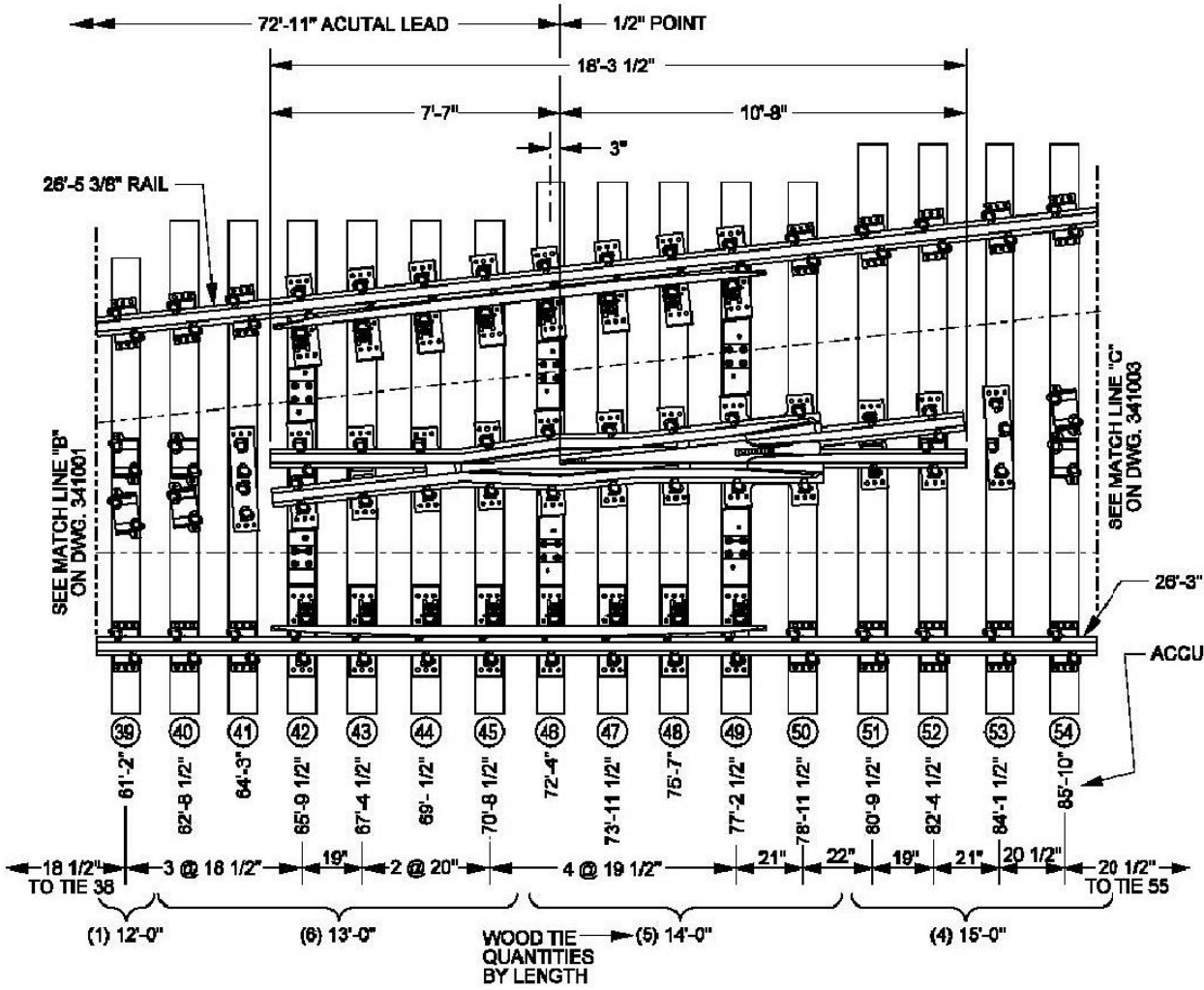
IOWA INTERSTATE RAILROAD

No. 9 Turnout

Exhibit F9-4

Typical Specifications & Criteria for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



NOTES:
1. SEE DWGS 341000, 341001, AND 341003 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 341100 FOR TURNOUT GEOMETRY.
4. SEE DWG 341200 FOR TURNOUT BILL OF MATERIAL.
5. PANEL WEIGHT = 18,000 LBS.

	UPRR	BNSF RH	BNSF LH
RBM	N/A	518030062	518030076
SOLID	N/A	518030077	518030078

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REVISION #	BY	DATE	DESCRIPTION

IOWA IAIS INTERSTATE

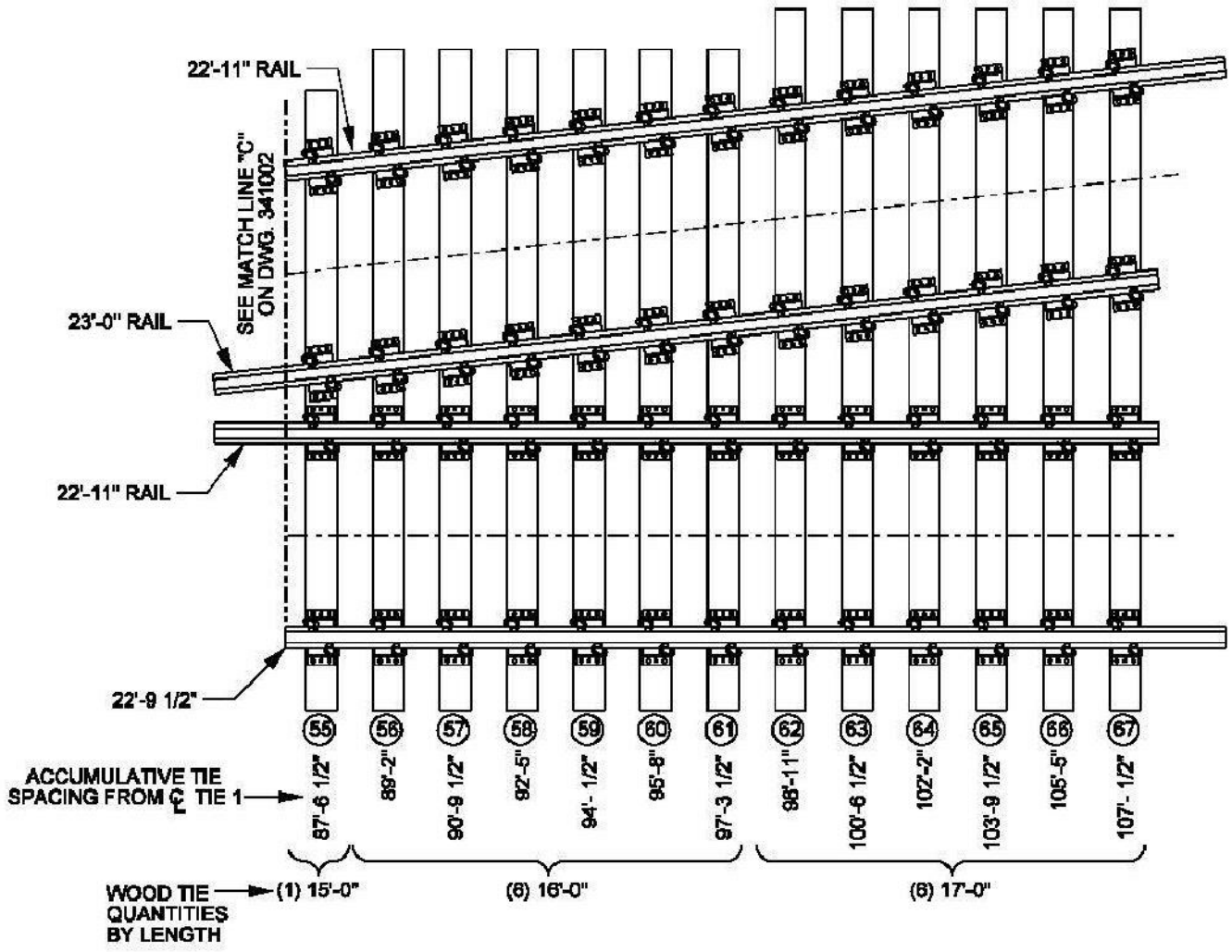
IOWA INTERSTATE RAILROAD

No. 9 Turnout

Exhibit F9-5

Typical Specifications & Criteria for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



NOTES:
1. SEE DWGS 341000, 341001, AND 341002 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. ALL TIE SPACING ON THIS DWG IS 19 1/2".
4. SEE DWG 341100 FOR TURNOUT GEOMETRY.
5. SEE DWG 341200 FOR TURNOUT BILL OF MATERIAL.
6. PANEL WEIGHT = 21,000 LBS.

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REVISION #	BY	DATE	DESCRIPTION

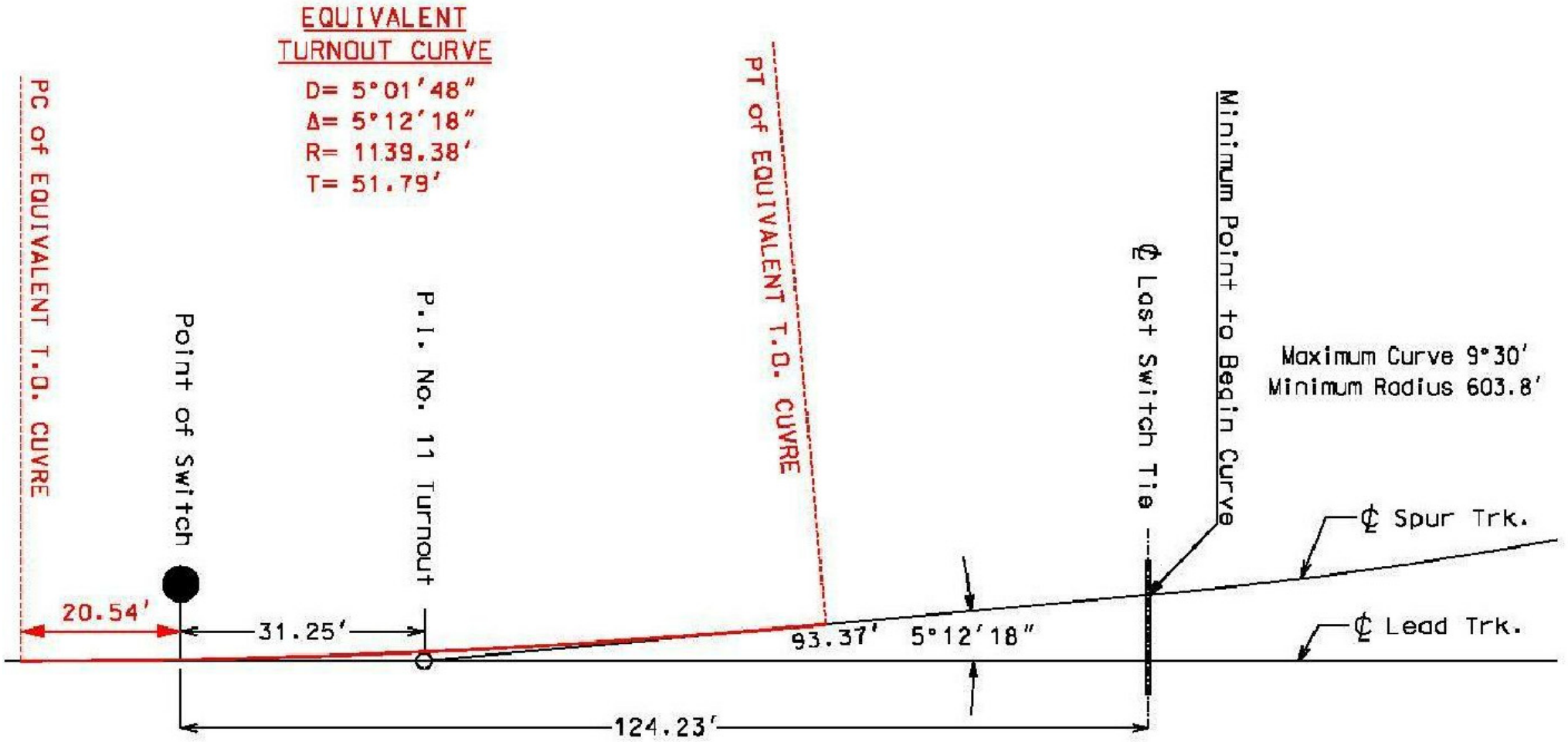
IOWA INTERSTATE RAILROAD

No. 9 Turnout

Exhibit F9-6

Typical Specifications & Criteria for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



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REVISION #	BY	DATE	DESCRIPTION

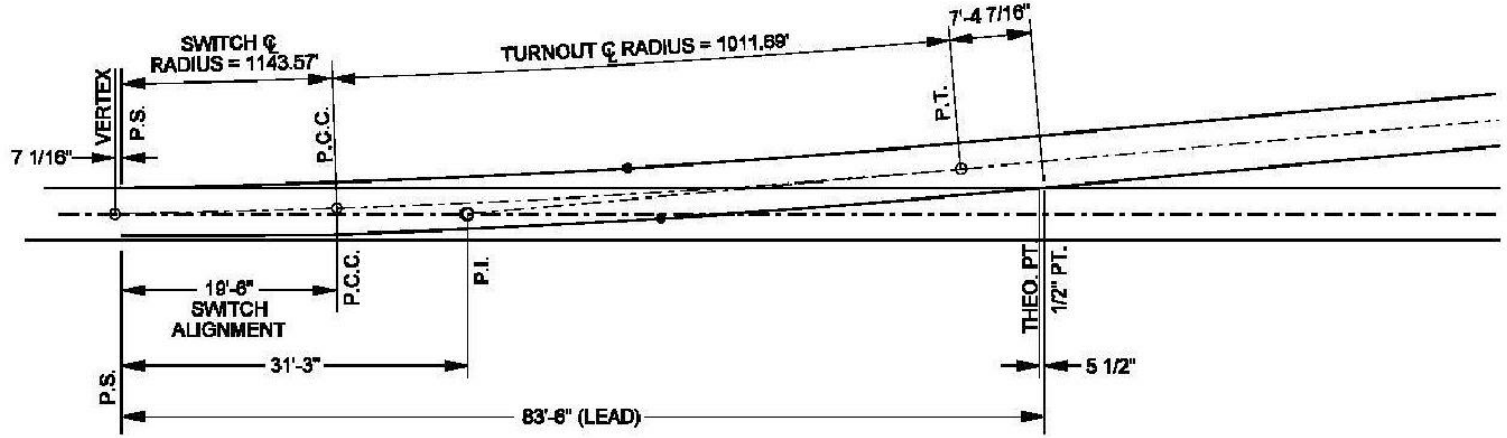
IOWA INTERSTATE RAILROAD

No. 11 Turnout

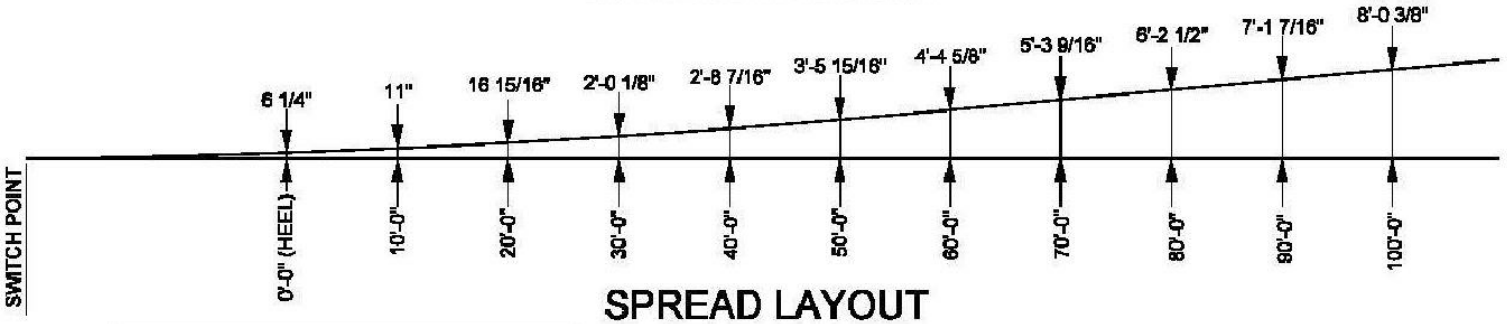
Exhibit F11-1

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



GENERAL LAYOUT



SPREAD LAYOUT

SWITCH DATA	
SWITCH LENGTH	19'-6"
HEEL SPREAD	6 1/4"
HEEL ANGLE	1°-59'-16"
SWITCH ANGLE	1°-00'-40"
THROW AT ROD #1	4 3/4"
RADIUS (CENTER LINE)	1143.57'
T =	9.69'
CENTRAL ANGLE - CLOSURE CURVE	0°58'16"
DEGREE OF CURVE	5°00'06"
TURNOUT POINT: THICKNESS AT POINT	1/8"
TURNOUT POINT: RADIUS (CLOSURE CURVE)	1145.92'
TURNOUT POINT: VERTEX DISTANCE	7 1/16"

FROG DATA	
ANGLE	5°-12'-18"
LENGTH	VARIES

TURNOUT DATA	
RADIUS OF CENTER LINE	1011.69'
T =	26.35'
CENTRAL ANGLE - CLOSURE CURVE	3°13'02"
DEGREE OF CURVE	5°40'44"

REVISION #	BY	DATE	DESCRIPTION

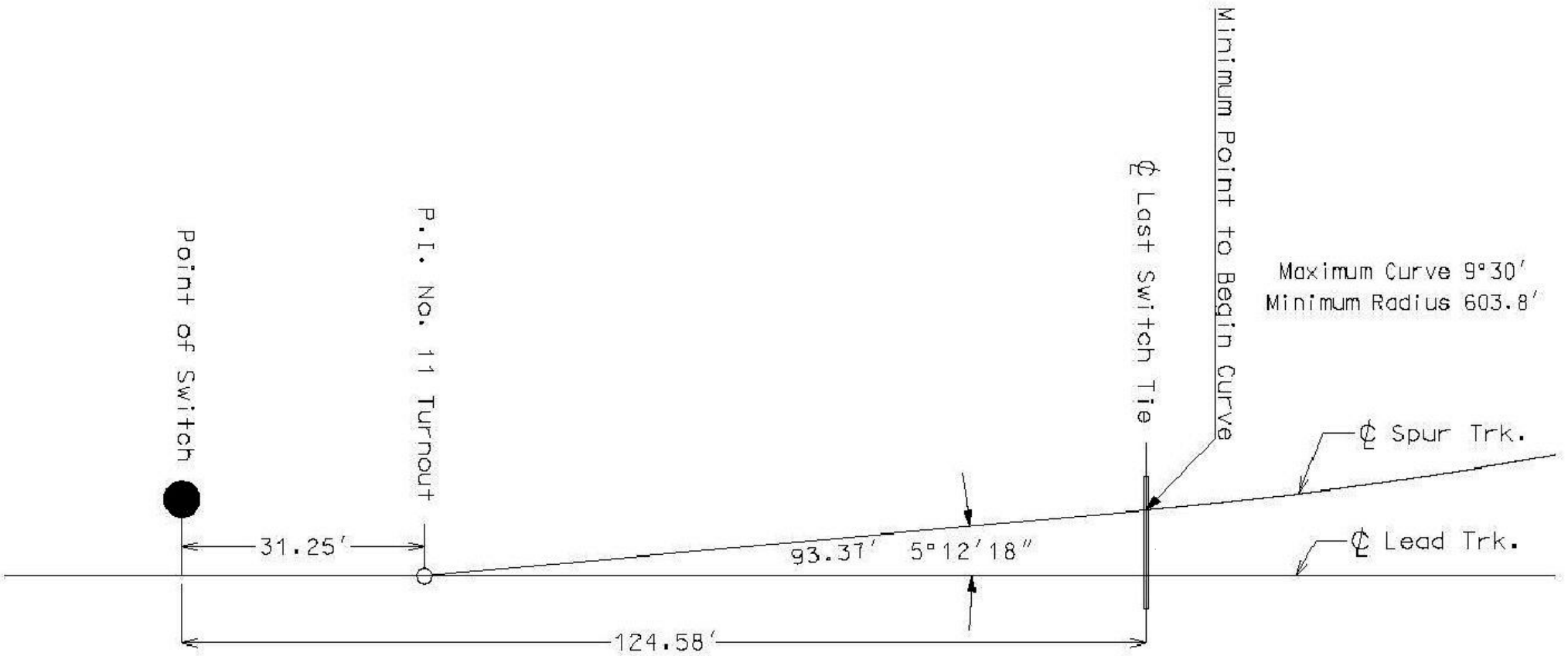
IOWA INTERSTATE RAILROAD

No. 11 Turnout

Exhibit F11-2

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



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REVISION #	BY	DATE	DESCRIPTION

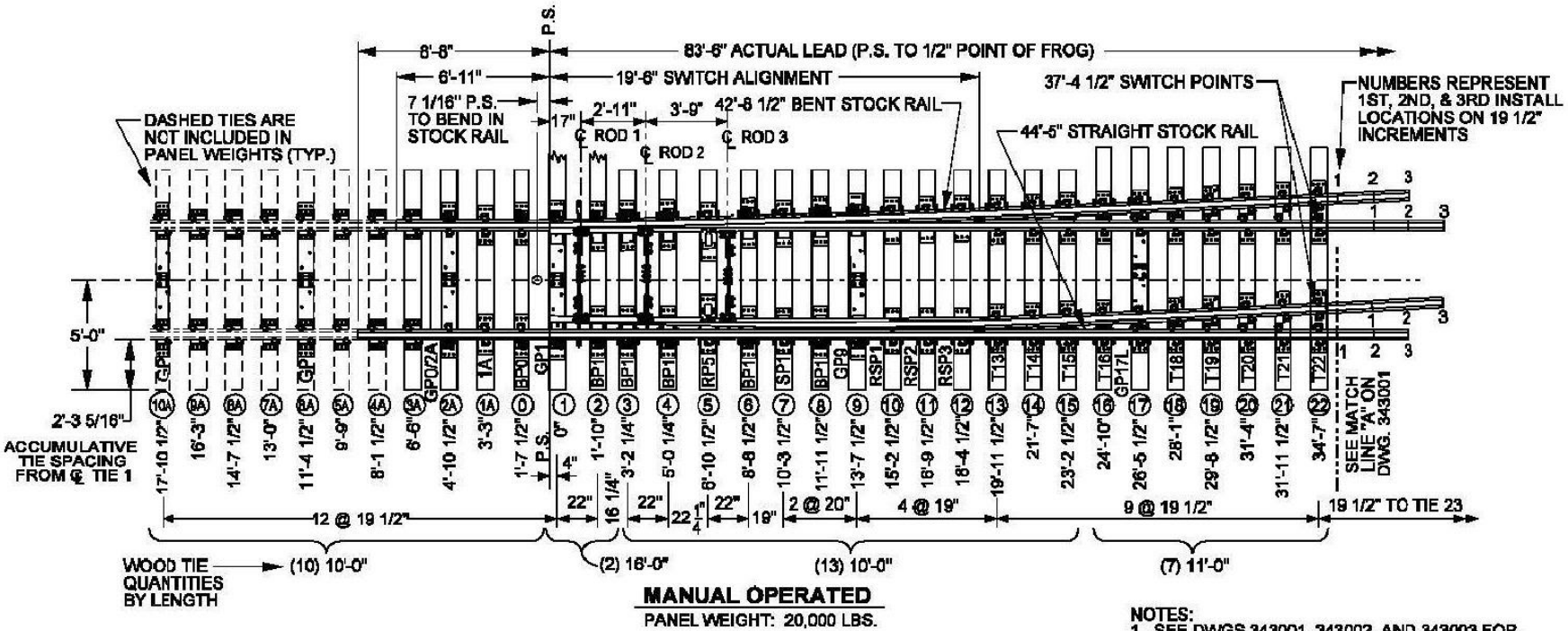
IOWA INTERSTATE RAILROAD

No. 11 Turnout

Exhibit F11-3

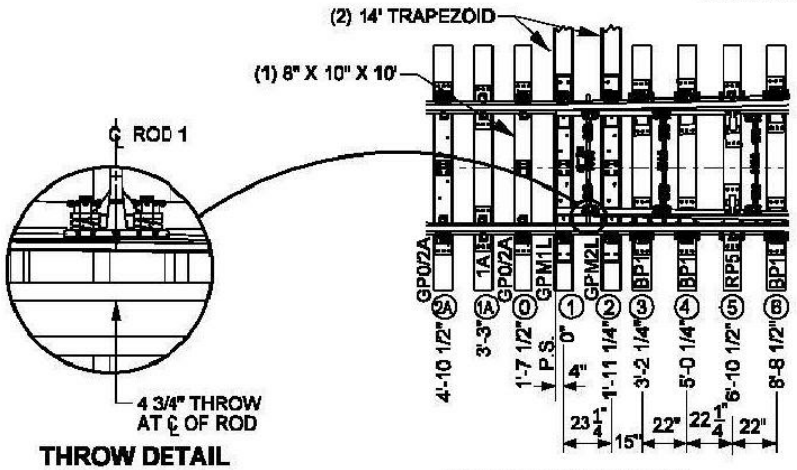
Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



MANUAL OPERATED

PANEL WEIGHT: 20,000 LBS.



THROW DETAIL

POWER OPERATED

PANEL WEIGHT: 20,000 LBS.

NOTES:
1. SEE DWGS 343001, 343002, AND 343003 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 343100 FOR TURNOUT GEOMETRY.
4. SEE DWG 343200 FOR TURNOUT BILL OF MATERIAL.
5. FULLY BOX ANCHOR STOCK RAILS, TIES 3-15 FOR SHIPPING OF PANELS ONLY.
6. APPLY 5" SAFE BOND WIRES ONE CRIB AHEAD OF HEEL OF SWITCH ON STOCK AND SWITCH POINT RAILS.
7. ALL SWITCH POINT AND STOCKRAIL DIMENSIONS ARE TO FIRST INSTALL, SEE PLAN 241500 FOR FULL LENGTH.

	UPRR	BNSF RH	BNSF LH
POWER	N/A	518030063	518030079
MANUAL	N/A	518030080	518030081
MAN. SPR. SW.	N/A	518030084	518030085

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REVISION #	BY	DATE	DESCRIPTION

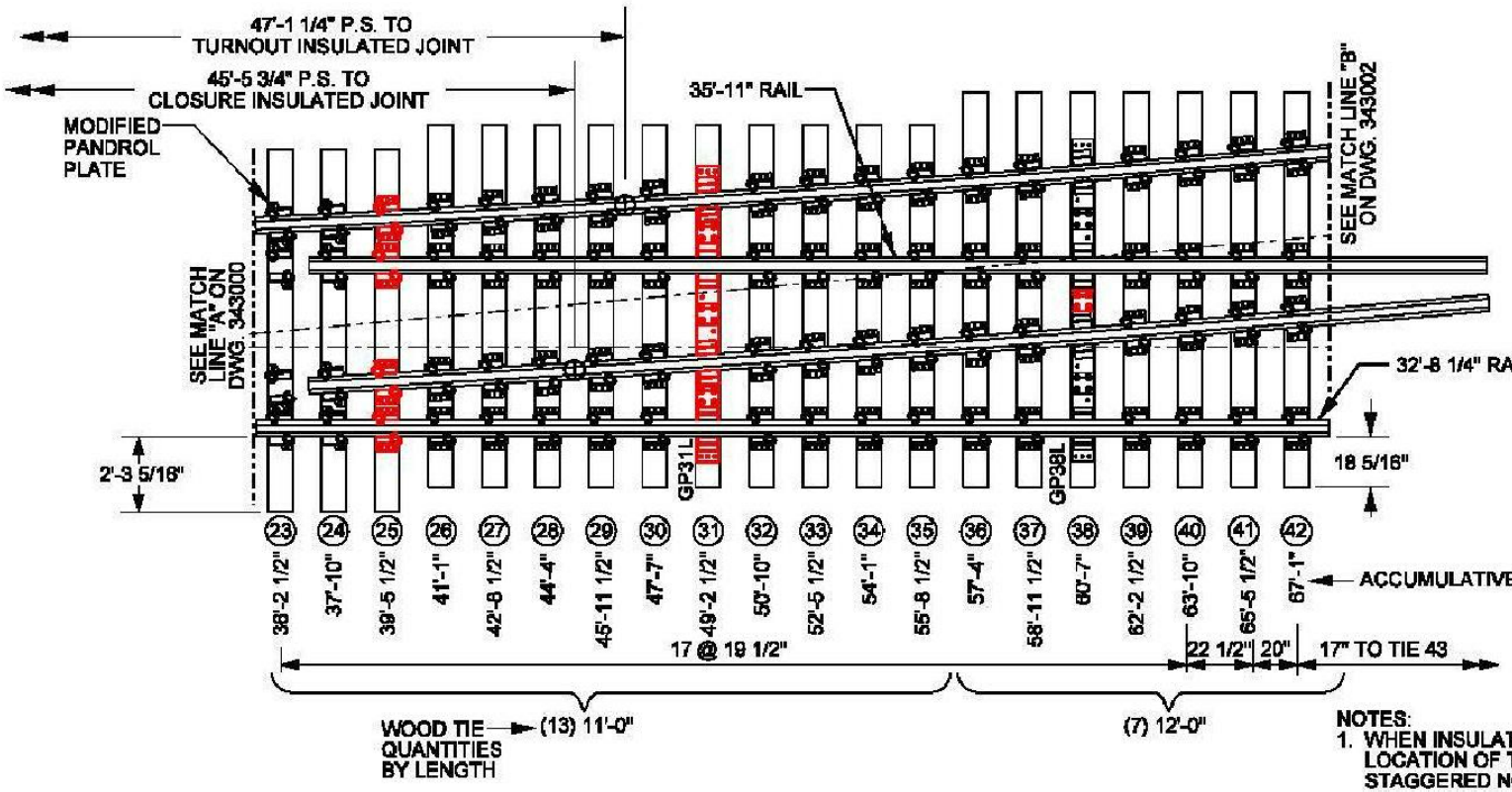
IOWA INTERSTATE RAILROAD

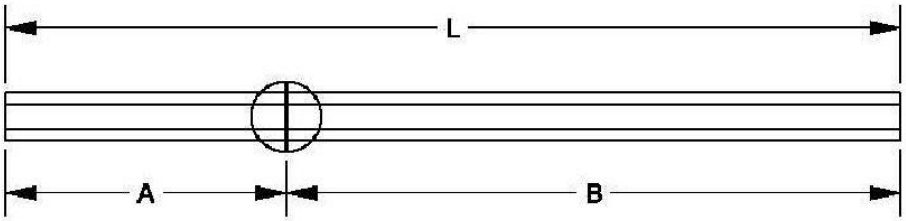
No. 11 Turnout

Exhibit F11-4

Typical Specifications & Criteria for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007





	A	B	L
TURNOUT INSULATED JOINT RAIL	11'-4"	21'-5"	32'-9"
CLOSURE INSULATED JOINT RAIL	8'-2"	27'-11"	36'-1"

NOTES:

1. WHEN INSULATED JOINTS ARE REQUIRED, THE LOCATION OF THE JOINTS SHOULD BE STAGGERED NO CLOSER THAN 6" AND NOT MORE THAN 4'-6" APART, MEASURED ALONG THE TURNOUT.
2. SEE DWGS 343000, 343002, AND 343003 FOR THE BALANCE OF LAYOUT PLANS.
3. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
4. SEE DWG 343100 FOR TURNOUT GEOMETRY.
5. SEE DWG 343200 FOR TURNOUT BILL OF MATERIAL.
6. PANEL WEIGHT = 17,000 LBS.

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REVISION #	BY	DATE	DESCRIPTION

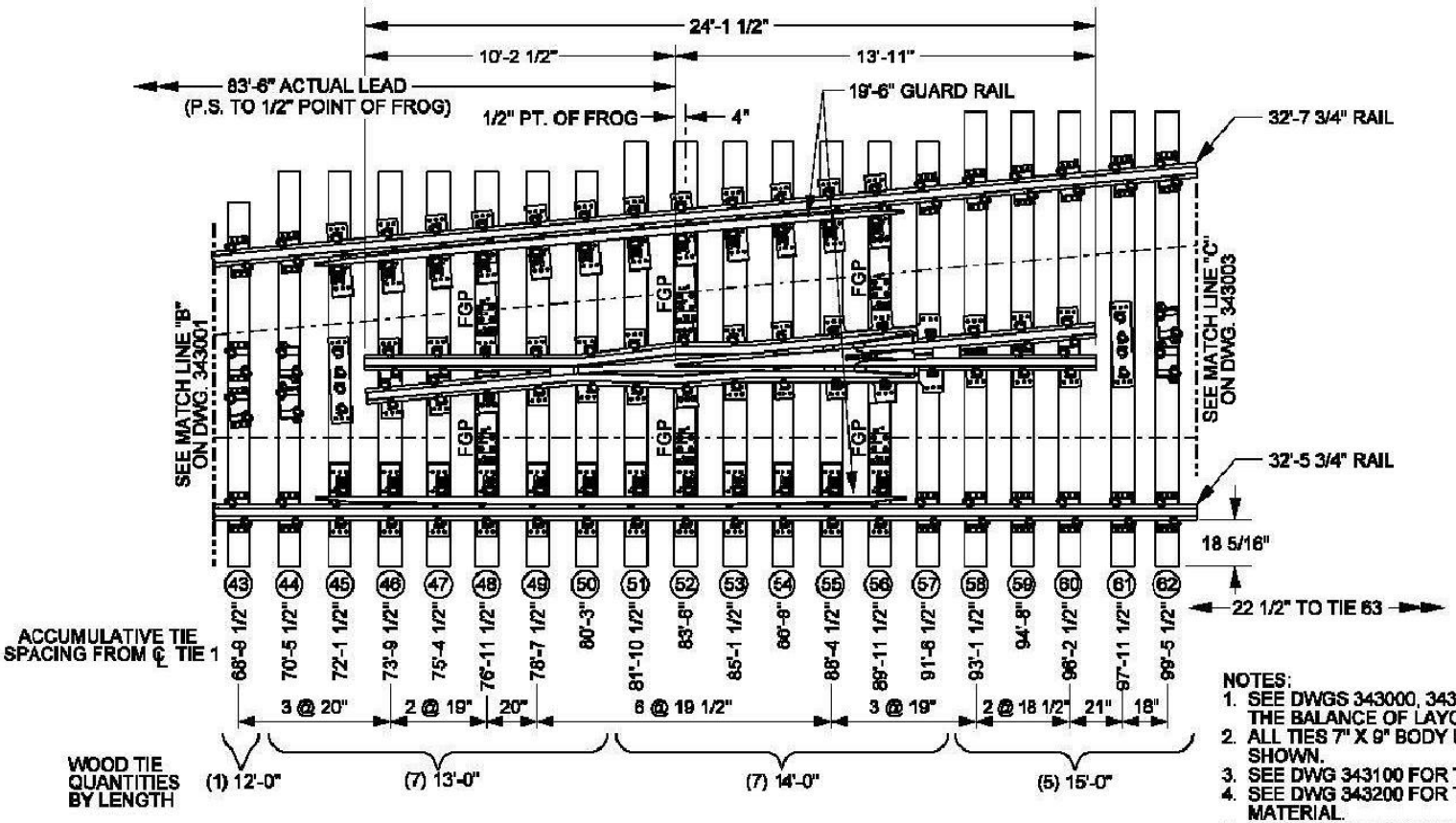
IOWA INTERSTATE RAILROAD

No. 11 Turnout

Exhibit F11-5

Typical Specifications & Criteria for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



NOTES:
1. SEE DWGS 343000, 343001, AND 343003 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 343100 FOR TURNOUT GEOMETRY.
4. SEE DWG 343200 FOR TURNOUT BILL OF MATERIAL.
5. APPLY 5" SAFE BOND WIRES ONE CRIB AHEAD OF TOE BLOCK, END OF SOLID WING RAIL, BEHIND END OF WING RAIL ON TAIL RAIL AND ONE CRIB BEHIND HEEL BLOCK OF FROG.
6. PANEL WEIGHT = 22,000 LBS.

	UPRR	BNSF RH	BNSF LH
RBM	N/A	518030064	518030086
SPR	N/A	518030087	518030088
SOLID	N/A	518030089	518030090

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REVISION #	BY	DATE	DESCRIPTION

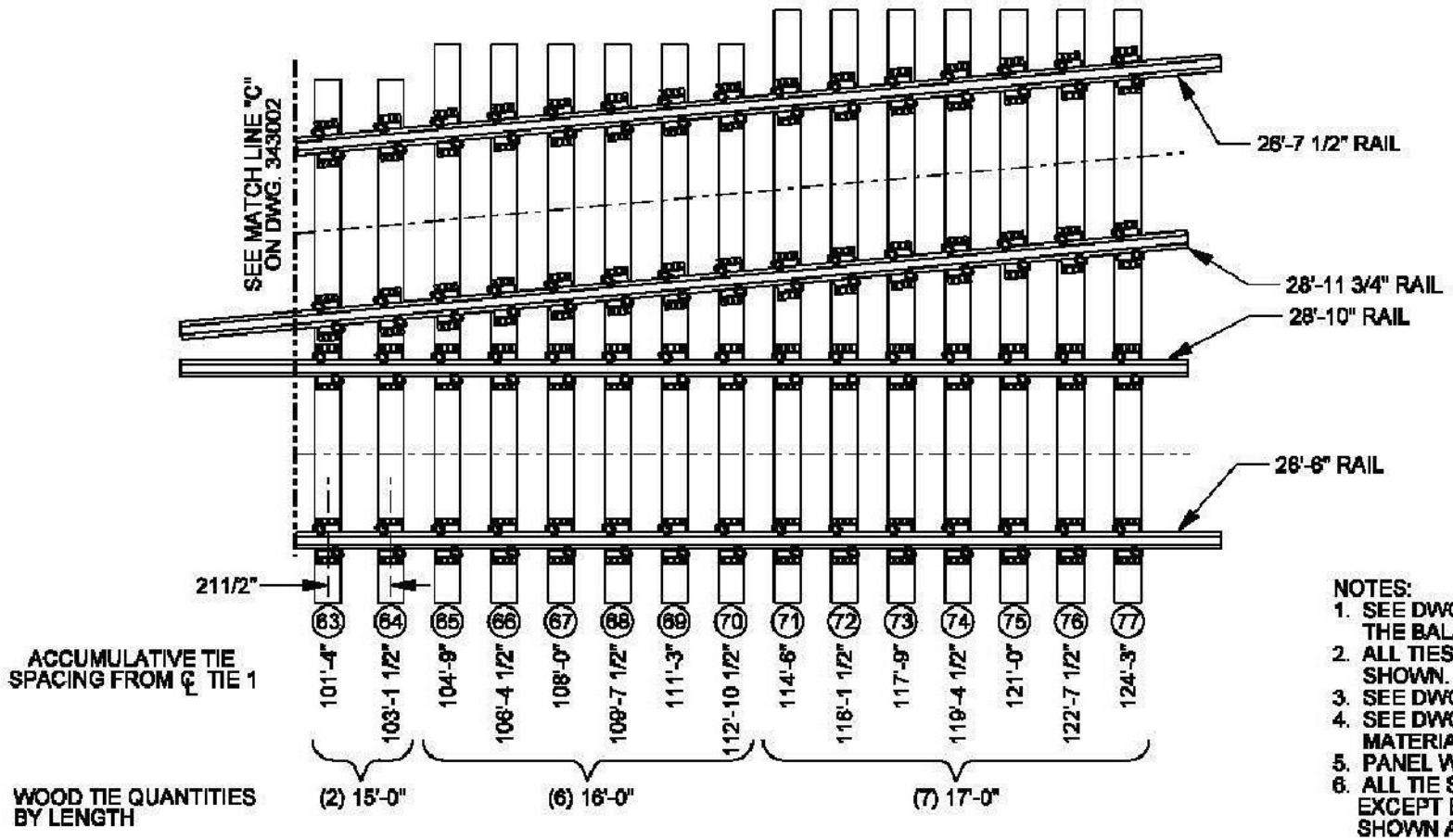
IOWA INTERSTATE RAILROAD

No. 11 Turnout

Exhibit F11-6

Typical Specifications & Criteria for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



NOTES:
1. SEE DWGS 343000, 343001, AND 343002 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 343100 FOR TURNOUT GEOMETRY.
4. SEE DWG 343200 FOR TURNOUT BILL OF MATERIAL.
5. PANEL WEIGHT = 24,000 LBS.
6. ALL TIE SPACING TO BE 19 1/2" ON THIS DWG. EXCEPT BETWEEN TIES 63 AND 64; WHICH ARE SHOWN AT 21 1/2".

REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

No. 11 Turnout

Exhibit F11-7

Typical Specifications & Criteria for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007

PROPERTY	Granite	Traprock	Quartzite	Limestone	Domestic Limestone	Blast Furnace Slag	Steel Slag	ASTM Test
Percent Material Passing No. 200 Sieve	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	C 117
Bulk Specific Gravity (See Note #2)	2.60	2.60	2.60	2.60	2.60	2.30	2.90	C 127
Absorption Percent	1.0	1.0	1.0	2.0	2.0	5.0	2.0	C 127
Clay Lumps & Friable 5 Cycles	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	C 142
Degradation	35%	25%	30%	35%	35%	40%	30%	See Note #1
Soundness (Sodium Sulfate)	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	C 88
Flat and/or Elongated Particles	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	C 4791

NOTES:

1. MATERIALS HAVING GRADATIONS CONTAINING PARTICLES RETAINED ON THE 1" SIEVE SHALL BE TESTED BY ASTM C 535 IF GREATER THAN 3/4" AND C 131 IF LESS THAN 1 1/2". MATERIALS HAVING GRADATIONS WITH 100% SIEVE SHALL BE TESTED BY ASTM C 131.

2. THE LIMIT FOR SPECIFIC GRAVITY IS A MINIMUM VALUE. LIMITS FOR THE TEST ARE MAXIMUM VALUES.

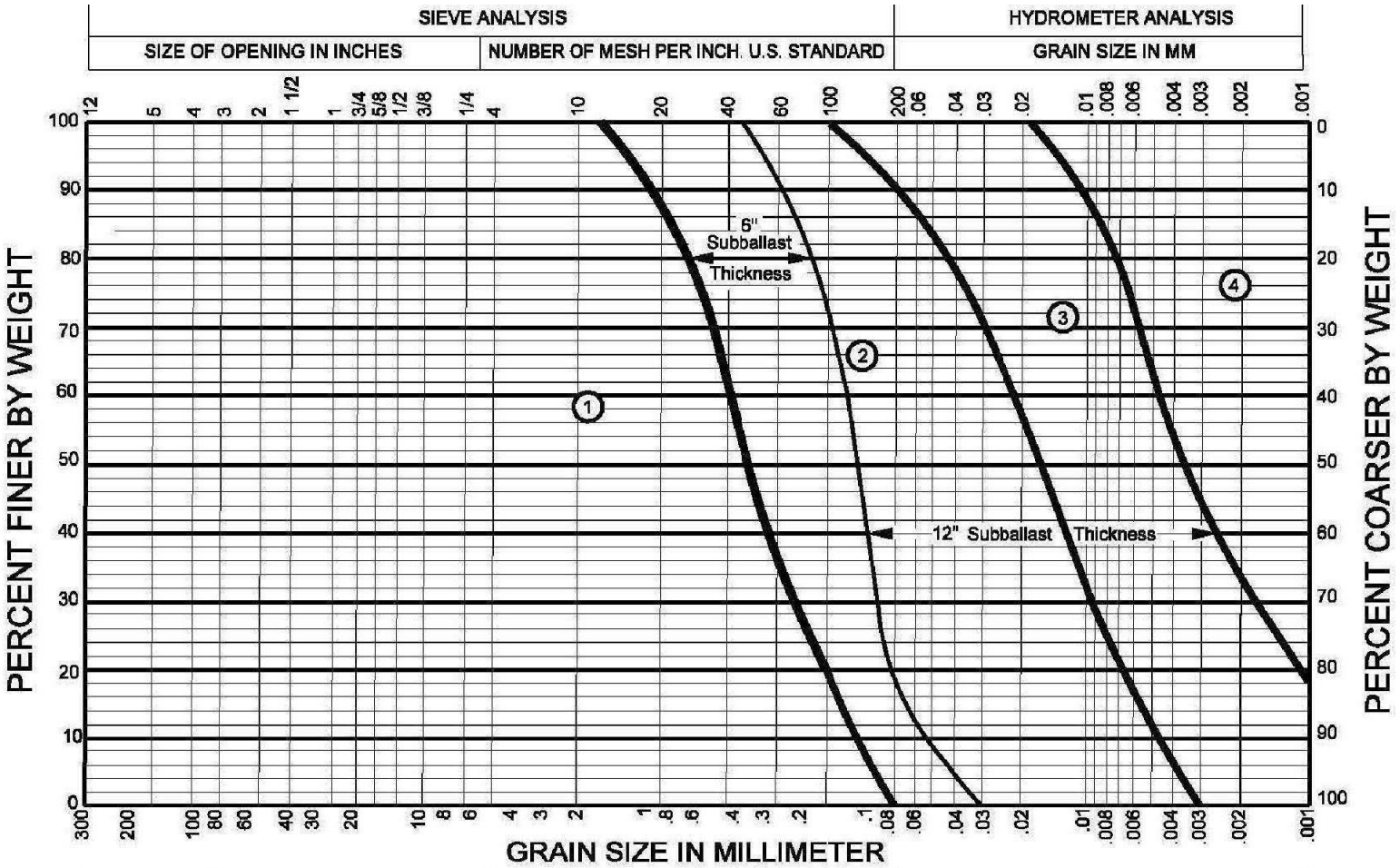
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

Exhibit "G"

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



(1) Zone of subgrade materials not requiring subballast.

(2) Zone of subgrade materials protected by coarse limit of subballast.

(3) Zone of subgrade materials protected by fine limit of subballast. This protection includes zone (2) also.

(4) Subgrade materials not protected by subballast. Additional measures will be required per recommendations of an engineering soils analysis.

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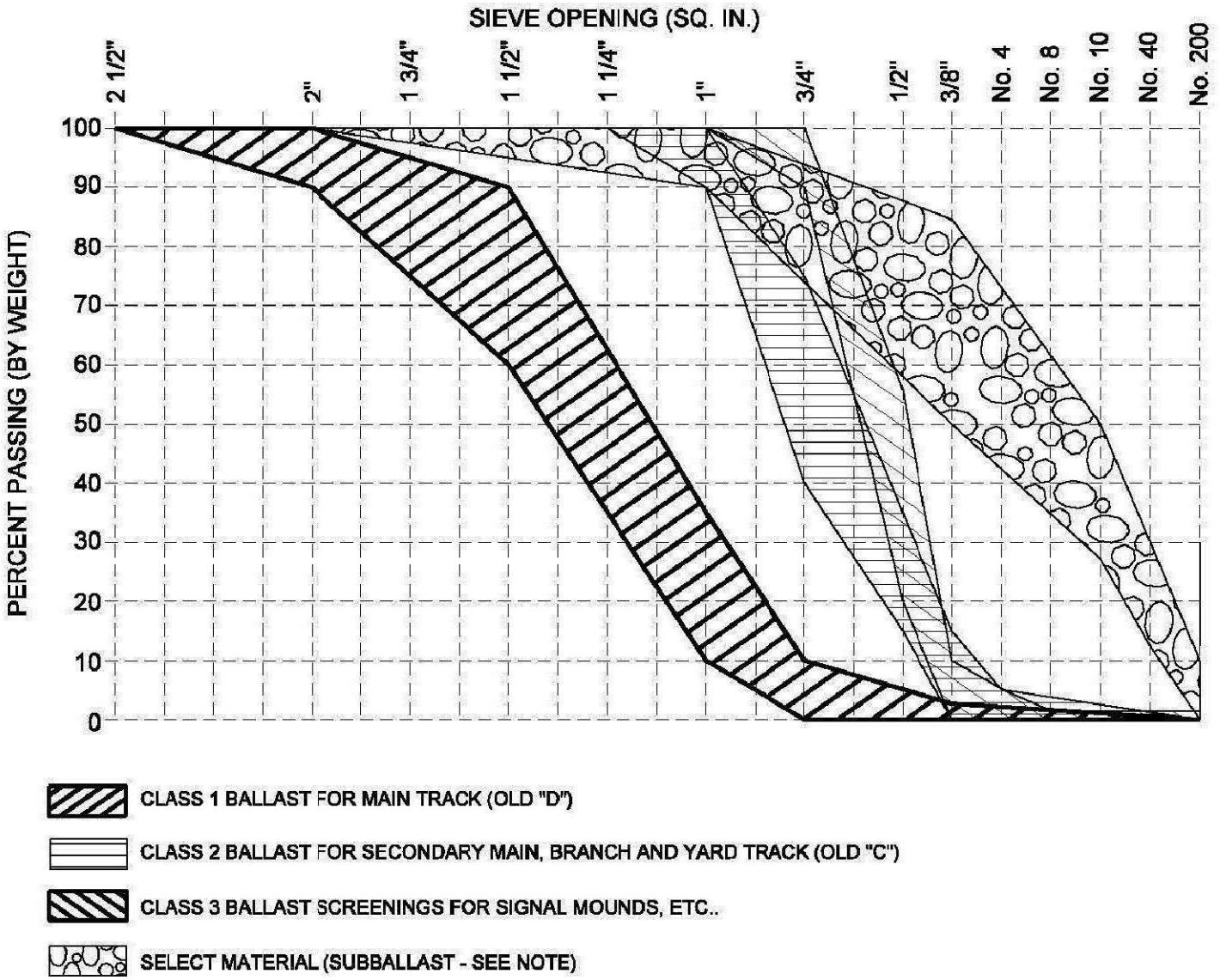
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

Exhibit "H"

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



AREMA Standard	4A	5	57	Sub Ballast
Square Opening	2"-3/4"	1"-3/8"	3/4"-0"	1-1/2"-0"
2½"	100			
2"	90-100			100
1¾"				
1½"	60-90			
1¼"		100		
1"	10-35	90-100	100	90-100
¾"	0-10	40-75	90-100	
½"		15-35	20-55	
3/8"	0-3	0-15	0-10	50-84
No. 4		0-5	0-5	
No. 8			0-1	
No. 10				26-50
No. 40				12-30
No. 200	0-0.5	0-0.5	0-1	0-10

PERCENT PASSING (BY WEIGHT)
[ALL AGGREGATE SAMPLING AND TESTING PER ASTM LATEST REVISION.]

NOTES:

1. IF SUBBALLAST IS NOT USED IN LOCATIONS WHERE POOR NATIVE SOIL CONDITIONS EXIST, SELECT MATERIAL MUST BE APPROVED BY CHIEF ENGINEER PRIOR TO USE.

2. CLASS 1 AND CLASS 2 BALLAST MATERIALS ARE REQUIRED TO BE WASHED PRIOR TO LOADING.

CLASS 1 BALLAST FOR MAIN TRACK (OLD "D")

CLASS 2 BALLAST FOR SECONDARY MAIN, BRANCH AND YARD TRACK (OLD "C")

CLASS 3 BALLAST SCREENINGS FOR SIGNAL MOUNDS, ETC..

SELECT MATERIAL (SUBBALLAST - SEE NOTE)

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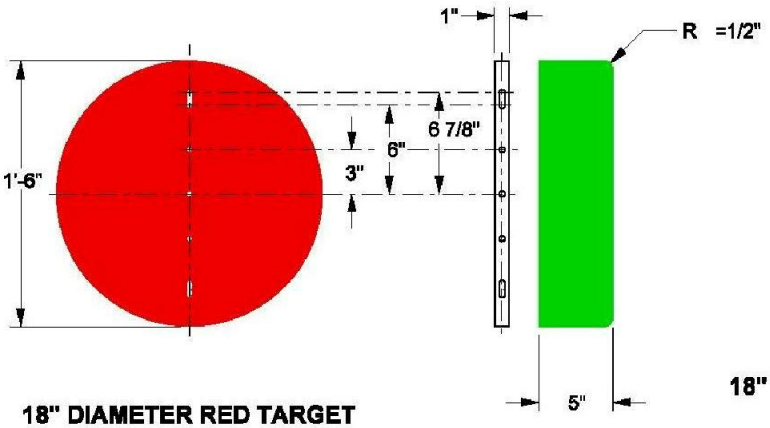
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

Exhibit "H-1"

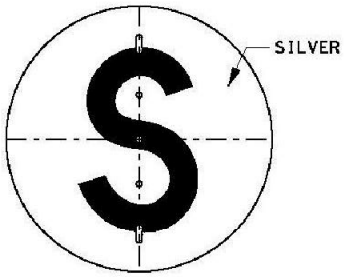
Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



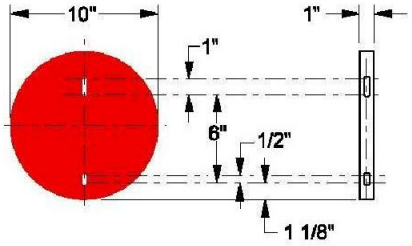
18" DIAMETER RED TARGET

18" GREEN TARGET

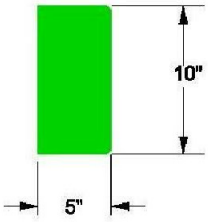


18" SILVER SPRING SWITCH TARGET

ALL 18" TARGETS HAVE IDENTICAL HOLES
SYMMETRIC ABOUT HORIZONTAL CENTERLINE

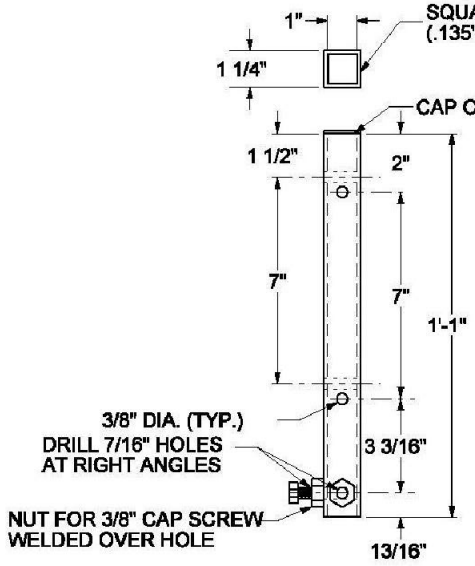


10" DIAMETER RED TARGET



10" GREEN TARGET

10" AND 18" PURPLE DERAIL TARGET
IDENTICAL HOLE DIMENIONS AS THE RED TARGETS



TARGET ROD MAST

NOTES:
1. ALL TARGETS TO BE 0.080" ALUMINUM.
2. ALL TARGETS TO BE DOUBLE SIDED.
3. ALL HOLES TO HAVE 3/16" RADIUS.
4. 18" DIAMETER RED TARGET TO HAVE NO. 3872 HIGH INTENSITY REFLECTIVE SURFACE. THESE TARGETS ARE FOR USE ON ALL MAINLINE SWITCH STANDS.
5. 10" DIAMETER TARGET TO HAVE "3M" NO. 3272 ENGINEER GRADE REFLECTIVE SURFACE. THESE TARGETS FOR USE ON ALL YARD AND INDUSTRY SWITCH STANDS.

NOTES:
6. 18" DIAMETER SILVER TARGET TO HAVE NO. 3290 WHITE REFLECTIVE SURFACE WITH 12" SILK SCREENED P.R.A. SERIES "D" BLACK LETTERS "S" ON BOTH SIDES. THIS TARGET FOR USE ON SWITCH STANDS ATTACHED TO A SPRING SWITCH.
7. 10" AND 18" DIAMETER PURPLE TARGET WILL HAVE NO. 3290 SILVER REFLECTIVE SURFACE REVERSE SCREENED WITH "3M" PROCESS NO. 893 (PURPLE) INK TO FORM A SILVER P.R.A. SERIES "D" LETTER "D" ON A PURPLE BACKGROUND FOR EACH SIDE. THE 18" DIAMETER TARGET TO BE USED ON ALL HIGH STANDS OR LOW STANDS THAT HAVE A HIGH MAST. THE 10" DIAMETER PURPLE TARGET TO BE USED ON LOW STANDS THAT HAVE A LOW MAST AND SIGN POSTS MARKING THE LOCATION OF DERAILS.
8. 10" AND 18" GREEN TARGETS TO HAVE NO. 3277 REFLECTIVE SURFACE. 10" TARGETS ARE FOR LOW AND GROUND STANDS AND THE 18" TARGET IS FOR ALL OTHER SWITCH STAND TYPES. 10" TARGET IS REQUIRED FOR BOTH SIDES OF MAST. THESE TARGETS ARE REQUIRED BY LAW IN MISSOURI AND WISCONSIN ONLY.
9. TARGET MAST: VENDOR TO SUPPLY 1 EACH - 1 1/2" ZINC PLATED 3/8" GRADE 5 CAP SCREW 5/8" ZINC PLATED 3/8" GRADE 5 CAP SCREW MAST TO BE PAINTED FLAT BLACK.

Exhibit "J-1"

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes

Date: 2/8/2008

IOWA INTERSTATE RAILROAD

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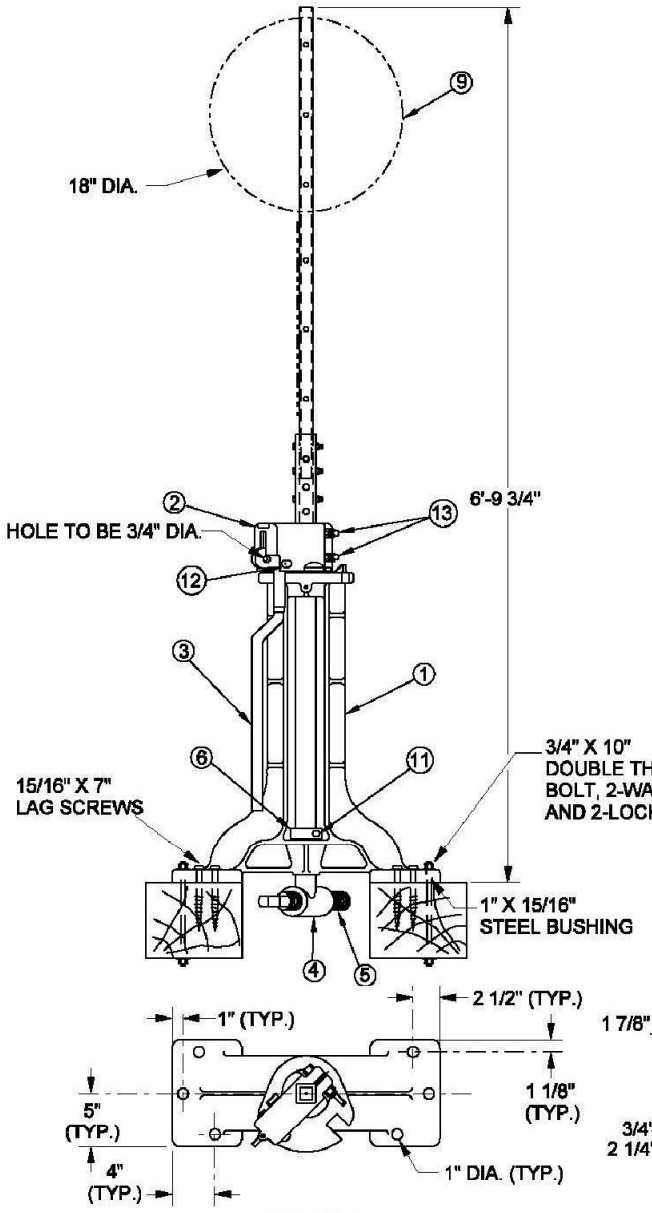
FIBER OPTIC CABLE!

REVISION #	BY	DATE	DESCRIPTION



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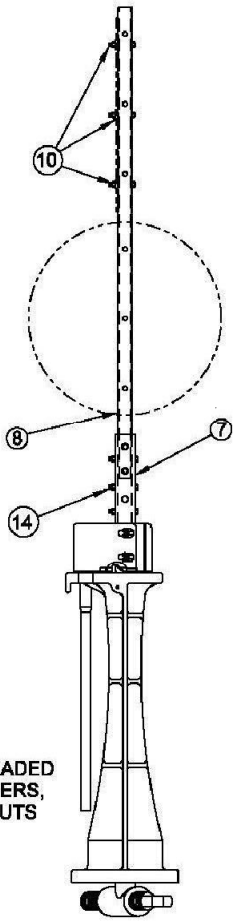
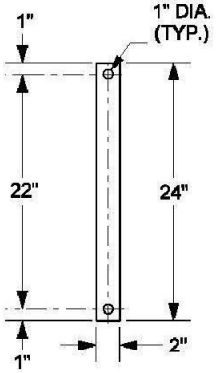
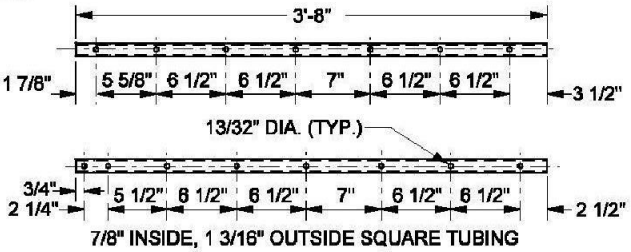




TIE STRAP

MOUNTING KIT

KIT (ITEM NO. 557-7387)
INCLUDES (2) 3/4" X 10"
DOUBLE THREADED BOLTS,
(4) WASHERS, (4) LOCK NUTS,
(10) 15/16" x 7" LAG SCREWS,
(2) STEEL BUSHINGS
(1) 1/2" x 2" x 24" STEEL STRAP



SPINDLE EXTENSION

ITEM NO.	NO. REQD.	PART NO.	DESCRIPTION
1	1	11209E	MAIN CASTING (MODIFIED AS SHOWN)
2	1	11212E	LEVER BRACKET
3	1	11213E	HAND LEVER
4	1	11201E	SPINDLE
5	1	11202E	CRANK EYE
6	1	11210E	COLLAR
7	2	11216E	SPLICE BRACKET
8	1	962023	SPINDLE EXTENSION
9	1	TARGET	(SUPPLIED BY U.P.)
10	3		3/8" X 2" BOLT SQ. HD. / HEX HD. NUT & FLAT WASHER (SUPPLIED BY U.P.)
11	1	11211E	RIVET 1/2" X 3 3/4" BUT. HD.
12	1	11214E	RIVET 5/8" X 3 1/4"
13	2	11215E	7/8" X 3 3/4" H.T. MACH. BOLTS/ HEX SLOTTED NUTS & 3/16" X 1 1/2" COTTER/SPRING WASHER
14	6	11217E	3/8" X 2 1/2" MACH. BOLTS/ SQ. HD. & HEX. ANCO. NUTS

NOTES:
1. RECOMMENDED USE, MAIN TRACK.
2. FOR SWITCH STAND MOUNTING KIT, USE ITEM NO. 557-7387.
3. APPLY TIE STRAP ON HEADBLOCK TIES ON OPPOSITE SIDE OF TRACK FROM SWITCH STANDS.
4. MINIMUM CONNECTING ROD LENGTH IS 6'-0 3/4".

Exhibit "J-2"

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes

Date: 2/8/2008

IOWA INTERSTATE RAILROAD

IOWA IAIS INTERSTATE

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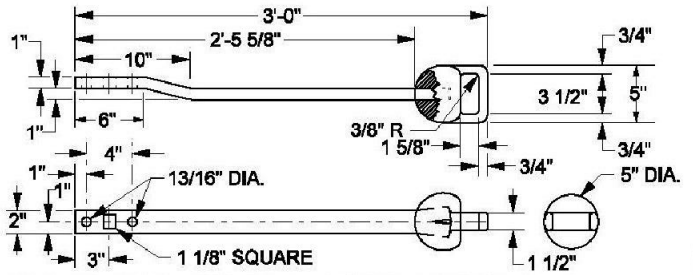
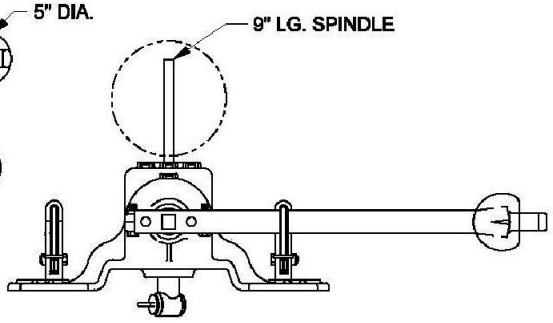
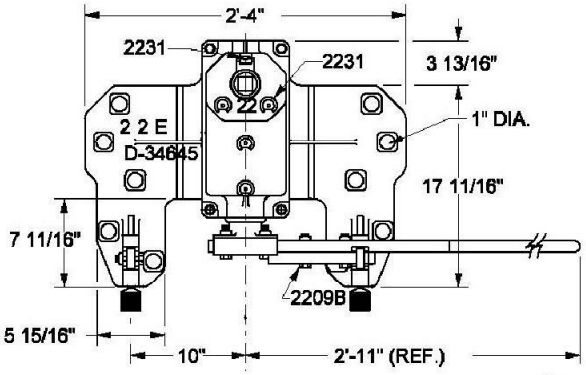
REVISION #	BY	DATE	DESCRIPTION



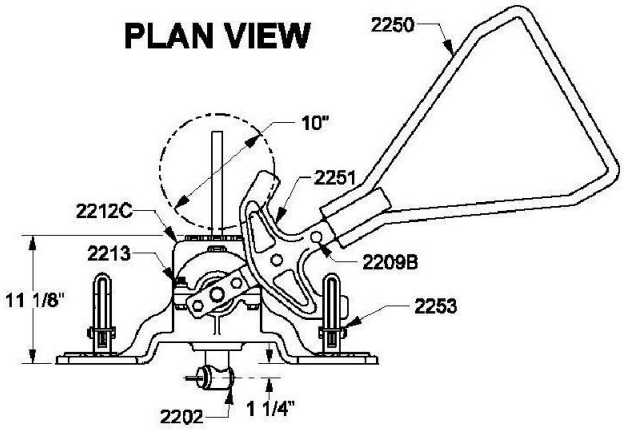
OPTIONAL 36" STRAIGHT HANDLE (USE FOR TIGHT CLEARANCE ONLY)

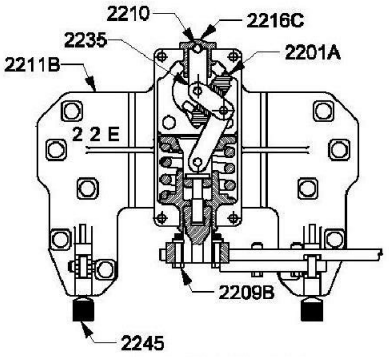


STAND WITH OPTIONAL 36" STRAIGHT HANDLE



PLAN VIEW





PLAN VIEW
WITH COVER REMOVED

QTY	CATALOG #	DRAWING #	DESCRIPTION
1	2235	22-5103	LINKAGE AND SPRING CAGE ASSY. (SEE ASSY DWG FOR PARTS DWGS)
1	2216C	22-6201	THRUST BUSHING
1	2210	289.01.01	THRUST BALL 1" DIA.
1	2212C	22-6100	COVER (S-604-C)
1	2252	22E-6000	BASE (D-34645)
1	2201A	———	SPINDLE (GL-2762) (DRILLED PER CUST.)
1	2202	SSC-100	CRANK EYE (GL-1889)
1	2250	92-7506	TRI-HANDLE LEVER
4	2213	201.12.06	SQ. HD. BOLT 5/8" X 3" LONG
4		202.15.07	HEX NUT 5/8"-11
4		203.15.03	LOCK WASHER 5/8"
4	2209B	201.12.07	SQ. HD. BOLT 3/4" X 2 3/4 " LONG
4		202.15.07	SECURITY NUT 3/4"-10
5	2231	251.01.01	1608B GREASE FITTING - DRIVE TYPE
1	2207		TARGET (PER CUSTOMER)
1	2208A		TARGET MAST (PER CUSTOMER)
2			BOLT
2			NUT
1	2251	PD-9461	YOKE (D-34637)
2	2253		1/2" X 2 1/4" HEX CAP SCREW
2			HEX SECURITY NUT
2	2254	S-618A	FOOT LATCH

NOTES:
1. RECOMMENDED USE: OTHER THAN MAIN TRACK.
2. IT IS RECOMMENDED THAT SWITCH STANDS BE INSPECTED AND LUBRICATED AT LEAST ONCE A YEAR IN BUSY LOCATIONS OR ADD OIL IN "OIL CUPS" WITH ANY GOOD GRADE ENGINE OIL. RECOMMEND OIL WITH GRAPHITE CONTENT (SUMMER-SAE 60, WINTER-SAE 40).
3. IF SWITCH STAND IS DISASSEMBLED, REGREASING OF ALL INTERNAL PARTS IS REQUIRED. APPLY GREASE LIBERALLY IN "THRUST BUSHING" CAVITY, BOTH ENDS "SPRING BASE", "SPINDLE" SLOT, AND ALL BEARING SURFACES (TEXACO NO.904 GREASE).
4. SWITCH STAND TO BE INSTALLED USING 15/16" X 7" COACH SCREWS.

Exhibit "J-3"

Typical Specifications & Criteria for Construction of Industrial Tracks

Drawn By: SJ Stoakes

Date: 2/8/2008

IOWA INTERSTATE RAILROAD

IOWA IAIS INTERSTATE

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REVISION #	BY	DATE	DESCRIPTION

CORRUGATED STEEL PIPE (CSP) GAGE TABLE FOR E-80 LIVE LOAD

Diameter (In.)	HEIGHT OF COVER (FEET) = BASE OF RAIL TO TOP OF PIPE														
	Min.*-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75
30	14	14	14	14	14	14	14	14	14	12	12	12	12	10	10
36	14	14	14	14	14	14	14	14	14	14	12	12	12	10	10
42	14	14	14	14	14	14	14	14	14	12	12	10	10	10	10
48	14	14	14	14	14	14	14	12	12	10	10	10	10	10	8
54	14	14	14	14	14	14	14	12	10	10	10	10	8	8	8
60	12	14	14	14	14	14	12	10	10	10	10	8	8	8	
66	12	14	14	14	14	12	12	10	10	10	8	8			
72	10	14	14	14	12	12	10	10	10	8	8				
78	10	12	14	14	12	10	10	10	8	8					
84	10	12	14	12	12	10	10	10	8						
90	10	12	14	12	10	10	10	8							
96	10	10	12	12	10	10	10	8							
102	8	10	12	10	10	10	8	8							
108	8	10	10	10	10	8	8								
114		8	10	10	8	8									
120		8	10	8	8										
126		8	8	8											
132			8												

* Minimum Height Of Cover - See Spacing And Cover Requirements, This Sheet.

CORRUGATED ALUMINUM ALLOY PIPE (CAAP) GAGE TABLE FOR E-80 LIVE LOAD

Diameter (In.)	HEIGHT OF COVER (FEET) = BASE OF RAIL TO TOP OF PIPE														
	Min.*-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75
30	14	14	14	14	14	14	14	14	14	12	12	12	10	10	10
36	12	14	14	14	14	14	14	12	12	12	10	10	10	10	10
42	12	14	14	14	14	14	12	12	10	10	10	10	10	8	8
48	12	14	14	14	14	12	12	10	10	10	10	8	8	8	8
54	12	14	14	14	12	12	10	10	10	10	8	8	8		
60	10	12	14	12	12	10	10	10	8	8					
66	10	12	12	12	10	10	8	8	8						
72	10	12	12	12	10	10	8	8	8						
78	10	10	12	12	10	10	8	8							
84	8	10	12	10	10	8	8								
90		8	10	10	8										
96			8	8											

* Minimum Height Of Cover - See Spacing And Cover Requirements, This Sheet.

NOTES FOR CSP AND CAAP

GENERAL

ALL PIPE CULVERTS ARE DESIGNED FOR COOPER E-80 LIVE LOADING, INCLUDING IMPACT.

THE TABLES SHOWN INDICATE THE MINIMUM REQUIRED GAGE THICKNESS FOR STRUCTURAL STABILITY BASED ON THE DESIGN ASSUMPTIONS LISTED BELOW. THE REQUIRED GAGE THICKNESS FOR CSP INCLUDES AN ALLOWANCE FOR CORROSION.

DESIGN ASSUMPTIONS

BACKFILL UNIT WEIGHT = 120 PCF

FACTORS OF SAFETY: SEAM STRENGTH - 3, WALL AREA - 2, BUCKLING - 2

MINIMUM YIELD POINT: CSP - 33 KSI, CAAP - 24 KSI

MODULUS OF ELASTICITY: CSP - 29,000 KSI, CAAP - 10,000 KSI

MINIMUM TENSILE STRENGTH: CSP - 45 KSI, CAAP - 31 KSI

CORRUGATED STEEL PIPE (CSP)

CORRUGATED STEEL PIPE AND COUPLING BANDS SHALL BE IN ACCORDANCE WITH THE A.R.E.A. SPECIFICATIONS, CHAPTER 1, PART 4, SECTION 4.5.

3" X 1" ANNULAR CORRUGATIONS SHALL BE USED FOR ALL PIPES WITH 36" DIAMETERS AND LARGER. 2-2/3" X 1/2" OR 3" X 1" ANNULAR CORRUGATIONS SHALL BE USED FOR 30" DIAMETER PIPE.

LONGITUDINAL SEAMS SHALL BE DOUBLE RIVETED.

CORRUGATED ALUMINUM ALLOY PIPE (CAAP)

CORRUGATED ALUMINUM ALLOY PIPE AND COUPLING BANDS SHALL BE IN ACCORDANCE WITH THE A.R.E.A. SPECIFICATIONS, CHAPTER 1, PART 4, SECTION 4.7.

3" X 1" ANNULAR CORRUGATIONS SHALL BE USED FOR ALL PIPE DIAMETERS.

LONGITUDINAL SEAMS SHALL BE DOUBLE RIVETED.

CORROSION PROTECTION

THE ENGINEER SHALL OBTAIN SITE SPECIFIC INFORMATION ON CORROSIVENESS OF THE SOIL WHICH MAY REQUIRE AN INCREASE IN GAGE THICKNESS OR PROTECTIVE COATINGS BASED ON LOCAL EXPERIENCE.

PROTECTIVE COATINGS FOR CORROSION PROTECTION SHALL CONFORM TO THE FOLLOWING CURRENT SPECIFICATIONS:

1. FIBER-BONDED BITUMINOUS (COMPOSITE) COATING - ASTM A825 (CSP ONLY).
2. POLYMERIC COATING - ASTM A762 OR AASHTO A245 (CSP ONLY).
3. GALVANIZED - AASHTO M 218 OR ALUMINUM (TYPE 2) - AASHTO M 274 (CSP ONLY).
4. ASPHALTIC COATING - AASHTO M 190 (CSP AND CAAP).

CAMBER

CAMBER SHALL BE PLACED IN ALL PIPE CULVERTS WHERE IT IS ANTICIPATED THAT THE CULVERT WILL SETTLE AS THE RESULT OF HIGH EMBANKMENT CONSTRUCTION OR COMPRESSIBLE FOUNDATION SOILS BELOW THE CULVERT BEDDING. ALL CULVERTS SHALL BE CAMBERED IN ACCORDANCE WITH THE FOLLOWING:

1. IN NO CASE SHALL THE CULVERT BE CAMBERED SO HIGH IN THE CENTER THAT WATER WILL BE POCKETED AT THE INLET END OF THE PIPE.
2. CULVERTS RESTING ON ROCK FOUNDATION NEED NOT BE CAMBERED.
3. EMBANKMENTS UP TO 8 FEET HIGH (MEASURED BASE OF RAIL TO FLOWLINE) REQUIRE A 1½ INCH CAMBER.
   EMBANKMENTS 8 FEET TO 12 FEET HIGH REQUIRE A 2½ INCH CAMBER.
   EMBANKMENTS 12 FEET TO 24 FEET HIGH REQUIRE A 4 INCH CAMBER.
   EMBANKMENTS 24 FEET TO 36 FEET HIGH REQUIRE A 6 INCH CAMBER.

THE ABOVE CAMBER STANDARDS, BASED ON THE HEIGHT OF EMBANKMENTS, MAY BE ADJUSTED IN THE FIELD WHERE AT THE DISCRETION OF THE ENGINEERING DEPARTMENT A GREATER OR LESSER AMOUNT OF CAMBER SHOULD BE BUILT INTO PIPE TO ADJUST FOR SOIL CONDITIONS ENCOUNTERED AT THE SITE.

FOR FILLS HIGHER THAN 36 FEET, THE ENGINEERING DEPARTMENT WILL PROVIDE THE CAMBER REQUIREMENTS.

RIPRAP

THE INLET AND OUTLET ENDS OF ALL CULVERTS SHALL BE PROTECTED BY RIPRAP. PACKAGED RIPRAP OR CONCRETE HEADWALLS.

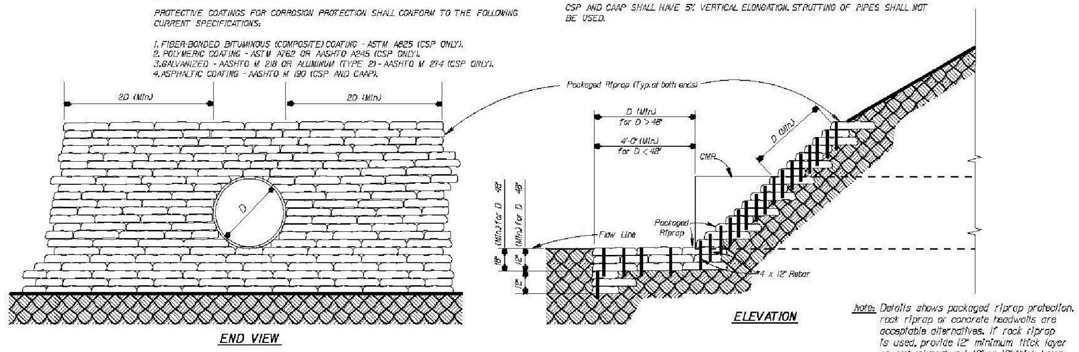
INSTALLATION

INSTALLATION OF CSP AND CAAP SHALL CONFORM TO THE UPRR GENERAL CONSTRUCTION SPECIFICATIONS, DATED DECEMBER 1981, SECTION 300, AND THE A.R.E.A. SPECIFICATIONS, CHAPTER 1, PART 4, SECTION 4.8.

NEW AND REPLACEMENT CULVERT LENGTHS ARE TO BE BASED ON STANDARD BRANCH OR MAIN LINE ROADBED SECTIONS.

ELONGATION

CSP AND CAAP SHALL HAVE 5% VERTICAL ELONGATION. STRUTTING OF PIPES SHALL NOT BE USED.



Note: Details shows packaged riprap protection, rock riprap or concrete headwalls are acceptable alternatives. If rock riprap is used, provide 12" minimum thick layer on embankment and 12" or 18" thick layer in front of culvert for D < 48" or D > 48" respectively. Rock riprap shall be placed within the limits shown above.

RIPRAP PROTECTION DETAIL

GENERAL NOTES FOR PACKAGED RIPRAP

Details shows 13"x21"x4¾" sacked concrete riprap bags as manufactured by United Products Surewall Systems. Alternate sacked concrete systems and bag sizes will be acceptable provided the final installation is essentially equal to that detailed.

Concrete Aggregate shall be graded #4 to ¾ inch maximum in size. Concrete mix shall have a min. 28 day compressive strength of 2000 psi. Sand and cement is to be a 5 to 1 uniform mix.

Bags shall be placed end to end and side by side with the sides and ends of the bags butted against the adjoining bags.

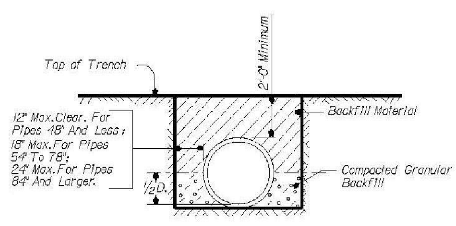
Bags shall be tamped or packed into place.

Completed bag walls shall be watered down every two hours during the daytime for three consecutive days.

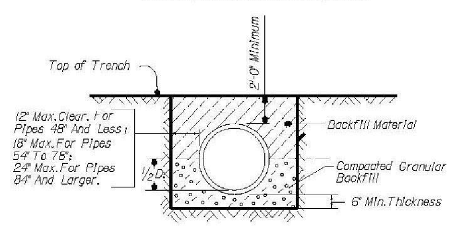
Reinforcing Steel to meet Grade 60 requirements.

NOTE: TO CONVERT FEET TO METERS MULTIPLY BY .3048
EXAMPLE: 2' x .3048m= .6096m

NOTE: TO CONVERT INCHES TO CENTIMETERS MULTIPLY BY 2.54
EXAMPLE: [illegible]" x 2.54cm= [illegible]cm



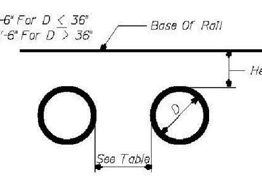
YIELDING (SOIL) FOUNDATION



NON-YIELDING (BEDROCK OR BOULDER) FOUNDATION

NOTE

Min. Cover = 1'-6" For D ≤ 36"
= 3'-6" For D > 36"



DIAMETER	MINIMUM SPACE BETWEEN PIPE
30" To 96"	One-Half (1/2) Diameter (D) of Pipe
96" To 144"	48"

SPACING AND COVER REQUIREMENTS

FIBER OPTIC CABLE! CALL BEFORE YOU DIG 1-800-336-9193

IOWA INTERSTATE RAILROAD

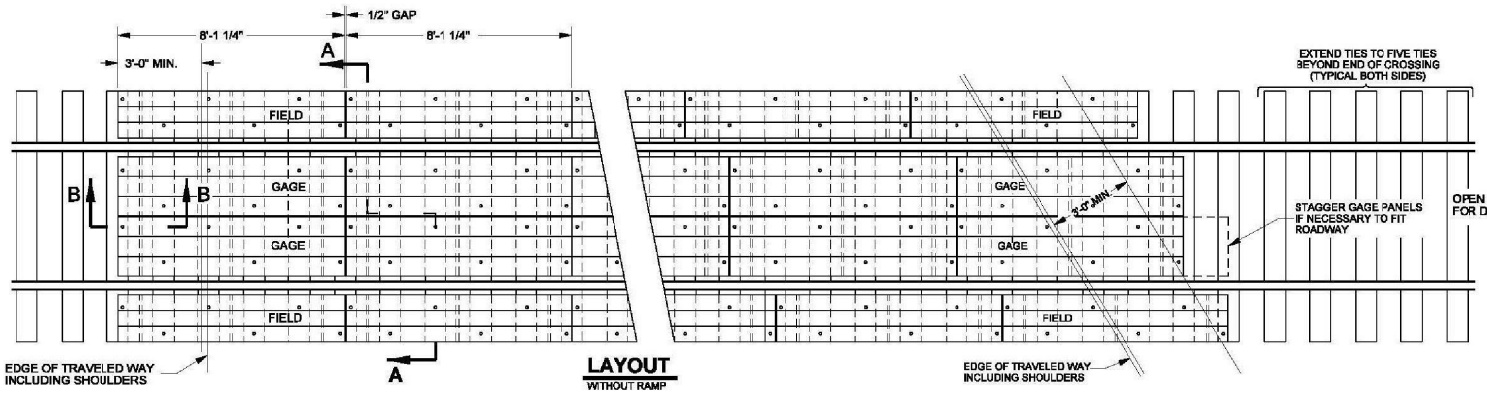
REVISION #	BY	DATE	DESCRIPTION

Exhibit "K"

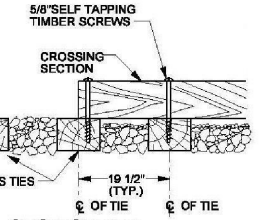
Typical Specifications & Criteria for Construction of Industrial Tracks

Drawn By: SJ Stoakes

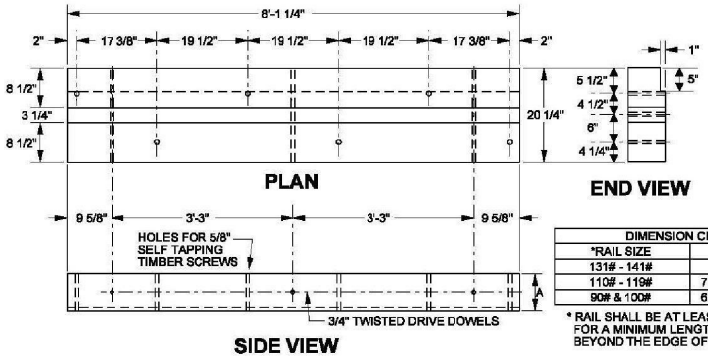
Date: 12/1/2007



LAYOUT
WITHOUT RAMP



SECTION B-B



PLAN **END VIEW** **SIDE VIEW**

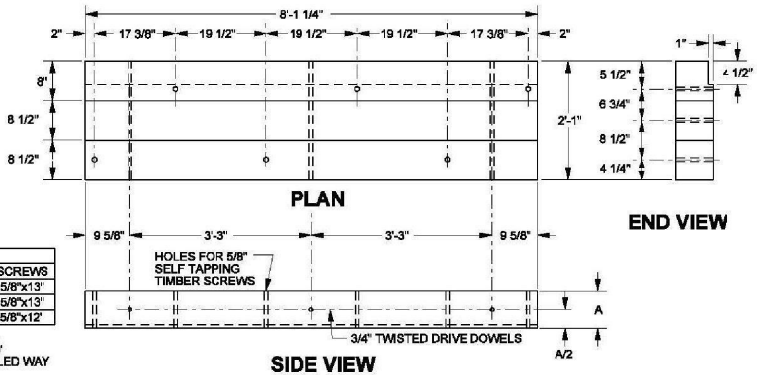
FIELD TIMBER PANEL A

MATERIAL FOR ONE SECTION
2 - A x 8 1/2" x 8'-1 1/4" TIMBERS
3 - 3/4"x19 1/2" TWISTED DRIVE DOWELS
6 - 5/8"x12" SELF TAPPING TIMBER SCREWS
1 - A x 3 1/4" x 8'-1 1/4" TIMBER

DIMENSION CHART		
*RAIL SIZE	A	SCREWS
131# - 141#	8"	5/8"x13"
110# - 119#	7 3/8"	5/8"x13"
90# & 100#	6 3/4"	5/8"x12"

* RAIL SHALL BE AT LEAST 115# FOR A MINIMUM LENGTH OF 20' BEYOND THE EDGE OF TRAVELED WAY

SUBBALLAST NOTE:
SUBBALLAST SECTION TO BE A MINIMUM OF 4" WHEN RENEWING EXISTING CROSSING. FOR NEW CONSTRUCTION, SUBBALLAST SECTION TO BE IN ACCORDANCE WITH CONSTRUCTION DESIGN STANDARDS OR AS REQ'D. BY STATE OR LOCAL AGENCIES.

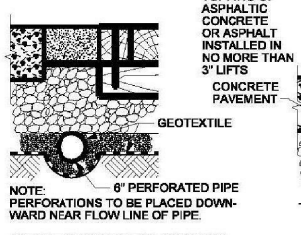


PLAN **END VIEW** **SIDE VIEW**

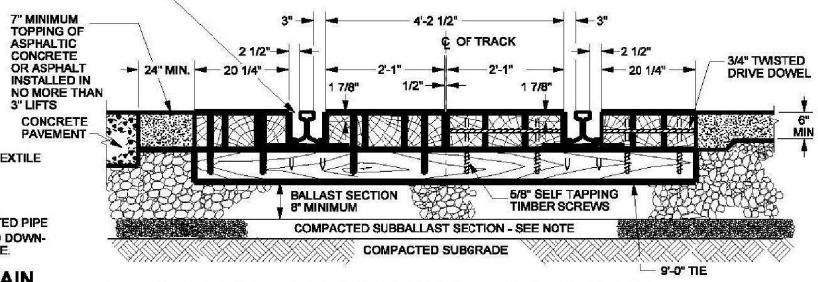
GAGE TIMBER PANEL B

MATERIAL FOR ONE SECTION
3 - A x 8 1/2" x 8'-1 1/4" TIMBERS
3 - 3/4"x24" TWISTED DRIVE DOWELS
6 - 5/8"x13" SELF TAPPING TIMBER SCREWS

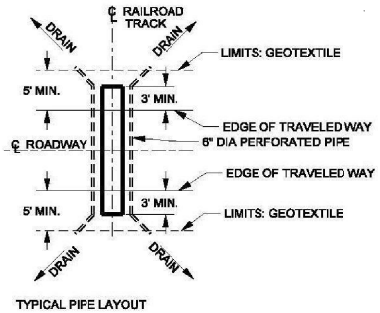
ON PUBLIC CROSSINGS, USE APPROVED RUBBER FLANGE WAY FILLER. ON PRIVATE CROSSINGS, FLANGEWAY FILLER IS NOT REQUIRED.



SECTION WITH DRAIN



SECTION A-A (THROUGH CROSSING WITH TIMBER TIES)



TYPICAL PIPE LAYOUT

NOTES:

1. CROSSING PANELS SHALL BE EVENLY SUPPORTED ON ALL TIES. TRACK STRUCTURE INCLUDING RAIL, OTM, TIES, BALLAST AND ROADBED SHALL BE IN EXCELLENT CONDITION. ALL TIES SHALL BE 9' LONG, SPACED AT 19 1/2" CENTERS AND EXTEND FIVE (5) TIES BEYOND END OF CROSSING. NEW 7" x 9" x 9'-0" TRACK TIES SHALL BE INSTALLED IF NECESSARY.

2. CROSSING SITE SHALL BE INSPECTED PRIOR TO START OF INSTALLATION TO DETERMINE PROPER DRAINAGE AND SURFACE SUPPORT IS PROVIDED, TRACK GRADE IS UNIFORM AND EXISTING TIES ARE AT LEAST 9'-0" LONG.

3. IF CONDITIONS WARRANT, SITE SHALL BE OVER-EXCAVATED AND CROSSING DRAINAGE SYSTEM INSTALLED USING COMPACTED, WELL GRADED GRANULAR FILL, SUBBALLAST, GEOTEXTILE AND PERFORATED DRAINAGE PIPE (IF REQUIRED) INSTALLED PER DETAILS OF THIS DRAWING.

4. ADDITIONAL SITE DRAINAGE, INCLUDING PROPER DRAINAGE AT EACH QUADRANT OF CROSSING SHALL BE COMPLETED TO INSURE ADEQUATE CROSSING DRAINAGE.

5. RAIL JOINTS SHALL BE LOCATED TO FALL OUTSIDE THE CROSSING AREA A MINIMUM OF 15'-0" FROM END OF CROSSING TIMBER.

6. FABRICATION AND TREATMENT:
CROSSING SECTIONS SHALL BE FABRICATED AND ASSEMBLED TO AVOID CUTTING OR FITTING AT THE POINT OF INSTALLATION. SECTIONS SHALL BE PRE-DRILLED WITH 1/2" HOLES AND TRANSVERSELY DOWELLED WITH 3/4" TWISTED-DRIVE DOWELS. EACH PLANK SHALL BE FRAMED, BORED AND TREATED WITH A P2 SOLUTION TO 8 LBS. PER CUBIC FOOT RETENTION PRIOR TO ASSEMBLY INTO CROSSING SECTION. PLACE THE CROSSING SECTION MARK ON THE END OF ALL SECTIONS, EACH MARK SHALL BEAR A SUFFIX DENOTING RAIL SIZE AS SHOWN UNDER CATEGORIES IN DIMENSION CHART.

7. MATERIALS AND INSTALLATION:
REQUISITIONS FOR PREFABRICATED CROSSING SECTIONS SHALL BE MADE SPECIFYING THE NUMBER OF EACH TYPE OF SECTION REQUIRED (A OR B) AND THE WEIGHT OF RAIL WITH WHICH IT IS TO BE USED (133, 131, ETC.) AS DENOTED IN THE DIMENSION CHART UNDER CATEGORIES. DRILLING SHALL START AT THE CENTERLINE OF CROSSING AND WORK TOWARD THE ENDS.

8. GEOTEXTILE AND PIPE SHALL BE INSTALLED ONLY AT LOCATIONS REQUIRED BY STATE OR LOCAL AGENCIES OR WHERE DESIGNATED BY IAISRR VICE PRESIDENT - ENGINEERING, OR A DESIGNATED REPRESENTATIVE.

9. REPORT CROSSING GATE MALFUNCTIONS TO IOWA INTERSTATE RAILROAD DISPATCHER: 1-800-321-3891

10. EXCEPTIONS TO THIS PLAN REQUIRE PRIOR APPROVED IN WRITING BY IAISRR VICE PRESIDENT - ENGINEERING, OR A DESIGNATED REPRESENTATIVE.

FIBER OPTIC CABLE! CALL BEFORE YOU DIG 1-800-336-9193

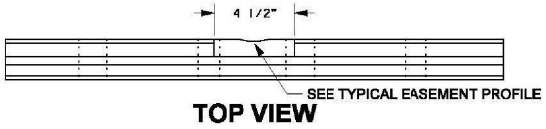
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

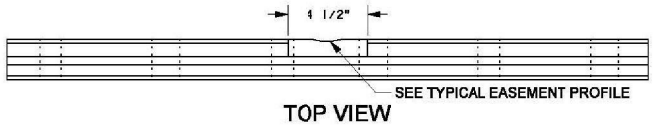
Exhibit "L"

Typical Specifications & Criteria
for Construction of Industrial Tracks

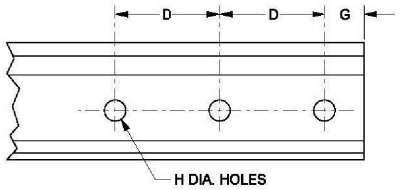
Drawn By: SJ Stoakes Date: 12/1/2007



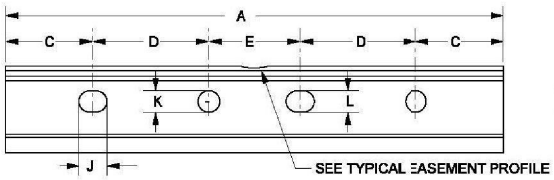
TOP VIEW



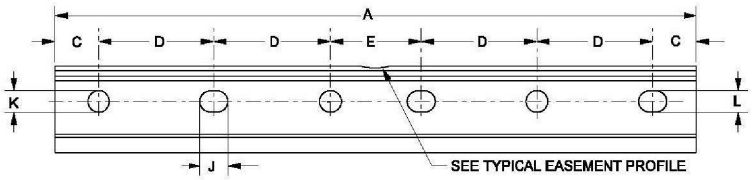
TOP VIEW



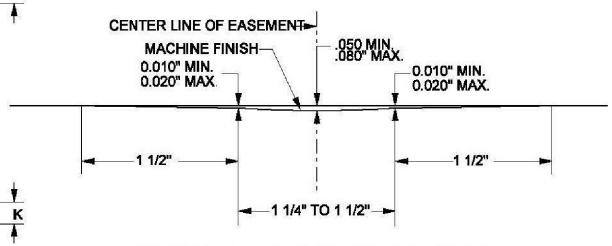
RAIL DRILLING



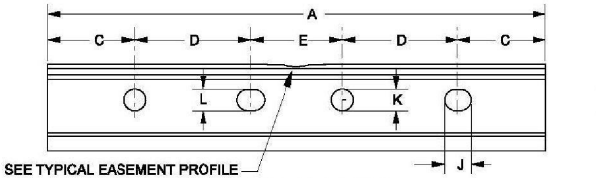
HOLE PATTERN 1



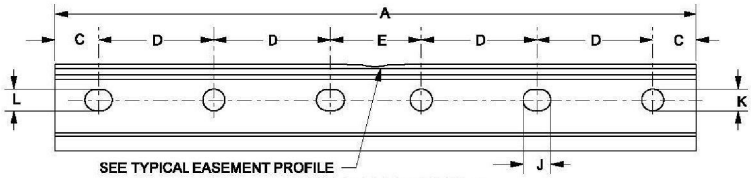
HOLE PATTERN 3



TYPICAL EASEMENT PROFILE



HOLE PATTERN 2

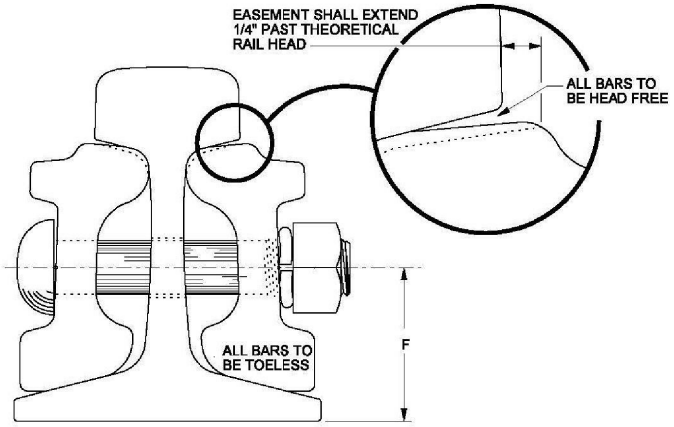


HOLE PATTERN 4

ELEVATION OF 24" AND 28" BAR

ELEVATION OF 36" BAR

DESCRIPTION	HOLE PATTERN	A	C	D	E	F	G	H	J	K	L
110 LB. 24" S.P. PUNCH	2	24"	3 3/4"	5 1/2"	5 1/2"	2 5/8"	2 11/16"	1 3/16"	1 1/2"	1 5/32"	1 7/16"
112 LB. 24" U.P. PUNCH	1	24"	2 15/16"	6 1/2"	5 1/8"	2 7/8"	2 1/2"	1 1/8"	1 9/16"	1 3/16"	1 3/16"
112 LB. 36" U.P. PUNCH	4	36"	3"	6 1/2"	6"	2 7/8"	2 15/16"	1 1/8"	1 9/16"	1 1/8"	1 1/8"
113 LB. 28" S.P. PUNCH	2	28"	4 15/16"	6 1/2"	5 1/8"	2 7/8"	2 1/2"	1 3/16"	1 9/16"	1 7/32"	1 3/16"
115 LB. 24" DRGW PUNCH	1	24"	3"	6"	6"	2 7/8"	2 15/16"	1 1/8"	1 9/16"	1 3/16"	1 3/16"
115 LB. 28" S.P. PUNCH	2	28"	4 15/16"	6 1/2"	5 1/8"	2 7/8"	2 1/2"	1 3/16"	1 9/16"	1 7/32"	1 3/16"
115 LB. 36" U.P. PUNCH	3	36"	2 7/16"	6"	7 1/8"	2 7/8"	3 1/2"	1 1/8"	1 13/32"	1 1/16"	1 1/16"
119 LB. 36" U.P. PUNCH	3	36"	2 7/16"	6"	7 1/8"	2 7/8"	3 1/2"	1 1/8"	1 13/32"	1 1/16"	1 1/16"
119 LB. 28" S.P. PUNCH	2	28"	4 15/16"	6 1/2"	5 1/8"	2 7/8"	2 1/2"	1 3/16"	1 1/2"	1 7/32"	1 3/16"
119 LB. 36" DRGW PUNCH	3	36"	3"	6"	6"	2 7/8"	2 15/16"	1 1/8"	1 9/16"	1 3/16"	1 9/16"
131 LB. 24" U.P. PUNCH	1	24"	2 15/16"	6 1/2"	5 1/8"	3 3/32"	2 1/2"	1 1/8"	1 9/16"	1 3/16"	1 3/16"
131 LB. 36" U.P. PUNCH	4	36"	2 15/16"	6 1/2"	6"	3 3/32"	2 15/16"	1 3/16"	1 1/2"	1 1/8"	1 1/8"
132 LB. 28" S.P. PUNCH	2	28"	4 15/16"	6 1/2"	5 1/8"	3 3/32"	2 1/2"	1 5/16"	1 9/16"	1 7/32"	1 3/16"
132 LB. 36" U.P. PUNCH	3	36"	2 7/16"	6"	7 1/8"	3 3/32"	3 1/2"	1 1/8"	1 13/32"	1 1/16"	1 13/32"
133 LB. 36" U.P. PUNCH	4	36"	2 7/16"	6"	7 1/8"	3"	3 1/2"	1 1/8"	1 1/2"	1 1/8"	1 1/8"
136 LB. 36" U.P. PUNCH	3	36"	2 7/16"	6"	7 1/8"	3 3/32"	3 1/2"	1 1/8"	1 13/32"	1 1/16"	1 1/16"
136 LB. 28" S.P. PUNCH	2	28"	4 15/16"	6 1/2"	5 1/8"	3 3/32"	2 1/2"	1 3/16"	1 9/16"	1 7/32"	1 3/16"
136 LB. 36" S.P. PUNCH	3	36"	2 7/16"	6 1/2"	5 1/8"	3 3/32"	2 1/2"	1 3/16"	1 9/16"	1 7/32"	1 3/16"
136 LB. 36" DRGW PUNCH	4	36"	3"	6"	6"	3 3/32"	2 15/16"	1 1/8"	1 9/16"	1 3/16"	1 3/16"



RAIL AND JOINT

NOTE:
STAGGERED JOINTS: RAIL MUST BE LAID WITH STAGGERED JOINTS IN MAIN TRACKS, EXCEPT WHERE BALANCING THE JOINTS FOR SWITCH LEADS, ROAD CROSSINGS, BRIDGE ENDS, AND SIGNAL CIRCUITS, AND IN SECONDARY TRACKS EXCEPT WHERE USE OF PREFABRICATED TRACK PANELS IS AUTHORIZED.

RAIL JOINT LOCATION: WHEN LAYING RAIL, JOINTS MUST NOT BE LOCATED IN ROAD CROSSINGS, BRIDGE DECKS, OR ON THE ENDS OF BRIDGES.

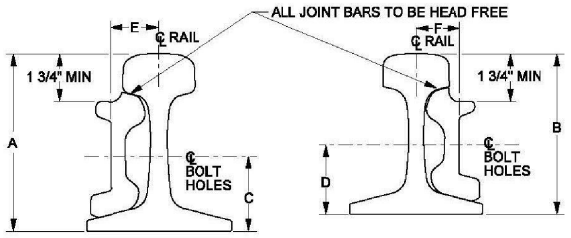
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

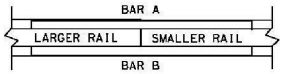
Exhibit "O"

Typical Specifications & Criteria
for Construction of Industrial Tracks

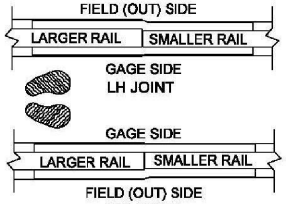
Drawn By: SJ Stoakes Date: 12/1/2007



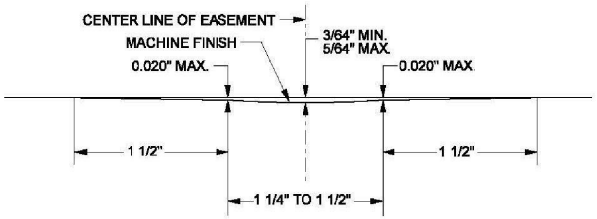
LARGER RAIL SMALLER RAIL



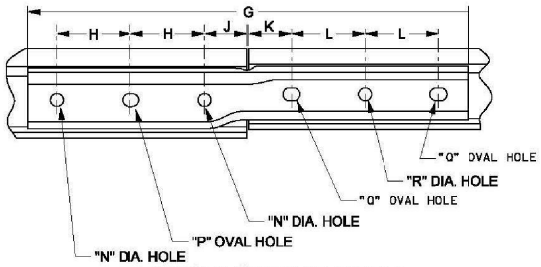
NON-HANDED JOINTS



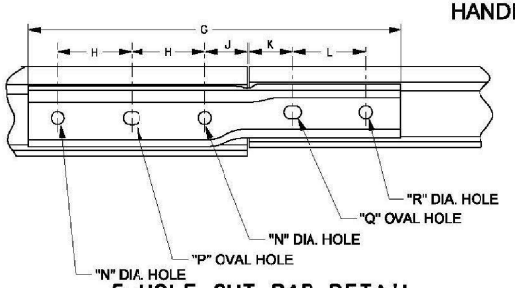
HANDED JOINTS



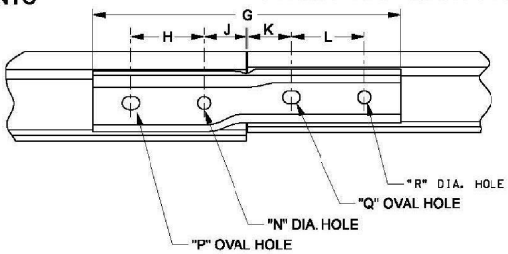
TYPICAL EASEMENT PROFILE



6-HOLE OUT BAR DETAIL



5-HOLE OUT BAR DETAIL



4-HOLE OUT BAR DETAIL

RAIL TO RAIL	BAR TYPE	A (NEW)	A (WORN)	B (NEW)	B (WORN)	C	D	E	F	G	H	J	K	L	N	P	Q	R
136RE - 133RE	6 HOLE	7 5/16"	—	7 1/16"	—	3 3/32"	3"	2"	2"	38"	6"	3 1/2"	3 1/2"	6"	1 1/8"	1 1/8" x 1 1/2"	1 1/8" x 1 1/2"	1 1/8"
136RE - 132RE	6 HOLE	7 1/4"	—	7"	—	3 3/32"	3 3/32"	1 31/32"	1 31/32"	36"	6"	3 1/2"	3 1/2"	6"	1 1/16"	1 1/16" x 1 13/32"	1 1/16" x 1 13/32"	1 1/16"
136RE - 119RE	6 HOLE	7 5/16"	—	6 13/16"	—	3 3/32"	2 7/8"	1 31/32"	1 13/16"	36"	6"	3 1/2"	3 1/2"	6"	1 1/16"	1 1/16" x 1 13/32"	1 1/16" x 1 13/32"	1 1/16"
SP136RE-119RE	6 HOLE	7 5/16"	—	6 13/16"	—	3 3/32"	2 7/8"	2"	2"	36"	6 1/2"	2 1/2"	2 1/2"	6 1/2"	1 7/32"	1 7/32" x 1 9/16"	1 7/32" x 1 9/16"	1 7/32"
D&RGW136RE-119RE	6 HOLE	7 5/16"	—	6 13/16"	—	3 3/32"	2 7/8"	2"	2"	36"	6"	2 15/16"	2 15/16"	6"	1 3/16"	1 3/16" x 1 9/16"	1 3/16" x 1 9/16"	1 3/16"
136RE - 115RE	6 HOLE	7 5/16"	—	6 5/8"	—	3 3/32"	2 7/8"	1 31/32"	1 13/16"	36"	6"	3 1/2"	3 1/2"	6"	1 1/16"	1 1/16" x 1 13/32"	1 1/16" x 1 13/32"	1 1/16"
136RE - 112RE	6 HOLE	7 5/16"	—	6 17/32"	6 11/32"	3 3/32"	2 7/8"	2"	2"	36"	6"	3 1/2"	2 1/2"	6 1/2"	1 1/8"	1 1/8" x 1 1/2"	1 1/8" x 1 1/2"	1 1/8"
SP136RE-SP110RE	4 HOLE	7 5/16"	—	6 1/4"	6 1/16"	3 3/32"	2 5/8"	2"	1 13/16"	26"	6 1/2"	2 1/2"	2 11/16"	5 1/2"	1 7/32"	1 7/32" x 1 9/16"	1 5/32" x 1 3/8"	1 5/32"
SP136RE-SP90ARA	4 HOLE	7 5/16"	—	5 5/8"	5 3/8"	3 3/32"	2 19/32"	2"	1 23/32"	26"	6 1/2"	2 1/2"	2 11/16"	5 1/2"	1 7/32"	1 7/32" x 1 9/16"	1 1/32" x 1 1/4"	1 1/32"
133RE - 132RE	6 HOLE	7 1/16"	—	7 1/8"	—	3"	3 3/32"	2"	2"	38"	6"	3 1/2"	3 1/2"	6"	1 1/8"	1 1/8" x 1 1/2"	1 1/8" x 1 1/2"	1 1/8"
133RE - 131RE	6 HOLE	7 1/16"	—	7 1/8"	—	3"	3 3/32"	2"	2"	38"	6"	3 1/2"	2 15/16"	6 1/2"	1 1/8"	1 1/8" x 1 1/2"	1 1/8" x 1 1/2"	1 1/8"
133RE - 119RE	6 HOLE	7 1/16"	—	6 13/16"	—	3"	2 7/8"	2"	1 13/16"	36"	6"	3 1/2"	3 1/2"	6"	1 1/8"	1 1/8" x 1 1/2"	1 1/16" x 1 13/32"	1 1/16"
133RE - 115RE	6 HOLE	7 1/16"	—	6 5/8"	—	3"	2 7/8"	2"	1 13/16"	36"	6"	3 1/2"	3 1/2"	6"	1 1/8"	1 1/8" x 1 1/2"	1 1/16" x 1 13/32"	1 1/16"
133RE - 112RE	6 HOLE	7 1/16"	—	6 17/32"	6 11/32"	3"	2 7/8"	2"	2"	36"	6"	3 1/2"	2 1/2"	6 1/2"	1 1/8"	1 1/8" x 1 1/2"	1 1/8" x 1 1/12"	1 1/8"
133RE - 110RE	6 HOLE	7 1/16"	—	6 1/4"	—	3"	2 5/8"	2"	2"	36"	6"	3 1/2"	2 11/16"	5 1/2"	1 1/8"	1 1/8" x 1 1/2"	1 1/8" x 1 1/2"	1 1/8"
133RE - 100RE	5 HOLE	7 1/16"	—	6"	—	3"	2 1/2"	2"	1 13/16"	30"	6"	3 1/2"	2 5/8"	5 1/2"	1 1/8"	1 1/8" x 1 1/2"	1 1/8" x 1 13/32"	1 1/8"
133RE - 90RA	5 HOLE	7 1/16"	—	5 17/32"	5 11/32"	3"	2 19/32"	2"	1 23/32"	30"	6"	3 1/2"	2 5/8"	5 1/2"	1 1/8"	1 1/8" x 1/12"	1" x 1 1/4"	1"
132RE - 119RE	6 HOLE	7 1/8"	—	6 3/4"	6 11/16"	3 3/32"	2 7/8"	2"	2"	36"	6"	3 1/2"	3 1/2"	6"	1 1/16"	1 1/16" x 1 13/32"	1 1/16" x 1 13/32"	1 1/16"
132RE - 115RE	6 HOLE	7 1/8"	—	6 5/8"	—	3 3/32"	2 7/8"	2"	1 13/16"	36"	6"	3 1/2"	3 1/2"	6"	1 1/16"	1 1/16" x 1 13/32"	1 1/16"x 1 13/32"	1 1/16"
119RE - 115RE	6 HOLE	6 11/16"	6 9/16"	6 1/2"	6 3/8"	2 7/8"	2 7/8"	2"	1 7/8"	36"	6"	3 1/2"	3 1/2"	6"	1 1/16"	1 1/16" x 1 13/32"	1 1/16" x 1 13/32"	1 1/16"
115RE - 112RE	5 HOLE	6 5/8"	—	6 17/32"	6 11/32"	2 7/8"	2 7/8"	1 7/8"	1 7/8"	30"	6"	3 1/2"	2 1/2"	6 1/2"	1 1/16"	1 1/16" x 1 13/32"	1 1/16" x 1 13/32"	1 1/16"
115RE - 100RE	5 HOLE	6 5/8"	6 1/2"	6"	5 13/16"	2 7/8"	2 3/4"	1 13/16"	1 13/16"	30"	6"	3 1/2"	2 1/2"	6 1/2"	1 1/16"	1 1/16" x 1 13/32"	1 1/16" x 1 13/32"	1 1/16"
115RE - 110RE	5 HOLE	6 5/8"	—	6 1/8"	6"	2 7/8"	2 5/8"	1 13/16"	1 13/16"	30"	6"	3 1/2"	2 29/32"	6"	1 1/16"	1 1/16" x 1 13/32"	1 1/16" x 1 7/16"	1 1/16"
115RE - 100RE	4 HOLE	6 5/8"	—	6"	—	2 7/8"	2 39/64"	2"	2"	26"	6 1/2"	2 1/2"	2 11/16"	5 1/2"	1 5/32"	1 1/8" x 1 3/8"	1 1/8" x 1 3/8"	1 5/32"
112RE - 10035	4 HOLE	6 5/8"	6 5/16"	5 45/64"	5 33/64"	2 7/8"	2 5/8"	1 13/16"	1 13/16"	24"	6 1/2"	2 1/2"	2 21/32"	6"	1 1/16"	1 1/16" x 1 13/32"	1 1/16" x 1 13/32"	1 1/16"
115RE - 90RA	5 HOLE	6 5/8"	—	5 9/16"	5 7/16"	2 7/8"	2 37/64"	1 13/16"	1 9/16"	30"	6"	3 1/2"	2 29/32"	6"	1 1/16"	1 1/16" x 1 13/32"	1 1/16" x 1 7/16"	1 1/16"
115RE - 85MP	5 HOLE	6 5/8"	—	5 7/32"	—	2 7/8"	2 21/128"	1 13/16"	1 3/4"	30"	6"	3 1/2"	2 13/32"	5"	1 1/16"	1 1/16" x 1 13/32"	1 1/16" x 1 7/16"	1 1/16"

NOTES:
1. AT PERMANENT CONNECTIONS OF DIFFERENT RAIL SECTIONS, COMPROMISE JOINTS OR COMPROMISE WELDS SHALL BE INSTALLED IN ACCORDANCE WITH CHIEF ENGINEER'S INSTRUCTIONS AND WHERE PRACTICABLE, THEY SHALL NOT BE LOCATED IN MAIN TRACK CURVE OR OPEN DECK BRIDGES, OR IN TURNOUTS.

FIBER OPTIC CABLE! CALL BEFORE YOU DIG 1-800-336-9193

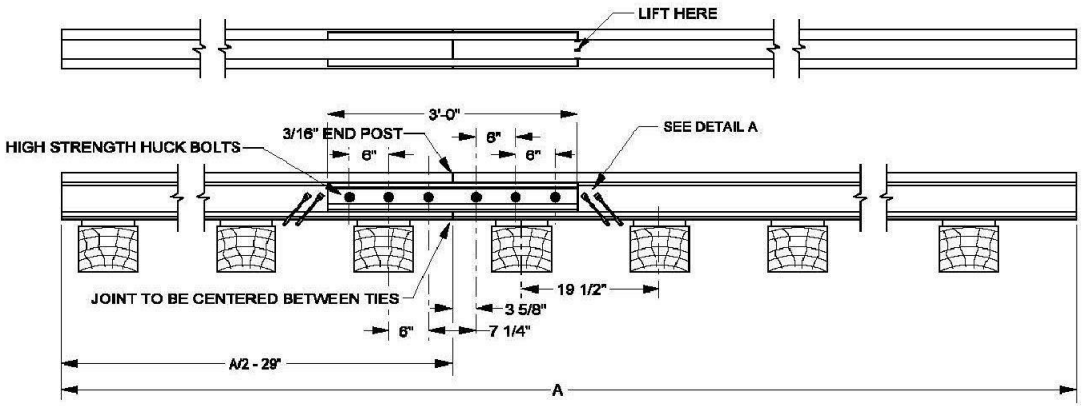
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

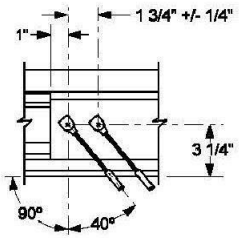
Exhibit "O-1"

Typical Specifications & Criteria
for Construction of Industrial Tracks

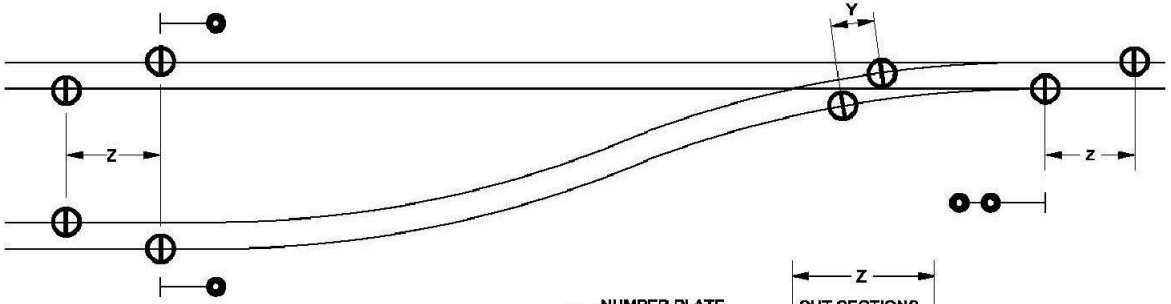
Drawn By: SJ Stoakes Date: 12/1/2007



6- HOLE JOINT PROFILE



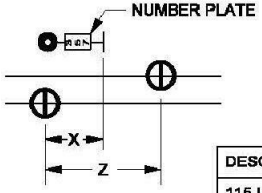
DETAIL A

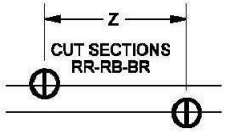


PREFERRED, MINIMUM, AND MAXIMUM INSULATED JOINT SPACING AT ABSOLUTE SIGNALS, INTERMEDIATE, SIGNALS, AND CUT SECTIONS FOR WOOD AND CONCRETE TIES ARE AS FOLLOWS:

CONCRETE TIES
X = 2'-0" (PREFERRED), 0" MIN., 10'-0" MAX.
Y = 4'-6" MAX.
Z = 4'-0" (PREFERRED AND MIN.), 20'-0" MAX.

WOOD TIES
X = 1'-7 1/2" (PREFERRED), 0" MIN., 9'-9" MAX.
Y = 4'-6" MAX.
Z = 3'-3" (PREFERRED AND MIN.), 19'-6" MAX.





DESCRIPTION	A
115 LB. STRAIGHT CUT	15'-29' (6-HOLE)
115 LB. STRAIGHT CUT	39' (6-HOLE)
133 LB. STRAIGHT CUT	18'-23' (8-HOLE)
133 LB. STRAIGHT CUT	18'-29' (8-HOLE)
133 LB. STRAIGHT CUT	39' (6-HOLE)
136 LB. STRAIGHT CUT	15'-29' (6-HOLE)
136 LB. STRAIGHT CUT	39' (6-HOLE)
141 LB. STRAIGHT CUT	18'-23' (8-HOLE)
141 LB. STRAIGHT CUT	35'-40' (8-HOLE)

NOTES:
1. ALL PLUGS TO BE CONSTRUCTED FROM HEAD HARDENED RAIL.
2. 8-HOLE JOINTS TO BE DRILLED 3 1/2-6-6-6
3. ATTACH BONDING WIRES AS SHOWN PER DETAIL A. BONDING MUST BE OF AN APPROVED LOW HEAT SOURCE.
4. 18' - 23' PLUGS TO BE USED IN TANGENT TRACK AND CURVES UP TO ONE DEGREE. 39'-0" PLUGS TO BE USED WHERE CURVATURE EXCEEDS 1°.
5. PLUGS TO BE CROPPED BACK A CRIB OR TWO FOR INITIAL INSTALLATION TO ALLOW SUBSEQUENT REPLACEMENT WITH LONGER PLUG RAILS IN THE FUTURE, HOWEVER, PLUG RAIL MUST REMAIN AT LEAST 15'-0" IN LENGTH.
6. I.D. TAG TO BE LOCATED 2'-0" FROM END OF BAR AND IS TO INCLUDE MANUFACTURER, DATE, RAIL SIZE, TYPE, LENGTH, SERIAL NUMBER, & WEIGHT.
7. INSULATED JOINT LOCATIONS SHOWN ARE FOR REFERENCE ONLY. ACTUAL LOCATIONS TO BE VERIFIED WITH A SIGNAL REPRESENTATIVE PRIOR TO INSTALLATION.

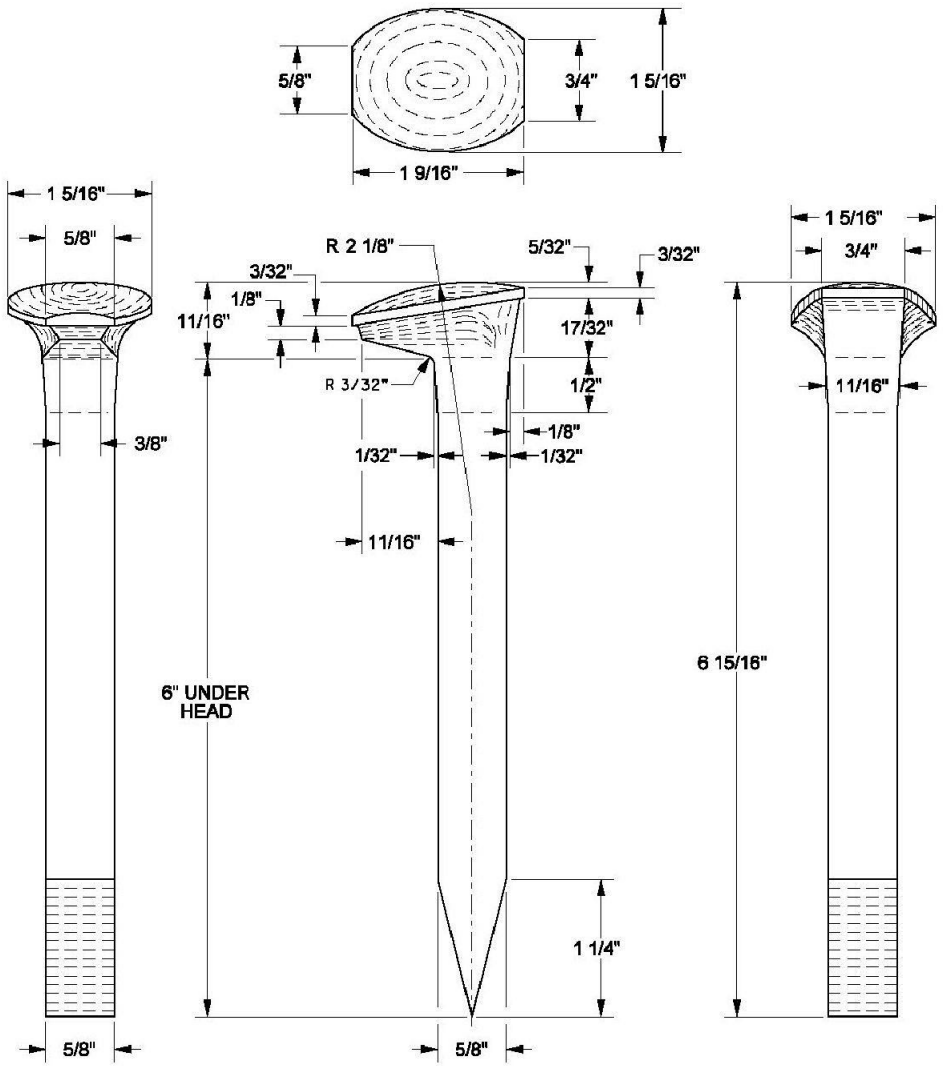
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

Exhibit "O-2"

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007



NOTES:

1. MATERIAL AND WORKMANSHIP TO BE IN ACCORDANCE WITH CURRENT AREMA MANUAL REQUIREMENTS FOR HIGH CARBON STEEL TRACK SPIKES WITHOUT COPPER.
2. PERMISSIBLE SHANK STRAIGHTNESS VARIATION, MEASURED IN EITHER PLANE, SHALL NOT EXCEED 0.0313".
3. MANUFACTURER'S I.D. AND THE LETTERS "HC" SHALL BE PRESSED ON THE HEAD OF EACH SPIKE WHILE BEING FORMED.
4. WEIGHT = APPROXIMATELY 0.875 LBS. EACH.

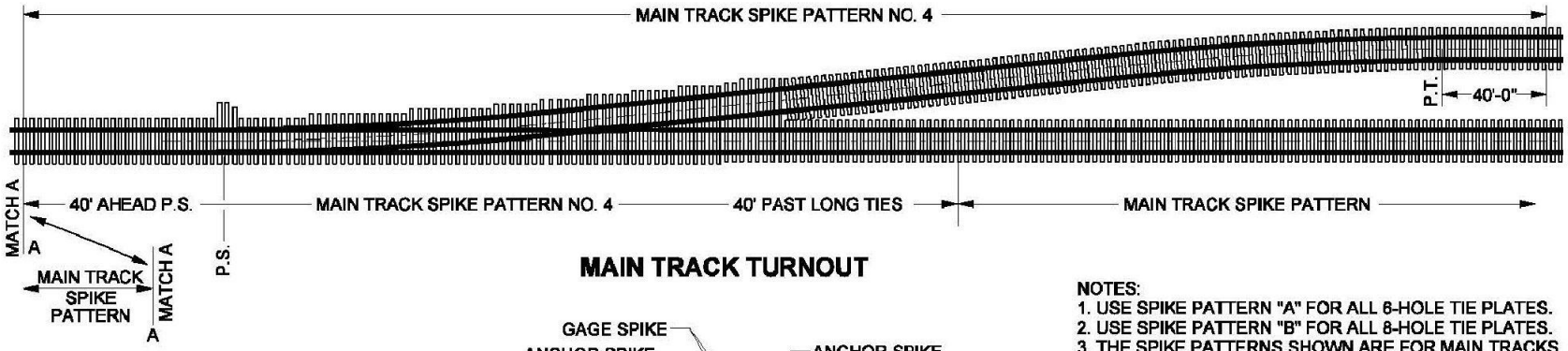
REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

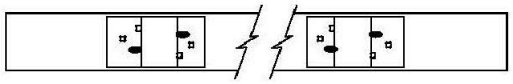
Exhibit "O-4"

Typical Specifications & Criteria
for Construction of Industrial Tracks

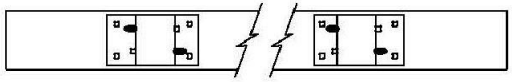
Drawn By: SJ Stoakes Date: 12/1/2007



MAIN TRACK TURNOUT

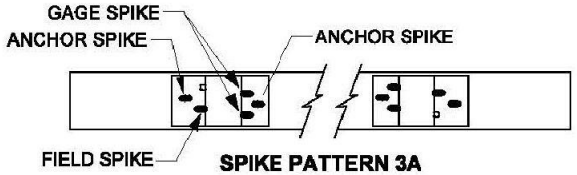


SPIKE PATTERN 1A

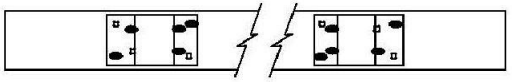


SPIKE PATTERN 1B

SPIKE PATTERN NO. 1

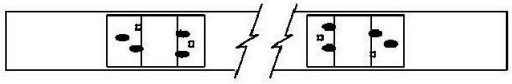


SPIKE PATTERN 3A

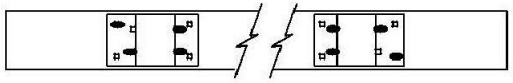


SPIKE PATTERN 3B

SPIKE PATTERN NO. 3

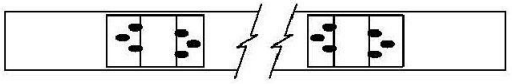


SPIKE PATTERN 2A

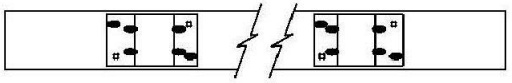


SPIKE PATTERN 2B

SPIKE PATTERN NO. 2



SPIKE PATTERN 4A



SPIKE PATTERN 4B

SPIKE PATTERN NO. 4

NOTES:
1. USE SPIKE PATTERN "A" FOR ALL 6-HOLE TIE PLATES.
2. USE SPIKE PATTERN "B" FOR ALL 8-HOLE TIE PLATES.
3. THE SPIKE PATTERNS SHOWN ARE FOR MAIN TRACKS, BRANCH LINE TRACKS, HEAVY TONNAGE SPURS, AND C.T.C. SIDINGS WITH 13" AND LONGER PLATES.
4. CHIEF ENGINEER WILL DETERMINE ANCHOR SPIKE PATTERN FOR ANY PLATES LESS THAN 13" LONG.
5. USE PATTERN 1A AND 1B ON TANGENT TRACK AND CURVES BELOW 1°30' FOR SPEEDS BELOW 40 MPH.
6. USE PATTERN 2A AND 2B:
   A) ON TANGENT TRACK AND CURVES BELOW 1°30' FOR SPEEDS 40 MPH AND ABOVE.
   B) ON CURVES 1°30' AND GREATER, BUT UNDER 4° FOR SPEEDS BELOW 40 MPH.
   C) ON NON C.T.C. SIDINGS, YARD AND INDUSTRY TRACKS WITH CURVES OVER 4°.
7. USE PATTERN 3A AND 3B:
   A) ON CURVES 1°30' AND GREATER BUT UNDER 4° FOR SPEEDS ABOVE 40 MPH.
   B) ON CURVES 4° AND GREATER, BUT UNDER 8° FOR SPEEDS BELOW 40 MPH.
8. USE PATTERN 4A AND 4B:
   A) ON CURVES 4° AND GREATER, BUT UNDER 8° FOR SPEEDS ABOVE 40 MPH.
   B) ON ALL CURVES 8° AND GREATER.
   C) ON ALL MAIN TRACK TURNOUTS.
9. ANY SPIKING PATTERN OTHER THAN WHAT IS SHOWN ON THIS DRAWING ARE TO BE APPROVED BY THE CHIEF ENGINEER.

FIBER OPTIC CABLE! CALL BEFORE YOU DIG 1-800-336-9193

REVISION #	BY	DATE	DESCRIPTION

IOWA INTERSTATE RAILROAD

Exhibit "O-5"

Typical Specifications & Criteria
for Construction of Industrial Tracks

Drawn By: SJ Stoakes Date: 12/1/2007