



MEMORANDUM

TO: District Engineers

DATE: January 12, 2006

FROM: Mark A. Marek, P.E. *mm*

SUBJECT: Revision to "Survey Control Documentation"

The memorandum of October 17, 2005, Subject: "Survey Control Documentation," is rescinded in its entirety. In addressing the issue of survey control documentation in construction project plans, clarification of the definition of "engineering survey" is necessary. According to the Texas Engineering Practice Act, "engineering survey includes any survey activity required to support the sound conception, planning, design, construction, maintenance, or operation of an engineered project." Therefore, a plan sheet showing survey information for a transportation project design is signed and sealed by a professional engineer (PE). An additional requirement that the sheet be signed and sealed by a registered professional land surveyor (RPLS) is at the district's option. The information contained in the October 17, 2005 memorandum is replaced by the following information.

In recent months, TxDOT has become aware of issues regarding survey control during the construction phase. Project field personnel have indicated that some of the benchmarks shown on the plans are not accurate, making it difficult to properly construct the project.

To address this concern, the construction project plans and/or project file should include a Survey Control Index Sheet and a Horizontal and Vertical Control Sheet signed and sealed by a PE. The Survey Control Index Sheet shows an overall view of the project control, and the Horizontal and Vertical Control Sheet identifies specific locations for each primary survey control point. Prior to the start of construction, TxDOT should verify the project control data.

Based on the definition of "engineering survey," these sheets should be signed and sealed by the PE in direct responsible charge (of the surveying). These sheets may also be signed and sealed by the responsible RPLS if required by the district, and may be an additional required deliverable from contract surveyors at the district's option. The survey metadata from the time the control was established should be included on the Horizontal and Vertical Control Sheet. Metadata is defined as a description of how the survey was performed, the basis of datum, survey units and adjustment factors that were used to establish the coordinate values, and any other information that the surveyors following the original survey need to accurately retrace the original survey.

The attached sheets are suggested examples of survey control documentation that should be included in construction project plans and/or project files. The use of these sheets, or similar documentation, may also be appropriate for significant right of way acquisition efforts.

The *PS&E Manual* will incorporate these suggested sheets in a future manual revision. Draft *PS&E Manual* language and examples of how the survey control documentation could be incorporated in the PS&E may be found on the TxDOT website at <http://crossroads.dot.state.tx.us/isdinfo/data/isd/srvymap/>.

If you have any questions or need additional information concerning these revisions, please contact your Design Division Director of Field Coordination.

Attachments

cc: Administration
Standing Committee on Surveying
CST
ISD
ROW

Survey Control Index Sheet *(Draft Language for the PS&E Manual)*

The next paragraphs cover these Survey Control Index Sheet topics:

- ◆ Purpose
- ◆ Guidelines
- ◆ Contents

Purpose. The purpose of the Survey Control Index Sheet is to show an overall view of the project and the relationship of primary monumentation and control used in preparation of the project. This sheet should be used in conjunction with the Horizontal and Vertical Control Sheet.

Guidelines. This sheet should be provided for all 4R projects and for 3R projects that involve substantial changes to the vertical grade and/or horizontal alignment of an existing facility and/or right of way acquisition.

The control points shown on the Survey Control Index Sheet should correspond with the information shown on the Horizontal and Vertical Control Sheet. The Survey Control Index Sheet should be signed and sealed by the professional engineer (PE) in direct responsible charge of the surveying. This sheet may also be signed and sealed by the responsible registered professional land surveyor (RPLS) if required by the district.

Contents. The following are the contents of the Survey Control Index Sheet:

- ◆ Overall view of the project and primary control monuments set for control of the project
- ◆ Identification of the control points
- ◆ Baseline and/or centerline
- ◆ Graphic (Bar) Scale
- ◆ North Arrow
- ◆ PE signature, seal and date.

(For an example of a Survey Control Index Sheet, see [Survey Index](#))

Horizontal and Vertical Control Sheet *(Draft Language for the PS&E Manual)*

The next paragraphs cover these Horizontal and Vertical Control Sheet topics:

- ◆ Purpose
- ◆ Guidelines
- ◆ Contents

Purpose. The purpose of the Horizontal and Vertical Control Sheet is to identify the primary survey control and the survey control monumentation used in preparation of the project. This sheet should be used in conjunction with the Survey Control Index Sheet which contains an overall view of the project and the relationship of primary monumentation and survey control used in preparation of the project.

Guidelines. This sheet should be provided for all 4R projects and for 3R projects that involve substantial changes to the vertical grade and/or horizontal alignment of an existing facility and/or right of way acquisition.

The Horizontal and Vertical Control Sheet should be signed and sealed by the professional engineer (PE) in direct responsible charge of the surveying. This sheet may also be signed and sealed by the responsible registered professional land surveyor (RPLS) if required by the district. Control point location maps should be drawn to scale and provide sufficient information so that the point can be located.

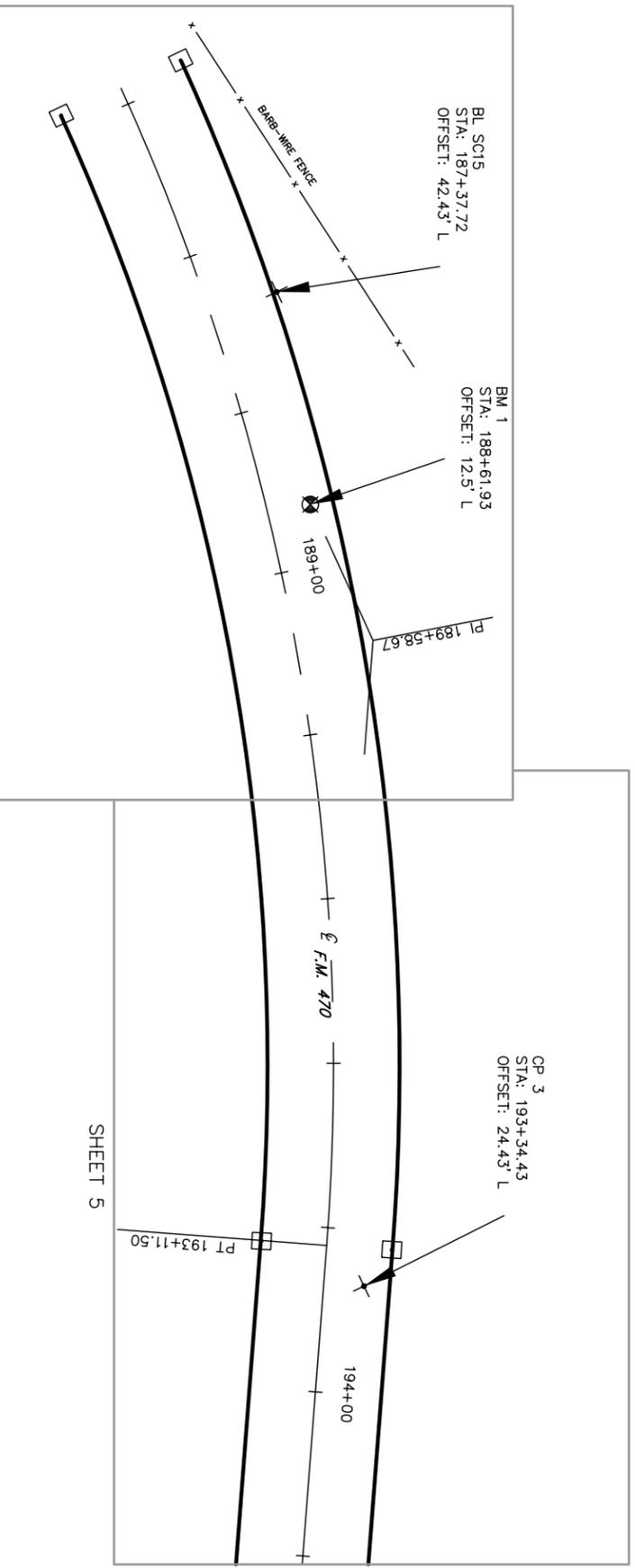
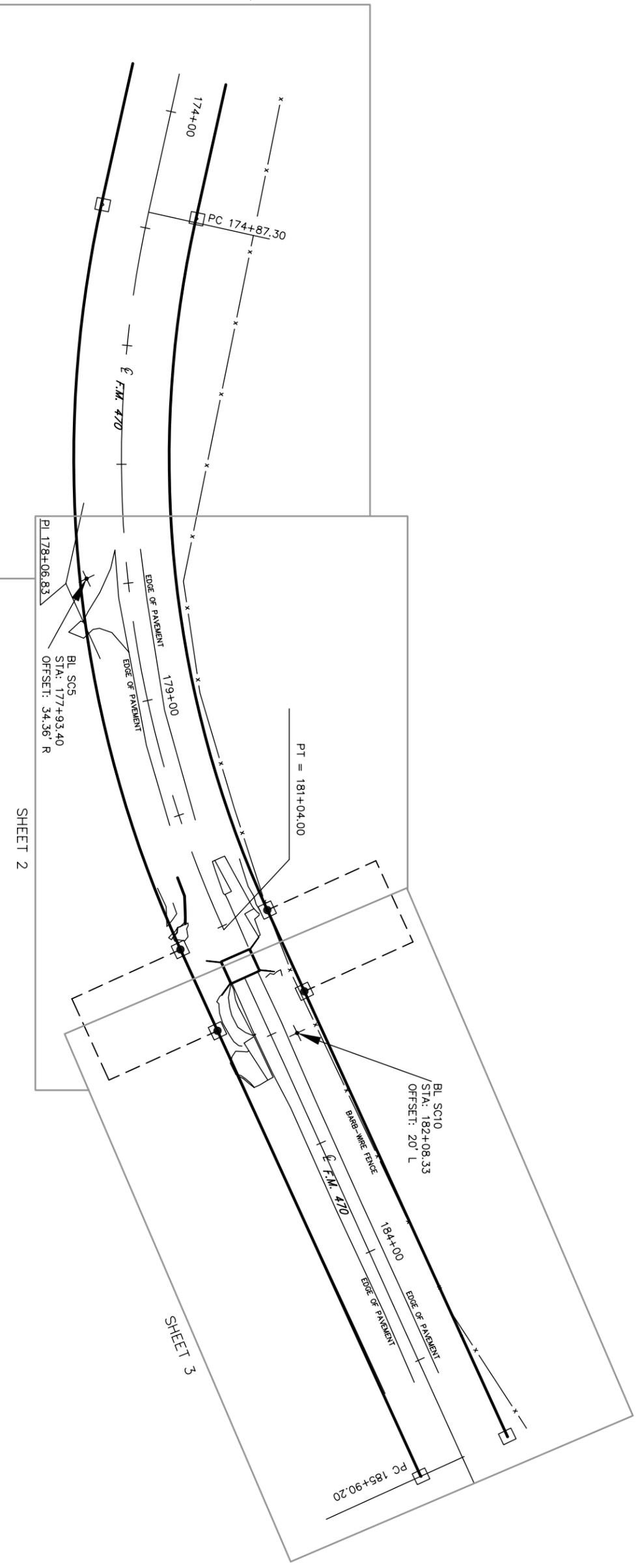
Contents. The following are the contents of the Horizontal and Vertical Control Sheet:

- ◆ Location for each control point, showing baseline and/or centerline alignment and North arrow
- ◆ Station and offset (with respect to the baseline or centerline alignment) of each identified control point
- ◆ Basis of Datum for horizontal control (base control monument/benchmark name/number, datum)
- ◆ Basis of Datum for vertical control (base control monument/benchmark name/number, datum)
- ◆ Date of the current adjustment of the datum
- ◆ Monumentation set for Control (Description, District name/number and Location ties)
- ◆ Surface Adjustment Factor and unit of measurement
- ◆ Coordinates (SPC Zone and surface or grid)
- ◆ Survey closure information
- ◆ Relevant metadata
- ◆ Graphic (Bar) Scale
- ◆ PE signature, seal and date
- ◆ TXDOT title block (District name, County, Highway No., and CSJ).

(For an example of a Horizontal and Vertical Control Sheet, see [H&Vcontrol](#))

SURVEY CONTROL INDEX SHEET

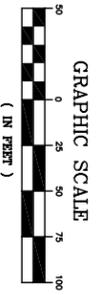
SUBMIT FINAL ON 11" x 17" MYLAR, W/ 1.5" LEFT BORDER



NOTES:
 1. COORDINATES AND DISTANCES ARE US SURVEY FEET. DISPLAYED IN SURFACE VALUES USING THE RECIPROCAL COMBINED SCALE FACTOR 1.00012.

2. THE VERTICAL CONTROL WAS ESTABLISHED FROM A DIGITAL LEVEL LOOP HOLDING THE ELEVATIONS OF PRIMARY CONTROL POINTS PROVIDED BY TxDOT:
 MU69363960 ELEV = 2059.80 FT [NAVD88(1991)]
 MU69604997 ELEV = 2196.06 FT [NAVD88(1991)]

3. ALL HORIZONTAL CONTROL ON THIS PROJECT WAS ESTABLISHED BY STATIC GPS METHODS AND BASED ON THE FOLLOWING PRIMARY CONTROL POINTS AS PROVIDED BY TxDOT:
 MU68564311 [NAD83(1993)]
 N30-13-09.1025 W099-19-36.0512 MU68564657 [NAD83(1993)]
 N30-15-01.5080 W099-19-36.3316



Survey Date:

COMPANY NAME/LOGO
 INCLUDING CONTACT INFORMATION.

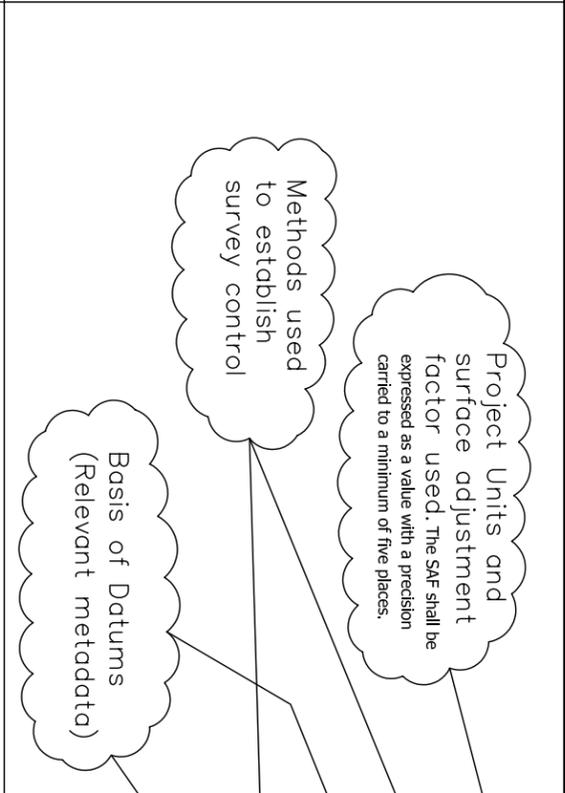
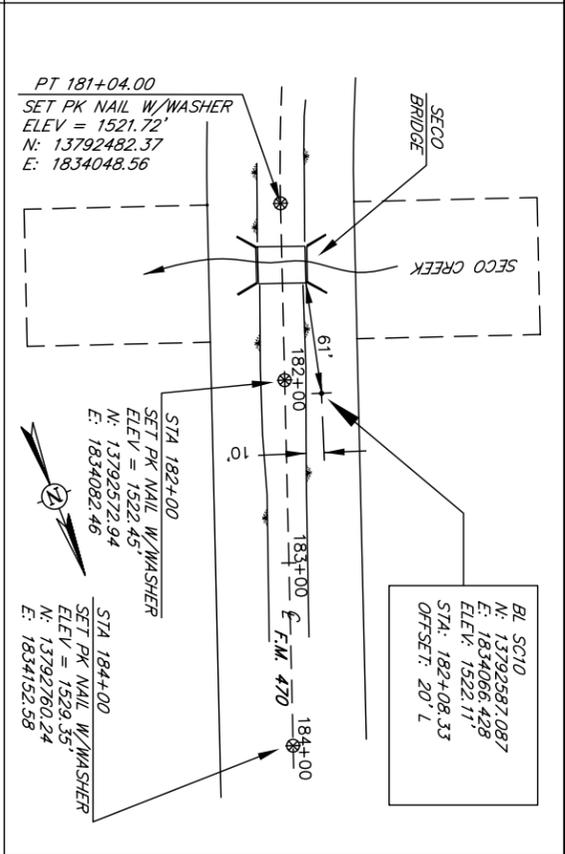
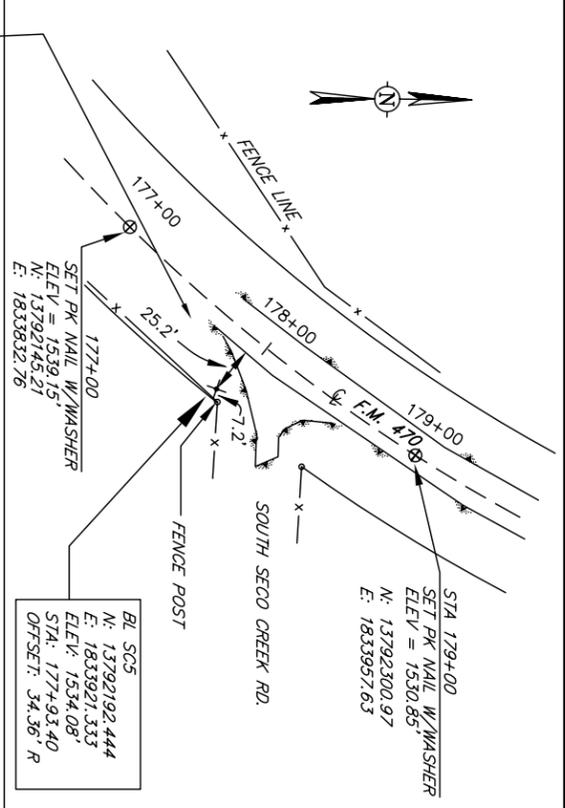


F.M. 470
 SURVEY CONTROL INDEX SHEET

FHWA TEXAS DIVISION		FEDERAL AID PROJECT NO.		SHEET NO.
STATE	DISTRICT	COUNTY		
TEXAS	00	NAME		
CONTROL	SECTION	JOB	HIGHWAY NO.	
0000	00	000	FM 470	

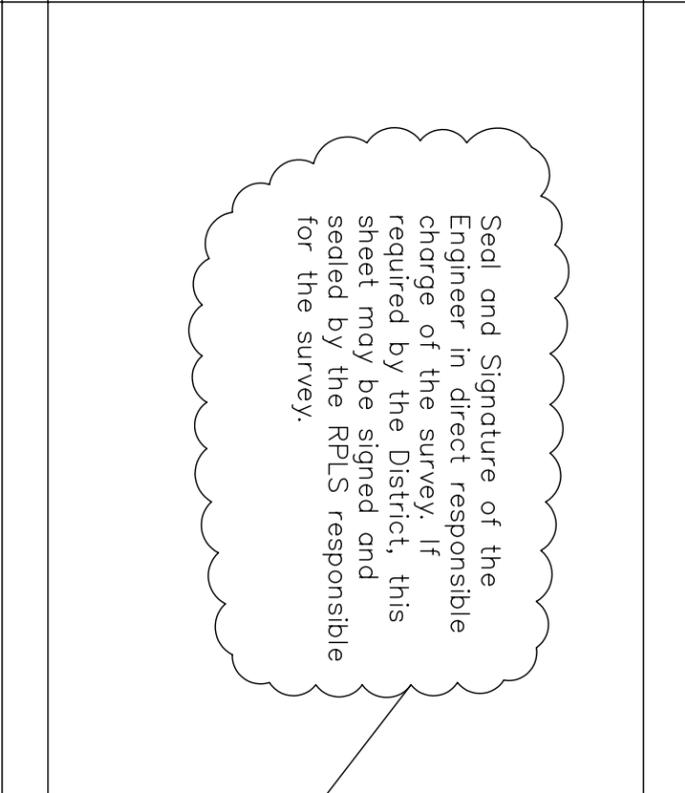
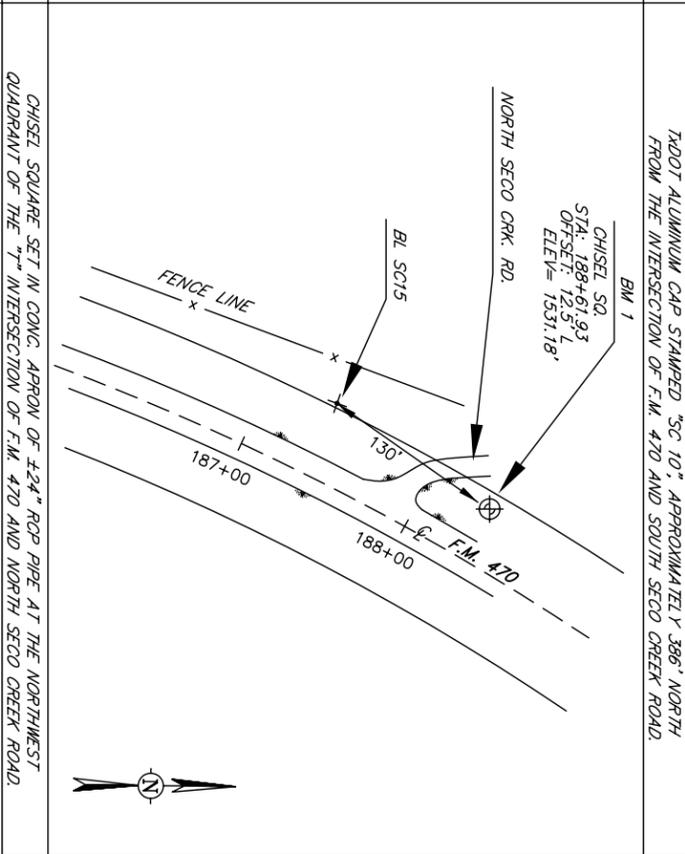
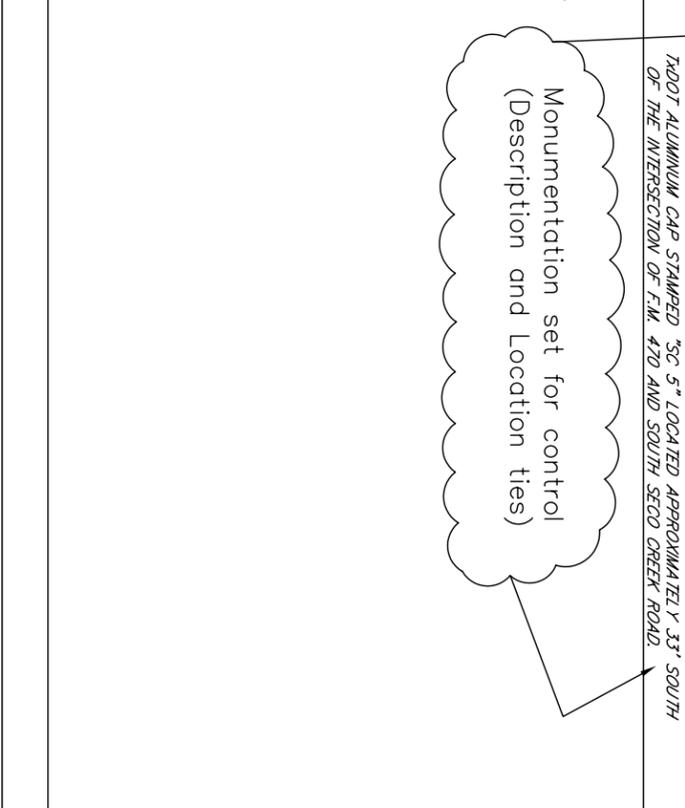
HORIZONTAL & VERTICAL CONTROL

SUBMIT FINAL ON 11" x 17" MYLAR, W/ 1.5" LEFT BORDER

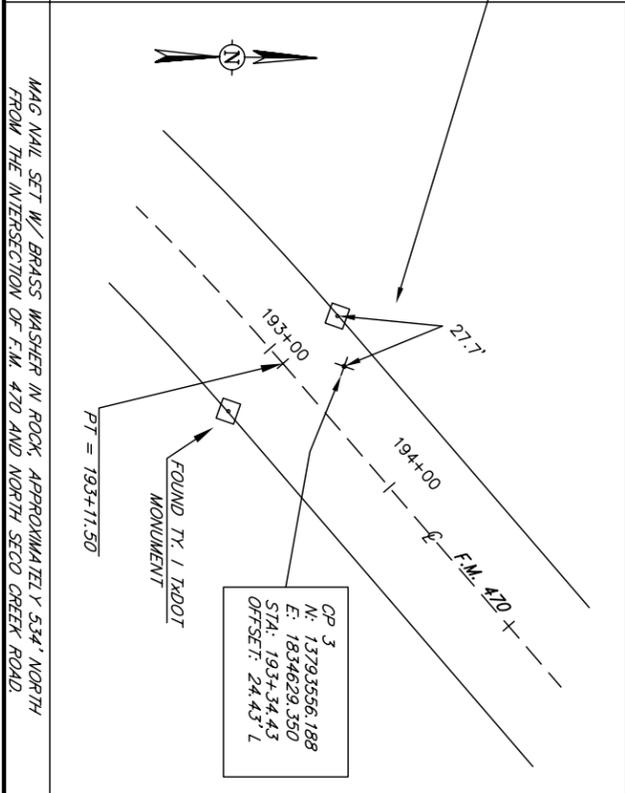
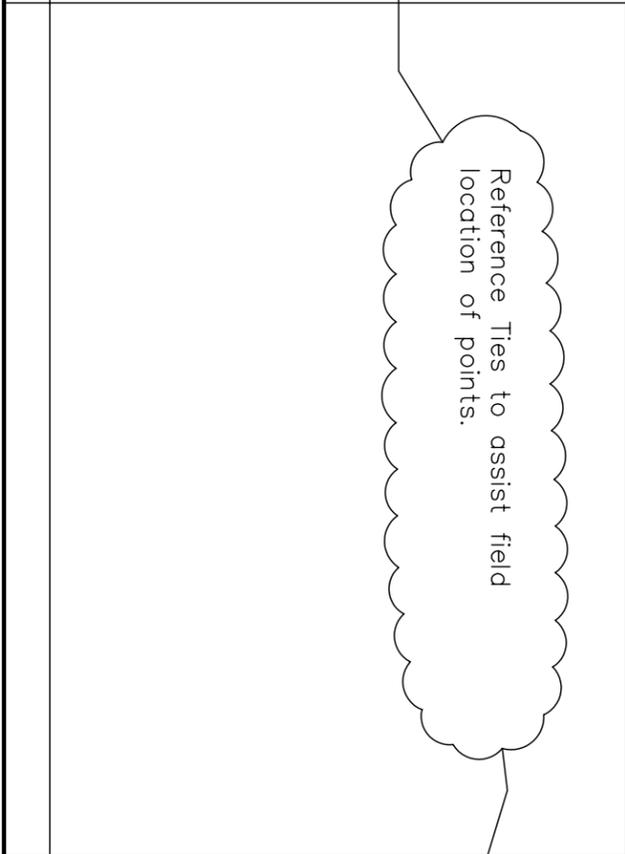
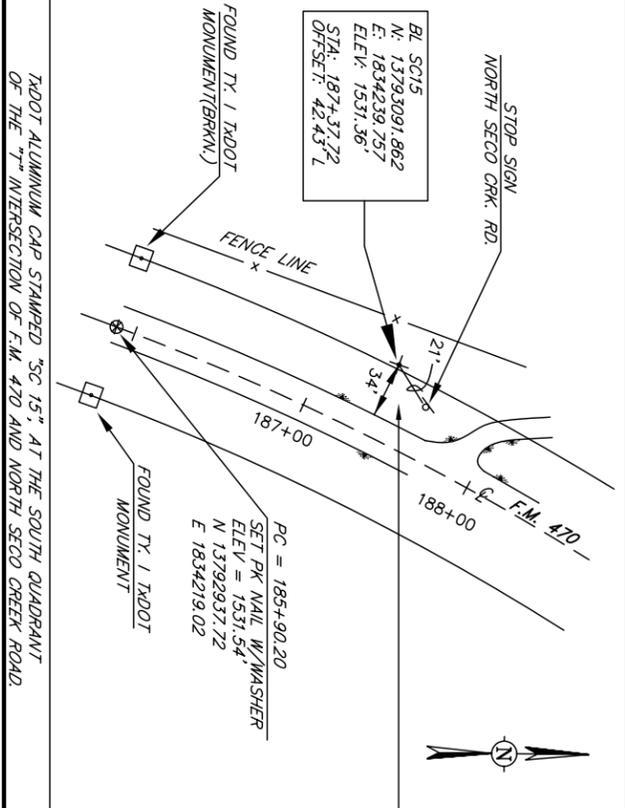


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 MU68564657 [NAD83(1993)]
 N30-15-01.5060 W099-19-36.3316



GRAPHIC SCALE
 (IN FEET)



Survey Date: _____

COMPANY NAME/LOGO
 INCLUDING CONTACT INFORMATION

TEXAS DEPARTMENT OF TRANSPORTATION

F.M. 470
 HORIZONTAL & VERTICAL CONTROL

FHWA TEXAS DIVISION	FEDERAL AID PROJECT NO.	SHEET NO.
STATE	DISTRICT	COUNTY
TEKAS	00	000
CONTROL	SECTION	JOB
0000	00	000
		HIGHWAY NO.
		FM 470