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Office of Proceedings May 3, 2024
May 3, 2024
Part of
Public Record

**Re: STB Finance Docket No. 22218, Atchison, Topeka & Santa
Fe Railway Company-Operating Rights-Southern Pacific
Transportation Company**

Dear Ms. Brown:

Enclosed for electronic filing in the referenced proceeding is the redacted, public version of Union Pacific Railroad Company's Opening Statement and Evidence. Union Pacific is filing electronic copies of its workpapers, which contain Confidential and Highly Confidential material, under seal.

Please contact me if you have any questions.

Sincerely,



Michael L. Rosenthal
*Counsel for Union Pacific
Railroad Company*

Enclosures

cc: All parties of record

BEFORE THE
SURFACE TRANSPORTATION BOARD

Finance Docket No. 22218

ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY
—OPERATING RIGHTS—
SOUTHERN PACIFIC TRANSPORTATION CO.

**UNION PACIFIC RAILROAD COMPANY'S
OPENING STATEMENT AND EVIDENCE**

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May 3, 2024

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EXHIBIT D – Verified Statement of Charles W. Rex III, MAI

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I. Introduction

This proceeding involves the interest rental BNSF Railway Company pays to use Union Pacific Railroad Company's 67.8-mile line between Kern Junction and Mojave, California, known as the Tehachapis Line. BNSF currently pays an amount prescribed by the Interstate Commerce Commission in 1967. The ICC's prescription has become inequitable, and Union Pacific is effectively subsidizing BNSF's operations on the Line. Union Pacific is asking the Board to revise the ICC's 1967 prescription and set a new interest rental amount using the capitalized earnings method from the Board's *SSW Compensation* methodology for computing trackage rights compensation. Application of the *SSW Compensation* methodology will substantially increase the interest rental, leveling the competitive playing field between Union Pacific and BNSF.

The only dispute in this proceeding is the amount of interest rental BNSF must pay to use the Line. On January 6, 2023, Union Pacific filed a petition asking the Board to reopen this proceeding and revise the prescribed interest rental. On January 26, 2023, BNSF acknowledged Union Pacific's right to reopen the proceeding. On May 15, 2023, the Board granted Union Pacific's petition but ordered the parties to mediate the dispute.

Mediation was unsuccessful. On December 4, 2023, the parties proposed a schedule for the submission of evidence, which the Board adopted on December 5, 2023.

This Opening Statement first describes the Tehachapis Line and the events leading to the present dispute. It then discusses the legal issues involved in determining the appropriate interest rental and summarizes the results of rental calculations based on two methods the Board has used in *SSW Compensation* cases: capitalized earnings (CE) and reproduction cost new less depreciation (RCNLD). It concludes by addressing two implementation issues: when to implement the new interest rental amount, and the potential impact of implementing the new rental.

In support of its Opening Statement, and as its Evidence, Union Pacific is submitting verified statements and supporting workpapers from three expert witnesses: Dr. Divya Mathur of Analysis Group, Inc. (Mathur VS); Harvey A. Crouch, PE, of Crouch Engineering (Crouch VS); and Charles W. Rex III, MAI, of RMI Valuation, LLC (Rex VS). Dr. Mathur determined the Line's valuation and calculated interest rental using CE. Her statement explains why CE is the economically appropriate valuation method in this proceeding. Mr. Crouch determined the Line's valuation and calculated interest rental using RCNLD. Mr. Rex's statement provides a real estate valuation that Mr. Crouch uses in his RCNLD calculation. Union Pacific's Evidence also includes a verified statement from Mr. David W. Hughes, Union Pacific's Assistant Vice President of Joint Facilities and Interline Operations (Hughes VS). Mr. Hughes provides context for the present dispute and addresses the potential impact of implementing the new rental.

II. Background

A. The Tehachapis Line

The Tehachapis Line runs for 67.8 miles between Kern Junction in Bakersfield, California, and Mojave, California. It crosses some of the most challenging terrain on Union Pacific's system. The Line rises from an altitude of 412 feet above sea level at Kern Junction, ascends to 4,025 feet at its highest point in Tehachapi, then descends to an altitude of 2,777 feet in Mojave. It has 55.7 route mile segments of double track and 13.1 route mile segments of single track. It also has 12 concrete-lined tunnels totaling 5,425 feet in length, as well as 140 culverts, 73 bridges, and 12 retaining walls.¹

The Line is an exceptionally valuable asset to both Union Pacific and BNSF. Union Pacific currently routes { }² trains per day over the Line, including high priority intermodal trains. Union Pacific's intermodal trains use the Line for routes from Los Angeles to the Pacific Northwest and Los Angeles to Lathrop, California. Union Pacific's manifest trains use the line for traffic moving between Los Angeles and Roseville, California, and between Roseville and El Paso, Texas.³

BNSF is highly dependent on the Line. It currently routes { } trains per day over the Line. The Line provides a critical link in BNSF's intermodal franchise. BNSF has no alternate route it could use to move double-stack intermodal traffic from markets in Northern California to connect with its highly efficient Southern Transcon

¹ See Crouch VS at 4–7.

² In Union Pacific's Opening Statement and Evidence, Highly Confidential information is enclosed in double braces, and Confidential information is enclosed in single braces. Highly Confidential information and Confidential information is redacted from the public version of documents filed at the Board.

³ See Hughes VS at 2.

route that runs from Los Angeles to Chicago. The line is also critical to BNSF's ability to offer competitive service for all its traffic moving in the I-5 Corridor.⁴

The Line was constructed in 1876 by a predecessor of Southern Pacific Transportation Company. Union Pacific now owns the line as successor to SP. In 1899, The Atchison, Topeka & Santa Fe Railway Company contracted with SP to use the Line, rather than construct its own line to bridge a gap in its network. BNSF now has trackage rights over the Line as successor to ATSF.

In 1912, SP and ATSF renegotiated their original trackage rights agreement. When the renegotiated agreement expired in 1961, the railroads were unable to agree on terms and conditions for renewal, so they submitted the issues to the ICC.⁵

B. The ICC's Prescribed Terms and Conditions

In 1967, the ICC entered an order prescribing 31 separate terms and conditions for ATSF's continued use of the Line.⁶ Two conditions are relevant in this proceeding: Conditions 17 and 30.

Condition 17 sets ATSF's annual rental for use of the Line at one-half of 5-1/2 percent of the ICC's \$17 million valuation of the Line.⁷ The ICC made the new rental retroactive to January 1, 1962—the day after the 1912 agreement had expired.⁸

⁴ *See id.* at 3.

⁵ *See generally Atchison, Topeka & Santa Fe Ry.—Operating Agreement—S. Pac. Co.*, 331 I.C.C. 367 (1967), *modified*, 333 I.C.C. 342 (1968) (jointly referred to as the *1967 Order*).

⁶ *See id.* at 387–404.

⁷ *See id.* at 394.

⁸ *See id.*

Condition 30 allows either party, on each succeeding fifth anniversary of the effective date of the transaction, to petition for revision of terms and conditions that may have become inequitable. It provides that the ICC will retain jurisdiction over the transaction for the purpose of revising the terms and conditions.⁹

C. SP's Petition to Reopen and the Joint Stipulation

In 1991, SP petitioned to reopen the proceeding to modify certain provisions of the prescribed conditions. In 1992, the ICC granted SP's petition, but only to address the condition establishing the interest rental for ATSF's use of the Line.¹⁰ In granting SP's petition, the ICC agreed with SP that the rental prescribed in Condition 17 was "clearly inequitable."¹¹

In June 1993, SP and ATSF negotiated a settlement that included changes to Condition 17. They called the settlement the "Joint Stipulation and Agreement." At the parties' request, the ICC entered an order formally incorporating the provisions of the Joint Stipulation and Agreement as a modification to the conditions prescribed in the *1967 Order*.¹²

In the Joint Stipulation and Agreement, ATSF's annual interest rental amount was initially set at \$5.5 million.¹³ In 2022, however, BNSF paid just \$2.1 million in

⁹ See *id.* at 403–04.

¹⁰ See *Atchison, Topeka & Santa Fe Ry.—Operating Agreement—S. Pac. Transp. Co. (1992 Order)*, 8 I.C.C.2d 297, 303 (1992).

¹¹ *Id.*

¹² See *Atchison, Topeka & Santa Fe Ry.—Operating Agreement—Southern Pac. Transp. Co. (July 1993 Order)*, FD 22218 et al., slip op. at 1 (ICC served July 8, 1993).

¹³ See *id.*, App. § 1(a).

annual interest rental, as a result of an adjustment mechanism based on yields of U.S. Treasury bonds.¹⁴

The Joint Stipulation and Agreement included an initial term of 17 years and provided it would continue in effect until terminated by either party, with at least six months prior written notice to the other party.¹⁵

D. Union Pacific's Petition to Reopen

On June 29, 2022, Union Pacific served BNSF with notice that it was electing to terminate the Joint Stipulation and Agreement as of December 31, 2022.¹⁶ Union Pacific terminated the Joint Stipulation and Agreement because the interest rental provision no longer provided fair compensation for BNSF's use of the Line.¹⁷

On January 6, 2023, Union Pacific filed a petition to reopen this proceeding pursuant to Condition 30 of the *1967 Order* for the purpose of revising Condition 17. Union Pacific explained it was seeking to reopen the proceeding because the interest rental paid by BNSF was "clearly inequitable."¹⁸

On January 26, 2023, BNSF filed a reply in which it asked the Board to grant Union Pacific's petition and requested that the Board order the parties to engage in Board-sponsored mediation.

¹⁴ See *id.*, App. § 1(b); see also Hughes VS at 2.

¹⁵ See *July 1993 Order*, App. § 3.

¹⁶ See Hughes VS at 4.

¹⁷ Union Pacific had to terminate the Joint Stipulation and Agreement to petition for reopening of the compensation terms. The Joint Stipulation suspended SP's right under Condition 30 to seek revisions of prescribed conditions that would be "inconsistent with" or that would "modify" the Joint Stipulation's provisions while the Joint Stipulation remained in effect. See *July 1993 Order*, App. §§ 4, 5.

¹⁸ Union Pacific's petition also requested reopening to revisit Condition 16. Union Pacific is not pursuing revisions to Condition 16.

On May 15, 2023, the Board granted Union Pacific’s petition to reopen and directed the parties to participate in mediation.¹⁹ The parties participated in a virtual mediation session on October 10, 2023, and an in-person session on October 27, 2023. Mediation was unsuccessful. On December 4, 2023, the parties jointly proposed a schedule for the submission of evidence, which the Board adopted on December 5, 2023.²⁰

III. Determining Interest Rental for the Tehachapis Line

The Board should determine the appropriate interest rental for the Tehachapis Line using CE, the Board’s “preferred approach for developing the rental component” in *SSW Compensation* cases.²¹ CE is the Board’s preferred approach because it “values the property as a going concern for railroad use, i.e., the use to which the property would actually be put.”²²

In Section III.A, Union Pacific explains how this proceeding fits into the *SSW Compensation* framework and why the Board should use CE. Although Board precedent requires use of CE, Union Pacific’s expert witnesses performed valuation analyses using both CE and RCNLD, because the ICC ordered the parties to use RCNLD in the special

¹⁹ See *Atchison, Topeka & Santa Fe Ry.—Operating Agreement—Southern Pac. Transp. Co.*, FD 22218 (STB served May 15, 2023).

²⁰ See *Atchison, Topeka & Santa Fe Ry.—Operating Agreement—Southern Pac. Transp. Co.*, FD 22218 (STB served Dec. 5, 2023).

²¹ *1992 Order*, 8 I.C.C.2d at 304; accord *CSX Corp.—Control & Operating Leases/Agreements—Conrail Inc.*, 3 S.T.B. 955, 964 n.18 (1998); see also *New England Cent. R.R.—Trackage Rights Order—Pan Am S. LLC*, FD 35842, slip op. at 18 (STB served Oct. 31, 2017) (“Case law confirms that the CE methodology is ‘preferred’” . . .).

²² *CSX Corp.*, 3 S.T.B. at 364 n.18.

circumstances that existed when it reopened this proceeding at SP's request in the early 1990s. The results of those analyses are described and summarized in Section III.B.

A. The Board Should Calculate Interest Rental Using CE.

The Board's established methodology for prescribing trackage rights compensation is called *SSW Compensation*.²³ "Under *SSW Compensation*, total compensation is the sum of three elements: (a) the variable cost incurred by the owning carrier due to the tenant carrier's operation over the owning carrier's track; (b) the tenant carrier's usage-proportionate share of the track's maintenance and operation expenses; and (c) an interest rental component designed to compensate the owning carrier for the tenant carrier's use of its capital dedicated to the track."²⁴

In this proceeding, only *SSW Compensation*'s third element—the interest rental component—is at issue.²⁵ The interest rental component is determined "by multiplying (i) the value of the assets that comprise the trackage rights line by (ii) a rate of return equal to the current pre-tax nominal cost of capital."²⁶ In past cases, the Board and the ICC have discussed four potential methods of determining the value of the assets that

²³ See generally *St. Louis Southwestern Ry.—Trackage Rights Over Missouri Pacific R.R.—Kansas City to St. Louis (SSW I)*, 1 I.C.C.2d 776 (1984); *St. Louis Southwestern Ry.—Trackage Rights Over Missouri Pacific R.R.—Kansas City to St. Louis (SSW II)*, 4 I.C.C.2d 668 (1987); *St. Louis Southwestern Ry.—Trackage Rights Over Missouri Pacific R.R.—Kansas City to St. Louis (SSW III)*, 5 I.C.C.2d 525 (1989); *Trackage Rights Over Missouri Pacific R.R.—Kansas City to St. Louis (SSW IV)*, 8 I.C.C.2d 80 (1991).

²⁴ *New England Cent. R.R.*, slip op. at 2–3.

²⁵ The other elements are addressed by conditions in the *1967 Order* that are not part of Union Pacific's petition to reopen.

²⁶ *New England Cent. R.R.*, slip op. at 3; *CSX Corp.—Control & Operating Leases/Agreements—Conrail Inc.*, 4 S.T.B. 75, 79 (1999).

comprise the trackage rights line, often called the investment base. In modern practice, they have used only two methods: CE and RCNLD.

Under CE, the investment base is arrived at by “multiplying the specific earnings assigned to the line by an earnings multiplier.”²⁷ The earnings multiplier “relates corporate earnings to corporate value.”²⁸

Under RCNLD, the investment base is arrived at by developing the total cost of reproducing the trackage rights line in its current configuration, pricing the necessary material and labor quantities at current levels, then accounting for the current age and conditions of the assets.²⁹

Use of *SSW Compensation* in this proceeding should not be controversial. When SP petitioned to reopen this proceeding in 1991, the ICC agreed that the interest rental prescribed in the *1967 Order* should be recomputed consistent with the principles adopted in *SSW Compensation*.³⁰

Use of CE to determine the investment base in the proceeding also should not be controversial. Board precedent establishes CE is the “preferred approach for developing the rental component” in *SSW Compensation* cases.³¹ The ICC used CE in its original line of *SSW Compensation* cases.³² The ICC explained CE was its preferred approach

²⁷ *1992 Order*, 8 I.C.C.2d at 304.

²⁸ *SSW I*, 1 I.C.C.2d at 787.

²⁹ See *Atchison, Topeka & Santa Fe Ry.—Operating Agreement—Southern Pac. Transp. Co. (March 1993 Order)*, FD 22218, slip op. at 2, 5–7 (ICC served Mar. 26, 1993).

³⁰ See *1992 Order*, 8 I.C.C.2d at 303.

³¹ *1992 Order*, 8 I.C.C.2d at 304; accord *CSX Corp.*, 3 S.T.B. at 964 n.18; see also *New England Cent. R.R.*, slip op. at 18 (“Case law confirms that the CE methodology is ‘preferred’ . . .”).

³² See generally, *SSW I*, 1 I.C.C.2d at 786.

“because, among other things, it values the property as a going concern for railroad use—*i.e.*, the use to which the property would actually be put.”³³ The Board has offered the same reason to explain its preference for CE.³⁴

When SP petitioned to reopen this proceeding in the 1990s, the ICC concluded the Line should be valued using RCNLD rather than CE, but its reasons for departing from its preferred method do not apply to this reopened proceeding. The ICC declined to use CE mainly because “SP had negative earnings from railroad operations,” at the time, and thus “an earnings multiplier for SP’s rail operations [was] not a meaningful figure.”³⁵ As the ICC observed, “the strict application of the CE approach might well produce a meaningless, negative valuation for the line.”³⁶

The ICC also noted SP’s concern that ATSF’s proposed application of CE would have excluded ATSF earnings from using the Line or would have included only revenue from ATSF’s inadequate rental payments. The ICC recognized that “line-specific earnings must include the earnings of both carriers.”³⁷

The circumstances that led the ICC to depart from its preferred methodology in the prior proceeding—concerns about SP’s negative earnings and the exclusion of ATSF earnings—do not exist here. As Dr. Mathur shows, Union Pacific has positive earnings

³³ *1992 Order*, 8 I.C.C.2d at 304.

³⁴ *See CSX Corp.*, 3 S.T.B. at 964 n.18 (“[CE] values the property as a going concern for railroad use, *i.e.*, the use to which the property would actually be put.”).

³⁵ *March 1993 Order*, slip op. at 4.

³⁶ *Id.*

³⁷ *Id.* In that proceeding, BNSF predecessor ATSF urged the ICC to use CE. SP argued for RCNLD because it was concerned CE would result in an inappropriately low rental due to its negative earnings and the exclusion of ATSF earnings. Both parties agreed that a third potential method, the comparable line segments approach, was unsuitable. *See id.* at 3.

from its rail operations, so the application of an earnings multiplier will not produce a meaningless valuation. Also, as Dr. Mathur shows, BNSF's line-specific earnings can be determined in the same manner as Union Pacific's line-specific earnings, so the CE calculation here can and does include the line-specific earnings of both carriers. The Board should therefore apply CE in this proceeding.

B. Interest Rental Calculations Using CE and RCNLD

Although Board precedent supports the application of CE to determine the appropriate interest rental for the Tehachapis Line, Union Pacific's evidence addresses both CE and RCNLD. In Section III.B.1, Union Pacific describes and summarizes the CE analysis performed by Dr. Mathur. In Section III.B.2, Union Pacific describes and summarizes the alternative RCNLD analysis performed by Mr. Crouch.

As Dr. Mathur's and Mr. Crouch's statements establish, under either method of determining appropriate interest rental for the Line, the rental established by the *1967 Order* has "become inequitable" and must be revised.³⁸

1. Application of CE

Union Pacific's CE analysis was performed by Dr. Mathur and is fully described in her accompanying verified statement and workpapers. First, Dr. Mathur determined Union Pacific's and BNSF's line-specific earnings from the Line by using the Board's Average Total Cost method of determining the portion of revenue from through-traffic appropriately attributed to a specific segment. She used Union Pacific's and BNSF's waybill data produced in discovery to determine each railroad's revenue from each movement that traversed the Line, then allocated the revenue between the Line and the

³⁸ *1967 Order*, 331 I.C.C. at 404.

other segments the movements traversed on Union Pacific's and BNSF's respective networks in proportion to each movement's average total cost (*i.e.*, variable costs and fixed costs) associated with the Line and the other segments.³⁹ The Board accepted the same basic approach to calculating line-specific earnings in *New England Central Railroad, Inc.—Trackage Rights Order—Pan Am Southern LLC*.⁴⁰ Dr. Mathur improved on the approach the Board accepted in *New England Central* by using both railroads' actual earnings, rather than relying on the landlord railroad's earnings as a proxy for the tenant's earnings.⁴¹

Second, Dr. Mathur calculated the multiplier needed to convert the total earnings from the Line into a valuation of the Line—*i.e.*, the investment base. More specifically, she calculated the multiplier based on market data regarding Union Pacific's enterprise value in relation to its earnings before interest and taxes, consistent with economic literature and the evidence in this proceeding showing the Line's earnings should be expected to grow over time, rather than remain static.⁴² Dr. Mathur's approach was consistent with Board precedent establishing that the "earnings multiplier ordinarily is

³⁹ See Mathur VS at 33–57.

⁴⁰ See *New England Cent. R.R.*, slip op. at 15.

⁴¹ Cf. *id.* ("In response to NECR's position that a CE calculation would need to include PAS's earnings from traffic shipped over the NECR segments at issue . . . , PAS used NECR's earnings per car mile and extrapolated PAS earnings based on PAS car miles.").

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⁴² See Mathur VS at 58–61.

the ratio of the landlord railroad's total system market value to its total system earnings.”⁴³

Third, Dr. Mathur determined the Line's investment base by multiplying the line-specific earnings attributed to the Line by the earnings multiplier.⁴⁴ Once again, Dr. Mathur's approach was consistent with precedent.⁴⁵

Finally, Dr. Mathur calculated BNSF's annual rental payment on a car-mile basis. She determined Union Pacific's breakeven return on investment for its investment in and ownership of the Line by multiplying the investment base by a rate of return equal to the pre-tax nominal cost of capital, derived from the railroad industry cost of capital published by the Board. She then multiplied the result by BNSF's usage factor—that is, BNSF's relative share of total traffic moving over the Line on a car-mile basis—to determine BNSF's total annual interest rental payment. She then divided BNSF's total annual interest rental payment by BNSF's total car miles for traffic moving over the Line to develop a rental charge on a per-car mile basis.⁴⁶ Yet again, Dr. Mathur's approach was consistent with precedent.⁴⁷

Dr. Mathur's calculations produce an interest rental payment of \$1.62 per car mile for 2023.⁴⁸

⁴³ *Toledo, Peoria & W. Ry.—Trackage Rights Compensation—Peoria & Pekin Union Ry.*, FD 26476 (Sub-No. 1), slip op. at 5 n.10 (ICC served Sept. 20, 1994); *see also, e.g., CSX Corp.*, 4 S.T.B. at 79; *1992 Order*, 8 I.C.C.2d at 304; *SSW II*, 4 I.C.C.2d at 680–81.

⁴⁴ *See Mathur VS* at 61–62.

⁴⁵ *See, e.g., 1992 Order*, 8 I.C.C.2d at 304.

⁴⁶ *See Mathur VS* at 62–65.

⁴⁷ *See, e.g., New England Central*, slip op. at 3.

⁴⁸ *See Mathur VS* at 65.

2. Application of RCNLD

Union Pacific's RCNLD analysis was performed by Mr. Crouch and is fully described in his accompanying verified statement and workpapers. First, Mr. Crouch estimated the total cost of reproducing the Line in its current configuration, except for the acquisition of real estate. He developed quantities of necessary materials using both records and in-person observations during field visits. He developed estimates of current costs from the best available sources for the various categories of assets, including the California Department of Transportation's historical database of past construction projects and Union Pacific's records of actual spending for work performed and assets installed on the Line.⁴⁹

Mr. Crouch also assessed the current condition of the Line to account for depreciation. He based his assessment on factors including, but not limited to, physical inspections of the Line, Union Pacific asset lists and records, Union Pacific information about past capital programs on the Line, engineering studies on lifespans of certain assets, and his extensive experience in the railroad industry. Based on his condition assessment, Mr. Crouch adjusted his estimate of the Line's reproduction cost to reflect the remaining life of the assets.⁵⁰ Mr. Crouch also adjusted the Line's reproduction cost to reflect actual investment BNSF made in the Line.⁵¹

Finally, Mr. Crouch calculated BNSF's annual rental payment on a per-car mile basis. To perform the calculation, he developed an RCNLD-based estimate of the Line's

⁴⁹ See Crouch VS at 2–3.

⁵⁰ See *id.* at 2–3, 7–8.

⁵¹ See *id.* at 58–59; see also *March 1993 Order*, slip op. at 7–8.

interest rental base by combining the results of Mr. Rex's real estate appraisal with his own estimate of the Line's reproduction costs new less depreciation. He then applied the cost of capital and BNSF usage data that Dr. Mathur developed to convert the resulting RCNLD-based interest rental base to a per-car mile basis.⁵²

Mr. Crouch's calculations produce an interest rental payment of \$1.56 per car mile for 2023.⁵³

IV. Other Issues

A. BNSF Should Pay the New Rental as of January 3, 2023.

The Board should require BNSF to pay the new rental calculated as a result of this proceeding as if the new rental had been in place as of January 3, 2023. The Board should thus order BNSF to compensate Union Pacific for the difference between the new rental calculated in this proceeding and any rental BNSF paid between January 3, 2023, and the effective date of the Board's order establishing the new rental amount.

Union Pacific notified BNSF on June 29, 2022, that it was electing to terminate the Joint Stipulation and Agreement as of December 31, 2022.⁵⁴ Terminating the Joint Stipulation and Agreement allowed Union Pacific to petition for revision of the *1967 Order's* interest rental condition as of January 3, 2023, pursuant to *1967 Order's* provision allowing either party to petition for revision of the conditions on each succeeding fifth anniversary of the effective date of the transaction.⁵⁵

⁵² See Crouch VS at 56–59.

⁵³ See *id.* at 59.

⁵⁴ See Hughes VS at 4.

⁵⁵ See *1967 Order*, 331 I.C.C. at 404.

Applying the new rental amount as of January 3, 2023, would be consistent with the *1967 Order*. The *1967 Order* required ATSF to pay SP retroactive compensation dating back to January 1, 1962—the day after the parties’ prior agreement expired.⁵⁶ Union Pacific is seeking the same treatment here—an order providing for compensation dating back to the day of its most recent opportunity to obtain a revision of the *1967 Order*’s interest rental condition. Retroactive compensation is common where one railroad is required to provide another railroad access to its facilities.⁵⁷

Not applying the new rental amount as of January 3, 2023, would be inequitable to Union Pacific. The *1967 Order* specifically provides for “revision of such of the terms and conditions imposed on the transaction as may have become inequitable.”⁵⁸ BNSF’s rental payment plainly has been inequitable since at least January 3, 2023, as established by evidence in this proceeding. Failing to fully remedy inequitable rental payments resulting from application of the *1967 Order* would compound the inequity.

Further, BNSF has had substantial notice that its rental payment would increase. Union Pacific formally notified BNSF on June 29, 2022, that it was electing to terminate the Joint Stipulation and Agreement as of December 31, 2022, after unsuccessful efforts

⁵⁶ See *id.* at 394; see also *id.* at 403–04 (“[T]he terms and conditions contained in section 17 prescribing the Santa Fe payments to Southern Pacific shall, upon final determination herein, be effective from January 1, 1962, and accounts relating to such payments shall promptly be adjusted accordingly.”).

⁵⁷ For example, in *SSW Compensation*, SP was ordered to make retroactive payments for the trackage rights at issue after compensation terms were established by the ICC. See *SSW I*, 1 I.C.C.2d at 792; *St. Louis Southwestern Ry.—Trackage Rights Over Missouri Pacific R.R.—Kansas City to St. Louis*, 8 I.C.C.2d 213, 214–15 (1991) (denying reconsideration of order to pay compound interest). Also, under 49 U.S.C. § 11102(a), the Board allows rail carriers to begin using the terminal facilities of other rail carriers before compensation terms are established, subject to retroactive compensation.

⁵⁸ *1967 Order*, 331 I.C.C. at 404.

to negotiate a new rental amount.⁵⁹ BNSF knew Union Pacific would petition to reopen the *1967 Order*'s rental condition on the first available opportunity, because BNSF's rental under Condition 30 was even lower than its rental under the Joint Stipulation and Agreement. BNSF has no right to retain the windfall it has been enjoying while paying inequitably low rent in the period since Union Pacific filed its petition.

B. Potential Impact

Union Pacific recognizes application of *SSW Compensation* principles will result in a significant increase to BNSF's rental payments for use of the Line. If BNSF desires, Union Pacific is willing to work with BNSF to address the impact of the change.⁶⁰

V. Conclusion

Union Pacific is currently subsidizing BNSF, a major competitor, by collecting inequitably low rental for the valuable Tehachapis Line. The Board should establish a new rental amount using *SSW Compensation*'s capitalized earnings method and order BNSF to pay rental amounts based on that method retroactively to January 1, 2023.

⁵⁹ See Hughes VS at 4.

⁶⁰ See *id.*

Respectfully submitted,

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May 3, 2024

CERTIFICATE OF SERVICE

I hereby certify that on this 3rd day of May, 2024, I caused a copy of the foregoing document to be served by email on all parties of record.

/s/ Michael L. Rosenthal

BEFORE THE
SURFACE TRANSPORTATION BOARD

Finance Docket No. 22218

ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY
—OPERATING RIGHTS—
SOUTHERN PACIFIC TRANSPORTATION CO.

VERIFIED STATEMENT OF DAVID W. HUGHES

My name is David Hughes. I am Assistant Vice President of Joint Facilities and Interline Operations for Union Pacific Railroad Company. My responsibilities include overseeing joint facilities, private and public partnership agreements, intercity passenger operations, and industry and public projects. I am submitting this statement to explain why Union Pacific is asking the Board to increase the amount of interest rental BNSF Railway Company must pay to use the Tehachapis Line.

The Tehachapis Line is an extremely valuable part of the networks of both Union Pacific and BNSF. The Line runs for 67.8 miles between Kern Junction and Mojave, California. Union Pacific owns the Line, as successor to Southern Pacific Transportation Company (“SP”). BNSF operates over the Line using trackage rights, as successor to The Atchison, Topeka and Santa Fe Railway Company (“ATSF”).

The issue of interest rental has long been the subject of regulation. SP constructed the Line in 1876. In 1899, SP agreed to grant ATSF trackage rights over the Line. In 1912, SP and ATSF renegotiated their original agreement. After the 1912 agreement expired in 1961, the two railroads were unable to agree to terms and conditions for ATSF’s continued use of the Line, so they submitted the issues to the Interstate Commerce Commission (“ICC”).

In 1967, the ICC issued an order prescribing 31 conditions for ATSF’s continued use of the Line. As one of the conditions, the ICC set the annual interest rental for ATSF’s use of the line at one-half of 5-1/2 percent of its \$17 million valuation of the Line.

In 1991, SP asked the ICC to reopen the prior proceeding and modify the interest rental condition. Ultimately, the parties settled the matter. In 1993, SP agreed to accept an interest rental payment of \$5.5 million per year, subject to adjustments upward or downward based on a formula linked to yields on U.S. Treasury bonds. SP was negotiating from a position of extreme

financial duress. In its petition to reopen, SP had told the ICC that it was “struggling to survive and to overcome severe operating losses.”¹ As a result, the initial interest rental amount and adjustment provision were both highly favorable to ATSF. By 2022, through application of the adjustment provision, BNSF’s annual interest rental payment under the settlement’s terms had dropped to the minimum payment allowable under the adjustment provision, just \$2.1 million. Further, Union Pacific had to terminate the 1993 SP-ATSF settlement to reopen this matter, so BNSF’s annual interest rental payment is currently governed by the ICC’s 1967 order, which established an even lower annual interest rental.

By any calculation, BNSF’s annual interest rental payment is clearly inequitable to Union Pacific. The Tehachapis Line is an exceptionally valuable asset to both Union Pacific and BNSF. Union Pacific and BNSF use the Line as a critical piece of their networks to move large volumes of traffic. The value that both railroads place on the Line becomes even more evident when one recognizes the costs to operate trains over and maintain the Line are much higher than average operating and maintenance costs, because of the Line’s prevailing mountain grades and large amount of curved track.

Union Pacific currently routes { } trains per day over the Tehachapis Line, consisting primarily of standard priority intermodal trains, high priority intermodal trains (also known as Z trains), and manifest trains. Union Pacific’s intermodal trains use the Line for two primary routes: Los Angeles to the Pacific Northwest and Los Angeles to Lathrop, California. Union Pacific’s manifest trains use the line for traffic moving between Los Angeles and Roseville, California, and between Roseville and El Paso, Texas. The Line represents the most effective and direct route for these moves within Union Pacific’s California network.

¹ See Hughes Workpaper “SP Petition to Reopen.pdf,” page 3.

BNSF is highly dependent on the Tehachapis Line. It currently routes { } trains per day over the Line. The Line provides a critical link in BNSF's intermodal franchise. BNSF has no alternate route it could use to move double-stack intermodal traffic from key markets in Northern California to connect up with its highly efficient Southern Transcon route that runs from Los Angeles to Chicago, with branches serving such key points as Phoenix, the Mexican Gateway at El Paso, Dallas/Ft. Worth, and Memphis. The Line is also critical to BNSF's ability to offer competitive service for all its traffic moving in the I-5 Corridor: BNSF cannot link the Pacific Northwest and their Northern Transcon with Southern California and their Southern Transcon and without operating over the Line. In 1967, the ICC recognized that ATSF would have needed to build its own line between Kern Junction and Mojave but for its trackage rights agreement with SP.² Nothing about the situation has changed.

The Tehachapis Line is both a valuable and scarce resource. The Line is consistently operating near or at fluid capacity. Furthermore, adding capacity is a very expensive undertaking because of the challenging terrain involved. For example, in 2016 Union Pacific completed a project that connected the Marcel Siding and the Walong Siding on the Line to create an additional segment of double main line. The project required construction of 4,215 feet of additional track. The cost to construct that less than one mile of track back in 2016 was \$12.5 million.³

² See *Atchison, Topeka & Santa Fe Ry.—Operating Agreement—S. Pac. Co.*, 331 I.C.C. 367, 377 (1967), *modified*, 333 I.C.C. 342 (1968) (“In terms of its importance to Santa Fe, the trackage is an essential link in its transcontinental route.”); *id.* at 378 (observing that ATSF “rel[ied] on the trackage to connect important areas in its territory.”).

³ Union Pacific performed the work for this project on BNSF's behalf. A spreadsheet containing Union Pacific's billing records for this project can be found in Hughes Workpaper “Marcel-Walong billing.xlsx.”

Union Pacific is asking the Board to establish an appropriate interest rental payment to reflect BNSF's use of the valuable, scarce, shared resource that is the Tehachapis Line—one that puts the parties on an equal footing. Union Pacific recognizes that application of the Board's well-established precedent for setting interest rental amounts will substantially increase BNSF's rental payments for use of the Line. Union Pacific is willing to work with BNSF to address the impact of the change. However, Union Pacific is currently subsidizing BNSF, a major competitor, by collecting inequitably low interest rental. BNSF has been benefitting from this subsidy for many years. And BNSF has known that change was coming since at least June 29, 2022, when Union Pacific provided written notice it would terminate the SP-ATSF settlement as of December 31, 2022.⁴

⁴ See Hughes Workpaper "Mojave Kern Stipulation Termination Letter.pdf." The letter, dated June 28, 2022, was transmitted by email on June 29, 2022. Union Pacific had notified BNSF verbally of its plans on June 10, 2022.

VERIFICATION

I, David W. Hughes, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this verified statement.

Executed on May 3, 2024.

/s/ David W. Hughes

BEFORE THE
SURFACE TRANSPORTATION BOARD

Finance Docket No. 22218

ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY
—OPERATING RIGHTS—
SOUTHERN PACIFIC TRANSPORTATION CO.

VERIFIED STATEMENT OF DR. DIVYA MATHUR

May 3, 2024

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- Exhibit 11A.** Earnings Attributable to Mojave-Kern Line for UP Under Alternative Off-Segment Density Assumptions
- Exhibit 11B.** Earnings Attributable to Mojave-Kern Line for BNSF Under Alternative Off-Segment Density Assumptions
- Exhibit 12.** UP Enterprise Value
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- Exhibit 15.** UP Market-Based EBIT Multiplier
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Exhibit 19. BNSF Usage Factor Calculation

Exhibit 20. Interest Rental Payment Calculation

Exhibit 21. BNSF Total Earnings on All Movements Traversing Mojave-Kern Line

I. INTRODUCTION

A. Qualifications

1. My name is Divya Mathur. I am an economist and a Managing Principal at Analysis Group, Inc., an economic, financial, and strategy consulting firm. I have over 15 years of experience as a professional economist. I have been retained as an expert witness and/or a consultant in complex litigation matters, regulatory investigations and proceedings, and business engagements in the areas of antitrust and competition, class certification, and damages. My experience includes analysis of markets and competitive dynamics; modeling of damages; and business and asset valuation. I have provided testimony at deposition and trial in numerous matters and have been qualified by courts as an expert economist. My engagements have included work on behalf of the United States Department of Justice and the Federal Trade Commission, as well as companies in numerous industries including consumer products, manufacturing, chemicals, pharmaceuticals, technology, and financial services.

2. I earned an M.A. and Ph.D. in economics from The University of Chicago and an A.B. in economics and mathematics from Mount Holyoke College. My doctoral research and teaching focused on industrial organization, a field in economics that studies, among other topics, firm behavior and industry dynamics, including the determinants of market competition and pricing decisions, as well as the effects of public policies such as antitrust law and government regulation. I lectured on competitive strategy and microeconomics while I was at The University of Chicago. I also served as a guest lecturer on topics in competitive strategy and industrial structure at undergraduate and graduate courses at the Kellogg School of Management at Northwestern University.

3. My qualifications, experiences, and the matters in which I have provided expert testimony are summarized in my curriculum vitae, attached hereto as **Appendix A**.

B. Assignment

4. I have been asked by counsel for Union Pacific Railroad Company (“UP”) to analyze the compensation that should be paid by BNSF Railway Company (“BNSF”) for trackage rights to operate over a railroad line between Mojave, CA and Kern Junction, CA owned by UP (“Mojave-Kern Line” also referred to as the “Tehachapis Line”).

5. I understand that the Surface Transportation Board (“the Board”) may rely on the compensation framework established in a series of decisions by its predecessor, the Interstate Commerce Commission (“ICC”), involving St. Louis Southwestern Railway Company (“SSW Compensation”).¹ The SSW Compensation framework consists of three components: (1) incremental variable costs incurred by the owner due to the tenant’s operations on the line; (2) the tenant’s proportionate share of the track maintenance and operating costs; and (3) interest rental payments “representing return on investment” designed to compensate the owner for the tenant’s consumption of the owner’s assets.²

¹ St. Louis Southwestern Railway Company - Trackage Rights Over Missouri Pacific Railroad Company - Kansas City to St. Louis, 1 I.C.C.2d 776 (1984) (“SSW I”); St. Louis Southwestern Railway Company - Trackage Rights Over Missouri Pacific Railroad Company - Kansas City to St. Louis - Trackage Rights Compensation, 4 I.C.C.2d 668 (1987) (“SSW II”); St. Louis Southwestern Railway Company - Trackage Rights Over Missouri Pacific Railroad Company - Kansas City to St. Louis 5 I.C.C.2d 525 (1989) (“SSW III”); St. Louis Southwestern Railway Company - Trackage Rights Over Missouri Pacific Railroad Company - Kansas City to St. Louis, 8 I.C.C.2d 80 (1991) (“SSW IV”).

² SSW I, pp. 779-780. (“We have adopted a methodology for computing compensation designed to reimburse UP for (1) variable costs incurred as a result of tenants’ operations, (2) tenants’ share, on a car-mile percentage use basis, of maintenance and operation (M&O) expense, and (3) tenants’ share on a usage basis of an interest rental component representing return on investment.”).

6. Specifically, I have been asked to calculate the economically appropriate interest rental payments BNSF (the tenant) should make to UP (the landlord) to compensate UP for BNSF's use of the Mojave-Kern Line using the Capitalized Earnings ("CE") method outlined by the ICC in SSW Compensation.³ I understand that the first two components of trackage rights payments, incremental variable costs and maintenance and operating costs, are not at issue in this matter.⁴

C. Materials considered

7. My opinions, and the bases for these opinions, are contained in this report and the attached exhibits and appendices. In reaching these opinions, I have considered various data, documents, and other information, including:

- a. Data produced by UP and BNSF pertaining to their respective traffic that traversed the Mojave-Kern Line and density across their respective systems;
- b. Data, information, and Excel programs provided by the Board related to its Uniform Rail Costing System ("URCS");
- c. Data from PC*Miler Rail ("PCMiler"), an industry-standard software package that calculates total mileages and suggests routes between specified origin and destination stations;

³ SSW I, p. 780 ("[W]e have rejected valuation methods based upon replacement cost and book value urged by various parties in favor of a capitalized earnings approach.").

⁴ Atchison, Topeka & Santa Fe Railway Company - Operating Rights - Southern Pacific Transportation Company - UP Petition to Reopen, Finance Docket No. 22218, January 6, 2023 ("Petition to Reopen"), p. 2. ("Union Pacific Railroad Company ('UP'), as successor to Southern Pacific Transportation Company ('SP'), hereby petitions that this proceeding be reopened for the purpose of revising Condition 16, which governs additions and betterments, and Condition 17, which governs the interest rental paid by BNSF Railway Company[.]").

- d. Previous decisions by the Board on trackage rights cases and related matters;
- e. Annual reports (including R-1 forms and SEC Form 10-Ks) of UP, BNSF, and other Class I railroads.

8. **Appendix B** attached to this report provides a list of the data, documents, and information that I considered in preparing this report and its supporting exhibits and appendices. In addition, I have relied on my skills, knowledge, training, education, and experience as a professional economist. I reserve the right to update my opinions, should additional relevant documents or information be made available to me.

D. Compensation

9. Analysis Group is being compensated for my time at the rate of \$1,100 per hour. I have been assisted in my work in this matter by staff at Analysis Group working under my direction. Analysis Group also receives compensation for time spent by the staff on this engagement at their customary billing rates. No compensation is contingent on the outcome of this matter or the opinions expressed in this report.

II. SUMMARY OF OPINIONS

10. Based on my review and analysis of the data and information identified herein, and my skills, knowledge, experience, expertise, and training, I have reached the opinions summarized below.

11. A railroad line has economic value as an asset because it enables a railroad to generate cash flows by moving customer traffic across that line. Interest rental payments compensate landlords for tenants' use of their asset and should be set at a level that provides the

landlord railroad an economically appropriate return on investment on the value of the asset. Setting the interest rental payment too high or too low relative to the economic value of the railroad line can distort the competitive positions of both landlord and tenant and lead to economically undesirable or inefficient outcomes. *See Section IV.*

12. I understand that the SSW Compensation framework has been used by the Board to determine the economically appropriate interest rental payments the landlord may charge a tenant. Under this framework, interest rental payments to the landlord are calculated as the product of: (1) the interest rental base, which reflects the value of the underlying asset—the railroad line; (2) the cost of capital, which reflects the rate of return the asset must generate to maintain its value; and (3) the usage factor, which reflects the tenant’s relative share of the total usage of the asset.

13. Under the CE method, a railroad line is valued as a going concern and as an economically productive asset. The interest rental base is calculated in two steps.

- a. *First*, earnings (*i.e.*, income) from the trackage rights line are calculated. In past Board matters involving overhead traffic, the Average Total Cost (“ATC”) method has been used to determine the portion of the revenue from each movement that should be attributed to the trackage rights line.
- b. *Second*, a multiplier is used to convert the current earnings generated by the trackage rights line into a valuation. Market-based multipliers—used in past trackage rights cases—are based on observable market data and incorporate the market’s expectations of future growth. A market-based multiplier is more appropriate than a multiplier equal to the inverse of the Weighted Average Cost of Capital (“WACC”) of the railroad industry because a WACC-based

multiplier assumes that there will be no growth in line earnings (*i.e.*, no future value added to the line beyond what is required to cover the current cost of capital) and as such is inconsistent with the historical growth in UP's and BNSF's earnings. *See Section VI.B.*

14. Prior Board proceedings have established a precedent for using the railroad industry pre-tax cost of capital published annually by the Board. *See Section V.B.* The usage factor (or "allocation") is used to determine how the cost of capital of the asset should be split between each user of the line. I allocate usage based on car miles (instead of other metrics such as gross tons) because car miles reflect the constraints on the capacity of the line, *i.e.*, the amount of cars that can traverse it. *See Section V.C.*

15. I calculate the interest rental payments owed to UP by BNSF for use of the Mojave-Kern Line using the CE method. I estimate the line earnings attributable to the Mojave-Kern Line from the UP and BNSF traffic that traversed the line using the ATC method based on waybill data, event data, and density data produced by UP and BNSF in this matter. I apply a market-based multiplier—UP's company-level EV/EBIT multiple—based on UP's publicly available data. *See Section VI.*

16. My estimates of the interest rental payment owed to UP for 2023 on an annual and per car mile basis is summarized in **Figure 1**.

Figure 1. Interest Rental Payment, Annual and per Car Mile⁵

<u>Year</u>	<u>Annual Payment (\$M)</u>	<u>Payment Per Car Mile (\$ nominal)</u>	<u>Inflation Adjustment</u>	<u>Payment Per Car Mile (\$ 2023)</u>
2021	\$ 70.57	\$ 1.46	23.79%	\$ 1.81
2022	\$ 56.76	\$ 1.24	14.88%	\$ 1.43
Average				\$ 1.62

17. Interest rental payments in the range of \$57 to \$71 million per year based on the CE method are reasonable and appropriate from an economic perspective relative to the economic value BNSF receives from access to the Mojave-Kern Line. BNSF's total earnings from traffic traversing the Mojave-Kern Line were {{ }} per year in 2021 and 2022 respectively. Access to the Mojave-Kern Line is important for BNSF—I understand that if BNSF no longer had access to the Mojave-Kern Line, it would likely need to make substantial investments and incur additional costs to continue moving the traffic that otherwise would have traversed the Mojave-Kern Line.

18. To the extent that the tenant's line earnings per car mile are lower than the landlord's {{ }}, the interest rental payment will be high relative to the tenant's earnings simply due to the mechanics of the CE method calculation. This is neither surprising nor inappropriate because the value of the asset that the tenant is paying to access must be based on its overall ability to generate earnings, regardless of how those earnings are distributed between the landlord and tenant. *See Section VII.A.*

⁵ **Exhibit 20.** My calculations are based on data from 2021 and 2022 as indicated in the first column of Figure 1. 2021 and 2022 are the two most recent years for which movement data are available from UP and BNSF. I calculate interest rental payment for 2023 by converting nominal dollars in 2021 and 2022 to inflation-adjusted 2023 dollars as shown in the last column of Figure 1 and described further in **Section VI.D.3.**

19. BNSF's interest rental payments under the current agreement are economically inappropriate, do not sufficiently compensate UP, and have resulted in an economic windfall to BNSF. UP received \$2.1 million and \$467,500 in interest rental payments from BNSF in 2022 and 2023 respectively under its existing trackage rights agreement, *i.e.*, less than 4 percent of the interest rental payments I calculated under the CE method. The substantial gap between BNSF's current interest rental payment and an economically appropriate payment highlights the magnitude of the subsidy that BNSF has received and is currently receiving from UP. *See Section VII.B.*

20. The CE method appropriately accounts for the line earnings of UP and BNSF while avoiding the concerns of "circularity" noted by the Board in previous trackage rights matters. My estimates of UP's line earnings are based on its revenues from customers as reported in its waybill data, and do not include the interest rental payments it receives from BNSF, and as such, are not subject to circularity concerns. In my estimates of BNSF's line earnings, when deducting line expenses from line revenues, I do not separately subtract the interest rental payments that UP receives from BNSF, thus avoiding potential circularity concerns. *See Section VII.C.*

III. BACKGROUND ON THE MOJAVE-KERN LINE

21. The Mojave-Kern Line was constructed in the 1870s by the predecessor railroad to Southern Pacific Railroad ("SP").⁶ The Mojave-Kern Line is an approximately 67-mile line of

⁶ Atchison, Topeka & Santa Fe Railway Co. - Operating Agreement - Southern Pacific Co., 331 I.C.C. 367 (1967) ("1967 Agreement"), p. 368; *see also* Petition to Reopen, p. 2.

railroad that connects Mojave, CA to Kern Junction, CA.⁷ It includes the 28-mile Tehachapi Pass which traverses the Tehachapi Mountains. The Tehachapi Pass features the Tehachapi Loop, a section of track that spirals over itself.⁸ **Figure 2** shows a map of the Mojave-Kern Line.

⁷ According to PCMiller, the distance between Mojave, CA and Kern Junction, CA stations is 67.2 miles. I also understand that UP's internal route planner uses 67.2 miles as the distance between Kern Jct. and Mojave. As such, I use 67.2 miles as the length of the Mojave-Kern Line in my report. I understand that certain other sources report the Mojave-Kern Line length as 67.8 miles. *See, e.g.,* Petition to Reopen, p. 2.

⁸ UP, "Built by a Community: Tehachapi Live Train Cams," available at <https://www.up.com/customers/track-record/tr091520-tehachapi-live-train-cams.htm>, accessed on March 26, 2024; "Tehachapi Pass Railroad Line," American Society of Civil Engineers, available at <https://www.asce.org/about-civil-engineering/history-and-heritage/historic-landmarks/tehachapi-pass-railroad-line>, accessed on April 12, 2024.

Figure 2. Map of Mojave-Kern Line⁹

22. SP originally entered into a trackage rights agreement with Atchison Topeka and Santa Fe Railway Company (“ATSF”) in 1899 for shared use of the Mojave-Kern Line.¹⁰ In 1967, after the original agreement expired and the parties could not agree on new terms and conditions for the rights, the ICC set the annual rental at ATSF’s share (half) of 5.5 percent of the base valuation of \$17 million.¹¹ In 1993, after the ICC granted a petition filed by SP to

⁹ Trimble MAPS, PCMiller. The blue highlighted portion of track represents the Mojave-Kern Line. The yellow lines represent other parts of UP’s system, and the orange lines represent other parts of BNSF’s system.

¹⁰ 1967 Agreement, p. 368.

¹¹ 1967 Agreement, pp. 367-368, 379-380.

reopen the proceeding and recompute the interest rental, the railroads agreed in a private negotiation to set the interest rental payment at \$5.5 million per year, to be updated every three years after 1998 based on the 30-year Treasury yield.¹² In 2022, BNSF's annual interest rental payment under the terms of the agreement was \$2.1 million.¹³

23. BNSF operates under the trackage rights agreement as the successor to ATSF.¹⁴ UP owns the Mojave-Kern Line as the successor to SP.¹⁵

24. The Mojave-Kern Line is a heavily trafficked line. For 2021 and 2022, the line's density was approximately {{ }} gross ton miles ("GTMs")¹⁶ per route mile.¹⁷ In

¹² Every three years, starting January 1, 1998, the interest rental agreement resets and the base interest rental payment is multiplied by the fraction of the average 30-year Treasury yield over the 36 preceding months (*i.e.*, the numerator) divided by the average 30-year rate for the 36 months preceding April 28, 1993 (*i.e.*, the denominator), subject to certain limits on changes in the numerator. The Board memorialized the interest rental agreement in its decision with a service date of July 8, 1993. Atchison, Topeka & Santa Fe Railway Company - Operating Agreement - Southern Pacific Transportation Company, Finance Docket No. 22218 (Sub-No. 1), July 8, 1993 ("ATSF III"), pp. 1-3. The Board issued prior decisions in this matter in 1992 and March 1993. *See* Atchison, Topeka & Santa Fe Railway Company - Operating Agreement - Southern Pacific Transportation Company, 8 I.C.C.2d 297 (1992) ("ATSF I"); Atchison, Topeka & Santa Fe Railway Company - Operating Agreement - Southern Pacific Transportation Company, Finance Docket No. 22218, March 26, 1993 ("ATSF II").

¹³ *See* Atchison, Topeka & Santa Fe Railway Company - Operating Rights - Southern Pacific Transportation Company - Verified Statement of David W. Hughes, Finance Docket No. 22218, May 3, 2024 ("Hughes VS"). p. 2 ("By 2022, through application of the adjustment provision, BNSF's annual interest rental payment under the settlement's terms had dropped to the minimum payment allowable under the adjustment provision, just \$2.1 million."). I understand that UP has submitted Mr. Hughes's statement as part of its opening evidence in this proceeding. In January 2023, UP cancelled the 1993 agreement and filed a petition to reopen the current proceedings to revise the interest rental paid by BNSF. Petition to Reopen, p. 1. As a result, I understand BNSF's interest rental payment in 2023 was based on the rate set in 1967 – \$467,500 per year (*i.e.*, half of 5.5 percent of the base valuation of \$17 million). Hughes VS, p. 2; Petition to Reopen, p. 4; 1967 Agreement, p. 394.

¹⁴ BNSF, "The History of BNSF: A Legacy for the 21st Century," available at https://www.bnsf.com/bnsf-resources/pdf/about-bnsf/History_and_Legacy.pdf, accessed on March 29, 2024, p. 7.

¹⁵ UP, "Timeline: History of Union Pacific," available at <https://www.up.com/timeline/index.cfm>, accessed on March 25, 2024.

¹⁶ "Gross ton miles" is a metric of traffic volume calculated by multiplying the gross tonnage of a given car or locomotive by the miles travelled by the car or locomotive, and then summing across all relevant cars or locomotives. The gross tonnage includes the weight of the transportation equipment (*i.e.*, the weight of the car or locomotive itself) and all contents it carries (*i.e.*, the weight of the commodity being carried, and any intermodal containers on the car).

¹⁷ This includes gross tonnage from both UP's and BNSF's traffic on the segment. *See Exhibit 1.*

contrast, UP's system-wide average density for 2021 and 2022 was approximately 27 million GTMs per mile, while BNSF's system-wide average density was approximately 50 to 52 million GTMs per mile.¹⁸ As such, the density of the Mojave Kern Line is almost {{ }} than UP's system average density, and approximately {{ }} than BNSF's system average density.¹⁹

25. On the Mojave-Kern Line, the tenant (BNSF) has historically accounted for {{ }} of the on-segment traffic than the landlord (UP). Specifically, BNSF accounted for {{ }} of the car miles on the Mojave-Kern Line in 2021 and 2022.²⁰ The ICC recognized the importance of the Mojave-Kern Line to ATSF in 1967 (prior to the merger with Burlington Northern), noting that the Mojave-Kern "trackage is an essential link in [ATSF's] transcontinental route."²¹ I understand from David Hughes, Assistant Vice President of Joint Facilities and Interline Operations at UP, that the Mojave-Kern Line is currently operating close to capacity.²²

26. The Mojave-Kern Line also has a unique geography and features which are typically associated with higher costs. Specifically, the Mojave-Kern Line runs through the Tehachapi Mountains. I understand that the Mojave-Kern Line's operating and maintenance

¹⁸ These figures are based on the system-wide average densities reported in table 720 of UP's and BNSF's R-1 forms adjusted to a per-route mile rather than per-track mile basis to be consistent with the on-segment densities I calculate from UP's density data. *See Exhibit 1.*

¹⁹ **Exhibit 1.**

²⁰ "Exhibit 19 and Mojave-Kern Car Mile Usage Data.xlsx," Mathur Workpaper 8.11; *see also Exhibit 19.*

²¹ 1967 Agreement, p. 377.

²² Hughes VS, pp. 1, 3 ("The Tehachapis Line is both a valuable and scarce resource. The Line is also consistently operating near or at fluid capacity.").

costs are accordingly higher than average, due to the mountain terrain and elements of the track design.²³

IV. ECONOMIC PRINCIPLES UNDERLYING INTEREST RENTAL PAYMENTS

27. In this section, I discuss certain economic principles underlying the valuation of railroad lines as economic assets, and the role of interest rental payments in trackage rights agreements that compensate landlords for tenants' use of their assets.

A. Railroad lines are economically productive assets

28. U.S. railroads invest in building and maintaining railroad networks. In the case of Class I railroads, such investments are frequently substantial and capital-intensive, spanning multiple states and regions across the United States. For example, UP owns over 26,000 route miles of track and operates in 23 states.²⁴ The net book value of UP's railroad network (*i.e.*, the original cost to acquire the railroad network less depreciation) was \$44.0 billion as of 2022.²⁵ BNSF owns over 23,000 route miles of track and operates in 28 states and three Canadian provinces.²⁶ The net book value of BNSF's railroad network was \$55.4 billion as of 2022.²⁷

²³ Hughes VS, p. 2 ("The value that both railroads place on the Line becomes even more evident when one recognizes the costs to operate trains over and maintain the Line are much higher than average operating and maintenance costs, because of the Line's prevailing mountain grades and large amount of curved track.").

²⁴ UP, Form 10-K for the year ended December 31, 2022, February 10, 2023 ("UP 2022 10-K"), pp. 18-19.

²⁵ Railroad network refers to road property which includes below-the-wheel assets such as the rail, bridges, tunnels, grading, stations, and signals. Net book value equals the original cost to acquire the road property (\$63.7 billion) less accumulated depreciation for road property (\$19.7 billion). UP, Class I Railroad Annual Report to the Surface Transportation Board for the Year Ending Dec. 31, 2022 ("UP 2022 R-1"), Schedule 330, Line 30 and Schedule 335, Line 30.

²⁶ BNSF, Form 10-K for the year ended December 31, 2022, February 27, 2023 ("BNSF 2022 10-K"), p. 7.

²⁷ Net book value equals total expenditures for road property (\$66.4 billion) less accumulated depreciation for road property (\$11.0 billion). BNSF, Class I Railroad Annual Report to the Surface Transportation Board for the Year Ending December 31, 2022 ("BNSF 2022 R-1"), Schedule 330, Line 30 and Schedule 335, Line 30.

Other Class I railroad networks own 18,000 to 20,000 miles of track, with net book values between \$11.9 billion and \$25.5 billion in 2022.²⁸

29. A railroad network is an asset that requires substantial capital investment by the railroad, both historically when the railroad network was first constructed, and over time as the railroad makes capital investments in expanding, replacing, and improving the network.²⁹ In turn, owning the railroad network allows the railroad to generate income from customers who pay to have goods and materials shipped across points on the network.³⁰ The railroad network therefore is an asset with economic value to the railroad by virtue of the railroad network's ability to generate an economic return (*i.e.*, cash flows) for the railroad.³¹ The economic return

²⁸ Canadian National Railway owns over 18,000 miles of track; the net book value of its railroad network was \$25.1 billion in 2022, which was converted from Canadian dollars ("CAD") to United States dollars ("USD") using the last reported exchange rate in 2022, 0.74 CAD/USD. Canadian National Railway, Annual Report for the year ended December 31, 2022 ("Canadian National Railway 2022 Annual Report"), p. 1; Canadian National Railway 2022 Annual Report, p. 92; Refinitiv, Exchange Rate Data. Canadian Pacific Railway, following its merger with Kansas City Southern, owns over 18,000 miles of track with a railroad network book value of 11.9 billion in 2022, which was converted from Canadian dollars ("CAD") to United States dollars ("USD") using the last reported exchange rate in 2022, 0.74 CAD/USD. Canadian Pacific Railway, Annual Report for the year ended December 31, 2022 ("Canadian Pacific Railway 2022 Annual Report"), p. 41; Canadian Pacific Railway 2022 Annual Report, p. 110; Exchange Rates. CSX operates over a railroad network of approximately 20,000 miles of track, and the book value of CSX's railroad network was \$25.5 billion in 2022. CSX Corporation Form 10-K for the year ended December 31, 2022, February 15, 2023 ("CSX 2022 10-K"), p. 3; CSX Transportation, Class I Railroad Annual Report to the Surface Transportation Board for the year ending December 31, 2022 ("CSX 2022 R-1"), Schedule 330, Line 30 and Schedule 335, Line 30. Norfolk Southern operates a railroad network of 19,100 miles of track, and the book value of Norfolk Southern's railroad network was \$24.5 billion in 2022. Norfolk Southern Corporation Form 10-K for the year ended December 31, 2022, February 3, 2023 ("Norfolk Southern 2022 10-K"), p. K4; Norfolk Southern Combined Railroad Subsidiaries, Class I Railroad Annual Report to the Surface Transportation Board for the Year Ending December 31, 2022 ("Norfolk Southern 2022 R-1"), Schedule 330, Line 30 and Schedule 335, Line 30.

²⁹ See, e.g., UP 2022 10-K, p. 20 ("Our rail network requires significant annual capital investments for replacement, improvement, and expansion. These investments enhance safety, support the transportation needs of our customers, improve our operational efficiency, and support emission reduction initiatives outlined in our Climate Action Plan.").

³⁰ See, e.g., UP 2022 10-K, pp. 7-8; BNSF 2022 10-K, p. 8.

³¹ See, e.g., Tim Koller, Marc Goedhart and David Wessels, *Valuation: Measuring and Managing the Value of Companies*, 7th Ed., John Wiley & Sons, 2020 ("Koller et al., 2020"), p. 27 ("In its purest form, *value* is the sum of the present values of future expected cash flows.") (Emphasis in original).

on the asset justifies the railroad's ongoing capital investment to maintain, improve, and operate the railroad network.³²

30. This principle applies not only to the railroad network as a whole, but also to individual components of a railroad network, such as the Mojave-Kern Line at issue in this matter. A railroad line has economic value as an asset because it enables the railroad to generate cash flows by moving customer traffic across that line. The economic value of different lines at different locations on a railroad network will vary depending on, among other factors, the profit the railroad is able to generate over that portion of its network.

31. Several factors affect the profit that a railroad earns from a given line and the underlying value of the line. First, the value of a line depends on the demand by customers to move traffic across that portion of the railroad network. A line that is located on a densely trafficked route in high demand is more valuable, all else equal, than a line that is located on a sparsely trafficked route with low demand.³³ Second, the value of the line will depend on whether there are alternative route options available to the railroad to move traffic over its railroad network. All else equal, a line that allows the railroad to move traffic between origins and destinations with limited or no alternative routes is more valuable than a line that moves traffic with possible alternative routes, because the railroad's ability to serve customers in the former case is heavily or entirely dependent on its use of the line. Finally, the value of the line will also depend on its profit margins. A line that earns higher margins for the railroad—

³² See, e.g., Koller et al., 2020, p. 27 (“Companies create value for their owners by investing cash now to generate more cash in the future.”).

³³ As demand increases, all else equal, so do a firm's profits. As a firm's profit increases, holding the investments required to generate that profit constant, so does the firm's value. Koller et al., 2020, pp. 49-51; R.Glenn Hubbard and Anthony Patrick O'Brien, *Money, Banking, and the Financial System*, 3rd Ed., Pearson, 2017 (“Hubbard & O'Brien (2017)”), pp. 78-83.

measured as the difference between the revenue generated from traffic traversing the line and the costs to maintain and operate over the line—will generate more economic value, all else equal.³⁴

B. Interest rental payments compensate landlords for tenants’ use of their asset

32. Under a trackage rights agreements, a railroad that owns a line (the “landlord” railroad) allows another railroad (the “tenant” railroad) to access and move traffic over its line and receives compensation in the form of payments from the tenant. Railroads sometimes enter into trackage rights agreements voluntarily because such agreements can be mutually beneficial to the parties.³⁵ In other instances, a railroad is required to enter into a trackage rights agreement as a condition to obtaining regulatory approval of a transaction.³⁶ When the parties to a trackage rights agreement cannot resolve compensation matters for themselves and cannot exit the arrangement, the Board and the ICC have resolved the issue using principles developed in SSW Compensation.³⁷ Under the SSW Compensation framework, the payments that tenant railroads make to landlord railroads typically include compensation for three components: (1) the incremental variable costs incurred by the landlord due to the tenant’s operations on the line; (2)

³⁴ See, e.g., Koller et al., 2020, p. 27 (“Companies create value for their owners by investing cash now to generate more cash in the future. The amount of value they create is the difference between cash inflows and the cost of the investments made, adjusted to reflect the fact that tomorrow’s cash flows are worth less than today’s because of the time value of money and the riskiness of future cash flows.”).

³⁵ For example, I understand that the Mojave-Kern trackage rights agreement was originally entered into by ATSF and SP in 1899 on a voluntary basis. Petition to Reopen, p. 3.

³⁶ In SSW Compensation, the ICC granted trackage rights to remedy potential anticompetitive effects of a merger. SSW I, p. 778 (“In order to preserve competition in the central corridor east of Denver, the Commission conditioned approval of the consolidation on a grant of trackage rights to DRGW[.]”).

³⁷ See, e.g., CSX Corporation and CSX Transportation, Inc., Norfolk Southern Corporation and Norfolk Southern Railway Company - Control and Operating Leases/Agreements - Conrail Inc. and Consolidated Rail Corporation, 3 S.T.B. 955 (1998) (“Conrail I”), p. 956 (“... [CP] indicated that, because the parties have been unable to reach an agreement, CP was requesting that we institute a proceeding addressing the matter.”); CSX Corporation and CSX Transportation, Inc., Norfolk Southern Corporation and Norfolk Southern Railway Company - Control and Operating Leases/Agreements - Conrail Inc. and Consolidated Rail Corporation, 4 S.T.B. 75 (1999), pp. 76-77 (“In our prior decision, we determined that ... the capitalized earnings (CE) method established in SSW Compensation is appropriate[.]”).

the tenant's proportionate share of the track maintenance and operating costs; and (3) interest rental payments which compensate the landlord for the tenant's consumption of the owner's assets.³⁸

33. A trackage rights agreements allows the tenant railroad to use an asset that the tenant does not own to generate profit for itself.³⁹ The third component of the trackage rights payment—the interest rental payment—provides the landlord a return on its investment in its asset.⁴⁰ An economically appropriate interest rental payment compensates the landlord for the economic return on its capital that the landlord would generate by moving its own traffic over the line for profit, or by selling the asset and putting the capital to another productive use but for the tenant's use of the line. The landlord incurs a cost from allocating its capital to the railroad asset rather than other productive uses. The landlord recoups this cost via a combination of earnings from its own traffic and interest rental payments from the tenant. If it did not receive interest rental payments from the tenant, it would still incur the investment costs from this capital allocation, but would not be able to fully recoup its costs. Relatedly, the interest rental payment represents the price the tenant pays in lieu of the cost it would incur if it allocated its own capital to an asset that allowed it to move the same traffic. As the ICC explained in SSW I, it seeks “to set compensation for the trackage rights which will put the tenant in same position as the owning carrier.”⁴¹

³⁸ SSW I, pp. 779-780 (“We have adopted a methodology for computing compensation designed to reimburse UP for (1) variable costs incurred as a result of tenants’ operations, (2) tenants’ share, on a car-mile percentage use basis, of maintenance and operation (M&O) expense, and (3) tenants’ share on a usage basis of an interest rental component representing return on investment.”). I understand that the first two components are not at issue in this matter. *See Section I.B.*

³⁹ SSW I, p. 786 (“In this context, the tenant railroad will enter the property of the ongoing, owning railroad[.]”).

⁴⁰ SSW I, p. 780.

⁴¹ SSW I, p. 786.

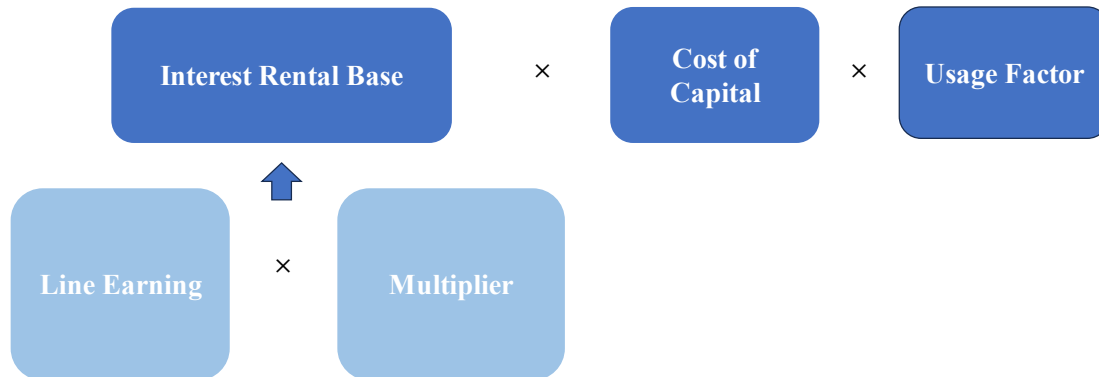
34. The interest rental payment should be set at a level that provides the landlord railroad a return on investment on the value of the asset. The factors discussed in **Section IV.A** that affect the value of the line, such as the volume of customer demand, availability of alternative routes, and profit margins of the line, therefore also affect the appropriate interest rental payment. Some of these factors (*e.g.*, the volume of customer demand and profit margins of the line) are explicitly incorporated into the valuation of the line under the CE method I describe in **Section V.A**. Nonetheless, the CE method may understate the full economic value of the line because it does not directly account for certain factors, such as the availability of alternative routes.

35. Setting the interest rental payment too high or too low relative to the economic value of the railroad line can distort the competitive positions of both landlord and tenant and lead to economically undesirable or inefficient outcomes. If the interest rental payment is too low, the landlord is unfairly penalized because it does not receive an adequate return on investment on the portion of the line's value that is attributable to the tenant's usage of the asset. Because the landlord still bears the cost of capital on the full value of the asset (*i.e.*, including the tenant's use of the asset), the landlord is at a disadvantage relative to the tenant and will either bear the burden of higher cost itself in the form of reduced profits or pass on the costs in the form of higher prices to its customers. Regardless, the tenant is unfairly advantaged if the interest rental payment is too low, because it effectively receives a subsidy—it can use the line at a rate below the landlord's cost of capital without fully compensating the landlord. This subsidy distorts the competitive process because the tenant can offer lower prices and win customers at the expense of the landlord (and potentially earn higher profits) not because it is more efficient at operating its business, but merely because it is not bearing the full cost of using an asset owned

by the landlord. Similarly, if the interest rental payment is set too high, then the landlord is unfairly advantaged, and the tenant is unfairly disadvantaged. As such, an economically appropriate interest rental payment will fully compensate the landlord railroad for its cost of capital on the value of the asset and generate neither an economic windfall nor a penalty for the landlord or the tenant.

V. OVERVIEW OF THE CE METHOD FOR DETERMINING INTEREST RENTAL PAYMENTS

36. In this section, I describe the SSW Compensation framework used by the Board to determine the economically appropriate interest rental payments the landlord may charge a tenant. Under this framework, interest rental payments to the landlord are calculated as the product of: (1) the **interest rental base**, which reflects the value of the underlying asset—the railroad line; (2) the **cost of capital**, which reflects the rate of return the asset must generate to maintain its value; and (3) the **usage factor**, which reflects the tenant’s relative share of the total usage of the asset. **Figure 3** provides an overview of the calculation of interest rental payments under the SSW Compensation framework.

Figure 3. Interest Rental Payments Under the SSW Compensation Framework

A. Interest rental base

37. Historically, I understand that the Board’s preferred method for calculating the interest rental base has been the CE method.⁴² In some trackage rights cases, the Board has used a different valuation method: Reproduction Cost New Less Depreciation (“RCNLD”).⁴³ In this section, I provide an overview of the CE method and its advantages from an economic perspective.

1. Overview of the CE method

38. The CE method estimates the value of the railroad line based on the earnings the line generates. Conceptually, the CE method aims to calculate the present value of economic

⁴² See SSW I, p. 786; see also, e.g., Conrail I; Conrail II.

⁴³ ATSF II, pp. 4-5. The Board has noted two other potential methods for valuing a trackage rights line: Comparable Line Segments (“CLS”) which uses similar line segments as a proxy to determine the interest rental base, and Stand-Alone Cost (“SAC”), which calculates the replacement cost of the most efficient, least costly configuration presently available. ATSF II, pp. 1-2. I am not aware of any recent cases in which the Board has applied CLS or SAC to determine the value of a trackage rights line.

benefits that the owner expects to derive from the railroad line given current earnings, expectations about growth and risk, and the time value of money.

39. The interest rental base is calculated in two steps. *First*, earnings (*i.e.*, income) from the trackage rights line are calculated. *Second*, those line-specific earnings are converted to the present-day value (or “price”) of the trackage rights line by multiplying the line-specific earnings by a capitalization factor (“multiplier” or “multiple”). Because the capitalization factor is the multiple that is used to convert the earnings generated by the trackage rights line into a valuation, the CE method can be thought of as a form of multiple-based valuation.

40. Multiple-based valuation is a standard methodology used widely in economics and finance.⁴⁴ As described by Koller et. al in *Valuation: Measuring and Managing the Value of Companies*, a widely used valuation textbook: “[t]he basic idea behind using multiples for valuation is that similar assets should sell for similar prices, whether they are houses or shares of stock... Companies in the same industry and with similar performance should trade at the same multiple.”⁴⁵ In the case of the CE method, the multiple is based on the market’s valuation of a railroad network (*i.e.*, a system of assets), and is applied to the earnings of a trackage rights line (*i.e.*, a specific asset) to determine its valuation.

⁴⁴ Koller et al., 2020, p. 257 (“By comparing the [market] multiple of one company versus another, you can examine how the market perceives the company’s future relative to other companies.”); Aswath Damodaran, *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset*, 3rd Ed., John Wiley & Sons, 2012 (“Damodaran (2012)”), p. 453 (“The use of relative valuation is widespread.”) and p. 508 (“These multiples are ultimately determined by the same fundamentals that determine the value of a firm in a discounted cash flow model—expected growth, risk, and cash flow potential. Firms with higher growth, lower risk, and higher payout ratios, other things remaining equal, should trade at much higher multiples of earnings than other firms. To the extent that there are differences in fundamentals across countries, across time, and across companies, the multiples will also be different.”).

⁴⁵ Koller et al., 2020, p. 367.

a. Calculation of line earnings

41. The first step of the CE method is to calculate the line earnings from the trackage rights line. Calculating earnings for a railroad line where all movements originate at the beginning of the line and terminate at the end of the line is straightforward—the revenue attributed to the line is the sum of the revenue from all traffic that traverses the line. In contrast, calculating earnings for overhead traffic—where movements traverse the trackage rights line, but originate and/or terminate their journey outside the line—is more challenging because only a portion of the movements’ revenue should be attributed to the line. In past Board matters involving overhead traffic, the Average Total Cost (“ATC”) method has been used to determine the portion of the revenue from each movement that should be attributed to the trackage rights line (the “on-segment” portion) and the portion that should be attributed to other lines (the “off-segment” portion).

42. The ATC method was originally developed for use in rate reasonableness cases to allocate revenues on and off a stand-alone railroad, but it has since been accepted by the Board as a methodology to estimate line earnings for overhead traffic in trackage rights cases.⁴⁶ The ATC method estimates the earnings from overhead traffic that can be attributed to a line by allocating a portion of the revenue for each movement that traverses the line on the basis of average total cost. As described by the Board, under the ATC method:

⁴⁶ Major Issues in Rail Rate Cases, Ex Parte No. 657 (Sub-No. 1), October 30, 2006 (“Major Issues”), p. 26; New England Central Railroad, Inc. - Trackage Rights Order - Pan AM Southern LLC, Finance Docket No. 35842, October 31, 2017 (“NECR-PAS Decision”), pp. 15, 17. (“[PAS] used the Average Total Cost (ATC) method to allocate revenues among different segments based on relative URCS costs... The Board will accept PAS’s CE valuation... PAS has presented a valid and adequately supported application of the CE methodology... PAS uses the ATC method to allocate revenues among different segments based on relative URCS costs that reflect NECR’s operating characteristics (*e.g.*, shipment type, mileage, number of cars, commodity). Using URCS in this manner is consistent with Board precedent.”).

Using the URCS variable and fixed costs for the carrier, and the density and miles of each segment, parties can calculate the railroad's average total cost per segment of a move. The revenues from each portion of the movement would then be allocated in proportion to the average total cost of the movement[.]⁴⁷

43. The ATC method requires estimates of average variable costs and average fixed costs. I discuss these components of the calculation below.

(i) *Variable costs*

44. Variable costs are costs that vary with the amount of traffic that traverses a line, and thus scale with the number of cars and gross tons in a movement, *e.g.*, fuel costs, crew wages, locomotive repair costs, and switching costs. Variable costs are estimated using URCS at the movement level.⁴⁸ Most variable costs are allocated to the on-segment and off-segment portion of the trip according to distance, *i.e.*, based on the ratio of on-segment miles to off-segment miles ("mileage ratio").⁴⁹ Allocating total movement variable costs based on the mileage ratio reflects the increase in variable costs with the distance a movement travels (*i.e.*, movements that travel further will have higher total variable costs associated with them). It also

⁴⁷ Major Issues, p. 26.

⁴⁸ Major Issues, p. 47 ("The Board uses the Uniform Rail Costing System (URCS) to determine a carrier's variable costs. URCS is a 'general purpose costing system for all regulatory costing purposes,' designed to measure system-wide average variable costs."). The Board develops URCS by adopting an "accounting based approach to costing" and "calculat[ing] system average variable unit costs from R-1 and other data filed by the railroads" on an annual basis. URCS then applies the unit costs to "calculate the total variable costs of railroad shipments[.]" URCS takes in several inputs describing a shipment such as the railroad traversed, the distance travelled, the number, type and ownership of freight car used and the net shipment weight. URCS first calculates the train mileage associated with the shipment and then estimates and sums up variable costs of the railroad shipment. *See* STB The Railroad Cost Program (Microsoft Excel Version), 2021 ("URCS Manual"), pp. 1, 3-26; STB, "Uniform Rail Costing System (URCS)," available at <https://www.stb.gov/reports-data/uniform-rail-costing-system/>, accessed on March 28, 2024.

⁴⁹ To arrive at more precise variable cost allocations, industry and interchange switching costs can be allocated based on whether the switches occur on-segment or off-segment. *See* NECR-PAS Decision. *See* New England Central Railroad, Inc. - Trackage Rights Order - Pan Am Southern LLC, Finance Docket No. 35842, July 19, 2016 ("PAS Reply"), PDF p. 110 ("The resulting variable costs were split into costs related to switch events, including non I&I SEMs and associated make wholes, and other variable costs. Costs related to switch events were assigned to the trackage rights segments where the switch occurred, based on the relative SEMs of each switch event and associated make whole costs.").

assumes that variable costs per mile are constant across all portions of a movement's route. The variable costs per mile can then be calculated on a per-GTM basis by dividing by the gross tons of the movement.

45. This method assumes constant variable costs per mile, because URCS only provides estimates of system-level costs and does not consider line-specific characteristics. I understand that in prior proceedings, the Board has ruled against the application of “movement-specific adjustments” to URCS’s system-wide average variable costs that would account for differences in variable costs based on geography or other factors, and I follow that precedent here.⁵⁰ However, using URCS’s system-wide variable costs can impose an important limitation—specifically, estimated line revenues would tend to be lower than the true line revenues for segments whose on-segment variable costs are higher than off-segment variable costs.

(ii) *Fixed costs*

46. In contrast to variable costs, fixed costs do not vary with the volume of traffic and are costs associated with owning and maintaining a mile of track. Calculations of the average fixed costs under the ATC method must reflect differences in the volume of traffic that moves over each segment (“segment density”) for the on-segment and off-segment portion of the movement.⁵¹ Segments that are more dense will have lower average fixed costs on a per GTM basis, because the fixed costs per mile of track are spread over a larger volume of traffic. Under

⁵⁰ See Major Issues, p. 48. The Board ruled against the application of “movement-specific adjustments” to URCS’s system-wide average variable costs in rate reasonable cases, because, among other reasons, “the analysis of [] movement-specific adjustments is complex, expensive, and time consuming.”

⁵¹ Major Issues, p. 26 (“[T]he Board believed that [the ATC approach] should address the railroads’ legitimate concerns about the need to take into account economies of density when allocating revenue from cross-over traffic.”); p. 34 (“Economies of density reflect how average total costs for a network of a given size initially decrease with increases in output.”).

the ATC method, fixed costs per GTM are estimated by first taking system-wide fixed costs from URCS and dividing by the total system miles to get fixed costs per mile. Then, fixed costs per mile are converted into fixed costs per GTM by dividing by the density of the on-segment and off-segment portions of the route.⁵²

(iii) *Average total costs and allocated revenues*

47. The average total cost on a per GTM basis is the sum of average variable cost and average fixed cost on a per GTM basis. The net revenue of each movement is then allocated on-segment versus off-segment based on the ratio of on-segment versus off-segment average total costs, the on-segment and off-segment mileage, and the gross tons of the movement.

48. However, in some cases the ATC method can lead to scenarios where the allocated on-segment revenue is lower than the on-segment variable costs as calculated with URCS, suggesting that the railroad suffers a loss from transporting that movement over that segment of the line. To account for this scenario, the Board has approved an Alternative ATC method, in which the on-segment revenue allocation is increased to ensure that on-segment revenue at least covers on-segment variable costs.⁵³

(iv) *Line earnings*

49. Finally, costs are allocated to the line and deducted from allocated line revenue to arrive at line earnings. In a trackage rights case between New England Central Railroad and Pan

⁵² Major Issues, p. 34 (“[The ATC method] uses the URCS system-average fixed cost and system-wide route miles to derive a system-average fixed cost per route mile. This calculation, when combined with the actual route miles and traffic tons of the segment in question, is used to derive the average fixed cost per ton of that segment.”)

⁵³ InterVISTAS, “An Examination of the STB’s Approach to Freight Rail Rate Regulation and Options for Simplification (Project FY14-STB-157),” STB, September 14, 2016, p. 37 (“In 2013, the STB adopted an alternative ATC method for revenue allocation.... The modification was adding a second step to ensure revenue allocated was not below variable cost. If that was the case, the allocation would be increased to match the URCS variable cost of the defendant carrier on a given segment[.]”).

Am Southern (“NECR-PAS”), the landlord railroad’s operating expenses (which include both variable and fixed expenses) were allocated to the line in proportion to variable costs from URCS.⁵⁴ As discussed in **Section VI.A.1**, I follow the precedent set in NECR-PAS of using the landlord railroad’s operating expenses to allocate costs to the trackage rights line, but I use the proportion of total costs (instead of variable costs) from URCS to account for the fact that operating expenses include both variable and fixed expenses. Subtracting the allocated line costs from the allocated line revenue produces a line earnings metric that is analogous to earnings before interest and taxes (“EBIT”).⁵⁵

b. Calculation of multiplier

50. The second step of the CE method is to calculate the multiplier that is used to convert the current earnings generated by the trackage rights line into a valuation. As the ICC explained in SSW I, “[t]he capitalized earnings approach requires the generation of a number, the earnings multiple, which relates corporate earnings to corporate value.”⁵⁶ This multiplier is analogous to a ratio that measures the valuation of one dollar of current earnings (*e.g.*, EBIT). For example, with a multiplier for a railroad line that equals 10, a railroad line that generates \$2 million in current earnings would be valued at \$20 million.

51. There are several ways to calculate a multiplier. One approach that has been used in past trackage rights cases is a market-based multiplier based on observable market data.⁵⁷ Market-based multipliers are based on the economic principle that similar assets should have

⁵⁴ NECR-PAS Decision, p. 15. (“According to PAS, its expert then: ...allocated operating expenses for 2014 proportional to the relative URCS variable costs assigned to each segment.”).

⁵⁵ NECR-PAS Decision, p. 15.

⁵⁶ SSW I, p. 787.

⁵⁷ *See, e.g.*, SSW II, pp. 680-681; Conrail II, pp. 79, 84.

similar values. These multipliers use market data from the landlord railroad or other comparable companies that are publicly traded (*i.e.*, a company whose underlying financials are available to the public, and therefore, whose stock price reflects the market’s view of the company’s value) to infer the appropriate market-based relationship between asset value and earnings.⁵⁸ As a result, market-based multipliers (often referred to as “market multiples” or “multiples” in economic and finance literature) incorporate the market’s expectations of future growth.⁵⁹

52. Another approach is to use a multiplier equal to the inverse of the Weighted Average Cost of Capital (“WACC”) of the railroad industry.⁶⁰ A valuation using the inverse of the WACC as the multiplier assumes that there will be no growth in line earnings (*i.e.*, no future value added to the line beyond what is required to cover the current cost of capital).⁶¹ As I

⁵⁸ Koller et al., 2020, p. 203 (“One simple way that investors and executives value companies is to value a company in relation to the value of other companies, akin to the way a real estate agent values a house by comparing it with similar houses that have recently sold. To do this, first calculate how similar companies are valued as a multiple of a relevant metric, such as earnings, invested capital, or an operating metric like barrels of oil reserves. You can then apply that multiple to the company you are valuing.”); Zvi Bodie, Alex Kane and Alan J. Marcus, *Investments*, 11th Ed., McGraw Hill Education, 2018 (“Bodie, Kane, and Marcus (2018)”), p. 313 (“The Law of One Price states that if two assets are equivalent in all economically relevant respects, then they should have the same market price.”); Damodaran (2012), p. 453 (“In relative valuation, the objective is to value assets based on how similar assets are currently priced in the market.”).

⁵⁹ Koller et al., 2020, p. 257 (“By comparing the multiple of one company versus another, you can examine how the market perceives the company’s future relative to other companies.”); Damodaran (2012), p. 508 (“These multiples are ultimately determined by the same fundamentals that determine the value of a firm in a discounted cash flow model—expected growth, risk, and cash flow potential. Firms with higher growth, lower risk, and higher payout ratios, other things remaining equal, should trade at much higher multiples of earnings than other firms. To the extent that there are differences in fundamentals across countries, across time, and across companies, the multiples will also be different.”).

⁶⁰ NECR-PAS Decision, p. 16 (“Here, PAS’s approach is appropriate because the cost of capital reflects the required return on investment for the industry... Accordingly, the Board will accept PAS’s use of the industry cost of capital in its CE calculation.”).

⁶¹ The value V of an asset—whose current annual cash flow (*i.e.*, earnings) is D , growth rate is constant at g every year, and annual cost of capital is c —is mathematically represented as $V = \frac{D}{c-g}$ using the well-known cash flow perpetuity formula. Koller et al., 2020, p. 50. Suppose D represents annual railroad line earnings, c equals the railroad industry’s WACC, and the annual growth rate g is assumed to equal 0 (*i.e.*, no growth). Then, the value V of the railroad line becomes:

$$V = \frac{\text{line earnings}}{\text{WACC}} = \text{line earnings} \times \frac{1}{\text{WACC}}.$$

discuss in **Section VI.B**, given the historical growth in UP's and BNSF's earnings, the inverse cost of capital multiplier is inappropriate for determining BNSF's interest rental payment on the Mojave-Kern Line.

c. Calculation of interest rental base

53. The interest rental base is calculated by multiplying the line earnings by the multiplier. The earnings measure calculated in the first step of the CE method should be consistent with the multiplier calculated in the second step of the CE method. For example, if EBIT is used as the earnings measure in the first step, then the multiplier should also reflect the valuation of one dollar of current EBIT.⁶²

2. Advantages of the CE method in determining interest rental base valuation

54. The CE method and the RCNLD method have both been used as valuation methods in past trackage rights matters.⁶³ The CE method values a railroad line as a going concern and as an economically productive asset. That is, the CE method incorporates both the economic value that a profitable railroad line generates currently and is expected to generate in the future. In contrast, the RCNLD method values a railroad line at the cost required to rebuild it. Specifically, under the RCNLD method, the value of the line segment is calculated as: (i) the

Therefore, $1/WACC$ represents a multiplier that converts line earnings to value if there is no earnings growth.

⁶² When performing a multiples-based analysis, it is critical that the earnings measure and the multiplier are calculated consistently; if not, the resulting estimate will be distorted by the differences in the earnings measure. *See, e.g.*, Damodaran (2012), p. 457 (“In relative valuation, the multiple is computed for all of the firms in a group and then compared across these firms to make judgments on which firms are overpriced and which are underpriced. For this comparison to have any merit, the multiple has to be defined uniformly across all of the firms in the group.”).

⁶³ *See, e.g.*, SSW I; Conrail I; NECR-PAS Decision; ATSF II; Arkansas and Missouri Railroad Company v. Missouri Pacific Railroad Company, 6 I.C.C.2d 619 (1990) (“A&M I”).

estimated cost of replacing the existing line less (ii) the amount of accrued depreciation (which accounts for the used status of the railroad line in question). I understand that the RCNLD method typically requires an assessment study by an engineering firm in which engineers estimate the replacement cost of various components of the railroad line new less adjustments for remaining useful life of the various components.

55. The ICC has acknowledged the relative advantage of the CE method in SSW I:

[The CE] method is predicated on the carrier continuing as a going-concern. This characteristic is perhaps the methodology's greatest advantage in valuing assets using in trackage rights operation...The RCNLD approach does not value the asset as a going-concern business, but rather solely as individual parcels of land and specific existing structures.⁶⁴

56. I understand that the Board has periodically reiterated the advantages of the CE method in determining the interest rental base, for example, stating in Conrail I that: “[t]he CE approach is our preferred method for developing the rental component in trackage rights compensation cases because, among other things, it values the property as a going concern for railroad use, *i.e.*, the use to which the property would actually be put.”⁶⁵ The Board reaffirmed the application of the CE method as being “valid and adequately supported” in NECR-PAS.⁶⁶

57. I understand that there are certain limited scenarios in which it may not be possible to use the CE method because the results of the calculation would not produce a reasonable estimate of the interest rental base.⁶⁷ In these limited scenarios, I understand the Board has identified the RCNLD method as a viable valuation methodology. For example, the

⁶⁴ SSW I, p. 786.

⁶⁵ Conrail I, p. 964 footnote 18; *see also* ATSF I, p. 304.

⁶⁶ NECR-PAS Decision, p. 15.

⁶⁷ *See e.g.*, A&M I, pp. 624-625; ATSF II, p. 4.

RCNLD method may be preferred over the CE method if a railroad line is unprofitable for one or both railroads.⁶⁸ However, this concern does not apply if both the landlord and tenant railroads generate positive earnings on the railroad line.

B. Cost of capital

58. The second component of the interest rental calculation is the cost of capital. The cost of capital represents the breakeven return on investment for investing capital to build or make additions and improvements to the railroad line. As explained in **Section IV.B**, interest rental payments are intended to compensate the landlord railroad for using its asset, so the cost of capital is a means of calculating the return that the landlord could have obtained if it put the capital invested in the asset to another productive use.

59. Prior Board proceedings have established a precedent for using the industry-wide railroad pre-tax cost of capital for calculating interest rental payments.⁶⁹ From an economic perspective, a pre-tax cost of capital is appropriate because interest rental payments are taxable income for the landlord railroad, and therefore should be calculated on a pre-tax basis.

60. The industry pre-tax cost of capital is calculated from the railroad industry cost of capital published annually by the Board. This published rate is a weighted average of the cost of

⁶⁸ See e.g., ATSF II, pp. 2-3.

⁶⁹ Shannon P. Pratt and Roger J. Grabowski, *Cost of Capital: Applications and Examples*, 5th Ed., John Wiley & Sons, 2014 (“Pratt and Grabowski (2014)”), p. 1008 (“Absent any ratemaking duties, the STB still uses cost of capital in several ways for its remaining duties: (i) [a]nnually to evaluate the adequacy of individual railroads’ revenues, (ii) [i]n deciding maximum rate cases, (iii) [r]eviewing railroad mergers, (iv) Uniform Rail Costing System[.] To support these four activities, the Board relies on a uniform standard for estimating railroad cost of capital on an industrywide basis.”); Railroad Cost of Capital - 2022, EP 558 (Sub-No. 26), August 3, 2023 (“STB 2022 Industry Cost of Capital”), p. 1 (“The cost-of-capital finding may also be used in other regulatory proceedings, including (but not limited to)... the setting of compensation for use of another carrier’s lines.”); ATSF II, pp. 6-7.

debt and the cost of equity for the railroad industry as a whole.⁷⁰ In order to convert the cost of capital to a pre-tax basis, certain adjustments must be made. The cost of debt calculated by the Borad is already on a pre-tax basis, and therefore no adjustment is needed to convert the cost of debt to a pre-tax basis.⁷¹ However, calculation of the pre-tax cost of equity requires adjustments to the post-tax cost of equity to account for the railroad's federal and state tax rates. The weighted average of the resulting pre-tax cost of equity and pre-tax cost of debt (weighted by the capital structure of the railroad) is the estimated industry pre-tax cost of capital.

C. Usage factor

61. The third component of interest rental calculation is the usage factor. The usage factor (or "allocation") is used to determine how the cost of capital of the asset should be split between each user of the line. For example, if the tenant landlord were the sole user of the line, and the landlord did not use the line at all for its own benefit, then it would be appropriate for the tenant to pay the landlord for the full rate of return on the landlord's capital. If the landlord and tenant use the line in equal amounts, it would be appropriate for the tenant to pay the landlord for 50 percent of the rate of return on the landlord's capital, and the owner to bear the cost of the other 50 percent.

62. In SSW Compensation, the usage factor was determined based on the actual proportionate usage of the line segment, as measured by GTMs.⁷² However, more recent

⁷⁰ STB 2022 Industry Cost of Capital, p. 12.

⁷¹ The Board calculates the cost of debt based on market-value yields for major railroad companies. These yields are already on a pre-tax basis because they represent the rate of return on major railroad companies' debt before accounting for the deductibility of interest expense. *See, e.g.*, STB 2022 Industry Cost of Capital, p. 4 ("[The Association of American Railroad's] cost-of-debt figure is based on the market-value yields of the major forms of long-term debt instruments for the railroad holding companies used in the composite.").

⁷² SSW I, p. 803; *see also* SSW II, p. 687.

trackage rights cases have determined the usage factor on the basis of car miles.⁷³ Allocating usage based on car miles makes sense from an economic perspective, because it reflects the constraints on the capacity of the line, which is limited by the amount of cars that can traverse it, not gross tons.

VI. ESTIMATE OF MOJAVE-KERN INTEREST RENTAL PAYMENTS UNDER THE CE METHOD

63. In this section, I describe my calculations of the interest rental payment owed by BNSF to UP for use of the Mojave-Kern Line based on the CE method. My estimates of Mojave-Kern Line earnings under the ATC method are discussed in **Section VI.A**. My estimates of the market-based EBIT multipliers are discussed in **Section VI.B**. My calculations of the interest rental base are discussed in **Section VI.C**. Finally, my calculations of interest rental payments, on an annual and per car mile basis are discussed in **Section VI.D**.

64. My calculations are based on data from 2021 and 2022, the two most recent years for which movement data are available from UP and BNSF. I understand that in NECR-PAS, the Board accepted a CE method estimate that relied on a single year of data.⁷⁴ Here I perform calculations based on an average of the two most recent years of data in order to smooth any potential year-specific idiosyncratic factors that may impact the calculations. Relying on data from 2021 and 2022 also avoids any idiosyncrasies caused by the COVID-19 pandemic in 2020 that are not representative of the valuation of the line going forward.

⁷³ A&M I, p. 622 footnote 8; ATSF II, p. 8; Conrail I, pp. 965-966; NECR-PAS Decision, pp. 41-42. A “car mile” refers to the movement of one car over one mile of track. To calculate total car miles over a given segment of track, one can sum the number of miles traversed by each car on the given segment of track.

⁷⁴ NECR-PAS Decision, p. 15.

A. Estimates of Mojave-Kern Line earnings

65. In this section, I estimate the line earnings attributable to the Mojave-Kern Line using the ATC method outlined in **Section V.A.1**. Under the SSW Compensation framework, it is necessary to account for the full economic value of the line as a going concern, which includes line earnings from both the tenant and the landlord.⁷⁵ Thus, when calculating line earnings, I account for both the UP and BNSF traffic that traversed the line as discussed below. Additional details on certain calculations underlying my estimates of Mojave-Kern Line earnings are provided in **Appendix C**.

1. ATC estimates of UP traffic

66. In this section, I describe my calculations of line earnings attributable to the Mojave-Kern Line from UP's traffic that traverses the line per the ATC method. In particular:

- a. *First*, I summarize the data I use for my calculations.
- b. *Second*, I describe the methodology for calculating movement-specific mileages (both on and off the Mojave-Kern Line).
- c. *Third*, I describe my calculation of movement-specific variable costs and the allocation of these costs to the Mojave-Kern Line versus the rest of the movement.
- d. *Fourth*, I describe my calculation of fixed costs and the allocation of these costs to the Mojave-Kern Line versus the rest of the movement.

⁷⁵ ATSF II, p. 3 (“[L]ine-specific earnings must include the earnings of both carriers.”).

- e. *Finally*, I present my estimates of UP’s revenue and line earnings attributable to the Mojave-Kern Line based on the ATC method.

67. I describe my calculations of line earnings attributable to the Mojave-Kern Line from BNSF’s traffic in the following section.

a. *Summary of key datasets*

68. To estimate UP’s line earnings associated with the Mojave-Kern Line under the ATC method, I rely primarily on three datasets produced by UP: its waybill data, its event data, and its density data.⁷⁶

69. *Waybill data*: UP’s waybill data include information from waybills that are associated with UP’s revenue-generating movements that traversed the Mojave-Kern Line.⁷⁷ In UP’s waybill data, each row corresponds to a unique cycle-sequence number (“CSN”), which represents a unique revenue-generating intermodal trailer or container, or non-intermodal car. A single waybill can correspond to multiple CSNs (*i.e.*, a movement may involve multiple containers and/or cars), though in most cases the mapping between movements and CSNs in UP’s data is one-to-one.⁷⁸ The data include key information about each CSN, including the gross and net tons associated with the CSN, the origin and destination stations of the movement,⁷⁹ the

⁷⁶ UP, Waybill Data, UP-MK-001933-HC - 001943-HC (“UP Waybill Data”); UP, Car Event Data, UP-MK-001913-HC - 001929-HC (“UP Event Data”); UP, Density Data,” UP-MK-001931-HC (“UP Density Data”).

⁷⁷ I refer to a shipment where a customer pays UP to move a given commodity from an origin to a destination point on UP’s system as an individual “movement.” Each movement is associated with a unique waybill, which is the shipping document prepared by the carrier corresponding to the movement.

⁷⁸ There are a total of {{ }} unique CSNs in the waybill data from 2021 and 2022, corresponding to {{ }} unique movements (*i.e.*, waybills). “UP Cleaning Script.R,” Mathur Workpaper 4.06.

⁷⁹ When I reference origin and destination stations in this section, unless otherwise stated, I am referring to the variables “SYS_ON_JCT_FSAC” and “SYS_OFF_JCT_FSAC” in the waybill data, which represent the stations where the movement’s journey on UP’s system begins and ends, as opposed to the true origin and destination stations of the movement. This is because the revenue reported in UP’s waybill data only

commodity being shipped, the identity of the shipper (*i.e.*, customer), and the revenue associated with the CSN.⁸⁰

70. *Event data:* UP's event data include more granular details on the journey a movement took in getting from its origin to destination station, including the sequence of stations the movement traversed, the date and time various events along the journey occurred, and the type of event that occurred (*e.g.*, arrival at a station, departure from a station, switching event, etc.).⁸¹ As these data include information on the sequence of stations traversed by each movement, they can be used to determine how many miles along the Mojave-Kern Line the movement travelled. {{ }} CSNs in UP's waybill data were matched to records in UP's event data.⁸² UP's event data includes many records for which there are no corresponding waybills, due to the inclusion of non-revenue generating empty movements and locomotives in the event data.

71. *Density data:* I use UP's density data in my calculations of fixed costs described below.⁸³ The density data include the total gross tonnage that traversed each track segment in UP's system annually and can therefore be used to calculate the density along a specific route traversed by a movement.⁸⁴

corresponds to the portion of the movement's journey that occurred on UP's system, so the relevant movements to consider are only those along UP's system. UP, Data Dictionary, UP-MK-001944-HC - 001945-HC ("UP Data Dictionary").

⁸⁰ UP Data Dictionary.

⁸¹ UP Event Data.

⁸² "UP Event Data 3.R," Mathur Workpaper 2.09.

⁸³ UP Density Data.

⁸⁴ I understand that the density data only include UP's tonnage (and not the landlord's tonnage) on track segments where UP has trackage rights but is not the owner. In my calculations of densities and fixed costs described in **Section VI.A.1.d**, I only rely on the densities for the track segments owned by UP.

b. Movement mileage calculations

72. In this section, I describe my calculation of movement-specific mileage for each movement that traversed the Mojave-Kern Line, including (a) mileage traversed over the Mojave-Kern Line (*i.e.*, “on-segment mileage”), and (b) mileage traversed over all other parts of its journey (*i.e.*, “off-segment mileage”). These inputs are needed to estimate on-segment variable costs and fixed costs (*i.e.*, the mileage ratio as described in **Section V.A.1.a** above). I calculate the mileage ratio using UP’s event data, supplemented when necessary with data from PCMiller. PCMiller is an industry-standard software package which provides total mileage for a movement for an origin station, destination station, and railroad, assuming the movement travels along the “shortest” route or the most “practical” route.⁸⁵

73. Using the event data, I calculate that {{ }} of CSNs⁸⁶ in UP’s waybill data have associated on-segment total mileage of 67.2 miles (*i.e.*, {{ }} movements traversed the length of the entire segment once along their journey). {{ }} of CSNs have non-zero on-segment mileage that is less than 67.2 miles (indicating they only partially traversed the full segment), and {{ }} of CSNs have on-segment mileage greater than 67.2 miles

⁸⁵ Trimble Maps (the vendor of PCMiller), describes PCMiller as a “point-to-point rail routing and mileage software. Covering the complete North American railroad system, PC*Miler Rail provides up-to-date information that rail owners, vendors, and users need for accurate rate determination and negotiation, equipment management, rail car mileage auditing, and carrier selection.” The software “generates routes and determines mileage between any two rail-served locations in North America” and can “calculate the Shortest route (least distance) or the Practical route (based on historical operations) between any two points.” “What is PC*MILER Rail?,” Trimble Maps, available at <https://support.pcmiller.com/en/support/solutions/articles/19000084727-what-is-pc-miler-rail->, accessed on April 11, 2024. I understand that PCMiller has been used in analyses accepted by the Board in prior proceedings. *See, e.g.*, PAS Reply, p. 35.

⁸⁶ I calculate the on-segment mileage at a CSN level as the event data is at a CSN level. For most movements with multiple CSNs, the on-segment mileage across all CSNs within the movement are equal. For the few movements where this is not the case, I assume the movement’s on-segment mileage is the median on-segment mileage I calculate across all of the movement’s CSNs.

(indicating they may have traversed the segment multiple times during their journey) (*see Exhibit 2A*).⁸⁷

74. I calculate off-segment mileage using the following steps:
- a. *First*, I calculate the total mileage associated with the movement using UP's event data by adding the mileage between all event stations along a CSN's route.⁸⁸
 - b. *Second*, I calculate the total mileage of each movement in PCMiller based on the movement's origin and destination stations.⁸⁹ In principle, the total mileage estimated from the event data represents the actual mileage traversed by the movement, whereas the total mileage estimated from PCMiller

⁸⁷ For {{ }} percent of CSNs in the waybill data, the on-segment mileage is zero (*see Exhibit 2A*). Based on the event data, all of the movements in UP's waybill data had an event at a station on the Mojave-Kern Line (*i.e.*, between Mojave and Kern Junction or at one of those two stations) or at Bakersfield (a station 0.3 miles north of the Kern Junction, just off the Mojave-Kern Line). Thus, these CSNs with zero on-segment mileage are CSNs with events at either endpoint of the Mojave-Kern Line, or at Bakersfield, that did not traverse the Mojave-Kern Line (*i.e.*, these are mainly CSNs whose journeys on UP's system either originated or terminated at Mojave, Kern Junction, or Bakersfield). Since there is no on-segment mileage associated with these CSNs, there are no on-segment costs associated with these CSNs, and therefore there are no on-segment line earnings associated with them. Thus, I exclude these CSNs from my ATC estimates. From an economic perspective, a railroad may still derive value from an overhead traffic segment if its movements originate or terminate at one of the segment's endpoints, even if the movements do not traverse the segment. However, since the ATC methodology mechanically does not associate on-segment costs (and therefore on-segment line earnings) with such movements, it does not associate any economic value with movements originating or terminating at Mojave or the Kern Junction that do not traverse the segment. Thus, the ATC methodology may understate the true economic value of the Mojave-Kern Line in this regard.

⁸⁸ If CSNs within the same movement have different total mileages from one another, I use the median total mileage across the CSNs as the total event data mileage of the movement.

⁸⁹ When using PCMiller to calculate total mileages, I use the "intermodal" routing setting for all intermodal movements and use the "practical" routing setting for all non-intermodal movements. If PCMiller cannot route an intermodal movement under the "intermodal" setting because it did not recognize the origin or destination station of the movement as an intermodal station, I use the "practical" setting.

represents the optimal route from the origin to destination station per PCMiller.⁹⁰

- c. *Third*, I assume that each movement's total mileage is the maximum of the total mileage from the event data and PCMiller.⁹¹ This assumption is conservative (*i.e.*, it is favorable to the tenant, BNSF) because it understates line earnings and as such, the interest rental payment payable to UP. Taking the maximum total mileage yields the highest possible off-segment mileage, resulting in the lowest possible ratio of on-segment to off-segment miles, which yields lower on-segment costs and therefore line earnings under the ATC method.
- d. *Finally*, I calculate off-segment mileage by subtracting the on-segment mileage from the total mileage of each movement.⁹²

⁹⁰ For {{ }} movements ({{ }} percent of all movements for 2021 and 2022), the total mileage from the event data and PCMiller are within 10 percent of each other. Additionally, for {{ }} movements ({{ }} percent of all movements for 2021 and 2022), the total mileage from the event data is higher than the total mileage from PCMiller. "UP Cleaning Script.R," Mathur Workpaper 4.06.

⁹¹ If the total mileage from either the event data or PCMiller is missing, I use the total mileage estimate from the other source.

⁹² See **Exhibit 3A** for a summary of the distribution of the mileage ratios across movements in UP's waybill data that traversed the Mojave-Kern Line.

c. Variable costs

75. I calculate the variable costs associated with each movement using URCS.⁹³

URCS uses several characteristics for each movement as inputs,⁹⁴ and outputs an estimate of the movement's total variable costs.⁹⁵ Certain movements cannot be processed through URCS, so I am unable to estimate variable costs for these movements.⁹⁶ I exclude these waybills from my initial allocation of line earnings under the ATC method, and account for their revenue in the final step of my calculation of line earnings via a gross-up adjustment.⁹⁷

76. For each movement, URCS outputs the associated total variable costs, as well as specific types of variable costs such as switching costs. When allocating these variable costs on-segment versus off-segment, I treat industry and interchange switching costs and all other variable costs separately.⁹⁸ Industry and interchange switching costs are allocated entirely off-segment, {{

}}.⁹⁹ All other variable costs are allocated

⁹³ As noted above, URCS calculates variable costs at a waybill level, which is less granular than the CSN-level of the waybill data. Specifically, a unique waybill may be associated with multiple CSNs if a customer's waybill order includes multiple cars or intermodal containers of commodities. Thus, before running the waybill data through URCS, I collapse it to a waybill level using the variable "WB_ID."

⁹⁴ The inputs required by the URCS model (in its batch processing mode) include: the segment railroad, distance, segment type (*e.g.*, originating or receiving and terminating or delivering), freight car type, number of cars or containers, ownership, weight per car, commodity, shipment size or intermodal nature, circuitry (a factor "used to inflate the short line mileage... to derive an estimate of the actual miles traveled"), TOFC Plan (*i.e.*, intermodal shipment service plan which "reflects the responsibility of the railroad for pickup and delivery cost, trailer/container ownership, protective service operations and intermodal car ownership"), total distance, and originating railroad. *See* URCS Manual, pp. 16-17, 24-25.

⁹⁵ URCS Manual, p. 1.

⁹⁶ *See* Appendix C; Exhibit 4A.

⁹⁷ *See* Section VI.A.1.e.

⁹⁸ Industry and interchange switching occurs at the movements' origin and destination. By contrast, intratrain and intertrain switching occurs throughout a movements' journey. URCS Manual, p. 36.

⁹⁹ {{ }} percent of waybills in UP's waybill data have an on-segment origin or destination station. "UP Event Data 1.R," Mathur Workpaper 2.07. I allocate all industry and interchange switching costs off-segment,

based on the proportion of on-segment to total miles (*i.e.*, the mileage ratio) for each waybill.

Figure 4 summarizes the allocated on-segment versus off-segment variable costs in 2021 and 2022.

Figure 4. UP's 2021 – 2022 On-Segment and Off-Segment Variable Costs¹⁰⁰

{{

}}

d. Fixed costs and density

77. To calculate the on-segment and off-segment fixed costs associated with each movement, I assign a portion of UP's system-wide fixed costs to each movement based on the on-segment and off-segment densities along the route of each movement. The density along each portion of the movement affects the calculation of fixed costs because, all else equal, fixed costs over a denser part of a railroad's system will be lower on a per GTM basis because the fixed costs are spread out over a higher volume of traffic along denser segments.

78. Specifically, to calculate the on-segment and off-segment fixed costs:

even for waybills originating or terminating on-segment. This assumption is conservative (*i.e.*, favors BNSF), because if I were to allocate industry and interchange switching costs on-segment for the waybills originating or terminating on-segment, the allocated on-segment costs, and therefore on-segment revenue and line earnings, would be higher.

¹⁰⁰ **Exhibit 5A.**

- a. *First*, I calculate an annual system-wide fixed cost per route mile for UP's system by dividing the total system-wide fixed costs reported in UP's URCS worktables each year by UP's system route miles reported in its annual R-1 forms (*see* **Figure 5**).¹⁰¹
- b. *Then*, I calculate a fixed cost per GTM for each movement for both the on-segment and off-segment portion of the movement's route.
 - i. For the on-segment fixed cost per GTM, I divide UP's system-wide fixed cost per mile by the annual density of the Mojave-Kern Line reported in UP's density data (*see* **Figure 5**).¹⁰² The on-segment fixed cost per GTM is the same for all movements in a given year.
 - ii. For the off-segment fixed cost per GTM, I divide the system-wide fixed cost per mile by an off-segment density for each movement. The off-segment density for each movement varies based on the route of each movement as described below.

¹⁰¹ **Exhibit 6A.** UP's fixed costs are associated only with track owned by UP. As such, when dividing by UP's system route miles, I exclude route miles that correspond to track that UP operates on but does not own (*i.e.*, track for which UP has trackage rights agreements with a different railroad). *See* UP, Class I Railroad Annual Report to the Surface Transportation Board for the Year Ending Dec. 31, 2021 ("UP 2021 R-1"), Schedule 700, pp. 62-63; UP 2022 R-1, Schedule 700, pp. 62-63; **Exhibit 6A**.

¹⁰² **Exhibit 7.** The on-segment density includes both UP's and BNSF's tonnage, as the total fixed costs along the Mojave-Kern Line are spread across all (*i.e.*, UP and foreign) gross tons traversing the segment. I understand that UP's 2021 density data only include UP's tonnage on the Mojave-Kern Line, while the 2022 density data include both UP's and BNSF's tonnage on the Mojave-Kern Line. Thus, I calculate BNSF's tonnage on the Mojave-Kern Line in 2021 using the data in "2021_BNSF.xlsx," Mathur Workpaper 6.02, and add that to the Mojave-Kern density calculated from UP's density data in 2021 to get BNSF's and UP's combined Mojave-Kern density for 2021.

- c. *Finally*, for each movement, I calculate the on-segment (off-segment) allocated fixed costs as the on-segment (off-segment) fixed cost per GTM, multiplied by the gross tons associated with the movement and the on-segment (off-segment) miles.¹⁰³ *See Figure 6.*

¹⁰³ I understand that the densities reported in the UP density data (which I use to calculate the off-segment densities of the “top routes” defined below and the on-segment density) include the gross tonnage of empty cars and locomotives. In contrast, the gross tonnage in the waybill data does not account for these additional sources of tonnage as the waybill data only corresponds to loaded cars or revenue-generating empties, but excludes non-revenue-generating empty movements. Thus, prior to multiplying the gross ton miles from the waybill data by the fixed cost per GTM (for both on-segment and off-segment fixed costs), I scale up the gross tons in the waybill data for each movement by the empty-loaded ratios from URCS and the ratio of locomotive gross ton mileage to all other gross ton mileage reported in UP’s R-1 forms.

Figure 5. UP's 2021 – 2022 System Fixed Cost per Mile and On-Segment Fixed Cost per GTM¹⁰⁴

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Figure 6. UP's 2021 – 2022 On-Segment and Off-Segment Fixed Costs¹⁰⁵

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79. As explained above, the off-segment density used to calculate off-segment fixed costs is unique to the route (*i.e.*, origin and destination station) of each movement. Estimating the density for a specific route requires a manual calculation in which the route must be mapped on PCMiller, and then each portion of the PCMiller route must be matched to UP's density data. As there are approximately {{ }} unique routes in UP's waybill data,¹⁰⁶ manually estimating the off-segment density of each unique route is computationally infeasible.

¹⁰⁴ **Exhibit 6A and Exhibit 7.**

¹⁰⁵ **Exhibit 9A.**

¹⁰⁶ "Identify Top Routes and Generate Exhibit 8 Output.R," Mathur Workpaper 6.04.

80. I calculate route-specific off-segment densities using UP's density for the top {{ }} routes that cover 70 percent of all movements processed through URCS (selected based on rank by waybill count, starting with the highest waybill count route) and 40 percent of all revenue on movements processed through URCS (selected based on rank by revenue, starting with the highest revenue route).^{107, 108} For movements on all other routes, I assume the off-segment density is equal to the annual average density (weighted by movement count) of the top routes. Movements on all routes that traverse the Mojave-Kern Line must also traverse at least one of the segments connected to the Mojave-Kern Line. Therefore, many off-segment portions of the non-top routes will overlap with the off-segment portions of the top routes (for which densities were calculated). Hence, the densities along the top routes are likely representative of the densities along most other non-top routes that involve traversing the Mojave-Kern Line. **Exhibit 8A** summarizes my off-segment density assumptions for movements on each top route and the weighted average assumption applied to all other routes. I also conduct sensitivity calculations to assess the impact of the assumption that the off-segment density of movements on non-top routes is equivalent to the weighted average density of the top routes.¹⁰⁹

¹⁰⁷ There is an overlap of {{ }} routes between the {{ }} most common routes by waybill count and {{ }} highest revenue-generating routes described above, and as such, I calculate route-specific off-segment density for a total of {{ }} top routes. I selected a lower 40 percent threshold for the top revenue routes, because calculating densities for routes covering 70 percent of revenue would have required manual computation of an additional {{ }} routes. "Identify Top Routes and Generate Exhibit 8 Output.R," Mathur Workpaper 6.04.

¹⁰⁸ **Exhibit 8A.**

¹⁰⁹ In **Exhibit 10A**, I present my calculations of UP's earnings attributable to the Mojave-Kern Line under the ATC method, assuming that the off-segment density of movements on non-top routes is equivalent to the weighted average density of the top routes. In **Exhibit 11A**, I conduct sensitivity calculations to assess the impact of the assumption that the off-segment density of movements on non-top routes is equivalent to the weighted average density of the top routes. I perform a low and high sensitivity scenario, which assumes the off-segment density of the non-top routes is equal to the 10th and 90th percentile off-segment density of the top routes each year, respectively. UP's Mojave-Kern line earnings are {{ }} under the low sensitivity scenario, and {{ }} under the high sensitivity scenario.

- e. *Estimates of Mojave-Kern Line revenue and earnings for UP traffic*

81. My estimates of UP's line earnings attributable to the Mojave-Kern Line based on the ATC method are based on the following calculations:

- a. *First*, I first calculate on-segment (off-segment) average total costs by adding the on-segment (off-segment) fixed and variable costs.
- b. *Second*, I allocate on-segment revenue for each movement by multiplying the movement's total net revenue by the proportion of average total cost that I estimate to be on-segment.¹¹⁰ For some movements, this yields an allocated on-segment revenue that is below the allocated on-segment variable costs. For these movements, I adjust the on-segment revenue to be equal to the net revenue of the movement multiplied by the proportion of on-segment to total variable costs.¹¹¹
- c. *Third*, I add on-segment revenue across all movements to calculate total revenue attributable to the Mojave-Kern Line.
- d. *Fourth*, I deduct allocated on-segment operating expense from the on-segment revenue to calculate line earnings.

¹¹⁰ Net revenue is calculated by adding gross revenue and the field UP_LIABILITY_AMOUNT, which I understand is used to capture certain adjustments made to gross revenue to arrive at the final amount of revenue collected. See UP Data Dictionary.

¹¹¹ I perform this adjustment for {{ }} of movements. After this adjustment, {{ }} of movements still have on-segment revenue below on-segment variable cost. "UP ATC Calculations (Baseline Density).R," Mathur Workpaper 7.04. This adjustment has been recognized by the STB in past trackage rights cases, as described in **Section V.A.1**.

- e. *Finally*, in order to account for the earnings from waybills that were excluded from my analysis because they could not be run through URCS, I apply a gross-up percentage to the line earnings estimates to calculate the final adjusted line earnings estimate.

82. In the fourth step, I take UP's system-wide operating expenses as reported in its 10-K¹¹² and allocate them to the Mojave-Kern Line using the ratio of on-segment total costs estimated under the ATC method to UP's system-wide total costs from URCS. In the NECR-PAS matter, the Board accepted a methodology in which operating expenses from NECR's financial statements were allocated to the trackage rights line using the ratio of on-segment to system-wide URCS variable cost.¹¹³ My methodology is consistent with NECR-PAS in using operating expenses from the railroad's financial statements as the cost measure for the trackage rights line. My methodology is also consistent with the fact that EBIT—which I use to calculate the market-based multipliers in **Section VI.B**—is calculated by removing operating expenses from revenue.¹¹⁴ However, unlike in NECR-PAS, I use the ratio of on-segment to system-wide URCS *total* costs (rather than variable costs) to allocate on-segment operating expenses because operating expenses contain both fixed and variable expenses, and therefore allocating operating expenses according to variable costs alone would distort the allocation. My estimates of allocated line revenue, operating expenses, and line earnings (as processed through the ATC method and adjusted for excluded waybills) are shown in **Figure 7**.

¹¹² UP, Form 10-K for the year ended December 31, 2021, February 4, 2022 ("UP 2021 10-K"), p. 36; UP 2022 10-K, p. 44.

¹¹³ NECR-PAS Decision, p. 15 ("According to PAS, its expert then ... allocated operating expenses for 2014 proportional to the relative URCS variable costs assigned to each segment.").

¹¹⁴ Operating expenses do not include capital investments. UP 2022 10-K, pp. 30, 46; BNSF 2022 10-K, pp. 19, 22.

Figure 7. UP’s 2021 – 2022 Mojave-Kern Line Earnings (Deducting Operating Expenses)¹¹⁵

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2. *ATC estimates of BNSF traffic*

83. In this section, I describe my calculations of line earnings attributable to the Mojave-Kern Line from BNSF’s traffic that traverses the line per the ATC method. The methodology underlying these calculations is consistent with my methodology for calculating UP’s estimated line earnings as described in the previous section.

a. *Summary of key datasets*

84. To estimate BNSF’s line earnings associated with the Mojave-Kern Line under the ATC method, I rely primarily on three datasets produced by BNSF: its waybill data, its event data, and its density data.¹¹⁶

85. *Waybill Data:* Similar to UP’s waybill data, BNSF’s waybill data include information from waybills that are associated with BNSF’s revenue-generating movements that traversed the Mojave-Kern Line. Each row in BNSF’s waybill data corresponds to a unique

¹¹⁵ **Exhibit 10A.**

¹¹⁶ BNSF, Waybill Data, BNSF-KM-HC-0000003 - 0000007 (“BNSF Waybill Data”); BNSF, Event Data, BNSF-KM-HC-0000008 - 0000017 (“BNSF Event Data”); BNSF, Density Data Workbook, BNSF-KM-HC-0000001 (“BNSF Density Data”).

waybill ID. Similar to the “CSN” field in UP’s waybill data,¹¹⁷ I understand that each waybill ID represents a unique revenue-generating intermodal trailer or container, or non-intermodal car. A unique waybill can correspond to multiple waybill ID observations (*i.e.*, a movement may involve multiple containers and/or cars) in BNSF’s waybill data, though the mapping between waybills and waybill ID observations is mostly one-to-one.¹¹⁸ The data include key information about each waybill ID such as the gross and net tons associated with the waybill ID, the origin and destination stations of the movement,¹¹⁹ the commodity being shipped, and the revenue associated with the waybill ID.¹²⁰ In addition, unlike UP’s waybill data, BNSF’s waybill data include the total mileage travelled by each movement, which I use in my movement mileage calculations as described further below.¹²¹ As discussed in the next section, BNSF’s waybill data include far more movements that did not traverse the Mojave-Kern Line than UP’s waybill data.

86. *Event Data:* BNSF’s event data include more granular information on the journey a movement took in getting from its origin to destination station, including the sequence of stations the movement traversed, the date and time various events along the journey occurred, and the type of event that occurred (*e.g.*, arrival at a station, departure from a station, switching

¹¹⁷ See Section VI.A.1.a.

¹¹⁸ There are a total of {{ }} unique waybill ID observations in the waybill data from 2021 and 2022, corresponding to {{ }} unique movements (*i.e.*, waybills). “BNSF MK waybill identification and on-segment mileage.R,” Mathur Workpaper 2.03. A unique waybill is identified by the unique combination of waybill date, waybill number, the railroad carrier that BNSF interchanges with to receive cars, and on- and off-system stations.

¹¹⁹ When I reference origin and destination stations in this section, unless otherwise stated I am referring to the variables “STN_FSAC_ON” and “STN_FSAC_OFF” in BNSF’s waybill data, which represent the stations where the movement’s journey on *BNSF’s system* begins and ends, as opposed to the true origin and destination stations of the movement. This is because the revenue reported in BNSF’s waybill data only corresponds to the portion of the movement’s journey that occurred on BNSF’s system, so the relevant movements to consider are only those along BNSF’s system. BNSF, Data Dictionary Workbook, BNSF-KM-C-0000015 (“BNSF Data Dictionary”).

¹²⁰ BNSF Data Dictionary.

¹²¹ See Section VI.A.2.b.

event, etc.).¹²² As these data include information on the sequence of stations traversed by each movement, they can be used to determine how many miles (if any) along the Mojave-Kern Line a movement travelled. These data are necessary to identify which movements in BNSF's waybill data actually traversed the Mojave-Kern Line, because BNSF's waybill data include many movements that did not traverse the segment and are therefore irrelevant to my analysis.

{{ }} percent of waybill IDs in BNSF's waybill data were matched to records in BNSF's event data.¹²³ BNSF's event data includes many records for which there are no corresponding waybills, due to the inclusion of non-revenue generating empty movements in the event data.

87. *Density Data:* I use BNSF's density data in my calculations of fixed costs described below.¹²⁴ The density data include the total gross tonnage that traversed each track segment in BNSF's system annually and can therefore be used to calculate the density along a specific route traversed by a movement.¹²⁵

b. Movement mileage calculations

88. In this section, I describe my calculation of movement-specific mileage for each movement that traversed the Mojave-Kern Line, including: (a) mileage traversed over the Mojave-Kern Line (*i.e.*, "on-segment mileage"), and (b) mileage traversed over all other parts of its journey (*i.e.*, "off-segment mileage"). In order to estimate on-segment variable costs and fixed costs, it is necessary to know the on-segment and off-segment mileages associated with each

¹²² BNSF Event Data.

¹²³ "BNSF MK waybill identification and on-segment mileage.R," Mathur Workpaper 2.03.

¹²⁴ BNSF Density Data.

¹²⁵ The density data do not include information on track segments where BNSF has trackage rights but is not the owner. For track segments owned by BNSF, the data include both BNSF and foreign tonnage. In my calculations of densities and fixed costs described in **Section VI.A.2.d**, I only rely on the densities for the track segments owned by BNSF.

movement (*i.e.*, the mileage ratio). I calculate the mileage ratio using BNSF's event data and waybill data, supplemented when necessary with data from PCMiller.

89. To calculate the on-segment mileages associated with the movements in BNSF's waybill data, I use BNSF's event data. Based on BNSF's event data, the waybill data produced by BNSF appear to include many movements that traversed through a part of BNSF's system in California but that never traversed the Mojave-Kern Line (unlike UP's waybill data, which was almost exclusively limited to traffic that traversed the Mojave-Kern Line).¹²⁶ Specifically,

{{ }} percent of the movements in BNSF's waybill data did not traverse the Mojave-Kern Line and have zero on-segment mileage.¹²⁷ These movements are irrelevant to my analysis and thus are excluded. Among the movements that did traverse the Mojave-Kern Line in some capacity, I calculate that {{ }} have associated on-segment total mileage of 67.2 miles (*i.e.*, traversed the entire length of the Mojave-Kern Line once). {{

{{ }} of Mojave-Kern traversing movements have on-segment mileage greater than 67.2 miles (indicating they may have traversed the segment multiple times during their journey), and {{ }} of Mojave-Kern traversing movements have non-zero on-segment mileage that is less than 67.2 miles (indicating they only partially traversed the full segment). *See Exhibit 2B* for details on these calculations.

90. I calculate off-segment mileage using the following steps:

¹²⁶ See Section VI.A.1.b.

¹²⁷ Exhibit 2B.

- a. *First*, I extract the total mileage for each movement reported in the waybill data.¹²⁸
- b. *Second*, I calculate the total mileage of each movement in PCMiler based on the movement's origin and destination stations. In principle, the total mileage from the waybill data represents the actual mileage traversed by the movement, whereas the total mileage estimated from PCMiler represents the optimal route from the origin to destination station per PCMiler.¹²⁹
- c. *Third*, I assume each movement's total mileage is the maximum of the total mileage from the event data and PCMiler.¹³⁰ This assumption is conservative (*i.e.*, favorable to the tenant, BNSF) because it understates line earnings and as such, the interest rental payment payable to UP. Taking the maximum total mileage yields the highest possible off-segment mileage, resulting in the lowest possible ratio of on-segment to off-segment miles, which yields lower on-segment costs and therefore line earnings under the ATC method.

¹²⁸ BNSF's waybill data include a field called "CYCLE_MILES," which represents the total miles each movement travelled on BNSF's system. BNSF Data Dictionary. When a movement includes multiple waybill IDs with different total mileages, I calculate the total mileage of the movement as the median of the total mileages of the associated waybill IDs.

¹²⁹ For {{ with non-zero on-segment mileage in 2021 and 2022, the total mileage from the waybill data and PCMiler are within 10 percent of each other. Additionally, for {{ of movements with non-zero on-segment mileage in 2021 and 2022, the total mileage from the waybill data is larger than the total mileage from PCMiler. "BNSF URCS ATC input prep script.R," Mathur Workpaper 4.05.

¹³⁰ If the total mileage from either the event data or PCMiler is missing, I use the total mileage estimate from the other source.

- d. *Finally*, I calculate off-segment mileage by subtracting the on-segment mileage from the total mileage of each movement.¹³¹

c. *Variable costs*

91. My methodology for calculating variable costs for BNSF is similar to my calculation of variable costs for UP, as described in **Section VI.A.1.c**. That is, I use URCS to calculate the variable costs associated with each movement. I exclude certain movements that cannot be processed through URCS and account for their revenue in the final step of my calculation of line earnings via a gross-up adjustment.¹³²

92. I allocate industry and interchange switching costs entirely off-segment, and allocate all other variable costs outputted from URCS based on the proportion of the movement's mileage that is on-segment. **Figure 8** summarizes the allocated on-segment versus off-segment variable costs for 2021 and 2022.

¹³¹ See **Exhibit 3B** for a summary of the distribution of the mileage ratios across movements in BNSF's waybill data that traversed the Mojave-Kern Line.

¹³² See **Exhibit 4B**; **Section VI.A.2.e**.

Figure 8. BNSF's 2021 – 2022 On-Segment and Off-Segment Variable Costs¹³³

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d. Fixed costs and density

93. To calculate the on-segment fixed costs for BNSF, I use the fixed costs per GTM that are shown in **Figure 5**, which are derived from UP's system-wide fixed costs. I use UP's fixed costs for the on-segment portion of each BNSF movement because UP is the owner of the Mojave-Kern Line, and therefore UP's fixed costs are most representative of the economics of the fixed costs of the Mojave-Kern Line. I then multiply the fixed cost per GTM from **Figure 5** by the gross tons and on-segment mileage for each movement to estimate the on-segment fixed costs of each Mojave-Kern traversing movement in BNSF's waybill data.¹³⁴

94. To calculate the off-segment fixed costs associated with each movement:

¹³³ **Exhibit 5B.**

¹³⁴ I understand that the densities reported in the BNSF density data (which I use to calculate the off-segment densities of the "top routes" defined below) and the UP density data (which I use to calculate the on-segment density) both include the gross tonnage of empty cars and locomotives. In contrast, the gross tonnage in the waybill data does not account for these additional sources of tonnage as the waybill data only corresponds to loaded cars (*i.e.*, revenue-generating movements). Thus, prior to multiplying the gross ton miles from the waybill data by the fixed cost per GTM (for both on-segment and off-segment fixed costs), I scale up the gross tons in the waybill data for each movement by the empty-loaded ratios from URCS and the ratio of locomotive gross ton mileage to all other gross ton mileage reported in BNSF's R-1 forms.

- a. *First*, I calculate an annual system-wide fixed cost per route mile for BNSF's system by dividing the total system-wide fixed costs reported in BNSF's URCS worktables each year by BNSF's system route miles reported in its annual R-1 forms (*see Figure 9*).¹³⁵ I use BNSF's system-wide fixed costs for the off-segment fixed cost calculation because the off-segment portion of BNSF's movements occur on BNSF's system.
- b. *Then*, I calculate a fixed cost per GTM for the off-segment portion of each movement's route by dividing the system-wide fixed cost per mile by the estimated off-segment density for each movement. The off-segment density for each movement varies based on the route of each movement as described below.
- c. *Finally*, for each movement, I calculate the off-segment allocated fixed costs as the off-segment fixed cost per GTM, multiplied by the gross tons associated with the movement and the off-segment miles. }}
- d. Figure 10 summarizes the on-segment and off-segment fixed costs I calculate for 2021 and 2022 for BNSF's Mojave-Kern traversing movements.

¹³⁵ **Exhibit 6B.** BNSF's fixed costs are associated only with track owned by BNSF. As such, when dividing by BNSF's system route miles, I exclude route miles that correspond to track that BNSF operates on but does not own (*i.e.*, track for which BNSF has trackage rights agreements with a different railroad). *See* BNSF, Class I Railroad Annual Report to the Surface Transportation Board for the year ending December 31, 2021 ("BNSF 2021 R-1"), Schedule 700, pp. 62-63; BNSF 2022 R-1, Schedule 700, pp. 62-63; **Exhibit 6B**.

Figure 9. BNSF's 2021 – 2022 System Fixed Cost per Mile¹³⁶

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Figure 10. BNSF's 2021 – 2022 On-Segment and Off-Segment Fixed Costs¹³⁷

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95. As explained above, the off-segment density used to calculate off-segment fixed costs is unique to the route (*i.e.*, origin and destination station) of each movement. As there are approximately {{ }} unique routes in BNSF's waybill data (after filtering for Mojave-Kern traversing movements),¹³⁸ manually estimating the off-segment density of each unique route is computationally infeasible.

96. Similar to my calculations for UP, I calculate route-specific off-segment densities using BNSF's density data for the {{ }} top routes that cover 70 percent of movements

¹³⁶ **Exhibit 6B.**

¹³⁷ **Exhibit 9B.**

¹³⁸ "Identify Top Routes and Generate Exhibit 8 Output.R," Mathur Workpaper 6.04.

processed through URCS (selected based on rank by waybill count, starting with the highest waybill count route) and 40 percent of all revenue on movements processed through URCS (selected based on rank by revenue, starting with the highest revenue route).^{139, 140} For movements on all other routes, I assume the off-segment density is equal to the annual average density (weighted by movement count) of the top routes. **Exhibit 8B** summarizes the off-segment density assumptions for movements on each top route and the weighted average assumption applied to all other routes. I also conduct sensitivity calculations to assess the impact of the assumption that the off-segment density of movements on non-top routes is equivalent to the weighted average density of the top routes.¹⁴¹

e. Estimates of Mojave-Kern Line revenue and earnings for BNSF traffic

97. To estimate BNSF's line earnings attributable to the Mojave-Kern Line, I perform calculations similar to my calculations for UP's line earnings, described in **Section VI.A.1.e**.¹⁴²

¹³⁹ There is an overlap of {{ }} routes between the {{ }} most common routes by waybill count and {{ }} highest revenue-generating routes and as such, I calculate route-specific off-segment density for a total of {{ }} top routes. I selected a lower 40 percent threshold for the top revenue routes, because calculating densities for routes covering 70 percent of revenue would have required manual computation of an additional 93 routes. "Identify Top Routes and Generate Exhibit 8 Output.R," Mathur Workpaper 6.04.

¹⁴⁰ **Exhibit 8B.**

¹⁴¹ In **Exhibit 10B**, I present my calculations of BNSF's earnings attributable to the Mojave-Kern Line under the ATC method, assuming that the off-segment density of movements on non-top routes is equivalent to the weighted average density of the top routes. In **Exhibit 11B**, I conduct sensitivity calculations to assess the impact of this assumption (that the off-segment density of movements on non-top routes is equivalent to the weighted average density of the top routes). I perform a low and high sensitivity scenario, which assumes the off-segment density of the non-top routes is equal to the 10th and 90th percentile off-segment density of the top routes each year, respectively. BNSF's Mojave-Kern line earnings are {{ }} under the low sensitivity scenario, and {{ }} under the high sensitivity scenario.

¹⁴² In particular, I allocate on-segment revenue for each movement by multiplying the movement's total net revenue by the proportion of average total cost that I estimate to be on-segment. For some movements, this yields an allocated on-segment revenue that is below the allocated on-segment variable costs. For these movements, I adjust the on-segment revenue to be equal to the net revenue of the movement multiplied by the proportion of on-segment to total variable costs. I perform this adjustment for {{ }} of movements. After this adjustment, {{ }} of movements still have on-segment revenue below on-segment

However, when calculating the operating expenses that are deducted from the revenue allocated to the Mojave-Kern Line, I allocate UP's operating expenses to calculate BNSF's on-segment fixed costs, and BNSF's operating expenses to calculate BNSF's on-segment variable costs.¹⁴³

This is because, as explained above, I apply UP's system-wide URCS fixed costs to calculate the on-segment fixed costs associated with BNSF's traffic since UP is the owner of the Mojave-Kern Line and its economics therefore better reflect the on-segment fixed costs.

98. In **Figure 11**, I summarize my estimates of the line earnings allocated to the Mojave-Kern Line, before and after adjusting to gross-up for waybills that were excluded from my analysis because they could not be run through URCS.

Figure 11. BNSF's 2021 – 2022 Mojave-Kern Line Earnings (Deducting Operating Expenses)¹⁴⁴

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variable cost. "BNSF ATC Calculations (Baseline Density).R," Mathur Workpaper 7.03. This adjustment has been recognized by the STB in past trackage rights cases, as described in **Section V.A.1**.

¹⁴³ Specifically, I calculate the total on-segment operating expenses as the sum of: (1) BNSF's on-segment fixed costs, divided by UP's system-wide URCS total costs, multiplied by UP's operating expenses from its 10-Ks, and (2) BNSF's on-segment variable costs, divided by BNSF's system-wide URCS total costs, multiplied by BNSF's operating expenses from its 10-Ks. See **Exhibit 10B**.

¹⁴⁴ **Exhibit 10B**.

B. Multipliers

99. In this section, I discuss my calculation of an appropriate multiplier to apply to line earnings. As discussed in **Section V.A.1.b**, a multiplier converts the current earnings generated by the trackage rights line into a valuation. Past trackage rights cases have relied on two approaches to calculate a multiplier: a market-based multiplier based on observable market data and a multiplier based on the inverse of the WACC of the railroad industry. In this section, I first explain why a market-based multiplier is more appropriate in this matter as a matter of economics. I then summarize my calculation of a market-based multiplier using historical data from 2021 and 2022.

1. A market-based multiplier is more appropriate than an inverse cost of capital multiplier

100. The inverse cost of capital multiplier is the inverse of the railroad industry's WACC (*i.e.*, $1/\text{WACC}$).¹⁴⁵ Mathematically, an inverse cost of capital multiplier assumes that: (i) the current line-specific earnings will remain constant (*i.e.*, there will be no growth) and (ii) the industry's WACC best represents the owner's cost of capital.¹⁴⁶ The assumption that the line earnings (in nominal terms) will remain constant is inconsistent with real-world evidence—UP's and BNSF's system-wide profits grew by compound annual rates of 3.2 and 2.9 percent per year respectively in the decade between 2013 and 2022.¹⁴⁷

¹⁴⁵ An inverse cost of capital multiplier was used in the CE method in NECR-PAS. *See* NECR-PAS Decision, p. 16 (“Here, PAS’s approach is appropriate because the cost of capital reflects the required return on investment for the industry... Accordingly, the Board will accept PAS’s use of the industry cost of capital in its CE calculation.”).

¹⁴⁶ *See* footnote 6161.

¹⁴⁷ UP’s operating income was \$7.45 billion and \$9.92 billion in 2013 and 2022, respectively. BNSF’s operating income was \$6.67 billion and \$8.60 billion in 2013 and 2022, respectively. UP, Form 10-K for the year ended December 31, 2013, February 7, 2014 (“UP 2013 10-K”), p. 50; UP 2022 10-K, p. 44; BNSF, Form 10-K for

101. In contrast, market-based multipliers are based on observable market data and therefore reflect the market's expectations of future growth, risk, the macro environment, competition, and other factors.¹⁴⁸ These multipliers are calculated as a ratio of observed market value (*e.g.*, stock price, acquisition price, etc.) and a financial metric such as earnings or revenue,¹⁴⁹ which is then used “to value assets based on how similar assets are currently priced in the market.”¹⁵⁰ One of the most commonly used market-based multipliers is an earnings multiple, which represents the present-day value (*i.e.*, price) the market would be willing to pay for one dollar of current earnings generated by the asset.¹⁵¹ In fact, past trackage rights cases have used market-based multipliers based on an observed market value divided by EBIT.¹⁵²

102. I consider the interest rental base calculated using a market-based multiplier to be most appropriate from an economic perspective, because market-based multipliers reflect the market's expectation of future growth, whereas the inverse cost of capital multiplier implicitly assumes no growth. The growth in total profitability of UP and BNSF between 2013 and 2022 suggests that it would not be reasonable to assume that the profitability of the line, and therefore

the year ended December 31, 2013, March 3, 2014 (“BNSF 2013 10-K”), p. 15; BNSF 2022 10-K, p. 19; “Average Earnings Growth.xlsx,” Mathur Workpaper 8.13.

¹⁴⁸ Koller et al., 2020, p. 257 (“By comparing the [market] multiple of one company versus another, you can examine how the market perceives the company's future relative to other companies.”); Damodaran (2012), p. 508 (“These multiples are ultimately determined by the same fundamentals that determine the value of a firm in a discounted cash flow model—expected growth, risk, and cash flow potential. Firms with higher growth, lower risk, and higher payout ratios, other things remaining equal, should trade at much higher multiples of earnings than other firms. To the extent that there are differences in fundamentals across countries, across time, and across companies, the multiples will also be different.”).

¹⁴⁹ Damodaran (2012), p. 453 (“The first is that, to value assets on a relative basis, prices have to be standardized, usually by converting prices into multiples of earnings, book values, or sales.”).

¹⁵⁰ Damodaran (2012), p. 453.

¹⁵¹ Damodaran (2012), pp. 454 (“Earnings Multiples[:] One of the more intuitive ways to think of the value of any asset is as a multiple of the earnings that asset generates.”), 468 (“Earnings multiples remain the most commonly used measures of relative value.”).

¹⁵² *See, e.g.*, SSW II, pp. 680-681; Conrail I, p. 965.

the magnitude of line earnings, will not grow in the future.¹⁵³ As described in the following sections, I use UP's company-level EV/EBIT multiple which represents the average value of one dollar of earnings for UP's entire system, a reasonable proxy for the UP-owned Mojave-Kern Line.

2. *Estimates of multipliers for 2021-2022*

103. I calculate UP's company-level EV/EBIT multiple using UP's publicly available data. First, I calculate UP's year-end EV (*i.e.*, the numerator of the EV/EBIT multiple) for 2021 and 2022 by adding UP's market capitalization (*i.e.*, the market value of equity calculated as share price times total number of shares outstanding), total debt, and total minority interest, and then subtracting cash and short-term investments.¹⁵⁴ I then calculate UP's annual EBIT for the same years.¹⁵⁵ Finally, I divide each year's EV by the corresponding EBIT to calculate UP's EV/EBIT multiples, which are then scaled by a "roadway apportionment factor" to reflect only the value derived from road assets (but not equipment).¹⁵⁶ **Figure 12** summarizes UP's EV/EBIT

¹⁵³ UP 2013 10-K, p. 50; UP 2022 10-K, p. 44; BNSF 2013 10-K, p. 15; BNSF 2022 10-K, p. 19.

¹⁵⁴ Damodaran (2012), p. 501 ("The enterprise value to EBITDA multiple relates the total market value of the firm, net of cash, to the earnings before interest, taxes, depreciation, and amortization of the firm: $EV/EBITDA = (\text{Market value of equity} - \text{Market value of debt} - \text{Cash})/EBITDA$ [...] Why is cash netted out of firm value for this calculation? Since the interest income from the cash is not counted as part of the EBITDA, not netting out the cash will result in an overstatement of the EV-to-EBITDA multiple. [...] With minority holdings, you can either subtract the estimated value of the holdings from the numerator or add the portion of the EBITDA of the subsidiary to the denominator."). I use debt values I obtain from S&P Capital IQ as a proxy for market value of debt. See **Exhibit 12**.

¹⁵⁵ **Exhibit 13**.

¹⁵⁶ **Exhibit 14** and **Exhibit 15**. The roadway apportionment factor is the ratio of the value of the railroad's road property to its road property and equipment from its R-1 form. A roadway apportionment factor has been used in past trackage rights cases. SSW II, pp. 677-678; Conrail I, p. 965. From a valuation perspective, the market valuation used in the numerator of a multiple and the earnings used in the denominator must correspond to the same operations. If an adjustment factor is used to apportion the enterprise value between the valuation of road assets and equipment, then a similar factor should be applied to apportion the earnings. Applying an adjustment factor only to the enterprise value assumes that railroad earnings are solely derived from road assets and not also from equipment. I apply the roadway apportionment factor here for consistency with past precedent, but I note that from a valuation perspective, the multiple is a unitless means of converting earnings into value; as

multipliers for 2021 and 2022.¹⁵⁷ UP's EV/EBIT multiples are in line with contemporary EV/EBIT multiples based on data from (publicly traded) comparable railroad companies and the December 2021 acquisition between Canadian Pacific and Kansas City Southern.¹⁵⁸

Figure 12. UP's 2021 – 2022 EV/EBIT Multipliers¹⁵⁹

<u>Year</u>	<u>Enterprise Value</u> <u>(\$B)</u>	<u>EBIT</u> <u>(\$B)</u>	<u>Roadway</u> <u>Apportionment Factor</u>	<u>EBIT</u> <u>Multiplier</u>
2021	\$ 184.9	\$ 9.6	82%	15.7
2022	\$ 159.7	\$ 10.3	82%	12.6

C. Estimates of interest rental base

104. To calculate the interest rental base, I multiply the Mojave-Kern Line earnings by an earnings multiplier. **Figure 13** shows the interest rental base for the Mojave-Kern Line based on the EBIT multipliers, and the applicable Mojave-Kern Line total line earnings annually for 2021 and 2022.

such, it would be appropriate to apply an unadjusted multiplier to the Mojave-Kern Line earnings to arrive at a valuation of the line as a going concern.

¹⁵⁷ As referenced, the multiplier calculated using the inverse cost of capital multiplier (*i.e.*, 1/WACC) would be approximately 7.0 for both 2021 and 2022. *See Exhibit 18.* As discussed above, the inverse cost of capital is not an appropriate multiplier to value the Mojave-Kern Line because it does not account for the Mojave-Kern Line's future earnings growth.

¹⁵⁸ **Exhibit 16.**

¹⁵⁹ **Exhibit 15.**

Figure 13. 2021 – 2022 Interest Rental Base for the Mojave-Kern Line¹⁶⁰

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D. Estimates of annual interest rental payment*1. Cost of capital*

105. To estimate UP’s breakeven return on investment for its investment in and ownership of the Mojave-Kern Line, the cost of capital is applied to the value of the line (*i.e.*, the interest rental base). As explained in **Section V.B**, the Board has set a precedent for using an industry-wide railroad pre-tax cost of capital. The Board publishes a cost of capital for a “composite railroad” defined as Class I carriers publicly traded on the New York Stock Exchange or Nasdaq Stock Market that: (i) paid dividends, (ii) owned a majority of rail assets, and (iii) had a sufficient debt rating.¹⁶¹ UP meets the definition of a composite railroad and as such, I apply the industry-wide railroad cost of capital published by the Board.

106. Because interest rental payments are taxable income for UP, I convert the Board’s published cost of capital to a pre-tax basis. The cost of debt is already on a pre-tax basis, and therefore I need not make any adjustments to the estimated cost of debt.¹⁶² I calculate the pre-tax

¹⁶⁰ **Exhibit 17.**

¹⁶¹ STB 2022 Industry Cost of Capital, p. 3.

¹⁶² The Board calculates the cost of debt based on market-value yields for major railroad companies. These yields are already on a pre-tax basis because they represent the rate of return on major railroad companies’ debt *before*

cost of equity from the post-tax cost of equity by applying a blended tax rate based on UP's federal and California tax rates.¹⁶³ I weight the pre-tax costs of debt and equity by the capital structure of the railroad industry. **Figure 14** shows my calculations of the pre-tax cost of capital by year.

Figure 14. California Pre-Tax Cost of Capital, 2021 – 2022¹⁶⁴

<u>Year</u>	<u>Pre-Tax Cost of Capital</u>
2021	14.2%
2022	14.4%

2. *Usage factor*

107. BNSF is required to compensate UP for the cost of capital associated with BNSF's usage of the line. As described in **Section V.C**, I calculate the usage factor based on the proportion of BNSF traffic to total line traffic on a car mile basis. To calculate the usage factor for BNSF, I use the monthly usage data provided by UP which specifies the car miles for UP and BNSF across the Mojave-Kern Line. I calculate an annual usage factor for BNSF based on BNSF's relative usage of the line based on car miles. **Figure 15** shows the usage factor by year.

accounting for the deductibility of interest expense. *See, e.g.*, STB 2022 Industry Cost of Capital, p. 4 (“[The Association of American Railroad’s] cost-of-debt figure is based on the market-value yields of the major forms of long-term debt instruments for the railroad holding companies used in the composite.”).

¹⁶³ The federal income tax rate has been a flat 21 percent since 2018. “Historical U.S. Federal Corporate Income Tax Rates & Brackets, 1909-2020,” Tax Foundation, available at <https://taxfoundation.org/data/all/federal/historical-corporate-tax-rates-brackets/>, accessed on April 11, 2024. The California corporate income tax rate of 8.84 percent is applicable given the Mojave-Kern Line's location in California. “Taxes in California,” Tax Foundation, available at <https://taxfoundation.org/location/california/>, accessed on April 11, 2024. UP can deduct state corporate income taxes paid against federal taxable income, creating a blended rate of 27.98 percent. Garrett Watson, “Combined Federal and State Corporate Income Tax Rates in 2022,” Tax Foundation, available at <https://taxfoundation.org/data/all/state/combined-federal-state-corporate-tax-rates-2022/>, accessed on April 11, 2024; **Exhibit 18**.

¹⁶⁴ **Exhibit 18**.

Figure 15. Annual Mojave-Kern BNSF Usage Factor, 2021 – 2022¹⁶⁵

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3. *Interest rental payment calculation*

108. Finally, I calculate the interest rental payment on an annual basis and on a per car mile basis by multiplying these components: (i) the interest rental base, (ii) the cost of capital, and (iii) the usage factor. I then divide the annual interest rental payment by the BNSF's total car miles (which includes both empty and loaded cars) to arrive at an interest rental rate on a car mile basis. Charging the tenant interest rental payments on a per car mile basis is reasonable from an economic perspective because it incentivizes the efficient use of the line by penalizing the tenant for empty car miles run on the track. **Figure 16** summarizes the interest rental payment on an annual basis and a per car-mile basis.

¹⁶⁵ Exhibit 19.

Figure 16. Interest Rental Payment, Annual and per Car Mile¹⁶⁶

<u>Year</u>	<u>Annual Payment (\$M)</u>	<u>Payment Per Car Mile (\$ nominal)</u>	<u>2023 Inflation Adjustment</u>	<u>Payment Per Car Mile (\$ 2023)</u>
2021	\$ 70.57	\$ 1.46	23.79%	\$ 1.81
2022	\$ 56.76	\$ 1.24	14.88%	\$ 1.43
Average				\$1.62

109. The annual and per car mile payments shown in the first two columns of **Figure 16** are in nominal dollars. I use the Annual Index of Chargeout Prices and Wage Rates – “Material prices, wage rates and supplements combined (excluding fuel)” published by the Association of American Railroads (“AAR”) for the Western District to convert the nominal amounts to the real 2023 amounts, and then calculate a simple average of these inflation-adjusted payment per car mile values.¹⁶⁷ This yields an interest rental payment of \$1.62 per car mile for 2023.¹⁶⁸ Going forward, the payment per car mile should be adjusted for inflation using the Western District Annual Index of Chargeout Prices and Wage Rates – “Material prices, wage rates and supplements combined (excluding fuel).”¹⁶⁹

¹⁶⁶ **Exhibit 20.**

¹⁶⁷ I use the Western District annual index because the Mojave-Kern Line is located in the Western United States. I use the “Material prices, wage rates and supplements combined (excluding fuel)” index consistent with the Board’s decision in NECR-PAS. *See, e.g.*, NECR-PAS Decision, pp. 19, 41.

¹⁶⁸ **Exhibit 20.**

¹⁶⁹ In a past trackage rights matter, the Board has determined that the interest rental payment should also be adjusted going forward to reflect the most recent cost of capital. *See* NECR-PAS Decision, p. 19 (“The trackage rights payments will be adjusted annually for both inflation and changes in the Board’s annual railroad industry cost-of-capital determination[.]”). Because the Board’s 2023 railroad industry cost of capital has not been published, I am not able to perform this adjustment. I reserve the right to update my interest rental payment estimates when the Board’s 2023 railroad cost of capital is available.

VII. THE CE METHOD RESULTS IN A REASONABLE INTEREST RENTAL PAYMENT

110. In this section, I assess whether the interest rental payments I have calculated based on the CE method are reasonable based on the economic value of BNSF's Mojave-Kern traversing traffic. I then compare the interest rental payment calculated using the CE method to BNSF's rental payments under the current trackage rights agreement. Finally, I address potential circularity concerns related to CE method calculations.

A. The CE method results in interest rental payments that are reasonable relative to BNSF's Mojave-Kern traversing traffic

111. Interest rental payments in the range of \$57 to \$71 million per year are reasonable and appropriate from an economic perspective based on the economic value BNSF receives from access to the Mojave-Kern Line.

112. *First*, the total annual earnings on traffic that traverses the Mojave-Kern Line inform the overall economic associated with access to the Mojave-Kern Line. BNSF's Mojave-Kern traversing traffic is largely comprised of traffic moving between {{

}}.¹⁷⁰

BNSF's *total* earnings from this traffic (measured as the total revenue from each movement less an estimate of operating expenses) were {{ }} in 2021 and 2022, respectively.¹⁷¹ BNSF's *line* earnings during this period, approximately {{

}} per year in 2021 and 2022, respectively as shown in **Figure 11**, represent {{

¹⁷⁰ **Exhibit 8B.**

¹⁷¹ **Exhibit 21.**

}} of BNSF's total earnings from this traffic. These line earnings are estimated using the ATC method, which allocates line earnings across the movement's entire journey on the basis of average total cost, which is roughly proportional with distance.¹⁷² From an economic perspective, however, line earnings and the underlying inputs into estimating line earnings such as costs and distance do not fully encompass the value associated with access to the line. BNSF's *total* annual earnings are a better indicator of the complete economic value BNSF derives from its access to the Mojave-Kern Line and the ensuing earnings to BNSF from its Mojave-Kern traversing traffic. The value of a specific input to a firm may be much greater than the cost to acquire that input, especially if the input lacks close substitutes and access to it is constrained. For example, a canal like the Panama Canal or Suez Canal allows cargo ships to avoid substantially longer and more arduous routes when transporting goods for international trade. Although these canals might make up a small portion of a ship's total journey in terms of distance—and the cost to operate the canal may not be particularly large relative to the costs the cargo ship incurs over its entire journey—access to the canal is very valuable to cargo shippers: it is a critical piece of infrastructure that enables the shippers to move large volumes of cargo across distances substantially longer than the length of the canals.¹⁷³

¹⁷² The distribution of the mileage ratio (the ratio of on-segment mileage to off-segment mileage) demonstrates that the Mojave-Kern line represents {{ }} of the total distance of most BNSF movements. For {{ }} percent of Mojave-Kern traversing movements, the mileage ratio is {{ }}. See **Exhibit 3B**.

¹⁷³ The Panama Canal is 50 miles long and allows ships travelling between the Caribbean Sea and the Pacific Ocean to traverse through Central America. Without access to this canal, ships would instead have to travel a much longer distance around the southern tip of South America or north of Canada. Burton L Gordon, Norman J Padelford, Aileen Cho, Wayne D. Bray and William E. Worthington, "Panama Canal," Britannica, available at <https://www.britannica.com/topic/Panama-Canal>, accessed on April 20, 2024; Theo Notteboom, Athanasios Pallis and Jean-Paul Rodrigue, *Port Economics, Management and Policy*, Ed., Routledge, 2022 ("Chapter 1.6 - Interoceanic Passages: Main Routing Alternatives between the Pacific and Atlantic"). The Suez Canal is 120 miles long and connects the Mediterranean Sea to the Red Sea. Without access to this canal, ships would instead have to travel a significantly longer distance around the southern tip of Africa. Charles Gordon Smith and William B. Fisher, "Suez Canal," Britannica, available at <https://www.britannica.com/topic/Suez-Canal>,

113. Access to the Mojave-Kern Line is important for BNSF. As the ICC recognized in its 1967 order, Mojave-Kern “trackage is an essential link in [Santa Fe’s] transcontinental route.”¹⁷⁴ I understand that there is no alternative route on BNSF’s current system that it could use to move the double stack intermodal traffic that currently traverses the Mojave-Kern Line: “BNSF has no alternate route it could use to move double-stack intermodal traffic from key markets in Northern California to connect up with its highly efficient Southern Transcon route that runs from Los Angeles to Chicago, with branches serving such key points as Phoenix, the Mexican Gateway at El Paso, Dallas/Ft. Worth, and Memphis.”¹⁷⁵ I also understand that access to the Mojave-Kern Line is critical to move all traffic, both intermodal and non-intermodal, along certain key parts of BNSF’s network: “[t]he [Mojave-Kern] Line is also critical to BNSF’s ability to offer competitive service for all its traffic moving in the I-5 Corridor: BNSF cannot link the Pacific Northwest and their Northern Transcon with Southern California and their Southern Transcon and without operating over the Line.”¹⁷⁶ See **Figure 17** and **Figure 18**.¹⁷⁷ I understand that if BNSF no longer had access to the Mojave-Kern Line, it would likely need to make substantial investments in constructing its own line between Kern Junction and Mojave to

accessed on April 20, 2024; Rob Picheta, “Why the Suez Canal is so important – and why its blockage could be so damaging,” CNN, available at <https://www.cnn.com/2021/03/26/africa/suez-canal-importance-explainer-scli-intl/index.html>, accessed on April 20, 2024.

¹⁷⁴ 1967 Agreement, p. 377.

¹⁷⁵ Hughes VS, p. 3.

¹⁷⁶ Hughes VS, p. 3.

¹⁷⁷ As shown in **Figure 17** and **Figure 18** the Mojave-Kern Line is the only intermodal route that connects the portion of BNSF’s network that is north of the Mojave-Kern Line (e.g., Stockton, Oakland, Richmond) to the rest of BNSF’s network. Absent access to the Mojave-Kern Line, any traffic that moves between the portion of BNSF’s network that is north of the Mojave-Kern Line and the rest of its network would be stranded. BNSF’s track that runs north from Keddie (north of Stockton) to the Pacific Northwest can only accommodate non-intermodal traffic.

continue moving the traffic that otherwise would have traversed the Mojave-Kern Line.¹⁷⁸

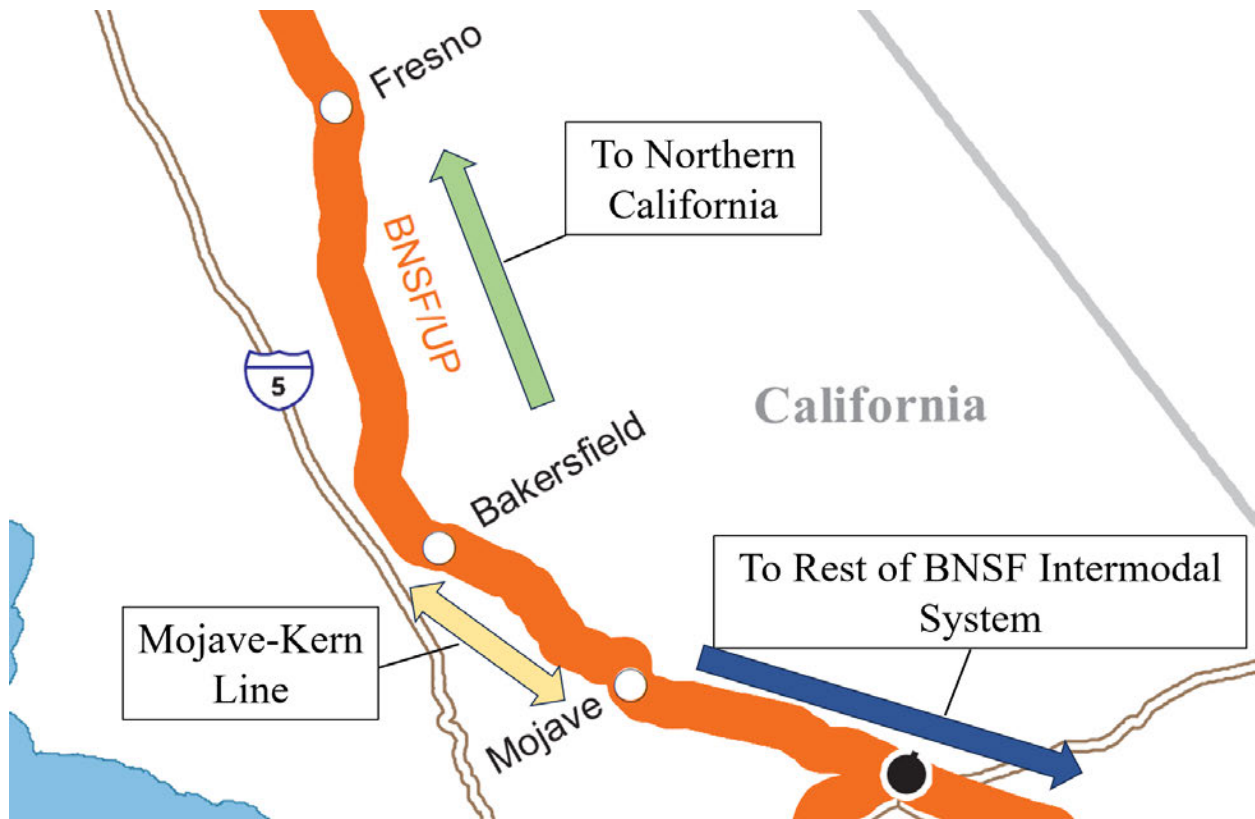
Without access to alternative routes for intermodal traffic, BNSF may forgo its earnings on double stack intermodal traffic that would otherwise traverse the Mojave-Kern Line.

Figure 17. Partial Map of BNSF's Network¹⁷⁹



¹⁷⁸ Hughes VS, p. 3 (“In 1967, the ICC recognized that ATSF would have needed to build its own line between Kern Junction and Mojave but for its trackage rights agreement with SP. Nothing about the situation has changed.”).

¹⁷⁹ BNSF, “BNSF Intermodal Map,” available at <https://www.bnsf.com/bnsf-resources/pdf/ship-with-bnsf/maps-and-shipping-locations/intermodal-map-large.pdf>, accessed on March 29, 2024. Routes that are able to move

Figure 18. Stylized Partial Map of BNSF's Intermodal Network¹⁸⁰

114. *Second*, the interest rental payment correctly reflects BNSF's consumption of UP's asset and should not be constrained by BNSF's line earnings. Under the CE method, the valuation of the Mojave-Kern Line as an economically productive asset accounts for the line's ability to generate earnings for both the landlord and the tenant; to the extent that the tenant's line earnings per car mile are lower than the landlord's {{ }}, the interest rental payment will be high relative to the tenant's earnings simply due to the mechanics of the

both intermodal and non-intermodal traffic are shown in dark orange. Routes that are only able to move non-intermodal traffic are shown in light orange. "Keddie" location indicator was added to the original map for emphasis.

¹⁸⁰ BNSF, "BNSF Intermodal Map," available at <https://www.bnsf.com/bnsf-resources/pdf/ship-with-bnsf/maps-and-shipping-locations/intermodal-map-large.pdf>, accessed on March 29, 2024.

CE method calculation. This is neither surprising nor inappropriate as a matter of economics because the value of the asset that the tenant is paying to access must be based on its *overall* ability to generate earnings, regardless of how those earnings are distributed between the landlord and tenant. As a hypothetical example, if BNSF earned negative or zero line earnings on the Mojave-Kern Line, it would not be reasonable to infer that BNSF should make zero interest rental payments to UP for use of an economically productive asset owned by UP. UP should not be penalized if BNSF does not profit on its portion of the traffic in proportion to the line's economic potential as an asset; ultimately what matters is that BNSF continues to use an economic asset owned by UP and must compensate UP accordingly.

B. BNSF's interest rental payments under the current agreement are economically inappropriate and have resulted in a windfall to BNSF

115. Based on the CE method, an economically appropriate interest rental payment reflecting the value of the Mojave-Kern Line as an economically productive asset would have been \$71 million and \$57 million per year for 2021 and 2022 respectively.¹⁸¹

116. These estimates are based on a CE method that has been endorsed by the Board in SSW Compensation and numerous other trackage rights matters. UP received \$2.1 million and \$467,500 in interest rental payments from BNSF in 2022 and 2023 respectively under its existing trackage rights agreement.¹⁸² The current interest rental payments are less than 4 percent of the interest rental payments under the CE method; they are not economically appropriate, do not sufficiently compensate UP, and have resulted in an economic windfall to BNSF. As discussed in **Section IV.B**, an interest rental payment that is too low relative to the economic valuation of the

¹⁸¹ **Exhibit 20.**

¹⁸² *See Section III.*

line can distort the competitive position for both landlord and tenant and lead to economically undesirable outcomes. The substantial gap between BNSF's current interest rental payment and an economically appropriate payment highlights the magnitude of the subsidy that BNSF has received and is currently receiving from UP.¹⁸³ BNSF has been and is continuing to obtain use of the line, an asset that UP owns, without adequately compensating UP for the full cost of its investment in that asset. This subsidy gives BNSF an unfair advantage relative to UP, because BNSF's costs for using the line are artificially low. BNSF's high share of traffic relative to UP's traffic on the Mojave-Kern Line further exacerbates the magnitude of the windfall to BNSF and the disadvantage to UP.¹⁸⁴

C. The CE method appropriately accounts for the line earnings of UP and BNSF while avoiding "circularity"

117. As discussed in **Section V**, under the CE method, it is necessary to account for the full economic value of the line as a going concern, which in the case of a pre-existing trackage rights agreement includes line earnings from both the landlord and the tenant.¹⁸⁵ However, as the Board has noted in previous trackage rights matters, it is important to avoid a situation in which the determination of an appropriate forward-looking interest rental payment under the CE method is affected by the current level of the interest rental payment under the pre-existing trackage rights agreement, an issue referred to as "circularity."¹⁸⁶ In this section, I explain why

¹⁸³ See, e.g., NECR-PAS Decision, p. 8 ("Retaining a trackage rights fee substantially lower than the number determined under SSW Compensation—less than half of the appropriately calculated fee, which is discussed below—would actually stand in the way of competitive parity, because it would require one carrier to subsidize its competitor's operations significantly.").

¹⁸⁴ See **Section III**.

¹⁸⁵ ATSF II, p. 3 ("Therefore, line-specific earnings must include the earnings of both carriers. Excluding ATSF's traffic in computing the multiplier would omit more than half of the total traffic on the line.").

¹⁸⁶ See, e.g., ATSF II, p. 3; see also, A&M I, p. 625; NECR-PAS Decision, p. 17.

my calculations of both UP's line earnings and BNSF's line earnings avoid potential circularity problems.

1. Circularity from inclusion of the interest rental payment in UP's line earnings

118. The Mojave-Kern Line currently generates two forms of income for UP: (i) earnings from its own movements across the line and (ii) trackage rights income, which includes income from interest rental payments, payments for incremental variable costs, and for maintenance and operating costs.¹⁸⁷ For BNSF, earnings are solely generated from movements across the line. My estimates of UP's line earnings are based on UP's revenues from customers as reported in its waybill data, and do not include the interest rental payments that UP receives from BNSF under the existing trackage rights agreement.¹⁸⁸ As such, per the Board's decision in prior proceedings,¹⁸⁹ my calculation of the interest rental payment is not subject to circularity concerns from inclusion of the interest rental payment in the landlord's line earnings.

119. For example, in NECR-PAS, the landlord, NECR argued that the calculation of line earnings under the CE method should include all income generated by the line, including earnings generated by both railroads from line-specific movements *and* trackage rights

¹⁸⁷ See ATSF III, pp. 2-4; 1967 Agreement, pp. 394-395.

¹⁸⁸ Furthermore, in calculating the cost metric to deduct from line revenues for Mojave-Kern, I remove trackage rights income from UP's earnings by excluding Other Income. This adjustment ensures that any income that UP receives from trackage rights agreements across its system is excluded from my line earnings estimates. This step was taken by PAS's expert in the NECR-PAS matter as well, though I note that in that matter, the trackage rights line was a much larger portion of the landlord's system than is the case in the current matter, meaning that the impact of this adjustment is less significant here. As of December 2019, NECR owned or leased 384 miles of railroad line. New England Central Railroad, "New England Central Railroad Home," available at <https://www.gwrr.com/necr/>, accessed on March 31, 2024; NECR-PAS Decision, p. 1 ("[T]he Board instituted a proceeding to establish new terms and conditions for the trackage rights of Pan Am southern LLC (PAS) over a New England Central Railroad, Inc. (NECR) railroad line, extending approximately 72.8 miles from White River Junction, Vt., to East Northfield, Mass.").

¹⁸⁹ NECR-PAS Decision, pp. 15, 17.

income.¹⁹⁰ However, as the Board previously noted in a decision related to the Mojave-Kern Line, inclusion of current trackage rights income (*i.e.*, the output of the CE method) in line earnings (*i.e.*, an input to the CE method) would mechanically be circular.¹⁹¹ Moreover, in NECR-PAS, the tenant, PAS noted that if the trackage rights income is included *in addition* to the tenant's line earnings, it would also double count the return that could be generated from the line.¹⁹² The Board affirmed this concern with its decision in NECR-PAS, which calculated the landlord's line earnings as the earnings generated by movements across the line, excluding any trackage rights income.¹⁹³

2. *Circularity in the calculation of BNSF's line earnings*

120. The potential circularity problem in estimating line earnings from the tenant's traffic is similar. For BNSF's traffic, it would be circular to estimate line earnings by calculating BNSF's revenues from its waybill data, and then subtracting the *actual incurred* costs of the trackage rights payments BNSF made to UP (along with other costs attributable to the line.) When deducting line expenses from line revenues, I do not separately subtract the interest rental payments that UP receives from BNSF under the existing trackage rights agreement. Instead, I

¹⁹⁰ New England Central Railroad, Inc. - Trackage Rights Order - Pan Am Southern LLC, Finance Docket No. 35842, January 23, 2017 ("NECR Rebuttal"), PDF pp. 92-93.

¹⁹¹ ATSF II, p. 3.

¹⁹² See New England Central Railroad, Inc. - Trackage Rights Order - Pan Am Southern LLC, Finance Docket No. 35842, February 22, 2017 ("PAS Surrebuttal"), PDF p. 103 ("Finally, PAS earnings generated on the trackage segments are included in the CE and separately adding trackage payments, which are already implicit in the PAS earnings determination, would introduce a double-count.").

¹⁹³ NECR-PAS Decision, p. 15, 17. ("The Board also agrees with PAS's arguments against factoring Amtrack payments and PAS trackage rights fees into NECR's earnings... and PAS earnings generated on the trackage rights segments are already included in the CE calculation, so that adding these payments again would double count them... Moreover, PAS is correct that adding the fees paid by PAS under the current trackage rights arrangement to a valuation determining fees going forward would be circular, with PAS's payment of trackage rights fees increasing the level of PAS's trackage rights fees.").

estimate BNSF's costs based on BNSF's overall operating expenses (for on-segment variable costs) and UP's overall operating expenses (for on-segment fixed costs) from the railroads' 10-Ks and allocate them to the line on the basis of URCS total costs.¹⁹⁴ Therefore, the potential circularity concern of incorporating the current Mojave-Kern interest rental payment in the application of the CE method is avoided.

121. In NECR-PAS, the Board approved a methodology which applied the landlord's line earnings per car mile to the tenant's traffic to calculate line earnings.¹⁹⁵ However, such an analysis does not account for potential differences in the profitability of the landlord and the tenant's traffic, which may be idiosyncratic to each movement. For example, the revenue and line earnings of traffic along certain routes or for certain customers may inherently differ in terms of profitability. My analysis sidesteps any such potential concerns by using an estimate of BNSF's earnings attributable to the Mojave-Kern Line using BNSF's waybill revenue and BNSF's operating expenses under the ATC method. {{

}}¹⁹⁶

¹⁹⁴ See **Exhibit 9B**. The operating expenses in the BNSF 10-Ks include BNSF's interest rental payments across its system-wide joint facility agreements. However, the impact of these system-wide costs when allocated to the Mojave-Kern Line is small because BNSF's system-wide joint facility rent payments are only 0.06 percent of BNSF's operating expenses in 2021 and 2022. BNSF 2022 R-1, Schedule 410; BNSF 2021 R-1, Schedule 410; BNSF 2022 10-K, p. 13; BNSF, Form 10-K for the year ended December 31, 2021, February 28, 2022 ("BNSF 2021 10-K"), p. 13. "BNSF Joint Facility Rent.xlsx," Mathur Workpaper 8.14.

¹⁹⁵ NECR-PAS Decision, p. 15 ("PAS used NECR's earnings per car mile and extrapolated PAS earnings based on PAS's car miles.").

¹⁹⁶ See **Exhibits 10A and 10B**.

VERIFICATION

I, Divya Mathur, declare under penalty of perjury that the foregoing is true and correct.

Further, I certify that I am qualified and authorized to file this Verified Statement.

Executed on May 3, 2024.



Divya Mathur, Ph.D.
May 3, 2024

Exhibit 1

Mojave-Kern Density Relative to UP and BNSF System Average Density

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Underlying Workpaper: “Exhibit 1.xlsx,” Mathur Workpaper 8.01.

Exhibit 2A
Distribution of On-Segment Mileage for UP Movements
2021 - 2022

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Sources:

- [1] UP Waybill Data.
- [2] UP Event Data.
- [3] PCMiller.

Underlying Workpaper: “Exhibit 2,” Mathur Workpaper 8.02.

Exhibit 2B
Distribution of On-Segment Mileage for BNSF Movements
2021 - 2022

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Sources:

- [1] BNSF Waybill Data.
- [2] BNSF Event Data.
- [3] PCMiler.

Underlying Workpaper: “Exhibit 2,” Mathur Workpaper 8.02.

Exhibit 3A
Distribution of Mileage Ratio for UP Movements
2021 - 2022

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Sources:

[1] UP Waybill Data.

[2] UP Event Data.

[3] PCMiller.

Underlying Workpaper: "Exhibit 3.xlsx," Mathur Workpaper 8.03.

Exhibit 3B
Distribution of Mileage Ratio for BNSF Movements
2021 - 2022

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Sources:

- [1] BNSF Waybill Data.
- [2] BNSF Event Data.
- [3] PCMiller.

Underlying Workpaper: "Exhibit 3.xlsx," Mathur Workpaper 8.03.

Exhibit 4A
Calculation of Line Earnings Gross-Up for UP Waybills

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Sources:

[1] UP Waybill Data.

[2] UP Event Data.

[3] PCMiller.

[4] "Mojave Kern- Missing Tare Weights.xlsx," Mathur Workpaper 1.01.

Underlying Workpaper: "Exhibit 4.xlsx," Mathur Workpaper 8.04.

Exhibit 4B
Calculation of Line Earnings Gross-Up for BNSF Waybills

Sources:

- [1] BNSF Waybill Data.
- [2] BNSF Event Data.
- [3] PCMiller.

Underlying Workpaper: “Exhibit 4.xlsx,” Mathur Workpaper 8.04.

Exhibit 5A

Variable Costs Attributable to Mojave-Kern Line for UP under ATC Method

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Underlying Workpaper: “Exhibits 5, 9, 10, 21.xlsx,” Mathur Workpaper 8.05.

Exhibit 5B

Variable Costs Attributable to Mojave-Kern Line for BNSF under ATC Method

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Underlying Workpaper: “Exhibits 5, 9, 10, 21.xlsx,” Mathur Workpaper 8.05.

Exhibit 6A
UP System Fixed Cost Per Mile

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Underlying Workpaper: “Exhibit 6.xlsx,” Mathur Workpaper 8.06.

Exhibit 6B

BNSF System Fixed Cost Per Mile

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Underlying Workpaper: “Exhibit 6.xlsx,” Mathur Workpaper 8.06.

Exhibit 7

Mojave-Kern Fixed Cost Per GTM

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Underlying Workpaper: “Exhibit 7,” Mathur Workpaper 8.07.

Exhibit 8A
Summary of UP Route-Specific Off-Segment Density Calculations

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Sources:
[1] UP Density Data.
[2] UP Waybill Data.
[3] UP Event Data.
[4] PCMiller.

Underlying Workpaper: “Exhibit 8.xlsx,” Mathur Workpaper 8.08.

Exhibit 8B
Summary of BNSF Route-Specific Off-Segment Density Calculations

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Sources:

- [1] BNSF Density Data.
- [2] BNSF Waybill Data.
- [3] BNSF Event Data.
- [4] PCMiller.

Underlying Workpaper: “Exhibit 8.xlsx,” Mathur Workpaper 8.08.

Exhibit 9A

Allocated Costs and Revenue Attributable to Mojave-Kern Line for UP under ATC Method

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Underlying Workpaper: “Exhibits 5, 9, 10, 21.xlsx,” Mathur Workpaper 8.05.

Exhibit 9B

Allocated Costs and Revenue Attributable to Mojave-Kern Line for BNSF under ATC Method

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Underlying Workpaper: “Exhibits 5, 9, 10, 21.xlsx,” Mathur Workpaper 8.05.

Exhibit 10A

Earnings Attributable to Mojave-Kern Line for UP under ATC Method

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Underlying Workpaper: “Exhibits 5, 9, 10, 21.xlsx,” Mathur Workpaper 8.05.

Exhibit 10B

Earnings Attributable to Mojave-Kern Line for BNSF under ATC Method

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Underlying Workpaper: “Exhibits 5, 9, 10, 21.xlsx,” Mathur Workpaper 8.05.

Exhibit 11A

Earnings Attributable to Mojave-Kern Line for UP Under Alternative Off-Segment Density Assumptions

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Underlying Workpaper: “Exhibit 11,” Mathur Workpaper 8.09.

Exhibit 11B

Earnings Attributable to Mojave-Kern Line for BNSF Under Alternative Off-Segment Density Assumptions

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Underlying Workpaper: “Exhibit 11,” Mathur Workpaper 8.09.

Exhibit 12
UP Enterprise Value

	2021 (\$B)	2022 (\$B)
[A] Market Capitalization	\$154.4	\$125.7
[B] Total Debt	\$ 31.5	\$ 35.0
[C] Cash and Short Term Investments	\$ 1.0	\$ 1.0
[D] Total Minority Interest	\$ 0.0	\$ 0.0
[E] Enterprise Value	\$184.9	\$159.7

Notes and Sources:

- [A] From S&P Capital IQ. Market Capitalization is as of the reporting date for UP's annual financial statements.
- [B] From S&P Capital IQ. Total Debt is as of the reporting date for UP's annual financial statements.
- [C] From S&P Capital IQ. Cash and Short Term Investments is as of the reporting date for UP's annual financial statements.
- [D] From S&P Capital IQ. Total Minority Interest is as of the reporting date for UP's annual financial statements.
- [E] = [A] + [B] - [C] + [D].

Underlying Workpaper: "Exhibits 12, 13, 14, 15, 16, 17, 18.xlsx," Mathur Workpaper 8.10.

Exhibit 13
UP Earnings Measures

	2021 (\$M)	2022 (\$M)
[A] Income Before Taxes	\$8,478	\$9,072
[B] Income Tax Expense	-\$1,955	-\$2,074
[C] Net Income	\$6,523	\$6,998
[D] Depreciation	-\$2,208	-\$2,246
[E] Interest Expense	-\$1,157	-\$1,271
[F] EBIT	\$9,635	\$10,343

Notes and Sources:

[A] UP 2021 10-K, p. 36 and UP 2022 10-K, p. 44.

[B] UP 2021 10-K, p. 36 and UP 2022 10-K, p. 44.

[C] = [A] + [B].

[D] UP 2021 10-K, p. 36 and UP 2022 10-K, p. 44.

[E] UP 2021 10-K, p. 36 and UP 2022 10-K, p. 44.

[F] = [A] - [E].

Underlying Workpaper: “Exhibits 12, 13, 14, 15, 16, 17, 18.xlsx,” Mathur Workpaper 8.10.

PUBLIC VERSION - REDACTED

Exhibit 14

UP Roadway Apportionment Factor

	2021	2022
[A] Net Road & Equipment (\$B)	\$ 52.6	\$ 53.7
[B] Net Road Property (\$B)	\$ 43.2	\$ 44.0
[C] Roadway Apportionment Factor	82%	82%

Notes and Sources:

[A] UP 2021 R-1, Table 200 and UP 2022 R-1, Table 200.

[B] UP 2021 R-1, Tables 330, 335 and UP 2022 R-1, Tables 330, 335.

[C] = [B] / [A].

Underlying Workpaper: “Exhibits 12, 13, 14, 15, 16, 17, 18.xlsx,” Mathur Workpaper 8.10.

PUBLIC VERSION - REDACTED

Exhibit 15
UP Market-Based EBIT Multiplier

	2021	2022
[A] Enterprise Value (\$B)	\$ 184.9	\$ 159.7
[B] Roadway Apportionment Factor	82%	82%
[C] EBIT (\$B)	\$ 9.6	\$ 10.3
[D] EBIT Earnings Multiplier	15.7	12.6

Notes and Sources:

[A] From S&P Capital IQ. See Exhibit 12.

[B] UP 2021 R-1 and UP 2022 R-1. See Exhibit 14.

[C] UP 2021 10-K and UP 2022 10-K. See Exhibit 13.

[D] = ([A] / [C]) x [B].

Underlying Workpaper: “Exhibits 12, 13, 14, 15, 16, 17, 18.xlsx,” Mathur Workpaper 8.10.

Exhibit 16

Market-Based EBIT Multipliers of Various Railroads

Railroad	2021	2022
Union Pacific	15.7	12.6
Canadian National Railway	13.6	13.0
Canadian Pacific Railway	18.2	17.5
CSX	13.0	10.7
Norfolk Southern	13.6	11.8
Kansas City Southern	19.2	-

Notes and Sources:

- [A] The market-based EBIT multiplier for a given company in a given year is calculated by dividing that company's enterprise value in that year by that company's EBIT for that year and multiplying by that company's apportionment factor for that year. The calculations underlying each company's enterprise value, EBIT, and apportionment factor for each year are analogous to the calculations underlying UP's enterprise value, EBIT, and apportionment factor detailed in Exhibits 12, 13, 14, and 15.
- [B] Canadian National Railway and Canadian Pacific Railway report their financial figures in Canadian dollars and are traded in Canadian dollars on the Toronto Stock Exchange. Their financial figures and market capitalizations have been converted to US dollars using the currency exchange rates on the last day in each fiscal year, as reported in Refinitiv.
- [C] In 2021, Canadian Pacific acquired Kansas City Southern for \$31 billion, including debt. The Kansas City Southern 2021 EBIT Multiplier is based on the Enterprise Value of \$31 billion, minus expected synergies of \$1 billion, implied in the transaction. The Kansas City Southern earnings figure is Kansas City Southern's 2021 EBIT of \$894 million plus merger expenses of \$264 million. Canadian Pacific 2021 Annual Report, p. 14; Form 10-K for the year ended December 31, 2021, "Canadian Pacific and Kansas City Southern Execute Agreement to Combine, Creating First Single-Line Rail Network Linking U.S.-Mexico-Canada," Kansas City Southern, available at https://www.kcsouthern.com/pdf/press-release/FINAL_CP-KCS_Execute_Agreement_to_Combine_Release.pdf?language_id=1, accessed on May 1, 2024, p. 1.
- [D] UP 2021 10-K and UP 2022 10-K.
- [E] UP 2021 R-1 and UP 2022 R-1.
- [F] "Exhibits 12, 13, 14, 15, 16, 17, 18.xlsx," Mathur Workpaper 8.10, Tabs "M&V - EBIT - N-UP," "Enterprise Value N-UP," "Roadway Factor N-UP," "Earnings Measures N-UP."

Underlying Workpaper: "Exhibits 12, 13, 14, 15, 16, 17, 18.xlsx," Mathur Workpaper 8.10.

Exhibit 17

Mojave-Kern Interest Rental Base Calculation

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Underlying Workpaper: “Exhibits 12, 13, 14, 15, 16, 17, 18.xlsx,” Mathur Workpaper 8.10.

Exhibit 18
Industry Cost of Capital Calculation

Input	2021	2022
[A] Long-Term Debt	17.71%	18.28%
[B] Common Equity	82.29%	81.72%
[C] Preferred Equity	0.00%	0.00%
Tax Rates		
[D] Federal	21.00%	21.00%
[E] California	8.84%	8.84%
[F] Blended	27.98%	27.98%
[G] Tax Factor	72.02%	72.02%
Post-Tax		
[H] Common Equity	12.03%	11.99%
Pre-Tax		
[I] Long-Term Debt	2.63%	4.28%
[J] Common Equity	16.70%	16.65%
Cost of Capital		
[K] Post-Tax Cost of Capital	10.37%	10.58%
[L] Pre-Tax Cost of Capital	14.21%	14.39%
Multiplier		
[M] Implied Multiplier	7.0	7.0

Notes and Sources:

[A] “Railroad Cost of Capital 2021,” Surface Transportation Board, August 2, 2022, p. 20; “Railroad Cost of Capital 2022,” Surface Transportation Board, August 3, 2023, p. 20.

[B] “Railroad Cost of Capital 2021,” Surface Transportation Board, August 2, 2022, p. 20; “Railroad Cost of Capital 2022,” Surface Transportation Board, August 3, 2023, p. 20.

[C] “Railroad Cost of Capital 2021,” Surface Transportation Board, August 2, 2022, p. 20; “Railroad Cost of Capital 2022,” Surface Transportation Board, August 3, 2023, p. 20.

[D] “Historical U.S. Federal Corporate Income Tax Rates & Brackets, 1909-2020,” Tax Foundation, August 24, 2021, <https://taxfoundation.org/data/all/federal/historical-corporate-tax-rates-brackets/>; Watson, Garrett, “Combined Federal and State Corporate Income Tax Rates in 2022,” Tax Foundation, September 27, 2022, <https://taxfoundation.org/combined-federal-state-corporate-tax-rates-2022/>.

Exhibit 18
Industry Cost of Capital Calculation

Notes and Sources (Continued):

[E] The California state corporate tax rate has been 8.84% since 1997. Fritts, Janelle, “State Corporate Income Tax Rates and Brackets for 2022,” Tax Foundation, January 18, 2022, <https://taxfoundation.org/state-corporate-income-tax-rates-brackets-2022/>; Beam, Adam, “California Democrats propose tax changes for businesses,” Associated Press, April 26, 2023, <https://apnews.com/article/california-budget-business-taxes-gavin-newsom-nancy-skinner-4cc2ed58a503c8a1365ed98cbb3bd095>.

$[F] = ((1 - [D]) \times E) + [D]$.

$[G] = 1 - [F]$.

[H] “Railroad Cost of Capital 2021,” Surface Transportation Board, August 2, 2022, p. 19; “Railroad Cost of Capital 2022,” Surface Transportation Board, August 3, 2023, p. 19.

[I] The cost of debt calculated by the board is on a pre-tax basis and therefore requires no adjustments. “Railroad Cost of Capital 2021,” Surface Transportation Board, August 2, 2022, p. 16; “Railroad Cost of Capital 2022,” Surface Transportation Board, August 3, 2023, p. 16.

$[J] = [H] / [G]$.

$[K] = [A] \times [I] + [B] \times [H]$.

$[L] = [A] \times [I] + [B] \times [J]$.

$[M] = 1 / [L]$.

Underlying Workpaper: “Exhibits 12, 13, 14, 15, 16, 17, 18.xlsx,” Mathur Workpaper 8.10.

Exhibit 19
BNSF Usage Factor Calculation

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Underlying Workpaper: “Exhibit 19 and Mojave-Kern Car Mile Usage Data.xlsx,”
Mathur Workpaper 8.11.

Exhibit 20
Interest Rental Payment Calculation

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Underlying Workpaper: “Exhibit 20.xlsx,” Mathur Workpaper 8.12.

Exhibit 21

BNSF Total Earnings on All Movements Traversing Mojave-Kern Line

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Underlying Workpaper: “Exhibits 5, 9, 10, 21.xlsx,” Mathur Workpaper 8.05.



APPENDIX A CURRICULUM VITAE

DIVYA MATHUR, PH.D.

Managing Principal, Analysis Group, Inc.

+1 (312) 291-5640 | divya.mathur@analysisgroup.com

Dr. Mathur specializes in the application of microeconomics, statistics, and econometrics to complex litigation matters, regulatory investigations, and consulting engagements in the areas of antitrust and competition, class certification, intellectual property, and commercial damages. Dr. Mathur has provided expert economic testimony on antitrust, class certification, and damages issues at depositions and trial. She regularly collaborates with academic and industry experts, leads consulting teams, and supports attorneys and other stakeholders in all phases of litigation. She has worked on behalf of the US Department of Justice (DOJ) and the Federal Trade Commission (FTC), and consulted to firms in numerous industries, including technology, media, telecommunications, pharmaceuticals, consumer products, financial services, manufacturing, and chemicals.

PROFESSIONAL EXPERIENCE

2008–Present, Analysis Group, Inc.

EDUCATION

Ph.D. Economics, The University of Chicago

Areas of Specialization: Industrial Organization, Labor Economics

M.A. Economics, The University of Chicago

A.B. Economics and Mathematics, *summa cum laude*, Mount Holyoke College

EXPERT WITNESS ENGAGEMENTS

- ***Carlisle Construction Materials, LLC et al. v. Graco Inc. et al.***
United States District Court, District of Delaware
Testified at deposition on antitrust issues and damages in the spray foam insulation industry on behalf of Carlisle (2024)
- ***Misty Snow, et al. v. Align Technology***
United States District Court, Northern District of California
Testified at deposition on class certification and damages pertaining to antitrust claims in the dental aligners industry on behalf of Align (2024)
- ***In re: EpiPen Direct Purchase Litigation***
United States District Court, District of Minnesota
Testified at deposition on class certification on behalf of CVS Caremark, Express Scripts, and OptumRx pertaining to rebating practices (2023)



- ***Erica Frasco, et al. v. Flo Health, Inc., Google, LLC, Meta Platforms, Inc., and Flurry, LLC***
United States District Court, Northern District of California
 Testified at deposition on class certification on behalf of Google on privacy and data collection practices on a mobile app (2023)
- ***Brainchild Surgical Devices, et al. v. CPA Global Limited***
United States District Court, Eastern District of Virginia
 Testified at deposition on class certification and damages on behalf of Defendant regarding disclosure of fees (2023)
- ***In re: Foreign Exchange Benchmark Rates Antitrust Litigation***
United States District Court, Southern District of New York
 Testified at deposition and trial on antitrust issues in an alleged price-fixing conspiracy on behalf of Credit Suisse (2022)
- ***Global Tubing, LLC v. Tenaris Coiled Tubes, LLC***
United States District Court, Southern District of Texas
 Testified at deposition on antitrust merits and damages pertaining to monopolization allegations in the oil and gas industry on behalf of Defendant (2022)
- ***Marriott International Customer Data Security Breach Litigation***
United States District Court, District of Maryland
 Testified at deposition on damages related to a data security incident on behalf of Marriott (2021)
- ***Ingevity Corporation, et al. v. BASF Corporation***
United States District Court, District of Delaware
 Testified at deposition and trial on antitrust merits and damages from alleged exclusive dealing and tying arrangements in the automotive parts industry on behalf of BASF (2020–2021)
- ***Tillage, et al. v. Comcast Corporation, et al.***
United States District Court, Northern District of California
 Testified at deposition on class certification and damages from alleged false advertising in the cable television industry on behalf of Comcast (2021)
- ***Payment Logistics Limited v. Lighthouse Network, LLC, et al.***
United States District Court, Southern District of California
 Submitted an expert report on the economic impact of a vertical merger on competition in the payment card processing industry on behalf of Lighthouse Network (2019)

SELECTED CONSULTING ENGAGEMENTS

Antitrust, Competition, and Regulation

- Analysis of services provided and fees charged by online e-commerce marketplaces
- Analysis of competition issues related to a mobile app store on behalf of a major technology firm
- Analysis of competition issues related to a proposed merger in the book publishing industry



- Analysis of competition issues pertaining to an early-stage acquisition in the pharmaceutical industry
- Analysis of antitrust liability and damages pertaining to the ticket sale practices of a major league sports team
- Analysis of competition issues related to a proposed merger in the telecommunications industry on behalf of the DOJ
- Analysis of competition issues related to a proposed merger in the sewage and waste management industry
- Analysis of the impact of alleged price fixing and bid rigging on behalf of a major automotive parts manufacturer
- Analysis of economic issues related to interchange rates and network rules and fees in the credit card industry
- Analysis of antitrust liability and damages related to allegations of price-fixing in the issuance of government-sponsored enterprise (GSE) bonds on behalf of a major financial institution
- Assessment of the economic impact of an import ban on certain smartphones and tablets on behalf of a major mobile device manufacturer in a US International Trade Commission proceeding
- Assessment of the economic impact of an import ban on certain microprocessors, servers, and personal computers on behalf of a major microprocessor manufacturer and original equipment manufacturers in a US International Trade Commission proceeding
- Assessment of competition in the marketplace for business data services including enterprise-level broadband internet services on behalf of a service provider in a US Federal Communications Commission proceeding
- Analysis of competition issues related to steering and tiering contractual provisions between health care providers and payers in a major health care system on behalf of the DOJ
- Analysis of antitrust liability and damages from refusal to deal and tying claims in the sale of demand deposit account debt portfolios
- Analysis of antitrust liability and damages from monopolization and tying claims involving applications on e-book viewers
- Analysis of antitrust liability and damages issues related to a consummated merger pertaining to drugs prescribed for pediatric heart defects on behalf of the FTC

Class Certification

- Assessment of class certification and damages claims by direct purchasers and end-payors of a brand name immunosuppressant drug
- Assessment of class certification and damages claims by direct purchasers and end-payors of a brand-name beta-blocker drug
- Assessment of class certification and damages claims by direct purchasers of a pharmaceutical therapy for Alzheimer's disease
- Assessment of class certification claims related to payment cards involved in an electronic data security breach



- Analysis of class certification claims related to alleged Real Estate Settlement Procedures Act (RESPA) violations associated with mortgage reinsurance
- Design and analysis of a survey on washing machines in connection with class action damages analyses

Intellectual Property

- Assessment of damages from alleged breach of contract and trademark misuse in the medical device industry
- Assessment of damages from the alleged infringement of a design patent in a retail merchandising and store display system
- Assessment of damages arising from the misappropriation of trade secrets related to product classification and data management systems.
- Analysis of appropriate licensing fees for performing rights for musical compositions in a major performing right organization's repertory
- Analysis of the economic value of patents donated to academic institutions using bibliometric and citation analyses using US Patent and Trademark Office (USPTO) patent data
- Analysis of economic issues related to the scanning and digitizing of books undertaken by a major technology company

Complex Commercial Litigation

- Estimation of damages and valuation of assets in a breach of contract dispute in the chemicals industry
- Valuation of insurance claims and related statistical analyses arising from wildfires
- Estimation of damages pertaining to a manufacturing and supply agreement in the pharmaceutical industry on behalf of a drug manufacturer
- Estimation of damages pertaining to pricing and rebates of pharmaceuticals in a breach of contract dispute on behalf of a major drug wholesaler
- Analysis of liability and damages from allegations of misrepresentation and defamation in the information technology research industry
- Assessment of damages from alleged false advertising and Lanham Act claims in the ride-sharing industry
- Statistical analysis of traffic stops on behalf of a major city police department
- Analysis of statistical sampling issues related to the purchase and securitization of residential mortgage loans
- Estimation of damages in a breach of contract dispute in the sub-prime credit card industry, including claims relating to contractual changes in credit card accounts and credit debt waiver products.
- Estimation of damages arising from an alleged breach of contract to provide logistics and distribution services for the US Army in overseas military engagements
- Estimation of damages resulting from an alleged breach of a market development agreement in the activated carbon industry

- Estimation of economic damages arising from a contract dispute related to military equipment

SELECTED PRESENTATIONS

- “Recent Developments in Cartels,” Global Antitrust/Competition Law Conference, Center for Transnational Law and Business, USC, May 2023
- Spring Meeting Mock Trial, American Bar Association Antitrust Law Section Spring Meeting, April 2023
- “The Ongoing Tale of Two-Sided Markets,” American Bar Association Antitrust Law Section Spring Meeting, April 2022
- “Mobile Payments in the Antitrust Spotlight,” Antitrust, Internet and Media Sections, American Bar Association, April 2021
- “Antitrust, IP, and Privacy | Intersections in Trends, Policies, and Strategies,” UIC John Marshall Law School Center for Intellectual Property, Information & Privacy Law, March 2021
- “Predicting the Future: U.S. M&A Consideration of Future Competitiveness of Merging Parties,” New York State Bar Association, Antitrust Section Mergers Committee, July 2020
- “Digital Platforms: Innovation, Antitrust, and Privacy,” UIC John Marshall Law School Center for Intellectual Property, Information & Privacy Law, March 2020
- “Tech in the Global Enforcement Spotlight,” Antitrust, Internet and Media Sections, American Bar Association, March 2020
- “Next Generation of Antitrust, Data Privacy and Data Protection Scholars,” NYU School of Law, American Bar Association, January 2020
- “Who Owns My Data,” Antitrust and Consumer Protection Sections, American Bar Association, November 2019
- “Pill Power: The Economics of Monopolization Claims in Pharmaceutical Markets,” Law and Economics Symposium: Current Topics in Life Sciences, May 2019
- “Introduction to Regression Analysis in Antitrust Litigation,” American Bar Association, November 2017
- “Competitive Strategy and Industrial Structure,” Kellogg School of Management at Northwestern University, 2016 and 2017
- “Competitive Strategy,” Kellogg School of Management at Northwestern University, 2016

SELECTED PUBLICATIONS

- “The Ongoing Tale of Two-Sided Markets,” with Ankur Kapoor, *Antitrust*, Volume 36, Number 3, Summer 2022
- “The Challenges of Using Return on Capital as an Indicator of Monopoly Power,” with Jakab Laszlo, Lau Christensen, and Aaron Yeater, *6th National Conference on Economics of Competition Law*, Competition Commission of India, March 2021
- “Remember Stacker? Another Look at Killer Acquisitions in the Digital Economy,” with Benoit D’Udekem and Marc Van Audenrode, *CPI Antitrust Chronicle*, May 2020



- “The Economic Impact of Open Source Software: How Open Source Platforms Drive Competition and Innovation in India,” with Anindya Ghose and Lau Christensen, *5th National Conference on Economics of Competition Law*, Competition Commission of India, March 2020
- “Economic and Financial Concepts,” with Jeff Cohen and David Smith, chapter in *Proving Antitrust Damages: Legal and Economic Issues*, Third Edition, American Bar Association, 2017

PROFESSIONAL MEMBERSHIPS

- American Economic Association
- American Bar Association (Antitrust Section)
 - ABA Antitrust Section Joint Conduct Committee, Vice Chair (2021–2024)

APPENDIX B
MATERIALS CONSIDERED

Surface Transportation Board Documents

AAR Railroad Cost Indexes, March 2024

Arkansas and Missouri Railroad Company v. Missouri Pacific Railroad Company, 6 I.C.C.2d 619 (1990)

Atchison, Topeka & Santa Fe Railway Co. - Operating Agreement - Southern Pacific Co., 331 I.C.C. 367 (1967)

Atchison, Topeka & Santa Fe Railway Company - Operating Agreement - Southern Pacific Transportation Company, Finance Docket No. 22218 (Sub-No. 1), July 8, 1993

Atchison, Topeka & Santa Fe Railway Company - Operating Agreement - Southern Pacific Transportation Company, 8 I.C.C.2d 297 (1992)

Atchison, Topeka & Santa Fe Railway Company - Operating Agreement - Southern Pacific Transportation Company, Finance Docket No. 22218, March 26, 1993

Atchison, Topeka & Santa Fe Railway Company - Operating Rights - Southern Pacific Transportation Company - UP Petition to Reopen, Finance Docket No. 22218, January 6, 2023

Atchison, Topeka & Santa Fe Railway Company - Operating Rights - Southern Pacific Transportation Company - Verified Statement of David W. Hughes, Finance Docket No. 22218, May 3, 2024

BNSF URCS 2021 Worktables

BNSF URCS 2022 Worktables

CSX Corporation and CSX Transportation, Inc., Norfolk Southern Corporation and Norfolk Southern Railway Company - Control and Operating Leases/Agreements - Conrail Inc. and Consolidated Rail Corporation, 3 S.T.B. 955 (1998)

CSX Corporation and CSX Transportation, Inc., Norfolk Southern Corporation and Norfolk Southern Railway Company - Control and Operating Leases/Agreements - Conrail Inc. and Consolidated Rail Corporation, 4 S.T.B. 75 (1999)

Major Issues in Rail Rate Cases, Ex Parte No. 657 (Sub-No. 1), October 30, 2006

New England Central Railroad, Inc. - Trackage Rights Order - Pan Am Southern LLC, Finance Docket No. 35842, February 22, 2017

New England Central Railroad, Inc. - Trackage Rights Order - Pan Am Southern LLC, Finance Docket No. 35842, January 23, 2017

New England Central Railroad, Inc. - Trackage Rights Order - Pan AM Southern LLC, Finance Docket No. 35842, October 31, 2017

New England Central Railroad, Inc. - Trackage Rights Order - Pan Am Southern LLC, Finance Docket No. 35842, July 19, 2016

Railroad Cost of Capital - 2021, Ex Parte No. 558 (Sub-No. 26), August 2, 2022

Railroad Cost of Capital - 2022, Ex Parte No. 558 (Sub-No. 26), August 3, 2023

St. Louis Southwestern Railway Company - Trackage Rights Over Missouri Pacific Railroad Company - Kansas City to St. Louis 5 I.C.C.2d 525 (1989)

St. Louis Southwestern Railway Company - Trackage Rights Over Missouri Pacific Railroad Company - Kansas City to St. Louis, 8 I.C.C.2d 80 (1991)

St. Louis Southwestern Railway Company - Trackage Rights Over Missouri Pacific Railroad Company - Kansas City to St. Louis, 1 I.C.C.2d 776 (1984)

St. Louis Southwestern Railway Company - Trackage Rights Over Missouri Pacific Railroad Company - Kansas City to St. Louis - Trackage Rights Compensation, 4 I.C.C.2d 668 (1987)

STB Carload Waybill Sample Reference Guide, January 30, 2023

STB Railroad Cost Program 2006-2022

STB The Railroad Cost Program (Microsoft Excel Version), 2021

UP URCS 2021 Worktables

UP URCS 2022 Worktables

Produced Data and Documents

BNSF, Data Dictionary Workbook, BNSF-KM-C-0000015

BNSF, Density Data Workbook, BNSF-KM-HC-0000001

BNSF, Event Data, BNSF-KM-HC-0000008 - 0000017

BNSF, Waybill Data, BNSF-KM-HC-0000003 - 0000007

UP, Car Event Data, UP-MK-001913-HC - 001929-HC

UP, Data Dictionary, UP-MK-001944-HC - 001945-HC

UP, Density Data, UP-MK-001931-HC

UP, Waybill Data, UP-MK-001933-HC - 001943-HC

Public Data

Refinitiv, Exchange Rate Data

S&P Capital IQ, Enterprise Value

Trimble MAPS, PCMiller

Financial Reports

BNSF, Class I Railroad Annual Report to the Surface Transportation Board for the year ending December 31, 2021

BNSF, Class I Railroad Annual Report to the Surface Transportation Board for the Year Ending December 31, 2022

BNSF, Form 10-K for the year ended December 31, 2013, March 3, 2014

BNSF, Form 10-K for the year ended December 31, 2021, February 28, 2022

BNSF, Form 10-K for the year ended December 31, 2022, February 27, 2023

Canadian National Railway, Annual Report for the year ended December 31, 2021

Canadian National Railway, Annual Report for the year ended December 31, 2022

Canadian Pacific Railway, Annual Report for the year ended December 31, 2021

Canadian Pacific Railway, Annual Report for the year ended December 31, 2022

CSX Corporation Form 10-K for the year ended December 31, 2021, February 16, 2022

CSX Transportation, Class I Railroad Annual Report to the Surface Transportation Board for the year ending December 31, 2021

CSX Corporation Form 10-K for the year ended December 31, 2022, February 15, 2023

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APPENDIX C

TECHNICAL NOTES ON CALCULATION OF MOJAVE-KERN LINE EARNINGS FOR UP AND BNSF UNDER ATC METHOD

1. This Appendix provides technical notes on the calculation of Mojave-Kern Line earnings including: (1) movement mileages, (2) variables costs, and (3) fixed costs and densities.

I. MOVEMENT MILEAGE CALCULATIONS

A. On-segment mileage

1. *UP*

2. The on-segment mileage of each CSN in UP's waybill data is calculated by analyzing the sequence of stations the CSN traversed based on UP's event data. For each CSN, the events are first sorted chronologically based on the event date and event time variables.¹ The event data is then filtered such that only events with event codes "TA" (train arrival) and "TD" (train departure) are kept, as these two event codes represent cars/containers arriving to or leaving each station.² After this filtering step, if there are consecutive events occurring at the same station, only one event per station is kept in order to create a non-duplicative chronological list of stations the CSN travelled.

3. The stations in the event data are represented by "CIRC 7" codes, consisting of two letters and three numbers that uniquely identify each station. The stations on the Mojave-

¹ The time zone variable is used to align all event dates and times to the same time zone before sorting the data to reflect the true chronology of the events. If multiple events are recorded at the exact same date/time, the event sequence number ("EVNT SEQ NBR") is used as the tiebreaker to sort the events chronologically.

² I understand from UP that there are a small number of CSNs that originate from (or terminate on) the Mojave-Kern Line and some of these CSNs will have events other than train arrivals and departures listed as the first (or last) chronological events. As a result, this filtering step is not applied to the CSNs that originated from or terminated on the Mojave-Kern Line.

Kern Line (the “on-segment stations”) correspond to CIRC 7 codes beginning with “JQ” and ending with numbers between 112 and 180 (inclusive). In particular, JQ112 represents East Mojave,³ higher numbered JQ stations correspond to stations further north (relative to JQ112) on the Mojave-Kern Line, and JQ180 represents Kern Junction.⁴ If a portion of the event data of a CSN include events at one or a set of consecutive on-segment stations, that portion of the CSN’s event data is categorized as an “on-segment trip.”

4. {{

}}

These stations are categorized as north or south of the Mojave-Kern Line (as summarized in **Figure C.1** below) based on PCMiller and a file I received from UP that links CIRC 7 codes to their station names and SPLC codes (which PCMiller recognizes as an input).⁶

Figure C.1. Categorization of CIRC 7 Codes North/South of Mojave-Kern Line

<u>CIRC 7 Code</u> <u>First Two Letters</u>	<u>North/South of Mojave-Kern Line</u>
JQ	If JQ### such that ### > 180, then north. If JQ### such that ### < 112, then south.
JR	If JR### such that ### > 200, then north. If JR### such that ### < 200, then south.
CO	If CO### such that ### < 165, then north. If CO### such that ### > 165, then south.
PX, RV, or OZ	Always north, regardless of last three digits.
CX, SP, or VS	Always south, regardless of last three digits.

³ According to PCMiller, East Mojave and Mojave are zero miles apart and located at the same geographic point. Thus, I refer to East Mojave as Mojave below.

⁴ “Circ 7 Decode.xlsx,” Mathur Workpaper 2.04; Trimble MAPS, PCMiller.

⁵ “UP Event Data 3.R,” Mathur Workpaper 2.09.

⁶ “Circ 7 Decode.xlsx,” Mathur Workpaper 2.04.

5. The on-segment mileage for each CSN is determined based on the geographic location of the stations traversed by the CSN immediately before and after an on-segment trip. In particular, on-segment mileage is calculated as follows:

- a. On-segment mileage of 67.2 miles (i.e., the full length of the Mojave-Kern Line) is assigned for all on-segment trips that have an event recorded at a station south (north) of the Mojave-Kern Line immediately before and an event recorded at a station north (south) of the Mojave-Kern Line immediately after. This is the most common case.⁷
- b. If a CSN's journey originates on the Mojave-Kern Line, and the first station after exiting the Mojave-Kern Line is north (south), then the on-segment mileage is calculated as the distance between the origin station and Kern Junction (Mojave). In other words, the CSN is interpreted to have partially traversed the Mojave-Kern Line.⁸
- c. If a CSN's journey terminates on the Mojave-Kern Line, and the station immediately before its final on-segment trip is north (south) of the Mojave-Kern Line, then the on-segment mileage is calculated as the distance between the destination station and Kern Junction (Mojave). In other words, the CSN is interpreted to also have partially traversed the Mojave-Kern Line.
- d. If an on-segment trip has an event recorded at a station north (south) of the Mojave-Kern Line both before and after the on-segment trip, the on-segment

⁷ As shown in **Exhibit 2A**, the vast majority of CSNs in 2021 and 2022 have exactly one on-segment trip of this kind (i.e., most CSNs fully traversed the Mojave-Kern Line exactly once during their journeys).

⁸ The distances between on-segment stations are obtained from PCMiller.

mileage is calculated as double the distance between the most southern (northern) on-segment station and Kern Junction (Mojave).⁹

- e. In any of the scenarios above, additional adjustments are made if one of the stations immediately before or after an on-segment trip has a CIRC 7 code of JR###, where ### is less than 200. {{

}} Thus, on-segment mileage is adjusted by either 0.3 or 1.3 miles if there is an event in one of those five off-segment stations (JR001, JR023, JR029, JR038, and JR108) immediately before or after an on-segment trip.¹⁰

6. In most cases, a CSN is associated with only one on-segment trip, though some CSNs are associated with multiple on-segment trips.¹¹ Therefore, the total on-segment mileage for each CSN is calculated as the sum of the on-segment mileage across all on-segment trips associated with the CSN. As shown in **Exhibit 2A**, a small percentage of CSNs have on-segment mileage of zero. These are CSNs that did not traverse the Mojave-Kern line at all but have events

⁹ This methodology assumes the CSN travelled south past Kern Junction (north past Mojave), turned around somewhere on-segment, and returned back north past Kern Junction (south past Mojave) again.

¹⁰ Additionally, in very rare cases, the station immediately before or after an on-segment station has a CIRC 7 code that does not begin with one of the two-letter codes shown in **Figure C.1**. In these cases, the on-segment mileage is calculated as (i) the distance between the northernmost and southernmost on-segment stations of the trip, or (ii) zero if the trip consists of only one on-segment station.

¹¹ For example, some CSNs' event data indicate the car/container travelled across the Mojave-Kern Line on two separate occasions along its journey. In these cases, the on-segment mileage of the CSN is double the length of the Mojave-Kern Line (i.e., 134.4 miles).

at one of the Mojave-Kern Line's endpoints (Mojave and Kern Junction) or Bakersfield station (just north of the Mojave-Kern Line).

7. {{

}} As on-segment mileage could not be determined for these CSNs, they are excluded from all ATC calculations entirely (i.e., they are not processed through URCS or included in the line earnings gross-up calculation shown in **Exhibit 4A**).

2. *BNSF*

8. The BNSF event data is used to calculate the on-segment mileage of each waybill ID in the BNSF waybill data.¹³ There are two relevant types of BNSF event data for the calculation of on-segment mileage: (1) the BNSF car event data and (2) the BNSF intermodal event data. The BNSF car event data contain information on individual events along the journeys of intermodal and non-intermodal cars. The BNSF intermodal event data complement the BNSF car event data by providing information on the events along the journeys of intermodal containers, including information on the intermodal cars the containers travelled on. Compared to the BNSF intermodal event data, the BNSF car event data provide more granular information on the sequence of stations traveled by each intermodal waybill ID. Therefore, the sequence of events and corresponding stations in the BNSF car event data are used to identify waybill IDs that traveled the Mojave-Kern line and calculate on-segment mileage.

¹² "UP Event Data 3.R," Mathur Workpaper 2.09.

¹³ As I explain in **Section VI.A.2**, each waybill ID in BNSF's waybill data represents a unique revenue-generating intermodal trailer or container, or non-intermodal car. A unique waybill can correspond to multiple observations of waybill ID (i.e., a movement may involve multiple containers and/or cars) in BNSF's waybill data, though majority of BNSF waybills have one waybill ID (i.e., a car or container) associated with them.

9. Non-intermodal waybill IDs in the BNSF waybill data can be directly linked to their corresponding car event data using the waybill ID (“WB_ID”) variable.¹⁴ In contrast, intermodal waybill IDs in the BNSF waybill data are first linked to the BNSF intermodal event data using the waybill ID (“WB_ID”) variable, and then linked to the corresponding BNSF car event data by matching the car waybill ID variable (“CAR_WB_ID”) in the BNSF intermodal event data with the waybill ID variable in the BNSF car event data. For intermodal waybill IDs (i.e., intermodal containers), an additional variable of event date (“EVT_DT”) is used when linking intermodal event data to corresponding car event data to ensure that only the car events that occurred while the container was on the car are considered when calculating the waybill ID’s on-segment mileage.

10. Once each waybill ID is linked to its corresponding car event data, the car event data are sorted chronologically using the event date in central time zone (“CENTRAL_EVT_DT”) and event time in central time zone (“CENTRAL_EVT_TM”) variables to obtain the sequence of stations the waybill ID traversed through. Then, the car event data is filtered to include only events with event codes “TA” (train arrival) or “TD” (train departure), similar to the calculation of on-segment mileage using UP event data.

11. The BNSF car event data is not as granular as UP’s event data in recording the stations that a container or car traversed through. { {

¹⁴ Non-intermodal waybills are identified in the BNSF waybill data as those with the intermodal plan variable (“IMDL_PLAN_CD”) having empty or non-numerical values.

}} Based on BNSF’s network map, if a waybill ID has consecutive events at any of the ten combinations of stations in **Figure C.2** below, it is essentially guaranteed that the waybill ID traversed the Mojave-Kern Line.¹⁶ Therefore, 67.2 on-segment miles are assigned to the waybill IDs with these combinations of consecutive stations in the car event data.

Figure C.2. Combinations of Stations Identifying Mojave-Kern Traversing Waybill IDs in BNSF Car Event Data {{

¹⁵ These stations are among the most common stations appearing in the BNSF event data that are geographically close to Mojave-Kern Line and are therefore the stations used to identify the Mojave-Kern Line traffic. In some rare cases, there are waybill IDs whose sequence of stations from the car event data include stations on the Mojave-Kern Line or other stations in California appearing in between a northern station and a southern station listed in **Figure C.2**. These waybill IDs are also assumed to have traversed the full Mojave-Kern Line and are assigned on-segment mileage of 67.2 miles.

¹⁶ BNSF, “BNSF Intermodal Map,” available at <https://www.bnsf.com/bnsf-resources/pdf/ship-with-bnsf/maps-and-shipping-locations/intermodal-map-large.pdf>, accessed on March 29, 2024.

}}

12. In some cases, multiple pairs of consecutive stations from **Figure C.2** above can appear in the waybill ID's car event data. For example, a waybill ID may have consecutive events from Bakersfield to Barstow and another set of consecutive events back from Barstow to Bakersfield. In these cases, the on-segment mileage on each individual Mojave-Kern "trip" is summed to obtain the total on-segment mileage for the waybill ID. {{

}}

13. In less common cases, the car event data of a waybill ID may have events at two or more consecutive stations on the Mojave-Kern Line. In such scenarios, if the waybill ID's movement does not start or end on the Mojave-Kern Line, it is considered to have traversed the full Mojave-Kern Line and is assigned 67.2 on-segment miles. If the waybill ID's movement starts or ends on the Mojave-Kern Line, then the on-segment mileage is calculated as the maximum distance among the stations on the Mojave-Kern Line in the waybill ID's car event data (i.e., partial on-segment mileage is calculated in such cases). {{

}}

14. {{

}} These waybill IDs are excluded from the ATC calculations. They are not processed through URCS, nor are they included in the line earnings gross up shown in **Exhibit 4B**.

¹⁷ "BNSF MK waybill identification and on-segment mileage.R," Mathur Workpaper 2.03.

B. Total mileage

1. From UP Event Data

15. The variable “MILES” is summed across all event data observations for each CSN to calculate the total mileage for each CSN. However, this procedure results in zero total mileage for all intermodal CSNs in the waybill data. To calculate the total mileage for intermodal CSNs, CSNs corresponding to intermodal containers (from the waybill data) are first linked to CSNs corresponding to the well cars the intermodal containers travelled on (from the event data) using a container to well car crosswalk dataset.¹⁸ This linkage is needed because the waybill data do not include the CSNs corresponding to well cars—since the well cars themselves do not generate revenue (the intermodal containers they carry do)—but the event data do include events from these well car CSNs along with associated mileage. Therefore, the total mileage for each intermodal container CSN is calculated by summing the mileage (from the event data) of the well cars on which the intermodal container travelled.¹⁹ This procedure yields the total mileage associated with each intermodal container’s CSN.

16. For well cars with car initials of “DTTB,” “DTTC,” “DTTD,” and “DTTE,” the total mileage in the event data is also always zero. Thus, an additional calculation step is required to calculate the total mileage for intermodal container CSNs from the waybill data that link to well cars with these car initials. I understand from UP that well cars with car initials “DTTA,” “DTTB,” “DTTC,” “DTTD,” or “DTTE” travelled on the exact same route as each other if they share the same equipment number (“EQMT_NBR”) and the first six digits of their CSNs in the

¹⁸ UP, “Wellcar,” UP Response to Discovery Request 37 (“UP Wellcar Crosswalk”).

¹⁹ Specifically, the mileages associated with the subset of events over which both the container’s CSN and each associated well car’s CSN have the same CIRC 7 stations in their event data (i.e., for the portion of the journey over which the container was actually on each well car) are summed.

event data. Additionally, well cars with car initials “DTTA” have nonzero total mileage in the event data. Thus, well cars with car initials of “DTTB,” “DTTC,” “DTTD,” or “DTTE” can be linked to the event data of their corresponding “DTTA” well car using their equipment numbers and first six digits of their CSNs, and then the total mileage associated with that “DTTA” well car is used as the total mileage for the intermodal containers that travelled on corresponding “DTTB,” “DTTC,” “DTTD,” or “DTTE” well cars.

2. *From BNSF Waybill Data*

17. The “CYCLE_MILES” variable from the BNSF waybill data represents the total mileage for each BNSF waybill ID (i.e., no additional calculation is needed).

3. *From PCMiler (for UP and BNSF)*

18. To calculate the total mileage from PCMiler for each CSN/waybill ID, the UP and BNSF waybill data are first split into (i) intermodal and (ii) non-intermodal CSNs/waybill IDs.²⁰ Then, the unique combinations of origin and destination stations (i.e., the set of unique routes) observed within the intermodal and non-intermodal waybills for both UP and BNSF are identified.²¹

²⁰ For UP, the variable INMD_SVC_CODE is used to determine whether a movement is intermodal or non-intermodal. For BNSF, the variable IMDL_PLAN_CD is used to determine whether a movement is intermodal or non-intermodal.

²¹ The order of the origin and destination stations is not considered when determining the unique routes, as the route is just the path between those two stations. Therefore, a movement traveling from, for example, Stockton, CA to Chicago, IL is considered to have traversed the same route as a movement traveling from Chicago to Stockton. For UP, the variable “SYS_ON_JCT_FSAC” is used for origin, and the variable “SYS_OFF_JCT_FSAC” is used for destination. For BNSF, the variable “STN_FSAC_ON” is used for origin, and the variable “STN_FSAC_OFF” is used for destination.

19. The total mileage is calculated using PCMiller’s “BatchPro” functionality.²² “BatchPro” functionality requires a text file as an input, in which each row is a route represented by an origin and a destination station.²³ PCMiller then calculates the total mileage between each origin and destination station based on a route setting: non-intermodal movements are routed using the “practical” setting, whereas intermodal movements are routed using both the “intermodal” setting and the “practical” setting. Both settings are used for intermodal movements because PCMiller returns zero total mileage for certain routes when the “intermodal” setting is used, along with an error message indicating that the given origin or destination station is not an intermodal station according to PCMiller.²⁴ Therefore, for intermodal movements, the total mileage calculated using the “intermodal” setting is used if available (i.e., PCMiller did not return an error message), and total mileage calculated using the “practical” setting is used otherwise.

20. In addition to calculating the total mileage of each route, PCMiller BatchPro can produce a detailed report listing the optimal station-by-station route for each origin and destination pair. This detailed report is used to confirm whether PCMiller routes the origin-destination pairs observed in the UP and BNSF waybill data across the Mojave-Kern Line. {{

²² PCMiller BatchPro is a program that “gives PC*MILER the power and flexibility to handle tasks such as generating distance totals and cost estimates for large volumes of origin and destination records.” The program allows users to read in large lists of origin-destination station pairs and generate reports identifying the distance between each origin and destination station in a pair, depending on whether traffic travels along “intermodal” routes or “practical” routes. The program also allows users to generate lists of every station on every route input into the software. “PC*MILER BatchPro Overview, Requirements and Installation,” Trimble Maps, available at <https://support.pcmiler.com/en/support/solutions/articles/19000076326-pc-miler-batchpro-overview-requirements-and-installation>, accessed on April 23, 2024.

²³ The relevant railroad (either UP or BNSF) is also included in each row of the input text file.

²⁴ The other common error messages (which can occur on both intermodal and non-intermodal routes) include that PCMiller cannot find one of the input stations, that there is an error between the station input into PCMiller and the railroad network on which that station is located, and that the station code is not formatted correctly. In these cases, no further adjustments are made and the PCMiller total mileage is treated as missing for all movements on the given route, and therefore the total mileage from the UP event data or BNSF waybill data is used instead.

}} For these CSNs/waybill IDs, the total mileage is recalculated by using PCMiller BatchPro to calculate the sum of (1) the total mileage from the origin station to Walong, CA (a station in the middle of the Mojave-Kern Line), and (2) the total mileage from the destination station to Walong, CA. This procedure essentially forces PCMiller to include the Mojave-Kern Line in the journey from the origin to the destination station for those movements that PCMiller BatchPro initially routed as not traversing the Mojave-Kern Line.²⁶

4. *Final calculation*

21. The final total mileage for each CSN in UP's waybill data (based on its origin and destination station) is calculated as the maximum of (i) the total mileage calculated from PCMiller and (ii) the total mileage calculated from the UP event data. Similarly, the final total mileage for each waybill ID from BNSF's waybill data is calculated as the maximum of (i) the total mileage calculated from PCMiller and (ii) the total mileage calculated from the BNSF waybill data.

²⁵ "BNSF_PCM.R," Mathur Workpaper 3.02, "UP_PCM.R," Mathur Workpaper 3.03. For BNSF, the waybill data are first filtered to those waybill IDs that had non-zero on-segment mileage based on the event data before calculating this percentage. This filter is applied because the majority of observations in the BNSF waybill data did not traverse the Mojave-Kern Line at all according to the event data (*see Exhibit 2B*); it is therefore expected that PCMiller would not necessarily route such observations via the Mojave-Kern Line.

²⁶ This procedure is applied because ultimately, for both UP and BNSF, only movements with positive on-segment mileage from the event data are relevant, since under the ATC method, only movements with positive on-segment mileage will be allocated on-segment costs, on-segment revenue, and on-segment line earnings. Thus, the total mileage from PCMiller must reflect the mileage assuming the movement traversed the Mojave-Kern Line.

II. VARIABLE COSTS

A. Preparation of URCS input data

22. In order to process the movements in the waybill data for both UP and BNSF through URCS, the URCS input variables must first be computed for each CSN or waybill ID. The URCS input variables include:

- a. Total mileage/total distance: This input is calculated using the methodology described in the **Section I** of this appendix.
- b. Railroad: This input is set to “UP” for all UP waybills and to “BNSF” for all BNSF waybills.
- c. Circuity: I understand from UP that no circularity adjustments are needed for the mileages calculated for each CSN or waybill ID, so this input is set to 1.
- d. Net weight/commodity code/number of cars: These inputs are directly obtained from the waybill data and require no additional calculations.
- e. Segment type: URCS requires users to choose one of six segment types.²⁷ The segment type for each CSN in UP’s waybill data is determined based on the original and destination railroad variables. The segment type for each waybill ID in BNSF’s waybill data is determined based on the on-junction and off-junction railroad variables.

²⁷ The six types of segments are Originate and Terminate; Originate and Deliver; Receive and Terminate; Receive and Deliver; Intra-Terminal; and Inter-Terminal.

- f. Freight car type: The AAR car codes in UP's and BNSF's waybill data are mapped to URCS car codes using the 2021 STB Carload Waybill Sample Reference Guide and URCS Railroad Cost Program.²⁸
- g. Car ownership: The car ownership codes and car initials in UP's and BNSF's waybill data are mapped to the URCS car ownership codes using URCS Phase III Railroad Cost Program.²⁹
- h. TOFC (trailer on flat car) plan: the TOFC plan codes in UP's and BNSF's waybill data are mapped to the URCS TOFC Plan codes using the 2021 STB Carload Waybill Sample Reference Guide and URCS Railroad Cost Program.³⁰
- i. Shipment size: URCS requires users to choose from four categories of shipment size (Single Car, Multi-Car, Unit Train, or Intermodal). The shipment size category is determined based on the number of cars and TOFC plan.³¹
- j. Originating railroad: For UP, this input is obtained directly from the waybill data. For BNSF, it is assumed the previous railroad that BNSF interchanged with for each waybill ID (captured by the variable "CARR_ABBR_ON") is

²⁸ STB Carload Waybill Sample Reference Guide, January 30, 2023 ("2021 STB Carload Waybill Sample Reference Guide"), p. 168; STB Railroad Cost Program 2006-2022 ("URCS Phase III Railroad Cost Program").

²⁹ URCS Phase III Railroad Cost Program. UP's and BNSF's waybills mapped to three car ownership classifications: (i) Private, (ii) Railroad, and (iii) TrailerTrain. In the UP waybill data, there are certain CSNs corresponding to intermodal containers that travelled on multiple cars with different URCS ownership classifications during their journey. In these rare cases, the UP event data are used to identify the first car the intermodal container CSN travelled on, and the URCS ownership classification of that first car is used as the URCS ownership classification for the intermodal container CSN.

³⁰ 2021 STB Carload Waybill Sample Reference Guide, p. 106; URCS Phase III Railroad Cost Program.

³¹ URCS Phase III Railroad Cost Program.

the originating railroad. For BNSF, the originating railroads are additionally categorized as “east” or “west” as required.

23. URCS is designed to be run at the waybill level, but both UP’s and BNSF’s waybill data are more granular than the waybill level (i.e., CSNs for UP and waybill IDs for BNSF are more granular than waybills). Thus, the URCS inputs are aggregated at the waybill level before the waybills are processed through URCS.³² If the total mileage differs across CSNs/waybill IDs within the same waybill for either UP or BNSF, the median mileage across those CSNs/waybill IDs is used to represent the total mileage at the waybill level. The number of cars is calculated at the waybill level by summing across all CSNs or waybill IDs within a waybill. Net weight is calculated at the waybill level as the weighted average (by car count) of net weight of the CSNs or waybill IDs within the waybill. For any other URCS inputs, if CSNs or waybill IDs within a waybill have different input values, the waybill is not processed through URCS and instead included in the line earnings gross up calculations shown in **Exhibit 4A** and **Exhibit 4B**.³³

³² The variable “WB_ID” is used to identify unique waybills in UP’s waybill data. The variables waybill date, waybill number, the railroad carrier that BNSF interchanges with to receive cars, and on- and off-system stations are used to identify unique waybills in BNSF’s waybill data.

³³ Additionally, in the rare cases where at least one of the underlying variables in the UP or BNSF waybill data used to determine the value of an URCS input variable has a missing or unusable value for a given CSN or waybill ID, that CSN or waybill ID and all other CSNs or waybill IDs within the same waybill are not processed through URCS and instead accounted for as part of the gross-up calculation in **Exhibit 4A** or **Exhibit 4B**. Similarly, in the rare cases where the calculated off-segment mileage is negative because the on-segment mileage is greater than the total mileage calculated for a specific CSN or waybill ID, that CSN or waybill ID and all other CSNs or waybill IDs within the same waybill are not processed through URCS and instead accounted for as part of the gross-up calculation in **Exhibit 4A** or **Exhibit 4B**.

B. Generation of URCS output

24. The STB updates the URCS Railroad Cost Program annually.³⁴ The URCS Phase III Railroad Cost Program (MS Excel Version) includes a Batch Cost Program, which allows multiple waybills from the same year to be run concurrently. Thus, the waybills are split up by year to separately run the URCS Batch Cost Program on an annual basis.

25. The URCS Batch Cost Program uses Visual Basic for Applications (“VBA”) code in a Microsoft Excel workbook. Running this program on each individual waybill would take a long time given the VBA code is designed to sequentially processes each waybill entry one-by-one. To minimize the URCS processing time, URCS is run on an “URCS group ID” level instead of a waybill level, in which waybills that have all the same URCS inputs except net weight (see below for why) are assigned the same “URCS group ID.” Because URCS allocates costs based on the URCS inputs, all waybills within the same “URCS group ID” will have the same URCS output (assuming constant net weight).

26. The only variable allowed to differ between waybills within the same “URCS group ID” is net weight because within an “URCS group ID,” the relationship between net weight and total variable costs is linear. Thus, the variable costs for each waybill can be calculated (as explained further below) based on the net weight of each individual waybill and the URCS output for that waybill’s “URCS group ID.”

27. To convert the URCS output (i.e., the URCS variable costs) of each unique “URCS group ID” to waybill-specific URCS variable costs, the linear relationship between net weight and total variable costs is first calculated. This relationship is determined by running

³⁴ STB, “Uniform Rail Costing System (URCS),” available at <https://www.stb.gov/reports-data/uniform-rail-costing-system/>, accessed on March 28, 2024.

URCS twice for each URCS group ID: once assuming the net weight equals the average net weight of the waybills within the URCS group ID, and once assuming the net weight equals a different value. Because the relationship between net weight and total variable costs is linear, it is possible to solve for the equation of the line (i.e., total variable costs as a function of net weight) using two data points (i.e., two different variable costs obtained from URCS using the average net weight and the arbitrary net weight). This equation is used with the actual weight of each waybill as the input to calculate the estimated total variable costs of the individual waybill within the “URCS group ID.”

C. Calculation of variable costs from URCS output

28. Total variable costs for each “URCS group ID” is recorded in variable L700 of the URCS output file.³⁵ As explained above, the total variable costs for each individual waybill within the “URCS group ID” is then calculated by using the data points of L700 and the net weight of two separate URCS outputs to solve for the linear relationship between net weight and total variable costs, and then applying the linear equation to the actual net weight to calculate URCS variable cost for each waybill.

29. As explained in **Section VI.A**, industry and interchange switching costs must be calculated separately for each waybill as they are allocated differently on-segment versus off-segment relative to all other variable costs. Industry and interchange switching costs are calculated from the URCS output for each “URCS group ID” as L311 plus L312, multiplied by the sum of L315, L317, and L319.³⁶ Since industry and interchange switching costs are not

³⁵ URCS Phase III Railroad Cost Program.

³⁶ URCS Phase III Railroad Cost Program.

correlated to net weight, the industry and interchange switching costs of each “URCS group ID” is equal to the industry and interchange switching costs of each waybill within the “URCS group ID.”

30. For each waybill, all other variable costs are then calculated by subtracting the industry and interchange switching costs from the total variable costs. As explained in **Section VI.A**, these costs are allocated to the Mojave-Kern Line based on the on-segment mileage ratio for each waybill under ATC. The variable costs are summarized for UP and BNSF in **Exhibit 9A** and **Exhibit 9B**, respectively.

III. FIXED COSTS AND DENSITY

A. Calculation of off-segment density for top routes

31. To calculate the off-segment density of each top route for both UP and BNSF (listed in **Exhibit 8A** and **Exhibit 8B**), the journey from the origin to the destination station is first routed in PCMiler.³⁷ The journey is first routed using the “intermodal” setting in PCMiler, and if this results in an error, the journey is routed using the “practical” setting.³⁸ For each route, PCMiler produces a detailed report, which includes the station-by-station route from the origin to destination, and the mileage between each station along the route.

³⁷ In identifying the top routes for both UP and BNSF, the directionality of the route is not considered as unique (e.g., Chicago to Stockton and Stockton to Chicago are considered the same route).

³⁸ For a few routes, the “intermodal” or “practical” settings suggest a route that does not traverse the Mojave-Kern Line. In these cases, either a different route setting (e.g., “shortest” route) that does route via the Mojave-Kern Line is used, or an intermediate stop on or near the Mojave-Kern Line (e.g., at Bakersfield) is added to ensure that PCMiler’s suggested route traverses through the Mojave-Kern Line.

32. Separately, an average density (per route mile) is calculated along each subdivision in both the UP and BNSF density data. A typical route consists of many subdivisions, and each subdivision consists of several granular station-to-station segments in the density data. To calculate the subdivision-level average densities, the total GTMs for the subdivision are first calculated by multiplying the total gross tons on each track segment by the track miles of each segment, and then summing across all track segments within the subdivision. These subdivision-level GTMs are then divided by the route miles of the subdivision, which are calculated by adding the mileage of each station-to-station segment within the subdivision without double counting mileage on multiple tracks along the same segment.

33. To merge the density data and the detailed report output from PCMiler for each route, each station listed on PCMiler's output is manually matched to a subdivision in either UP's or BNSF's density data, based on the stations listed in the track descriptions within each subdivision in the density data. The off-segment density for each route is then calculated based on the weighted (by PCMiler mileage) average density of each subdivision traversed on the PCMiler route, excluding the on-segment portion of the journey.³⁹

B. Scaling up of GTMs to account for empty car weight and locomotive weight

34. As explained in **Section VI.A**, to calculate on-segment (off-segment) fixed costs, the on-segment (off-segment) fixed costs per GTM are multiplied by on-segment (off-segment) GTMs from the waybill data and event data.

³⁹ The BNSF density data does not include information on the parts of BNSF's system where it has trackage rights but is not the landlord. Similarly, the UP density data include only UP (and not foreign) tonnage on parts of its system where it has trackage rights but is not the landlord. Thus, if the PCMiler route involves traversing over a portion of each railroad's system that it does not own (and therefore, complete density data that include the landlord density is unavailable), this portion of the route is excluded from the route's off-segment density calculation.

35. However, since the fixed costs per GTM are calculated using the density data, which include tonnages from non-revenue-generating empty cars and locomotives, the gross ton mileage from the waybill data (which consists of revenue-generating cars) must be adjusted upward to reflect the gross ton mileage of empty cars, locomotive weight, and other non-revenue weight.

36. To account for the gross ton mileage traveled by empty cars and containers in the GTM calculation, the tare ton miles (i.e., the ton miles excluding the net weight of the underlying commodity) of loaded cars and containers in the waybill data are scaled up by multiplying them with the corresponding URCS empty/loaded ratios, which “convert[] the loaded miles of a shipment into the total miles traveled (loaded and empty).”⁴⁰ Therefore, the GTMs for a movement are calculated as the sum of (i) the net shipment ton miles, (ii) the loaded cars’ tare ton miles multiplied by the empty/loaded ratio for cars, and (iii) (if the movement is intermodal) the loaded containers’ tare ton miles multiplied by the empty/loaded ratio for containers. Shipment net ton mileage is calculated as the product of net shipment weight and mileage traveled by the shipment. Similarly, the tare ton mileage of a loaded car or container is calculated as the product of the loaded car’s or container’s tare weight and mileage traveled.⁴¹

⁴⁰ URCS defines the E/L ratio of container/trailer units similarly: “the ratio of total loaded plus empty trailer/container unit miles, divided by loaded trailer/container unit miles.” URCS Manual, pp. 18, 36.

⁴¹ For intermodal movements, multiple containers could be loaded on the same intermodal car. Therefore, when calculating GTMs for intermodal movements, the intermodal car tare weight is divided by the number of containers traveling with a car (on average) to avoid over-counting the intermodal car tare weight. To be consistent with the URCS method, the average number of containers loaded on a car is calculated for each car type using the UP waybill data and BNSF waybill and event data. *See* URCS Phase III Railroad Cost Program. For each movement, the intermodal car’s tare weight included in the GTM calculation is equal to the intermodal car’s full tare weight divided by the average number of containers on an intermodal car of the same car type. A small percentage of intermodal cars in UP’s waybill data in 2021 and 2022 are missing tare weight and car type. For intermodal CSNs associated with these intermodal cars, the average intermodal car tare weight per container among cars included in the GTM calculation is applied as the intermodal car tare weight.

37. The gross ton mileage calculated for each movement after applying the empty/loaded ratios as described above is then further scaled up by the system-wide ratio of locomotive and non-revenue GTMs to total GTMs reported in the R-1 forms of each railroad to account for locomotive tonnage and other non-revenue generating sources of gross tonnage mileage.⁴² These scaled up on- and off-segment movement-level GTMs⁴³ are then multiplied by the on- and off-segment fixed costs per GTM calculated using the density data, respectively, to estimate the on- and off-segment fixed costs for each movement.

⁴² UP 2021 R-1, Schedule 755; UP, Class I Railroad Annual Report to the Surface Transportation Board for the Year Ending Dec. 31, 2022 (“UP 2022 R-1”), Schedule 755; BNSF, Class I Railroad Annual Report to the Surface Transportation Board for the year ending December 31, 2021 (“BNSF 2021 R-1”), Schedule 755; BNSF, Class I Railroad Annual Report to the Surface Transportation Board for the Year Ending December 31, 2022 (“BNSF 2022 R-1”), Schedule 755.

⁴³ On-segment and off-segment GTMs are calculated using the same methodology, except that on-segment GTMs are based on the on-segment miles of each movement and off-segment GTMs are based on the off-segment miles (i.e., total miles less on-segment miles) of each movement.

BEFORE THE
SURFACE TRANSPORTATION BOARD

Finance Docket No. 22218

ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY
—OPERATING RIGHTS—
SOUTHERN PACIFIC TRANSPORTATION CO.

VERIFIED STATEMENT OF HARVEY A. CROUCH, PE

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I. INTRODUCTION

A. Qualifications

My name is Harvey A. Crouch, PE. I have worked for 33 years as President of Crouch Engineering. I began my railroad career in 1977 as a Co-op Engineer with Southern Railway Company. I worked for Southern Railway and then its successor, Norfolk Southern Railway, as an engineer, project engineer, and track supervisor until 1987. After earning a Masters of Science in Environmental Engineering and working with TVA in its Water Quality Department, I founded Crouch Engineering in 1991. Over the years, my work has included supervising hundreds of capital improvement, maintenance, and inspection projects across the United States, for most of the Class 1 railroads, and many short line and regional railroads, involving all types of railroad assets. Details of my experience are provided in my Curriculum Vitae included as Exhibit A.

In working on this project, I was assisted by Crouch Engineering's highly experienced railway engineers: Kevin Lindsey, PE, bridge expert and Director of Structures; Jay Harris, PE, railway track engineering expert and Director of Track Projects; Jack McLain, PE, Project Manager and former Assistant Chief Engineer - Design for Norfolk Southern Railway; Kyle McKinney, PE, engineer and stand-alone cost case expert; and Randy Zeiger, PE, tunnel and geotech expert. Over the years, their work has included supervising hundreds of capital improvement, maintenance, and inspection projects across the United States, for most of the Class 1 Railroads, and many short line and regional railroads, involving all types of railroad assets. Details of my team's combined 120 years of railway engineering experience and expertise are provided in their individual Curriculum Vitae included as Exhibit B.

B. Assignment

I have been asked by counsel for Union Pacific Railroad (“UP”) to develop the Reproduction Cost New Less Depreciation (“RCNLD”) value for certain railroad track assets owned by UP between Mojave and Kern Junction, California (the “Mojave-Kern Line” or “subject track”). The “subject track” for my RCNLD valuation consists of the Mojave-Kern Line’s main line track, which includes sections of single track and double track main line, passing tracks, the track roadbeds, and all other tracks and track related assets owned by UP between Mojave and Kern Junction, such as bridges, tunnels, signals, and public improvements. The as-of date for my RCNLD valuation is January 1, 2023.

My RCNLD valuation of the subject track estimates the costs of reproducing the Mojave-Kern Line in its present condition. In my statement below, I describe how I develop the reproduction costs and condition assessment of the subject track. In developing my valuation, I first estimate the costs of reproducing the subject track’s assets in new condition. I then perform a condition assessment to determine the assets’ remaining useful life for each asset category, and I use the remaining life information to develop depreciated values of the assets.

In addition, as part of my assignment, I was asked to incorporate into my calculations a RCNLD valuation for the real estate associated with the subject line that was independently developed by Charles W. Rex III, MAI, of RMI Valuation, Inc.

C. Materials Considered

I develop the reproduction costs of the subject track by estimating the quantities and costs of work and material that would be required to construct the Mojave-Kern Line. My estimates are based on information produced in this proceeding by UP, my and my team’s physical inspections of the subject track during multi-day site visits on March 13-16 and March 27-30, 2023, Interstate Commerce Commission records, data from the California Department of Transportation

(“Caltrans”), other documents described below, and my and my team’s professional judgments as engineers. My condition assessment of the subject track is based on records produced by UP, inspections performed during site visits, engineering studies on lives for specific assets, other documents described below, and my and my team’s professional judgements as engineers.

D. Summary of Opinion

The table below summarizes my opinion of the reproduction cost new value and physical depreciation of the subject track, the total RCNLD valuation after incorporating the real estate valuation provided by Mr. Rex, and the net RCNLD after subtracting the value of investments made in the subject track by BNSF. My reproduction cost new estimate is conservative in many respects, particularly in adopting mobilization, engineering, and contingency factors based on precedent established in prior cases before the Surface Transportation Board.

**Table 1: Mojave-Kern Line
Reproduction Cost New Less Depreciation¹**

1. RCNLD Valuation (without real estate)	
1a. Reproduction Cost New	\$833,153,735
1b. Less Physical Depreciation	\$220,197,500
1c. Reproduction Cost New Less Depreciation (RCNLD)	\$612,956,235
2. RCNLD Real Estate Valuation	
2a. Real Estate Cost²	\$115,675,000
3. Total Reproduction Cost New Less Depreciation	\$728,631,235
4. BNSF Funded Investments³	\$39,026,339
5. Net Reproduction Cost New Less Depreciation	\$689,604,896

¹ See Crouch Workpaper “Total Summary of Costs.xlsx,” tab “Summary.”

² See Verified Statement of Charles W. Rex III, MAI.

³ See Crouch Workpaper “BNSF AB Credits.xlsx.”

II. OVERVIEW OF THE MOJAVE-KERN LINE

The Mojave-Kern Line is an approximately 67.8-mile railroad line. The line begins at Kern Junction, in Bakersfield, California, climbs eastward to Tehachapi, then descends eastward into Mojave, California. Between Kern Junction and Bena, California, the track traverses terrain that varies from flat to rolling, rising from an altitude of 412 feet above sea level at Kern Junction, to 892 feet above sea level at Bena, as shown below in Figures 1 and 2.

Figure 1: Kern Junction, near MP 313.56, looking east



Figure 2: Between Kern Junction and Bena, looking east



East of Bena, the Mojave-Kern Line crosses through extremely challenging terrain along the Tehachapi River, passing through 12 railroad tunnels and ascending to 4,025 feet at its highest point in Tehachapi before descending to an altitude of 2,777 feet in Mojave, as shown below in Figures 3, 4, 5, and 7.

Figure 3: Between Bena and Tehachapi, looking east



**Figure 4: Near MP 335.2
(Bridge in foreground; BNSF train in background)**



Figure 5: Near MP 343.57



Figure 6: Between Tehachapi and Mojave, looking east



The Mojave-Kern Line is probably best known for a feature called the Tehachapi Loop. The Tehachapi Loop is a 3,779-foot spiral of track rising at an approximately two-percent grade that allows trains to gain 77 feet of elevation over a very short lateral distance, as shown below in Figure 7.

Figure 7: View of Tehachapi Loop from above Tunnel No. 9



In all, the Mojave-Kern Line has 54.7 route mile segments of double track and 13.1 route mile segments of single track, fully controlled by means of Centralized Traffic Control (“CTC”) and Positive Train Control (“PTC”), with maximum speeds ranging from 25 mph to 60 mph, depending on the severity of the grade and curvature. It also has 12 concrete-lined tunnels totaling 5,425 feet in length, as well as 140 culverts, 73 bridges, and 12 retaining walls.

The Mojave-Kern Line’s geographic limits, asset components, and asset locations are labeled on the Map Exhibit found in Crouch Workpaper “1.0 - UP Mojave Kern JF Plan Exhibit.pdf,” contained in folder “1 - Maps and Exhibits.”

III. REPRODUCTION COST NEW LESS DEPRECIATION

My analysis focuses on the reproduction of all assets within the limits of the subject track in their current condition. In the sections below, I describe the processes I use to develop the costs of reproducing the various categories of assets that form the subject track. Generally speaking, my process involves developing inventories for each category of asset that identify (i) the relevant quantities of assets, and (ii) the conditions of existing assets based on installation dates or by

observations. I develop the estimated costs to construct the assets, then reduce the construction costs as appropriate based on the condition of the assets in place. I describe the details below and in my accompanying workpapers.

A. Roadbed Preparation

Preparing land for railroad operations requires clearing the land of vegetation, grading earth and rock into a suitable right-of-way, providing for lateral drainage, culverts, and retaining walls, and seeding and mulching areas disturbed by construction. I discuss each of these elements of construction costs in the sections below.

1. Clearing and Grubbing and Erosion Control

Clearing is the process of removing brush and trees. Grubbing is the process of removing roots and stumps. Clearing vegetation and grubbing roots and stumps from the right-of-way is an initial step in roadbed preparation. Prior to clearing and grubbing, standard practice is to furnish and install erosion and sediment control devices such as silt fence and rock check dams to prevent soil and sediments from leaving the construction site and entering streams and tributaries to waters of the United States.

a) Quantities

(1) Clearing and Grubbing

During my site visits, I observed that vegetation exists all along the subject track, varying from grass to light brush, to wooded areas. Based on my observations of the subject track roadbed, ballast sections, ditches, cut and fill slopes, and track centers, I determined it is reasonable to use UP's standard roadbed sections to develop roadbed widths, which are used as the basis for clearing and grubbing, adding slope distance and room for shaping slopes and other grading activities along the subject track roadbed. Clearing limits were established by using UP typical roadbed sections to develop a standard width for the development of the roadbed, with the assumption of a 5' fill

on one side and 5' cut with a ditch on the other side, totaling 90' for double track and 75' for single track. *See* Crouch Workpaper "UP Mojave Roadbed and Sub-ballast Calculator.xlsx," Tab "Clearing and Seeding," contained in folder "2 - Grading."⁴ I then calculate the number of acres needing clearing and grubbing by dividing the subject track into single track and double track segments, then multiplying the horizontal distance of the clearing and grubbing limits by the track foot length of each segment, excluding bridges, tunnels, and crossings. *See* Crouch Workpaper "UP Mojave Roadbed and Sub-ballast Calculator.xlsx," Tabs "Summary," "Clearing and Seeding," contained in folder "2 - Grading"; *see also* Crouch Workpaper "Track Construction Costs.xls," Tab "Quantity Calculator," contained in folder "3 - Track" (calculating double track and single track for grading calculations).

(2) Silt Fence

A silt fence is a temporary sediment barrier made of porous fabric. The purpose of silt fencing is to retain the soil on a construction site until the construction is sufficiently completed to allow revegetation and permanent soil stabilization to begin. Based on my observation of the subject track and local terrain during site visits, I provide for silt fencing along either one or both sides of the roadbed.

Specifically, between MP 313.57 and MP 325.50, I provide for silt fencing on both sides of the roadbed to address the grading impacts anticipated on the rolling terrain between Kern and Sandcut. Between MP 325.50 and MP 360.0, I provide for silt fencing on just one side of the roadbed between Sandcut and Tehachapi, because the roadbed is generally perched on the side of hills and mountains, and sediments cannot migrate uphill due to gravity. Between MP 360.0 and

⁴ Diagrams of UP's typical roadbed sections can be found in Crouch Workpapers "0001.pdf" and "0002.pdf," contained in folder "1 - Maps and Exhibits," within the "Track Standards" folder.

MP 381.43, I provide for silt fencing on both sides of the roadbed on the milder mountain grades and level to rolling terrain between Tehachapi and Mojave. *See* Crouch Workpaper “UP Mojave Roadbed and Sub-ballast Calculator.xlsx,” Tabs “Summary,” “Silt Fence,” contained in folder “2 - Grading.”

(3) Rock Check Dams

Rock check dams are used during roadbed construction to slow the flow of water and to intercept soil and water from debris flowing through lateral ditches. Based on my observation of the subject track and local terrain during site visits, I provide for rock check dams between MP 325.50 and MP 360.0, where the railbed runs along the sides of hills and mountains, in ditches on the upslope side of the railbed. More specifically, I provide for one 10-linear foot check dam every 150 linear feet. *See* Crouch Workpaper “UP Mojave Roadbed and Sub-ballast Calculator.xlsx,” Tabs “Summary,” “Check Dams,” contained in folder “2 - Grading.”

b) Reproduction Cost New

To develop unit costs for clearing and grubbing and erosion control, I use information from a database created by the California Department of Transportation (“Caltrans”). Caltrans maintains a database of historic unit costs from past highway construction projects by year, location, item descriptions, quantities, and documented costs. Linear highway roadbed construction is essentially the same as linear railroad roadbed construction, employing the same basic materials, equipment, and methods for clearing and grubbing, erosion and sediment control devices, excavation, borrow, embankment, and other construction activities. Use of Caltrans cost data is particularly appropriate in this proceeding because it is the most geographically and regionally specific cost data available for projects similar in magnitude to construction of the subject track.

Further, the Caltrans database allows me to filter cost data to focus on similar geographic regions, project magnitudes, asset quantities, and time frames. Geographically, I use data from

Districts 6, 7, 8 and 9, as shown below in Figure 8. My workpapers show the other filters I use to identify relevant unit costs and how I develop weighted unit costs using the data.

Figure 8: Caltrans Project Data Districts



My calculation of costs for clearing and grubbing can be found in Crouch Workpaper “Grading & Site Costs.xlsx,” Tabs “Summary,” “Clearing,” “Silt Fence,” “Check Dams,” contained in folder “2 - Grading.”

c) Condition assessment

Clearing and grubbing and erosion control are part of roadbed preparation. In my experience, the roadbed of a properly maintained railroad has an indefinite remaining useful life. Improvements such as clearing and grading are considered never to “wear out:” or become obsolete. Such improvements do not deteriorate with use or passage of time if they are properly maintained. Based on my observation, the subject track has been properly maintained. Assuming proper maintenance continues, there should never be a need for future clearing or grubbing of the

subject track. It is my opinion that the overall condition of the roadbed and trackage grading assets reflect no physical depreciation.

2. Earthwork

a) Reproduction Cost New

Earthwork is performed to reconfigure the topography of a site to prepare it to be built upon. It includes excavation, in which portions of soils and rock are removed to reach the roadbed subgrade, and borrow, in which material is moved to the site to construct embankments to reach subgrade levels. Earthen materials excavated down to the subgrade elevations are either used in the construction of roadbed embankments or are spoiled (wasted, along the subject line). Where not enough excavated material is available to construct the necessary embankments, borrowed earthen materials are brought in to complete the construction.

To develop the excavation and borrow quantities for the subject track, I obtained a copy of the original Interstate Commerce Commission Grading Report (“ICC Report”), in which construction quantities for the original Mojave-Kern Line are recorded, from the National Archives. *See* Crouch Workpaper “Southern_Pacific-VS22_CA_001thru072.pdf,” contained in folder “2 - Grading.” The ICC Report provides cut (excavation) and borrow (fill) quantities in cubic yards. I use the excavation and borrow data from the ICC Report for to estimate the quantities of excavation and borrow required to reproduce the subject track. My calculation of cut and fill quantities from the ICC Report can be found in Crouch Workpaper “UP Mojave Roadbed and Sub-ballast Calculator.xlsx,” Tabs “Summary,” “Grading,” contained in folder “2 - Grading.”

To develop costs for excavation and borrow activities, I use the Caltrans database described above, as excavation and borrow activities are the same in the context of highway and railroad construction. My calculation of earthwork costs can be found in Crouch Workpaper “Grading & Site Costs.xlsx,” Tabs “Summary,” “Cut,” “Borrow,” contained in folder “2 - Grading.”

b) Condition assessment

Earthwork is part of roadbed preparation. In my experience, the roadbed of a properly maintained railroad has an indefinite remaining useful life. Based on my observation, the subject track has been properly maintained. The existing roadbeds were constructed primarily in the 1800s, with some washout repairs and other modifications occurring over time. In some places, roadbed slopes have been fortified, as needed over time, with placement of rip rap stone or other slope stabilization measures. The original roadbed is largely still in place, as originally constructed.

As evidenced by the current train operations on many Class 1 railroads in the United States over roadbeds originally constructed in the 1800's, railroad roadbeds have a very, very long useful life. This empirical evidence supports that the majority of cuts and embankments currently in place within the Joint Facility will be in use for centuries to come.

It is my opinion that the overall condition of the roadbed and trackage grading assets reflect no physical depreciation.

3. Lateral Drainage

In my development of reproduction costs of the subject track, I assume lateral ditches along the roadbed shoulders would be formed during, and within the process of, routine grading activities, including excavation of materials. Under this assumption, earthwork quantities provided in the ICC Report account for grading of lateral ditches. I therefore assume no additional excavation-related grading work or costs are attributed to lateral drainage.

In Section III.A.1.a.3, Rock Check Dams - Quantities, I discuss the use of rock check dams in lateral ditches to slow the flow of stormwater runoff, allowing for some sediments to settle in the ditches, as a component of erosion and sediment control.

4. Culverts

a) Reproduction Cost New

Culverts are used to allow water to flow under roadbeds at natural drainage and stream crossings. To develop the quantities and costs of culverts necessary to reproduce the subject track, I used documents produced by UP⁵ to develop an inventory that included information about culvert locations, lengths, types, materials, and year built. My team then verified culvert locations and types during field visits. *See* Crouch Workpaper “Mojave Field Verification_Culvert_Inventory.xlsx,” Tab “Culvert Inv. - UP Inspection,” contained in folder “5.3 - Culverts.” They also assessed the condition of the culverts they observed. *See* Crouch Workpaper “Mojave Field Verification_Culvert_Inventory.xlsx,” Tab “Culvert Inv. - Life Remaining,” contained in folder “5.3 - Culverts.” The types of culverts along the subject track vary greatly in terms of culvert type, size, and inlet and outlet protection. The culvert types include structural plate pipe; corrugated metal pipe; smooth steel pipe; wood box; corrugated metal pipe; cast iron pipe; vitrified clay pipe; concrete pipe; concrete arch; and concrete box. Examples of culverts are shown below in Figures 9, 10, and 11.

⁵ *See* Crouch Workpaper “UP-MK-000411 to UP-MK-000563.pdf,” contained in folder “5.1 - Bridges.”

Figure 9: Smooth Steel Pipe Culvert at MP 316.45



Figure 10: Concrete Arch Culvert at MP 358.27



Figure 11: Corrugated Metal Pipe Culvert at MP 340.99

To determine the cost to reproduce the culverts along the subject track, I use culvert cost data from the Caltrans database. Culverts used in highway construction are essentially the same as culverts used in rail construction. First, I develop a list of every type of culvert on the subject track. Second, I use the Caltrans database to develop a cost per linear foot for every type of culvert, except arch and box culverts, for which there was no data in the Caltrans database. For arch and box culverts, I separately develop a cost per liner foot by (i) identifying the approximate quantities of their components (*i.e.*, concrete and rebar for stone and concrete culverts, timber for wood culverts) based on the size of the culverts, and (ii) using component prices from the Caltrans database. I then apply the relevant cost per linear foot to each of the culverts, based on their length. I also use Caltrans data to calculate costs of wingwalls for those culverts with wingwalls based on the quantity of concrete and rebar that would be used to construct them. The detailed calculations

can be found in Crouch Workpaper “UP Mojave - Culverts - All Cost Summary.xlsx,” contained in folder “5.3 - Culverts.”⁶

b) Condition assessment

I develop the remaining useful life of existing culverts based on their current condition rating and the projected deterioration rate. As noted above, my team assessed the condition of culverts based on observations during site visits. Based on those assessments, they assigned each culvert a rating on a scale of 0 through 9, using the National Bridge Inventory (“NBI”) condition rating scale provided by the Federal Highway Administration (“FHA”). (The NBI does not provide condition rating forecasts for culverts.) The rating scale is reproduced below in Figure 12.

Figure 12: NBI Condition Rating Code and Descriptions

Code	Condition	Description
N	NOT APPLICABLE	Component does not exist.
9	EXCELLENT	Isolated inherent defects.
8	VERY GOOD	Some inherent defects.
7	GOOD	Some minor defects.
6	SATISFACTORY	Widespread minor or isolated moderate defects.
5	FAIR	Some moderate defects; strength and performance of the component are not affected.
4	POOR	Widespread moderate or isolated major defects; strength and/or performance of the component is affected.
3	SERIOUS	Major defects; strength and/or performance of the component is seriously affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions.
2	CRITICAL	Major defects; component is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions in order to keep the bridge open.
1	IMMINENT FAILURE	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
0	FAILED	Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.

⁶ Within the workpaper, Tab “Culvert - Summary” contains a cost estimate for each culvert; Tab “Culvert Inv. - UP Inspection” contains information about each culvert and the development of its costs; Tab “CulvertCostMaster” contains the unit price per linear foot for each type of culvert; Tab “Box Culverts” shows the development of price per linear foot for box and arch culverts; Tab “CaltransWingWalls” shows the development of the amount of concrete and rebar in wingwalls.

In addition, within the folder “5.3 - Culverts,” the folder “Caltrans Unit Costs” contain individual files showing the development of costs per linear foot for the various types of culverts, as well as the costs for concrete, rebar, and lumber. The folder “Box Culvert Exhibits” contains files showing the development of concrete and rebar quantities for box culverts.

To estimate the remaining useful life of a culvert, deterioration rates for steel and concrete culverts with known ages are calculated using NBI data for 20 steel highway bridges and 223 concrete bridges in Kern County, California, and NBI's Proportional Hazards Deterioration.⁷ Model. Kern County was used because bridges there would experience the same general environment as structures on the subject line. By subtracting the current structure rating from the maximum rating of 9 and dividing this value by the age of the structure, a linear deterioration rate is established. This can then be used to forecast when the culvert will reach a "deficient" rating of 3. The average deterioration rate for all culverts of a particular material is used to calculate a remaining useful life.⁸ The remaining life results are then calculated as a percentage.⁹ The detailed calculations can be found in Crouch Workpaper "Mojave Field Verification_Culvert_Inventory.xlsx," Tab "Culvert Inv. - Life Remaining," contained in folder "5.3 - Culverts."¹⁰ I calculate a reproduction cost new less depreciation value for each culvert based on its estimated percentage remaining life in Crouch Workpaper "UP Mojave - Culverts - All Cost Summary.xlsx," Tab "Culvert Inv. - UP Inspection," contained in folder "5.3 - Culverts."

⁷ The deteriorations rates are calculated in Crouch Workpaper "WIP_Life Expectancy Calculations.xlsx," Tab "NBI Deterioration Rates," contained in folder "5.1 - Bridges," within the "Service Life" folder. The "Service Life" folder also contains the underlying NBI data in the folder "NBI Data."

⁸ Due to the large number of culverts, only the largest culverts were photographed and inspected. The remaining culverts were assigned a condition rating based on the ratings developed for the observed culverts of the same material. Photographs of the largest culverts are provided within folders labeled by milepost contained in folder "5.3 - Culverts."

⁹ A structure with a life span of at least 100 years is considered to have 100% life remaining.

¹⁰ Additional details regarding use of NBI data and methods are provided in Crouch Workpaper "UP Mojave - Bridges - All Cost Summary.xlsm," Tab "Methodology," contained in folder "5.1 - Bridges."

5. Retaining walls

a) Reproduction cost new

Retaining walls are used to hold back soil and prevent erosion where land slopes steeply. To develop the costs of retaining walls necessary to reproduce the subject track, I used information provided by UP to develop an inventory that included information about the locations, lengths, types, and year built of the existing retaining wall structures on the subject track. My team then verified the information during field visits. *See* Crouch Workpaper “Mojave Field Verification_Retaining Wall_Inventory.xlsx,” Tab “Retaining Inv. - UP Inspection,” contained in folder “5.2 - Retaining Walls.” They also assessed the condition of the retaining walls they observed. *See* Crouch Workpaper “Mojave Field Verification_Retaining Wall_Inventory.xlsx,” Tab “Retaining Inv. - Life Remaining,” contained in folder “5.2 - Retaining Walls.” The types of retaining walls along the subject track include jumbo block walls; rail pile walls; steel pile & lagging walls; and cast-in-place concrete walls. Examples of retaining walls are shown below in Figures 13, 14, and 15.

Figure 13: Jumbo Block Retaining Wall at MP 34090

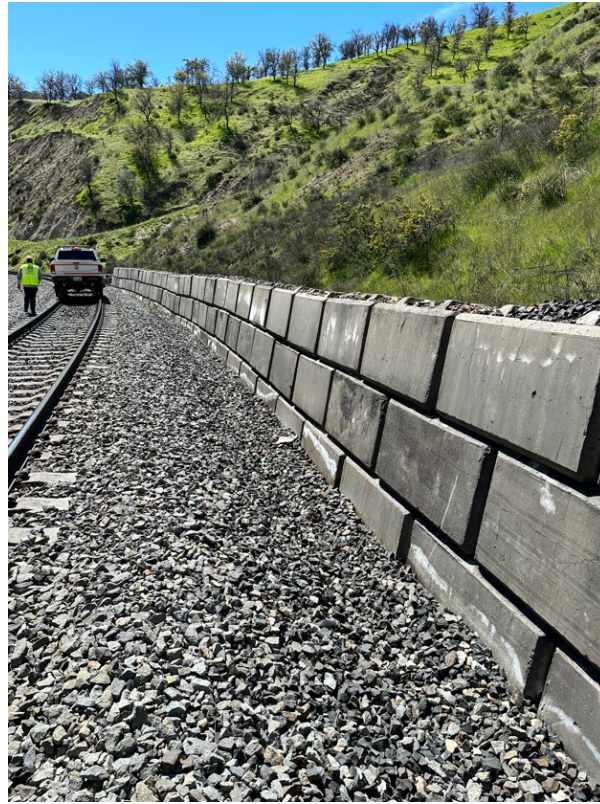


Figure 14: Cast-In-Place Concrete Wall at MP 343.83



Figure 15: Rail Pile Wall at MP 344.66



To determine the cost to reproduce the retaining walls along the subject track, I develop the quantities of materials required to construct each wall based on the wall's type, length, height, and other data. The development of unit quantities for each wall is contained in spreadsheets within the folder identifying each retaining wall (by milepost) contained in Crouch Workpaper folder "5.2 - Retaining Walls." I develop the unit costs for each type of material required to construct each wall based on unit prices from the Caltrans database, discussed above, with the exception of prices for rail for rail pile-type retaining walls, for which I use unit prices for rail from UP. The detailed calculations can be found in Crouch Workpaper "UP Mojave - Retaining Walls - All Cost Summary.xlsm," contained in folder "5.2 - Retaining Walls."¹¹

¹¹ Within the workpaper, Tab "RW - Summary" contains a cost estimate for each retaining wall; Tab "tblTotalCost" contains information about the components of each retaining wall and the development of its costs; Tab "CostsMaster" contains the unit prices for the various components of the retaining walls.

In addition, within the folder "5.3 - Retaining Walls," the folder "Caltrans Unit Costs" contain (continued...)

b) Condition Assessment

I develop the remaining useful life of existing retaining walls based on their current condition rating and the projected deterioration rate. As noted above, my team assessed the condition of retaining walls culverts based on observations during site visits. Based on those assessments, they assigned each retaining wall a rating on a scale of 0 through 9, using the FHA's NBI condition rating scale described in the discussion of culverts.

Because there is no public information that provides deterioration rates for retaining walls, I calculate the remaining life of retaining walls using deterioration rates for concrete and steel structures using NBI data and the same basic approach applied to culverts. The detailed calculations can be found in Crouch Workpaper "Mojave Field Verification_Retaining Wall_Inventory.xlsx," Tab "Retaining Inv. - Life Remaining," contained in folder "5.2 - Retaining Walls." I calculate a reproduction cost new less depreciation value for each retaining wall based on its estimated percentage remaining life in Crouch Workpaper "UP Mojave - Retaining Walls - All Cost Summary.xlsm," Tab "RW - Summary," contained in folder "5.2 - Retaining Walls."

6. Seeding and Mulching

a) Reproduction cost new

Seeding and mulching is used for erosion control, to help stabilize exposed soils and restore areas disturbed during construction activity. Seeding and mulching includes preparing the soil surface, applying lime, fertilizer, and seed, followed by an application of mulch. In developing the costs to reproduce the subject track, I provide for seeding and mulching of areas within the clearing limits described in Section III.A.1. However, I do not provide for seeding and mulching where the subballast cap on the railroad roadbed covers the soil, or where there are bridges, tunnels, or grade

individual files showing the development of the unit costs for components of the retaining walls.

crossings. *See* Crouch Workpaper “UP Mojave Roadbed and Sub-ballast Calculator.xlsx,” Tabs “Summary,” “Clearing and Seeding,” contained in folder “2 - Grading.”

To develop unit costs for seeding and mulching, I use the data from the Caltrans database. Caltrans separates seeding and mulching activities and costs, so I use the same approach. My calculation of seeding and mulch costs can be found in Crouch Workpaper “Grading & Site Costs.xlsx,” Tabs “Summary,” “Seeding,” “Mulch,” contained in folder “2 - Grading.”

b) Condition assessment

Seeding and mulching are part of roadbed preparation. In my experience, the roadbed of a properly maintained railroad has an indefinite remaining useful life. Based on my observation, the subject track has been properly maintained. Assuming proper maintenance continues, there should never be a need for future seeding and mulching of the subject track. It is my opinion that the overall condition of the roadbed and trackage grading assets reflect no physical depreciation.

B. Track Construction

As described above, the Mojave-Kern Line track includes segments of double track main line and single track main line, along with sidings used for passing trains. The materials required to construct the subject track include ballast and sub-ballast, ties, rails, and rail lubricators, and other track materials, including plates, spikes, and anchors. I discuss each of these elements of construction costs in the sections below.

1. Ballast

a) Reproduction cost new

Ballast is a layer of crushed stone or gravel placed on the surface of railroad trackbed. It holds the tracks in place, distributes the weight of trains evenly over the track bed, and provides drainage. Based on my observation of the subject track, I determined it is reasonable to develop ballast quantities using UP’s typical roadbed sections, ballast section side slopes, standard ballast

depths, and ballast shoulder widths. UP's standard designs for wood tie track construction and concrete tie track construction can be found in Crouch Workpapers "0001.pdf" and "0002.pdf," respectively, contained in folder "1 - Maps and Exhibits," within the "Track Standards" folder.

The total volume of ballast required for a given length of track is calculated by multiplying the track length (less the length of turnouts) by the ballast cross-sectional area for the corresponding unit volume of ballast, after subtracting the volume of ballast occupied by each crosstie. I base my ballast calculations on the volume quantities identified in UP's standard designs: 973 cubic yards per 1,000 feet of track for track with concrete crossties and 12" of ballast under the centerline, and 960 cubic yards per 1,000 feet of track for track with wood crossties and 19" of ballast under the centerline.

To develop the total quantity of ballast required for the subject track, I convert the volumes UP states in cubic yards per 1,000 feet of track to volume stated in tons per track foot. I also determine the number of track feet with concrete crossties and the number of track feet with wood crossties. I then multiply each distance by the appropriate volume figure. My calculation is conservative because more ballast is required under curved tracks, but I treated all tracks as tangent track. *See* Crouch Workpaper "Track Construction Costs.xlsx," Tabs "Quantity Calculator," "Tie Inventory," contained in folder "3 - Track."

To develop unit costs for ballast, I use average prices of ballast based on costs UP actually billed BNSF for purchases of a minimum of 500 tons of ballast installed on the subject track, adjusted to 2023 levels using AAR's M&S Index, and converted into a cost per track foot for track with concrete ties and track with wood ties. *See* Crouch Workpaper "Track Construction

Costs.xls,” Tabs “Track Unit Price Calculator,” “Mojave - Kern Material Billed,” “Cost Index,” contained in folder “3 - Track.”¹²

Finally, I develop a total cost by multiplying the ballast quantity by the ballast unit cost. My calculation of ballast costs can be found in Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

b) Condition assessment

The remaining useful life for ballast is indefinite because ballast is not removed ahead of, during, or following maintenance. Instead, when rail is replaced, crossties are replaced, or track is surfaced in line maintenance programs, additional ballast is placed and distributed, on top of existing ballast. This work is done as a part of regular maintenance. Based on my observation of the subject track, the track appears to be regularly and well maintained, as one would expect of such actively used line. It is my opinion that the overall condition of the ballast on the subject track reflects no physical depreciation.

2. Subballast

a) Reproduction cost new

Subballast is a layer of material placed under the ballast. A subballast cap seals the soil roadbed, is sloped to drain storm runoff away from the track structure, and transfers track loading from the ballast section into the subgrade. Based on my observation of the subject track, I determined it is reasonable to develop subballast quantities using UP’s standard designs for track construction. *See* Crouch Workpapers “0001.pdf” and “0002.pdf,” respectively, contained in folder “1 - Maps and Exhibits,” within the “Track Standards” folder.

¹² UP produced the Mojave-Kern material billing information in discovery. *See* Crouch Workpaper “UP-MK-000069-HC.xlsx,” contained in folder “3 - Track.”

Using the volume quantities identified in UP's standard designs, I calculate volumes of subballast per foot of track: 1.11 cubic yards per foot of track for a single track section with a 12" depth, and 1.67 cubic yards per foot of track for a double track section with 12" depth. Then, to develop the total quantity of subballast required for the subject track, I determine the number of single track and double track miles included in the subject track, excluding track foot length for bridges, tunnels, and crossings, and multiply each distance by the appropriate volume figure. *See* Crouch Workpaper "UP Mojave Roadbed and Sub-ballast Calculator.xlsx," Tab "Grading," contained in folder "2 - Grading." *See also* Crouch Workpaper "Track Construction Costs.xls," Tab "Quantity Calculator" contained in folder "3 - Track" (calculating double track and single track for grading calculations).

To develop costs for subballast, I use the Caltrans database described above. Subballast material used for railroad construction is roughly equivalent to the gradation of Caltrans subbase and base aggregate, Class 2. Subballast costs typically includes furnishing, hauling, placing, shaping, and compacting the subballast materials. This approach is used by UP and some other Class 1 railroads and is used by Caltrans for highway construction projects. My calculation of subballast costs can be found in Crouch Workpaper "Grading & Site Costs.xlsx," Tabs "Summary," and "Subballast," contained in folder "2 - Grading."

b) Condition assessment

The remaining useful life for subballast is indefinite, because subballast is not removed ahead of, during, or following any regular maintenance activities. It will remain under the ballast and track indefinitely. Further, during my observation of the subject track, I did not observe any conditions suggesting deterioration of subballast. It is my opinion that the overall condition of the subballast on the subject track reflects no physical depreciation.

3. Ties

a) **Reproduction cost new**

Crossties are used in track construction to support the steel rails and to transfer and distribute train loading from the rail, through the ties, to the track ballast. To develop the quantities and costs of ties necessary to reproduce the subject track, I used documents produced by UP¹³ to develop an inventory that includes information about the location, type, and age of crossties on the subject track. My team then verified the information during field visits. *See* Crouch Workpaper “Track Construction Costs.xlsx,” Tab “Tie Inventory,” contained in folder “3 - Track.”

As noted in the UP documents, and as observed in the field, concrete ties are used for all track except in tunnels, on some bridges, on the track approaches to some turnouts, and where temporary track panels have been installed following derailments. In tunnels, treated hardwood timber ties were used (7” x 9” x 8’6” in dimension). Where timber ties are used for temporary panelized track installations following derailments, the timber ties are replaced within a short time with concrete ties.

To determine the number of ties required for the subject track, I use concrete ties (except for track in tunnels, where I use timber ties). Based on the observed spacing of ties on the subject track, for concrete ties, I use a standard spacing of 24” from center of tie to center of tie, equivalent to 0.5 concrete ties per track foot, and for timber ties, I use a standard timber tie spacing of 19.5” from center of tie to center of tie, equivalent to 0.615 timber ties per track foot. I calculate the total number of concrete and timber ties required by applying the observed spacing to the total track feet of track with concrete ties and track with timber ties, after adjusting for turnouts. My

¹³ *See* Crouch Workpaper “UP-MK-000062-C.xlsx,” contained in folder “3 - Track.”

calculations can be found in Crouch Workpaper “Track Construction Costs.xlsx,” Tabs “Quantity Calculator.”

To develop unit costs for ties, I use the average prices of concrete and timber ties based on costs UP actually billed BNSF for purchases of a minimum of 500 concrete ties or 100 lumber ties installed on the subject track, adjusted to 2023 levels using AAR’s M&S index. *See* Crouch Workpaper “Track Construction Costs.xls,” Tabs “Track Unit Price Calculator,” “Mojave - Kern Material Billed,” “Cost Index,” contained in folder “3 - Track.”

Finally, I develop the total cost for ties by multiplying the quantities of concrete and wood ties by the corresponding unit costs. My calculations of tie costs can be found in Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

b) Condition assessment

I develop the remaining useful life of ties based on their age of installation and expected lifespan. I use a timber tie lifespan of at least 20 years and a concrete tie lifespan of 30 years based on my experience and knowledge. As discussed above, I used information provided by UP to develop a tie inventory that includes information about the location, type, and age of crossties on the subject track. I use the information about type and tie age—based on the dates ties were installed—to calculate the average remaining useful life of the ties in percentage terms for concrete and timber ties. My calculations can be found in Crouch Workpaper “Track Construction Costs.xls,” Tab “Tie Inventory,” contained in folder “3 - Track.” I then use the average remaining life percentages to calculate the reproduction cost new less depreciation for ties that would be used to reproduce the subject track. *See* Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

4. Rail

a) Reproduction cost new

To develop the quantities and costs of rail necessary to reproduce the subject track, I used documents produced by UP¹⁴ to develop an inventory that included information about the location, weight, and age of rail on the subject track, and whether the rail is on a curve. My team then verified the information during field visits. *See* Crouch Workpaper “Track Construction Costs.xlsx,” Tab “Rail Size Inventory,” contained in folder “3 - Track.”

As noted in the UP documents, and as observed in the field, the subject track has segments of 141-pound, 136-pound, and 133-pound rail. 141-pound rail is used for approximately 68% of the track miles, 136-pound rail is used for approximately 28% of track miles, and 133-pound rail is used for approximately 4% of track miles. Based on my experience, only small amounts of the 133-pound rail are currently being produced. In developing rail quantities, I use 136-pound rail in lieu of 133-pound rail.

My calculation of rail quantities that would be used to reproduce the subject track can be found in Crouch Workpaper “Track Construction Costs.xls,” Tabs “Quantity,” “Rail Size Inventory,” contained in folder “3 - Track.”

To develop unit costs for rail, I use the average prices for 141-pound and 136-pound rail based on costs UP actually billed BNSF for purchases of a minimum of 500 linear feet of rail installed on the subject track, adjusted to 2023 levels using AAR’s M&S index. *See* Crouch Workpaper “Track Construction Costs.xls,” Tabs “Track Unit Price Calculator,” “Mojave - Kern Material Billed,” “Cost Index,” contained in folder “3 - Track.”

¹⁴ *See* Crouch Workpaper “UP-MK-000061-C.xls,” contained in folder “3 - Track.”

Finally, I develop a total cost for rail by multiplying the quantities of 141-pound and 136-pound rail by the corresponding unit costs. My calculation of rail costs can be found in Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.” I then use the average remaining life percentages to calculate the reproduction cost new less depreciation for rail that would be used to reproduce the subject track. *See* Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

b) Condition assessment

I develop the remaining useful life of rail based on the age of rail installed. In my calculations, I use an expected useful life of 23 years for tangent track and 9 years for rail in curves, based on review of rail changeout data provided by UP and discussions with UP engineering personnel and the UP manager of track maintenance for the subject track. To determine the remaining life of rail, I first classify the rail in each segment in the rail inventory as tangent track or in a curve based on whether its age is greater than 9 years. I then subtract the actual age of the rail from the relevant expected useful life to determine the rail’s remaining useful life. I next calculate the average remaining life in percentage terms for 141-pound and 136-pound rail on the subject track. *See* Crouch Workpaper “Track Construction Costs.xlsx,” Tab “Rail Size Inventory,” contained in folder “3 - Track.” Finally, I use the average remaining life percentages to calculate the reproduction cost new less depreciation for track that would be used to reproduce the subject track. *See* Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

5. Field welds

a) Reproduction cost new

Based on my observation of the subject track, the entire Mojave-Kern line is continuous welded rail. During field visits, I observed segments of temporarily installed track panel using

jointed rail following track damage from derailments, but my understanding is that joints are removed by field welding rail within very short timeframes.

To develop the quantities of field welds needed to reproduce the subject line, I calculate the number of field welds needed to weld the ends of 1,400 linear foot strings of welded rail to create continuous welded rail for the entire subject track. *See* Crouch Workpaper “Track Construction Costs.xls,” Tab “Quantity Calculator,” contained in folder “3 - Track.”

To develop unit costs for field welds, I use the average prices for field weld kits based on costs UP actually billed BNSF for purchases of a minimum of 100 kits used for projects on the subject track, adjusted to 2023 levels using AAR’s M&S index. *See* Crouch Workpaper “Track Construction Costs.xls,” Tabs “Track Unit Price Calculator,” “Mojave - Kern Material Billed,” “Cost Index,” contained in folder “3 - Track.”

Finally, I develop a total cost for field welds by multiplying the quantities of field welds by the corresponding unit cost. My calculation of field weld costs can be found in Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

b) Condition assessment

Because field welds would be performed when rail is replaced, I use the average remaining life percentages for 136-pound and 141-pound rail, developed as described in Section III.B.4.b, to calculate the reproduction cost new less depreciation for field welds that would be used to reproduce the subject track. *See* Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

6. Turnouts

a) Reproduction cost new

To develop the quantities and costs of turnouts necessary to reproduce the subject track, I used documents provided by UP¹⁵ to develop an inventory that included information about the location, turnout frog number, weight of rail, age and other characteristics of turnouts on the subject track. My team then verified the information during field visits. I identified 44 turnouts as part of the subject track. The turnouts range in size from #11 turnouts to #24 turnouts and in rail weight from 115 to 141 pounds. *See* Crouch Workpaper “Track Construction Costs.xlsx,” Tab “Turnout Inventory,” contained in folder “3 - Track.”

To estimate the costs to reproduce the turnouts on the subject track, I use the average prices for turnouts based on costs UP actually billed BNSF for turnouts installed on the subject track, adjusted to 2023 levels using AAR’s M&S index. *See* Crouch Workpaper “Track Construction Costs.xls,” Tabs “Track Unit Price Calculator,” “Mojave - Kern Material Billed,” “Cost Index,” contained in folder “3 - Track.” In the few instances in which a billed cost was not available for a specific type or size of turnout, I use a prorated cost based on turnout size, using a similar turnout as the basis for the cost.

I also determine added labor and equipment costs associated with installing turnouts. I develop the labor and equipment cost per turnout based on information provided by UP regarding labor and equipment costs associated with a project involving construction of approximately 25,000 feet of new track in Bakersfield, California, at Kern Junction.¹⁶ My understanding is that UP billed BNSF for 50% of the cost of the project, including the labor-related costs, which are

¹⁵ *See* Crouch Workpaper “UP-MK-000272-C.xlsx.”

¹⁶ *See* Crouch Workpaper “Track Construction Costs.xls,” Tab “WO 20516 Detail Summary,” contained in folder “3 - Track.”

based on Union Pacific's collective bargaining agreement covering employees who performed the work (plus standard additives for fringe benefits, supervisory costs, and equipment),¹⁷ but BNSF declined to pay its share and therefore does not have the right to use the track. The project included installation of seven turnouts. I develop the labor and equipment cost per turnout, adjusted to 2023 levels using AAR's Wage Rates and Supplements Index, in Crouch Workpaper "Track Construction Costs.xlsx," Tabs "WO 20516 Detail Summary," "Labor Cost Index," contained in the folder "3 - Track."

Finally, I develop total labor and equipment costs for turnouts by multiplying the cost per turnout by the number of turnouts on the subject track. *See* Crouch Workpaper "Track Construction Costs.xlsx," Tab "Summary," contained in folder "3 - Track."

b) Condition assessment

Because turnouts are installed in tangent sections of track, I develop the remaining useful life of each turnouts installed on the subject track using the average useful life of rail in tangent track, developed as described in Section III.B.4.b. As discussed above, I used information provided by UP to develop a turnout inventory that includes information about the location, type, and age of turnouts on the subject track. I use information about turnout size and age—based on the dates the turnouts were installed—to calculate the average remaining useful life of the turnouts in percentage terms for turnouts of different sizes. My calculations can be found in Crouch Workpaper "Track Construction Costs.xls," Tab "Turnout Inventory," contained in folder "3 - Track." I then use the average remaining life percentages to calculate the reproduction cost new

¹⁷ Current versions of a Union Pacific document showing labor and equipment additives can be found in Crouch Workpaper "Non-Tariff Billing Procedures.pdf," contained in the folder "3 - Track."

less depreciation for turnouts that would be used to reproduce the subject track. *See* Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

7. Rail lubricators

a) Reproduction cost new

Rail lubricators are a type of wayside equipment that apply a lubricant to the gauge side of the rail so that when railcars pass over the lubricator, lubricant sticks to the rail car wheels, and is carried for some distance along the track for the purpose of reducing friction between wheels and the rail, extending rail life and wheel life. To develop the quantities and costs of rail lubricators to reproduce the subject track I used documents provided by UP¹⁸ to identify 70 rail lubricators on the subject track. *See* Crouch Workpaper “Track Construction Cost.xlsx,” Tab “Lubricator Inventory,” contained in folder “3 - Track.”

To develop unit costs for lubricators, I use the average price for lubricators based on costs UP actually billed BNSF for rail lubricators installed on the subject track, adjusted to 2023 levels using AAR’s M&S index. *See* Crouch Workpaper “Track Construction Costs.xls,” Tabs “Track Unit Price Calculator,” “Mojave - Kern Material Billed,” “Cost Index,” contained in folder “3 - Track.”

Finally, I develop a total cost for rail lubricators by multiplying the quantity of lubricators by the corresponding unit cost. My calculation of rail lubricator costs can be found in Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

b) Condition assessment

In my experience, the remaining useful life for lubricators is indefinite, as long as they are regularly maintained, filled with grease, and repaired as needed. During my observation of the

¹⁸ *See* Crouch Workpaper “Lubricator Inventory.xlsx,” contained in folder “3 - Track.”

subject track, I did not observe any conditions suggesting rail lubricators were not being regularly maintained. It is my opinion that the overall condition of the rail lubricators on the subject track reflects no physical depreciation.

8. Plates, spikes, and anchors (OTM for lumber ties)

a) Reproduction cost new

Tie plates, spikes, and rail anchors are components of track construction where timber ties are used. I develop quantities for ties plates, spikes, and anchors based on my calculation of the number of timber ties required to reproduce the subject track, *see* Section III.B.3, and UP's standard designs for track construction addressing spiking and anchor patterns, which are consistent with my observations of the subject track, and which can be found in Crouch Workpapers "0417.pdf" and "0420.pdf," respectively, contained in folder "1 - Maps and Exhibits," within the "Track Standards" folder. Specifically, I provide for two Pandrol Victor System steel tie plates, with two spikes per plate for every timber tie. I also provide for anchors every other tie. *See* Crouch Workpaper "Track Construction Costs.xlsx," Tab "Quantity Calculator," contained in folder "3 - Track."

To develop unit costs for tie plates, spikes, and anchors, I use the average price UP actually billed BNSF for purchases of these items installed on the subject track, adjusted to 2023 levels using AAR's M&S index. *See* Crouch Workpaper "Track Construction Costs.xls," Tabs "Track Unit Price Calculator," "Mojave - Kern Material Billed," "Cost Index," contained in folder "3 - Track."

Finally, I develop the total cost for tie plates, spikes, and anchors by multiplying the quantities of those items by the corresponding unit costs. My calculations can be found in Crouch Workpaper "Track Construction Costs.xls," Tab "Summary," contained in folder "3 - Track."

b) Condition assessment

I use the average remaining life percentages calculated for 136-pound rail, the rail used where the subject track has timber ties, developed as described in Section III.B.4.b, to calculate the reproduction cost new less depreciation for tie plates, spikes, and anchors that would be used to reproduce the subject track. *See* Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

9. Rail clips

a) Reproduction cost new

Rail clips are components of track construction where concrete ties are used. I develop quantities for rail clips based on my calculation of the number of concrete ties required to reproduce the subject track, *see* Section III.B.3, and UP’s standard designs for track construction addressing rail clips, which are consistent with my observations of the subject track, and which can be found in Crouch Workpapers “0201.pdf,” contained in folder “1 - Maps and Exhibits,” within the “Track Standards” folder. Specifically, I provide for two Safelok clips for every concrete tie. *See* Crouch Workpaper “Track Construction Costs.xlsx,” Tab “Quantity Calculator,” contained in folder “3 - Track.”

To develop unit costs for rail clips, I use the average price UP actually billed BNSF for purchases of Safelok clips installed on the subject track, adjusted to 2023 levels using AAR’s M&S index. *See* Crouch Workpaper “Track Construction Costs.xls,” Tabs “Track Unit Price Calculator,” “Mojave - Kern Material Billed,” “Cost Index,” contained in folder “3 - Track.”

Finally, I develop the total cost for rail clips by multiplying the quantity of clips by the corresponding unit cost. My calculations can be found in Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

b) Condition assessment

I use the average remaining life percentages calculated for the rail used where the subject track has concrete ties, developed as described in Section III.B.4.b, to calculate the reproduction cost new less depreciation for rail clips and other track material that would be used to reproduce the subject track. *See* Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”¹⁹

10. Track construction (labor and equipment)

a) Reproduction cost new

I base material costs on UP costs of materials billed to BNSF for work performed on the subject track. Costs I provide for ballast, ties, rail, field welds, and other track material do not include the costs of labor and equipment required to construct the subject track. Caltrans cost data includes labor. I included labor costs for developing costs for turnouts. And I develop labor costs for track construction below.

To develop unit costs for track labor and equipment necessary to install ballast, ties, rail, and other track material on the subject track, I develop a track construction cost per track foot based on information provided by UP regarding labor and equipment costs associated with a project involving construction of approximately 25,000 feet of new track in Bakersfield, California, at Kern Junction.²⁰ My understanding is that UP billed BNSF for 50% of the cost of the project, including the labor-related costs, which are based on Union Pacific’s collective bargaining agreement covering employees who performed the work (plus standard additives for

¹⁹ In many situations, I would determine the remaining life of tie clips based on the remaining life of ties. However, on the subject track, rail is typically replaced before ties, so here I use the remaining life of rail.

²⁰ *See* Crouch Workpaper “Track Construction Costs.xls,” Tab “WO 20516 Detail Summary,” contained in folder “3 - Track.”

fringe benefits, supervisory costs, and equipment),²¹ but BNSF declined to pay its share and therefore does not have the right to use the track. I develop a per-track foot unit cost for track constructed, adjusted to 2023 levels using AAR's Wage Rates and Supplements Index, in Crouch Workpaper "Track Construction Costs.xlsx," Tabs "WO 20516 Detail Summary," "Labor Cost Index," contained in the folder "3 - Track."

Finally, I develop total track labor and equipment costs by multiplying the unit costs by the number of track-feet, after deducting the lengths of turnouts, bridges, and crossings. *See* Crouch Workpaper "Track Construction Costs.xlsx," Tab "Summary," contained in folder "3 - Track."

b) Condition assessment

I use a combination of the average remaining life percentages for rail and ties, developed as described in Sections III.B.3.b and III.B.4.b, to calculate the reproduction cost new less depreciation for labor that would be used to install rail and ties to reproduce the subject track. My combined average life attributes one-quarter of depreciation to ties, two-quarters of depreciation to rail, and one-quarter of depreciation to ballast. *See* Crouch Workpaper "Track Construction Costs.xls," Tab "Summary," contained in folder "3 - Track."

C. Bridges

1. Reproduction cost new

I develop reproduction costs for seventy-three bridges on the subject track by developing unit quantities for each bridge and its component parts, then applying unit costs for construction from the Caltrans database, referenced above. I develop total costs for each structure, and then

²¹ Current versions of a Union Pacific document showing labor and equipment additives can be found in Crouch Workpaper "Non-Tariff Billing Procedures.pdf," contained in the folder "3 - Track."

adjust those costs based on the remaining useful life calculated for each structure, as discussed below.

To develop the unit quantities for each bridge and its component parts, I used documents produced by UP to develop an inventory that included detailed information about each bridge. I began with UP's bridge book for the Mojave Subdivision.²² UP's bridge book provides detailed information for each substructure and superstructure, including materials, overall structure length, bridge section information, span lengths, bridge heights, bridge widths, year(s) built, and deck type. UP also provided existing structures drawings for some of the bridges. Examples of bridges are shown below in Figures 16, 17, 18, and 19.

Figure 16: Bridge at MP 330.04



²² See Crouch Workpaper "UP-MK-000411.pdf," contained in folder "5.1 - Bridges."

Figure 17: Bridge at MP 346.83



Figure 18: Bridge at MP 349.74



Figure 19: Bridge at MP 350.28



During field visits, my team corroborated the information provided by UP through visual inspections, and they collected additional information regarding the bridges on UP's list where sufficient data were not provided to evaluate and estimate the replacement cost. *See* Crouch Workpaper "Mojave Field Verification_Bridge_Inventory.xlsx," Tab "Bridge Inv - UP Inspection," contained in folder "5.1 - Bridges." In addition, a condition code was assigned for each bridge based on those observations. *See* Crouch Workpaper "Mojave Field Verification_Bridge_Inventory.xlsx," Tab "Bridge Inv - Life Remaining," contained in folder "5.1 - Bridges."

To estimate the cost to reproduce the bridges on the subject track, I develop the quantity of materials required to construct each bridge based on a combination of design plans received from UP, bridge data provided by UP, and measurements and observations in the field, based on the type of structure, length, height, superstructure design, substructure design, materials of construction, and other characteristics of each bridge. The development of unit quantities for

material associated with each bridge is contained in spreadsheets within the folders identifying each bridge (by milepost) contained in Crouch Workpaper folder “5.1 - Bridges.”

I develop unit costs for each type of material required to construct each bridge using information from UP, my team’s observations in the field, unit cost data obtained using the Caltrans database, and other cost data provided by UP.²³ I use historical unit cost data from the Caltrans database because highway bridges and railroad bridges are similar with respect to the basic materials used for design and construction. Railroad bridges are designed for much heavier loads than for highway bridges. However, highway bridges are constructed using the same materials, just with less reinforcing steel, and less concrete. The detailed calculations can be found in Crouch Workpaper “UP Mojave - Bridges - All Cost Summary.xlsm,” contained in the folder “5.1 - Bridges.”²⁴

2. Condition assessment

I develop the remaining useful life of existing bridges based on their current condition rating and the projected deterioration rate using the same approach as for culverts. As noted above, my team assessed the condition of bridges based on observations during site visits. Based on those assessments, they assigned each bridge superstructure and substructure a rating on a scale of 0 through 9, using the NBI condition rating scale described in Section III.A.4.b, and shown in Figure 12.

²³ See Crouch Workpapers, folder “Form 30s,” contained in the folder “5.1 - Bridges.”

²⁴ Within the workpaper, Tab “tblTotalCost” compiles the component quantity and pricing information from the separate files for each individual bridge; Tab “CostsMaster” contains the unit prices for the various components of the bridges. In addition, within the folder “5.1 - Bridges,” the folder “Caltrans Unit Costs” contain individual files showing the development of the unit costs for components of the bridges.

To estimate the remaining useful life of the bridge superstructure and substructure, deterioration rates steel and concrete bridges are calculated using NBI data for 20 steel highway bridges and 223 concrete bridges in Kern County, California, and NBI's Proportional Hazards Deterioration Model.²⁵ Kern County was used because bridges there would experience the same general environment as structures on the subject line. By subtracting the current structure rating from the maximum rating of 9 and dividing this value by the age of the structure, a linear deterioration rate is established. This can then be used to forecast when the structure will reach a "deficient" rating of 3. The average deterioration rate for all bridge structures of a particular material is used to calculate a remaining useful life. The remaining life results for the substructure and superstructure are then calculated as a percentage.²⁶ The detailed calculations can be found in Crouch Workpaper "Mojave Field Verification_Bridge_Inventory.xlsx," Tab "Bridge Inv. - Life Remaining," contained in folder "5.1 - Bridges."²⁷ I calculate a reproduction cost new less depreciation value for each bridge based on the estimated percentage remaining life of its substructure and superstructure in Crouch Workpaper "UP Mojave - Bridges - All Cost Summary.xlsx," Tab "Bridge - Summary," contained in folder "5.1 - Bridges."

²⁵ The deteriorations rates are calculated in Crouch Workpaper "WIP_Life Expectancy Calculations.xlsx," Tab "NBI Deterioration Rates," contained in folder "5.1 - Bridges," within the "Service Life" folder. The "Service Life" folder also contains the underlying NBI data in the folder "NBI Data."

The deterioration rates for timber bridges are also calculated in the "WIP_Life Expectancy Calculations.xlsx" workpaper, and the methodology is described in Crouch Workpaper "UP Mojave - Bridges - All Cost Summary.xlsx," Tab "Methodology," contained in folder "5.1 - Bridges."

²⁶ A structure with a life span of at least 100 years is considered to have 100% life remaining.

²⁷ Additional details regarding use of NBI data and methods are provided in Crouch Workpaper "UP Mojave - Bridges - All Cost Summary.xlsx," Tab "Methodology," contained in folder "5.1 - Bridges."

D. Elevated Walkway

1. Reproduction cost new

On the subject track, an elevated walkway is located at Cliff Siding, as shown below in Figure 20. The walkway is used for crew changes and maintenance work at this location, where the subject track is perched on the side of the mountain.

Figure 20: View of Elevated Walkway



To develop unit quantities for the elevated walkway, I used information provided by UP, and my team corroborated the information and collected additional information during their field inspection. See Crouch Workpaper “UP - Mojave - EW 342.20 - Quantities.xlsx,” Tab “Sub - Summary” in folder “MP 342.20,” contained in folder “5.6 - Elevated Walkway.” To develop unit costs for the elevated walkway, I use cost data from the Caltrans database for the various materials needed to construct the elevated walkway. The cost data can be found in the folder “Caltrans Unit Costs” in Crouch Workpaper folder “5.6 - Elevated Walkway.” I develop the total cost of constructing the elevated walkway by multiplying the unit quantities by the respective unit costs.

See Crouch Workpaper “UP - Mojave - EW 342.20 - Quantities.xlsx,” Tab “EW - Summary,” in folder “MP 342.20,” contained in folder “5.6 - Elevated Walkway.”

2. Condition assessment

Based on my observation of the elevated walkway’s condition during my site visit, I did not reduce the reproduction cost new. *See* Crouch Workpaper “UP - Mojave - EW 342.20 - Quantities.xlsx,” Tab “Report Table,” in folder “MP 342.20,” contained in folder “5.6 - Elevated Walkway.”

E. Tunnels

1. Reproduction cost new

The subject track includes twelve tunnels. The existing tunnels were most likely completed by drill-and-blast means and methods in the late 1800s, along with five other tunnels that have since been eliminated, abandoned, or daylighted. All the tunnels were lined with a continuous reinforced concrete liner in the early 1920s, except for Tunnel 8, where an approximately 400-foot-long section in the center of the tunnel remains unlined. Examples of the tunnels are shown below in Figures 21, 22, and 23.

Figure 21: Tunnel 3



Figure 22: Tunnel 5



Figure 23: Tunnel 15



I develop reproduction costs for the twelve tunnels by developing unit quantities for each component of tunnel construction, then applying unit costs for construction from the Caltrans database, referenced above, and a cost quote obtained for 90-pound rail used for initial liner support in certain tunnels.

To develop the unit quantities for tunnel construction, my team used documents provided by UP to develop an inventory with information about each tunnel, including its location, length, type, and number of tracks. They then verified the information and assessed the condition of the tunnels during field visits. See Crouch Workpaper “Mojave Field Verification_Tunnel_Inventory.xlsx,” Tab “Tunnel Inv. - UP Inspection,” contained in folder “5.4 - Tunnels.” In addition, during the field visits, my team physically inspected each tunnel. Based on those inspections, they calculated unit quantities of construction elements required to reproduce

the tunnels, including quantities for bedrock excavation; initial liner supports; temporary formwork; the final liner; concrete quantities for the portals, walls, and liners; and steel reinforcing. The development of unit quantities for the construction elements for each can be found in drawings within the folder identifying each tunnel (by number and milepost) contained in Crouch Workpaper folder “5.4 - Tunnels.”

I develop unit costs for each of the construction elements required to reproduce the tunnels primarily using Caltrans data. *See* Crouch Workpaper “Tunnel Quantity Calculations.xlsx,” contained in folder “5.4 - Tunnels.”²⁸ I develop costs for each tunnel based on a drill-and-blast construction methodology. The drill-and-blast method is commonly used today in tunnel construction. There are alternative methods, such as using a tunnel boring machine; however, the geology of the rock along the subject track is conducive to using the drill-and-blast methodology.

Finally, I develop the total costs of constructing the tunnels by multiplying the unit quantities by the respective unit costs. *See* Crouch Workpaper “Tunnel Quantity Calculations.xlsx,” Tab “Quantity Per Tunnel,” contained in folder “5.4 - Tunnels.”

Because I use original construction plans to develop information about the quantity of materials used to construct the tunnels, the tunnel costs I develop do not include the costs associated with modifications that were made in the early 1990s to create additional clearance to accommodate double-stack rail cars. However, based on my observation and experience, the cost difference between constructing the tunnels without the additional clearance and constructing them without the additional clearance would be negligible—the modifications readily could have been incorporated into the original design at an insubstantial cost.

²⁸ The workpaper contains individual tabs showing the development of the unit costs for components of the tunnels. Folder “5.4 - Tunnels” also has the workpaper “Specialty Item.pdf,” which contains a cost quote for 90-pound rail used for initial liner support in certain tunnels.

2. Condition assessment

The remaining useful life for the tunnels is indefinite. Once constructed, tunnels will remain in use indefinitely. The tunnels on the subject track have remained in use for 130 years. However, tunnel liners will require maintenance over time. Based on observations during field visits, I estimate the liners have a remaining useful life of approximately 75 years. I calculate a reproduction cost new less depreciation value for the tunnels and liners in Crouch Workpaper “Tunnel Quantity Calculations.xlsx,” Tab “Quantity Per Tunnel,” contained in folder “5.4 - Tunnels.”

F. Signals / Communications

1. Reproduction cost new

The subject track is signaled territory, using Centralized Traffic Control (CTC) with Positive Train Control (PTC) signaling and dispatching to control train operations. To develop unit quantities for signals, I used information provided by UP²⁹ to develop a signal inventory, and during my site visit, I observed the signals and verified the accuracy of the inventory. *See* Crouch Workpaper “Signal Construction Costs.xlsx,” Tab “Signal Inventory,” contained in folder “4 - Signals.”

²⁹ *See* Crouch Workpaper “Signal Inventory.xlsx,” contained in folder” 4 - Signals.”

Figure 24: Cantilevered Signal at Kern Junction



Figure 25: Signal Mast near CP Bena



To develop unit costs for signals for CTC, I calculate an average cost per signal based on information provided by UP regarding the costs associated with a project involving installation of CTC on the subject track between Kern Junction and Sandcut, California. *See* Crouch Workpaper “Signal Construction Costs.xlsx,” Tab “WO 21478 Detail Summary ,” contained in folder “4 - Signals.” My understanding is that UP billed BNSF for 50% of the cost of the project, but BNSF refused to pay its share. The project included installation of seventeen signals. I develop the cost per signal, adjusted to 2023 levels using AAR’s M&S and Wage Rates and Supplements Indices,

and the total cost for installing CTC on the subject track, in Crouch Workpaper “Signal Construction Costs.xlsx,” Tabs “Signal Inventory,” “Material Cost Index,” “Labor Cost Index,” contained in folder “4 - Signals.”

To develop the cost for PTC, I use information provided by UP regarding the cost to install PTC on the subject track, adjusted to 2023 levels using AAR’s M&S and Wage Rates and Supplements Indices. *See* Crouch Workpaper “Signal Construction Costs.xlsx,” Tab “PTC Work Orders,” contained in folder “4 - Signals.”³⁰ I understand UP billed BNSF for 50% of these costs, and the parties ultimately entered into settlement agreement that addressed BNSF’s responsibility to pay for PTC on several different UP lines, including the subject track.³¹

To develop the total cost for signals on the subject track, I added the cost associated with CTC and the costs associated with PTC. Crouch Workpaper “Signal Construction Costs.xlsx,” Tabs “Summary,” contained in folder “4 - Signals.”

I also develop the costs of AEI Detectors on the subject track. I determined there are three AEI Detectors on the subject track based on information produced by UP.³² I develop a unit cost for AEI Detectors based on costs UP actually billed BNSF for AEI Detectors installed on the subject track, adjusted to 2023 levels using AAR’s M&S index. *See* Crouch Workpaper “Track Construction Costs.xls,” Tabs “Track Unit Price Calculator,” “Mojave - Kern Material Billed,” “Cost Index,” contained in folder “3 - Track.” Finally, I develop the total cost for AEI Detectors by multiplying the quantities by the unit costs. My calculations of sign costs can be found in

³⁰ *See also* Crouch Workpaper “UP-MK-001352-HC.xlsx,” contained in folder “4 - Signals.”

³¹ *See* Crouch Workpaper “UP-MK-001352-HC.xlsx,” contained in folder “4 - Signals.”

³² *See* Crouch Workpaper “UP-MK-000344-HC.xlsx,” contained in folder “3 - Track.”

Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

2. Condition assessment

The remaining useful life of the signal system used to control and operate trains is indefinite. In my experience, signal system components are routinely inspected and maintained regularly, keeping the system fully operational over time to assure safe train operations and to conform to safety rules and regulations. The signals I observed during my site visit did not appear to have any signs of deterioration. I did not reduce the replacement cost new of signals to reflect depreciation. For the same reasons, I did not reduce the replacement cost new of AEI Detectors to reflect depreciation.

G. Public improvements

I develop costs for certain public improvements in my development of reproduction costs, as discussed below.

1. Signs

The subject track contains a variety of signs along the right-of-way, including mileposts, speed signs, ENS signs, whistle posts, yield signs, and stop signs. To develop unit quantities for signs, I used information provided by UP,³³ to develop a sign inventory, and during my site visit, I observed the signs and verified the accuracy of the inventory. *See* Crouch Workpaper “Track Construction Costs.xlsx,” Tab “Sign Inventory,” contained in folder “3 - Track.”

To develop unit costs for signs, I use average prices of various signs based on costs UP actually billed BNSF for purchases of signs installed on the subject track, adjusted to 2023 levels using AAR’s M&S Index. *See* Crouch Workpaper “Track Construction Costs.xls,” Tabs “Track

³³ *See* Crouch Workpaper “Signs Inventory.xlsx,” contained in folder “3 - Track.”

Unit Price Calculator,” “Mojave - Kern Material Billed,” “Cost Index,” contained in folder “3 - Track.”

Finally, I develop the total cost for signs by multiplying the quantities by the unit costs. My calculations of sign costs can be found in Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

In my experience, once installed, the remaining useful life of signs is indefinite. The signs I observed during my site visit did not appear to have any significant deterioration. I did not reduce the replacement cost new of signs to reflect depreciation.

2. Grade Crossings

The subject track contains a variety of grade crossings along the right-of-way. To develop unit quantities for grade crossings, I used information produced by UP,³⁴ to produce an inventory of grade crossings on the subject track. My grade crossing inventory identifies a total of 121 public and private highway - railroad crossings on the subject track. Of the total number, there are 101 highway - railroad at-grade crossings, and 20 grade-separated crossings, each listed individually for main track No. 1, or for main track No. 2. I inspected these crossings during my field observations to verify the data provided by UP. The inventory provided by UP was correct, except that a new crossing was added near Kern, installed by the railroad for crew changes. The grade crossing surface materials are primarily concrete slab, with a small number that are asphalt or concrete pavement. I develop the total quantity of grade crossings based on the inventory. *See* Crouch Workpaper “Track Construction Costs.xlsx,” Tab “Road Crossing Inventory,” contained

³⁴ *See* Crouch Workpaper “UP-MK-001353-HC.xlsx,” contained in folder “3 - Track.”

in folder “3 - Track.” I also develop the total quantity of grade crossing warning signals for existing signalized crossings using the same inventory. *See id.*

To develop unit costs for grade crossings, I use average prices of for concrete crossings based on costs UP actually billed BNSF for concrete crossings installed on the subject track, adjusted to 2023 levels using AAR’s M&S Index. *See* Crouch Workpaper “Track Construction Costs.xls,” Tabs “Track Unit Price Calculator,” “Mojave - Kern Material Billed,” “Cost Index,” contained in folder “3 - Track.” I also use average costs for grade crossing warning signals based costs associated with the project involving installation of CTC on the subject track between Kern Junction and Sandcut, California, described above in Section III.F.1. *See* Crouch Workpaper “Track Construction Costs.xls,” Tab “Road Crossing Costs,” contained in folder “3 - Track.”

Finally, to develop total costs for grade crossings and warning signals, I multiply the quantities by the associated unit costs. My calculation of grade crossing and warning signals can be found in Crouch Workpaper “Track Construction Costs.xls,” Tab “Summary,” contained in folder “3 - Track.”

In my experience, the remaining useful life of grade crossings and related warning signals is indefinite. At most, these assets will require minor maintenance over time. The grade crossings and warning signals I observed during my site visit did not appear to have significant deterioration. I did not reduce the replacement cost new of for grade crossings or warning signals to reflect depreciation.

H. Mobilization, Engineering, and Contingency Costs

My development of the subject track’s reproduction costs also includes additives for mobilization, engineering, and contingencies, as discussed below.

1. Mobilization Additive

Mobilization involves the marshalling and movement of people, equipment, and supplies to the construction site. Mobilization costs would be incurred to reproduce the subject track. A mobilization factor is typically calculated as a percentage of the construction cost. I apply a 2.7% mobilization additive to all amounts consistent with STB precedent in stand-alone cost rate cases. In my opinion, the cost of mobilization is understated due to the length of the project, the difficult terrain, difficulty of access during construction, and the remote location.

2. Engineering Additive

Engineering costs would be incurred to plan, design, and manage reproduction of the subject track. I apply a 10% engineering additive to all amounts above, not including mobilization, consistent with STB precedent stand-alone cost rate cases. In my opinion, the cost of engineering is understated due to the length of the project, the difficulties associated with surveying in this rough terrain and topography, difficulty of access during construction, the level of difficulty of the design through the mountains, and the need for more design intensive efforts related to the 12 tunnels and numerous bridges, the need for designing access roads for construction, full time construction management and engineering services, and materials testing during construction.

3. Contingency Additive

A contingency account provides funds to cover unforeseen costs that might arise during construction. Unforeseen costs would be an issue even in reproducing the subject track. I apply a 10% contingency additive to all amounts above, including mobilization and contingency additive amounts, consistent with STB precedent in stand-alone cost rate cases. In my opinion, a 10% contingency is likely underestimated due to requirements for environmental studies, environmental permitting, planning, preliminary engineering studies, the need for alternate designs, constructing modern structures and the safety requirements and efforts in this extreme

terrain and topography, difficulty of access during construction, and unknowns with respect to the geology and groundwater conditions that would be encountered at each tunnel and retaining wall, as well as the remote location.

I. Land

As noted above, an a RCNLD valuation for the real estate associated with the subject line that was independently developed by Charles W. Rex III, MAI, of RMI Valuation, Inc. Mr. Rex's valuation can be found in the verified statement that he submitted in this proceeding. I incorporate the results of his valuation in the summary tables below.

IV. Summary of RCNLD Valuation

Table 2 below summarizes the reproduction costs new less depreciation for the subject track, excluding land.

**Table 2: Mojave-Kern Line
Reproduction Cost New Less Depreciation (excluding land)³⁵**

Description	STB Acct	Total Reproduction Cost New	Total Reproduction Cost New Less Depreciation
Grading & Site	003	\$97,174,145	\$97,174,145
Track			
Ties	008	\$81,124,990	\$28,580,310
Rail & OTM	009 & 010	\$131,275,766	\$60,021,882
Ballast	011	\$59,309,256	\$59,309,257
Signs	013	\$73,950	\$73,950
Turnouts/Switches	009	\$42,209,235	\$9,980,716
Crossing Costs, AEI Detectors, Lubricators	027 & 039	\$10,885,146	\$10,885,146
Signals	027	\$81,097,346	\$81,094,346
Structures			
Bridges	006	\$67,736,195	\$56,649,224
Retaining Walls	003	\$4,465,448	\$3,844,319
Culverts	006	\$8,857,441	\$6,692,156
Tunnels	005	\$87,541,822	\$79,823,687
Elevated Walkway	006	\$310,029	\$310,029
<i>Mobilization (2.7%)</i>		\$18,145,641	\$13,349,858
<i>Engineering (10%)</i>		\$67,206,077	\$49,443,917
Subtotal		\$757,412,487	\$557,232,941
<i>Contingency (10%)</i>		\$75,741,249	\$55,723,294
Total		\$833,153,735	\$612,956,235

³⁵ See Crouch Workpaper “Total Summary of Costs.xlsx,” tab “Summary.”

Table 3 below summarizes the reproduction costs new less depreciation for the subject track after including land costs.

**Table 3: Mojave-Kern Line
Reproduction Cost New Less Depreciation including Land³⁶**

Reproduction Cost New	\$833,153,735
Depreciation	\$220,197,500
Reproduction Cost New Less Depreciation	\$612,956,235
Real Estate Cost (STB Acct 002)	\$115,675,000
Total Reproduction Cost New Less Depreciation	\$728,631,235

V. Calculation of Interest Rental Payment Per Car Mile for 2023

I understand that UP is using my RCNLD valuation as part of a proceeding in which UP is asking the Surface Transportation Board to prescribe the interest rental BNSF must pay to use the subject track. UP asked me to calculate the amount of interest rental implied by my valuation on a per-car mile basis. UP supplied me with an electronic spreadsheet created by another witness, Dr. Divya Mathur, for purposes of performing that calculation.

I also understand that UP's predecessor, Southern Pacific Transportation Company, previously asked the Interstate Commerce Commission to prescribe the interest rental to be paid for use of the subject track by BNSF's predecessor, The Atchison, Topeka & Santa Fe Railway Company, and at the time, the ICC indicated RCNLD valuations should exclude the value of investments in the subject track made by ATSF. As a result, in calculating interest rental on a per-car mile basis, I subtract the value of BNSF's payments for PTC from my RCNLD valuation.

³⁶ See Crouch Workpaper "Total Summary of Costs.xlsx," tab "Summary"; Verified Statement of Charles W. Rex III, MAI.

I further understand that two recent capital projects on the subject track were funded by BNSF and the State of California, and in connection with those projects, UP and BNSF agreed that BNSF would not pay interest rental for any part of the projects. UP supplied me with information regarding the costs of those investments based on its bills for the projects, as well as BNSF's payments for PTC. *See* Crouch Workpaper "BNSF AB Credits.xlsx." In calculating the interest rental amount on a per-car mile basis, I subtract the costs of those two projects from my RCNLD valuation.

Using my RCNLD valuation, net of the value of the BNSF-funded investments described above, and Dr. Mathur's spreadsheet, which applies cost of capital and usage information to the valuation, I calculate an interest rental amount of \$1.56 per car mile for 2023. *See* Crouch Workpaper "RCNLD per car mile calculation.xlsx."

**Table 4: Mojave-Kern Line
RCNLD Per Car Mile Calculation³⁷**

[A]	RCNLD Interest Rental Base (\$M)	\$728.6
[B]	BNSF funded investments (\$M)	\$39.0
[C]	RCNLD Interest Rental Base Less BNSF Investments (\$M)	\$689.6
[D]	2022 Pre-Tax Cost of Capital	14.39%
[E]	2022 Usage Factor	62.47%
[F]	Interest Rental Payment (\$M, 2022)	\$61.98
[G]	2022 BNSF Car Miles (in Millions)	45.69
[H]	Interest Rental Payment per Car Mile (\$, 2022)	\$1.36
[I]	Inflation Adjustment to 2023	14.88%
[J]	Interest Rental Payment per Car Mile (\$, 2023)	\$1.56
[F]	$= [C] \times [D] \times [E]$	
[H]	$= [F] / [G]$	
[J]	$= [H] \times (1 + I)$	

³⁷ *See* Crouch Workpaper "RCNLD per car mile calculation.xlsx."

VERIFICATION

I, Harvey A. Crouch, declare under penalty of perjury that the foregoing is true and correct.

Further, I certify that I am qualified and authorized to file this verified statement.

Executed on May 3, 2024.

/s/ Harvey A. Crouch



Harvey A. Crouch P.E.

Crouch Engineering, Inc.

EDUCATION

Tennessee Technological University - MSCE – 1989
Tennessee Technological University - BSCE - 1982

CURRENT POSITION

President and Chief Executive Officer

PROFESSIONAL REGISTRATION

Professional Engineer - Licensed in AL, AZ, AR, CO, CT, FL, GA, HI, IL, IN, KS, KY, ME, MD, MA, MI, MN, MS, MO, MT, NE, NH, NM, NC, NV, OH, OK, OR, PA, SC, TN, TX, UT, VT, VA, WA, WV

PROFESSIONAL MEMBERSHIP

- American Railway Engineering and Maintenance-of-way Association
- American Short Line and Regional Railroad Association
- Tennessee Short Line Railroad Association
- American Society of Civil Engineers
- National Society of Professional Engineers

EMPLOYMENT HISTORY

1991- Present, President and CEO, Crouch Engineering

1990 - 1991 Project Manager - McCoy Associates, Inc.

1989 - 1990 Environmental Engineer - Tennessee Valley Authority

1988 - 1989 Graduate Research Assistant - Tennessee Tech

1986 - 1987 Track Supervisor MW&S - Norfolk Southern Corporation

1983 - 1986 Project Engineer MW&S - Norfolk Southern Corporation

1977 - 1983 Co-op Engineer and Management Trainee MW&S - Norfolk Southern Corporation

Crouch Engineering, Inc. – President and CEO - Mr. Crouch is the founder, President, and CEO of Crouch Engineering. In addition to his leadership role, he maintains a lead role in many railroad track, bridge, highway, and industrial development projects. Responsibilities include project planning and feasibility studies, planning for and work on the survey, design, and construction management tasks for large railroad capital improvement and capacity projects. Mr. Crouch has been the Engineer of Record on more than 300 Track design projects for railroads and railroad customers.

A few examples of recent project work leading the design of a 27 mile long main line between Jansen and Weston, Colorado for New Elk Coal Company; design of the interchange yard at NA Junction, CO; a new 10 mile double track design project near Gretna, VA; design of the NS Roanoke Yard including a new main track bypass around the north side of the yard; redesign of a railroad yard in Mobile, AL; design of projects for new Amtrak passenger service between Richmond and Norfolk, VA (80 miles; \$93 million), and between Lynchburg and Roanoke, VA (\$43million); planning, survey, geotechnical, design and construction project management for a new 17 Mile (12 mile long main line, 3 mile long branch line, two mile long sidings, a high speed wye track), and rehabilitation of 8 miles of





existing track to FRA Class 3 in South Bay, FL, for the South Central Florida Express; design of new tracks for the expansion of the Norfolk Southern railroad yard in Bellevue, OH; design of an expansion for Mercedes Benz USI in Vance, AL; design of a new railroad yard, an office, and repair shop in Hartsville, SC; the design of ten new railway locomotive and car repair shops across the US; and FRA compliant bridge management plans, inspections, and load ratings for many short line and museum railways.

Starting with Southern Railway Industrial Development in 1977, Mr. Crouch has over 44 years of experience in all areas of Railway Engineering, including: track and facility design for railroads and railroad customers, bridge design, FRA rules tested and Railroad certified track inspection, track and bridge rehabilitation program design, derailment analysis, construction cost estimates, route planning, construction project management; bridge inspection and rehabilitation program design; highway road and bridge design; grade crossing design; industrial development for many types of industries, local governments and private industry; safety training; railroad topographic surveys; new railroad track and bridge facility design; planning for local governments including benefit cost analyses, grant applications, and grant management for Federal Railroad Administration Grants, Appalachian Regional Commission Grants, and state grants in Alabama, Georgia, Nebraska, Texas, Tennessee, Kentucky, Pennsylvania, Michigan, etc., construction cost estimates, planning for industrial development corridors, new facilities and industrial parks, bulk transfer facilities, intermodal facilities, and hydrologic and hydraulic analyses for bridge and culvert replacements; investigation and resolution of right-of-way encroachment issues; preparation and updating of Track charts; preparation of valuation maps and location maps; preparation of plans, specifications, bid documents and contract documents, and conducting bid processes for hundreds of projects; grade separation project design and management, etc.

Mr. Crouch has worked as a railway engineering expert witness on behalf of railroad customers (shippers) on more than 10 Railroad freight rate cases before the Surface Transportation Board (2000 – 2014).

Mr. Crouch has worked with more than 200 short line and regional railroads, provides engineering services to six Class 1 railroads, and more than 200 industrial railroad customers.

As a former Southern Railway and Norfolk Southern employee, and with six Class 1 railroad clients, Mr. Crouch has vast experience and expertise in railroad track and facility design, and is familiar with AREMA and Class 1 engineering, maintenance, and operating practices, as well as FRA track safety standards, methods for inspection, identification of FRA track defects, and design of maintenance and rehabilitation programs based on achieving various FRA Classes of track.

Mr. Crouch receives annual roadway worker protection safety training, meeting the individual railroad's FRA compliance requirements, for many railroads, including CSX Transportation Railroad, UP, BNSF, CN, and Norfolk Southern Railway.

Mr. Crouch has worked on more than 200 track inspection and rehabilitation / maintenance design projects. Most projects involved making an inspection of the track, determining the scope of repairs needed to achieve the desired level of operation / speed / FRA Class of Track, preparing plans and specifications detailing the work to be performed, conducting public and private bid processes, and performing construction project management services during the work.





Kevin N. Lindsey, P.E., Director of Engineering, Crouch Engineering

EDUCATION

Tennessee Technological University - BSCE 2000

PROFESSIONAL REGISTRATION – TN License #108666 / NC License #37617

Professional Engineer – Licensed in Tennessee and 29 other states

PROFESSIONAL MEMBERSHIP

- AREMA – Committee 10; ASLRRA

EMPLOYMENT HISTORY

1997 - Present, Crouch Engineering, currently Director of Engineering - Structures

Mr. Lindsey brings over 25 years' experience in railway bridge and structures engineering, including railway bridge inspection, load rating, design, passenger platform design, and construction project engineering. He has designed, inspected and load rated hundreds of railroad bridges. Mr. Lindsey's experience also includes the design of highway bridges, retaining walls, unloading pits, and other railroad structures, as well as emergency response to railroad bridge – highway vehicle strikes.

He has a broad range of experience in the design and management of railroad bridge and structures projects, including planning, surveying, design, specifications, bid phase, and construction project management. Project management tasks have included conducting pre-construction meetings, public meetings, project documentation, invoice review, construction engineering, construction inspection, track and bridge construction inspection, and managing change orders.

His most recent project related experience includes oversight of a low level platform, overhead pedestrian access bridge, and a stair / elevator tower design project for the North Carolina Department of Transportation (NCDOT) on an existing North Carolina Railroad Company double mainline with trackage rights to Norfolk Southern and Amtrak in Kannapolis, NC. The proposed platform designed is 400' long with a 143'-4" long canopy. Mr. Lindsey has overseen all aspects of the structural design including plans and details, calculations, cost estimates and the creation of special provisions to be included in the project specifications.

Mr. Lindsey has also recently been responsible for another NCDOT passenger project, which to date has consisted of preliminary/ concept plans for a new platform with canopy and a grade separated pedestrian access, including overhead bridge and tunnel options, and a pile lagging retaining wall for the rail station in Salisbury, NC. This station is also on an existing North Carolina Railroad Company double mainline with trackage rights to Norfolk Southern and Amtrak.

Project related experience also includes the oversight of the design of the NCDOT Charlotte Gateway Station as a representative of Norfolk Southern Railway. Mr. Lindsey was responsible for confirming all plans and details for the Charlotte Gateway Station project were done according to Norfolk Southern's Public Projects Manual and Standard Specifications for Materials and Construction. Charlotte Gateway Station project include the review of plans and calculations for six railroad bridges, retaining walls and a double sided high level platform. Mr. Lindsey has also been

responsible for reviewing all construction submittals, request for information, change orders and contractor clarifications on behalf of Norfolk Southern ensuring the protection of the railroad's interest.

Mr. Lindsey's project experience includes design oversight for the new 800' long high level Amtrak passenger platform at Norfolk Ave. in Roanoke, VA, on Norfolk Southern Railway, and design of the 1,600 foot long liner for the 12'x6' brick arch Trout Run culvert, for 286k loading, both associated with the Amtrak / Norfolk Southern / VA DRPT Lynchburg to Roanoke service extension.

Additional railroad related projects include the following BNSF Bridge replacement designs: Bridge 27.4, LS 1025, Imperial, MO; Bridge 28.9 LS 1025, Barnhart, MO; Bridge 562.1 LS 1001, New Albany, MS; Bridge 733.5, LS 1001, Birmingham, AL; Bridge Span and Bearing Replacement, Bridge 390.2 LS 1001, Black Rock, AR; and, Bridge Span and Bearing Replacement, Bridge 462.69 LS 1001, Turrell, AR.

Recent experience also includes the following CSXT bridge replacements: Bridge 00F 341.00, Mason, TN; Bridge A 367.50, Moncks Corner, SC; Bridge 00F 370.70, Memphis, TN; Bridge 00F 350.00, Arlington, TN.

Mr. Lindsey has been responsible, working as the Owner's representative, for plan review and review of project specifications prepared by third parties, and construction engineering and inspection for projects on railroad rights-of-way for many short line and regional railroads. He is responsible for hundreds of annual bridge inspections, load ratings, bridge reports and plans and executes railroad bridge rehabilitation and replacement programs for many railroads.



Jerry H. Harris, P.E., Director of Engineering, Crouch Engineering

EDUCATION

Tennessee Technological University - BSCE 1997

PROFESSIONAL REGISTRATION – TN License #107688

Professional Engineer – Licensed in Tennessee, and 15 other states

PROFESSIONAL MEMBERSHIP

- AREMA; TSLRA

EMPLOYMENT HISTORY

1998 - Present, Crouch Engineering, Director of Engineering

Mr. Harris brings more than 25 years of civil and railway engineering planning, survey, design and construction project management for large scale freight and passenger railway projects, railroad industrial development projects, public project design; planning and feasibility studies; grade crossings and grade separations; track realignments; road design; track design for major projects; cost estimating, writing specifications for bidding and construction; and, construction project management.

Mr. Harris' recent experience includes oversight of surveying and track design for 23 miles of sidings and railroad infrastructure for Formosa Plastics proposed facility in St. James Parrish, LA; QA/QC review of a 27 mile long main line project between Jansen, CO and Weston, CO; design of an interchange yard at NA Junction, CO; and manager over the track and road design for the 17 mile long SCFE SE Extension Project.

He was also responsible for oversight of the 80 mile long Amtrak / Norfolk Southern Railway / VA DRPT / CSX Norfolk to Petersburg, VA passenger project, including redesign of Portlock Yard in Chesapeake, VA to add a new switching lead track, and expand yard capacity; design of a new NS / CSX connection track and passing siding on CSX; design of a double main line bypass around the Petersburg Autoramp; design of a wye track and Amtrak servicing track at St. Julian Ave; design of a passenger platform track and related main line track modifications; and, design of numerous cross-overs between Norfolk and Petersburg.

Additional Track Project related experience also includes oversight of surveying and track design for the Amtrak / Norfolk Southern / VA DRPT / Lynchburg to Roanoke, VA passenger project, including design of a new 10 mile long section of double track main line near Gretna, VA; design of a new Amtrak servicing facility and servicing track at Albemarle Ave. in Roanoke, VA; design of a passenger platform track and related main line track modifications near Norfolk Ave. in Roanoke, VA; and, design of modifications to Norfolk Ave. and Warehouse Row in Roanoke.

Examples of other recent, similar project work includes design oversight for the NC DOT new passenger platform projects at Kannapolis and Salisbury, NC on the Norfolk Southern Railway which includes planning and design for new platforms, parking, and related facilities; planning and design for a new NS siding at Blanford, SC; Design of Leighton Siding, AL; design of the NS support yard in Huntsville, AL for a new Toyota / Mazda manufacturing facility; Redesign of the NS south Yard in Mobile, AL; design of NS Odum Siding, Odum, GA; and design of a new three mile long siding at Carlisle, SC.

Mr. Harris's recent track design experience related to industrial facilities includes the design of railroad infrastructure for a 4,000 railcar storage yard, bulk transfer facility, and railcar repair shop for a private developer, working with BNSF in western LA; preliminary and final track design (80 miles of railroad track infrastructure), including sidings and yards, for the Formosa Plastics plant in St. James Parrish, LA on the UP Railroad; track design for a full service railcar repair facility for GE Railcar, Texarkana, AR – 57 AC site (15 miles of railroad track infrastructure); design of a marshalling yard for Enterprise South, Chattanooga, TN to serve Volkswagen; and design of the Colonel's Island Yard expansion, Brunswick Island, GA on the Golden Isles RR.

His recent CSX Transportation Railroad track design experience includes responsibility for the survey and design of more than 10 new sidings, including Cave City, KY; Nortonville, KY; Robards, KY; War Trace, TN; Tullahoma, TN; and Monks Corner, SC.

He has been responsible, working as the Owner's representative, for the management of many public projects impacting railroads, including preliminary site reviews and inspections, plan review and review of project specifications prepared by third parties, preparation of plans and specifications for work by railroads, and, construction engineering and inspection for projects on railroad rights-of-way for many short line and regional railroads.

Mr. Harris has also been responsible for managing over 100 railroad track rehabilitation projects for short line railroads in Tennessee, Mississippi, Colorado, Kentucky, Pennsylvania, Alabama, Georgia, and Florida. He has been responsible for track inspections, development of scopes of work, tie marking for replacement of defective crossties, development of plans, specifications, bidding documents, as well as conducting public bid process for many short line railroads, railroad authorities, and local governments, and private industry. He has managed the construction phase of rehabilitation project work including construction engineering and inspection, project documentation, and control of budgets and schedules for projects.



Jack H. McLain P.E., Senior Project Manager, Crouch Engineering

EDUCATION

University of Tennessee - BSCE 1977

PROFESSIONAL REGISTRATION – GA License #13537; NC #19362

Professional Engineer – Licensed in Georgia and 5 other states

PROFESSIONAL MEMBERSHIP

- AREMA

EMPLOYMENT HISTORY

2014 - Present, Senior Project Manager, Crouch Engineering

1977 - 2014, Asst. Chief Engineer (Retired), Norfolk Southern Railway

Mr. McLain brings over 39 years of railroad engineering experience beginning as a Design & Construction Engineer performing design work at Norfolk Southern Corporation and progressing ultimately to managing personnel and projects retiring as the Assistant Chief Engineer Design. He worked with many state DOT's to successfully complete passenger projects on freight railroads.

As an NSR design engineer, he was responsible for the surveying, cost estimating, design (site, drainage, track and utilities), permitting, writing specifications, and bid package preparation for a large variety of projects including but not limited to new industrial tracks, sidings, main lines and facilities such as intermodal and bulk transfer terminals.

As an NSR manager, Mr. McLain had leadership oversight for the NSR Engineering Department's Design Group and was charged with managing approximately 20 design engineers in developing the annual capital budget, performing feasibility studies, scheduling and assigning projects, updating / creating service contracts, plan and estimate review, public meetings, updating the estimate program, adhering to public funding requirements and maintaining safety and performance goals for the group.

Mr. McLain's recent experience at Crouch Engineering includes leading NCDOT Passenger Studies between Asheville and Salisbury, NC, and between Raleigh and Wilmington, NC; work on main line replacements costs for UP; and review of preliminary plans for an 87 mile long main line in NE Utah. He also performs site and plan reviews as needed for track projects.

Examples of past projects involved overall design and permitting management for the Crescent Corridor Intermodal Terminals (6 new or expanded terminals), TIGER funded capacity improvement projects (sidings and curve reductions), a major expansion of the Bellevue, OH class yard, Bakken crude oil projects involving sidings and a direct connection to a refinery in Delaware City, the Sand Mountain feasibility study (new 30+/- mile mainline route), and the Amtrak / Norfolk Southern / CSX / VA DRPT Mainline Passenger Project (Norfolk to Petersburg, VA) involving a CSX connection and siding extension in Petersburg, VA, a new passenger platform and platform track at Harbor Park in Norfolk, an Amtrak servicing facility, servicing track and wye track at St. Julian Ave. in Norfolk, VA; redesign of the Portlock Yard in Chesapeake, VA, track changes at Portsmouth Yard, a double main line bypass around the Petersburg Auto Ramp, and, track changes to the yard at the auto ramp.



Kyle McKinney, PE, Project Engineer, Crouch Engineering, Inc.

EDUCATION

Tennessee Technological University – BSCE 2010

PROFESSIONAL REGISTRATION – TN License # 117460

EMPLOYMENT HISTORY

2010 – Present, Project Engineer, Crouch Engineering, Inc.

With over 15 years of experience Mr. McKinney has been responsible for and involved in numerous track design projects for both passenger and freight service. He has been responsible for planning and coordination of project surveys, processing engineering survey data, design tasks, plan production, and construction staking.

His experience on railroad related projects includes track design for restoring standard roadbeds, ditches, and horizontal and vertical track alignment for 2 miles of track restoration for the KXHR and CSX railroads in Knoxville, TN (TDOT SR-62 Project); horizontal and vertical design for an industrial lead track and new railroad yard near Plaquemine, LA; Plan Production for a 2 mile industrial lead track and yard near Fultondale, AL; Process engineering survey for a new 10 mile long double track project for NSR near Gretna, VA; Cutting cross-sections and producing cut/fill numbers for 16 miles of new main line track for South Florida Central Express in South Bay, FL.

Mr. McKinney has been responsible for civil site designs, including site design, drainage calculations, site grading, roadway design, utilities, and building layouts for industrial facilities. These projects include: the 4 mile long Bridge the Gap Greenway project, with 2 crossings of the Roanoke River and 2 NS railroad underpasses for the City of Roanoke, VA; force main and grinder pump for Norfolk Southern Railroad yard in Louisville, KY; parking lot expansion for warehouse in La Vergne, TN; 200,000 SF Building expansion for warehouse owned by in Wilson County, TN.

His most recent passenger project related experience includes civil design work for a low level platform, overhead pedestrian access bridge, and a stair / elevator tower design project for the North Carolina Department of Transportation (NCDOT) on an existing double mainline in Kannapolis, NC. These tasks include lane changes of two existing local streets and parking, new proposed parking lot for the rail station, proposed grading and ditches, fence locations, ROW and easement locations, and plan production of preliminary construction plans for NCDOT Rail Division.

Mr. McKinney has also been involved with NCDOT passenger project, which to date has consisted of preliminary plans for a new platform with canopy and a grade separated pedestrian access for the rail station in Salisbury, NC on an existing double mainline. Tasks include proposed grading and ditches, fence locations, ROW and easement locations, and plan production of preliminary plans for NCDOT Rail Division.

Since 2010, Mr. McKinney has been in charge of CAD standards and implementation at Crouch Engineering. This includes updating design software and training technicians on new methods to produce the best quality plans for clients. This includes both AutoCAD Civil 3D and Bentley MicroStation and inRoads.

2006 – 2008, Technician, Martin Engineering / 2001 - 2006, Technician, McKinney Engineering

During his time with Martin Engineering and McKinney Engineering, he was involved as part of a team to complete site design projects that included commercial site design and residential design being



proposed in multiple cities and counties in Tennessee. The projects included residential lot layout and grading, utility design and layout, road design, and drawing revisions using multiple CAD platforms.



Randy Zeiger, PE

Senior Structural Engineer

Why Randy?

Mr. Zeiger has over 30 years of engineering design and consulting experience on a wide variety of projects for local and state government agencies, railroad, and mining industries. For the past 17+ years, Mr. Zeiger has focused on railroad services primarily related to roadbed stabilization, emergency landslide response, tunnel construction, rehabilitation, and monitoring, and capital improvements such as siding extensions and intermodal yards. For local and state government agencies, he has experience in the design and permitting for bridges and FEMA Regulated Rivers. For the mining industry, he has experience in the design and permitting for coal refuse impoundments and has investigated, evaluated and designed many small and large freshwater dams. His experience includes site investigations, feasibility studies, field and laboratory testing, stability analysis, seepage analysis, hydrologic and hydraulic analysis, retaining wall design, report preparation, cost estimating, plan preparation, development of construction specifications and construction management.

Examples of recent, similar project work include:

Tunnel Engineering Design

Pan Am –Emergency Tunnel Collapse Response, North Adams, MASS: Tunnel Engineer responsible for tunnel design and construction monitoring for an emergency tunnel collapse near North Adams, Massachusetts. The project included safely stabilizing the sinkhole and removing the loose material from within, safety scaling and applying shotcrete along the first 400 feet of the tunnel to provide a safe work zone for the crews, clear the tunnel debris and install final liner support consisting of steel sets. Final liner consisted of installing (40) W6x25 steel sets on 3-foot centers throughout the collapse zone. The bays were filled with C6x8.2 channel lagging and then backfilled with 3,000 psi structural grout. The grout was placed 5-feet above the newly installed steel sets. The sinkhole was backfilled completely with 250 psi lightweight concrete. Rail serve was restored within 53 days from initial incident.

UP – System-wide Tunnel Assessment: Tunnel Engineer responsible for assessing and defect mapping approximately 300 tunnels across Union Pacific's system. Project included a visual walk-thru of each tunnel, stationing the tunnels, and performing a detailed defect mapping of the existing liner for each tunnel. This information was used to evaluate the quality of the liner to determine if additional engineering would be required and to provide an order-of-magnitude construction cost for the repairs based on the outcome of the engineering. This was all formulated and presented in a report for each tunnel. Assisted UP with creating a repair list for the top 20 tunnels to assist with their yearly budgeting.

NS – MP SC-121.1 Emergency Tunnel Washout Response, Columbia, SC: Tunnel Engineer responsible for tunnel design and construction monitoring for an emergency tunnel washout near Columbia, South Carolina. The project included installing 120 foot long 24-inch diameter canopy tubes around the proposed tunnel opening and then mining out the interior soil to form the tunnel. The canopy pipes were installed to provide temporary support of the surrounding soil and railroad tracks during the excavation and placement of the permanent lining system. The permanent liner consisted of installing a circular shaped rib and lagging tunnel, approximately 120 feet long, using W8x40 steel ribs on 4 foot center/center spacing with C6x8.2 channels as the lagging.

Experience:

31 total years
<1 with Crouch Engineering

Education:

BS, Civil Engineering, 2000

Registrations:

PE – AL, GA, OH, OR, PA, VA,
WA

Training & Certifications:

Confined Space Training, 2005
Deep Foundation Institute
Seminar, 2005
Analysis of Landslides
Training, 2005
FRA On-Track Worker Safety
Training, 2004 through 2022
AREMA Track Alignment
Design Seminar, 2012

Affiliations:

American Railway Engineering
& Maintenance of Way
Association (AREMA),
Committees 1 & 10

PUBLIC VERSION - REDACTED

US Army Corp of Engineers – Spirit Lake Outlet Tunnel, Portland, OR District: Tunnel Engineer responsible for interim design support and construction monitoring of the rehabilitation to a portion of the 8,465 foot long outlet drainage tunnel to Spirit Lake located at the Mt. St. Helens Volcanic Monument in Skamania County, Washington. The project consisted of designing and installing a 10.5 diameter W8x28 steel rib and lagging liner on 2 foot centers over a distance of 32 feet, the development and submittal of engineering-related plans, creating and daily and weekly status reports, project consultation, and coordinating quality assurance reviews.

Oregon Department of Transportation - FFO-US101 Culvert Replacement, Manzanita, OR: Tunnel Engineer responsible for an alternative tunnel design and engineering-during-construction services for the implementation of an interior liner system. The project included installing 140 foot long 36-inch diameter canopy tubes around the proposed tunnel opening and then mining out the interior soil to form the tunnel. The canopy pipes were installed to provide temporary support of the surrounding soil and Highway US101 during the excavation and placement of the permanent lining system. The permanent liner consisted of installing a “U” shaped rib and lagging tunnel, approximately 140 feet long, using W8x58 steel ribs and posts on 4 foot center/center spacing with fiber reinforced shotcrete as the lagging.

CSXT – Emergency Tunnel Fire Response, Robinson Creek, KY: Project manager and Senior Project Engineer for emergency response to a Railroad Tunnel Fire near Pikeville, Kentucky. Provided around the clock field engineering consultation, design, general contracting and construction management services, and environmental coordination for the project. Services included initial exploratory investigation, assessment of tunnel conditions, initial and final liner repair, construction oversight, subcontracting services, scheduling, and progress tracking. Rail service was re-established in 45 days.

Railroad Engineering Design/Construction Projects

NSC – Mile Post B-184.5 Proposed Roadbed Stabilization, Dearborn Division, Cleveland, OH: Senior Project Engineer responsible for the design and construction of a 500-foot long cantilevered Soldier Pile Wall and a 500-foot long driven pile shear pin wall which the piles consisted of HP14x102 on 5-foot center/center spacing and were driven to a total depth of 110 feet. The proposed repairs also consisted of installing 45-foot long soil nails at 5-feet vertical and 5-foot horizontal spacing along the existing concrete retaining wall below the tracks. Upon installation of the soils nails, a new cast-in-place concrete facing was applied along the entire length of the retaining wall. The setting consists of a large embankment fill or side-hill fill. The tracks at this location have been plagued by instability due to a massive landslide that originated along the north side of the tracks and extended southward, under the tracks, to the river. The failure encompassed NS tracks, two large concrete retaining walls, the lower CSXT tracks, and a sheet pile bulkhead along the Cuyahoga River. During construction, responsibilities included managing and overseeing on-site personnel, coordinating contractors' schedules, monitoring tie-back anchor testing, tracking material quantities and pay requests.

NSC – Mile Post 299.0 Proposed Cut Slope Stabilization and Enhancements, Piedmont Division, Highpoint, NC: Senior Project Engineer responsible for the design and construction of a 2,000-foot long cantilevered Soldier Pile Wall. The project consisted of designing measures to stabilize and enhance the existing cut slopes parallel to the tracks in downtown Highpoint, NC. The project was a collaborative effort between the City of Highpoint, Norfolk Southern, and North Carolina Railroad to improve conditions north of the existing Amtrak Station. The Soldier Pile Wall incorporated a combination of driven H-piles (HP14x89 and HP14x102) on 6-foot and 8-foot centers, with precast concrete panels and riprap slope protection. During construction, responsibilities included staffing the project with a qualified field representative to provide construction observation and oversight on a bi-monthly basis and review Contractor's submittals to determine compliance with construction drawings and specifications.

PUBLIC VERSION - REDACTED

NSC – Alta Vista Corridor Tunnel Clearance Improvements; Roanoke, VA: Senior Project Engineer for Construction Management Services to achieve increased vertical clearance through 5 railroad tunnels to accommodate for future double-stack freight. Clearance improvement program requires ground support and modification or removal of portions of existing tunnel liners in 10-hour work windows. Services include: construction monitoring services on a full-time basis, maintain a daily log, inspect ground support, submittal review, and general tunneling consultation.

CSXT – Mile Post OKC-80.0, CC Subdivision - Emergency Wall Construction, Paris, KY: Senior Project Engineer for emergency response to derailment near Paris, Kentucky. Responsibilities included the design and construction of a 200-foot long, 40 foot high Soldier Pile and Tieback Anchor Retaining Wall. Train derailment resulting from the failure of the existing stacked stone wall which caused the roadbed material to unravel during the passing of a train. The Soldier Pile & Tieback Anchor Wall incorporated a combination of drilled-in-piles (2-W14x53) with precast concrete lagging and 3 rows tie-back anchors (2 rows of 85k anchors and 1 row of 135k anchors). During construction, responsibilities included managing and overseeing on-site personnel, coordinating contractors' schedules, monitoring tie-back anchor testing, tracking material quantities and pay requests.

NSC – Montgomery Tunnel #1 Clearance Improvements; Christiansburg, VA: Senior Project Engineer for Construction Management Services to achieve increased vertical clearance through Montgomery Tunnel to accommodate for future double-stack freight. Clearance improvement program requires ground support and modification or removal of portions of existing tunnel liners in two (2) 12-hour work windows, 7 days per week for 107 calendar days. Services include: construction monitoring services on a full-time basis, maintain a daily log, inspect ground support, submittal review, and general tunneling consultation.

CSXT - Clearance Feasibility Study; Cincinnati Terminal, CC and KD Subdivision Tunnels, Atlanta, GA to Cincinnati, OH: Project Manager responsible for the assessment of order-of-magnitude construction cost and of the problem and methods for achieving the required double-stack clearance. The review included twenty-three (23) tunnels ranging in length from a few hundred feet to over 2,000 feet. Review included an assessment of the specific clearance limitations, tunnel conditions, liner conditions, and portal areas. The assessment concluded that liner notching, track lowering, tunnel crown removal, open cut, and trim-blasting of bedrock "tights" would be feasible methods to achieve the clearance increase.

LRL – Ashland Tunnel Clearance Improvement Project, Ashland, KY: Project Manager with Contractor for achieving increased vertical clearance through 2 railroad tunnels to accommodate for future enlarged trash containers. Clearance improvement program requires ground support and modification or removal of portions of existing tunnel liners in 10-hour work windows, to allow continued rail traffic. Services include: environmental permitting services, construction materials testing, on-call surveying, and provide final as-builts once clearances have been reached.

NSC – Mile Post I-34.5 and I-35.4 Proposed Roadbed Stabilization, Dry Fork Branch, Bandy, VA: Project Manager responsible for the design and construction of two 258-foot long Soldier Pile and Tieback Anchor Retaining Wall. Roadbed instability resulting from a slope movement within the cross-valley fill was causing the track to experience problems. The track was experiencing cross-level, profile loss, and alignment. The Soldier Pile & Tieback Anchor Wall incorporated a combination of drilled-in H-piles (HP12x63) with steel channel lagging and 105k capacity tie-back anchors. During construction, responsibilities included managing and overseeing on-site personnel, coordinating contractors' schedules, monitoring tie-back anchor testing, tracking material quantities and pay requests.

CSXT – Brook Tunnel Surface Drainage, Keystone Subdivision, Confluence, PA: Project Manager responsible for overseeing the field survey, hydrologic and hydraulic analysis, desk top environmental review, development of Erosion and Sediment Control Plans, and perform final

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design. During the course of the project, managed environmental efforts to supply any information required to Environmental firm for permitting efforts. These efforts were carried out due the emergency of the tunnel liner system, which is covered under separate firm.

CSXT – Nissan Tunnel Clearance Review, Smyrna, TN: Project Manager responsible for the assessment of the clearance limitations, tunnel conditions, liner conditions, and portal conditions of the Nissan Tunnel near Smyrna, TN. Assessment included observations and recommendations for typical track lowering to achieve clearance improvements for automax cars, and preliminary construction cost estimates.

NSC – MP V-412.8, Little Mossy Tunnel, Pocahontas Division, Lively, WV: Project Manager responsible for investigation and design of remedial treatments to an active slide along the portal of the existing tunnel and recommendations for addressing the related periodic rock falls within the 330-foot long tunnel. Responsible for preparation of bid documents and construction plans for recommended treatment. The repairs consisted of constructing (CIP) concrete wing walls at the West Portal, and installing rock dowels and shotcrete to line a 50-foot long section of the tunnel.

CSXT - Big Bend Tunnel, Talcott, WV: Project Manager responsible for investigation, design, and QA/QC of remedial treatments to recurring ballast pockets forming under track structure in 6,168 foot long, concrete-lined tunnel. Tunnel floor includes concrete invert slab and side trough drains that were fouled due to mud pumping and silt accumulation. Remedial treatments included system of compaction grout columns to underpin floor slab and fill voids. Program also included cleaning weep holes and trough drains.

RJ Corman – Kansas City Southern de Mexico, Tunnel Clearance Review, San Luis Potosi, Mexico. Project Manager responsible for investigation and assessment of nine (9) tunnels on Kansas City Southern de Mexico (KCSM) Line “L” near Tamasopo, Mexico to assess potential methods and construction quantities for obtaining increased clearances through these structures. Our review consisted of a brief hi-rail or walk-through visual inspection of the tunnels and approach areas. Our assessment included a review of available composite clearance diagrams provided by KCSM and consideration of various clearance improvement methodologies.

CSXT – MP QB-164.0 Stateline Tunnel, West Stockbridge, MA. Project Manager responsible for the review and assessment rock quality and strength to determine if rock tights can be removed by mechanical means, determine if rock tights can be removed without additional delamination or spalling of tunnel roof rock, and determine the length of rock tights to be trimmed.

NSC – Big Bull Tunnel, Saint Paul, VA. Project Manager for evaluation and remediation of tunnel roof conditions (brick lined) subject to periodic brick falls threatening train traffic. Program involved identification of high hazard zones, defect mapping, 3D tunnel laser scan, topographic survey, and convergence monitoring of tunnel walls. The defect mapping consists of a plan for the tunnel walls and crown and showing obvious cracks, holes, spall areas, deterioration areas, previous wall repairs, etc. The laser scan intent was to develop a complete and accurate “picture” or image of the tunnel walls, including the defects, for comparison to the manual defect mapping and as a permanent condition record. Convergence monitoring of the tunnel consists of a series of tape extensometer points around the liner at various cross-sections along the length of the tunnel. Periodic measurements of the distance between the points are taken using a calibrated extensometer. Measurements are compared to the original baseline data to denote changes in distance over time.

NSC - Blair Tunnel, Jewell Ridge, VA. Project Manager for evaluation and remediation of tunnel roof conditions (concrete lined) subject to periodic concrete falls threatening train traffic. Program involved identification of high hazard roof zones, defect mapping, and 3D tunnel laser scan. The defect mapping consists of a plan for the tunnel walls and crown and showing

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obvious cracks, holes, spall areas, deterioration areas, previous wall repairs, etc. The laser scan intent was to develop a complete and accurate “picture” or image of the tunnel walls, including the defects, for comparison to the manual defect mapping and as a permanent condition record.

NSC – Review and Design of Remedial Repairs, Pembroke Tunnel; Pembroke, VA. Project Engineer responsible for developing the necessary engineering design for repairs to Pembroke Tunnel near Pembroke, VA. The tunnel consists of single, curved track and is about 300 feet long. For the most part, the tunnel consists of a brick-lined arch and crown with a gunite (shotcrete) facing and stone masonry sidewalls. The primary problem area is approximately 45 feet long beginning about 10 feet from the West Portal. In this reach along the south arch, the gunite facing above the springline is separating (8-12”) from the underlying brick. The separation extends approximately 5 to 6 feet above the springline into the arch. Responsible for preparation of bid documents and construction plans for recommendation treatment.

CSXT – National Gateway Initiative Clearance Project; MD-OH. Project Manager for design and construction management team services to provide geotechnical engineering consulting on an as-needed basis for the project. Services included technical inspections, design, development of plans, and development of specifications for tunnel enlargements and roadbed repairs.

CSXT – Virginia Avenue Tunnel, Washington, DC. Project Manager responsible for fast-track program to clean fouled tunnel invert and repair drainage system to correct rough track conditions. In 2010, managing engineering services to develop condition survey of tunnel for subsequent corrective actions to address poor invert conditions and associated track problems.

NSC – Heartland Corridor Tunnel Clearance Improvements; VA-WV. Project Manager and Consultant with construction management team for achieving increased vertical clearance through 28 railroad tunnels to accommodate for future double-stack freight. Clearance improvement program requires ground support and modification or removal of portions of existing tunnel liners in 10-hour work windows, typically at night to allow continued rail traffic. Services include: peer review of design, monitoring and collecting data for investigative probing program to classify ground conditions and select clearance improvement technique, construction inspection and reporting, and general tunnelling consultation.

NSC – Review and Assessment of Rockfall, Little Tom Tunnel; Coeburn, VA. Project Engineer for investigation and provide assessment and recommendations for addressing the related periodic rock falls within the 1900-foot long tunnel. Responsible for preparation of bid documents and construction plans for recommendation treatment.

NS – Rossville TN IMF/NEPA Environmental Permitting, Rossville, TN. Project Manager responsible for oversight of the development of the Environmental Assessment (EA) for proposed Memphis Regional Intermodal Facility following Tennessee Environmental Streamlining Agreement (TESA) process to complete National Environmental Policy Act (NEPA) requirements. TDOT was the lead state agency; FRA and FHWA were co-lead Federal agency; USACE and MDOT were cooperating agencies. Twenty-one federal, state, and local agencies requested to participate. Support included completing environmental field surveys and studies on approximately 773-acre.

NSC – Field Investigation and Remedial Repair Alternatives, Durmid Tunnel; Lynchburg, VA. Project Engineer for establishing a monitoring program to assess the condition of the existing tunnel liner and to identify structural defects that might warrant more frequent inspection, treatment, or repair. The number, length, and height of each timber set was recorded. Each set was inspected for signs of decay, deterioration, and structural damage. Areas of seepage and saturation along the crown and walls were identified. Information from the inspection was used to produce a description/condition spreadsheet of timber sets and a Defect Map of the tunnel. In addition to the manual defect mapping, a general field survey and a three-

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dimensional laser scan of the tunnel interior was performed. The intent of the 3D laser scan was to develop a “picture” or image of the tunnel walls, including the defects, for comparison to the manual defect mapping.

CSXT - Sinks Tunnels Remediation, Sinks, KY. Project Manager responsible for systematic evaluation and remediation of tunnel roof conditions (3 unlined tunnels), subject to periodic rockfalls threatening train traffic and clearance improvements for existing rock quarry. Program involved identification of high hazard roof zones and design of rock-bolt and fiber reinforced shotcrete-lining system.

CSXT - Clearance Feasibility Study; Lexington Industrial Track Tunnels, Ashland, KY. Project Engineer for an assessment of the specific clearance limitations, tunnel conditions, liner conditions, and portal areas of two tunnels along the Lexington Industrial Track. Assessment included observations and recommendations for type of construction to achieve double stack clearance improvements, and preliminary construction cost estimates.

NSC – MP V-347.7 Proposed Roadbed Stabilization, Pocahontas Division, Kegley, WV. Project Engineer responsible for the design and construction of a slope stabilization system, consisting of anchored reaction blocks along the toe of the failure mass. Roadbed instability resulting from a slope movement within the cross-valley fill was causing the track to experience problems. The track was experiencing both cross-level and profile loss. The system included twenty-five (25) 316-kip reaction block anchors spaced at 16-foot centers in 4 rows. During construction, responsibilities included managing and overseeing on-site personnel, coordinating contractors’ schedules, monitoring tie-back anchor testing, tracking material quantities and pay requests.

CSXT - Solway Tunnel Rehabilitation; Solway, TN. Project Engineer for establishing a monitoring program consisting of two main components: defect mapping of the existing liner and convergence monitoring of the walls and arches in select areas. The defect mapping consists of a plan for the tunnel walls and crown and showing obvious cracks, holes, spall areas, deterioration areas, previous wall repairs, etc. Convergence monitoring of the tunnel consists of a series of tape extensometer points around the liner at various cross-sections along the length of the tunnel. Periodic measurements of the distance between the points are taken using a calibrated extensometer. Measurements are compared to the original baseline data to denote changes in distance over time.

CSXT - Eagle Tunnel, Glencoe, KY. Project Engineer for design and preparation of construction plans and specifications for a complete “day-lighting” of the 700-foot long tunnel. Responsible for preparation of bid documents, pre-bid meeting, and construction field-engineering throughout the course of construction. Monitored and tracked construction quantities, reviewed submittals, helped coordinate with adjacent property owners, and reviewed pay requests on behalf of CSXT. The day-light excavation included 300,000 cubic yards of soil and shale and was performed under live-track conditions.

CSXT - Grant Tunnel, Grant, KY. Project Engineer for establishing a monitoring program consisting of two main components: defect mapping of the existing liner and convergence monitoring of the walls and arches in select areas. The defect mapping consists of a plan for the tunnel walls and crown and showing obvious cracks, holes, spall areas, deterioration areas, previous wall repairs, etc. Convergence monitoring of the tunnel consists of a series of tape extensometer points around the liner at various cross-sections along the length of the tunnel. Periodic measurements of the distance between the points were taken using a calibrated extensometer. Measurements were compared to the original baseline data to denote changes in distance over time.

CSXT - Clearance Feasibility Study; Alleghany and James River Subdivision Tunnels, Portsmouth, VA to Columbus, OH. Project Engineer for an assessment of the magnitude of the problem and methods for achieving the required double stack clearance. The review included five (5)

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tunnels ranging in length from a few hundred feet to over 4,700 feet. Review included an assessment of the specific clearance limitations, tunnel conditions, liner conditions, and portal areas. Fixed features such as bridges and switches were identified and considered as part of the clearance assessment. The assessment concluded that liner notching, track lowering, and trim-blasting of bedrock “tights” would be feasible methods to achieve the clearance increase.

CSXT – Moreland Siding Project, A&WP Subdivision, Moreland, GA. Project Engineer for initial site visit to identify all environmental concerns, construction limitations and oversee field personnel during construction. Major duties include coordination with all personnel responsible for all permitting issues, design of the Erosion and Sediment Control Measures and Storm Water Pollution Prevention Plans (SWWPPP), and perform periodic site visits.

CSXT – Greentop Siding Project, A&WP Subdivision, Newnan, GA. Project Engineer for initial site visit to identify all environmental concerns, construction limitations and oversee field personnel during construction. Major duties include coordination with all personnel responsible for all permitting issues, design of the Erosion and Sediment Control Measures and Storm Water Pollution Prevention Plans (SWWPPP), and perform periodic site visits. Also, responsible for the design of a deadman anchor retaining wall to assist the support of the new siding and mainline track.

CSXT – Mile Post BI-94.3, Garrett Subdivision, Defiance, OH. Project Engineer for the geotechnical study designed to investigate the lateral failure of shoulder into adjacent ditch along heavy tonnage double mainline. Directed field personnel during construction monitoring during roadbed stabilization. Repair consisted of rock buttress along shoulder.

CSXT – Lanta Siding Project, Pond Fork Subdivision, Lanta, WV. Project Engineer responsible to provide fast-track geotechnical investigation and environmental permitting services for extension to coal siding along Pond Fork River. Proposed fast track siding construction project included, design and monitoring of the installation of a 550 foot long Soldier Pile and Tieback Anchor Retaining Wall, the extension of a 10 foot high concrete arch culvert, monitoring grading operations, field engineering, SWPPP monitoring, reporting during construction, and tracking of quantities and budget.

CSXT – Mullins Siding Project, Andrews Subdivision, Mullins, SC. Project Engineer for initial site visit to identify all environmental concerns, construction limitations and oversee field personnel during construction. Major duties include coordination with all personnel responsible for all permitting issues, design of the Erosion and Sediment Control Measures and Storm Water Pollution Prevention Plans (SWWPPP), and perform periodic site visits.

CSXT – Casky Siding Project, Henderson Subdivision, Hopkinsville, KY. Project Engineer responsible for the design and field engineering, and construction monitoring of a rockfill buttress constructed on an emergency basis along the railroad tracks. Developed a conceptual design, in the field, performed test pit observations to delineate the depth of the keyway, estimated rock quantities, observed the Contractor’s construction methods and reported on the contractor’s progress, on a daily basis, and maintained project files.

CSXT – Mile Post QR-97.45, Riverline Subdivision, Eavesport, NY. Project Engineer for the geotechnical study designed to investigate a roadbed instability problem. Directed field personnel during the drilling operations, performed geotechnical analysis, and designed a repair scheme. Directed field personnel during construction of designed repair scheme, which consisted of compaction and slurry grouting of the roadbed problem, published geotechnical construction summary report, and tracked pay items.

CSXT – Mile Post QR-102.9, Riverline Subdivision, West Camp, NY. Project Engineer for the geotechnical study designed to investigate a roadbed instability problem. Directed field personnel during the drilling operations, performed geotechnical analysis, and designed a repair scheme. Directed field personnel during construction of designed repair scheme, which

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consisted of compaction and slurry grouting of the roadbed problem, published geotechnical construction summary report, and tracked pay items.

CSXT – Mile Post 00T-99.5, LCL Subdivision, Independence, KY. Project Engineer responsible for the design and construction of a 424-foot long Soldier Pile and Tieback Anchor Retaining Wall. Roadbed instability resulting from a slope movement within the cross-valley fill was causing the track to experience problems. The track was experiencing both cross-level and profile loss. The Soldier Pile & Tieback Anchor Wall incorporated a combination of driven H-piles (HP14x73) with timber lagging and 140k capacity tie-back anchors with concrete reaction blocks. During construction, responsibilities included managing and overseeing on-site personnel, coordinating contractors' schedules, monitoring tie-back anchor testing, tracking material quantities and pay requests. The project was completed ahead of schedule and 12% below budget.

CSXT – Mile Post PLM-50.0 to 51.4, Monongahela Subdivision, Newell, PA. Field Engineer during the construction of a driven H-pile retaining system along the riverside shoulder at seven locations ranging in length from 250-1000 feet, installation of 10 new cross-drains, and 10,000 liner feet of ditch cleaning. Provided full-time field engineering and construction management. Responsibilities included coordinating contractors' schedules, tracking material quantities, project reporting and resolving technical issues in the field. The project was completed 6% below budget and within the projected schedule.

CSXT – Siding Extension and Roadbed Repair; Alum Creek, WV. Geotechnical Engineer for design and investigation of roadbed construction consisted of two primary components: excavation and grading for the siding roadbed and the repair of a roadbed problem area (landslide) consisting of a driven H-pile and wood lagging retaining wall.

CSXT – Cross Drain Inspection and Survey on the LCL Subdivision: Louisville, KY to Cincinnati, OH. Field Engineer responsible for cross-drain inspection and location along the LCL Subdivision from Louisville, KY to Cincinnati, OH.

CSXT – Mill Creek Tunnel By-Pass; Carrollton, KY. Field Engineer for investigation of tunnel invert plagued by mud pumping after invert lowering attempt for clearance improvements. Ultimate long-term solution consisted of by-pass open cut in problematic clay-shale and limestone bedrock.

CSXT - Bakers Tunnel, Nashville, TN. Field Engineer for systematic evaluation and remediation of tunnel roof conditions (unlined tunnel) subject to periodic rock falls threatening train traffic. Program involved identification of high hazard roof zones and design of rock-bolt and fiber reinforced shotcrete-lining system.

Bridge Engineering Design

City of Massillon – Timber Bike and Hike Trail, Massillon, OH. Bridge Engineer responsible for design and construction monitoring of a pressure treated timber bike and hike trail. The project included the design of a 14-foot wide timber structure constructed on driven timber piles spaced at 10 feet centers and prefabricated timber bridge constructed on a reinforced concrete abutments on driven timber piles.

Portage County – County Road 18 Bridge Replacement, Portage County, OH. Bridge Engineer responsible for design and construction monitoring of a 3 span prestressed box beam bridge. The project included the design of spread footers for the support of hammerhead piers and semi-integral abutments. The superstructure consisted of a 3 span continuous prestressed box beam design.

Mahoning County – State Route 422, Youngstown, OH. Bridge Engineer responsible for designing a superstructure re-decking. The project included visual inspection of existing structure and sounding of reinforced concrete piers and abutments. The superstructure was

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raised an additional 2 feet to meet the Ohio Department of Transportation design criteria of 16.5 feet of vertical clearance. The design included pier and abutment caps, continuous reinforced concrete deck (8.5 inches thick), reinforced concrete traffic and pedestrian barriers, and vandal protection fencing.

Mine Waste Disposal and Dam Design

Martinka Combined Refuse Fill; Fairmont, WV. Field Engineer for the design and regulatory approval for a life-of-mine coal refuse disposal fill. The project included the design of a staged fill to provide 32 years of disposal capacity in addition to the design of a large earthfill dam and numerous surface drainage controls. Engineering analyses included geotechnical exploration and testing, detailed hydrologic and hydraulic modelling, stability analysis, and seepage analysis. Design was originally performed for Southern Ohio Coal Company. Engineering services continue for the new owner, Eastern Associated Coal Corporation (Martinka Coal Company). Ongoing services include regular construction quality control monitoring and general engineering planning assistance.

Ferguson Fill Impoundment; Cumberland, OH. Field Engineer for the geotechnical investigation, testing, analysis, and design of modifications to an existing 40-foot-high earthen dam to upgrade it to meet state and federal regulatory criteria. Analysis included slope stability, seepage, and flood routing analyses. Design included the preparation of plans and specifications for construction activities. Currently providing construction inspection services.

Grandstaff Impoundment; Cumberland, OH. Field Engineer for the geotechnical field investigation, laboratory testing, engineering analysis, and design of modifications to an existing 80-foot-high earthen dam. The modifications will bring the structure into compliance with state and federal criteria, and the completed embankment will accommodate a major haul road and electric railroad crossing along the crest. Analyses included slope stability, seepage, and flood routing analyses. Design work included the preparation of detailed plans and specifications for construction. Currently providing construction inspection services.

Horse Run Impoundment; Noble County, OH. Field Engineer for the geotechnical study for the analysis and design of modifications to an existing 80-foot-high earthfill dam. Engineering activities included drilling, testing, instrumentation, stability analyses, flood routing analyses, and the preparation of detailed plans and specifications for construction. Plans have been reviewed and approved by the Mine Safety and Health Administration (MSHA) and the Ohio Department of Natural Resources (ODNR). The modifications will include construction of a massive earthfill upstream buttress, slip-lining an existing spillway pipeline, and excavating a large open channel spillway. Currently providing construction inspection services.

Muskingum Slurry Impoundment Construction Monitoring; Cumberland, OH. Field Engineer for the construction observation, monitoring, testing and reporting during progressive construction of the hydraulic fill embankment dam to verify compliance with design assumptions and applicable regulations. Services include: field density testing of embankment fill; monitoring instrumentation; inspecting embankment slopes and drains; documenting slurry discharge locations and pool levels; laboratory testing; reporting; and, annual reporting/certifications of construction as required by state and federal regulations. Services also include periodic checks on refuse production rates and verification of design staging.

Elmwood Tailings Impoundment; Gordonsville, TN. Field Engineer for the investigation, testing, analysis, design, permitting, and construction quality control monitoring of a rockfill dam for the permanent disposal of zinc tailings. Design included feasibility study, embankment staging, flood routing analysis, stability analysis, seepage analysis, and preparation of plans and construction specifications. Stability analysis included an assessment of mass embankment failure due to liquefaction of the hydraulically placed tailings. Continuing to perform quarterly site inspections and provide general engineering consultation for active facility.

BEFORE THE
SURFACE TRANSPORTATION BOARD

Finance Docket No. 22218

ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY
—OPERATING RIGHTS—
SOUTHERN PACIFIC TRANSPORTATION CO.

VERIFIED STATEMENT OF CHARLES W. REX III, MAI



CAMERON R. REX, MAI, GISP
CHARLES W. (SANDY) REX III, MAI
CHARLES W. REX IV, MAI, AI-GRS

VALUATION OF

*THE UNION PACIFIC RAILROAD COMPANY'S
MOJAVE SUBDIVISION FROM
MILEPOST 313.56 AT KERN JUNCTION, BAKERSFIELD
TO MILEPOST 381.43 AT SOUTH MOJAVE JUNCTION, MOJAVE,
ALL WITHIN KERN COUNTY, CALIFORNIA
USING THE COST APPROACH
(REPRODUCTION COST NEW LESS DEPRECIATION) AND
THE SALES COMPARISON APPROACH
(CORRIDOR VALUATION METHODOLOGY)*

PREPARED FOR

*MICHAEL L. ROSENTHAL
COVINGTON & BURLING LLP
850 TENTH STREET, NW
WASHINGTON, DC 20001*

DATE OF VALUE: AUGUST 23, 2023

DATE OF REPORT: MAY 2, 2024

PREPARED BY

*RMI VALUATION, LLC
NORTHBROOK, ILLINOIS*





CAMERON R. REX, MAI, GISP
CHARLES W. (SANDY) REX III, MAI
CHARLES W. REX IV, MAI, AI-GRS

May 2, 2024

Michael L. Rosenthal
Covington & Burling LLP
850 Tenth Street, NW
Washington, DC 20001

RE: Market Value estimate (land only) of the Union Pacific Railroad Company's Mojave Subdivision from Milepost 313.56 at Kern Junction in Bakersfield to Milepost 381.43 at South Mojave Junction in Mojave, all within Kern County, California using the Cost Approach (Reproduction Cost New Less Depreciation) and the Sales Comparison Approach (Corridor Valuation Methodology)

Dear Mr. Rosenthal:

At your request, we have prepared an estimate of the market value of the land comprising Union Pacific Railroad Company's existing Mojave Subdivision between Kern Junction in Bakersfield at Milepost 313.56 and South Mojave Junction in Mojave at Milepost 381.43, all within Kern County, California. This valuation considers both the cost approach, using the reproduction cost new less depreciation methodology, and the sales comparison approach using the corridor valuation methodology. This valuation is of the corridor land *only*.

The documentation of this valuation is communicated in the following 190-page appraisal report. The effective date of valuation is August 23, 2023.

This appraisal report is intended to comply with the reporting requirements set forth under Standards Rule 2-2(a) of the *Uniform Standards of Professional Appraisal Practice* (USPAP). As such, it presents a summary of the data, reasoning, and analysis that were used in the appraisal process to develop our opinion of value.

The purpose and intended use of this appraisal is to estimate the market value of the land using the cost approach (reproduction cost new less depreciation) and the sales comparison approach (corridor valuation methodology) for the Union Pacific/BNSF Joint Facilities located between Bakersfield and Mojave, California to assist the Union Pacific Railroad Company in negotiations with BNSF Railway and for filing with the Surface Transportation Board (STB). The client is the Union Pacific Railroad Company, and the intended users are Union Pacific Railroad Company personnel and its representatives, as well as the Surface Transportation Board.



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Michael L. Rosenthal

May 2, 2024

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This appraisal *does not* include the valuation of any rail and building improvements that are located within the boundaries of the subject property.

Based upon the conditions, contingencies, hypothetical conditions, and extraordinary assumptions discussed in this report, and subject to the signed certification, it is my opinion and conclusion that the market value of the land for the subject property, as of August 23, 2023, is

Market Value Estimate (Sales Comparison Approach)

Across-the-fence Value	\$	33,050,000
Corridor Factor		3.50
Corridor Value	\$	115,675,000

Market Value Estimate (Cost Approach)

Across-the-fence Value	\$	33,050,000
Assemblage Factor		8.50
Assemblage Cost (RCN)	\$	280,925,000
Obsolescence	\$	(165,250,000)
Reproduction Cost New Less Depreciation	\$	115,675,000

\$115,675,000
(rounded)

Respectfully,
RMI Valuation, LLC



Charles W. (Sandy) Rex III, MAI
California Certified General Real Estate Appraiser
BREA No. 3003323

SUMMARY OF IMPORTANT CONCLUSIONS

LOCATION	The subject property is Union Pacific's Mojave Subdivision, extending from Kern Junction, located at Haley Street (extended) in Bakersfield, California, being Milepost 313.56 to South Mojave Junction, located approximately 465 feet south of the intersection of the centerline of Union Pacific's Mojave Subdivision and the centerline of the Aerospace Highway overhead crossing in Mojave, California, being Milepost 381.43. The line extends in a generally easterly and then southerly direction.		
OWNER	Union Pacific Railroad Company 1400 Douglas Street Omaha, Nebraska 68179		
JOINT USER	BNSF Railway Company 2650 Lou Menk Drive Fort Worth, Texas 76131		
DATE OF VALUATION	August 23, 2023		
PROPERTY RIGHTS APPRAISED	A title report has not been provided for the subject corridor. We have made the reasonable assumption that valid title for rail and associated corridor use is held by Union Pacific as evidenced by such use for well over 100 years. Additionally, since this appraisal includes an estimate of the hypothetical assemblage cost for the land, we have assumed that similar title would be acquired, which would allow for continued use as a railroad corridor. For the slope, access, and other similar easements, we have assumed that they represent a shared use with the underlying property owners. For the water pipeline easement, we have assumed the rights would be like other similar water pipeline easements. <i>This appraisal does not separately consider water rights.</i> Through our review of the original acquisition deeds, we are aware that significant water rights have been acquired. The understanding of the extent of these water rights, and their valuation is beyond the scope of this appraisal report. This is an extraordinary assumption in this appraisal.		
LAND SIZE	Length:	67.87± miles	
	Area: Total:	1,596.01± acres	
	Fee/railroad easement:	1,438.41± acres	
	Slope, access, etc. easement:	144.66± acres	
	Water pipeline easement:	112.94± acres	
	Width:		
	Predominantly:	200 feet	
	Calculated of all property:	192.43± feet	

HIGHEST AND BEST USE	The highest and best use of the subject property is for continued corridor use as a mainline freight railroad corridor.		
ACROSS-THE-FENCE VALUE	\$33,268,595		
USAGE FACTORS	Corridor:	100%	
	Slope, access, etc. easements:	50%	
	Water pipeline easement:	75%	
ACROSS-THE-FENCE VALUE TIMES USAGE FACTOR (ROUNDED)	\$33,050,000		
ASSEMBLAGE FACTOR	Range:	7.0 to 10.0	
	Estimate:	8.5	
REPRODUCTION COST NEW (ROUNDED)	\$280,925,000		
OBSOLESCENCE (ROUNDED)	\$165,250,000		
REPRODUCTION COST NEW LESS DEPRECIATION (ROUNDED)	\$115,675,000		
CORRIDOR FACTOR	3.5		
CORRIDOR VALUE (ROUNDED)	\$115,675,000		
RECONCILED VALUE (ROUNDED) ¹	\$115,675,000		

¹ See Rex Workpapers "4 – Valuation/Rex – Subject Valuation.xlsx/Subject Valuation (tab)" and "Valuation Summary (tab)"

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SUBJECT OVERVIEW MAP



SUBJECT AERIAL OVERVIEW MAP



SUBJECT PHOTOGRAPHS



Photo 1. Looking west from MP 313.61 in Bakersfield towards the western extent where BNSF exits the Mojave Subdivision to the south (left). 8/23/2023.



Photo 2. Looking west from MP 315 in Bakersfield. Edison Highway is on the left side of the photo. 8/23/2023.

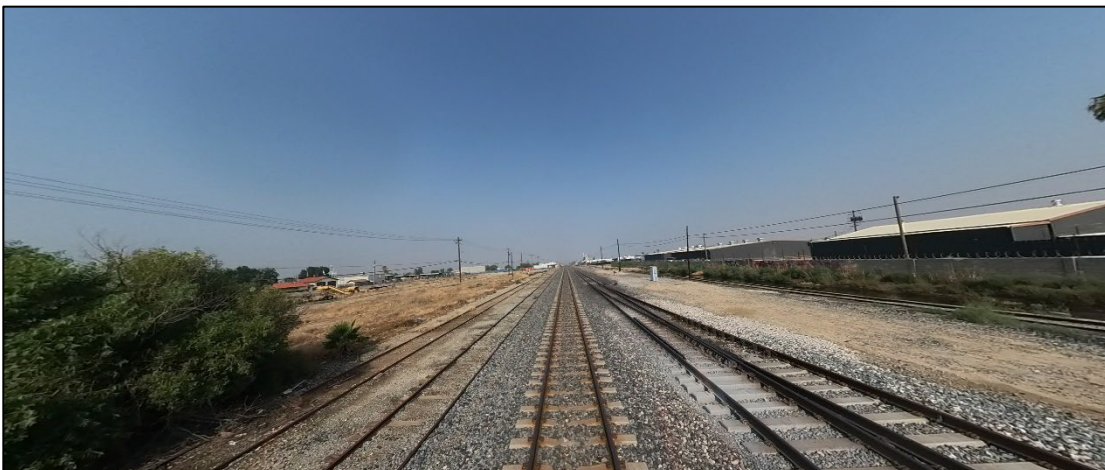


Photo 3. Looking west from MP 320 in Edison. 8/23/2023.



Photo 4. Looking west from MP 325, west of Bena. Bena Road is on both sides of the corridor. 8/23/2023.



Photo 5. Looking west from MP 330. 8/23/2023.



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Photo 7. Looking west from MP 340, west of Bealville. 8/23/2023.



Photo 8. Looking west from MP 345, northwest of Rowen. 8/22/2023.



Photo 9. Looking north from MP 351.71 (above MP 351) at the top of the Tehachapi Loop. Note that the train extends from the west (left) through the tunnel to the east (right) and its head end is to the north. 8/22/2023.

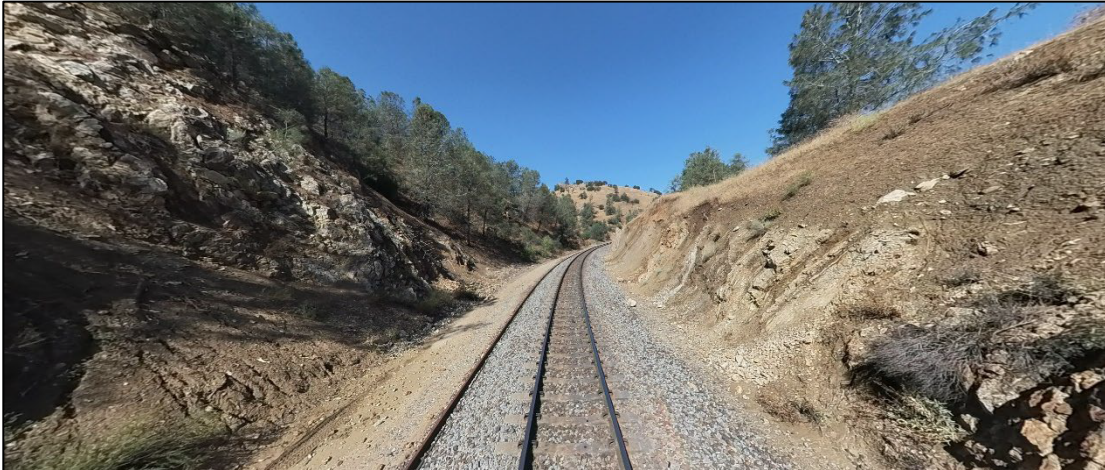


Photo 10. Looking west from MP 355. 8/22/2023.



Photo 11. Looking east from MP 360 in Tehachapi. 8/22/2023.



Photo 12. Looking west from MP 365 in Monolith. 8/22/2023.

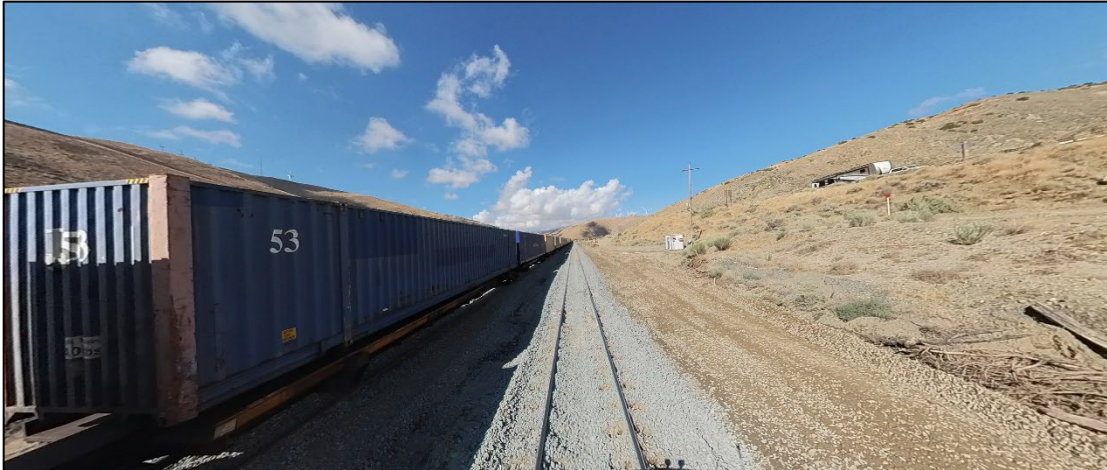


Photo 13. Looking west from MP 370 in Cameron, at the site of the washout from Tropical Storm Hillary. 8/22/2023.



Photo 14. Looking west from MP 375. 8/22/2023.

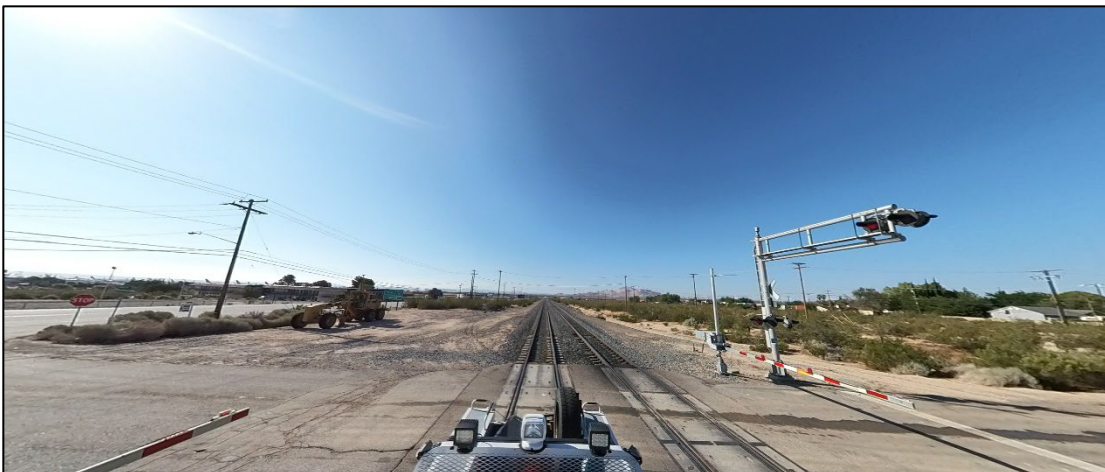


Photo 15. Looking south from MP 380 in Mojave. 8/22/2023.

INTRODUCTION

CERTIFICATION

The undersigned certifies that, to the best of my knowledge and belief, except as otherwise noted in this appraisal report,

1. The statements of fact contained in this appraisal report are true and correct.
2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, impartial, and unbiased professional analyses, opinions and conclusions.
3. I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved.
4. I have performed no services, as an appraiser or in any other capacity, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.
5. I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.
6. My engagement in this assignment was not contingent upon developing or reporting predetermined results.
7. My compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction of value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.
8. Additionally, my analyses, opinions, and conclusions were developed, and this report has been prepared in conformity with the *Uniform Standards of Professional Appraisal Practice*, and the requirements of the California Bureau of Real Estate Appraisers.
9. The reported analyses, opinions, and conclusions were developed, and this report has been prepared in conformity with the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute.
10. The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives.
11. As of the date of this report, Charles W. Rex III, MAI, Charles W. Rex IV, MAI, AI-GRS, and Cameron R. Rex, MAI, R/W-AC have completed the continuing education program for Designated Members of the Appraisal Institute.
12. Cameron R. Rex, MAI, R/W-AC made a personal inspection of the property that is the subject of this report and the comparable sales from August 19 - 23, 2023. Charles W. Rex III, MAI and Charles W. Rex IV, MAI, AI-GRS inspected the subject property and comparable sales using high-quality digital imagery.
13. Charles W. Rex IV, MAI, AI-GRS and Cameron R. Rex, MAI, R/W-AC assisted in the collection and analysis of data used in this appraisal. They also assisted with the writing of the report.

14. Based upon the conditions, contingencies, hypothetical condition, and extraordinary assumption presented in this report, the estimate of the market value of the land for the subject property, as of August 23, 2023, is **\$115,675,000**.

Market Value Estimate (Sales Comparison Approach)

Across-the-fence Value	\$	33,050,000
Corridor Factor		3.50
Corridor Value	\$	115,675,000

Market Value Estimate (Cost Approach)

Across-the-fence Value	\$	33,050,000
Assemblage Factor		8.50
Assemblage Cost (RCN)	\$	280,925,000
Obsolescence	\$	(165,250,000)
Reproduction Cost New Less Depreciation	\$	115,675,000



Charles W. (Sandy) Rex III, MAI
California Certified General Real Estate Appraiser
BRE No. 3003323

GENERAL UNDERLYING ASSUMPTIONS

This appraisal has been developed based on the following general assumptions:

1. No responsibility is assumed for the legal description or for matters including legal or title considerations. Title to the property is assumed to be good and marketable unless otherwise stated.
2. The property is appraised free and clear of any and all liens or encumbrances unless otherwise stated.
3. The information furnished by others is believed to be reliable; however, no warranty is given for its accuracy.
4. All engineering material is assumed to be correct. The plot plans and illustrative material in this report are included only to assist the reader in visualizing the property.
5. It is assumed that there are no hidden or unapparent conditions of the property, subsoil, or structures that render it more or less valuable. No responsibility is assumed for such conditions or for obtaining engineering studies that may be required to discover them.
6. It is assumed that there is full compliance with all applicable federal, state, and local environmental regulations unless noncompliance is stated, defined, and considered in the appraisal report.
7. It is assumed that the property conforms to all applicable zoning and use regulations and restrictions, unless a nonconformity has been identified, described, and considered in the appraisal report.
8. It is assumed that all required licenses, certificates of occupancy, consents, or other legislative or administrative authority from any local, state, or federal government or private entity or organization have been or can be obtained or renewed for any use on which the opinion of value contained in this report is based.
9. It is assumed that the use of the land and improvements is confined within the boundaries or property lines of the property described and that there is no encroachment or trespass unless noted in the report.

LIMITING CONDITIONS

This appraisal report has been made with the following limiting conditions:

1. Possession of this report, or a copy of it, does not carry with it the right of publication. It may not be used for any purpose by any person other than the party to whom it is addressed without the written consent of the appraiser and in any event only with proper written qualification and only in its entirety.
2. The appraiser, by reason of this appraisal, is not required to give further consultation or testimony, or be in attendance in court with reference to the property in question unless arrangements have been previously made.
3. Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraiser, or the appraiser's firm) shall be disseminated to the public through advertising, public relations, news, sales, or other media without the prior written consent and approval of the appraiser.
4. The property was not appraised subject to long-term leases on land or improvements that affect the value of the land.

5. Unless otherwise stated in this report, the existence of hazardous substances, including without limitation asbestos, polychlorinated biphenyls, petroleum leakage, or agricultural chemicals, which may or may not be present on the property, or other environmental conditions, was not called to the attention of nor did the appraiser become aware of such during his inspection. The appraiser has no knowledge of the existence of such materials on or in the property unless otherwise stated. The appraiser, however, is not qualified to test such substances or conditions. If the presence of such substances or environmental conditions may affect the value of the property, the value estimated is predicated on the assumption that there is no such condition on or in the property or in such proximity thereto that it would cause a loss in value.

HYPOTHETICAL CONDITIONS

This appraisal is made based on the following hypothetical condition. Any changes to this condition may affect the assignment results and the estimate of the market value of the land.

1. The assemblage cost (reproduction cost new) is estimated under the hypothetical condition that the existing rail line does not exist, and that a new rail line would be assembled and constructed along the same route of the existing line. Under this condition, we have assumed that the adjacent property boundaries would be extended into the subject property. We have further assumed that the uses of the property would be the same as current, even under the assumption that the rail line did not exist.

EXTRAORDINARY ASSUMPTION

This appraisal is made based on the following extraordinary assumption. Any changes to this assumption may affect the assignment results and the estimate of the market value of the land.

1. This appraisal does not separately consider water rights. Through our review of the original acquisition deeds, we are aware that significant water rights have been acquired. The understanding of the extent of these water rights, and their valuation is beyond the scope of this appraisal report.

IMPORTANT DEFINITIONS

Across-the-fence (ATF) method. A land valuation method used in the appraisal of corridors. The across-the-fence method is used to develop a value opinion based on comparison to abutting land.²

Across-the-fence (ATF) value. In the valuation of real estate corridors, the value concluded based on a comparison with adjacent lands before the consideration of any other adjustment factors.³ The ATF value accounts for location and market conditions. Accordingly, this is an intermediate value without (or prior to) the consideration of the corridor factor. This method typically includes detailed divisions

² *The Dictionary of Real Estate Appraisal*, 7th edition, Appraisal Institute, Chicago, IL 2022, 3.

³ *Ibid.*, 3.

of the corridor for each change in land use. The valuation is based on analysis of comparable sales for each of the varying land uses along the corridor.

Assemblage cost. In the context of corridors, 'assemblage cost' refers to the total expenditures involved in acquiring and consolidating multiple parcels of land or property rights to create a unified corridor for specific uses such as transportation or utility infrastructure. This cost encompasses direct expenses, including the purchase price of the land. Indirect costs include legal and administrative fees, surveying and valuation expenses, costs associated with relocating existing tenants or businesses, public relations and community engagement activities, and environmental impact assessments. Together, these costs reflect the premium or added value derived from forming a larger, more functional parcel from smaller individual lots, enhancing the corridor's utility and potential profitability.

Assemblage factor. The assemblage factor is a multiplier applied to the across-the-fence (ATF) value, which is based on comparable sales of similar land. It accounts for premiums on direct land acquisition costs and encompasses indirect expenses such as legal fees, surveying, environmental mitigation, and other related overheads. This factor ensures that the total economic impact of the property's development is reflected in its valuation, capturing both the acquisition premium and all associated costs. The result of the ATF value times the assemblage factor is the assemblage cost or reproduction cost new (RCN).

Assembled corridor. A strip of land used for transportation or transmission purposes (e.g., rail, highway, power, information, slurries, liquids) under single control (not necessarily ownership) that was assembled from two or more separate and distinct land parcels not having a common owner.⁴

Corridor. A strip of land used for transportation or transmission purposes (e.g., rail, highway, power, information, slurries, liquids).⁵

Corridor factor. In corridor valuation, the ratio of the market value (or market price) of a corridor to the corridor's across-the-fence value. Corridor factors are applied to reflect the benefit or advantage, if any, of the corridor having already been assembled. Typically used in the valuation of existing corridors and not the assembly of a new corridor. Sometimes called an *enhancement factor* or *continuity factor*.⁶

$$\text{Corridor factor (CF)} = \text{sale price of existing corridor} \div \text{ATF value of existing corridor}$$

The corridor factor reflects the relationship between the ATF value and the actual market price of the corridor. The size of the factor is a function of the importance of the corridor as a transportation/communications corridor. For instance, sales of mainline corridors that connect Points A and B, where there are no alternatives, reflect higher corridor factors, while an abandoned corridor, where Points C and D are meaningless to the market, may reflect a corridor factor of 1 or less. The importance of the linkage between the points and alternatives to it are two of the most important factors in measuring the corridor factor.

⁴ *The Dictionary of Real Estate Appraisal*, 7th edition, Appraisal Institute, Chicago, IL 2022, 11.

⁵ *Ibid.*, 43.

⁶ *Ibid.*, 43.

Corridor factors can be measured by:

- Cash price of existing corridor ÷ ATF value of existing corridor, or
- Total price of existing corridor ÷ ATF value of existing corridor.

Many sales of corridors in the recent past include some or all of the following:

- Cash paid by the seller,
- Continued use by the seller for a period of time,
- Joint trackage agreements,
- Realignment of the track, paid for by the buyer,
- Upgrading of an alternative route by the buyer for the benefit of the seller,
- Other upgrades of the track and signaling to help alleviate or mitigate some or all the loss of the corridor, paid for by the buyer,
- Subsurface or aerial rights transferred by the seller.

To fully understand a potentially comparable corridor sale and to develop a valid corridor factor, the value of these noncash items must be considered so that the total cash equivalent price of the corridor is used to calculate the corridor factor. The cash price of a corridor sale that includes noncash consideration is a function of the amount of the noncash consideration. In using the total price, corridor factor estimates are adjusted for noncash consideration on the subject corridor.

Market value. The most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms, for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress.⁷

Obsolescence. One cause of depreciation; an impairment of desirability and usefulness caused by new inventions, changes in design, improved processes for production, or external factors that make a property less desirable and valuable for a continued use; may be either functional or external.⁸

Reproduction cost. The estimated cost to construct, at current prices as of the effective date of the appraisal, a duplicate or replica of the building being appraised, using the same or similar materials, construction standards, design, layout, and quality of workmanship and embodying all the deficiencies, superadequacies, and obsolescence of the subject building.⁹

Reproduction cost new less depreciation (RCNLD). A valuation method used to estimate the current value of a property or asset. It starts with determining the cost to reproduce the asset with a new one of similar kind and quality at present market prices. From this *reproduction cost new*, depreciation is subtracted to account for any loss of value due to factors like age, wear and tear, and obsolescence. This method provides an estimate of the fair value of the asset as it stands today, reflecting both its current utility and the impact of its usage and aging over time.

Usage factor. The percentage of fee value that the market attributes to the partial use of rights.

⁷ *The Dictionary of Real Estate Appraisal*, 7th edition, Appraisal Institute, Chicago, IL 2022, 118.

⁸ *Ibid.*, 134.

⁹ *Ibid.*, 163.

DATE OF VALUATION

The effective date of this valuation is August 23, 2023.

PURPOSE, INTENDED USE, AND INTENDED USERS OF THE APPRAISAL

The purpose and intended use of this appraisal is to estimate the market value of the land using the cost approach (reproduction cost new less depreciation) and the sales comparison approach (corridor valuation methodology) for the Union Pacific/BNSF Joint Facilities located between Bakersfield and Mojave, California to assist the Union Pacific Railroad Company in negotiations with BNSF Railway and for filing with the Surface Transportation Board (STB). The client is the Union Pacific Railroad Company, and the intended users are Union Pacific Railroad Company personnel and its representatives, as well as the Surface Transportation Board.

SCOPE OF THE APPRAISAL

In the context of this report, scope describes the extent of the process of collecting, analyzing, confirming, and reporting data, necessary to develop a complete valuation and estimate of the market value of the land.

Cameron R. Rex, MAI, inspected the entirety of the subject property by hi-rail vehicle on August 22 and 23, 2023, and inspected the comparable across-the-fence (ATF) sales between August 19 and 23, 2023. Charles W. (Sandy) Rex III, MAI and Charles W. Rex IV, MAI, AI-GRS, inspected the subject property and comparable ATF sales using high-quality digital imagery.

Digital property boundaries and railroad valuation maps were provided by Union Pacific. The UP provided digital property boundaries were generally accepted as correct. The digital property boundaries were split for areas where only slope, access, etc. easements were acquired, and for areas that Union Pacific identified as not to be included as part of the UP/BNSF Joint Facilities. Across-the-fence land uses were preliminarily determined using high-quality digital imagery, zoning, and land use maps, and were confirmed during the on-the-ground inspection.

A search for land sales comparable to the across-the-fence land uses was undertaken in Kern County. The sales search was accomplished using the jurisdiction's GIS parcel and ad valorem assessment databases obtained from CoreLogic. Additionally, sales were extracted from third-party sources such as CoStar. Sales were verified through the recorded deeds and property record cards, and each sale was mapped within ArcGIS Pro.

Using this information enabled us to identify and obtain sales comparable to the ATF land uses. Sales were identified by date, land use/zoning, size, and location criteria. All sales were physically inspected from the ground, as well as within our GIS system using high-quality digital aerial imagery.

For the comparable ATF sales analysis, information obtained for each sale was converted to dynamic Excel spreadsheets and then analyzed. Non-parametric graphical analysis was used to derive market-supported adjustments to account for variances in price. The sales were compared to the

ATF land uses and ATF unit values were estimated and applied to the appropriate segments. We used this process for the entire corridor.

All available data was considered in arriving at the highest and best use of the subject property, as well as the across-the-fence properties.

All three approaches to value were considered. For this valuation, we used the cost approach by employing the reproduction cost new less depreciation method, as well as the sales comparison approach by employing the corridor valuation method.

The reproduction cost new less depreciation methodology utilizes the across-the-fence valuation method to estimate the value of the across-the-fence land and then utilizes an assemblage factor, which estimates the additional costs incurred in assembling the corridor, including the direct and indirect costs, and is then adjusted for all forms of depreciation, in particular obsolescence.

The corridor valuation methodology utilizes the across-the-fence valuation method to estimate the value of the across-the-fence land and then utilizes a market-extracted corridor factor to estimate the market value of the corridor. Since the highest and best use of the subject property is for continued corridor use as a mainline freight railroad corridor, similar corridors were used to estimate a corridor factor to apply to the ATF value. The corridor factor is estimated using comparable corridor sales. The value of the corridor includes real estate, as well as the contribution of grading, drainage, sub-ballast, bridges, trestles, and tunnels; of which any contributory value is included in the overall corridor value.

All corridor sales used in the report to derive the corridor factor were thoroughly researched and confirmed with parties familiar with the transaction. While we have obtained maps and aerials of these corridors, most have not been physically inspected. *Much of the information contained within the corridor sales is proprietary to one or more of the parties to the transaction as well as to RMI Valuation, LLC. Their intended use is for this appraisal only. Any use by anyone other than the Union Pacific Railroad Company or its representatives, for profit or otherwise, is strictly prohibited by the copyright law of the United States. This information can only be used with the written permission of RMI Valuation, LLC.*

In both the reproduction cost new less depreciation and corridor valuation methodologies a usage factor is used for those portions of the subject property used for slope/access/etc. easements, and as a water pipeline easement.

The two methodologies are reconciled in order to conclude a final estimate of the market value.

This appraisal report is intended to comply with the reporting requirements set forth under Standards Rule 2-2(a) of the *Uniform Standards of Professional Appraisal Practice* (USPAP). As such, it presents a summary of the data, reasoning, and analysis that were used in the appraisal process to develop our opinion of value.

PROPERTY IDENTIFICATION/DESCRIPTIVE DATA

OWNERSHIP

Owner

Union Pacific Railroad Company
1400 Douglas Street
Omaha, Nebraska 68179

Joint User

BNSF Railway Company
2650 Lou Menk Drive
Fort Worth, Texas 76131

TITLE AND PROPERTY RIGHTS APPRAISED

A title report has not been provided for the subject corridor. We have made the reasonable assumption that valid title for rail and associated corridor use is held by Union Pacific as evidenced by such use for well over 100 years. Additionally, since this is the estimate of the hypothetical assemblage cost for the land, we have assumed that similar title would be acquired, which would allow for continued use as a railroad corridor.

For the slope, access, and other similar easements, we have assumed that they represent a shared use with the underlying property owners. For the water pipeline easement, we have assumed the rights would be like other similar water pipeline easements.

This appraisal does not separately consider water rights. Through our review of the original acquisition deeds, we are aware that significant water rights have been acquired. The understanding of the extent of these water rights, and their valuation is beyond the scope of this appraisal report. This is an extraordinary assumption in this appraisal.

FIVE-YEAR TITLE HISTORY

No known substantive change in title has occurred within the past five years.

LEGAL DESCRIPTION

A legal description was not provided for the subject property. However, the subject property is comprised of the portion of Union Pacific's Mojave Subdivision extending from Kern Junction at Milepost 313.56 to South Mojave Junction at Milepost 381.43 that is highlighted in the maps titled *Kern Jct – Mojave Joint Use Facilities by Southern Pacific Co. and Atchison Topeka and Santa Fe Ry Co.* maps, dated December 31, 1961 and revised February 19, 1963¹⁰. The joint use property is also shown in the maps included in the Addendum, titled *Kern Jct – Mojave Joint Use of Facilities by Union*

¹⁰ See Rex Workpapers "3 – Maps/MK Joint ROW Map (Hi-Res).pdf"

Pacific and BNSF, as created by RMI Valuation, LLC and dated September 28, 2023, beginning on page 153¹¹. The subject property is a portion of that property shown on the following Railroad Valuation Maps¹²:

- | | | | |
|-------------|-----------|--------------|-----------|
| • V-52/1 | (CE35100) | • V-52/11 | (CE35121) |
| • V-52/S-1b | (CE35104) | • V-52/12 | (CE35122) |
| • V-52/S-1c | (CE35105) | • V-52/13 | (CE35123) |
| • V-52/2 | (CE35108) | • V-52/S-13a | (CE35124) |
| • V-52/3 | (CE35109) | • V-52/S-13b | (CE35125) |
| • V-52/S-3 | (CE35110) | • V-52/14 | (CE35126) |
| • V-52/4 | (CE35111) | • V-52/S-14a | (CE35127) |
| • V-52/S-4 | (CE35112) | • V-52/S-14b | (CE35128) |
| • V-52/5 | (CE35113) | • V-52/15 | (CE35129) |
| • V-52/6 | (CE35114) | • V-52/16 | (CE35130) |
| • V-52/S-6 | (CE35115) | • V-52/17 | (CE35131) |
| • V-52/7 | (CE35116) | • V-52/18 | (CE35132) |
| • V-52/8 | (CE35117) | • V-52/19 | (CE35133) |
| • V-52/S-8 | (CE35118) | • V-52/S-19a | (CE35135) |
| • V-52/9 | (CE35119) | • V-52/S-19b | (CE35136) |
| • V-52/10 | (CE35120) | | |

LOCATION AND ACCESS

The subject property consists of Union Pacific Railroad Company's Mojave Subdivision from Kern Junction in Bakersfield, California at Milepost 313.56, extending in a generally eastern direction to South Mojave Junction in Mojave, California at Milepost 381.43. The line has been jointly used by Union Pacific and BNSF (and their predecessors) since approximately 1900, with BNSF having trackage rights.

The western extent of the subject property, at Kern Junction is approximately 2.1 miles east of the Bakersfield downtown center. At Kern Junction the BNSF Bakersfield Subdivision diverges from the Union Pacific Mojave Subdivision, providing connections to Fresno, Stockton, and Richmond, California. The subject corridor extends southeasterly through Bakersfield, East Bakersfield, Potomac Park, Hillcrest, and East Niles, all part of the Bakersfield metropolitan area. The line continues southeasterly into the predominantly agricultural area east of Bakersfield, where it passes through Edison (MP 320), and continues through agricultural areas until Milepost 327, where it crosses into a predominantly mountainous rangeland area near Bena. The line continues southeasterly to Caliente (MP 335.5), where it turns westerly before turning southerly and then easterly towards Bealville (MP 340.5). From Bealville the line continues in a generally southeasterly direction to Keene (MP 348), where it continues southeasterly to the Tehachapi Loop (MP 351). The Tehachapi Loop is a 3,779-foot-long (0.71 mile) spiral track, which rises at a two percent (2%) grade, gaining 77 feet in elevation and makes a 1,210-foot diameter circle. From the Tehachapi Loop, the line continues southeasterly, then south, passing by Golden Hills to the south, before turning easterly

¹¹ See Rex Workpapers "2 – Report Exhibits/Maps/23-220 RMI Joint Facilities Map Book 09282023.pdf"

¹² See Rex Workpapers "3 – Maps/Railroad Valuation Maps/"

at Milepost 359, where it enters the City of Tehachapi (MP 360.5). The line continues easterly to Monolith (MP 364.5) and then turns southeasterly to Cameron (MP 369.5), where it continues northeasterly to Milepost 376, where the line turns southerly and continues to Mojave (MP 380.5), and terminates at Milepost 381.43 at South Mojave Junction, where the BNSF Mojave Subdivision diverges from the UP Mojave Subdivision, providing connections to BNSF's Barstow Yard, Los Angeles, and BNSF's rail system to the East.

From Bakersfield, the subject corridor runs directly adjacent to Edison Highway from the western extent at Milepost 313.56 to Milepost 323.74, where it continues to run directly adjacent to Bena Road to Milepost 330. From Milepost 330 to Milepost 346 the line is accessible from private railroad access roads, and public crossings in Caliente and Bealville. From Milepost 346 to Milepost 358.2 the line runs generally along State Highway 58, though access to the line is from private railroad access roads only. From Milepost 358.2 to Milepost 360 the line is only accessible from private railroad access roads. The line runs directly adjacent to Tehachapi Blvd from Milepost 360 to Milepost 367.66. From Milepost 367.66 to Milepost 376 the line runs adjacent to State Highway 58, though access to the line is primarily from private railroad access roads only. From Milepost 376 to the eastern extent at Milepost 381.43, the line runs adjacent to Sierra Highway (58 Local), though access is generally from private railroad access roads only.

The subject corridor has approximately 35 at-grade crossings along its 67.87 miles, with sixteen (16) being public crossings, seven (7) being private crossings, and twelve (12) being private railroad crossings.

SIZE AND SHAPE

The total length of the subject property is 67.87± miles. The breakdown of the area of the subject property is shown in Figure 1.¹³

Description	Area (acres)
Fee/railroad easement	1,438.41
Slope, access, etc. easement	144.66
Water pipeline easement	12.94
Total	1,596.01

Figure 1. Subject Property Area (acres)

The width of the corridor is predominantly 200 feet. The calculated average width of the corridor (less the slope, access, etc. easements) is 174.85 feet. The calculated average width including the slope easements is 192.43 feet.

¹³ See Rex Workpapers "4 – Valuation/Rex – Subject Valuation.xlsx/Subject Valuation (tab)"

TOPOGRAPHY

The subject corridor traverses relatively level terrain as it gradually rises out of the San Joaquin Valley from Bakersfield, where the western extent begins at an elevation of 419 feet MSL. Starting in Bena the corridor starts to enter steep mountainous terrain as it climbs to the Tehachapi Pass in Tehachapi reaching its maximum elevation of 4,037 feet MSL. From Tehachapi the line begins to descend into the Fremont Valley and Mojave Desert, to an elevation of 2,705 feet MSL at the line's eastern extent.

From the line's minimum elevation (419 feet MSL), at its western extent to the line's maximum elevation (4,037 feet MSL) at Milepost 362.23 in Tehachapi, the line ascends 3,618 feet or 74.3 feet per mile. From Tehachapi to the line's eastern extent (2,705 feet MSL), the line descends 1,332 feet or 69.4 feet per mile.

While the corridor itself has a relatively uniform grade, beyond the corridor is very mountainous terrain with steep cliffs above and below in certain areas. There are twelve (12) active tunnels remaining out of the 18 original tunnels located between Bakersfield and Tehachapi. Figure 2 shows an elevation profile of the subject property with Bakersfield on the left and Mojave on the right.

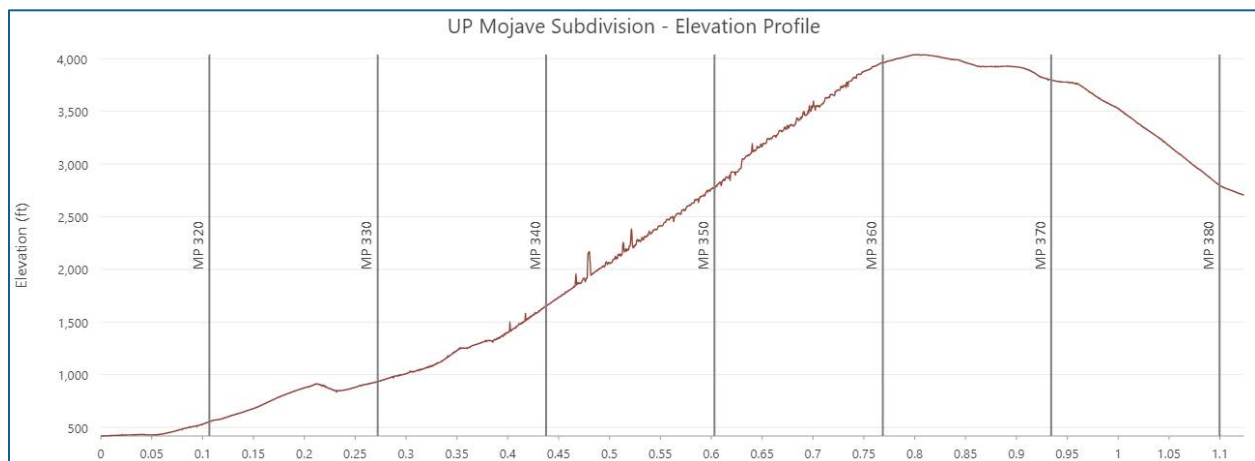


Figure 2, Subject Property Elevation Profile

IMPROVEMENTS

The subject corridor is a major freight railroad mainline. Of the 67.87 miles of the line, approximately 55.59 miles (81.9%) are double-tracked or have passing sidings, while the remaining 12.28 miles (18.1%) are single-tracked. The track and building improvements located within the boundaries of the subject property *are not considered* in this valuation, as this is a valuation of the *land only*.

SUBJECT HISTORY

Union Pacific's Mojave Subdivision from Bakersfield to Mojave was constructed by the Southern Pacific Railroad between 1874 and 1876. In 1900, or soon thereafter, the Atchison, Topeka and Santa Fe Railway (predecessor to the BNSF Railway) negotiated trackage rights on the Mojave Subdivision, which have continued to today.

ZONING AND OTHER LAND USE REGULATIONS

The subject property is a railroad corridor that predates zoning ordinances (where zoning exists). Adjacent ATF zoning varies according to land uses and zoning jurisdiction. We have considered local zoning in the ATF land use classification of the subject property.

The subject corridor is regulated by the Surface Transportation Board (STB). The purpose of this regulation is to ensure that common carrier obligations are met according to the Staggers Act of 1980.

CURRENT USE

The Union Pacific Mojave Subdivision, a vital link in the transcontinental freight network, serves as a major mainline freight corridor that is operated jointly by Union Pacific and BNSF Railway under a trackage rights agreement. This subdivision is strategically important, connecting various regional and national routes.

As detailed in the operational data provided by Union Pacific, the subdivision accommodates approximately 30 trains per day, which is corroborated by data from the USDOT Crossing Inventory. The majority of the traffic consists of overhead movement for both Union Pacific and BNSF Railway, though Union Pacific also manages local freight services at the western terminus from Bakersfield Yard and at the eastern end from Mojave Yard.

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¹⁴ See Rex Workpapers "5 – Miscellaneous/Mojave Traffic Data – 2019-2023.xlsx"

ACROSS-THE-FENCE LAND USES AND ZONING

The across-the-fence land uses along the subject property include:

- Agricultural
- Commercial
- Desert Acreage
- Industrial
- Mobile home
- Multifamily Residential
- Rangeland
- Single-family Residential
- Residential Development
- Rural Residential

The across-the-fence properties are zoned by the City of Bakersfield, Kern County and City of Tehachapi.

- City of Bakersfield
 - o M-2 (General Manufacturing)
- Kern County
 - o A (Exclusive Agriculture)
 - o A-1 (Limited Agriculture)
 - o C-1 (Neighborhood Commercial)
 - o C-2 (General Commercial)
 - o E(1/4) (Estate 0.25 acre)
 - o E(1/2) RS (Estate 0.5 acre – Residential Suburban)
 - o E(1) RS (Estate 1 acre – Residential Suburban)
 - o E(2 ½) RS (Estate 2.5 acres – Residential Suburban)
 - o E(20) RS (Estate 20 acres – Residential Suburban)
 - o M-1 (Light Industrial)
 - o M-2 (Medium Industrial)
 - o M-3 (Heavy Industrial)
 - o MP (Mobile home Park)
 - o OS (Open Space)
 - o R-1 (Low Density Residential)
 - o R-1 MH (Low Density Residential – Mobile home)
 - o R-2 (Medium Density Residential)
 - o R-3 (High Density Residential)
- City of Tehachapi
 - o A (Agriculture)
 - o C-2 (Central Commercial)
 - o C-3 (Central Commercial)
 - o M-1 (Light Industrial)
 - o M-2 (Heavy Industrial)
 - o OS (Open Space)
 - o RSP (Recreation, School, Public Use)
 - o T-5 (Downtown)
 - o East Tehachapi Specific Plan

MARKET AREA ANALYSIS

The primary purpose of the area analysis is to determine how social, governmental, economic, and environmental forces influence property values in the subject property's market. It is used to help identify the geographic area that is subject to the same influences as the property being appraised.

The Mojave Subdivision from Bakersfield to Mojave is located entirely within Kern County, California. The subject generally extends from the eastern side of Bakersfield in an east-southeasterly direction terminating west of Rutan Field, home of the Mojave Air and Space Port.

Kern County, located in the southwestern portion of the state, comprises the Bakersfield, California, Metropolitan statistical area (MSA) with an estimated population of 909,235, according to the 2020 census. With a total area of 8,163 square miles, it is the third-largest county in the state. It has an estimated population density of about 110 inhabitants per square mile, significantly less dense than California's overall population density of 253.7 per square mile.

Kern County's primarily known for its large agricultural base and petroleum extraction industries in addition to its significant military defense installations, including Edwards Air Force Base and China Lake Naval Air Weapons Station. The aviation sector is also well established in Kern County at the Mojave Air and Space Port, known for its cutting-edge aerospace design innovations and as the home of the National Test Pilot School.

Between the 2010 and 2020 census, Kern County grew by about 8.3%, an annual compounded growth rate of about 0.8% per year. California, during the same period, grew by about 6.1% from 37,253,956 to 39,538,223, respectively.

As of 2022, there were approximately 227,499 households in the county, with about 3.17 persons per household. The median household income was estimated at \$63,883, slightly below the US and California with median household incomes at \$75,149, and \$91,905, respectively.

In 2022, the unemployment rate, not seasonally adjusted, in Kern County was estimated at 6.9%, while California was at 4.3% and the US overall was about 3.7% according to the Federal Reserve Bank of St. Louis.

HIGHEST AND BEST USE ANALYSIS

Highest and best use, a necessary element of market value, is the physically possible and legally permissible use recognized by the subject market area that results in the highest value of the subject property; therefore, the four criteria the highest and best use of a property must meet are legal permissibility, physical possibility, financial feasibility, and maximum productivity. A property cannot be valued until its highest and best use is determined because the selection of comparable sales and market information is dependent on its highest and best use.

In a highest and best use analysis, factors that influence use and value in the market area are related to the subject's attributes. In addition, highest and best use analysis looks at the supply and demand of various uses to establish timing, risk, and feasibility of those uses that are physically possible and legally permissible on the subject property. The one use that results in the highest value is the highest

and best use. Related to the estimate of the highest and best use is the timing of that use; that is, is the use feasible today or at some time in the future?

Highest and best use analysis looks at the property as though vacant and as improved.

In the present case, a thorough highest and best use analysis of the subject property is not necessary since the subject is a major freight rail transportation corridor, subject to common carrier obligations. No other use exists in the market area that would result in competing highest and best uses. Therefore, the highest and best use of the subject property is for continued corridor use for freight railroad purposes with coexisting utility and telecommunications occupancies.

VALUATION METHODOLOGY

For the purposes of this appraisal, we utilize two approaches in the valuation of the subject property, the sales comparison approach and the cost approach. The first is the more traditional and accepted Corridor Valuation Methodology, which is a derivative of the sales comparison approach. This method utilizes the across-the-fence methodology to estimate the across-the-fence value, and then a market-derived corridor factor, which takes into account the importance of the corridor as a corridor which is applied to estimate the value of the corridor.

The second is the reproduction cost new less depreciation (RCNLD) method, which is a derivative of the cost approach. This method estimates the assemblage cost of the land, including all land acquisition costs, legal and administrative costs, surveying and valuation costs, relocation costs, public relations and community engagement costs, and environmental impact costs. This methodology utilizes the sales comparison approach to estimate the across-the-fence (ATF) value, and then an assemblage factor is estimated to account for the costs associated with the real estate over and above the value of the property rights to be acquired, this results in the reproduction cost new (RCN), in which depreciation and/or obsolescence is then estimated in order to estimate market value. *The RCNLD estimated in this appraisal does not include the cost of any improvements or the construction of the corridor.*

CORRIDOR VALUATION METHODOLOGY

The primary method employed in this appraisal is the sales comparison approach, wherein the land is valued using the across-the-fence methodology, also known as the corridor valuation methodology. This approach is a specialized application of the sales comparison approach designed specifically for evaluating corridors.

Our studies and analysis reveal that over 90% of the variance in sale prices of corridors, where the highest and best use is as a corridor, can be explained by the ATF value. The importance of the corridor itself accounts for most of the remaining variance. This methodology, thoroughly supported by market data, stands as the only reliable means to account for price variances among different corridor sales. If a valuation method can successfully explain these variances, it is deemed appropriate for valuing similar properties.

The ATF methodology's validity has been upheld by judicial precedent, including notable cases such as New York Central Lines, LLC v. State of New York¹⁵, where the ATF methodology was found by the Appellate Division of the New York Supreme Court to be the proper methodology in the valuation of corridors, and in Union Pacific Railroad Co. v. Santa Fe Pacific Pipelines, Inc., et al.¹⁶, where the Supreme Court of the State of California found the ATF methodology to be the correct methodology for the valuation of an 1,800-miles subsurface pipeline occupancy within a railroad corridor.¹⁷ These decisions confirm its appropriateness for corridor valuation across various contexts.

In the valuation process, market value must be derived from sales of similar assembled corridors. Variance in corridor sale prices is effectively explained by examining the ATF value employed during transaction negotiations and comparing it to the total sale price. This analysis yields a corridor factor, essential for comprehending the dynamics influencing market values.

It is critical to note that the ATF value alone *does not* constitute the market value of an assembled corridor. Sole reliance on the ATF value is not corroborated by empirical data nor markets trends. An examination of our corridor sale database, which includes 52 rigorously analyzed corridor sales, shows that corridors actively used as rail lines at the time of sale exhibited an average corridor factor of 1.88 times their ATF value.

The corridor factor may be less than one, equal to one, or greater than one. For example, if the highest and best use of a corridor is for disassembly, the corridor factor will likely be less than one, reflecting discounts for sales costs, holding costs, the holding period, and the applicable discount rate. However, this valuation methodology is not typically applied when a corridor's highest and best use is non-corridor or for disassembly, where a *net liquidation valuation methodology* is more appropriate, though the outcome would reflect a corridor factor of less than one.

The market value of a corridor is calculated by multiplying the ATF value by a market-derived corridor factor. The ATF value *does not* assume that the subject corridor has a highest and best use the same as the ATF land uses, but instead reflects the effects of location and market conditions on value, while the corridor factor reflects the corridor's continuity, utility, and importance as a corridor. Differences in topography and shape between the subject corridor and the adjacent ATF land uses are not considered. This is supported by the comparable corridor sales where such differences are not considered in the ATF value for the corridor sales, providing consistency between the comparable sales analysis and the valuation of the subject corridor.

The significance of a corridor generally correlates with a higher corridor factor. Data analysis reveals that the *average* corridor factors vary by usage: trail/NITU corridors at 1.31, industrial tracks and secondary lines at 1.82, mainlines at 1.94, and high-intensity mainlines at 2.15. Highly active

¹⁵ New York Central Lines, LLC v. State of New York (N.Y. App. Div. 2016) 35 N.Y.S.3d 713; see also Id. (N.Y. App. Div. 2012) 957 N.Y.S.2d 252.

¹⁶ Union Pacific Railroad Co. v. Santa Fe Pacific Pipelines, Inc., et al. (BC319170) 2012 WL 5185779.

¹⁷ In this case, tried over a four and a half-year period, the appraiser for the pipeline company attempted to show that the best method of valuation for the subsurface rights was to use purportedly comparable existing agreements using direct comparison, without consideration of precise location, particularly the consideration of the ATF value of the comparable agreements. This methodology was roundly rejected by the court, and the ATF methodology using a market-extracted corridor factor and a market-extracted usage factor was found to be the proper method of estimating market value – as was thoroughly discussed in the 100+-page opinion.

mainline corridors, especially those with no alternatives and high traffic, can have corridor factors exceeding 2, sometimes as high as 5, highlighting their critical importance and value in the market.

The ATF value is estimated by segmenting the corridor according to changes in adjacent land uses. Each change initiates a new segment delineation, with the ATF value estimated for each based on the unit values of the adjacent land uses, without adjustments for differences in size or utility of the subject segment.

Following the estimation of the ATF value, a usage factor is determined based on the intended use for each segment – whether for corridor purposes, slope or access easements, or water pipeline easements. This usage factor helps quantify the value of the full or partial rights owned.

The total value of the corridor is then calculated by multiplying the total subject ATF value by the market-extracted total corridor factor, prior to the consideration of any in-kind consideration. In this case, *no in-kind consideration has been identified in the valuation of the subject property.*

REPRODUCTION COST NEW LESS DEPRECIATION (RCNLD) METHODOLOGY

The second approach utilized in this appraisal is the cost approach. In this approach, the land is valued by estimating the assemblage cost of the land required for the corridor (reproduction cost new), as it is currently configured, taking into account all costs associated with the assemblage of the corridor and deducting depreciation and/or obsolescence, the resulting estimate is the reproduction cost new less depreciation.

The reproduction cost new less depreciation methodology is typically used in the valuation of improved properties, where the cost to reproduce the asset new is estimated and then subtracting all forms of depreciation to estimate the value of the improvement, and then estimating the value of the land using the sales comparison approach. This appraisal *does not include* the valuation of the track and building improvements nor the cost to construct or prepare the corridor for construction, however, utilizing the reproduction cost new less depreciation methodology takes into account the cost of assembling the corridor land, including the land acquisition costs, legal and administrative costs, surveying and valuation costs, relocation costs, and environmental costs in order to estimate the reproduction cost new of the corridor land.

To estimate the cost of obtaining the real estate rights for the subject railroad corridor the across-the-fence methodology is used, which is a derivative of the sales comparison approach. The ATF value is estimated by dividing the subject corridor into segments based on adjacent/underlying land uses. Each time a land use changes on one side of the corridor or the other, a new segment is designated. The ATF value is then estimated for each segment according to the unit value of its adjacent or underlying land uses, without adjustment for size or utility of the subject segment. In this methodology, the ATF value represents the expected cost of the land or property rights to be acquired, or its base cost.

After the estimate of the ATF value, a usage factor is estimated based upon whether the particular segment is to be used for corridor purposes, slope or access easements, or for a water pipeline easement. The usage factor accounts for the value of the full or partial property rights being acquired.

The costs associated with assembling land for a corridor include costs over and above the estimated ATF value of the subject property (or adjacent properties). These costs are accounted for in the assemblage factor. These additional costs can vary significantly based on a number of factors.

1. **Premium for Assemblage:** When assembling a large corridor, the purchasing entity may need to pay a premium over the standard market value to convince owners to sell. This is especially true if the project cannot proceed without acquiring specific parcels, giving the landowners leverage to negotiate higher prices.
2. **Eminent Domain and Compensation:** In cases where eminent domain (the right of a government or entity to expropriate private property for public use, with payment of compensation) is exercised, the compensation paid might not always align with the market value perceived by the landowner or the condemnor. Condemnors are required to pay “just compensation,” which should theoretically reflect fair market value.
3. **Market Conditions:** The local real estate market can affect acquisition costs. In a high-demand area, the costs may naturally exceed the average market values listed for similar properties in less sought-after locations. Conversely, if the project is seen as beneficial to the area, it might increase property values even before purchase.
4. **Size and Shape of the Parcel:** The cost can also vary depending on the size and shape of the parcel. Oddly shaped parcels that are more difficult to develop for other purposes might be cheaper, whereas larger, well-shaped parcels can command a higher price.
5. **Full vs Partial Acquisition:** The need for a full versus partial acquisition of a property may also affect the cost. A partial acquisition may result in damages to the remainder, which could drastically increase the overall cost, especially when large land holdings are involved, and it is not practical to acquire the entirety of the property, even when damages caused by the partial acquisition are high.
6. **Zoning and Future Use:** If the land is zoned for high-value use (like commercial or industrial as opposed to agricultural), acquiring it can be more expensive. Additionally, if future uses increase the value of the land, owners might anticipate these changes and demand higher prices.
7. **Costs of Negotiation and Litigation:** The process of negotiating for land acquisition, especially if prolonged, can add to the costs. If land acquisition leads to litigation, the costs can increase significantly, not necessarily reflecting the land’s market value but rather the legal complexities involved.
8. **Strategic Importance:** The strategic importance of specific parcels for the project completion can also skew the cost. If certain parcels are critical for the corridor’s continuity, their acquisition cost might be much higher than the market value.
9. **Legal and Administrative Costs:** This includes expenses for legal services such as negotiating purchases, handling contracts, resolving disputes, and dealing with possible expropriation issues. There may also be significant costs associated with regulatory compliance, securing permits, and potential environmental assessments.
10. **Surveying and Valuation Costs:** Before acquiring land, it needs to be surveyed and valued. This ensures that the boundaries are correctly defined and that the purchase price is fair. Professional surveyors and appraisers need to be hired for these tasks.
11. **Relocation Costs:** If the land being acquired is occupied, there may be costs associated with relocating current residents or businesses. This includes compensation for moving and possibly additional payment to cover the difference in cost between their old and new locations.

12. **Environmental Impact Costs:** Even though this is technically separate from improvement costs, assessing the environmental impact as part of the land assembly process can be necessary. This might include studies on wildlife, vegetation, water resources, and other ecological assessments to comply with environmental regulations.
13. **Public Relations and Community Engagement Costs:** These costs arise from the need to manage relationships with local communities and other stakeholders. Effective communication and engagement can be crucial, especially if the project faces public opposition or requires significant changes to the local environment or infrastructure.

Many of these factors directly affect the land acquisition costs, while some are additional soft costs that can vary based on the scale and complexity of the project. Overall land value may also affect the size of the assemblage factor. This is particularly true when comparing the assemblage of a corridor in an urban environment with extremely high land values, as compared to the assemblage of a corridor in a sparsely populated rural environment. In an urban setting, while the overall costs are higher, the assemblage factor as a multiplier of the ATF value might be lower proportionally because the high land value dilutes the impact of the fixed soft costs. Whereas, in a rural setting, a higher assemblage factor is reflected to account for the proportionally higher impact of the fixed costs on lower land values.

The process of estimating an assemblage factor is a combination of trying to quantify any premium that may be required in order to assemble the full corridor, over and above the ATF value, as well as an estimation of the soft costs that are required in order to complete the assemblage. Additionally, analysis of other assemblages can be used to support the overall assemblage factor estimate.

The total estimate of the assemblage cost of the corridor land is the product of the ATF value times the assemblage factor, and thus the reproduction cost new for the assembled corridor land.

The final step in estimating the reproduction cost new less depreciation, is the estimate of depreciation and/or obsolescence. Land, as a rule, does not depreciate in the economic sense because it does not deteriorate over time. However, the value of land can be affected by other factors, which might be akin to economic, external, as well as functional obsolescence.

The estimate of obsolescence involves examining the significant disparity between the reproduction cost new and how the market typically recognizes value. This disparity is often illuminated by assessing the degree of obsolescence, including economic, external, and functional factors, even in corridors without viable rail alternatives and those that are crucial to current transportation needs.

The reproduction cost new provides a comprehensive estimate of all costs necessary to replicate the corridor, incorporating not just the direct cost of land, but also extensive soft costs required in its assemblage. Additionally, government subsidies often play a crucial role in supporting the assembly of these corridors, reflecting their perceived public benefits such as enhancing connectivity and stimulating economic growth. Despite such support, the *market values*, as determined by participants, typically align closer to the across-the-fence value multiplied by a corridor factor. This calculation often results in a figure significantly lower than the reproduction cost new, suggesting a strong presence of various forms of obsolescence affecting the market's perception of the corridor's value.

Functional obsolescence is particularly relevant in the context of rail corridors where the design or layout may no longer meet modern transport demands or technological standards. Economic and

external obsolescence also contribute significantly to this disparity. Economic shifts such as changes in the volume or type of goods transported, or external factors like new environmental regulations or community opposition, can all devalue the corridor despite its operational significance. Market participants also frequently overlook the additional assemblage costs accounted for in the reproduction cost new, which are crucial for the initial setup and continuity of the corridor but are often not considered in the market's perception of value.

Given the lack of other market evidence directly comparable to newly constructed corridors, the most viable method to estimate the total obsolescence affecting a corridor's value is to subtract the corridor value (calculated as ATF value times corridor factor) from the reproduction cost new. This approach offers a pragmatic means to quantify obsolescence by reflecting the difference between the theoretical cost of creating a fully functional new corridor and the actual market value as recognized by industry participants.

CORRIDOR VALUATION

ACROSS-THE-FENCE VALUATION

The ATF value reflects the particular location and market conditions of the corridor, as well as the value of the adjacent and underlying lands that would need to be acquired in an assemblage and is estimated by classifying the subject corridor's across-the-fence (adjacent/underlying) land uses; the classification is based on each ATF parcel's current use, as well as its highest and best use. Sales comparable to the ATF properties and recent to the date of value are used to value the ATF properties as though vacant. Adjustments are made for varying elements of comparison, but not for shape or topographical differences of the subject valuation segment. If size is determined to be a factor in the difference between the price of one sale versus another, then the average size of the across-the-fence parcels is used for the adjustment, and not the size of the subject segment. The principle is to estimate the value of the adjoining land and to apply these unit values to the corridor.

The first step in the process is to divide the subject corridor into valuation segments. Each time the ATF land use changes on one side of the corridor or the other, a segment line is drawn. ATF land uses are based on field inspection, as well as data within our GIS, which includes, among other things; high-quality digital imagery, USGS topographical maps, and local zoning and land use data. The subject property is divided into 116 segments.

The segment areas were calculated in ESRI's ArcGIS Pro, based on digital property boundaries provided by Union Pacific, and segmented by RMI Valuation, LLC.

The ATF land value is based on comparable sales. A search for sales with uses comparable to the ATF land uses was made in the vicinity of the subject property in Kern County, California, using the county's GIS parcel and ad valorem assessment database, obtained from CoreLogic, as well as third-party sources such as CoStar.

In cases where an ATF land use is either a road, railroad, or river, the ATF land use (value) on the opposite side of the corridor is used for the segment. In situations where a road, etc., is on both sides of the corridor, the ATF land use from the side of the least disruptive barrier is used (path of least resistance).

All comparable ATF sales were inspected by Cameron R. Rex, MAI, R/W-AC between August 19 and 23, 2023. All sales were analyzed and verified by deed and assessor property record card. The price per square foot or acre units of comparison are used for the various land use categories. Comparable sales searches and analysis were completed for the land uses shown on page 29.

Use of Sales Groups and Unit Value IDs

In the organization of the valuation within this appraisal report, we utilize *Sales Groups*, which are a group of comparable sales with similar land use and/or zoning. These groups of sales are analyzed to estimate a unit value. In some cases, within a given location, instances exist where a given ATF land use may be included within several segments. In some cases, that land use is valued using the same unit value based on our analysis of the comparable sales. In other cases, the segments within a given ATF land use may have more than one indicated unit value, for instance, when a size adjustment is required for the average size of the ATF parcels. Accordingly, each distinct ATF unit value estimate is assigned a *Unit Value ID*. Beginning on page 61 of the *Addendum*, in the section titled *Sales Group Valuations*, a summary of each of the *Sales Groups* is included. Each section identifies the ATF land use, the comparable sales table, adjustments table, adjustment graphs, notes, and a summary of the *Unit Value IDs* that are based on that *Sales Group*, and the unit value conclusion for each *Unit Value ID*. These *Sales Group* pages provide the explanation and justification for the unit values used in the *Subject ATF Valuation* table as shown in Figure 6 on page 42. A summary of the *Unit Value IDs* and their concluded unit values is shown in Figure 5 on page 40.

All comparable ATF sales data and analysis used in this report are contained within Rex Workpapers "1 – Comparable Sales/Rex – Comparable ATF Sales.xlsx". This spreadsheet contains tabs for each Sales Group. The deeds for all sales used in this valuation are included in Rex Workpapers "1 – Comparable Sales/Sale Deeds/" and are organized in folders for each Sales Group. Additionally, maps of the comparable ATF sales by Sales Group are provided in KML format in Rex Workpapers "1 – Comparable Sales/Sales Maps/".

Explanation of the Valuation Process for ATF Unit Values

For each ATF land use along the subject property, sales comparable to the ATF land uses are selected. These sales are then analyzed using both quantitative and qualitative analysis.

Quantitative adjustments are specific adjustments in the form of dollars or percentages that are applied to the indicated unit values for each sale, which are extracted by comparing sales to each other or to other market information. For example, consider a property that sold for \$1.00 per square foot two years ago and a recent, similar property that sold for \$1.20 per square foot. The difference between these two prices can help estimate an adjustment for time, or market conditions, in this example \$0.10 per square foot per year or 10% per year.

Adjusting for advantageous financing is an example of using other market information for a quantitative adjustment. In such a case, the present value of the actual principal and interest payments, which were part of the negotiations between buyer and seller, is calculated at market rates to estimate an adjustment for financing, also known as a cash equivalency adjustment.

To illustrate this process, we are using *Sale Group 5 (Unit Value ID 11)* for Agricultural ATF land uses east of Bakersfield as an example. The sales table for *Sales Group 5* is shown on page 75.¹⁸

The first step in quantitative analysis is to identify elements that explain variances in sale price per acre. This analysis consists of plotting the various elements of comparison against sale price per acre.

The main elements of comparison that were identified and considered for the agricultural ATF land uses along the subject property are market conditions and size. In this example, the quantitative analysis of the agricultural comparable sales indicated that both market conditions and size showed a high correlation to price. In this instance, size was used as the first adjustment to the agricultural comparable sales, which showed that about 63% of the variance in sale price is explained by size, as shown in Figure 5.

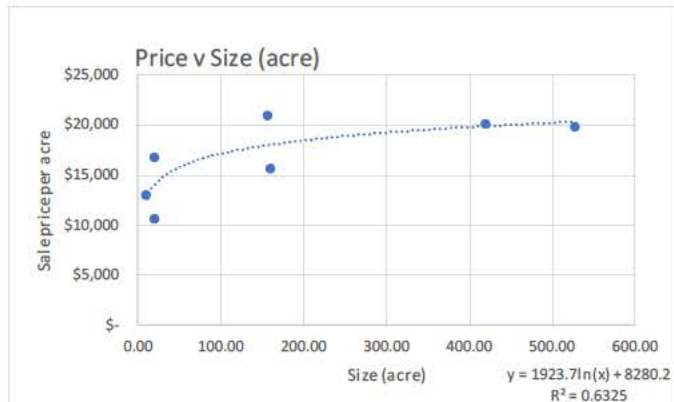


Figure 3. Sales Group 5 (UVID 11) - Adjustment 1 (size)

Illustrating the data's trend, the dotted blue line is the single curvilinear line closest to all data points, or sales. (The line's equation is shown in the lower right-hand corner.) The adjustment to the sales for size is calculated by using the slope of the line adjusted to the average size of the across-the-fence parcels along the agricultural ATF land uses. In other words, the difference between a sale's predicted price on the line and the subject's predicted value on the line, divided by the sale's predicted price, is the percentage of adjustment for size.

After the adjustment for size, the remaining element of comparison – market conditions – is plotted against sale price per acre, except this time the adjusted sale price per acre is used after the size adjustment is made. In this case, as shown in Figure 6, an additional adjustment for market conditions is justified, which indicated that approximately 73% of the remaining variance was explained by market conditions. In this example, the sales are adjusted to the date of sale of the most recent sale, November 14, 2022, using the formula in the lower right.



Figure 4. Sales Group 5 (UVID 11) - Adjustment 2 (market conditions)

No additional quantitative adjustments are indicated.

¹⁸ See Rex Workpapers "1 – Comparable Sales/Rex – Comparable ATF Sales.xlsx/SG5_AGR_BKR (tab)"

Qualitative analysis is the process of reconciliation to a value estimate by comparing the sales to the subject's ATF land uses for those elements that are not explicitly supported by quantitative analysis of the market. This process is usually best accomplished by ranking the sales from lowest to highest adjusted unit value. Starting with the lower unit values, the sales are compared to the ATF land use for differences other than those that have been quantitatively analyzed.

During the comparative process, the ATF land use is ranked within the sales, thus narrowing the range between comparable sales least inferior and least superior. By final comparison of these two sales most comparable to the ATF land use, an estimate of the market unit value for the ATF land use is made. In addition, summary statistics such as arithmetic mean, standard deviation, and median are used to support the qualitative analysis.

This process is shown for each *Sales Group* beginning on page 60 in the *Addendum*, in the *Sales Group Valuations* section. A summary of the Unit Value IDs showing the adjusted summary statistics and unit value conclusions is shown in Figure 5, on page 40. These unit values are applied to the appropriate Valuation Segments, based upon their *Unit Value ID* in Figure 6 on page 42.

The average ATF unit value is applied to the segment area. In cases where one ATF land use is a road or river, the ATF land use and corresponding unit value from the opposite side of the corridor is used for that segment.

The ATF value is the segment *Size (acres)* times the *Average Unit Value (per acre)*. This product is shown in the ATF Value column, within Figure 6 on page 42

UNIT VALUE SUMMARY

Figure 5¹⁹ shows the ATF unit value summary used in the ATF valuation for each valuation segment. The first column – *Unit Value ID* – is used in the *Subject ATF Valuation* table, shown as Figure 6 on page 42.

Unit Value ID	Sales Group	Land Use	Adjustment 1	Adjustment 2	Size Adjustment	Size Unit	Price Unit Type	Average Unit Value	Median Unit Value	Unit Value Conclusion
0	0	Road/River								
1	1	Industrial - Bakersfield					sqft	\$ 5 21	\$ 5 19	\$ 5 00
2	2	Residential - Bakersfield	Market Conditions	Size	0 24	acre	sqft	\$ 7 77	\$ 7 66	\$ 7 75
3	2	Residential - Bakersfield	Market Conditions	Size	0 27	acre	sqft	\$ 7 39	\$ 7 28	\$ 7 40
4	2	Residential - Bakersfield	Market Conditions	Size	0 15	acre	sqft	\$ 9 58	\$ 9 43	\$ 9 55
5	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	3 11	acre	sqft	\$ 2 77	\$ 2 75	\$ 2 75
6	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	1 94	acre	sqft	\$ 3 38	\$ 3 35	\$ 3 35
7	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	1	acre	sqft	\$ 4 47	\$ 4 44	\$ 4 45
8	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	3 88	acre	sqft	\$ 2 52	\$ 2 50	\$ 2 50
9	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	9 53	acre	sqft	\$ 1 73	\$ 1 71	\$ 1 75
10	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	16 49	acre	sqft	\$ 1 37	\$ 1 36	\$ 1 35
11	5	Agricultural - Bakersfield	Size	Market Conditions	60 9	acre	acre	\$ 17,815	\$ 18,593	\$ 17,800
12	5	Agricultural - Bakersfield	Size	Market Conditions	135 5	acre	acre	\$ 19,508	\$ 20,360	\$ 19,500
16	7	Rural Residential (1-20ac)	Size		0 97	acre	acre	\$ 12,557	\$ 12,861	\$ 12,500
17	7	Rural Residential (1-20ac)	Size		19 14	acre	acre	\$ 6,145	\$ 6,293	\$ 6,150
18	7	Rural Residential (1-20ac)	Size		3 13	acre	acre	\$ 9,484	\$ 9,713	\$ 9,500
13	8	Rangeland Acreage					acre	\$ 1,098	\$ 827	\$ 1,100
14	10	Rural Residential (10-20ac)	Market Conditions				acre	\$ 8,344	\$ 8,252	\$ 8,340
15	11	Single Family Residential	Market Conditions				sqft	\$ 1 79	\$ 1 80	\$ 1 80
27	12	Commercial - Tehachapi	Market Conditions	Size	2 19	acre	sqft	\$ 2 77	\$ 2 67	\$ 2 75
28	12	Commercial - Tehachapi	Market Conditions	Size	0 73	acre	sqft	\$ 3 21	\$ 3 09	\$ 3 20
20	13	Industrial - Tehachapi	Size		31 89	acre	sqft	\$ 0 36	\$ 0 33	\$ 0 35
21	13	Industrial - Tehachapi	Size		42 6	acre	sqft	\$ 0 30	\$ 0 27	\$ 0 30
22	13	Industrial - Tehachapi	Size		27 93	acre	sqft	\$ 0 40	\$ 0 36	\$ 0 40
23	13	Industrial - Tehachapi	Size		3 07	acre	sqft	\$ 1 80	\$ 1 62	\$ 1 80
24	13	Industrial - Tehachapi	Size		3 34	acre	sqft	\$ 1 70	\$ 1 53	\$ 1 70
25	13	Industrial - Tehachapi	Size		19 98	acre	sqft	\$ 0 50	\$ 0 45	\$ 0 50
26	13	Industrial - Tehachapi	Size		5 36	acre	sqft	\$ 1 23	\$ 1 10	\$ 1 20
19	15	Residential Development - Tehachapi	Size	Market Conditions	30 57	acre	acre	\$ 35,989	\$ 35,768	\$ 36,000
29	16	Desert Acreage	Market Conditions				acre	\$ 1,460	\$ 1,421	\$ 1,460
31	17	Industrial - Mojave					acre	\$ 7,816	\$ 6,135	\$ 11,000
30	19	Residential Development - Mojave	Market Conditions				acre	\$ 8,586	\$ 9,099	\$ 8,600

Figure 5. ATF Unit Value Summary

USAGE FACTOR ANALYSIS

Various parcels along the subject corridor were acquired as easements for purposes other than for corridor use. These uses include slope, embankment, revetments, access, and deposit of waste material, among other uses. In general, the locations of the easements are in rural, sparsely populated areas, where the land use is for rangeland. It is our opinion that these easements represent a shared use between the railroad and the underlying property owner, as such, we estimate the usage factor for slope, etc. easements at **50%**.

Portions of the identified subject property are for water pipeline use. Based on our analysis of a number of transactions of subsurface easements/licenses, we have found that the majority of the transactions reflect usage factors of 75% for subsurface easements or licenses. This is supported by recent confidential agreements within our files, which show similar usage factors. Our discussions with railroad representatives show that a 75% usage factor is the norm. One Class I railroad typically uses a usage factor of 70%, but they also use a higher rent capitalization rate of 13%, which is higher than the typical rent capitalization rate found amongst other Class I railroads. Therefore, a usage

¹⁹ See Rex Workpapers "4 – Valuation/Rex – Subject Valuation.xlsx/UVID Lookup (tab)"

factor of **75%** is the most appropriate for the portions of the subject property used solely for a water pipeline.

ATF VALUATION SUMMARY

Figure 6²⁰ on page 42 shows the across-the-fence valuation of the subject corridor after the application of the usage factor, but before the application of the corridor factor or assemblage factor. The total across-the-fence value estimated for the subject property is the same for both the Corridor Valuation Methodology (sales comparison approach) and the Reproduction Cost New Less Depreciation Methodology (cost approach). This table brings together the ATF value and usage factor of each segment, as previously discussed.

The segment numbers are those shown in the *Subject Detailed Segment Maps* beginning on page 112 in the *Addendum*.²¹ The two columns titled *Unit Value ID* identify the *Unit Value ID* as reflected in the *ATF Unit Value Summary*, shown as Figure 5 on page 40, and detailed in the *Sales Group Valuations*, beginning on page 61 in the *Addendum*. The *Average ATF Unit Value* is the average ATF unit value per acre for each segment. The *ATF Value* is the segment area in acres times the *Average ATF Unit Value*. The column titled *ATF Value x Usage Factor* is the *ATF Value* times the estimated *Usage Factor* for each segment.

The total *ATF Value* of the subject property, before consideration of the usage factor, is \$33,268,696. After the application of the usage factor for those segments which are for slope, etc. easements or a water pipeline, the total *ATF Value x Usage Factor* is \$33,050,304, rounded to **\$33,050,000**.

²⁰ See Rex Workpapers "4 – Valuation/Rex – Subject Valuation.xlsx/Subject Valuation (tab)"

²¹ The segments are also shown in Rex Workpapers "4 – Valuation/UP Mojave Sub – Subject Segments and Non-Joint use Property.kmz"

PUBLIC VERSION - REDACTED

Figure 8. Subject Valuation

Segment	Land use		Valuation		Size		Sales Group		Unit Value ID		Unit Value (/unit)		Unit Value (/acre)		Average ATF		Usage Factor	ATF Value x Usage Factor
	South/West	North/East	Map	Type	(acres)	(sqft)	South/West	North/East	South/West	North/East	South/West	North/East	South/West	North/East	Unit Value (/acre)	ATF Value		
1	IND	IND (RR)	V-52/1	Corridor	0.96	41,810	1	1	1	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 209,048
2	ROAD	IND (RR)	V-52/1	Corridor	4.70	204,600	0	1	0	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 1,022,999
3	ROAD	RES	V-52/1	Corridor	3.74	162,988	0	2	0	2	\$ 7.75	/sqft	\$ 7.75	/sqft	\$ 337,590	\$ 337,590	100%	\$ 1,263,156
4	ROAD	RES	V-52/1	Corridor	1.05	45,752	0	2	0	3	\$ 7.40	/sqft	\$ 7.40	/sqft	\$ 322,344	\$ 322,344	100%	\$ 338,564
5	ROAD	MF	V-52/1	Corridor	5.77	251,549	0	3	0	5	\$ 2.75	/sqft	\$ 2.75	/sqft	\$ 119,790	\$ 119,790	100%	\$ 691,760
6	ROAD	MH (ROAD)	V-52/1	Corridor	1.74	75,693	0	3	0	6	\$ 3.35	/sqft	\$ 3.35	/sqft	\$ 145,926	\$ 145,926	100%	\$ 253,571
7	ROAD	MH	V-52/1	Corridor	1.36	59,349	0	3	0	7	\$ 4.45	/sqft	\$ 4.45	/sqft	\$ 193,842	\$ 193,842	100%	\$ 264,101
8	ROAD	RESDEV	V-52/1	Corridor	1.61	70,142	0	3	0	8	\$ 2.50	/sqft	\$ 2.50	/sqft	\$ 108,900	\$ 108,900	100%	\$ 175,356
9	ROAD	RES	V-52/1	Corridor	4.58	199,443	0	2	0	4	\$ 9.55	/sqft	\$ 9.55	/sqft	\$ 415,998	\$ 415,998	100%	\$ 1,904,685
10	ROAD	IND	V-52/2	Corridor	4.85	211,415	0	1	0	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 1,057,074
11	ROAD	RES	V-52/2	Corridor	4.80	209,197	0	2	0	3	\$ 7.40	/sqft	\$ 7.40	/sqft	\$ 322,344	\$ 322,344	100%	\$ 1,548,061
12	ROAD	RESDEV	V-52/2	Corridor	3.98	173,294	0	3	0	9	\$ 1.75	/sqft	\$ 1.75	/sqft	\$ 76,230	\$ 76,230	100%	\$ 303,265
13	ROAD	IND	V-52/2	Corridor	4.95	215,558	0	1	0	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 1,077,791
14	ROAD	IND	V-52/2	Corridor	1.71	74,590	0	1	0	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 372,948
15	ROAD	RESDEV	V-52/2	Corridor	0.79	34,574	0	3	0	8	\$ 2.50	/sqft	\$ 2.50	/sqft	\$ 108,900	\$ 108,900	100%	\$ 86,434
16	ROAD	IND	V-52/2	Corridor	1.09	47,541	0	1	0	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 237,707
17	ROAD	RESDEV	V-52/2	Corridor	7.08	308,387	0	3	0	10	\$ 1.35	/sqft	\$ 1.35	/sqft	\$ 58,806	\$ 58,806	100%	\$ 416,322
18	ROAD	IND	V-52/2	Corridor	2.36	102,902	0	1	0	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 514,509
19	ROAD	IND	V-52/2	Corridor	9.44	411,202	0	1	0	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 2,056,009
20	ROAD	AGR	V-52/2	Corridor	9.46	412,172	0	4	0	11	\$ 17,800	/acre	\$ 17,800	/acre	\$ 17,800	\$ 17,800	100%	\$ 168,427
21	ROAD	IND	V-52/2	Corridor	9.84	428,463	0	1	0	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 2,142,314
22	IND	IND	V-52/2	Corridor	6.60	287,518	1	1	1	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 1,437,589
23	IND	IND	V-52/2	Corridor	0.80	34,666	1	1	1	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 173,329
24	IND	IND	V-52/3	Corridor	20.81	906,601	1	1	1	1	\$ 5.00	/sqft	\$ 5.00	/sqft	\$ 217,800	\$ 217,800	100%	\$ 4,533,006
25	ROAD	AGR	V-52/3	Corridor	66.72	2,906,468	0	4	0	12	\$ 19,500	/acre	\$ 19,500	/acre	\$ 19,500	\$ 19,500	100%	\$ 1,301,105
26	ROAD	AGR	V-52/3	Corridor	2.00	86,971	0	4	0	12	\$ 19,500	/acre	\$ 19,500	/acre	\$ 19,500	\$ 19,500	100%	\$ 38,933
27	ROAD	AGR	V-52/4	Corridor	58.84	2,563,057	0	4	0	12	\$ 19,500	/acre	\$ 19,500	/acre	\$ 19,500	\$ 19,500	100%	\$ 1,147,374
28	ROAD	RANGELAND	V-52/4	Corridor	16.39	714,135	0	8	0	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 18,034
29	ROAD	RANGELAND	V-52/5	Corridor	11.75	511,710	0	8	0	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 12,922
30a	ROAD	RANGELAND	V-52/5	Esmt - Slope, etc	1.99	86,479	0	8	0	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 2,184
30	ROAD	RANGELAND	V-52/5	Corridor	11.16	486,015	0	8	0	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 12,273
31a	RANGELAND	RANGELAND	V-52/5	Esmt - Slope, etc	1.50	65,506	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 827
31	RANGELAND	RANGELAND	V-52/5	Corridor	24.71	1,076,339	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 27,180
32	RANGELAND	RANGELAND	V-52/6	Corridor	51.84	2,258,165	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 57,024
33	RURAL RES	RURAL RES	V-52/6	Corridor	9.84	428,703	7	7	16	16	\$ 12,500	/acre	\$ 12,500	/acre	\$ 12,500	\$ 12,500	100%	\$ 123,021
34	RANGELAND	RANGELAND	V-52/6	Corridor	11.68	508,839	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 12,849
35	RANGELAND	RANGELAND	V-52/7	Corridor	3.24	141,020	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 3,561
36	RANGELAND	RANGELAND	V-52/7	Corridor	42.94	1,870,632	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 47,238
37a	RANGELAND	RANGELAND	V-52/8	Esmt - Slope, etc	0.10	4,311	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 54
37b	RANGELAND	RANGELAND	V-52/8	Esmt - Slope, etc	0.38	16,514	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 209
37c	RANGELAND	RANGELAND	V-52/8	Esmt - Slope, etc	4.48	195,077	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 2,463
37d	RANGELAND	RANGELAND	V-52/8	Esmt - Slope, etc	0.53	23,050	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 291
37	RANGELAND	RANGELAND	V-52/8	Corridor	33.90	1,476,838	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 37,294
38	RANGELAND	RANGELAND	V-52/8	Corridor	15.94	694,133	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 17,529
39a	RANGELAND	RANGELAND	V-52/8	Esmt - Slope, etc	7.26	316,044	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 3,990
39b	RANGELAND	RANGELAND	V-52/8	Esmt - Slope, etc	0.46	20,196	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 255
39c	RANGELAND	RANGELAND	V-52/8	Esmt - Slope, etc	0.33	14,222	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 180
39d	RANGELAND	RANGELAND	V-52/8	Esmt - Slope, etc	2.05	89,194	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 1,126
39	RANGELAND	RANGELAND	V-52/8	Corridor	24.02	1,046,305	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 26,422
40	RANGELAND	RANGELAND	V-52/8	Corridor	5.51	239,853	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 6,057
41a	RANGELAND	RANGELAND	V-52/9	Esmt - Slope, etc	0.37	16,072	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 203
41b	RANGELAND	RANGELAND	V-52/9	Esmt - Slope, etc	1.01	43,859	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 554
41c	RANGELAND	RANGELAND	V-52/9	Esmt - Slope, etc	0.70	30,619	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 387
41d	RANGELAND	RANGELAND	V-52/9	Esmt - Slope, etc	0.13	5,610	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	50%	\$ 71
41	RANGELAND	RANGELAND	V-52/9	Corridor	15.81	688,519	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 17,387
42	RANGELAND	RANGELAND	V-52/9	Corridor	25.85	1,125,884	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 28,431
43	RURAL RES	RANGELAND	V-52/9	Corridor	15.70	683,881	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 3,625	100%	\$ 56,912
44	RURAL RES	RANGELAND	V-52/9	Corridor	4.13	179,741	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 3,625	100%	\$ 14,958
45	RURAL RES	RANGELAND	V-52/9	Corridor	17.47	760,905	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 3,625	100%	\$ 63,321
46	ROAD	RANGELAND	V-52/9	Corridor	8.51	370,731	0	8	0	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	100%	\$ 9,362
47	RURAL RES	RANGELAND	V-52/9	Corridor	5.47	238,345	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 3,625	100%	\$ 19,835

PUBLIC VERSION - REDACTED

Figure 8. Subject Valuation

Segment	Land use		Valuation		Size		Sales Group		Unit Value ID		Unit Value (/unit)		Unit Value (/acre)		Average ATF		Usage Factor	ATF Value x Usage Factor		
	South/West	North/East	Map	Type	(acres)	(sqft)	South/West	North/East	South/West	North/East	South/West	North/East	South/West	North/East	Unit Value (/acre)	ATF Value				
48	RURAL RES	RANGELAND	V-52/10	Corridor	24 63	1,072,953	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 89,290	100%	\$ 89,290
49	RURAL RES	RANGELAND	V-52/10	Corridor	8 87	386,174	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 32,137	100%	\$ 32,137
50	RANGELAND	RURAL RES	V-52/10	Corridor	4 62	201,351	11	7	15	18	\$ 1 80	/sqft	\$ 9,500	/acre	\$ 78,408	\$ 9,500	\$ 43,954	\$ 203,172	100%	\$ 203,172
51a	RURAL RES	RURAL RES	V-52/10	Esmt - Slope, etc	1 03	44,808	11	7	15	18	\$ 1 80	/sqft	\$ 9,500	/acre	\$ 78,408	\$ 9,500	\$ 43,954	\$ 45,213	50%	\$ 22,606
51	RURAL RES	RURAL RES	V-52/10	Corridor	1 74	75,715	11	7	15	18	\$ 1 80	/sqft	\$ 9,500	/acre	\$ 78,408	\$ 9,500	\$ 43,954	\$ 76,399	100%	\$ 76,399
52a	RANGELAND	RANGELAND	V-52/10	Esmt - Slope, etc	10 17	442,964	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 11,186	50%	\$ 5,593
52	RANGELAND	RANGELAND	V-52/10	Corridor	17 54	764,214	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 19,298	100%	\$ 19,298
53a	RANGELAND	RANGELAND	V-52/10	Esmt - Slope, etc	0 29	12,556	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 317	50%	\$ 159
53b	RANGELAND	RANGELAND	V-52/10	Esmt - Slope, etc	12 34	537,587	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 13,575	50%	\$ 6,788
53c	RANGELAND	RANGELAND	V-52/10	Esmt - Slope, etc	8 71	379,394	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 9,581	50%	\$ 4,790
53d	RANGELAND	RANGELAND	V-52/10	Esmt - Slope, etc	2 99	130,213	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 3,288	50%	\$ 1,644
53	RANGELAND	RANGELAND	V-52/10	Corridor	46 59	2,029,445	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 51,249	100%	\$ 51,249
54	RANGELAND	RANGELAND	V-52/11	Corridor	22 95	999,608	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 25,243	100%	\$ 25,243
55a	RURAL RES	RANGELAND	V-52/11	Esmt - Slope, etc	0 40	17,617	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 1,466	50%	\$ 733
55b	RURAL RES	RANGELAND	V-52/11	Esmt - Slope, etc	0 30	13,136	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 1,093	50%	\$ 547
55c	RURAL RES	RANGELAND	V-52/11	Esmt - Slope, etc	0 07	3,131	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 261	50%	\$ 130
55	RURAL RES	RANGELAND	V-52/11	Corridor	15 57	678,297	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 56,447	100%	\$ 56,447
56a	RURAL RES	RANGELAND	V-52/11	Esmt - Slope, etc	0 07	2,877	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 239	50%	\$ 120
56b	RURAL RES	RANGELAND	V-52/11	Esmt - Slope, etc	0 17	7,311	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 608	50%	\$ 304
56c	RURAL RES	RANGELAND	V-52/11	Esmt - Slope, etc	0 63	27,303	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 2,272	50%	\$ 1,136
56d	RURAL RES	RANGELAND	V-52/11	Esmt - Slope, etc	0 11	4,639	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 386	50%	\$ 193
56	RURAL RES	RANGELAND	V-52/11	Corridor	18 71	815,194	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 67,839	100%	\$ 67,839
57	RURAL RES	RANGELAND	V-52/11	Corridor	14 37	625,768	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 52,075	100%	\$ 52,075
58a	RURAL RES	RANGELAND	V-52/11	Esmt - Slope, etc	1 36	59,077	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 4,916	50%	\$ 2,458
58	RURAL RES	RANGELAND	V-52/11	Corridor	5 01	218,413	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 18,176	100%	\$ 18,176
59a	RURAL RES	RANGELAND	V-52/11	Esmt - Slope, etc	36 01	1,568,383	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 130,519	50%	\$ 65,259
59	RURAL RES	RANGELAND	V-52/11	Corridor	15 25	664,277	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 55,280	100%	\$ 55,280
60a	RURAL RES	RANGELAND	V-52/11	Esmt - Slope, etc	4 13	179,809	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 14,963	50%	\$ 7,482
60	RURAL RES	RANGELAND	V-52/11	Corridor	1 04	45,326	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 3,772	100%	\$ 3,772
61a	RURAL RES	RANGELAND	V-52/12	Esmt - Slope, etc	27 11	1,180,763	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 98,261	50%	\$ 49,131
61b	RURAL RES	RANGELAND	V-52/12	Esmt - Slope, etc	4 38	190,882	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 15,885	50%	\$ 7,942
61	RURAL RES	RANGELAND	V-52/12	Corridor	49 32	2,148,402	7	8	17	13	\$ 6,150	/acre	\$ 1,100	/acre	\$ 6,150	\$ 1,100	\$ 3,625	\$ 178,787	100%	\$ 178,787
62a	RANGELAND	ROAD	V-52/12	Esmt - Slope, etc	7 73	336,548	8	0	13	0	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 8,499	50%	\$ 4,249
62b	RANGELAND	ROAD	V-52/12	Esmt - Slope, etc	2 25	98,063	8	0	13	0	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 2,476	50%	\$ 1,238
62	RANGELAND	ROAD	V-52/12	Corridor	39 54	1,722,373	8	0	13	0	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 43,494	100%	\$ 43,494
63	RANGELAND	ROAD	V-52/12	Corridor	12 47	543,016	8	0	13	0	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 13,713	100%	\$ 13,713
64	RANGELAND	ROAD	V-52/13	Corridor	3 71	161,585	8	0	13	0	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 4,080	100%	\$ 4,080
65a	RANGELAND	RANGELAND	V-52/13	Esmt - Slope, etc	1 44	62,713	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 1,584	50%	\$ 792
65	RANGELAND	RANGELAND	V-52/13	Corridor	4 07	177,185	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,100	\$ 4,474	100%	\$ 4,474
66	RES	RANGELAND	V-52/13	Corridor	11 69	509,071	11	8	15	13	\$ 1 80	/sqft	\$ 1,100	/acre	\$ 78,408	\$ 1,100	\$ 39,754	\$ 464,592	100%	\$ 464,592
67a	RURAL RES	RANGELAND	V-52/13	Esmt - Slope, etc	1 72	74,869	15	8	19	13	\$ 36,000	/acre	\$ 1,100	/acre	\$ 36,000	\$ 1,100	\$ 18,550	\$ 31,883	50%	\$ 15,941
67	RURAL RES	RANGELAND	V-52/13	Corridor	9 47	412,439	15	8	19	13	\$ 36,000	/acre	\$ 1,100	/acre	\$ 36,000	\$ 1,100	\$ 18,550	\$ 175,637	100%	\$ 175,637
68	RESDEV/ACR	RANGELAND	V-52/13	Corridor	8 07	351,343	15	8	19	13	\$ 36,000	/acre	\$ 1,100	/acre	\$ 36,000	\$ 1,100	\$ 18,550	\$ 149,619	100%	\$ 149,619
69	COM	IND	V-52/13	Corridor	4 24	184,816	12	13	27	20	\$ 2 75	/sqft	\$ 0 35	/sqft	\$ 119,790	\$ 15,246	\$ 67,518	\$ 286,465	100%	\$ 286,465
70	IND	IND	V-52/13	Corridor	10 25	446,357	13	13	23	21	\$ 1 80	/sqft	\$ 0 30	/sqft	\$ 78,408	\$ 13,068	\$ 45,738	\$ 468,675	100%	\$ 468,675
71	IND	IND	V-52/13	Corridor	4 06	177,015	13	13	24	22	\$ 1 70	/sqft	\$ 0 40	/sqft	\$ 74,052	\$ 17,424	\$ 45,738	\$ 185,866	100%	\$ 185,866
72	ROAD	IND	V-52/13	Corridor	2 19	95,442	0	13	0	23	\$ 1 80	/sqft	\$ 1 80	/sqft	\$ 78,408	\$ 78,408	\$ 78,408	\$ 171,795	100%	\$ 171,795
73	ROAD	COM	V-52/13	Corridor	1 38	59,927	0	12	0	28	\$ 3 20	/sqft	\$ 3 20	/sqft	\$ 139,392	\$ 139,392	\$ 139,392	\$ 191,765	100%	\$ 191,765
74	COM	COM	V-52/13	Corridor	20 83	907,340	12	12	27	27	\$ 2 75	/sqft	\$ 2 75	/sqft	\$ 119,790	\$ 119,790	\$ 119,790	\$ 2,495,184	100%	\$ 2,495,184
75	ROAD	IND	V-52/13	Corridor	6 50	282,923	0	13	0	21	\$ 0 30	/sqft	\$ 0 30	/sqft	\$ 13,068	\$ 13,068	\$ 13,068	\$ 84,877	100%	\$ 84,877

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Figure 8. Subject Valuation

Segment	Land use		Valuation		Size		Sales Group		Unit Value ID		Unit Value (/unit)		Unit Value (/acre)		Average ATF		ATF Value	Usage Factor	ATF Value x Usage Factor		
	South/West	North/East	Map	Type	(acres)	(sqft)	South/West	North/East	South/West	North/East	South/West	North/East	South/West	North/East	Unit Value (/acre)	ATF Value					
87	RANGELAND	ROAD	V-52/15	Corridor	27.68	1,205,895	8	0	13	0	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 30,452	100%	\$ 30,452		
88	RANGELAND	RANGELAND	V-52/15	Corridor	3.32	144,720	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 3,655	100%	\$ 3,655		
89	RANGELAND	RANGELAND	V-52/15	Corridor	21.68	944,225	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 23,844	100%	\$ 23,844		
90	RANGELAND	RANGELAND	V-52/15	Corridor	10.78	469,664	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 11,860	100%	\$ 11,860		
91	DESERT ACR	ROAD	V-52/16	Corridor	93.58	4,076,480	16	0	29	0	\$ 1,460	/acre	\$ 1,460	/acre	\$ 1,460	\$ 1,460	\$ 136,631	100%	\$ 136,631		
92	DESERT ACR	DESERT ACR	V-52/17	Corridor	86.62	3,773,004	16	16	29	29	\$ 1,460	/acre	\$ 1,460	/acre	\$ 1,460	\$ 1,460	\$ 126,460	100%	\$ 126,460		
93	DESERT ACR	DESERT ACR	V-52/18	Corridor	24.35	1,060,624	16	16	29	29	\$ 1,460	/acre	\$ 1,460	/acre	\$ 1,460	\$ 1,460	\$ 35,549	100%	\$ 35,549		
94	DESERT ACR	ROAD	V-52/18	Corridor	21.13	920,419	16	0	29	0	\$ 1,460	/acre	\$ 1,460	/acre	\$ 1,460	\$ 1,460	\$ 30,850	100%	\$ 30,850		
95	DESERT ACR	DESERT ACR	V-52/18	Corridor	26.48	1,153,268	16	16	29	29	\$ 1,460	/acre	\$ 1,460	/acre	\$ 1,460	\$ 1,460	\$ 38,654	100%	\$ 38,654		
96	DESERT ACR	ROAD	V-52/19	Corridor	4.40	191,667	16	0	29	0	\$ 1,460	/acre	\$ 1,460	/acre	\$ 1,460	\$ 1,460	\$ 6,424	100%	\$ 6,424		
97	DESERT ACR	ROAD	V-52/19	Corridor	5.91	257,359	16	0	29	0	\$ 1,460	/acre	\$ 1,460	/acre	\$ 1,460	\$ 1,460	\$ 8,626	100%	\$ 8,626		
98	RESDEV	ROAD	V-52/19	Corridor	5.61	244,422	19	0	30	0	\$ 8,600	/acre	\$ 8,600	/acre	\$ 8,600	\$ 8,600	\$ 48,256	100%	\$ 48,256		
99	RESDEV	ROAD	V-52/19	Corridor	0.63	27,241	19	0	30	0	\$ 8,600	/acre	\$ 8,600	/acre	\$ 8,600	\$ 8,600	\$ 5,378	100%	\$ 5,378		
100	IND	ROAD	V-52/19	Corridor	6.56	285,874	17	0	31	0	\$ 11,000	/acre	\$ 11,000	/acre	\$ 11,000	\$ 11,000	\$ 72,191	100%	\$ 72,191		
101	IND	ROAD	V-52/19	Corridor	11.08	482,619	17	0	31	0	\$ 11,000	/acre	\$ 11,000	/acre	\$ 11,000	\$ 11,000	\$ 121,874	100%	\$ 121,874		
102	IND	ROAD	V-52/19	Corridor	2.41	104,837	17	0	31	0	\$ 11,000	/acre	\$ 11,000	/acre	\$ 11,000	\$ 11,000	\$ 26,474	100%	\$ 26,474		
103	IND	ROAD	V-52/19	Corridor	18.16	790,869	17	0	31	0	\$ 11,000	/acre	\$ 11,000	/acre	\$ 11,000	\$ 11,000	\$ 199,714	100%	\$ 199,714		
104	ROAD	MH	V-52/19	Corridor	0.77	33,575	0	19	0	30	\$ 8,600	/acre	\$ 8,600	/acre	\$ 8,600	\$ 8,600	\$ 6,629	100%	\$ 6,629		
105	RURAL RES	RURAL RES	V-52/6	Esmt - Pipeline	0.09	3,880	7	7	16	16	\$ 12,500	/acre	\$ 12,500	/acre	\$ 12,500	\$ 12,500	\$ 1,113	75%	\$ 835		
106	RANGELAND	RANGELAND	V-52/6	Esmt - Pipeline	0.38	16,496	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 417	75%	\$ 312		
107	RANGELAND	RANGELAND	V-52/6	Esmt - Pipeline	2.70	117,560	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 2,969	75%	\$ 2,227		
108	RANGELAND	RANGELAND	V-52/8	Esmt - Pipeline	1.21	52,849	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,335	75%	\$ 1,001		
109	RANGELAND	RANGELAND	V-52/9	Esmt - Pipeline	2.19	95,478	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 2,411	75%	\$ 1,808		
110	RURAL RES	RURAL RES	V-52/9	Esmt - Pipeline	1.00	43,607	7	7	17	17	\$ 6,150	/acre	\$ 6,150	/acre	\$ 6,150	\$ 6,150	\$ 6,157	75%	\$ 4,617		
111	RURAL RES	RURAL RES	V-52/10	Esmt - Pipeline	1.80	78,617	7	7	17	17	\$ 6,150	/acre	\$ 6,150	/acre	\$ 6,150	\$ 6,150	\$ 11,100	75%	\$ 8,325		
112	RANGELAND	RANGELAND	V-52/10	Esmt - Pipeline	1.67	72,864	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,840	75%	\$ 1,380		
113	RANGELAND	RANGELAND	V-52/10	Esmt - Pipeline	1.04	45,243	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 1,143	75%	\$ 857		
114	RANGELAND	RANGELAND	V-52/10	Esmt - Pipeline	0.18	7,863	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 199	75%	\$ 149		
115	RANGELAND	RANGELAND	V-52/11	Esmt - Pipeline	0.31	13,643	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 345	75%	\$ 258		
116	RANGELAND	RANGELAND	V-52/11	Esmt - Pipeline	0.35	15,450	8	8	13	13	\$ 1,100	/acre	\$ 1,100	/acre	\$ 1,100	\$ 1,100	\$ 390	75%	\$ 293		
					1,596.01	69,522,110														\$ 33,268,595	\$ 33,050,304

CORRIDOR FACTOR ANALYSIS

Figure 7²², beginning on page 47 summarizes the comparable corridor sales used to derive quantitative adjustments for the corridor factor. They are from the RMI Valuation Corridor Sale Database and are highly analyzed and interpreted. Those sales highlighted in yellow are given the most weight. They are discussed and summarized in this report²³.

In Figure 7, the *Corridor Type Rating* column is a numeric rating of the importance of the corridor. An abandoned corridor with a highest and best use to disassemble rates a 1, while an abandoned rail corridor with a highest and best use to continue as a corridor rates a 2. Corridors that have been purchased as assembled corridors for transmission line use are rated 2 to 2.5, depending on the importance of the corridor. Generally, freight industrial leads have a rating of 2.5 to 3, depending on the amount of their rail traffic, longitudinal utility occupancies, and other potential corridor uses. Secondary lines are assigned a rating of 4. Mainline rail corridors are assigned a rating of 5 to 6, depending on the amount of annual rail traffic, the number and importance of longitudinal utility and communication occupancies, and the potential for other uses. In the case of the subject corridor, the corridor was assigned a corridor type rating of 6 since it is a primary mainline corridor for freight traffic, in addition to having multiple occupancies along its entire length.

The column entitled *Acquisition Type* reflects the type of acquisition, where a rating of 5 represents an acquisition of the full width of the corridor; a rating of 3 or 4 represents an acquisition of a portion of the width of the corridor; and a rating of 1 represents an acquisition of a portion of an unusually wide corridor where there is clearly excess width. The subject is classified as a 5 because this is the valuation of the entire width of the corridor.

Corridor Sales Given Most Weight – Discussion

The following is a discussion of the corridor sales given the most weight. This discussion highlights important value-related aspects of each sale and compares the sale to the subject corridor. The sales are presented in the order presented in Figure 7, which is the order of the adjusted corridor factors from low to high.

Note. *Much of the information contained within this section of the report is proprietary to one or more of the parties to the transaction, as well as to RMI Valuation. Their intended use is for this appraisal only. Any use, for profit or otherwise, is strictly prohibited by the copyright laws of the United States. This information is restricted to the use of the valuation that is the subject of this report. This information can only be used by others with the written permission of RMI Valuation.*

Corridor Sale 2000-1101. This sale from UPRR to Sacramento Regional Transit District is 6.10 miles long. It was classified as a mainline at the time of sale, which was November 1, 2000. It was purchased for local passenger rail. Its total corridor factor is 1.23.

²² See Rex Workpapers “4 – Valuation/Rex – Corridor Sales.xlsx/Quantitative Analysis (tab)”

²³ See Rex Workpapers “4 – Valuation/RMI Corridor Sale Writeups 05022024.pdf” for full corridor sale write-ups.

This sale is considered comparable to the subject property in that it is a mainline sale with a corridor type rating of 6, like the subject's type rating. The sale was purchased for future passenger rail service, but the rail traffic and importance of the corridor is much inferior to that of the subject. Additionally, UPRR has substitute routes within the area of the sale corridor. Additionally, the length of this corridor sale is much shorter than the subject.

Corridor Sale 007. In May of 1988, The Florida DOT purchased an 81 mile corridor from CSX. This corridor was CSX's mainline serving southeast Florida from Riveria Beach to Miami. After deducting the price paid for the rail improvements and considering the non-cash consideration, the total corridor factor is 1.26.

This corridor sale crosses through the dense urban area of South Florida and has a length similar to the subject's length. The number of freight trains on this line is considerably less, since the freight traffic is primarily dead end or local traffic, being at the "end of the line". The sale is inferior as to its importance.

Corridor Sale 023. The Port Authority of Allegheny County purchased 6.90 miles of a mainline corridor from Conrail in September 1978. The buyer replaced the tracks on nearby property owned by the seller. The price shown is for land only. The total corridor factor is 1.71.

This corridor is in an urban area. It is 6.90 miles, considerably shorter than the subject length. The traffic on this corridor and its overall importance is quite inferior to the subject corridor.

Corridor Sale 125. This corridor extends from Beaumont, Texas, to the northwest side of Port Arthur, a distance of 10.88 miles. The sale closed on December 28, 1992, and was the purchase of 25 feet of a 100±-foot mainline corridor. The Texas Transportation Commission purchased the excess right-of-way for adjacent road expansion. No corridor improvements nor in-kind consideration was included in the sale. The total corridor factor indicated by this sale is 2.16.

This sale is similar to the subject corridor because it is a mainline, although its importance and the amount of rail traffic is much less than the subject. Accordingly, the subject corridor is superior to this corridor sale.

Corridor Sale 2018-35582. On June 29, 2018, New Jersey Transit purchased this 3.24-mile corridor from Conrail. The corridor is located in New Brunswick, New Jersey. The significance of this sale is that it is adjacent to the Northeast Corridor and, therefore, takes on its importance because of proximity to the Northeast Corridor. The sale reflects a corridor factor of 2.26.

The corridor itself is not a mainline thoroughfare and is much shorter than the subject. Additionally, the traffic on the corridor at the time of sale was minimal. Accordingly, this sale is much inferior to the subject.

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Figure 9. Comparable Corridor Sales - Mojave Subdivision

[illegible]

PUBLIC VERSION - REDACTED

Figure 9. Comparable Corridor Sales - Mojave Subdivision

[illegible]

Highlighted Sales			
Arithmetic mean	1.57	2.15	2.15
Standard deviation	0.56	0.84	0.84
Coefficient of variance	36%	39%	39%
Minimum	0.81	1.23	1.23
Maximum	2.26	3.43	3.43
Median	1.71	2.16	2.16

Corridor Sale 10290-1141. On November 3, 2011, the Florida DOT purchased a 70.31-mile active mainline corridor from CSX. The corridor extends from Deland, Florida, through downtown Orlando to Poinciana, south of Kissimmee. The corridor was one of two CSX mainline corridors for north/south traffic in Florida. The state purchased the corridor for developing a commuter rail system. As part of the sale negotiations, the state paid for the necessary increased rail capacity on CSX's westerly route. Additionally, CSX retained freight rights. Taking into account the cash price as well as the significant in-kind consideration, the total indicated corridor factor is 3.03.

This is perhaps the best comparable sale, although the passenger and freight traffic is significantly less than the subject. In addition, the freight carrier maintained a satisfactory alternative route. Accordingly, this sale is also inferior to the subject corridor.

Corridor Sale 012. This corridor sale was originally contracted on March 12, 1973, but did not close until July 30, 1991. It is a mainline corridor in the northeast portion of the District of Columbia, which is intensively developed. The portion of the corridor purchased runs from Franklin Street, Washington, DC, to 16th Street, Silver Springs, Maryland. The transportation agency, WMATA, required the corridor that the railroad occupied. As part of the consideration to the railroad, WMATA purchased a 50-foot right-of-way on either side for the benefit of CSX. WMATA provided CSX with a permanent easement and rebuilt the tracks within each new right-of-way. While WMATA spent an exorbitant amount on the replacement right-of-way, the amount considered in the analysis of the sale is the value contribution to CSX. Although the railroad was essentially made whole, its ownership in the replacement right-of-way is only an easement. The total corridor factor reflected by this sale is 3.43.

As with the above sales, the traffic on this line at the time of sale was considerably less than the subject. Accordingly, this sale is inferior to the subject corridor.

Quantitative Adjustments

These seven corridor sales are analyzed both quantitatively and qualitatively with the other 53 sales shown in Figure 7. Only total corridor factors are used because many sales consist of in-kind consideration in addition to cash.

The sales occurred throughout the United States and over a wide time frame. Since a corridor factor is the ratio of total price to the across-the-fence (ATF) value, location and market conditions do not have an influence on the corridor factor, which is supported both by logic and analysis of the sales. The ATF value measures the influence of location, as well as market conditions. In addition, analysis of the sales shows that neither market conditions nor location impacts the magnitude of the corridor factor.

In quantitative analysis, the next step is to identify elements that explain variances in corridor factors. In this valuation, the following elements are analyzed and given the appropriate numeric rating:

Corridor Type	Acquisition type	Size (acres)
Mainline	Entire corridor	Average width (feet)
Industrial lead	Partial corridor	Length (miles)
Transmission corridor	Excess	Occupancy type
Abandoned corridor	NITU	None
Disassemblage/liquidation	No	Subsurface
Area type	Yes	Aerial
Rural	Market conditions (sale date)	
Urban	ATF Value (per square foot)	

*1 Depends on importance and traffic *2 Depends on amount of right-of-way

The above elements of comparison are plotted against the total corridor factor to determine any trends that may identify the rationale behind variances in total corridor factors. Variance in the total corridor factor could not be explained by any except the importance of the corridor (corridor type).

The corridor type explains approximately 20.5% of the variance of the total corridor factors, as shown in Figure 10.²⁴ Because type explains the most about the variance, this element is used to make the first market extracted adjustment. As the trend line shows, the higher the classification of the corridor type, generally the higher the corridor factor, which shows that sales of mainline corridors reflect a higher corridor factor than sales with less intense use.

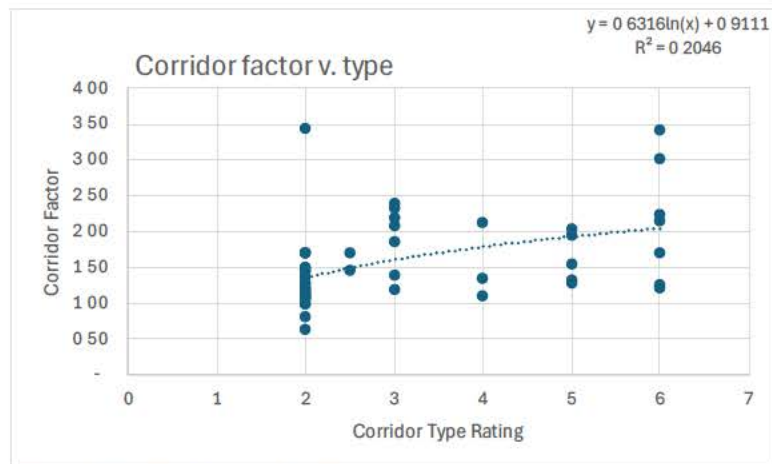


Figure 8. Corridor Sales - Corridor factor v. type

Illustrating the data's trend, the blue dotted line is the single line closest to all data points, or sales. (The line's equation is shown in the upper right-hand corner of the graph.) The adjustment is calculated by using the slope of the line. The subject corridor is classified as a primary mainline corridor with the highest and best use for continued corridor use. Accordingly, it is assigned a numerical rating of 6. The adjustment, therefore, requires calculation of the predicted total corridor factor for the subject corridor with a type rating of 6. The adjustment to each sale is calculated by subtracting the sale's predicted corridor factor on the line from the subject's predicted factor on the line and dividing by the sale's predicted factor, which results in the percent adjustment for the type of corridor.

These adjustments are shown in Figure 7 on page 47. After adjustment for corridor type, each element of comparison is again plotted against the total corridor factor, except this time the adjusted total corridor factor is used. No other adjustments are indicated by quantitative analysis. Therefore, qualitative analysis is used to arrive at a final estimate of the total corridor factor.

²⁴ See Rex Workpapers "4 – Valuation/Rex – Corridor Sales.xlsx/Graphs (tab)"

Qualitative Adjustments

As previously discussed, after making quantitative adjustments, only the 7 sales considered most comparable are considered. These are primarily sales that approach the same intensity of use similar to the subject property.²⁵

Figure 7 arranges the sales used for the qualitative analysis in order of their adjusted total corridor factors from lowest to highest. After quantitative adjustments, all the sales show an average adjusted total corridor factor of 2.04, with a coefficient of variance of 34%.

The seven highlighted sales given the most weight indicate an average total corridor factor of 2.15 with a coefficient of variance of 39%; the indicated median is 2.16.

The valuation problem is that all the comparable corridor sales are inferior in use intensity and importance to the subject corridor. No corridor sale has occurred of a corridor that is superior to the subject property, accordingly, bracketing of the sales to arrive at a conclusion is not possible in this case. Without a doubt, the most important corridor in the country is the Northeast Corridor that extends between Washington, DC and Boston, Massachusetts. While it is difficult to imagine that this corridor would ever sell in an arms-length transaction, it is my professional opinion that it would sell for a corridor factor significantly higher than indicated by the corridor sales, potentially with a corridor factor in the range of 4 to 5.

The subject corridor is a major chokepoint and is the only usable north/south freight rail passage between Los Angeles and San Francisco. Both of the primary western Class I railroads (Union Pacific and BNSF Railway) make heavy use of this route. This is evidenced by an average of 30 trains per day; { as discussed in more detail beginning on page 28.

The top end of the corridor sales that are considered the most comparable to the subject has a total corridor factor of 3.43. The subject property is superior to the existing corridor sales but is inferior to the Northeast Corridor. Accordingly, the reasonable range for the subject property is 3.00 to 5.00. Since the subject corridor is superior in importance to even the highest indicated sale corridor factor, a reasonable estimate and my opinion of the corridor factor for the subject property as of the effective date of valuation is 3.50.

The following aids in supporting the corridor factor conclusion. *The details, including the parties and locations of this information are confidential and subject to confidentiality agreements, hence only secondary weight is placed on it.* In northern Indiana, a petroleum pipeline corridor exists with multiple pipelines. We obtained information on five of the agreements. The dates of the agreements range from 1993 to 2015, with two of the agreements occurring in 2015. These agreements range in length from 1.54 miles to 3.73 miles. Based on a 2016 estimate of the ATF value for each agreement, the corridor factors range from 2.20 to 4.26 within the same corridor. The arithmetic mean of the corridor factors is 3.14. The corridor represents a primary pipeline corridor. Significantly, these corridor factors were estimated using 2016 ATF values, resulting in the corridor factors being underestimated. Occupancies within pipeline corridors generally represent the same corridor

²⁵ For corridor sales analysis see Rex Workpapers "4 – Valuation/Rex-Corridor Sales.xlsx/Quantitative Analysis (tab)"

factors as other corridors after making adjustment for usage factors related to the property rights acquired.

In the northeast, a tunnel exists that provides one of the only reasonable and economical means of access to a major economic center for pipelines and transmission lines. Again, the details of this information are confidential, so it is only used as secondary support. Recently, the owner negotiated an agreement for a power transmission line that reflects an effective corridor factor of 2.90 based on a 2016 estimate of the ATF value. In 2001 and 2007, three different entities purchased an option for a power line occupancy through the tunnel that reflected effective corridor factors of 2.92 to 3.75, based on 2016 ATF estimates. For reasons not related to the property or price, these options were not exercised.

As stated above, the comparable corridor sales given the most weight indicate an estimate of the corridor factor of 3.50, with some extrapolation. Such an estimate is justified because the subject corridor is a critical choke point and has more freight traffic as compared to the corridor sales. The consideration of the secondary support in the two paragraphs above also provides market support for estimating a factor higher than the upper end of the range indicated by the corridor sales. Accordingly, the estimate of the corridor factor for the subject corridor is **3.50**, although it can be argued that it could be higher.

CORRIDOR VALUATION SUMMARY

Figure 6, beginning on page 42, shows the across-the-fence valuation of the subject property, including application of the usage factor, where applicable, but before consideration of the corridor factor. The total across-the-fence value before consideration of the usage factor is \$33,268,595. After the application of the usage factor the *ATF Value x Usage Factor* is \$33,050,304, rounded to **\$33,050,000**. Based on our concluded corridor factor of **3.50**, as discussed in the previous section, the total corridor value of the subject property, using the sales comparison approach, as of August 23, 2023 is, **\$115,675,000**.

Market Value Estimate (Sales Comparison Approach)

Across-the-fence Value	\$	33,050,000
Corridor Factor		3.50
Corridor Value	\$	115,675,000

REPRODUCTION COST NEW LESS DEPRECIATION VALUATION

As previously discussed, the second approach employed in this appraisal is the cost approach, utilizing the reproduction cost new less depreciation (RCNLD) methodology. In this approach we estimate the reproduction cost new by multiplying the across-the-fence value by an assemblage factor. The across-the-fence value used in this approach, is the same used in the sales comparison approach, as discussed on page 41 and shown in detail in Figure 6 on page 42. The following sections discuss the estimates of the assemblage factor, obsolescence, and finally the estimate of the reproduction cost new less depreciation.

ASSEMBLAGE FACTOR ANALYSIS

Generally, when estimating the cost of assembling a corridor, an assemblage factor must be estimated. The assemblage factor accounts for the costs associated with the real estate over and above the value of the rights to be acquired.

Various studies by state departments of transportation have historically shown that assemblage factors for assembling a right-of-way range from 4 to 10 times the market value of the land. While there are cases where the assemblage factor was both higher and lower than this range, most corridor assemblages are within the range.

In 2009, we completed a detailed study on a pipeline corridor that extended approximately 61 miles between Concord and Sacramento, California. We obtained all the acquisition files, as well as the completed cost. Our analysis revealed that the overall assemblage factor was 9.63.

Overall, the total cost of assemblage can be quite variable, which is dependent on various factors, including:

- willingness of adjacent landowners to sell,
- the number of acquisition parcels,
- the number of individual landowners that must be negotiated with,
- the number of acquisitions that occur through negotiation versus condemnation,
- the acceptance by the community for the project,
- the level of permitting that is required,
- environmental impacts of the project and any required mitigation,
- the number and cost of surveys, appraisals, and other associated services required to assemble the corridor.

In many instances, the relationship between the market value of the property to be acquired and the fixed costs of the services required to acquire the property can have a large impact on the assemblage factor. In areas where the land values are high it would likely exhibit a lower assemblage factor due to the lower soft costs in relation to value. In the inverse the soft costs may be significantly higher in relation to areas where the land values are low, which would result in a higher assemblage factor. In the case of the subject property, the western 13.44 miles (19.8%), closest to Bakersfield, makes up approximately 74.4% of the ATF value, whereas the western 54.43 miles (80.2%) makes up approximately 25.6% of the ATF value. This indicates that the majority of the subject property would likely show a higher assemblage factor due to the lower land values to be acquired.

Based upon the above, we believe the assemblage factor for the subject property would be at the higher end of the range of assemblage factors, likely between 7.0 and 10.0.

Therefore, the best estimate of the preliminary assemblage factor for the subject property is a range of **7.0 to 10.0**, or a point estimate of **8.5**.

Analysis of California High-Speed Rail – Bakersfield to Palmdale Project Section

The California High-Speed Rail project is an ambitious transportation initiative aimed at creating a high-speed passenger train system that connects major cities across California. The project envisions trains operating at speeds of up to 220 miles per hour, significantly cutting down travel times between destinations such as San Francisco and Los Angeles. The project was initiated with voter approval in 2008, however it has faced numerous challenges including budget overruns, legal battles, and delays. Despite these hurdles, construction has commenced in the Central Valley (Merced to Bakersfield), with the goal to initiate service between 2030 and 2033. The overall goal of the project is to expand the system into a statewide network that improves connectivity, supports economic development, and contributes to environmental sustainability by reducing greenhouse gas emissions.

Figure 11, shows the breakdown of the California High-Speed Rail project by Section. Currently, only the portion of the project in the Central Valley Region, between Merced and Bakersfield are under construction. However, the majority of the Phase 1 portions of the project have completed the Final Environmental Impact Report/Environmental Impact Statement process.

Section	Region	Length (miles)	Phase	EIR/EIS Status	Under Construction
San Francisco to San Jose	Northern California	51	1	Complete	No
San Jose to Merced	Northern California	120	1	Complete	No
Sacramento to Merced	Northern California	160	2	TBD	No
Merced to Fresno	Central Valley	65	1	Complete	Yes
Fresno to Bakersfield	Central Valley	114	1	Complete	Yes
Bakersfield to Palmdale	Southern California	80	1	Complete	No
Palmdale to Burbank	Southern California	38	1	2024	No
Burbank to Los Angeles	Southern California	12	1	Complete	No
Los Angeles to Anaheim	Southern California	30	1	2025	No
Los Angeles to San Diego	Southern California	120	2	TBD	No

Figure 9. Breakdown of California High-Speed Rail Project by Section

Of particular interest, as it relates to the subject property and assemblage factor estimate, is the 80±-mile Bakersfield to Palmdale section of the California High-Speed Rail project. This section extends from approximately 4.35 miles northwest of the western extent of the subject property, in Bakersfield, and runs generally parallel to the subject property easterly to Tehachapi, where it turns southeast towards Lancaster before turning southerly to Palmdale. The line between Tehachapi and Lancaster passes approximately 12±-miles west of Mojave. Figure 12 shows the location of the California High-Speed Rail (Bakersfield to Palmdale) Corridor in relation to the subject property (UP Mojave Subdivision).

While the California High-Speed Rail – Bakersfield to Palmdale section follows a more direct route through the Tehachapi Mountains and has been designed without the extreme curves of the subject property, the assemblage costs should be fairly comparable.

We have performed a high-level analysis of the projected costs associated with the assemblage of the Bakersfield to Palmdale section. This analysis is based on the *California High-Speed Rail Authority – Draft 2024 Business Plan* and associated documents, as well as the *California High-Speed Rail Authority – Bakersfield to Palmdale Project Section – Final Environmental Impact Report/Environmental Impact Statement – May 2021*. All analysis is based on publicly available information. Based on our review, we determined that a per mile comparative analysis would not return reasonable results, this is primarily due to the ratio of total acres to total miles. The subject property contains approximately 23.52 acres per mile, whereas the Bakersfield to Palmdale section contains approximately 86.56 to 91.25 acres per mile. Therefore, we have utilized a per acre comparative analysis. The subject property is approximately 1,596.01± acres, and the Bakersfield to Palmdale corridor ranges from 7,351 acres based on the “Acres of Existing Land Uses Subject to Permanent Conversion to Transportation Use”²⁶ to 7,749 acres based on the “Acres of General Plan Designated Land Uses Subject to Permanent Conversion to Transportation Use”²⁷. This is based on the Preferred Alternative, as defined in the Final Record of Decision, dated August 2021, which includes Alternative 2, the Refined CCNM Design Option, the Palmdale Station, and the Avenue M Maintenance Site and MOWF.

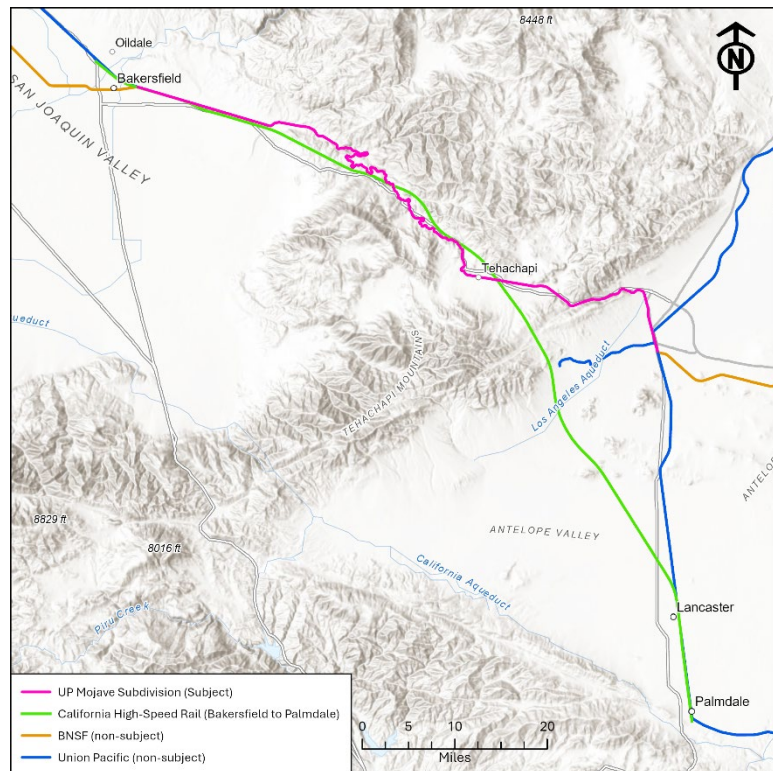


Figure 10. Map of CHSRA (Bakersfield to Palmdale) and Subject Property

²⁶ California High-Speed Rail Authority. (2021). Table 3.13-5, Permanent conversion of existing land uses. In *Bakersfield to Palmdale Project Section - Final Environmental Impact Report/Environmental Impact Statement, Volume 1: Report*, Section 3.13 Station planning, land use, and development (p. 29). Retrieved from https://hsr.ca.gov/wp-content/uploads/2021/06/BP_Final_EIRS_Vol_1_CH_3.13_Station_Planning_Land_Use_and_Development.pdf

²⁷ California High-Speed Rail Authority. (2021). Table 3.13-6, Permanent conversion of planned land uses. In *Bakersfield to Palmdale Project Section - Final Environmental Impact Report/Environmental Impact Statement, Volume 1: Report*, Section 3.13 Station planning, land use, and development (p. 30). Retrieved from https://hsr.ca.gov/wp-content/uploads/2021/06/BP_Final_EIRS_Vol_1_CH_3.13_Station_Planning_Land_Use_and_Development.pdf

Figure 13 shows the Draft 2024 Business Plan Cost Estimates for the Bakersfield to Palmdale section²⁸. We have limited this table to only those accounts that include costs associated with the assemblage of the right-of-way land, including *Account 40: Sitework, Right of Way, Land, Existing Improvements* and *Account 80: Professional Services*. Those sub-accounts shown in red are excluded, as they do not pertain to the assemblage of the corridor land. Note that *Sub-account 40.09: Relocation of existing households and businesses* and *Sub-account 80.08: Surveys, testing, investigation* do not include a cost, as none was reported within the publicly available cost estimates. We have also included *Account 90: Unallocated Contingency*, which was estimated at 5% of the included costs (as defined in the project documentation).

Account	Description	Cost
40 SITEWORK, RIGHT OF WAY, LAND, EXISTING IMPROVEMENTS		
40.01	Demolition, clearing, site preparation	Excluded
40.02	Site utilities, utility relocation	Excluded
40.03	Hazardous material, contaminated soil removal/mitigation, ground water treatments	Excluded
40.04	Environmental mitigation: wetlands, historic/archeology, parks	\$ 393,500,090
40.05	Site structures including retaining walls, sound walls	Excluded
40.06	Temporary facilities and other indirect costs during construction	Excluded
40.07	Purchase or lease of real estate	\$ 733,341,658
40.08	Highway/pedestrian overpass/grade separations	Excluded
40.09	Relocation of existing households and businesses	N/A
80 PROFESSIONAL SERVICES		
80.01	Service Development Plan/Service Environmental	Excluded
80.02	Preliminary Engineering/Project Environmental	Excluded
80.03	Final design	Excluded
80.04	Project management for design and construction	Excluded
80.05	Construction administration & management	Excluded
80.06	Professional liability and other non-construction insurance	Excluded
80.07	Legal; Permits; Review Fees by other agencies, cities, etc.	\$ 95,144,000
80.08	Surveys, testing, investigation	N/A
80.09	Engineering inspection	Excluded
80.10	Start up	Excluded
TOTAL		\$ 1,221,985,748
90.00	Unallocated Contingency (5%)	\$ 61,099,287
TOTAL (w/ Unallocated Contingency)		\$ 1,283,085,035

Figure 11. California High-Speed Rail (Bakersfield to Palmdale) - Draft 2024 Business Plan Cost Estimate

The total estimated cost attributable to the assemblage of the land for the Bakersfield to Palmdale high-speed rail corridor is \$1,283,085,035. Given the relatively similar location and land use makeup of the Bakersfield to Palmdale corridor to the subject property, we have utilized the estimated ATF Value per Acre of the subject property (\$20,845/acre²⁹) in this analysis. Figure 12³⁰ shows the calculation of the assemblage factors based on the total costs shown in Figure 13.

²⁸ California High-Speed Rail Authority. (2024). Appendix I: Bakersfield to Palmdale costs by SCCS (YOE\$). In *Draft 2024 Business Plan - Technical Supporting Document - Capital Cost Basis of Estimate Report* (p. 53). <https://hsr.ca.gov/wp-content/uploads/2024/02/Draft-2024-Business-Plan-Basis-of-Estimate-FINAL-A11Y.pdf>

²⁹ The ATF Value per Acre is estimated by dividing the total ATF value of the subject property by the total acreage of the subject property.

³⁰ See Rex Workpapers "4 – Valuation/Rex – Subject Valuation.xlsx/CHSR Analysis (tab)"

Description	ATF Value			Total Land	Assemblage
	Acres	per Acre	ATF Value	Assemblage Cost	Factor
Existing Land Uses Subject to Permanent Conversion	7,351	\$ 20,845	\$ 153,231,595	\$ 1,283,085,035	8.37
General Plan Designated Land Uses Subject to Permanent Conversion	7,749	\$ 20,845	\$ 161,527,905	\$ 1,283,085,035	7.94

Figure 12. California High-Speed Rail (Bakersfield to Palmdale) Assemblage Factor Calculation

The indicated range of 7.94 to 8.37 assumes that the total acreage is acquired in fee. The indicated range would increase if some of the property were only the acquisition of easement rights (such as access, air rights, etc.). Based on the final report, it is contemplated that some of the permanent acquisitions may be returned to non-transportation uses at some point in the future, which would increase the assemblage factor range.

While only a rough estimate of the calculated assemblage factor for the Bakersfield to Palmdale corridor is presented, we believe this provides evidence that our conclusion of an assemblage factor of 8.5 for the subject property is within the range of reasonableness.

REPRODUCTION COST NEW SUMMARY

As previously discussed, the reproduction cost new is estimated by multiplying the across-the-fence estimate, as shown on page 41, and shown in detail in Figure 6 on page 42, by the estimate of the assemblage factor discussed in the previous section, as shown below.

Across-the-fence Value	\$ 33,050,000
Assemblage Factor	8.50
Assemblage Cost (RCN)	\$ 280,925,000

Therefore, the estimate of the reproduction cost new of the subject property, as of August 23, 2023 is
\$280,925,000.

OBSOLESCENCE

As discussed in the *Reproduction Cost New Less Depreciation (RCNLD) Methodology* section, beginning on page 33, the estimate of obsolescence involves examining the significant disparity between the reproduction cost new and how the market typically recognizes value. This disparity is often illuminated by assessing the degree of obsolescence, including economic, external, and functional factors, even in corridors without viable rail alternatives and those that are crucial to current transportation needs.

Because there are no known corridor sales that have sold immediately or soon after construction in recent history, there is no evidence of market-derived obsolescence. Additionally, since the estimate of obsolescence considers all forms of obsolescence it is difficult to quantify each form in a meaningful manner. However, if we consider that the obsolescence is a measurement of the difference between the reproduction cost new (RCN) and the market value perceived by market participants, then we can accept that

$$\text{Obsolescence} = \text{Reproduction Cost New (RCN)} - \text{Market Value}$$

In this case, the reproduction cost new is the *ATF value* times the *assemblage factor* and the market value is as estimated by the most commonly accepted methodology of estimating the market value of corridors, being the corridor valuation methodology or across-the-fence methodology, which is the *ATF value* times the market-derived *corridor factor*. While this estimate of obsolescence results in a non-independent conclusion, by subtracting the estimate of market value from the reproduction cost new, no other supportable methodology of estimating the obsolescence to be applied to the reproduction cost new of a corridor exists.

Therefore, the estimate of obsolescence for the subject property is

Corridor Value	\$	115,675,000
Reproduction Cost New	\$	280,925,000
Obsolescence	\$	(165,250,000)

The resulting obsolescence of \$165,250,000 is approximately 58.8% of the reproduction cost new, or 5 times the across-the-fence value.

REPRODUCTION COST NEW LESS DEPRECIATION VALUATION SUMMARY

The estimate of the reproduction cost new less depreciation takes the reproduction cost new estimated on page 57, and subtracts the estimate of obsolescence discussed above, as shown below.

Across-the-fence Value	\$	33,050,000
Assemblage Factor		8.50
Assemblage Cost (RCN)	\$	280,925,000
Obsolescence	\$	(165,250,000)
Reproduction Cost New Less Depreciation	\$	115,675,000

Therefore, the estimate of the reproduction cost new less depreciation of the subject property, as of August 23, 2023 is **\$115,675,000**.

FINAL ESTIMATE OF VALUE

In this appraisal, we have employed two valuation approaches to estimate the market value of the subject property.

The first approach, the sales comparison approach, using the Across-the-Fence (ATF) Methodology, also known as the Corridor Valuation Methodology, we estimated an ATF value of \$33,050,000, as discussed on page 41 and shown in detail in Figure 6 on page 42. Applying a corridor factor of 3.50, as discussed beginning on page 45, the resulting corridor value estimate is **\$115,675,000**. This approach is grounded in market data, making it highly reliable and widely accepted for valuing corridor properties.

In the second approach, the cost approach, we employed the reproduction cost new less depreciation (RCNLD) methodology. Starting with the same ATF value of \$33,050,000, as discussed on page 41 and shown in detail in Figure 6 on page 42, we estimated an assemblage factor of 8.5 to account for additional costs associated with assembling the land, including acquisition premiums, survey and appraisal costs, legal expenses, and environmental mitigation, as discussed beginning on page 53. This resulted in a reproduction cost new (RCN) of \$280,925,000. To address obsolescence – which includes functional, external, and economic factors – we derived an obsolescence estimate by subtracting the corridor value (from the sales comparison approach) from the reproduction cost new, resulting in \$165,250,000, as discussed on page 57. Subtracting the obsolescence from the reproduction cost new provided an estimate of value using the cost approach, or reproduction cost new less depreciation of **\$115,675,000**.

Both valuation approaches converge at a final estimate of value of \$115,675,000. The sales comparison approach, supported by empirical data and market trends, is considered the most reliable and supportable method for corridor valuation. Additionally, in this valuation, it is the only approach that is fully independent from the other approach.

Therefore, based upon the conditions, contingencies, hypothetical condition, and extraordinary assumption presented in this report, the estimate of the market value of the land for the subject property, as of August 23, 2023, is **\$115,675,000**.³¹

Market Value Estimate (Sales Comparison Approach)

Across-the-fence Value	\$	33,050,000
Corridor Factor		3.50
Corridor Value	\$	115,675,000

Market Value Estimate (Cost Approach)

Across-the-fence Value	\$	33,050,000
Assemblage Factor		8.50
Assemblage Cost (RCN)	\$	280,925,000
Obsolescence	\$	(165,250,000)
Reproduction Cost New Less Depreciation	\$	115,675,000

³¹ See Rex Workpapers “4 – Valuation/Rex – Subject Valuation.xlsx”

ADDENDUM

SALES GROUP VALUATIONS

All Data contained within the following Sales Groups Valuations is contained within Rex Workpapers "1 – Comparable Sales/Rex – Comparable ATF Sales.xlsx" with tabs for each Sales Group. Maps of the sales by Sales Group are also available as KML files in Rex Workpapers "1 – Comparable Sales/Sales Maps/". Deeds for all sales used in the valuation are included in Rex Workpapers "1 – Comparable Sales/Sale Deeds/" with folders for each Sales Group.

PUBLIC VERSION - REDACTED

UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

Sales Group 1: Industrial Comparable ATF Sales – Bakersfield

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 1: Industrial - Bakersfield

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2019-118746	7/19/2019	Linda Sue Collins Trust	Moises L. Arce	3727 Edison Hwy	Bakersfield	14425009	35.3632	-118.9358	C-2	\$ 100,000
2019-127452	8/19/2019	Victor Zamarripa & Han S. Kim	ADR United Group, LLC	Brundage Ln	Bakersfield	17368008	35.3534	-118.9461	M-1 PD	\$ 1,350,000
2019-148503	10/23/2019	Ronald & Arleisa N. Anderson, Jr.	Luis E. Ascencio	912 E 21St St	Bakersfield	01702015	35.3753	-118.9895	M-2	\$ 16,000
2019-153330	10/25/2019	330 E. 19th Street, LLC, et.al.	Alfredo & Blanca E. Lorenzo	406 E 19Th St	Bakersfield	016110014	35.3761	-118.9977	M-1	\$ 240,000
2019-171680	12/12/2019	Ben F. Stinson III Trust	ADR United Group, LLC	5353 E Brundage Ln	Bakersfield	17368010	35.3534	-118.9450	M-1 PD	\$ 470,000
2019-172510	12/19/2019	AMS Business Group, LLC	Eduardo Valdez & Eduardo V.	3831 Edison Hy	Bakersfield	14424009	35.3627	-118.9338	C-2	\$ 25,000
2020-9610	1/14/2020	Loxi L. Engelhardt Trust	Conway F. & Elizabeth H. Lopez	E Brundage Ln	Bakersfield	14223022	35.3547	-118.9579	M-2	\$ 400,000
2020-26622	2/25/2020	Rafael G. & Ana M. Morales	Rogelio Tinoco	720 Mt Vernon Av	Bakersfield	13838204	35.3694	-118.9681	M-2	\$ 135,000
2020-95598	7/15/2020	Leesa Sanders	Alberto & Maria Michel	308 Mt Vernon Av	Bakersfield	14033007	35.3585	-118.9679	M-1	\$ 25,000
2021-34399	2/22/2021	Adrian Hernandez	Rodrigo Rojas	461 Lake St	Bakersfield	01425022	35.3804	-118.9955	M-1	\$ 75,000
2021-57081	3/19/2021	Niles Investment, LLC	Eric Ochoa	451 Lake St	Bakersfield	01425006	35.3805	-118.9957	M-1	\$ 18,500
2021-106269	5/18/2021	Avtar Singh & Rajvir S. Gill	Francisco Gonzalez	305 Yampa St	Bakersfield	14033014	35.3582	-118.9683	M-1	\$ 69,000
2021-124693	6/24/2021	Lynn Gudmundson, Jr.	4 FC, Inc.	130 Morning Dr	Bakersfield	14510005	35.3602	-118.9151	M-1	\$ 832,000
2021-130734	7/8/2021	W. P. Davies Oil Company	Bassi, LLC & Panam Investments,	Kimber Av	Bakersfield	17714066	35.3503	-118.9128	M-1	\$ 300,000
2021-186155	9/24/2021	Vernon & Charlotte Clark, Jose D.	Delgadina B. Aldaco & Rigoberto	Monticello Ave	Bakersfield	01924218	35.3624	-118.9793	M-2	\$ 150,000
2022-83899	5/20/2022	Curtis & Judy Sparks	Michael & Cindy Henson Family	Felipe Ct	Bakersfield	17338003	35.3514	-118.9188	M-2	\$ 950,000
2022-124946	8/11/2022	Richard T. Compton	Brent & Bryn R. Milton	520 E 19Th St	Bakersfield	01610008	35.3756	-118.9957	M-1	\$ 30,000
2022-181598	11/28/2022	David N. Bailey	Victor M. Valencia	Virginia Ave	Bakersfield	01924219	35.3616	-118.9797	M-2	\$ 135,000
2023-34904	2/21/2023	Judy Deneen, Jerry & Larry	Home Equity Options, LLC	Tulare St	Bakersfield	01435020	35.3787	-118.9960	M-2	\$ 14,500
2023-30376	3/9/2023	R & V Catano, LLC	Rogelio J. Tinoco	900 E Truxtun Ave	Bakersfield	01716012	35.3736	-118.9903	M-1	\$ 160,000
2023-32645	3/22/2023	Home Rescue Development, LLC	Rosalio Barragan	1319 Ogden St	Bakersfield	13832011	35.3711	-118.9738	M-2	\$ 125,000

PUBLIC VERSION - REDACTED

UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

SALES GROUP 1: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 1: Industrial Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per sqft
2019-118746	7/19/2019	\$ 100,000	0.28	\$ 8.13
2019-127452	8/19/2019	\$ 1,350,000	5.17	\$ 6.00
2019-148503	10/23/2019	\$ 16,000	0.14	\$ 2.66
2019-153330	10/25/2019	\$ 240,000	0.69	\$ 7.98
2019-171680	12/12/2019	\$ 470,000	2.74	\$ 3.94
2019-172510	12/19/2019	\$ 25,000	0.10	\$ 5.47
2020-9610	1/14/2020	\$ 400,000	3.35	\$ 2.74
2020-26622	2/25/2020	\$ 135,000	0.62	\$ 4.99
2020-95598	7/15/2020	\$ 25,000	0.13	\$ 4.34
2021-34399	2/22/2021	\$ 75,000	0.23	\$ 7.35
2021-57081	3/19/2021	\$ 18,500	0.14	\$ 3.05
2021-106269	5/18/2021	\$ 69,000	0.16	\$ 9.73
2021-124693	6/24/2021	\$ 832,000	5.37	\$ 3.56
2021-130734	7/8/2021	\$ 300,000	1.23	\$ 5.59
2021-186155	9/24/2021	\$ 150,000	2.65	\$ 1.30
2022-83899	5/20/2022	\$ 950,000	3.58	\$ 6.10
2022-124946	8/11/2022	\$ 30,000	0.34	\$ 2.00
2022-181598	11/28/2022	\$ 135,000	0.45	\$ 6.92
2023-34904	2/21/2023	\$ 14,500	0.12	\$ 2.89
2023-30376	3/9/2023	\$ 160,000	0.71	\$ 5.19
2023-32645	3/22/2023	\$ 125,000	0.30	\$ 9.54
Subject				
Arithmetic mean				\$ 5.21
Standard deviation				\$ 2.43
Coefficient of variance				47%
Minimum				\$ 1.30
Maximum				\$ 9.73
Median				\$ 5.19

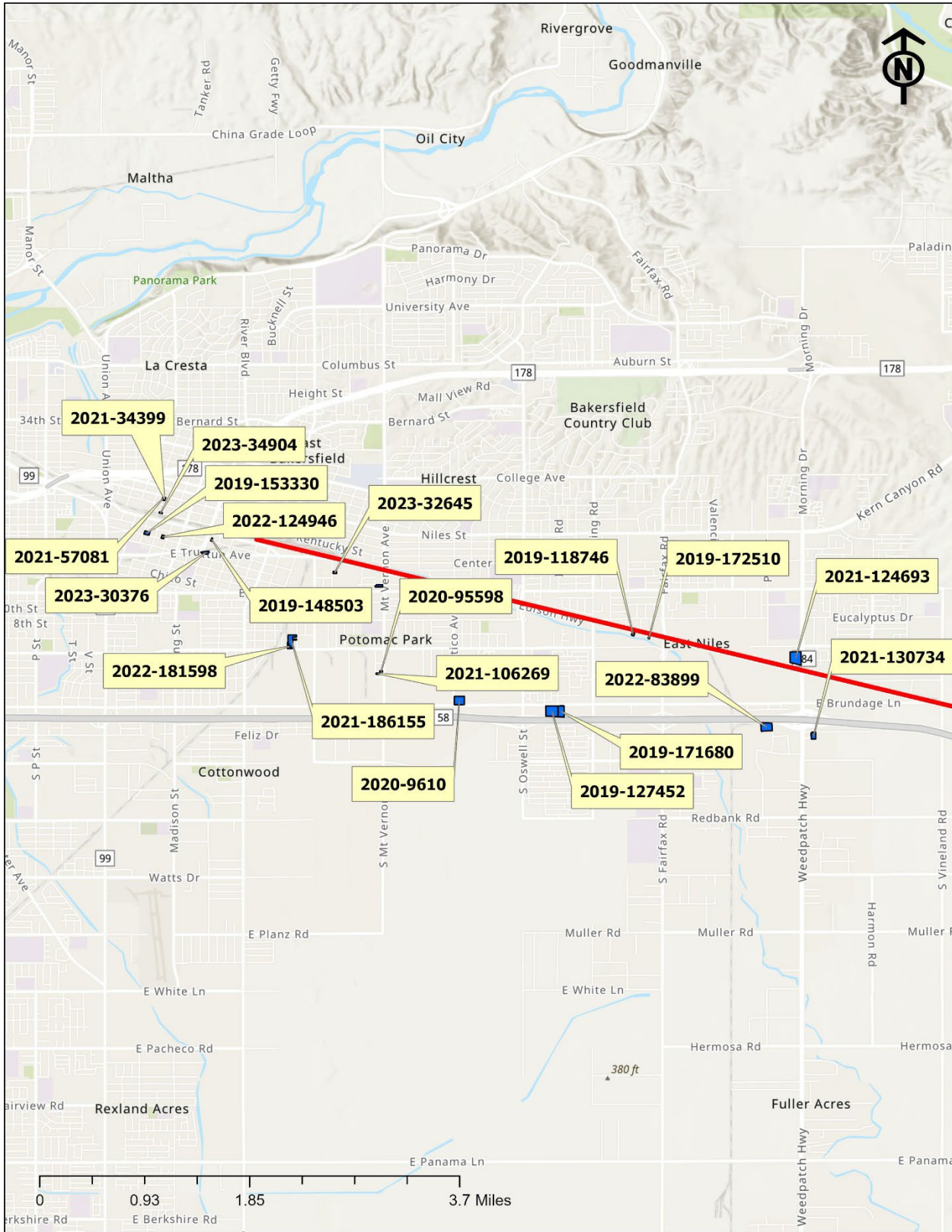
NOTES The comparable sales for the industrial ATF land uses in Bakersfield indicated no quantitative adjustments. The indication in the comparable sales table is shown for Unit Value ID 1. The most weight is given to the arithmetic mean.

UNIT VALUE
CONCLUSIONS

Sales Group 1. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
1	1	Industrial - Bakersfield	sqft	\$ 5.21	\$ 5.19	\$ 5.00

SALES GROUP 1: COMPARABLE SALES MAP



PUBLIC VERSION - REDACTED

UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

Sales Group 2: Residential Comparable ATF Sales – Bakersfield

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 2: Residential - Bakersfield

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2019-100805	8/6/2019	Mikaela Cadena	Dorados Investments, LLC	1128 Jefferson St Abc	Bakersfield	12719012	35.3869	-118 9813	R-2	\$ 21,000
2019-107798	8/15/2019	Home Rescue Development, LLC	Galindo R. M. Orozco & Bercita F. A. Aguilar	2835 Lake St	Bakersfield	13713001	35.3738	-118 9544	R-2	\$ 64,000
2019-155386	10/9/2019	Charan Sihota, Atma S. & Satypal K. Aujla	Maria F. Ventura	1430 Lincoln St	Bakersfield	12712012	35.3846	-118 9769	R-2	\$ 22,500
2020-31618	2/20/2020	Valdez Family Trust	Ruben Cruz	1619 Lincoln St A	Bakersfield	12818017	35.3834	-118 9743	R-3	\$ 25,000
2020-141217	9/3/2020	Nationstar Mortgage, LLC	Cruz Diaz Corporation	1141 Owens St	Bakersfield	01535001	35.3795	-118 9867	R-2	\$ 14,916
2021-30484	2/8/2021	Francisco J. Zamora, Rolando Gonzales, Armando Pena, Jr., & Fernando Perez, Jr.	Ramiro & Blanca Medina	1327 Orange Dr	Bakersfield	13815218	35.3781	-118 9720	R-3	\$ 52,500
2021-66598	4/5/2021	Aldo Hernandez & Alma D. Ramirez	Benito P. Huerta & Juana R. Ramirez	1221 Niles St	Bakersfield	01524006	35.3796	-118 9824	C-1	\$ 65,000
2021-122303	5/25/2021	Jose, Laura, Salvador M. & Martha O. Rodriguez	Charanjit Singh	514 Niles St	Bakersfield	01404014	35.3829	-118 9933	R-3	\$ 45,000
2021-108672	6/1/2021	Jiang Investment, LLC	Jose Lopez	931 Normandy Dr	Bakersfield	13520129	35.3738	-118 9388	R-1	\$ 60,000
2021-121141	6/1/2021	Shawn, Ari & Farnoosh Tinoosh	Lucia Reyes	Flower St	Bakersfield	12707018	35.3853	-118 9846	R-3	\$ 31,000
2021-204655	10/26/2021	Blue Line Investments, LLC	Boys & Girls Club of Kern County	828 Monterey St	Bakersfield	01411010	35.3806	-118 9884	R-2	\$ 60,000
2021-206678	10/27/2021	Martha P. Mendoza	Fidel S. Santiago & Jose I. N. Martinez	2508 Kentucky St	Bakersfield	13746016	35.3733	-118 9624	R-2	\$ 55,000
2021-209047	11/1/2021	Lorene D. Oglesby Revocable Living Trust	Freddie Espinoza	430 Park Dr	Bakersfield	14506001	35.3651	-118 9190	E(1/2)	\$ 50,000
2021-210220	11/2/2021	David R. Torres-Nava	Maedas, LLC	1408 Monterey St	Bakersfield	01526012	35.3785	-118 9798	R-2	\$ 78,000
2021-241330	12/21/2021	Heartland RC Corporation	Miyoko A. K. Chilombo, Sean M. Gallagher, Ilse & Manuela T. Orejuela	1420 Kentucky St	Bakersfield	01542008	35.3763	-118 9801	C-1	\$ 45,000
2022-7222	1/12/2022	B & R Holdings, LLC	Guillermo & Maria Aguirre	3420 Fillmore Av	Bakersfield	13517106	35.3699	-118 9417	R-2	\$ 70,000
2022-19245	1/18/2022	B & L Homes, LLC	Yair I. F. Murguia	1800 Pacific St	Bakersfield	13808116	35.3802	-118 9731	R-3	\$ 47,000
2022-10799	1/19/2022	Nicanor Aguilar & Cristina Galvan	Alejandro Chavez & Genoveva T. Hernandez	1828 Kentucky St	Bakersfield	13826210	35.3747	-118 9737	R-1	\$ 35,000
2022-59307	3/25/2022	Pamela Moore, Mark, Michael, Tony, Laura, Tim & Steve Long, Julie Ruiz	Angel G. Morfin	1413 Lake St	Bakersfield	01542003	35.3768	-118 9804	R-3	\$ 43,000
2022-86786	4/20/2022	Francisco J. Pesqueira	IP Home Solutions, LLC	1612 Lincoln St	Bakersfield	12816013	35.3842	-118 9746	R-3	\$ 48,000
2022-92777	5/26/2022	Friendly Loan Company	Miyoko Chilombo	1120 Gage St	Bakersfield	01535010	35.3789	-118 9859	R-4	\$ 80,000
2022-149302	9/20/2022	Marco A. & Berenice Gordillo	Aldo Hernandez & Alma D. Ramirez	1205 Lake St	Bakersfield	01540002	35.3776	-118 9837	R-3	\$ 50,000
2022-182167	12/6/2022	Robert & Paula Phillips	Esteban Aguilar	1331 Beale Av	Bakersfield	01520001	35.3821	-118 9873	R-3	\$ 60,000
2023-5987	1/6/2023	Estate of Fidel Garcia Martinez	Boys and Girls Clubs of Bakersfield	814 Monterey St	Bakersfield	01411013	35.3807	-118 9889	R-2	\$ 80,000
2023-31906	3/15/2023	Jeannie J. Bishop & Edna N. Hamilton	Martha A. O. Martinez	Buna Ln	Bakersfield	17706006	35.3465	-118 8759	R-2	\$ 60,000

PUBLIC VERSION - REDACTED

UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

SALES GROUP 2: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

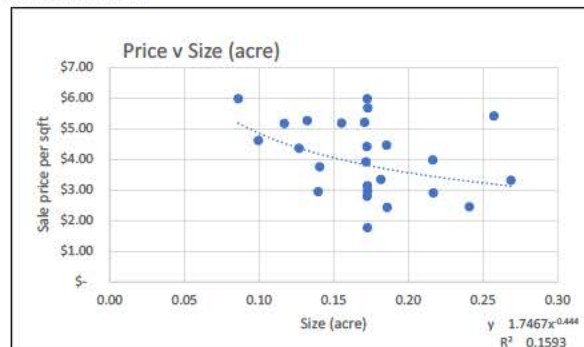
Sales Group 2: Residential Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per sqft	Market Cond. Adjustment	Size Adjustment	Adjusted \$/sqft
2019-100805	8/6/2019	\$ 21,000	0.19	\$ 2.59	113%	-11%	\$ 4.93
2019-107798	8/15/2019	\$ 64,000	0.26	\$ 5.71	115%	3%	\$ 12.66
2019-155386	10/9/2019	\$ 22,500	0.09	\$ 5.99	126%	-37%	\$ 8.60
2020-31618	2/20/2020	\$ 25,000	0.24	\$ 2.38	133%	0%	\$ 5.56
2020-141217	9/3/2020	\$ 14,916	0.17	\$ 1.98	102%	-14%	\$ 3.47
2021-30484	2/8/2021	\$ 52,500	0.27	\$ 4.48	68%	5%	\$ 7.91
2021-66598	4/5/2021	\$ 65,000	0.17	\$ 8.65	57%	-14%	\$ 11.71
2021-122303	5/25/2021	\$ 45,000	0.17	\$ 6.01	48%	-14%	\$ 7.66
2021-121141	6/1/2021	\$ 31,000	0.10	\$ 7.14	47%	-32%	\$ 7.08
2021-108672	6/1/2021	\$ 60,000	0.17	\$ 8.06	47%	-14%	\$ 10.16
2021-204655	10/26/2021	\$ 60,000	0.17	\$ 7.99	25%	-14%	\$ 8.64
2021-206678	10/27/2021	\$ 55,000	0.13	\$ 9.53	25%	-23%	\$ 9.16
2021-209047	11/1/2021	\$ 50,000	0.22	\$ 5.29	25%	-4%	\$ 6.30
2021-210220	11/2/2021	\$ 78,000	0.17	\$ 10.35	24%	-14%	\$ 11.13
2021-241330	12/21/2021	\$ 45,000	0.17	\$ 5.98	19%	-14%	\$ 6.15
2022-7222	1/12/2022	\$ 70,000	0.19	\$ 8.66	17%	-11%	\$ 9.02
2022-19245	1/18/2022	\$ 47,000	0.13	\$ 8.50	16%	-25%	\$ 7.45
2022-10799	1/19/2022	\$ 35,000	0.14	\$ 5.75	16%	-21%	\$ 5.25
2022-59307	3/25/2022	\$ 43,000	0.17	\$ 5.73	11%	-14%	\$ 5.47
2022-86786	4/20/2022	\$ 48,000	0.14	\$ 7.83	9%	-21%	\$ 6.72
2022-92777	5/26/2022	\$ 80,000	0.22	\$ 8.48	6%	-4%	\$ 8.62
2022-149302	9/20/2022	\$ 50,000	0.17	\$ 6.64	1%	-14%	\$ 5.80
2022-182167	12/6/2022	\$ 60,000	0.12	\$ 11.77	0%	-27%	\$ 8.52
2023-5987	1/6/2023	\$ 80,000	0.16	\$ 11.82	-1%	-18%	\$ 9.68
2023-31906	3/15/2023	\$ 60,000	0.18	\$ 7.58	0%	-12%	\$ 6.70
Subject							
		3/15/2023	0.24				
Arithmetic mean				\$ 7.00			\$ 7.77
Standard deviation				\$ 2.58			\$ 2.25
Coefficient of variance				37%			29%
Minimum				\$ 1.98			\$ 3.47
Maximum				\$ 11.82			\$ 12.66
Median				\$ 7.14			\$ 7.66

ADJUSTMENT 1



ADJUSTMENT 2



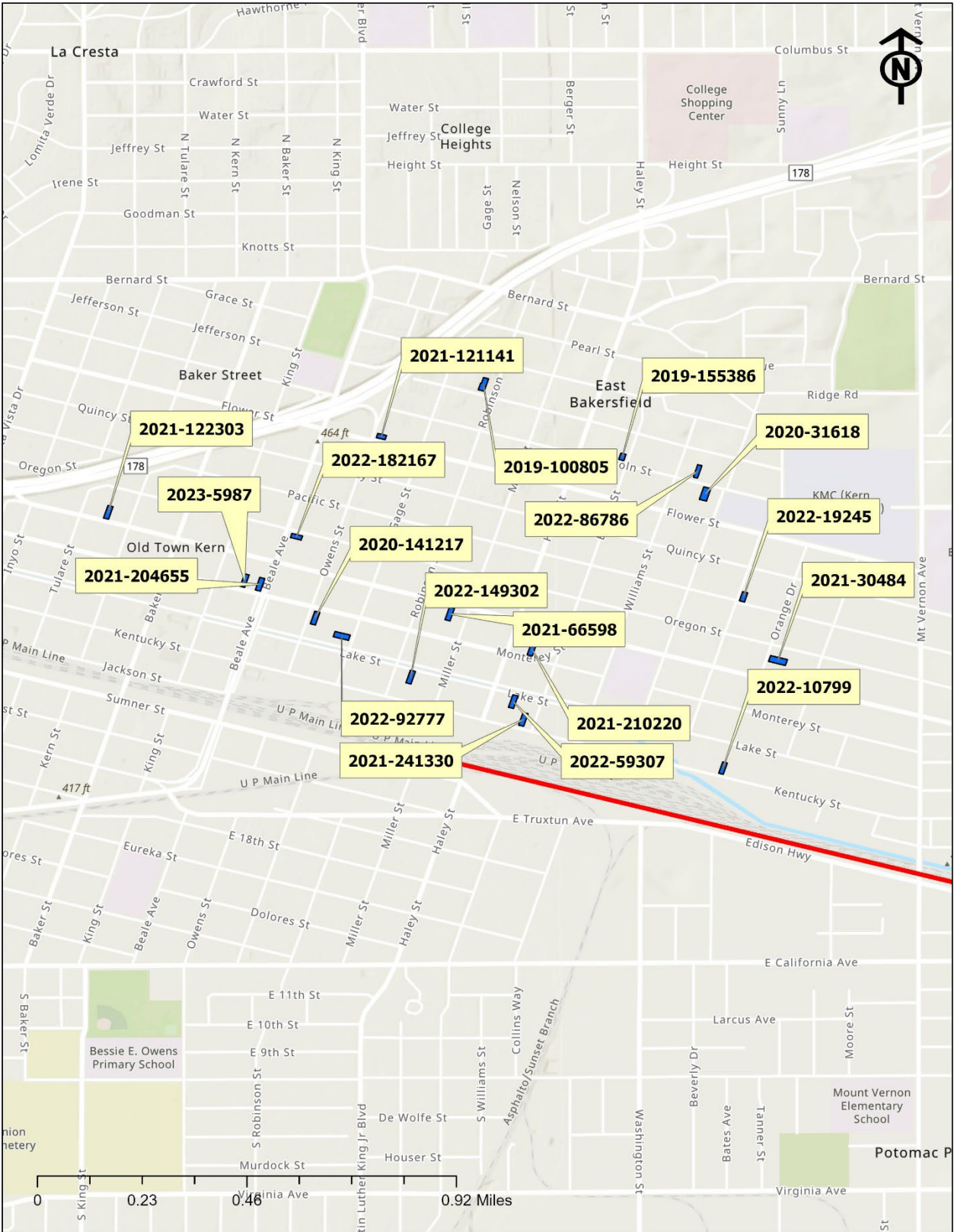
NOTES The comparable sales for the residential ATF land uses in Bakersfield indicated an adjustment for market conditions and size. The adjustments in the comparable sales table are shown for Unit Value ID 2, with an adjustment for market conditions, March 15, 2023, the most recent sale date, and size, 0.24 acres, the average size of the ATF parcels. The most weight is given to the adjusted arithmetic mean toward the adjusted median.

UNIT VALUE
CONCLUSIONS

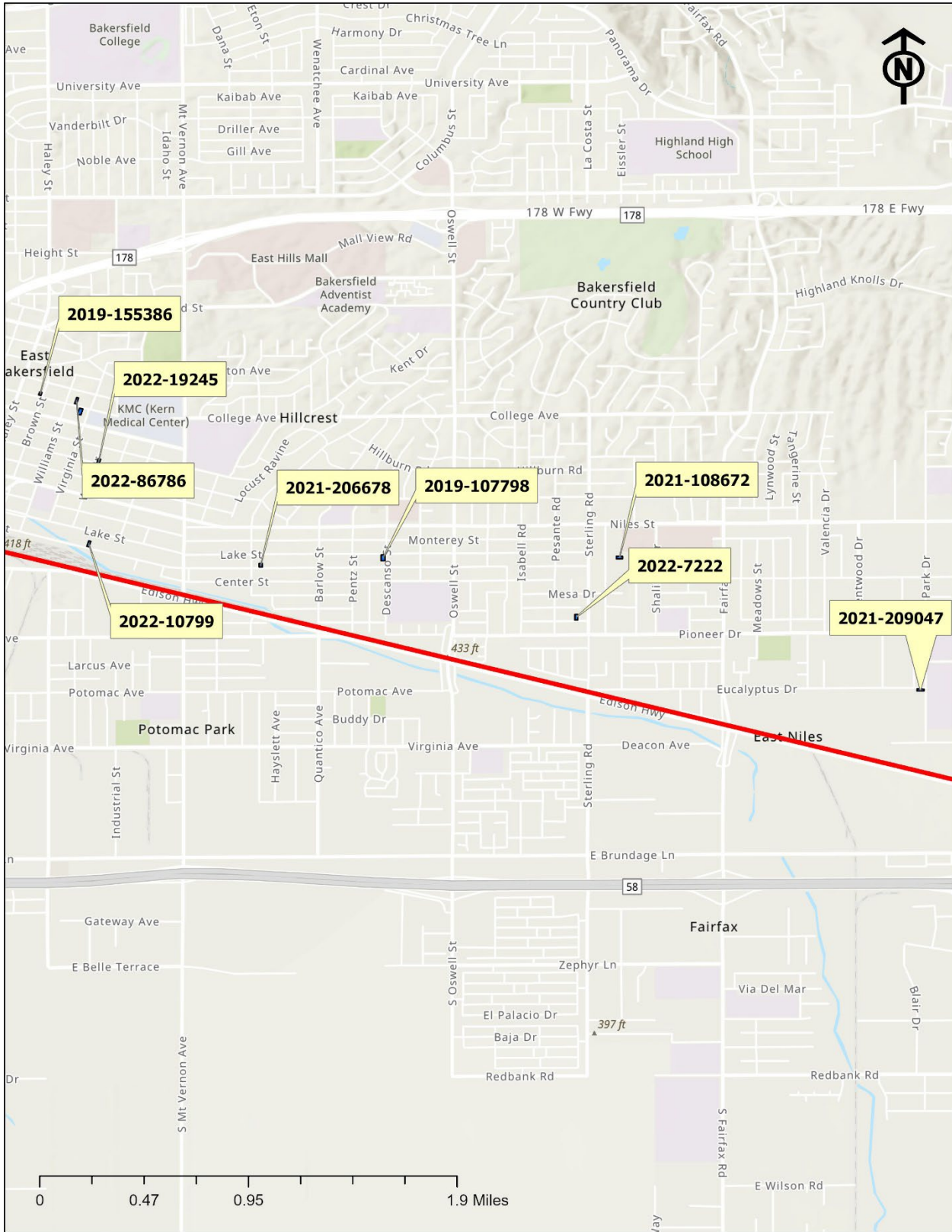
Sales Group 2. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Adjustment 1	Adjustment 2	Avg ATF Size	Average ATF Size Unit	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
2	2	Residential - Bakersfield	Market Conditions	Size	0.24	acre	sqft	\$ 7.77	\$ 7.66	\$ 7.75
3	2	Residential - Bakersfield	Market Conditions	Size	0.27	acre	sqft	\$ 7.39	\$ 7.28	\$ 7.40
4	2	Residential - Bakersfield	Market Conditions	Size	0.15	acre	sqft	\$ 9.58	\$ 9.43	\$ 9.55

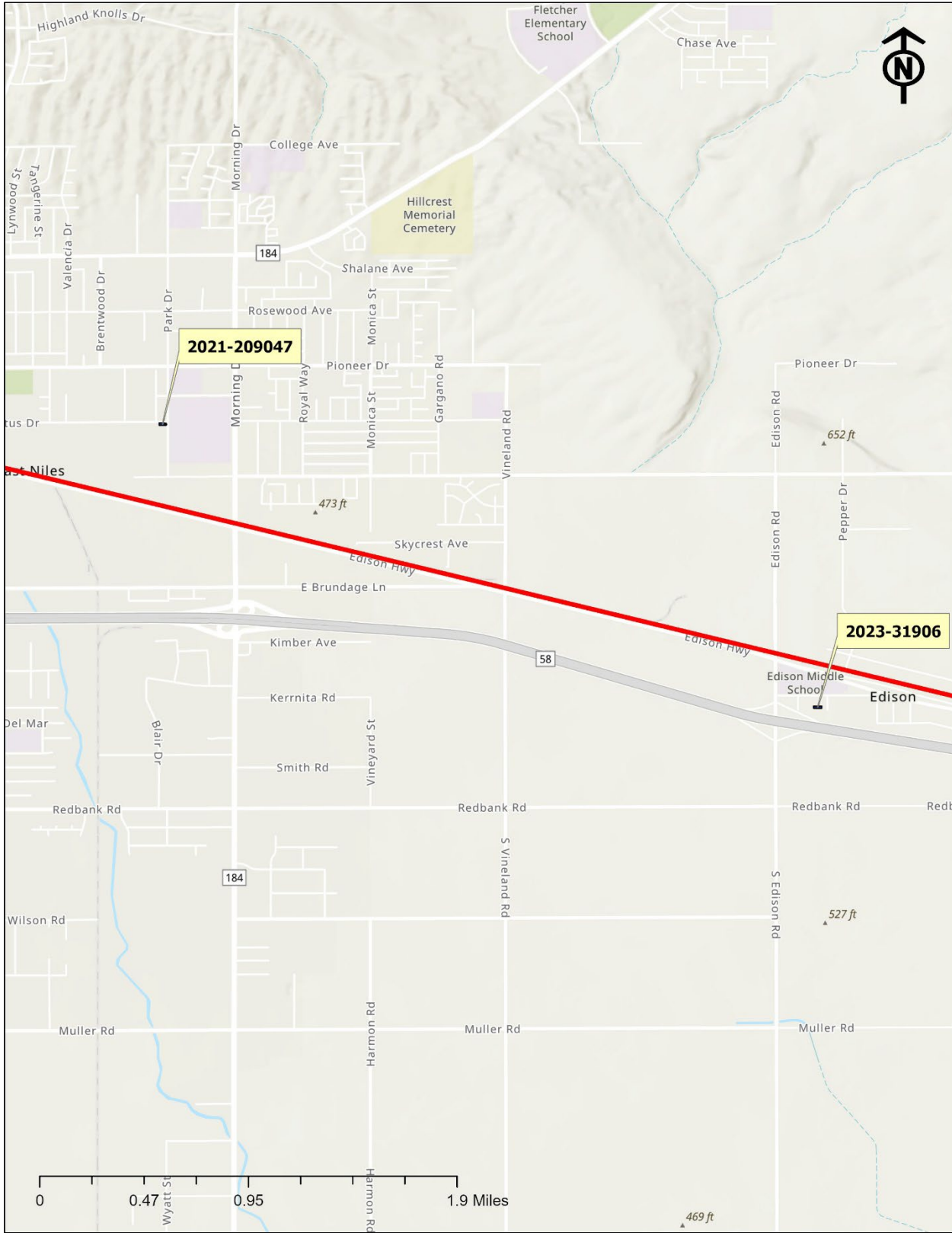
SALES GROUP 2: COMPARABLE SALES MAP 1



SALES GROUP 2: COMPARABLE SALES MAP 2



SALES GROUP 2: COMPARABLE SALES MAP 3



PUBLIC VERSION - REDACTED

UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

Sales Group 3: Residential Development/Multifamily Residential/Mobile Home Residential Comparable ATF Sales – Bakersfield

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 3: Residential Development/Multifamily Residential/Mobile Home Residential - Bakersfield

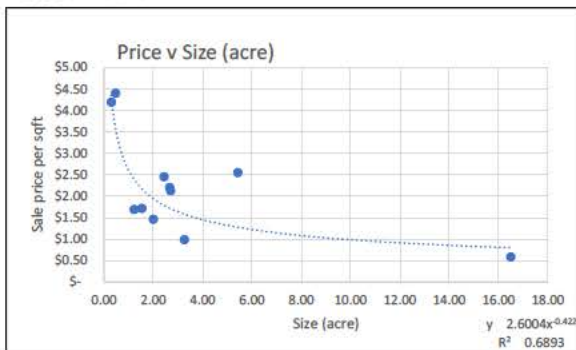
Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2019-73241	6/12/2019	Javier Marcial	Miguel A. G. Espinoza	2900 Citrus Dr	Bakersfield	14210005	35.3671	-118.9548	E(1/2)	\$ 115,000
2020-74571	6/9/2020	Lamar Development Company, Inc.	Freddie Espinoza	Virginia Av	Bakersfield	14308007	35.3633	-118.9469	E(1/2)	\$ 419,000
2020-135781	9/9/2020	Maria E. Pena	Freddie Espinoza	3300 Virginia Av	Bakersfield	14308008	35.3621	-118.9483	E(1/2)	\$ 127,500
2021-37522	2/24/2021	Nairn Investments	A & M Perez, LLC	2018 Kentucky St	Bakersfield	13825045	35.3741	-118.9707	R-3	\$ 54,000
2021-40316	2/24/2021	Fidencio C. Amado & Arely Solis	Yesenia Solorzano	Rosewood Av	Bakersfield	13306019	35.3739	-118.9159	E(1/2)	\$ 250,000
2021-55190	3/12/2021	Roberto S. Bravo	Jose Nuno	Larcus Ave	Bakersfield	14113026	35.3672	-118.9628	R-1	\$ 90,000
2021-123090	6/24/2021	Robert G. Bucholz, Jr.	Mr. Mikes Construction, LLC	4020 Oregon St	Bakersfield	13425011	35.3792	-118.9352	R-1	\$ 140,000
2022-98267	3/3/2022	Habitat for Humanity Golden Empire, Inc.	Amani Enterprises	Quantico Av	Bakersfield	14220013	35.3588	-118.9566	R-2	\$ 255,000
2022-110767	6/10/2022	Manuel & Sara Aguilar	APC Properties 2, LLC	5301 Pioneer Dr	Bakersfield	14501007	35.3679	-118.9250	R-1	\$ 260,000
2022-135430	8/18/2022	Gemsons Corporation	Golden Empire Affordable	3927 Oregon St A	Bakersfield	13429010	35.3773	-118.9391	R-2	\$ 90,000
2022-172616	11/15/2022	Unisys Venture Capital, LLC	Housing Authority of The County	3299 Pioneer Dr	Bakersfield	14305017	35.3674	-118.9458	R-2	\$ 603,000

SALES GROUP 3: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 3: Residential Development/Multifamily Residential/Mobile Home Residential Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per sqft	Size Adjustment	Market Cond. Adjustment	Adjusted \$/sqft
2019-73241	6/12/2019	\$ 115,000	1.54	\$ 1.72	-26%	105%	\$ 2.61
2020-74571	6/9/2020	\$ 419,000	16.49	\$ 0.58	102%	133%	\$ 2.75
2020-135781	9/9/2020	\$ 127,500	2.00	\$ 1.46	-17%	127%	\$ 2.76
2021-37522	2/24/2021	\$ 54,000	0.30	\$ 4.19	-63%	104%	\$ 3.17
2021-40316	2/24/2021	\$ 250,000	2.70	\$ 2.13	-6%	104%	\$ 4.08
2021-55190	3/12/2021	\$ 90,000	1.22	\$ 1.69	-33%	101%	\$ 2.29
2021-123090	6/24/2021	\$ 140,000	3.26	\$ 0.99	2%	82%	\$ 1.83
2022-98267	3/3/2022	\$ 255,000	2.66	\$ 2.20	-6%	37%	\$ 2.82
2022-110767	6/10/2022	\$ 260,000	2.43	\$ 2.45	-10%	21%	\$ 2.69
2022-135430	8/18/2022	\$ 90,000	0.47	\$ 4.40	-55%	11%	\$ 2.21
2022-172616	11/15/2022	\$ 603,000	5.42	\$ 2.55	26%	0%	\$ 3.23
Subject	11/15/2022		3.11				
Arithmetic mean				\$ 2.22			\$ 2.77
Standard deviation				\$ 1.19			\$ 0.60
Coefficient of variance				54%			22%
Minimum				\$ 0.58			\$ 1.83
Maximum				\$ 4.40			\$ 4.08
Median				\$ 2.13			\$ 2.75

ADJUSTMENT 1



ADJUSTMENT 2



NOTES

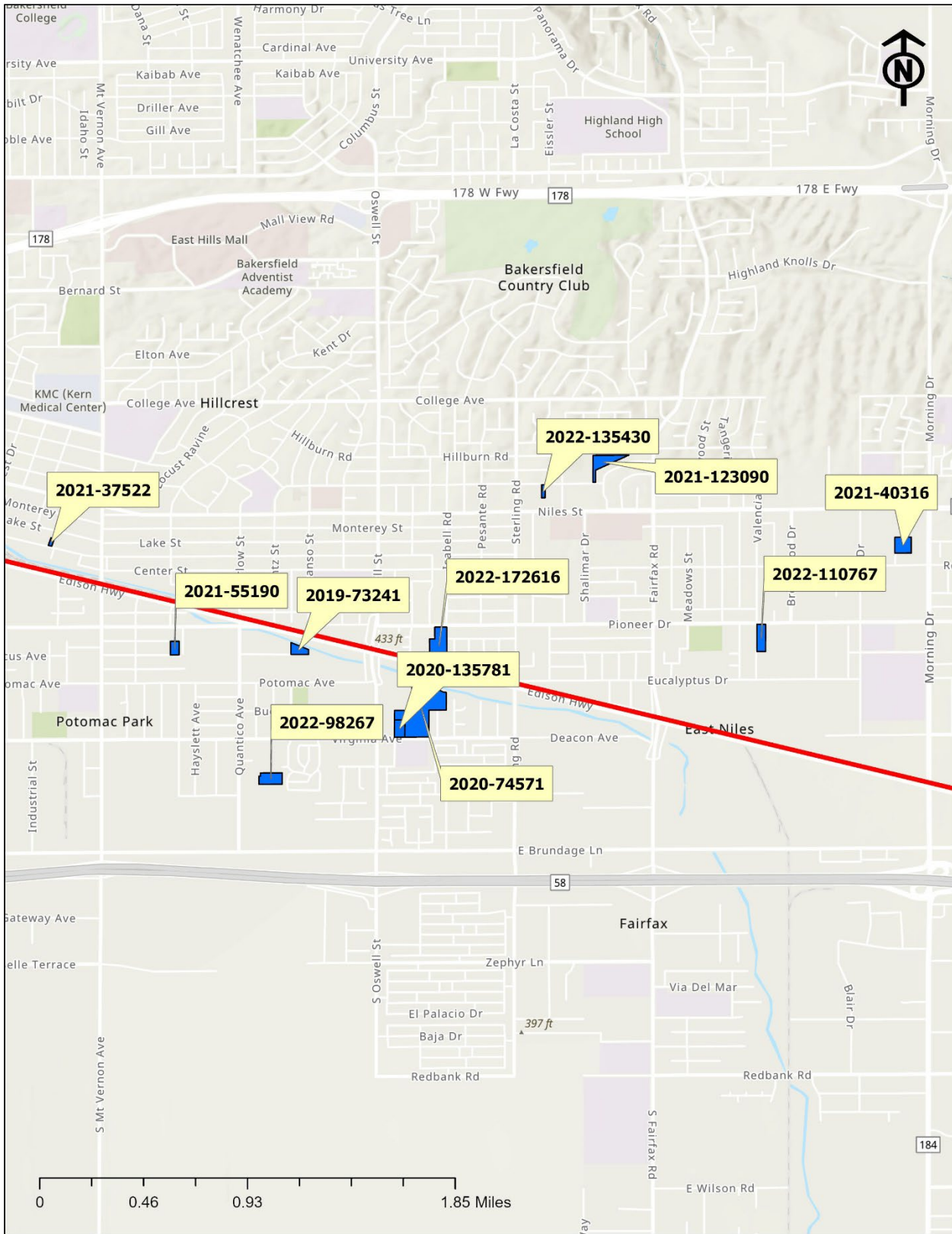
The comparable sales for the residential development, multifamily residential and mobile home residential ATF land uses in Bakersfield indicated an adjustment for size and market conditions. The adjustments in the comparable sales table are shown for Unit Value ID 5, with an adjustment for size, 3.11 acres, the average size of the ATF parcels, and market conditions, November 15, 2022, the most recent sale. The most weight is given to the adjusted arithmetic mean toward the adjusted median.

UNIT VALUE
CONCLUSIONS

Sales Group 3. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Adjustment 1	Adjustment 2	Avg ATF Size	Average ATF Size Unit	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
5	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	3.11	acre	sqft	\$ 2.77	\$ 2.75	\$ 2.75
6	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	1.94	acre	sqft	\$ 3.38	\$ 3.35	\$ 3.35
7	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	1.00	acre	sqft	\$ 4.47	\$ 4.44	\$ 4.45
8	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	3.88	acre	sqft	\$ 2.52	\$ 2.50	\$ 2.50
9	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	9.53	acre	sqft	\$ 1.73	\$ 1.71	\$ 1.75
10	3	Res Dev/MF/MH - Bakersfield	Size	Market Conditions	16.49	acre	sqft	\$ 1.37	\$ 1.36	\$ 1.35

SALES GROUP 3: COMPARABLE SALES MAP



PUBLIC VERSION - REDACTED

UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

Sales Group 5: Agricultural Comparable ATF Sales – Bakersfield

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 5: Agricultural - Bakersfield

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2020-16552	2/3/2020	Fisher Family Trust	Ronald J. & Tamara A. DeVries	Redbank Rd	Bakersfield	17721023	35.3390	-118.8764	A	\$ 200,000
2020-34009	3/4/2020	Lester C. Surgener II & Gregory R. Surgener	Orange Tree Partners	15601 Muller Rd	Bakersfield	17723048	35.3219	-118.8298	A	\$ 2,500,000
2020-199536	12/9/2020	June Palomino	Claudia M. Rivera		Arvin	17912012	35.2866	-118.7969	A FP	\$ 130,000
2021-205695	10/27/2021	Stull Family Trust	Western Farmland, LLC		Bakersfield	17721015	35.3320	-118.8456	A-1/A	\$ 8,400,000
2022-151819	9/22/2022	Harter Family Partnership of 1997	Sunridge Vineyards, LP	Comanche Dr	Bakersfield	17819026	35.2928	-118.8296	A	\$ 3,284,000
2022-182387	10/25/2022	Rogelio & Ana Morales	Iron Door Properties #2, LLC	Redbank Rd	Bakersfield	17721025	35.3381	-118.8731	A	\$ 330,000
2022-170534	11/14/2022	Lehr Family LP	Warmerdam Land Co. South, LLC		Bakersfield	17722003	35.3269	-118.8417	A-1/A	\$ 10,457,000

PUBLIC VERSION - REDACTED

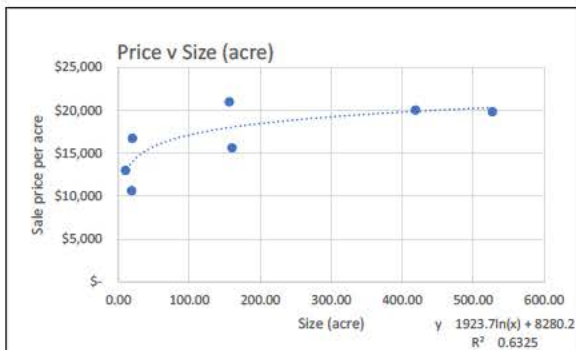
UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

SALES GROUP 5: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 5: Agricultural Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per acre	Size Adjustment	Market Cond. Adjustment	Adjusted \$/acre
2020-16552	2/3/2020	\$ 200,000	18.81	\$ 10,635	16%	36%	\$ 16,779
2020-34009	3/4/2020	\$ 2,500,000	160.00	\$ 15,625	-10%	33%	\$ 18,593
2020-199536	12/9/2020	\$ 130,000	10.00	\$ 13,000	27%	13%	\$ 18,674
2021-205695	10/27/2021	\$ 8,400,000	418.79	\$ 20,058	-19%	2%	\$ 16,694
2022-151819	9/22/2022	\$ 3,284,000	156.36	\$ 21,003	-10%	0%	\$ 18,840
2022-182387	10/25/2022	\$ 330,000	19.70	\$ 16,755	15%	0%	\$ 19,329
2022-170534	11/14/2022	\$ 10,457,000	526.92	\$ 19,846	-20%	0%	\$ 15,795
Subject	11/14/2022		60.90				
Arithmetic mean				\$ 16,703			\$ 17,815
Standard deviation				\$ 3,901			\$ 1,360
Coefficient of variance				23%			8%
Minimum				\$ 10,635			\$ 15,795
Maximum				\$ 21,003			\$ 19,329
Median				\$ 16,755			\$ 18,593

ADJUSTMENT 1



ADJUSTMENT 2



NOTES

The comparable sales for the agricultural ATF land uses in Bakersfield indicated an adjustment for size and market conditions. The adjustments in the comparable sales table are shown for Unit Value ID 11, with an adjustment for size, 60.9 acres, the average size of the ATF parcels, and market conditions, November 14, 2022, the most recent sale. The most weight is given to the adjusted arithmetic mean.

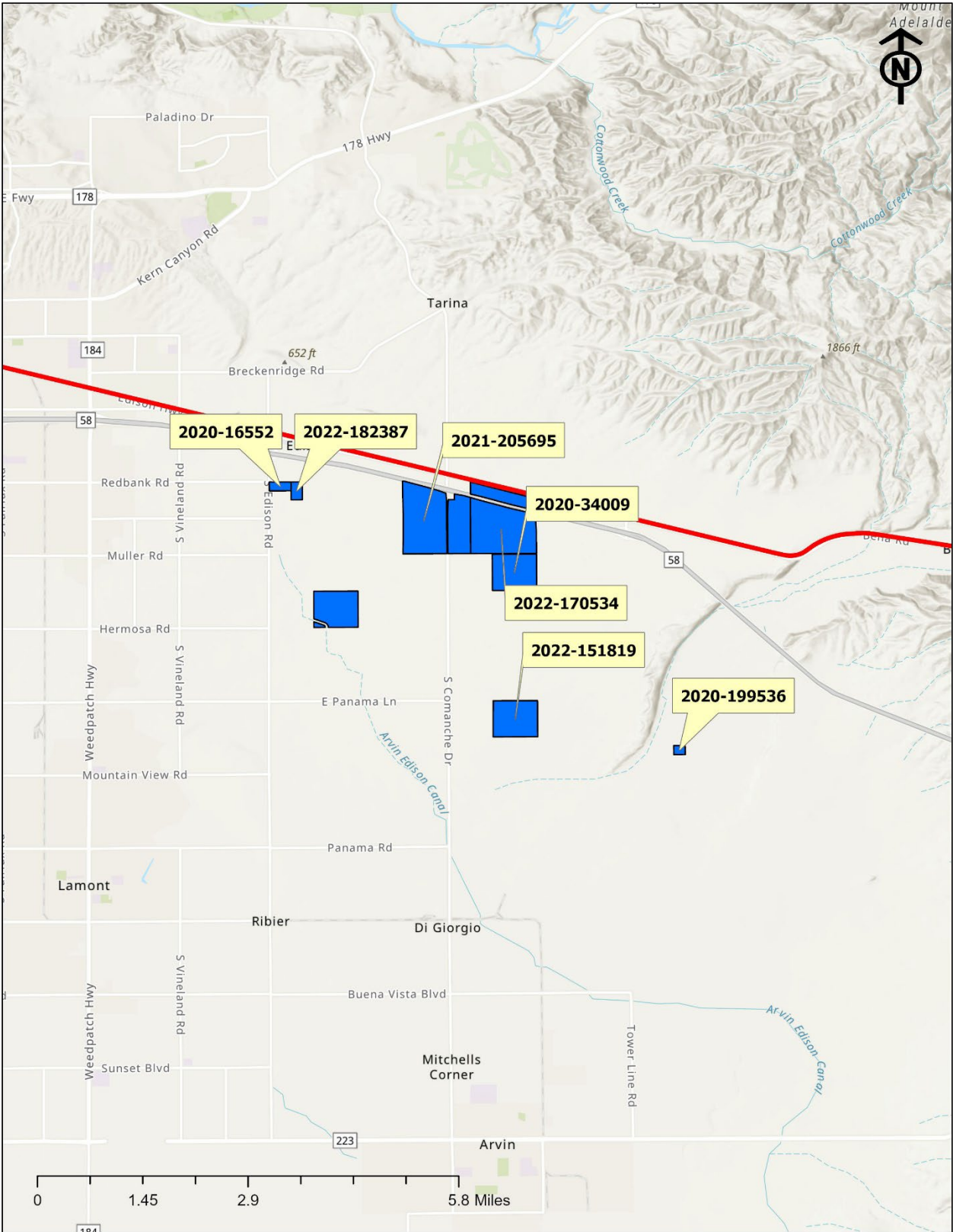
UNIT VALUE

CONCLUSIONS

Sales Group 5. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Adjustment 1	Adjustment 2	Avg ATF Size	Average ATF Size Unit	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
11	5	Agricultural - Bakersfield	Size	Market Conditions	60.90	acre	acre	\$ 17,815	\$ 18,593	\$ 17,800
12	5	Agricultural - Bakersfield	Size	Market Conditions	135.50	acre	acre	\$ 19,508	\$ 20,360	\$ 19,500

SALES GROUP 5: COMPARABLE SALES MAP



PUBLIC VERSION - REDACTED

UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

Sales Group 7: Rural Residential Comparable ATF Sales – 1 to 20 acres

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 7: Rural Residential - Kern County

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2019-57271	5/9/2019	Linda C. Jelinek	John L. & Heather A. Maliska	Mariposa Ave	Tehachapi	22215001	35.1745	-118.5062	E(2 1/2) R	\$ 24,000
2019-79827	5/15/2019	James R. Dufour	Fernando M. & Maria C. Garcia	Pine Ridge Dr	Tehachapi	28926102	35.1696	-118.4809	E(2 1/2) R	\$ 32,000
2019-79834	6/21/2019	Vander Meyden Family Trust	Saul Ruano	Marigold Ave	Tehachapi	22204206	35.1679	-118.4960	E(2 1/2) R	\$ 35,000
2020-58196	4/27/2020	Lewis & Clark Fund Advisers, LLC	Alex & Nicholas Galvan	Fir Dr	Tehachapi	28928310	35.1639	-118.4827	E(2 1/2) R	\$ 19,500
2020-73472	5/19/2020	W. Wayne & Ina M. Whatley	Eliseo Ramirez	Winesap St	Tehachapi	22309108	35.1386	-118.4735	A-1	\$ 12,500
2020-88653	6/4/2020	Mairs and Sons Land & Livestock	Christopher & Jennifer Wymore	30326 Hart Oaks Dr	Keene	50425003	35.2575	-118.6234	E(5) RS MH	\$ 45,000
2020-101108	7/28/2020	Espericueta Family Trust	Javier Luna & Cathy De La Torre	Oak Knoll Dr	Tehachapi	22205207	35.1623	-118.4871	E(2 1/2) R	\$ 21,000
2020-176353	10/22/2020	Pat Sheeren	Jonathan P. & Daphne Orenshein	Tamarac Dr	Tehachapi	22203115	35.1652	-118.4928	E(2 1/2) R	\$ 25,000
2021-41275	2/22/2021	Steele Family Trust	Enrique A. C. Belmonte	Cedar Glen Dr	Tehachapi	22209007	35.1547	-118.4881	E(2 1/2) R	\$ 18,000
2021-48984	3/2/2021	Donate Investments, LLC	Hector Sanchez	Mountain View Dr	Tehachapi	22213103	35.1726	-118.4914	E(2 1/2)	\$ 28,000
2021-75657	3/25/2021	Saeid & Niloufer N. Hariri	Christina Gentry	19508 Sycamore Dr	Tehachapi	28928104	35.1637	-118.4784	E(2 1/2) R	\$ 49,000
2021-69283	3/29/2021	Flanagan Living Trust, Jamie &	Ollie M. & Aurora G. McCaulley	Sycamore Dr	Tehachapi	28928107	35.1635	-118.4803	E(2 1/2) R	\$ 39,500
2021-92549	5/11/2021	Kim J. Anderson	Andrew & Tanya Marshall	Woodford Tehachapi Rd	Tehachapi	22204217	35.1664	-118.4980	E(2 1/2) R	\$ 26,500
2021-130053	7/7/2021	Eloise E. Byers	W. V. T. Service, Inc.	Sycamore Dr	Tehachapi	28929109	35.1589	-118.4804	E(2 1/2) R	\$ 12,000
2021-142867	7/22/2021	Jenik Samvalian	Juan D. Carrillo	Marigold Ave	Tehachapi	22205109	35.1614	-118.4918	E(2 1/2) R	\$ 10,000
2021-165555	8/9/2021	Wild West Land Company	Meina Guan	Yucca Ct	Tehachapi	28926115	35.1738	-118.4843	E(2 1/2) R	\$ 20,000
2021-183454	8/18/2021	Dale M. Cummings	Signature Investments, LLC	Woodford Tehachapi Rd	Keene	50512003	35.2280	-118.5668	A-1	\$ 100,000
2021-243064	12/14/2021	Paz Family Trust	Matthew & Madison Weir	Sycamore Dr	Tehachapi	28928106	35.1648	-118.4801	E(2 1/2) R	\$ 44,000
2022-50222	3/10/2022	Harold E. Moore Revocable Trust	Gregorio Guevara	Woodford Tehachapi Rd	Tehachapi	22225008	35.1808	-118.5119	A	\$ 145,000
2022-53593	3/21/2022	CA Best Homes, Inc.	Abraham G. Navarrete & Angel M. Garcia	Dove Tail Ct	Tehachapi	28927017	35.1661	-118.4791	E(2 1/2) R	\$ 25,000
2022-98231	5/2/2022	Becky J. Mills	Monica C & Melissa Stewart,	Hart Oaks Dr	Keene	50426014	35.2552	-118.6292	E(5) RS MH	\$ 85,000
2022-180573	12/5/2022	Pio B. & Velaria R. Perez Family	William C. Pullen	Yucca Ct	Tehachapi	28926107	35.1730	-118.4825	E(2 1/2) R	\$ 26,000
2023-29993	3/7/2023	Teresita J. Adargo	Jordan T. & Ashley M. Gibson	Dove Tail Ct	Tehachapi	28927007	35.1658	-118.4833	E(2 1/2) R	\$ 25,000

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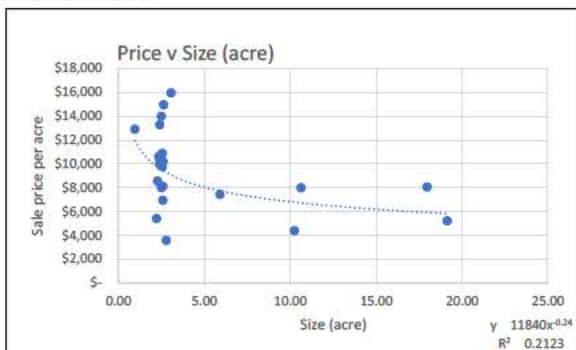
UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

SALES GROUP 7: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 7: Rural Residential Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per acre	Size Adjustment	Adjusted \$/acre
2019-57271	5/9/2019	\$ 24,000	2.41	\$ 9,959	-6%	\$ 9,354
2019-79827	5/15/2019	\$ 32,000	2.41	\$ 13,278	-6%	\$ 12,472
2019-79834	6/21/2019	\$ 35,000	2.50	\$ 14,000	-5%	\$ 13,266
2020-58196	4/27/2020	\$ 19,500	2.28	\$ 8,553	-7%	\$ 7,927
2020-73472	5/19/2020	\$ 12,500	0.97	\$ 12,915	-25%	\$ 9,749
2020-88653	6/4/2020	\$ 45,000	10.26	\$ 4,387	33%	\$ 5,830
2020-101108	7/28/2020	\$ 21,000	2.59	\$ 8,108	-4%	\$ 7,748
2020-176353	10/22/2020	\$ 25,000	2.56	\$ 9,766	-5%	\$ 9,306
2021-41275	2/22/2021	\$ 18,000	2.59	\$ 6,950	-4%	\$ 6,641
2021-48984	3/2/2021	\$ 28,000	2.57	\$ 10,895	-5%	\$ 10,392
2021-75657	3/25/2021	\$ 49,000	3.07	\$ 15,961	0%	\$ 15,887
2021-69283	3/29/2021	\$ 39,500	2.64	\$ 14,962	-4%	\$ 14,364
2021-92549	5/11/2021	\$ 26,500	2.60	\$ 10,192	-4%	\$ 9,749
2021-130053	7/7/2021	\$ 12,000	2.22	\$ 5,405	-8%	\$ 4,978
2021-142867	7/22/2021	\$ 10,000	2.79	\$ 3,584	-3%	\$ 3,487
2021-165555	8/9/2021	\$ 20,000	2.50	\$ 8,000	-5%	\$ 7,581
2021-183454	8/18/2021	\$ 100,000	19.14	\$ 5,225	54%	\$ 8,064
2021-243064	12/14/2021	\$ 44,000	5.92	\$ 7,432	17%	\$ 8,659
2022-50222	3/10/2022	\$ 145,000	17.97	\$ 8,068	52%	\$ 12,266
2022-53593	3/21/2022	\$ 25,000	2.42	\$ 10,331	-6%	\$ 9,713
2022-98231	5/2/2022	\$ 85,000	10.63	\$ 7,997	34%	\$ 10,719
2022-180573	12/5/2022	\$ 26,000	2.43	\$ 10,700	-6%	\$ 10,070
2023-29993	3/7/2023	\$ 25,000	2.36	\$ 10,593	-7%	\$ 9,900
Subject			3.13			
Arithmetic mean				\$ 9,446		\$ 9,484
Standard deviation				\$ 3,303		\$ 2,926
Coefficient of variance				35%		31%
Minimum				\$ 3,584		\$ 3,487
Maximum				\$ 15,961		\$ 15,887
Median				\$ 9,766		\$ 9,713

ADJUSTMENT 1



NOTES The comparable sales for the rural residential ATF land uses ranging from 1 to 20 acres in size indicated an adjustment for size. The adjustments in the comparable sales table are shown for Unit Value ID 18, with an adjustment for size, 3.13 acres, the average size of the ATF parcels. The most weight is given to the adjusted arithmetic mean toward the adjusted median.

UNIT VALUE
CONCLUSIONS

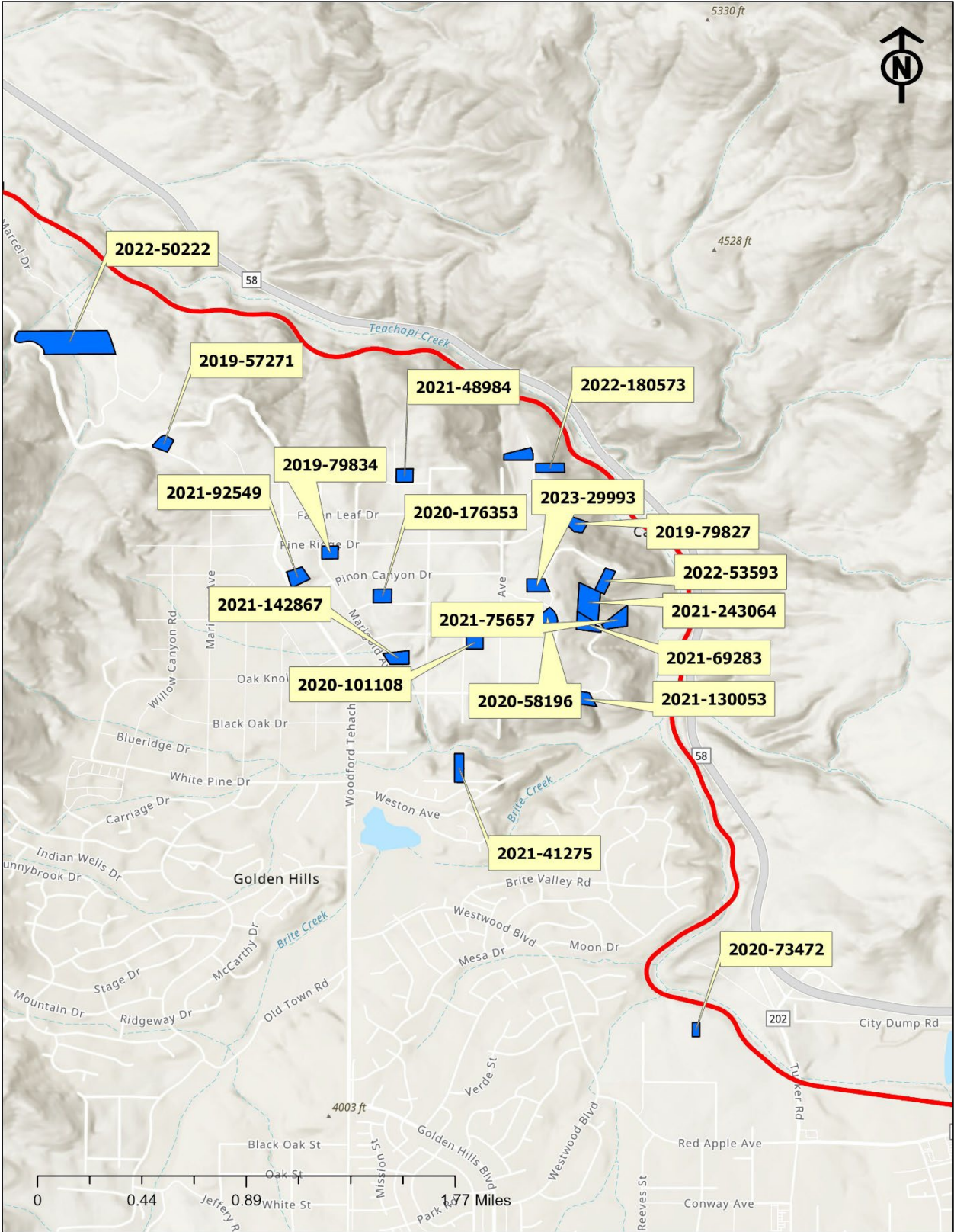
Sales Group 7. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Adjustment 1	Avg ATF Size	Average ATF Size Unit	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
16	7	Rural Residential (1-20ac)	Size	0.97	acre	acre	\$ 12,557	\$ 12,861	\$ 12,500
17	7	Rural Residential (1-20ac)	Size	19.14	acre	acre	\$ 6,145	\$ 6,293	\$ 6,150
18	7	Rural Residential (1-20ac)	Size	3.13	acre	acre	\$ 9,484	\$ 9,713	\$ 9,500

SALES GROUP 7: COMPARABLE SALES MAP 1



SALES GROUP 7: COMPARABLE SALES MAP 2



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UNION PACIFIC'S MOJAVE SUBDIVISION
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Sales Group 8: Rangeland Acreage Comparable ATF Sales

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 8: Rangeland Acreage - Kern County

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2011-125408	9/16/2011	Milton and Diane Rudnick Rev Living Trust	The Nature Conservancy		Caliente	17917006	35.3312	-118.6378	A	\$ 11,209,000
2019-173888	12/17/2019	Alanna S., LLC	T-Rail Land and Development, LP	Bena Rd	Bakersfield	26601003	35.3287	-118.7433	M-3	\$ 99,000
2020-89151	7/7/2020	John and Patricia Beard 2010 Family Trust, etal	The Nature Conservancy		Caliente	39721006	35.3246	-118.5861	A	\$ 4,250,000
2020-99915	7/22/2020	Raymond Villanueva	Kevin S. Santos	26608 Desert Oak Ct	Keene	50403008	35.2161	-118.6034	A	\$ 400,000
2020-141686	9/28/2020	Charles A. Abel	The Nature Conservancy		Tehachapi	50405007	35.2132	-118.6303	A	\$ 3,500,000
2020-203312	12/17/2020	S & B Cummings Family Trust	Cynthia D. Gonzalez	Woodford Tehachapi Rd	Keene	50520008	35.2386	-118.5768	A-1/A	\$ 10,000
2021-31415	12/27/2020	Lower Loop Canyon Ranch, LLC	Gus Salcido	Woodford-Tehachapi Rd	Keene	50506027	35.2095	-118.5453	A	\$ 40,000
2021-51717	3/19/2021	Windriver Holdings, LLC	The Nature Conservancy	23261 Hwy 119	Keene	50405008	35.2027	-118.6006	E(1) RS	\$ 370,207
2021-136656	7/9/2021	Jay, Bonnie, Rena & Martin A. Moss	T-Rail Land and Development, LP	Bena Rd	Bakersfield	26601001	35.3309	-118.7509	M-3	\$ 16,000
2021-142452	7/21/2021	Keene Ranch Company	T-Rail Land and Development, LP	Bena Rd	Bakersfield	26601002	35.3308	-118.7471	M-3	\$ 42,500
2021-241478	12/22/2021	Loop Ranch, LLC	The Nature Conservancy		Caliente	17928002	35.2201	-118.4962		\$ 31,866,500
2022-42105	3/14/2022	Donna Douglas	The Nature Conservancy		Caliente	17925001	35.2971	-118.5383		\$ 2,500,000
2022-87320	5/12/2022	Sand Canyon of Tehachapi, LLC	Paradise Trucking & RMR Trucking	20156 Sand Canyon Rd	Tehachapi	22411116	35.1173	-118.3234	A-1	\$ 500,000
2023-24008	2/26/2023	Phyllis M. Hix	T-Rail Land and Development, LP	Bena Rd	Bakersfield	26606002	35.3230	-118.7109	A/M-3	\$ 240,000

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UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

SALES GROUP 8: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 8: Rangeland Acreage Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per acre
2011-125408	9/16/2011	\$ 11,209,000	14,377.63	\$ 780
2019-173888	12/17/2019	\$ 99,000	40.37	\$ 2,452
2020-89151	7/7/2020	\$ 4,250,000	5,470.16	\$ 777
2020-99915	7/22/2020	\$ 400,000	400.00	\$ 1,000
2020-141686	9/28/2020	\$ 3,500,000	3,163.02	\$ 1,107
2020-203312	12/17/2020	\$ 10,000	23.95	\$ 417
2021-31415	12/27/2020	\$ 40,000	48.37	\$ 827
2021-51717	3/19/2021	\$ 370,207	640.00	\$ 578
2021-136656	7/9/2021	\$ 16,000	50.74	\$ 315
2021-142452	7/21/2021	\$ 42,500	51.36	\$ 827
2021-241478	12/22/2021	\$ 31,866,500	28,010.77	\$ 1,138
2022-42105	3/14/2022	\$ 2,500,000	4,557.33	\$ 549
2022-87320	5/12/2022	\$ 500,000	294.34	\$ 1,699
2023-24008	2/26/2023	\$ 240,000	82.63	\$ 2,905
Subject				
Arithmetic mean				\$ 1,098
Standard deviation				\$ 758
Coefficient of variance				69%
Minimum				\$ 315
Maximum				\$ 2,905
Median				\$ 827

NOTES

The comparable sales for the rangeland acreage ATF land uses indicated no quantitative adjustments. The indication in the comparable sales table is shown for Unit Value ID 13. The most weight is given to the arithmetic mean.

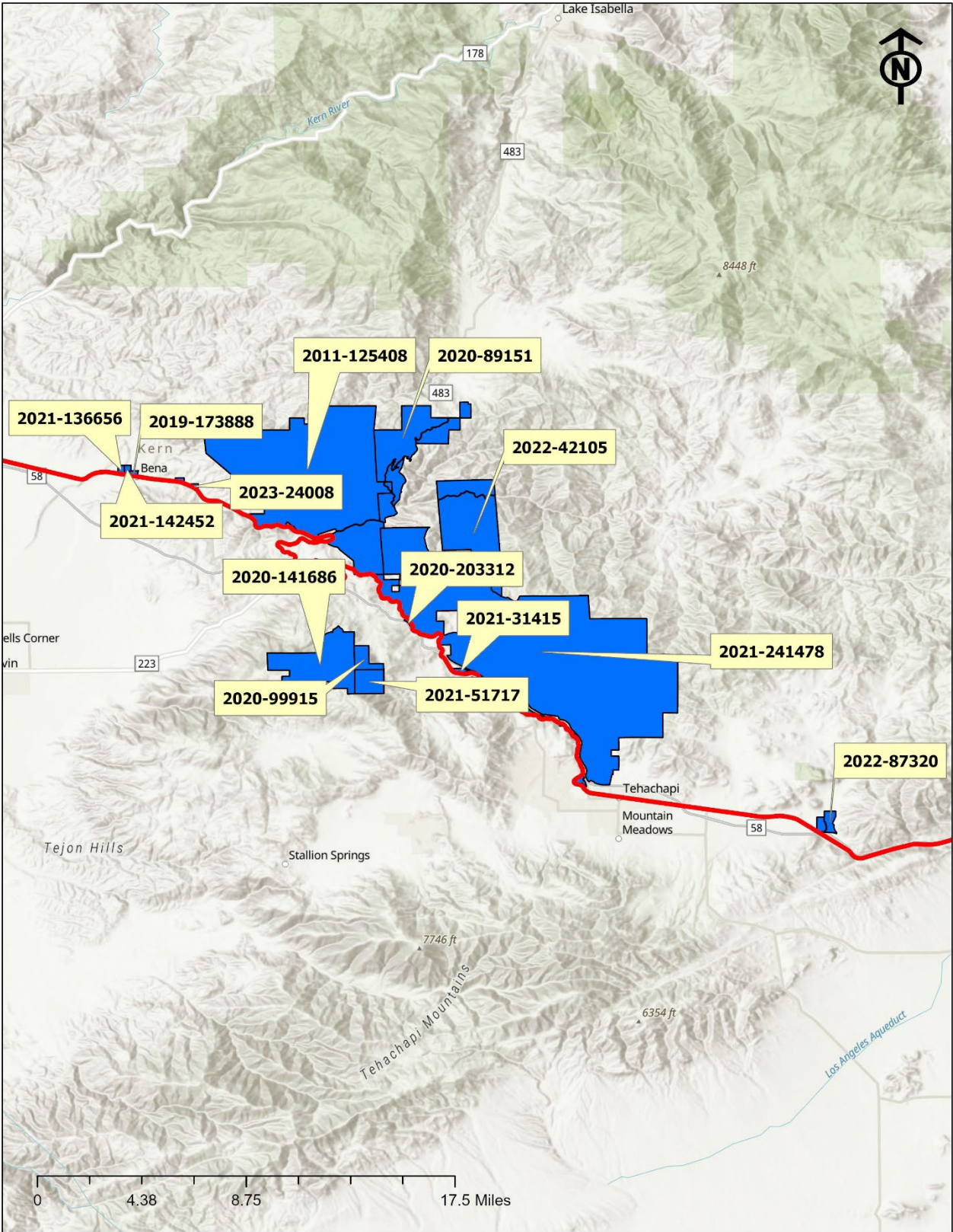
UNIT VALUE

CONCLUSIONS

Sales Group 8. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
13	8	Rangeland Acreage	acre	\$ 1,098	\$ 827	\$ 1,100

SALES GROUP 8: COMPARABLE SALES MAP



Sales Group 10: Rural Residential Comparable ATF Sales – 10 to 20 acres

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 10: Rural Residential - Kern County

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2020-88653	6/4/2020	Mairs and Sons Land & Livestock Company, LLC	Christopher & Jennifer Wymore	30326 Hart Oaks Dr	Keene	50425003	35.2575	-118.6234	E(5) RS MH	\$ 45,000
2021-183454	8/18/2021	Dale M. Cummings	Signature Investments, LLC	Woodford Tehachapi Rd	Keene	50512003	35.2280	-118.5668	A-1	\$ 100,000
2022-50222	3/10/2022	Harold E. Moore Revocable Trust	Gregorio Guevara	Woodford Tehachapi Rd	Tehachapi	22225008	35.1808	-118.5119	A	\$ 145,000
2022-98231	5/2/2022	Becky J. Mills	Monica C & Melissa Stewart, Jacob J. Correa	Hart Oaks Dr	Keene	50426014	35.2552	-118.6292	E(5) RS MH	\$ 85,000

SALES GROUP 10: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 10: Rural Residential Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per acre	Market Cond. Adjustment	Adjusted \$/acre
2020-88653	6/4/2020	\$ 45,000	10.26	\$ 4,387	91%	\$ 8,380
2021-183454	8/18/2021	\$ 100,000	19.14	\$ 5,225	55%	\$ 8,123
2022-50222	3/10/2022	\$ 145,000	17.97	\$ 8,068	10%	\$ 8,875
2022-98231	5/2/2022	\$ 85,000	10.63	\$ 7,997	0%	\$ 7,997
Subject	5/2/2022					
Arithmetic mean				\$ 6,419		\$ 8,344
Standard deviation				\$ 1,894		\$ 388
Coefficient of variance				30%		5%
Minimum				\$ 4,387		\$ 7,997
Maximum				\$ 8,068		\$ 8,875
Median				\$ 6,611		\$ 8,252

ADJUSTMENT 1



NOTES

The comparable sales for the rural residential ATF land uses ranging from 10 to 20 acres in size indicated an adjustment for market conditions. The adjustments in the comparable sales table are shown for Unit Value ID 14, with an adjustment for market conditions, May 2, 2022, the most recent sale. The most weight is given to the adjusted arithmetic mean.

UNIT VALUE

CONCLUSIONS

Sales Group 10. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Adjustment 1	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
14	10	Rural Residential (10-20ac)	Market Conditions	acre	\$ 8,344	\$ 8,252	\$ 8,340

SALES GROUP 10: COMPARABLE SALES MAP



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UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

Sales Group 11: Single-Family Residential Comparable ATF Sales

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 11: Residential - Tehachapi

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2019-106587	8/9/2019	Renata Luisa Mirabella Trust & Joseph Mirabella III	Kari M. Blackburn	19912 Mesa Dr	Tehachapi	27047408	35.1435	-118.4847	E(1/4)	\$ 17,500
2019-165999	12/2/2019	James A. Bottomley	Stephen M. Shaw	23020 Monroe Ln	Tehachapi	27055009	35.1547	-118.4837	E(1/2)	\$ 33,000
2020-53671	4/13/2020	Barry M. & Rhonda Aboltin	Scott M. Staabs	19320 Moon Dr	Tehachapi	28907216	35.1456	-118.4741	E(1/2) RS	\$ 37,000
2020-97866	7/6/2020	Santos, Alicia & Leonardo Ruiz	Henry & Lillian J. Orellana	21520 Westwood Bl	Tehachapi	46816211	35.1316	-118.4808	E(1/2) RS	\$ 26,000
2020-120443	7/28/2020	Ross Family Trust	Mahavir S. Gill	22700 Jerry Dr	Tehachapi	28915118	35.1497	-118.4783	E(1/2) RS	\$ 25,000
2021-55273	3/15/2021	Saticoy Development Company, LLC	Gene Roberson Construction Profit Sharing Plan	19801 Hi Ct	Tehachapi	28920006	35.1515	-118.4827	E(1/2) RS	\$ 41,000
2021-115381	6/16/2021	James K. & Akiko Michiuye	AGB Holdings, LLC	22641 Tree Ct	Tehachapi	28909018	35.1493	-118.4776	E(1/2) RS	\$ 68,000
2021-132962	7/13/2021	John Burgeson Contractors, Inc.	Martin A. Sanchez	22650 Tree Ct	Tehachapi	28909016	35.1489	-118.4766	E(1/2) RS	\$ 85,000
2021-219717	11/15/2021	K4K, LLC	Nicholas A. Freels	19870 Piedra Dr	Tehachapi	46830307	35.1368	-118.4838	E(1/2) RS	\$ 34,000
2022-755	12/9/2021	Chad & Jamie Riley	Musa Wadud & Leland Krelle	22800 Tom Ct	Tehachapi	28918310	35.1511	-118.4771	E(1/2) RS	\$ 20,000
2022-100470	6/14/2022	Kerrin Clenard	Warren Peterson Construction, Inc.	21831 San Gabriel Dr	Tehachapi	46825110	35.1367	-118.4826	E(1/2) RS	\$ 45,000
2022-97438	6/14/2022	Gabriela M. & George Vasilescu	Norma Lainez	22820 Jerry Dr	Tehachapi	28915107	35.1513	-118.4761	E(1/2) RS	\$ 52,500

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UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

SALES GROUP 11: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 11: Residential Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per sqft	Market Cond. Adjustment	Adjusted \$/sqft
2019-106587	8/9/2019	\$ 17,500	0.38	\$ 1.06	55%	\$ 1.64
2019-165999	12/2/2019	\$ 33,000	0.50	\$ 1.50	46%	\$ 2.20
2020-53671	4/13/2020	\$ 37,000	0.63	\$ 1.35	37%	\$ 1.85
2020-97866	7/6/2020	\$ 26,000	0.53	\$ 1.13	32%	\$ 1.49
2020-120443	7/28/2020	\$ 25,000	0.59	\$ 0.97	31%	\$ 1.27
2021-55273	3/15/2021	\$ 41,000	0.56	\$ 1.67	18%	\$ 1.98
2021-115381	6/16/2021	\$ 68,000	0.80	\$ 1.95	14%	\$ 2.22
2021-132962	7/13/2021	\$ 85,000	0.77	\$ 2.54	13%	\$ 2.87
2021-219717	11/15/2021	\$ 34,000	0.83	\$ 0.94	8%	\$ 1.01
2022-755	12/9/2021	\$ 20,000	0.49	\$ 0.93	7%	\$ 0.99
2022-100470	6/14/2022	\$ 45,000	0.59	\$ 1.76	0%	\$ 1.76
2022-97438	6/14/2022	\$ 52,500	0.55	\$ 2.19	0%	\$ 2.19
Subject	6/14/2022					
Arithmetic mean				\$ 1.50		\$ 1.79
Standard deviation				\$ 0.53		\$ 0.55
Coefficient of variance				36%		31%
Minimum				\$ 0.93		\$ 0.99
Maximum				\$ 2.54		\$ 2.87
Median				\$ 1.43		\$ 1.80

ADJUSTMENT 1



NOTES

The comparable sales for the single-family residential ATF land uses indicated an adjustment for market conditions. The adjustments in the comparable sales table are shown for Unit Value ID 15, with an adjustment for market conditions, June 14, 2022, the most recent sale. The most weight is given to the adjusted arithmetic mean.

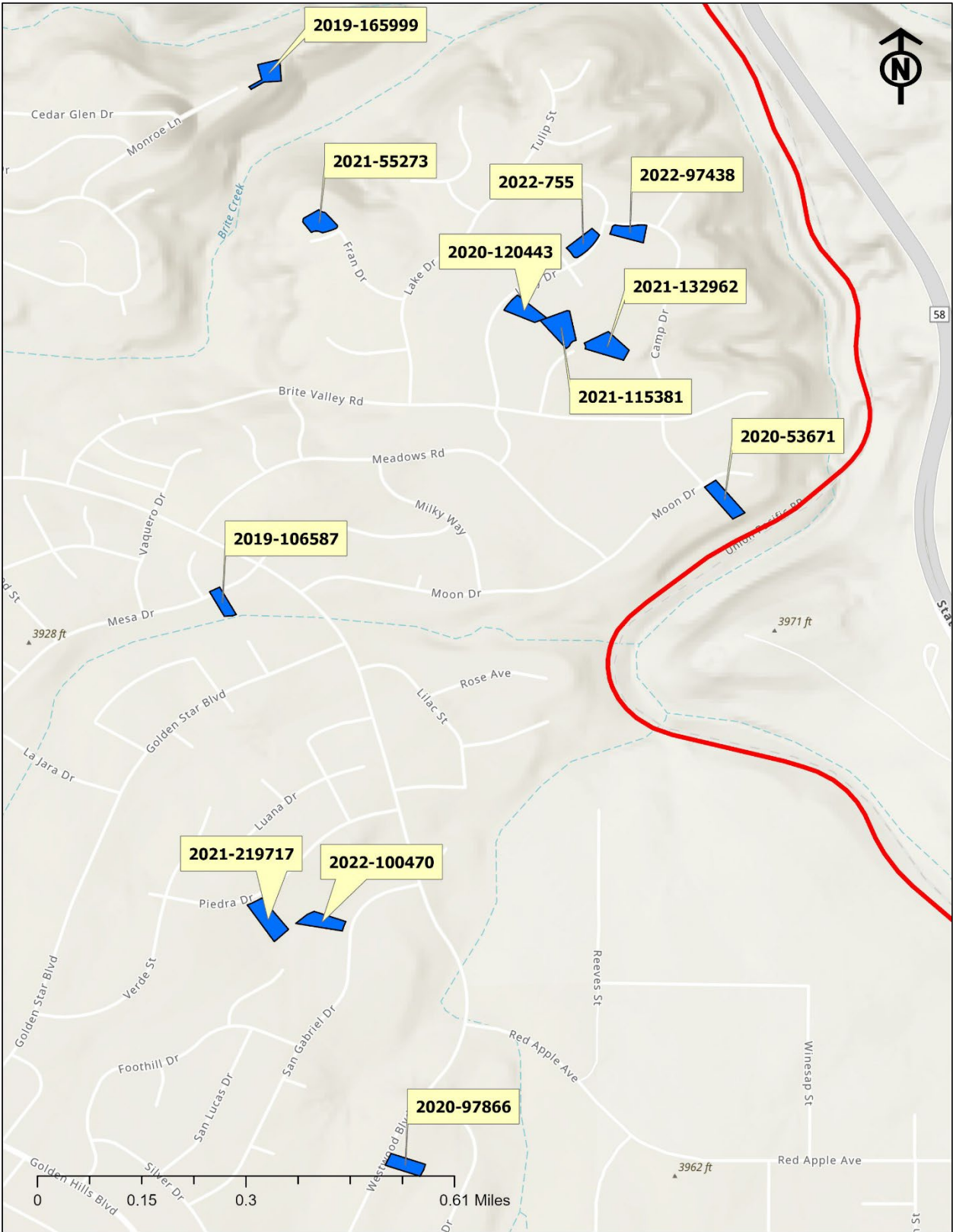
UNIT VALUE

CONCLUSIONS

Sales Group 11. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Adjustment 1	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
15	11	Single Family Residential	Market Conditions	sqft	\$ 1.79	\$ 1.80	\$ 1.80

SALES GROUP 11: COMPARABLE SALES MAP



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UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

Sales Group 12: Commercial Comparable ATF Sales – Tehachapi

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 12: Commercial - Tehachapi

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2019-20057	12/7/2018	Stacey K. Suor Trust & Small Living Trust	Mountain Top Real Estate Holdings, LLC		Tehachapi	04003002	35.1323	-118.4509	T-5	\$ 65,000
2019-140323	10/18/2019	Samya Hospitality, LLC	Trophy Hospitality Inc.		Tehachapi	22355003	35.1449	-118.4477	C-3	\$ 800,000
2020-93380	4/9/2020	James T. & Jean L. Fowler Revocable Trust	Farmworkers Institute of Education & Leadership Development Inc.	Mulberry St	Tehachapi	41509014	35.1314	-118.4557	C-3	\$ 220,000
2020-128483	9/3/2020	Darin J. Bowe & Patrick McLaughlin	Issa A. Noman	3729 Pondera St	Tehachapi	41509010	35.1313	-118.4594	SD-2	\$ 300,000
2021-184407	8/25/2021	Ruth J. Ballard Trust	Darrow Family, LLC		Tehachapi	41511003	35.1364	-118.4520	C-2	\$ 150,000
2022-38199	3/5/2022	JC Capital Investments, LLC	Silvia Hooks Trust	124 F St	Tehachapi	04013003	35.1309	-118.4490	T-5	\$ 34,500
2022-93094	5/18/2022	Margaret Wynn, et al.	Graham Wilson Trust		Tehachapi	22357002	35.1419	-118.4477	C-3	\$ 150,000

SALES GROUP 12: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

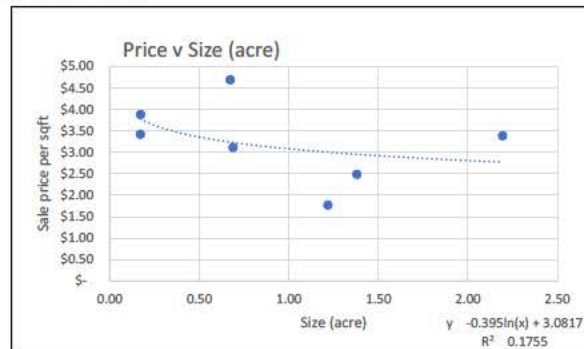
Sales Group 12: Commercial Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per sqft	Market Cond. Adjustment	Size Adjustment	Adjusted \$/sqft
2019-20057	12/7/2018	\$ 65,000	0.17	\$ 8.71	-61%	-15%	\$ 2.90
2019-140323	10/18/2019	\$ 800,000	2.19	\$ 8.37	-60%	16%	\$ 3.92
2020-93380	4/9/2020	\$ 220,000	1.22	\$ 4.15	-57%	7%	\$ 1.89
2020-128483	9/3/2020	\$ 300,000	0.67	\$ 10.25	-54%	-1%	\$ 4.65
2021-184407	8/25/2021	\$ 150,000	0.69	\$ 5.00	-38%	-1%	\$ 3.09
2022-38199	3/5/2022	\$ 34,500	0.17	\$ 4.59	-16%	-15%	\$ 3.30
2022-93094	5/18/2022	\$ 150,000	1.38	\$ 2.49	0%	9%	\$ 2.70
Subject	5/18/2022		0.73				
Arithmetic mean				\$ 6.22			\$ 3.21
Standard deviation				\$ 2.87			\$ 0.88
Coefficient of variance				46%			28%
Minimum				\$ 2.49			\$ 1.89
Maximum				\$ 10.25			\$ 4.65
Median				\$ 5.00			\$ 3.09

ADJUSTMENT 1



ADJUSTMENT 2



NOTES

The comparable sales for the commercial ATF land uses in Tehachapi indicated an adjustment for market conditions and size. The adjustments in the comparable sales table are shown for Unit Value ID 28, with an adjustment for market conditions, May 18, 2022, the most recent sale, and size, 0.73 acres, the average size of the ATF parcels. The most weight is given to the adjusted arithmetic mean.

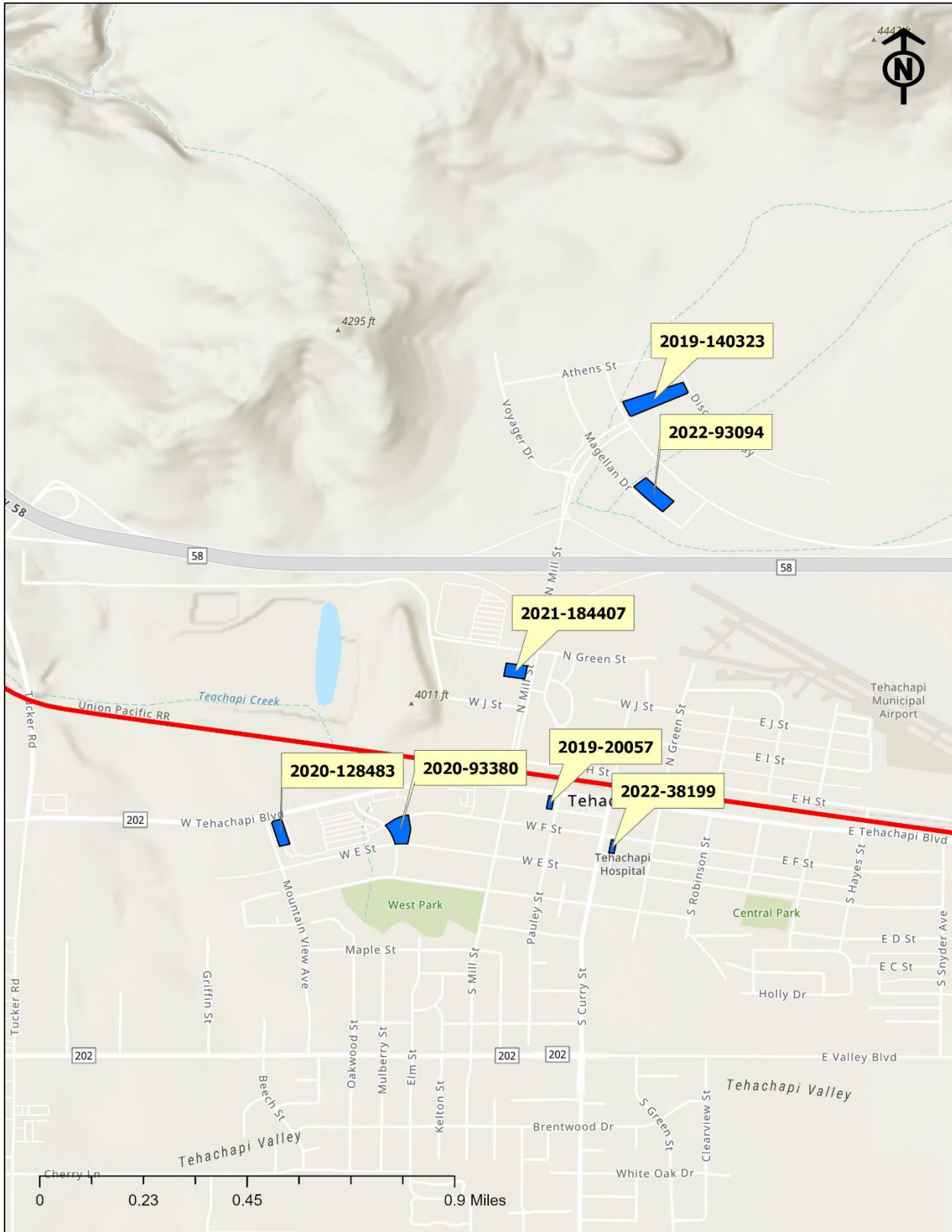
UNIT VALUE

CONCLUSIONS

Sales Group 12: Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Adjustment 1	Adjustment 2	Avg ATF Size	Average ATF Size Unit	Conclution Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
27	12	Commercial - Tehachapi	Market Conditions	Size	2.19	acre	sqft	\$ 2.77	\$ 2.67	\$ 2.75
28	12	Commercial - Tehachapi	Market Conditions	Size	0.73	acre	sqft	\$ 3.21	\$ 3.09	\$ 3.20

SALES GROUP 12: COMPARABLE SALES MAP



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UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

Sales Group 13: Industrial Comparable ATF Sales – Tehachapi

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 13: Industrial - Tehachapi

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2019-93974	7/30/2019	Frank C. Mendez, Sr. Living Trust	Jose L. Flores	Steuber Rd	Tehachapi	22319028	35.1296	-118.4150	A-1	\$ 200,000
2020-22228	11/7/2019	Hector Vizcarra	Leon & Marta Young	Industrial Pkwy	Tehachapi	41511026	35.1368	-118.4527	M-2	\$ 215,000
2020-143687	9/18/2020	Joel Hecht & Arthur S. & Kathleen A. Misaki 1987 Family Trust	1900 E. Adams St., LLC	Industrial Pkwy	Tehachapi	41517019	35.1383	-118.4488	M-1	\$ 450,000
2021-67148	3/27/2021	Thomas C. Hickman Trust	Tower Tech, Inc.	Goodrick Dr	Tehachapi	22318042	35.1319	-118.4281	M-2	\$ 104,500
2021-156829	8/11/2021	Stiekman Family Trust	Sukhvinder S. & Jaswinder K. Ghuman Revocable Living Trust, et.al.	Stiekman St	Tehachapi	22336041	35.1219	-118.3946	M-1 PD	\$ 560,000
2021-190253	9/28/2021	Stacy Barnett	Maria G. Zacarias-Gomez & Gabriela Rocha-Zacarias	Dennison Dr	Tehachapi	22318014	35.1319	-118.4316	M-1	\$ 85,000
2021-192986	10/7/2021	Roy Jarrett & Hector Vizcarra	Evergreen Hospitality, Inc.	W J St	Tehachapi	41511033	35.1361	-118.4528	M-2	\$ 270,000
2021-197567	10/18/2021	Frank & Phyllis M. Armstrong Family Trust	Ajit S. Ghuman	Hwy 151	Tehachapi	22351060	35.1239	-118.4067	IND/RES	\$ 450,000
2021-214543	10/26/2021	Proffitt Family, LLC	Bowe Contractors, Inc.	601 Bailey Av	Tehachapi	22365012	35.1272	-118.4274	M-1	\$ 170,000
2021-219033	11/9/2021	Douglas L. Mulder & Aron L. & Terry L. Brock Revocable Trust	Sukhvinder S. & Jaswinder K. Ghuman	Gemestone St	Tehachapi	22336045	35.1221	-118.3913	M-1/P	\$ 300,000
2022-66780	4/11/2022	Robert J. & Jannette C. Tracz & Tracz Trust	Sim Sanitation, Inc.	Ca-58	Tehachapi	22351039	35.1233	-118.4016	IND	\$ 275,000
2022-123190	7/6/2022	Diane Sutton Living Trust 2005	Daniel J. Landeros	Ca-58	Tehachapi	22318036	35.1335	-118.4224	M-2	\$ 200,000

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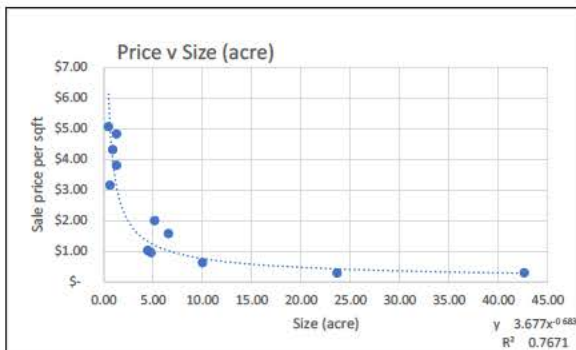
UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

SALES GROUP 13: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 13: Industrial Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per sqft	Size Adjustment	Adjusted \$/sqft
2019-93974	7/30/2019	\$ 200,000	4.79	\$ 0.96	28%	\$ 1.23
2020-22228	11/7/2019	\$ 215,000	1.29	\$ 3.81	-48%	\$ 2.00
2020-143687	9/18/2020	\$ 450,000	5.15	\$ 2.01	34%	\$ 2.70
2021-67148	3/27/2021	\$ 104,500	0.47	\$ 5.07	-74%	\$ 1.33
2021-156829	8/11/2021	\$ 560,000	42.60	\$ 0.30	469%	\$ 1.72
2021-190253	9/28/2021	\$ 85,000	0.62	\$ 3.16	-68%	\$ 1.00
2021-192986	10/7/2021	\$ 270,000	1.28	\$ 4.83	-48%	\$ 2.51
2021-197567	10/18/2021	\$ 450,000	6.55	\$ 1.58	58%	\$ 2.50
2021-214543	10/26/2021	\$ 170,000	0.90	\$ 4.32	-59%	\$ 1.77
2021-219033	11/9/2021	\$ 300,000	23.64	\$ 0.29	281%	\$ 1.11
2022-66780	4/11/2022	\$ 275,000	10.01	\$ 0.63	112%	\$ 1.33
2022-123190	7/6/2022	\$ 200,000	4.45	\$ 1.03	22%	\$ 1.26
Subject			3.34			
Arithmetic mean				\$ 2.33		\$ 1.70
Standard deviation				\$ 1.81		\$ 0.60
Coefficient of variance				78%		35%
Minimum				\$ 0.29		\$ 1.00
Maximum				\$ 5.07		\$ 2.70
Median				\$ 1.79		\$ 1.53

ADJUSTMENT 1



NOTES

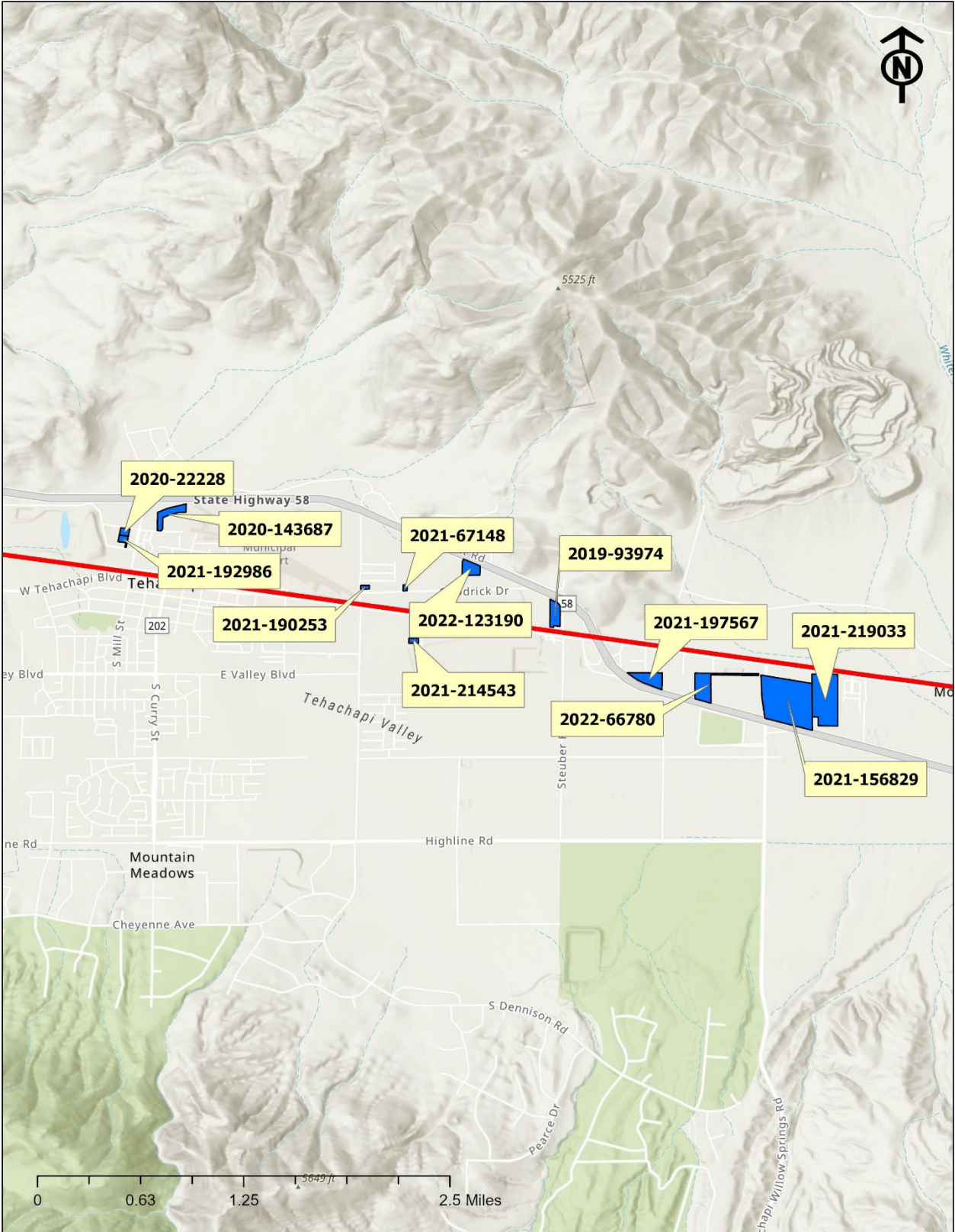
The comparable sales for the industrial ATF land uses in Tehachapi indicated an adjustment for size. The adjustments in the comparable sales table are shown for Unit Value ID 24, with an adjustment for size, 3.34 acres, the average size of the ATF parcels. The most weight is given to the adjusted arithmetic mean.

UNIT VALUE
CONCLUSIONS

Sales Group 13. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Adjustment 1	Avg ATF Size	Average ATF Size Unit	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
20	13	Industrial - Tehachapi	Size	31.89	acre	sqft	\$ 0.36	\$ 0.33	\$ 0.35
21	13	Industrial - Tehachapi	Size	42.60	acre	sqft	\$ 0.30	\$ 0.27	\$ 0.30
22	13	Industrial - Tehachapi	Size	27.93	acre	sqft	\$ 0.40	\$ 0.36	\$ 0.40
23	13	Industrial - Tehachapi	Size	3.07	acre	sqft	\$ 1.80	\$ 1.62	\$ 1.80
24	13	Industrial - Tehachapi	Size	3.34	acre	sqft	\$ 1.70	\$ 1.53	\$ 1.70
25	13	Industrial - Tehachapi	Size	19.98	acre	sqft	\$ 0.50	\$ 0.45	\$ 0.50
26	13	Industrial - Tehachapi	Size	5.36	acre	sqft	\$ 1.23	\$ 1.10	\$ 1.20

SALES GROUP 13: COMPARABLE SALES MAP



Sales Group 15: Residential Development Comparable ATF Sales – Tehachapi

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 15: Residential Development - Tehachapi

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2019-150944	10/21/2019	Ronnie Strasser	Greenbriar Capital (US), LLC	E Valley Blvd	Tehachapi	41701224	35.1233	-118.4418	T-4	\$ 160,000
2021-165700	3/6/2021	Cardiff Equities, Inc.	Saticoy Development Company, LLC	18812 Cherry Ln	Tehachapi	41611008	35.1185	-118.4640	A-1/E(5)	\$ 1,250,000
2021-71291	3/12/2021	Young W. Park	Saticoy Development Company, LLC	Holly Dr	Tehachapi	41501218	35.1271	-118.4459	T-4	\$ 410,000
2021-82685	3/15/2021	Michael & Mary Sullivan Family Trust & Dieterle/Schmidt Trust	Saticoy Development Company, LLC	E Valley Blvd	Tehachapi	22350001	35.1234	-118.4300	T-4	\$ 325,000
2021-142202	7/23/2021	Ronnie Strasser	Jeffrey J. Ciachurski	E Valley Blvd	Tehachapi	41501214	35.1253	-118.4445	T-4.5/T-4	\$ 600,000
2022-31803	2/14/2022	Tower Assets, LLC	Pinion 96, LLC	Elm St	Tehachapi	41650001	35.1179	-118.4546	T-4	\$ 600,000

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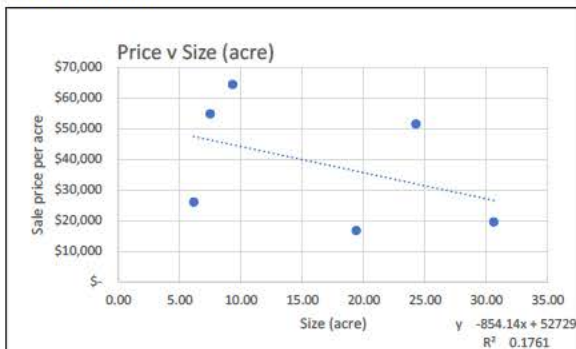
UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

SALES GROUP 15: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 15: Residential Development Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per acre	Size Adjustment	Market Cond. Adjustment	Adjusted \$/acre
2019-150944	10/21/2019	\$ 160,000	6.14	\$ 26,074	-44%	127%	\$ 33,185
2021-165700	3/6/2021	\$ 1,250,000	24.24	\$ 51,568	-17%	39%	\$ 59,746
2021-71291	3/12/2021	\$ 410,000	7.47	\$ 54,867	-43%	39%	\$ 43,671
2021-82685	3/15/2021	\$ 325,000	19.37	\$ 16,779	-26%	38%	\$ 17,056
2021-142202	7/23/2021	\$ 600,000	30.57	\$ 19,625	0%	22%	\$ 23,925
2022-31803	2/14/2022	\$ 600,000	9.30	\$ 64,531	-41%	0%	\$ 38,352
Subject	2/14/2022		30.57				
Arithmetic mean				\$ 38,907			\$ 35,989
Standard deviation				\$ 20,483			\$ 15,105
Coefficient of variance				53%			42%
Minimum				\$ 16,779			\$ 17,056
Maximum				\$ 64,531			\$ 59,746
Median				\$ 38,821			\$ 35,768

ADJUSTMENT 1



ADJUSTMENT 2



NOTES

The comparable sales for the residential development ATF land uses in Tehachapi indicated an adjustment for size and market conditions. The adjustments in the comparable sales table are shown for Unit Value ID 19, with an adjustment for size, 30.57 acres, the largest comparable sale, and market conditions, February 14, 2022, the most recent comparable sale. The most weight is given to the adjusted arithmetic mean.

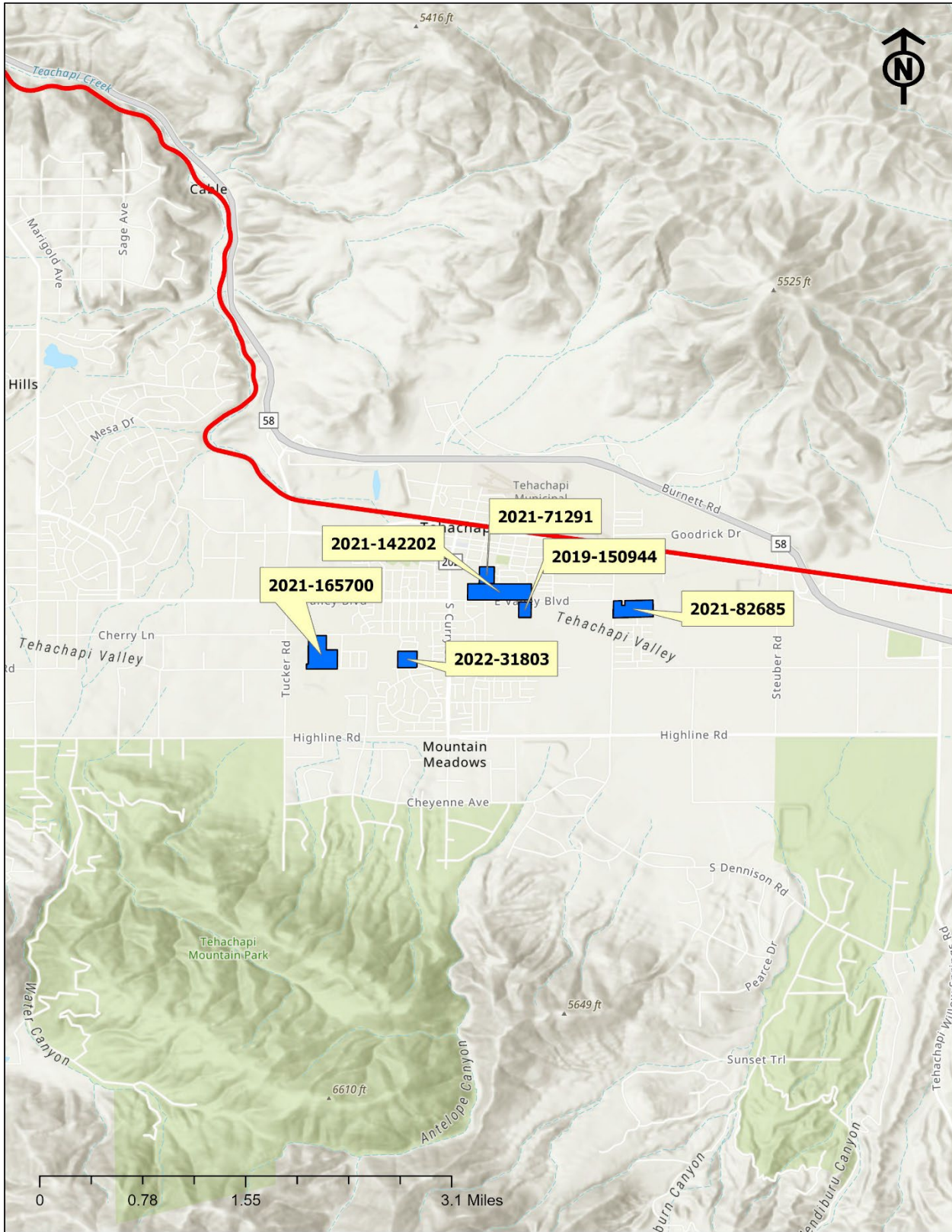
UNIT VALUE

CONCLUSIONS

Sales Group 15. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Adjustment 1	Adjustment 2	Avg ATF Size	Average ATF Size Unit	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
19	15	Residential Development - Tehachapi	Size	Market Conditions	30.57	acre	acre	\$ 35,989	\$ 35,768	\$ 36,000

SALES GROUP 15: COMPARABLE SALES MAP



PUBLIC VERSION - REDACTED

UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

Sales Group 16: Desert Acreage Comparable ATF Sales

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 16: Desert Acreage - Kern County

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2020-99117	6/23/2020	James & Doris Webster Family Trust	Barry Rogow	25Th St W	Mojave	42710005	35.0291	-118.1778	A-1	\$ 7,500
2020-177313	10/21/2020	Ann Margaret Hanzmann Acct. #35901	Little Red Hen Coffee Shop, LLC	Minard Trl	Mojave	42701021	35.0786	-118.1669	A-1 H	\$ 28,000
2022-50309	11/6/2020	Andres Olacchea	DL Investors 1, LLC	Blick St	Mojave	42704122	35.0766	-118.1999	A-1	\$ 5,000
2021-26514	1/27/2021	June A. Elias	PW Real Estate Ventures, LLC	Alma Ave	Mojave	42709003	35.0364	-118.1770	A-1	\$ 5,000
2021-168030	6/18/2021	Discountland, Inc.	Skawkie Baydoun		Mojave	22447020	35.0903	-118.2577	E(20)	\$ 7,000
2021-229738	10/28/2021	Jeanne K. Tutich Survivor Trust	Sidney R. & Shannon M. Kilby	Ca-58	Mojave	22524104	35.0876	-118.1816	A-1	\$ 40,000
2022-95551	6/3/2022	Fabian Miro & Nick Flageollet	Eduardo A. M. Maldonado	Minard Trl	Mojave	42701019	35.0796	-118.1650	A-1 H	\$ 5,000
2022-124998	7/28/2022	Innovative Real Estate Investing, LLC	20KC 22SAL, LLC		Mojave	22541102	35.0886	-118.2028	A	\$ 70,000
2022-120134	8/1/2022	Home Equity Options, LLC	Fabian Miro	Ca-58	Mojave	22424251	35.1023	-118.1855	A-1	\$ 7,000
2022-152476	9/29/2022	Minn Family Trust	Kourosh & Parisa Ramezani	Ca-58	Mojave	22462008	35.1045	-118.1856	A-1	\$ 75,000
2023-22289	1/11/2023	1987 De Monte Family Revocable Trust	Olaoluwalotabi Thomas	Koch St	Mojave	42704206	35.0817	-118.1963	A-1 FPS	\$ 4,000
2023-52193	3/21/2023	Green Tara Investments, LLC	Scott M. Cooley 1997 Separate Property Trust		Mojave	22428108	35.1008	-118.2572	A-1	\$ 23,000
2023-46139	3/23/2023	Mark L. Seminario	Daniel Sokolovsky	Ca-58	Mojave	22524105	35.0853	-118.1813	A-1	\$ 115,000
2023-44835	4/4/2023	David B. White	Humberto Gonzalez	Koch St	Mojave	42704208	35.0808	-118.1968	A-1 FPS	\$ 10,000

PUBLIC VERSION - REDACTED

UNION PACIFIC'S MOJAVE SUBDIVISION
BAKERSFIELD TO MOJAVE, CALIFORNIA

SALES GROUP 16: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 16: Desert Acreage Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per acre	Market Cond. Adjustment	Adjusted \$/acre
2020-99117	6/23/2020	\$ 7,500	10.00	\$ 750	118%	\$ 1,634
2020-177313	10/21/2020	\$ 28,000	15.32	\$ 1,828	8%	\$ 1,968
2022-50309	11/6/2020	\$ 5,000	2.50	\$ 1,998	2%	\$ 2,031
2021-26514	1/27/2021	\$ 5,000	5.00	\$ 1,000	-19%	\$ 812
2021-168030	6/18/2021	\$ 7,000	4.83	\$ 1,449	-35%	\$ 940
2021-229738	10/28/2021	\$ 40,000	22.07	\$ 1,813	-41%	\$ 1,070
2022-95551	6/3/2022	\$ 5,000	2.44	\$ 2,046	-40%	\$ 1,235
2022-124998	7/28/2022	\$ 70,000	17.72	\$ 3,951	-37%	\$ 2,485
2022-120134	8/1/2022	\$ 7,000	2.80	\$ 2,499	-37%	\$ 1,577
2022-152476	9/29/2022	\$ 75,000	25.47	\$ 2,945	-33%	\$ 1,982
2023-22289	1/11/2023	\$ 4,000	2.54	\$ 1,578	-20%	\$ 1,264
2023-52193	3/21/2023	\$ 23,000	30.00	\$ 767	-4%	\$ 733
2023-46139	3/23/2023	\$ 115,000	64.93	\$ 1,771	-4%	\$ 1,704
2023-44835	4/4/2023	\$ 10,000	10.00	\$ 1,000	0%	\$ 1,000
Subject 4/4/2023						
Arithmetic mean				\$ 1,814		\$ 1,460
Standard deviation				\$ 883		\$ 532
Coefficient of variance				49%		36%
Minimum				\$ 750		\$ 733
Maximum				\$ 3,951		\$ 2,485
Median				\$ 1,792		\$ 1,421

ADJUSTMENT 1



NOTES

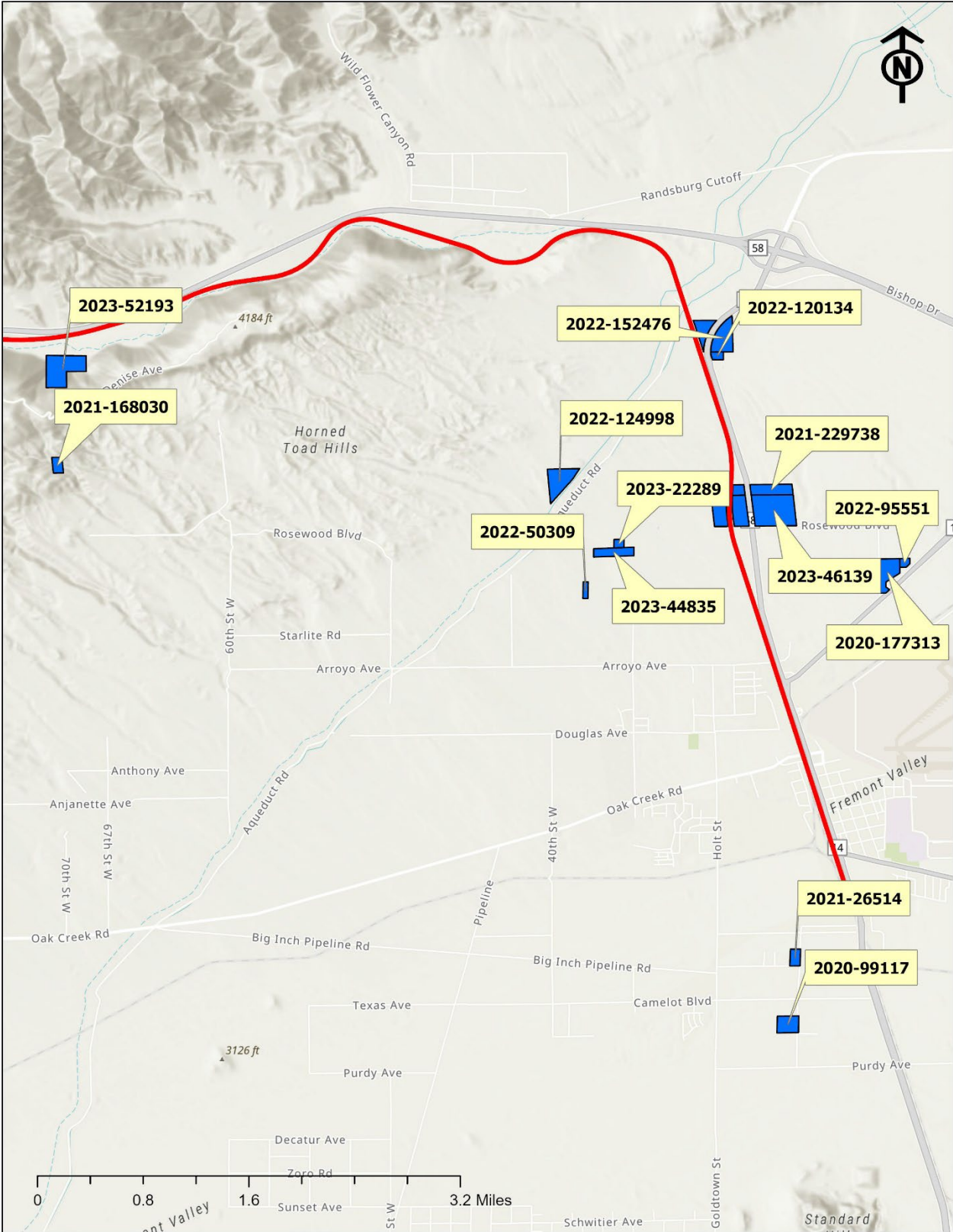
The comparable sales for the desert acreage ATF land uses indicated an adjustment for market conditions. The adjustments in the comparable sales table are shown for Unit Value ID 29, with an adjustment for market conditions, April 4, 2023, the most recent sale. The most weight is given to the adjusted arithmetic mean.

UNIT VALUE
CONCLUSIONS

Sales Group 16. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Adjustment 1	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
29	16	Desert Acreage	Market Conditions	acre	\$ 1,460	\$ 1,421	\$ 1,460

SALES GROUP 16: COMPARABLE SALES MAP



Sales Group 17: Industrial Comparable ATF Sales – Mojave

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 17: Industrial - Mojave

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2019-147102	8/2/2019	Hugo V. & Lucille R. Cianciulli Family Living Trust, et.al.	Cohen Kids Living Trust	16800 Highway 14	Mojave	23606008	35.0655	-118.1754	M-2	\$ 322,000
2022-64699	4/14/2022	Daniel Kneip	Blue House Properties, Inc.	Arroyo Ave	Mojave	42707032	35.0674	-118.1936	R-1 FPS	\$ 45,000
2022-115613	7/16/2022	Forecast Land Corporation	Shannon & Stephanie Lombard	Arroyo Ave	Mojave	42705125	35.0691	-118.1956	A-1 FPS	\$ 22,500
2022-152349	10/7/2022	Project Mojave, LP	Western Natural Resources, LLC	United St	Mojave	42702017	35.0361	-118.1538	A-1/M-3	\$ 1,100,000

SALES GROUP 17: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 17: Industrial Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per acre
2019-147102	8/2/2019	\$ 322,000	22.22	\$ 14,490
2022-64699	4/14/2022	\$ 45,000	9.55	\$ 4,714
2022-115613	7/16/2022	\$ 22,500	4.99	\$ 4,505
2022-152349	10/7/2022	\$ 1,100,000	145.59	\$ 7,555
Subject				
Arithmetic mean				\$ 7,816
Standard deviation				\$ 4,662
Coefficient of variance				60%
Minimum				\$ 4,505
Maximum				\$ 14,490
Median				\$ 6,135

NOTES The comparable sales for the industrial ATF land uses in Mojave indicated no quantitative adjustments. The indication in the comparable sales table is shown for Unit Value ID 31. Equal weight is given to Sales 2019-147102 and 2022-152349.

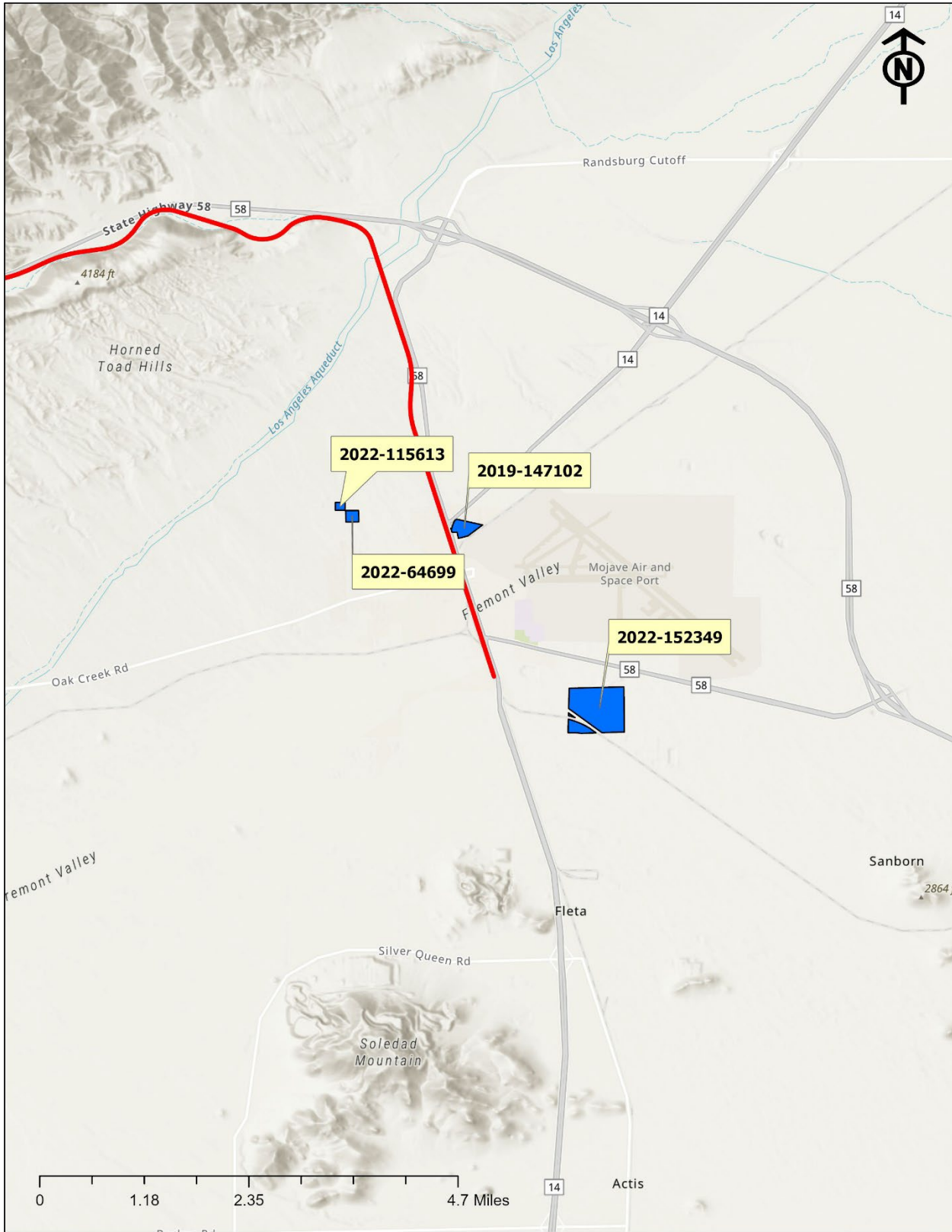
UNIT VALUE

CONCLUSIONS

Sales Group 17. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
31	17	Industrial - Mojave	acre	\$ 7,816	\$ 6,135	\$ 11,000

SALES GROUP 17: COMPARABLE SALES MAP



Sales Group 19: Residential Development Comparable ATF Sales – Mojave

COMPARABLE SALES – GENERAL INFORMATION

Sales Group 19: Residential Development - Mojave

Sale #	Sale Date	Grantor	Grantee	Address	City	Primary APN	Sale Latitude	Sale Longitude	Zoning	Sale Price
2022-64786	4/18/2022	Triglav Trust	Blue House Properties, Inc.	Douglas Ave	Mojave	42707013	35.0620	-118.1914	R-3 PD FPS	\$ 55,000
2022-89939	5/6/2022	Randy Boswell, et.al.	RH Land, LLC	Douglas Ave	Mojave	42707031	35.0621	-118.1891	R-3 PD FPS	\$ 35,000
2022-136204	8/22/2022	BOM 3 Partners, LLC	59TC 8me, LLC	Douglas Ave	Mojave	42707002	35.0621	-118.1870	R-1 FPS	\$ 65,000
2022-172305	11/4/2022	Rowan Management, Inc.	Blossom Capital QOF, LLC	Oak Creek Rd	Mojave	23648002	35.0550	-118.1817	R-1/R-2	\$ 121,000
2023-3908	1/5/2023	Steven Oliver Living Trust	59TC 8me, LLC	Oak Creek Rd	Mojave	42707028	35.0565	-118.1895	R-1 FPS	\$ 892,000

SALES GROUP 19: COMPARABLE SALES – ADJUSTMENTS/UNIT VALUE

Sales Group 19: Residential Development Comparable Sales

Sale #	Sale Date	Sale Price	Size (acre)	Price per acre	Market Cond. Adjustment	Adjusted \$/acre
2022-64786	4/18/2022	\$ 55,000	9.89	\$ 5,561	77%	\$ 9,818
2022-89939	5/6/2022	\$ 35,000	9.26	\$ 3,781	75%	\$ 6,621
2022-136204	8/22/2022	\$ 65,000	9.15	\$ 7,101	48%	\$ 10,494
2022-172305	11/4/2022	\$ 121,000	21.23	\$ 5,699	21%	\$ 6,898
2023-3908	1/5/2023	\$ 892,000	98.03	\$ 9,099	0%	\$ 9,099
Subject	1/5/2023					
		Arithmetic mean		\$ 6,248		\$ 8,586
		Standard deviation		\$ 1,982		\$ 1,742
		Coefficient of variance		32%		20%
		Minimum		\$ 3,781		\$ 6,621
		Maximum		\$ 9,099		\$ 10,494
		Median		\$ 5,699		\$ 9,099

ADJUSTMENT 1



NOTES

The comparable sales for the residential development ATF land uses in Mojave indicated an adjustment for market conditions. The adjustments in the comparable sales table are shown for Unit Value ID 30, with an adjustment for market conditions, January 5, 2023, the most recent sale. The most weight is given to the adjusted arithmetic mean.

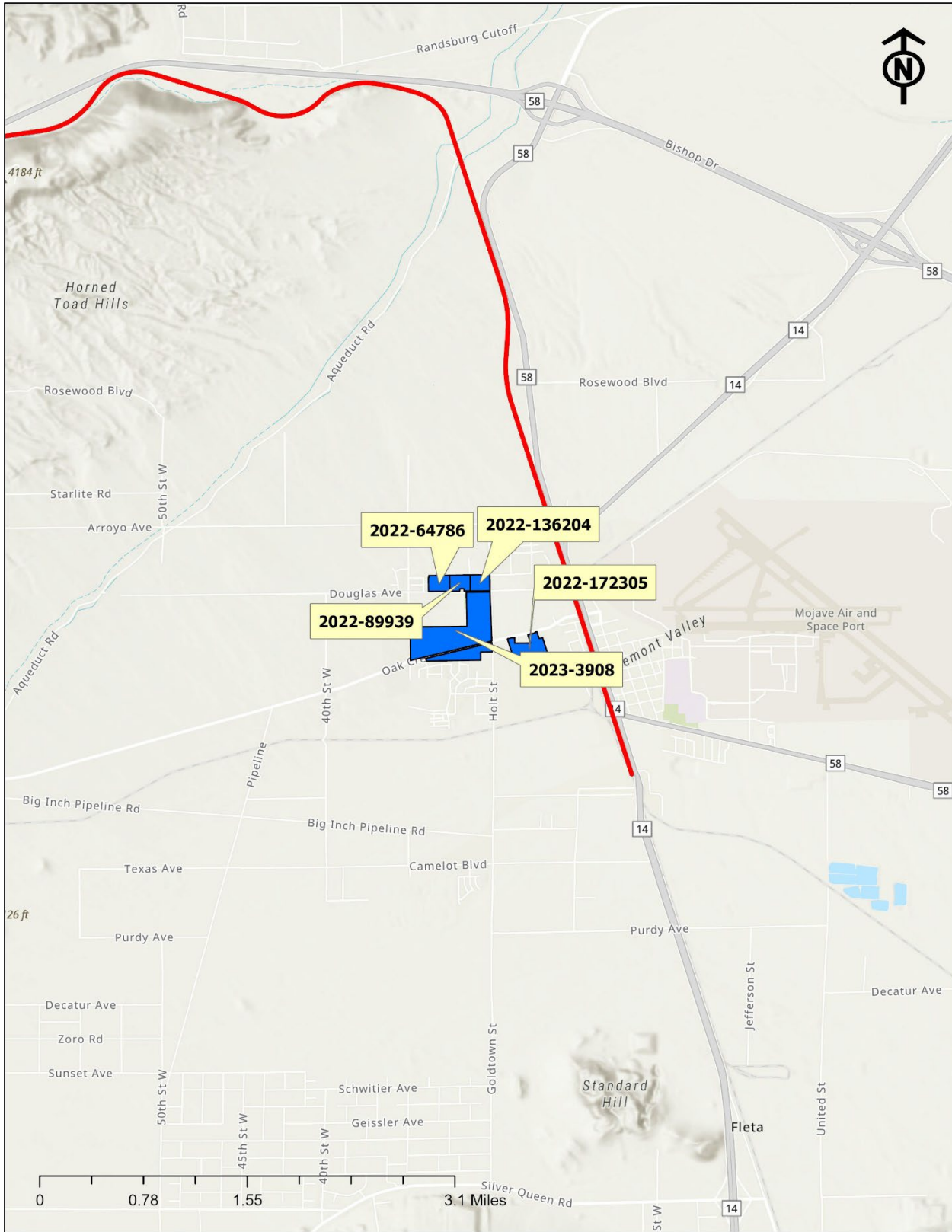
UNIT VALUE

CONCLUSIONS

Sales Group 19. Unit Value ID Summary

Unit Value ID	Sales Group	Land Use	Adjustment 1	Conclusion Unit Type	Average Unit Value (/unit)	Median Unit Value (/unit)	Unit Value Conclusion (/unit)
30	19	Residential Development - Mojave	Market Conditions	acre	\$ 8,586	\$ 9,099	\$ 8,600

SALES GROUP 19: COMPARABLE SALES MAP



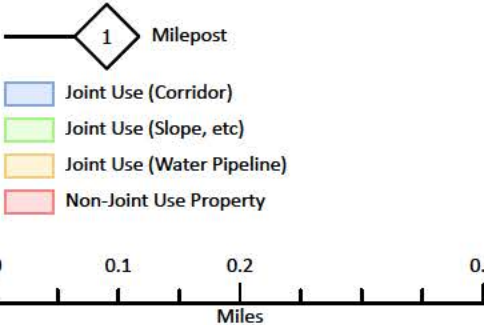
SUBJECT DETAILED SEGMENT MAPS

*See Rex Workpapers “4 – Valuation/UP Mojave Sub – Subject Segments
and Non-Joint use Property.kmz”*

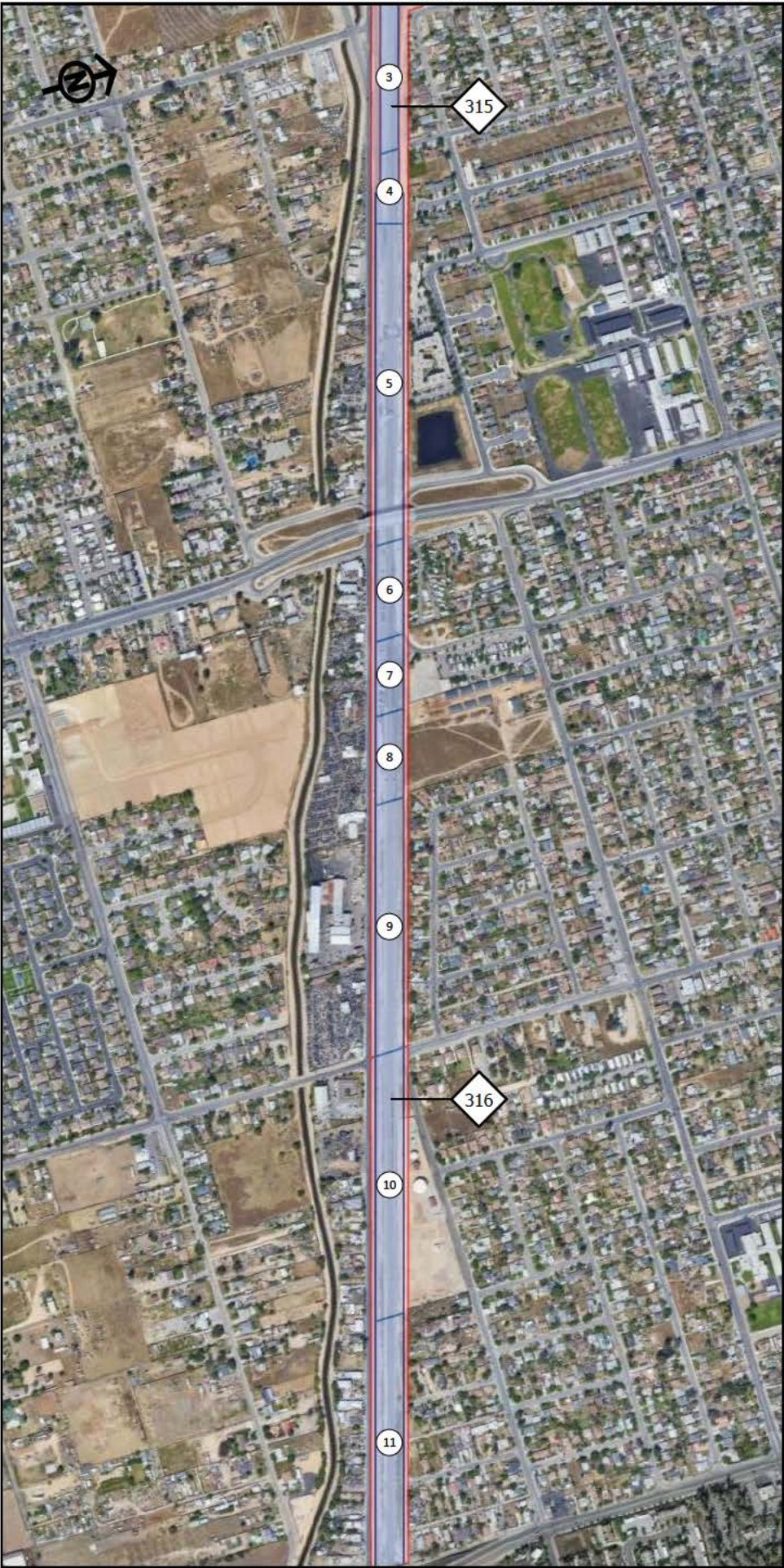
Subject Detailed Segment Map 1 of 40



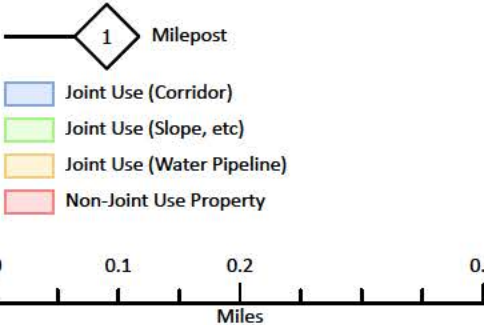
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
1	IND	IND (RR)	1	1
2	ROAD	IND (RR)	0	1
3	ROAD	RES	0	2



Subject Detailed Segment Map 2 of 40



Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
3	ROAD	RES	0	2
4	ROAD	RES	0	3
5	ROAD	MF	0	5
6	ROAD	MH (ROAD)	0	6
7	ROAD	MH	0	7
8	ROAD	RESDEV	0	8
9	ROAD	RES	0	4
10	ROAD	IND	0	1
11	ROAD	RES	0	3



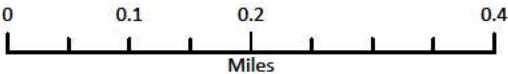
Subject Detailed Segment Map 3 of 40



Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
11	ROAD	RES	0	3
12	ROAD	RESDEV	0	9
13	ROAD	IND	0	1
14	ROAD	IND	0	1
15	ROAD	RESDEV	0	8
16	ROAD	IND	0	1
17	ROAD	RESDEV	0	10
18	ROAD	IND	0	1

1 Milepost

- Joint Use (Corridor)
- Joint Use (Slope, etc)
- Joint Use (Water Pipeline)
- Non-Joint Use Property

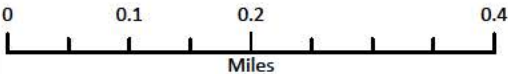


Subject Detailed Segment Map 4 of 40

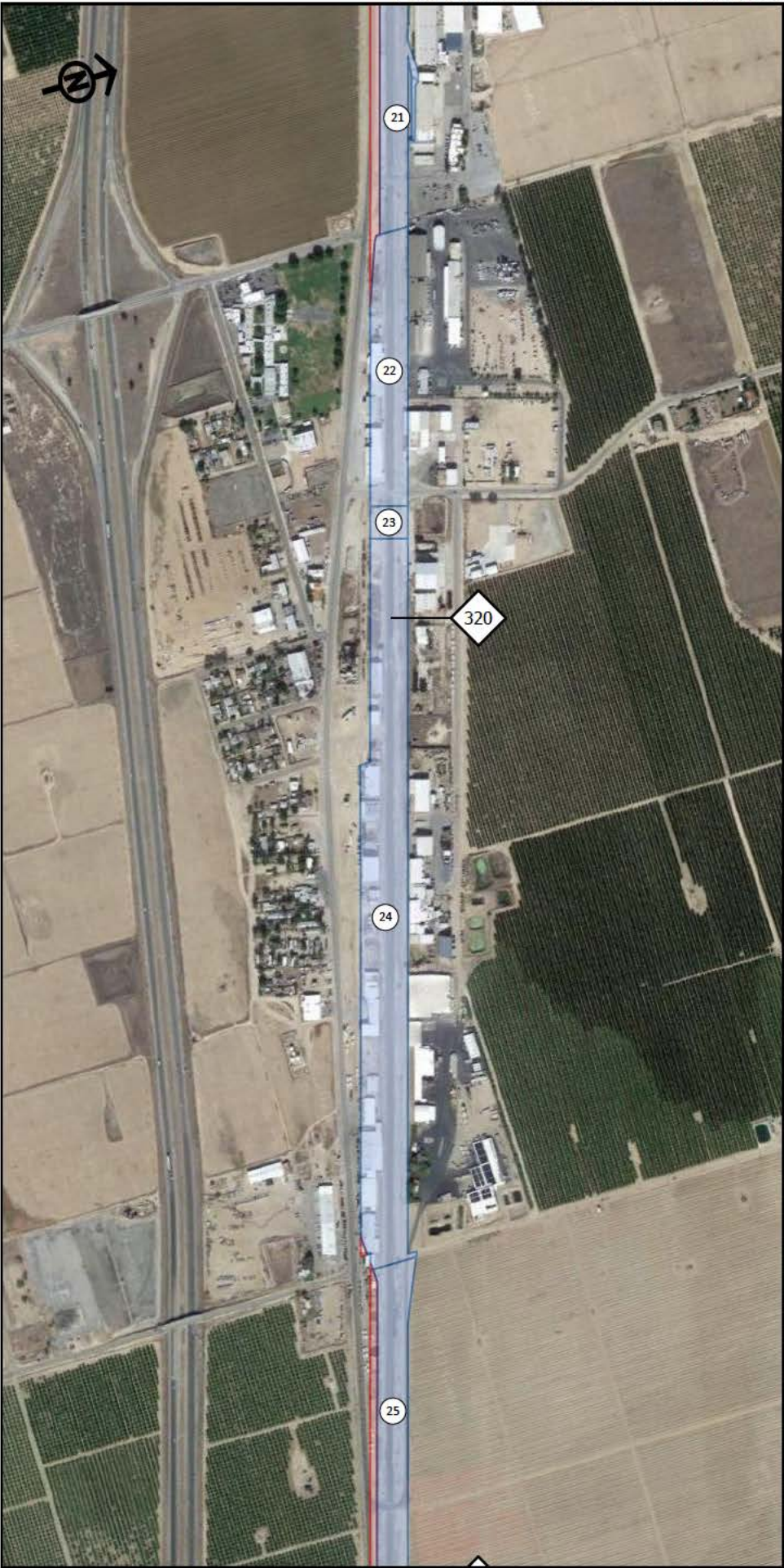


Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
17	ROAD	RESDEV	0	10
18	ROAD	IND	0	1
19	ROAD	IND	0	1
20	ROAD	AGR	0	11
21	ROAD	IND	0	1

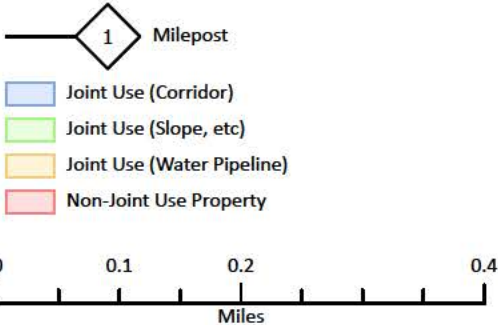
-  Milepost
-  Joint Use (Corridor)
-  Joint Use (Slope, etc)
-  Joint Use (Water Pipeline)
-  Non-Joint Use Property



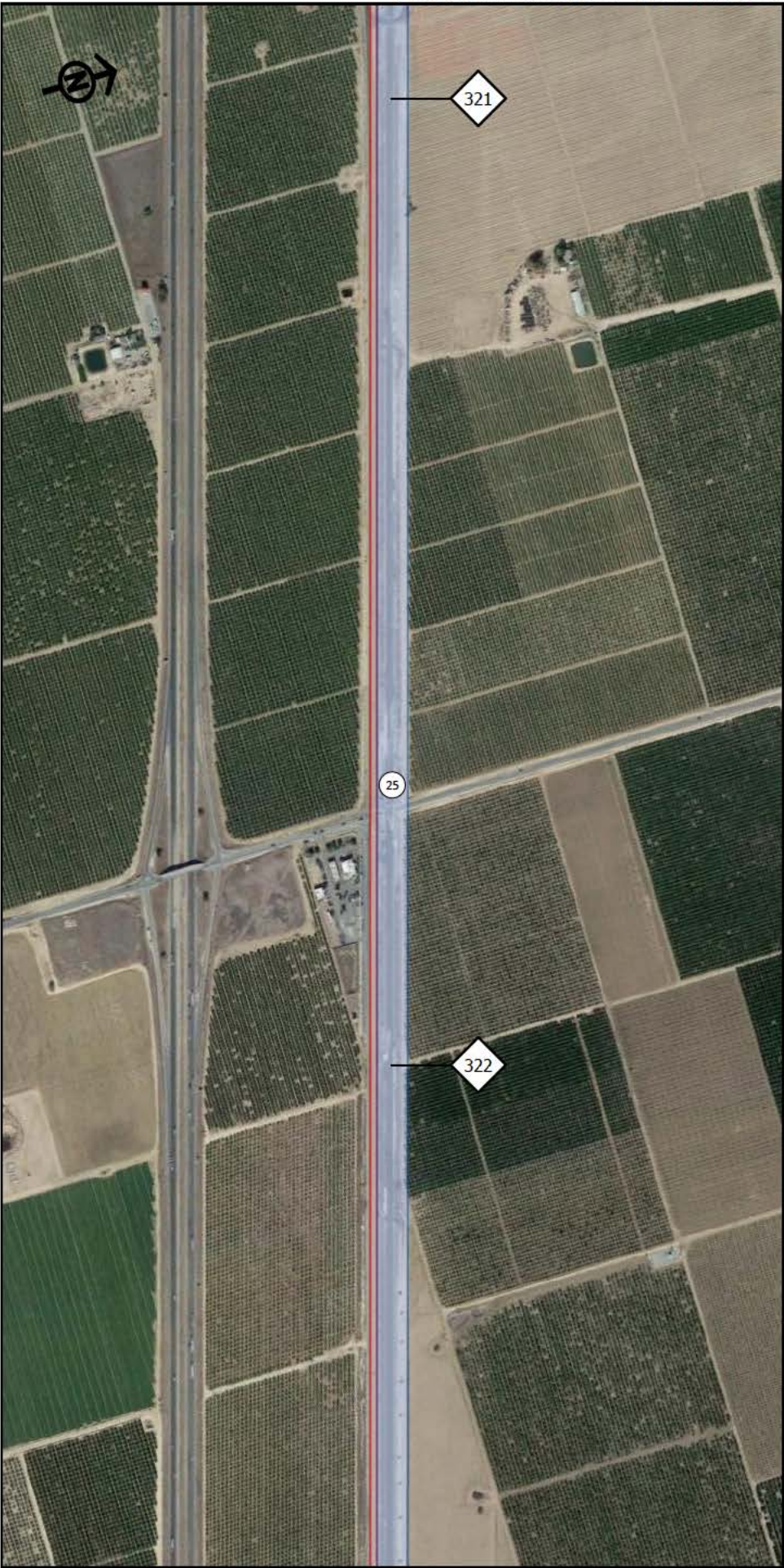
Subject Detailed Segment Map 5 of 40



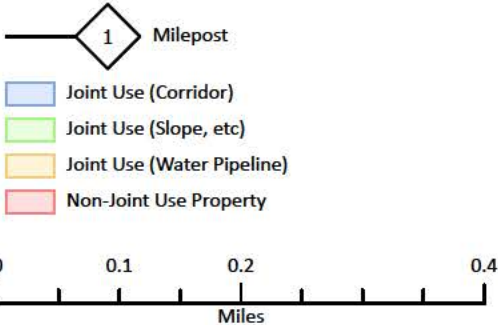
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
21	ROAD	IND	0	1
22	IND	IND	1	1
23	IND	IND	1	1
24	IND	IND	1	1
25	ROAD	AGR	0	12



Subject Detailed Segment Map 6 of 40



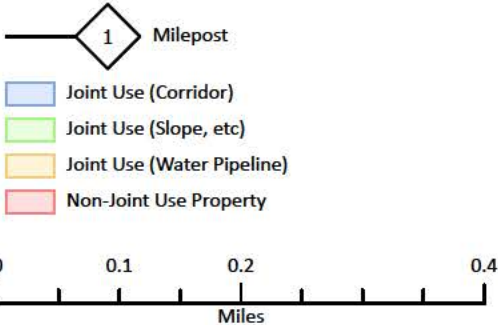
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
25	ROAD	AGR	0	12



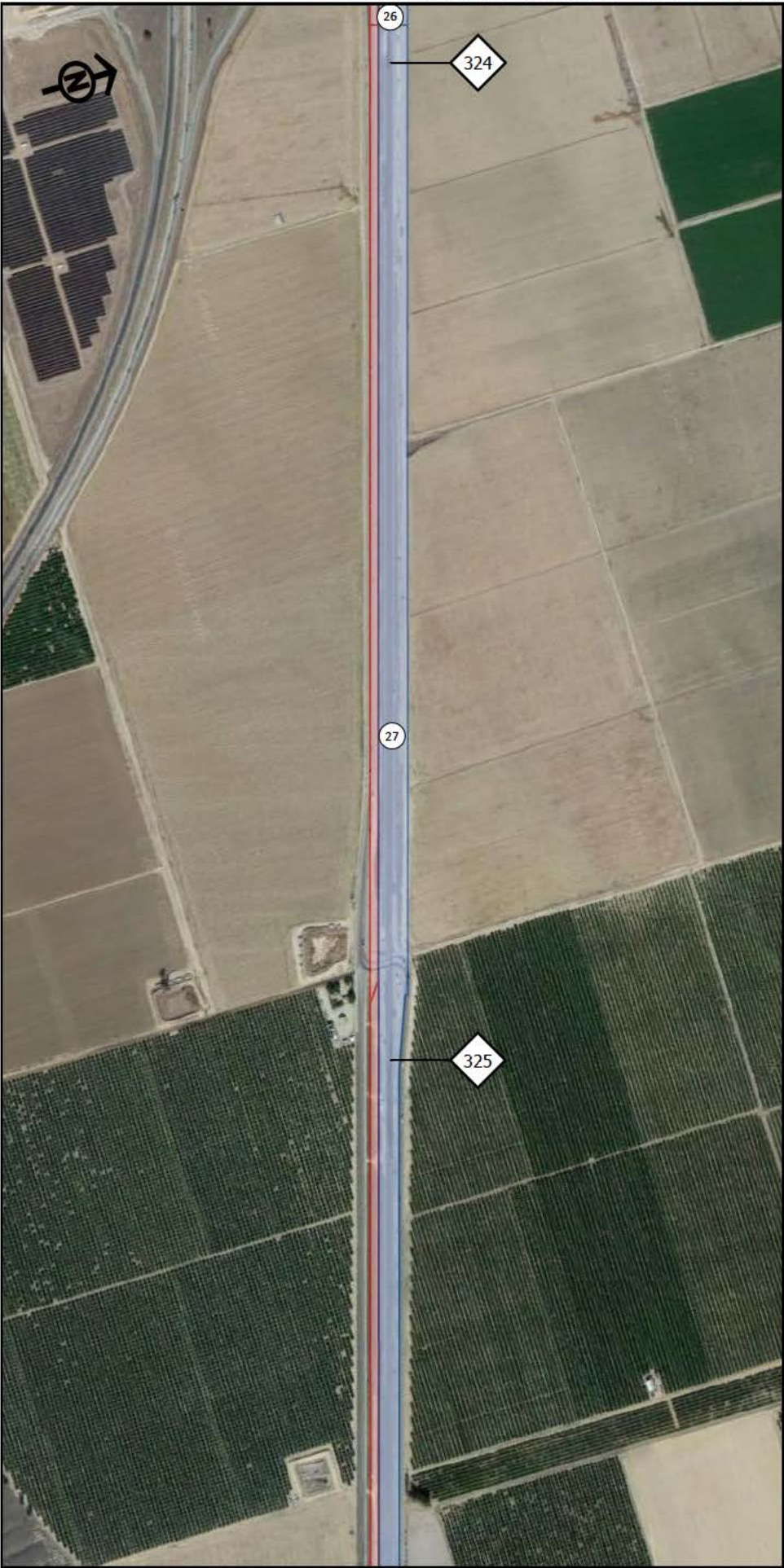
Subject Detailed Segment Map 7 of 40



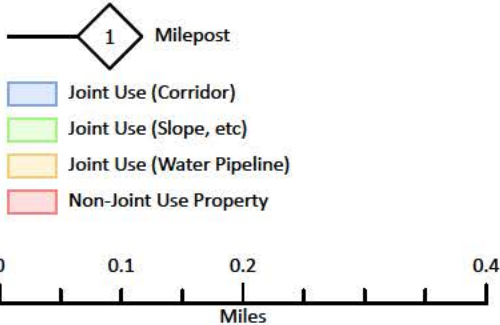
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
25	ROAD	AGR	0	12
26	ROAD	AGR	0	12
27	ROAD	AGR	0	12



Subject Detailed Segment Map 8 of 40



Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
26	ROAD	AGR	0	12
27	ROAD	AGR	0	12



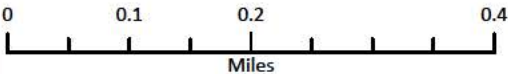
Subject Detailed Segment Map 9 of 40



Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
27	ROAD	AGR	0	12
28	ROAD	RANGELAND	0	13

1 Milepost

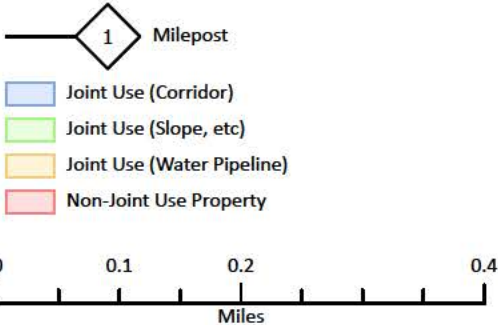
- Joint Use (Corridor)
- Joint Use (Slope, etc)
- Joint Use (Water Pipeline)
- Non-Joint Use Property



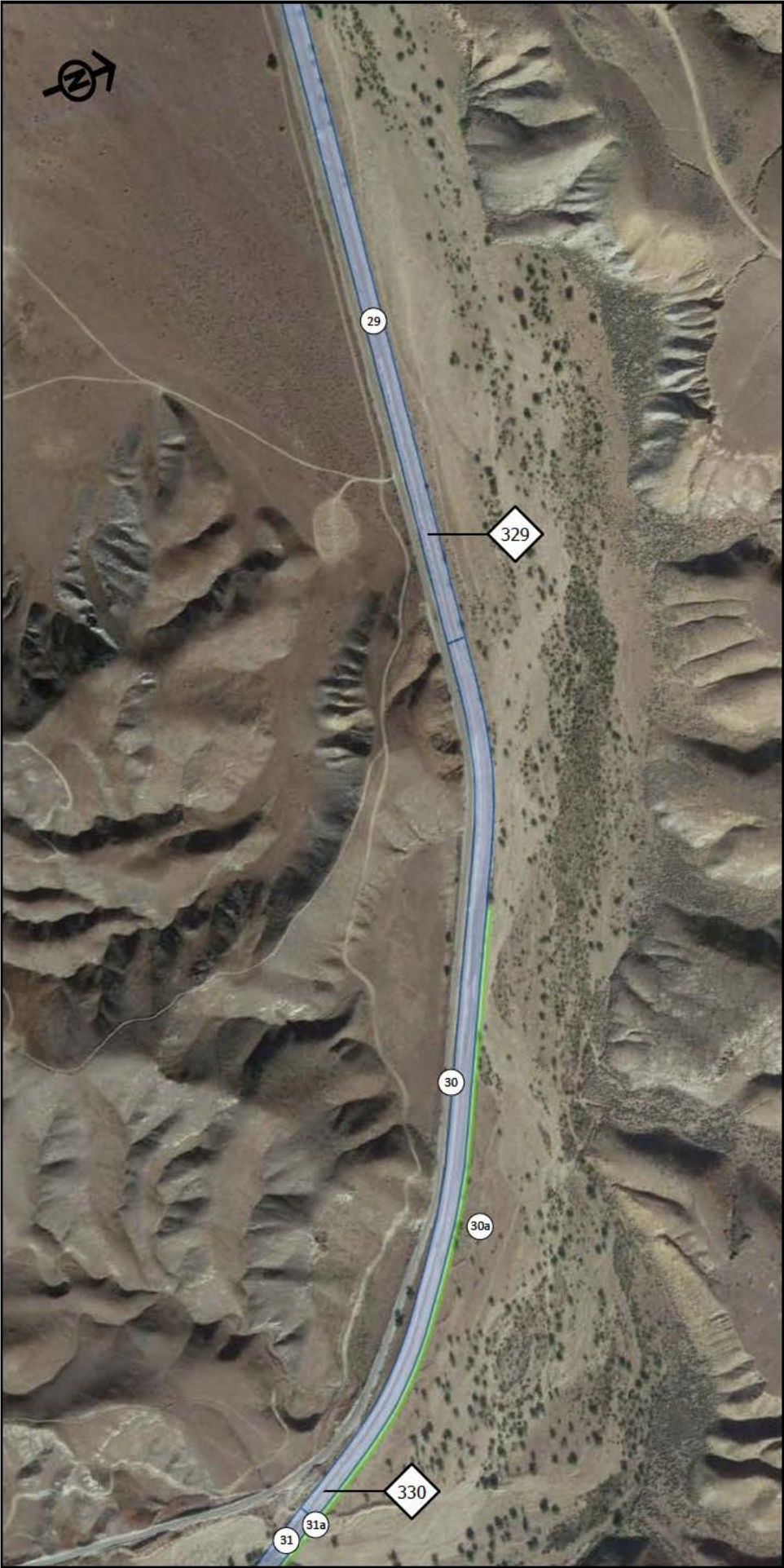
Subject Detailed Segment Map 10 of 40



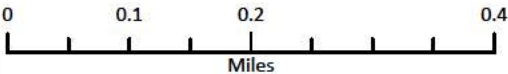
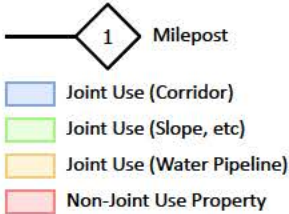
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
27	ROAD	AGR	0	12
28	ROAD	RANGELAND	0	13
29	ROAD	RANGELAND	0	13



Subject Detailed Segment Map 11 of 40



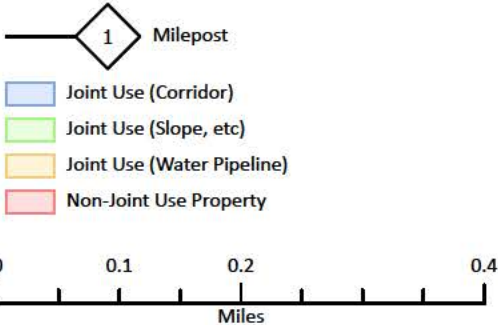
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
29	ROAD	RANGELAND	0	13
30	ROAD	RANGELAND	0	13
31	RANGELAND	RANGELAND	13	13



Subject Detailed Segment Map 12 of 40



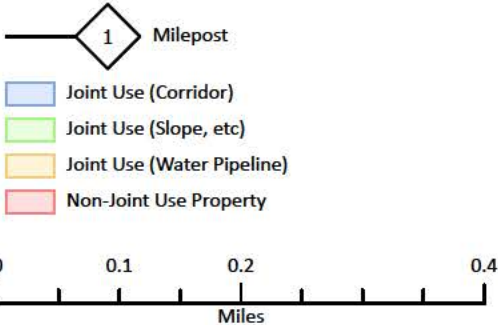
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
30	ROAD	RANGELAND	0	13
31	RANGELAND	RANGELAND	13	13



Subject Detailed Segment Map 13 of 40



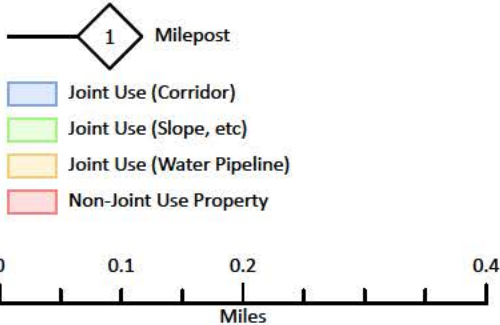
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
31	RANGELAND	RANGELAND	13	13
32	RANGELAND	RANGELAND	13	13



Subject Detailed
Segment Map
14 of 40



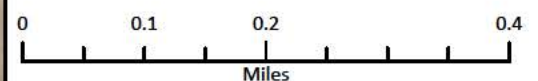
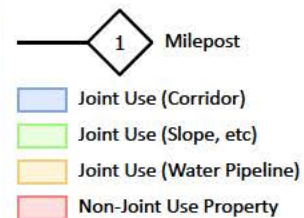
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
32	RANGELAND	RANGELAND	13	13
33	RURAL RES	RURAL RES	16	16
36	RANGELAND	RANGELAND	13	13



Subject Detailed Segment Map 15 of 40



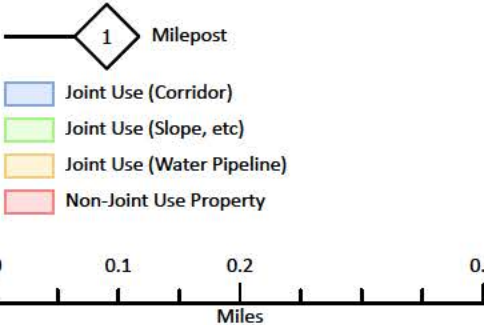
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
32	RANGELAND	RANGELAND	13	13
33	RURAL RES	RURAL RES	16	16
34	RANGELAND	RANGELAND	13	13
35	RANGELAND	RANGELAND	13	13
36	RANGELAND	RANGELAND	13	13
105	RURAL RES	RURAL RES	16	16
106	RANGELAND	RANGELAND	13	13
107	RANGELAND	RANGELAND	13	13



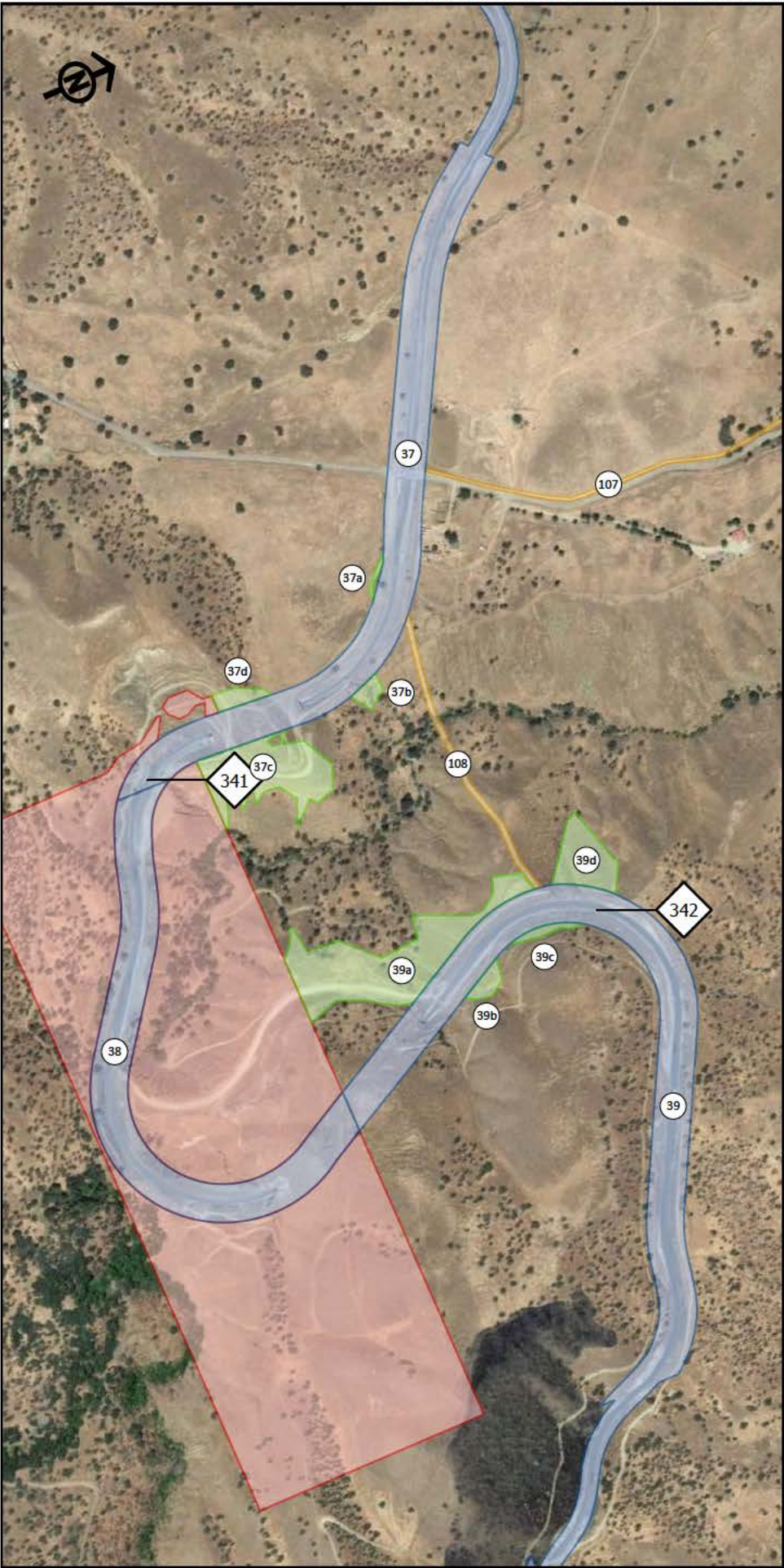
Subject Detailed Segment Map 16 of 40



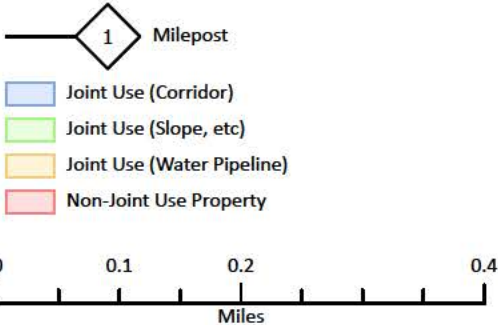
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
36	RANGELAND	RANGELAND	13	13
37	RANGELAND	RANGELAND	13	13



Subject Detailed Segment Map 17 of 40



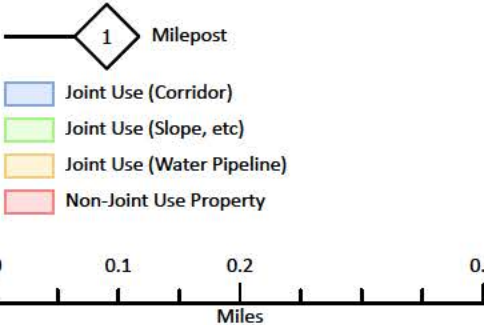
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
37	RANGELAND	RANGELAND	13	13
38	RANGELAND	RANGELAND	13	13
39	RANGELAND	RANGELAND	13	13
40	RANGELAND	RANGELAND	13	13
107	RANGELAND	RANGELAND	13	13
108	RANGELAND	RANGELAND	13	13



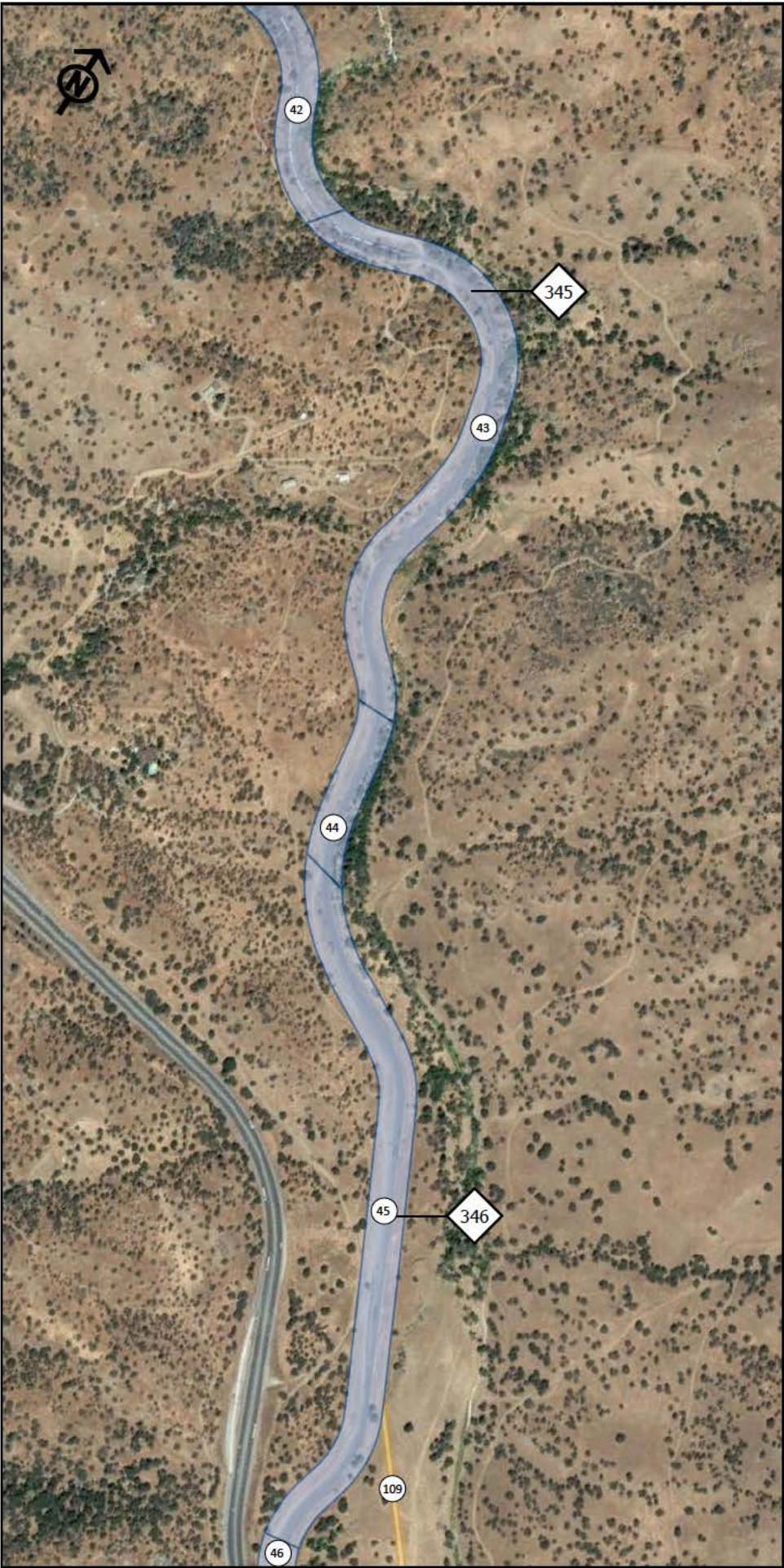
Subject Detailed Segment Map 18 of 40



Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
39	RANGELAND	RANGELAND	13	13
40	RANGELAND	RANGELAND	13	13
41	RANGELAND	RANGELAND	13	13
42	RANGELAND	RANGELAND	13	13

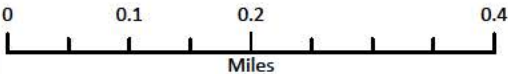


Subject Detailed Segment Map 19 of 40

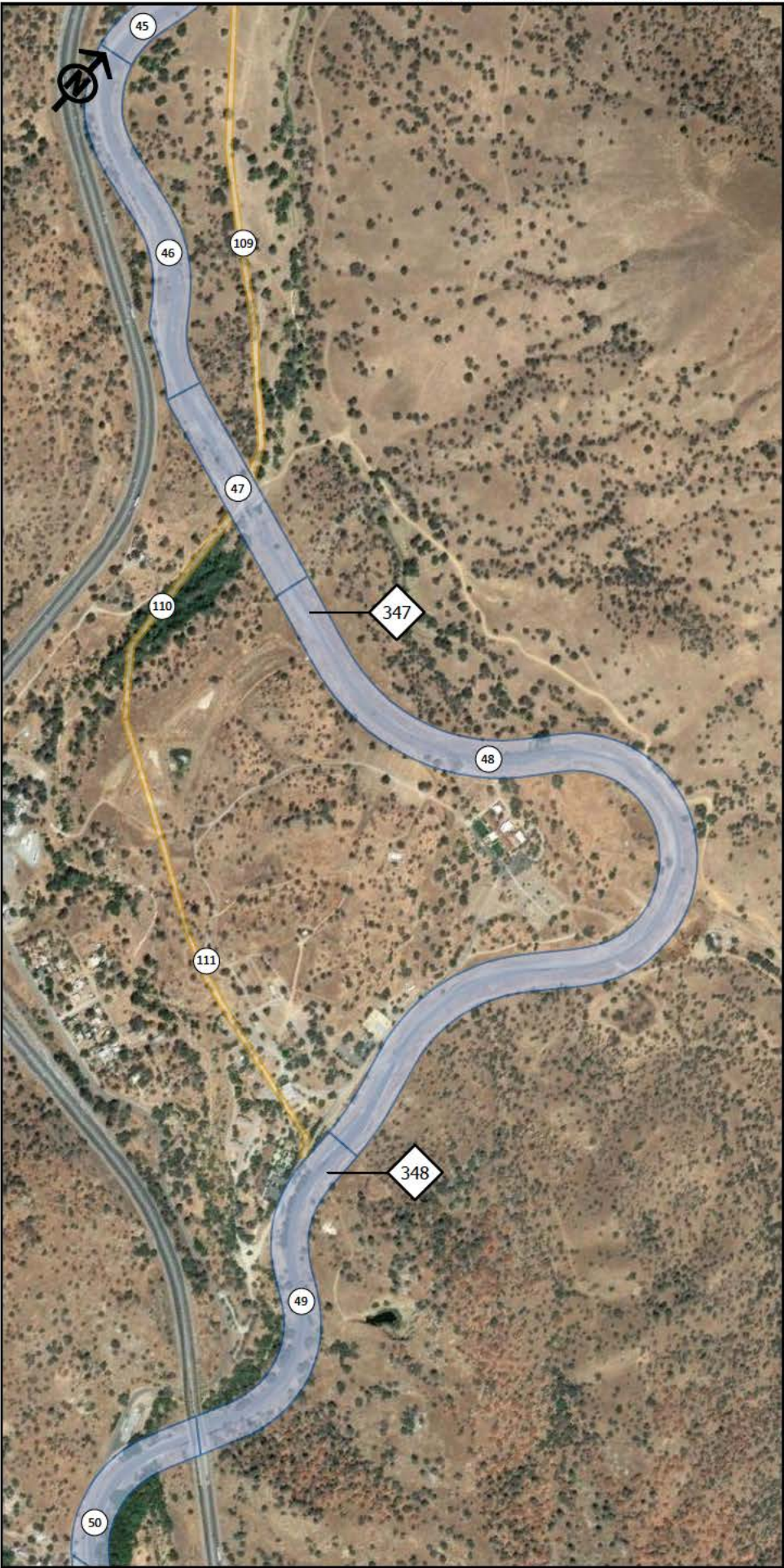


Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
42	RANGELAND	RANGELAND	13	13
43	RURAL RES	RANGELAND	17	13
44	RURAL RES	RANGELAND	17	13
45	RURAL RES	RANGELAND	17	13
46	ROAD	RANGELAND	0	13
109	RANGELAND	RANGELAND	13	13

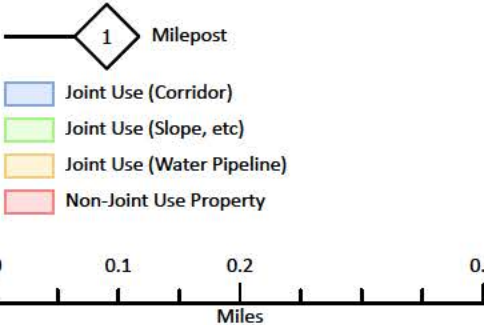
- Milepost
- Joint Use (Corridor)
- Joint Use (Slope, etc)
- Joint Use (Water Pipeline)
- Non-Joint Use Property



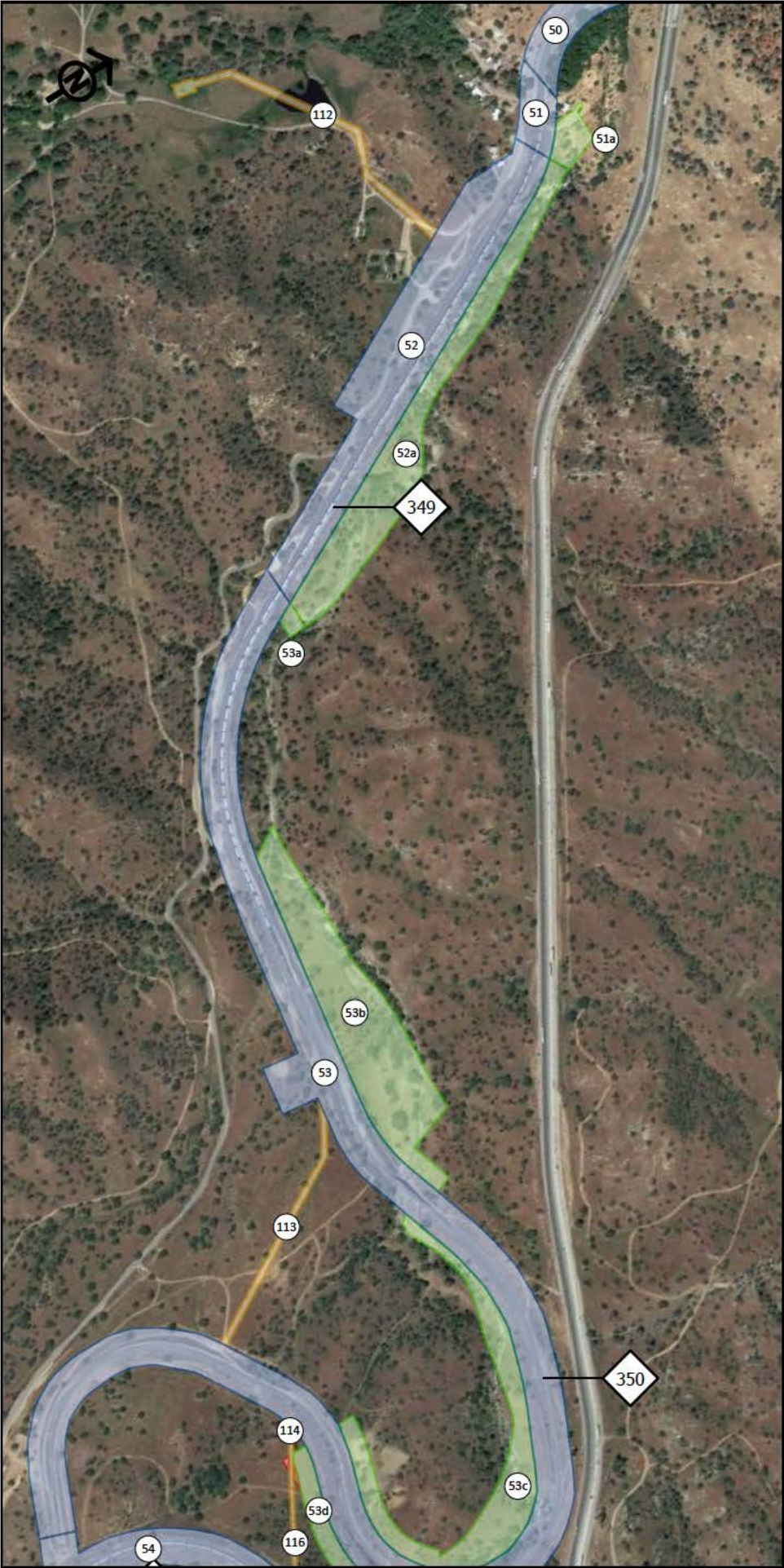
Subject Detailed Segment Map 20 of 40



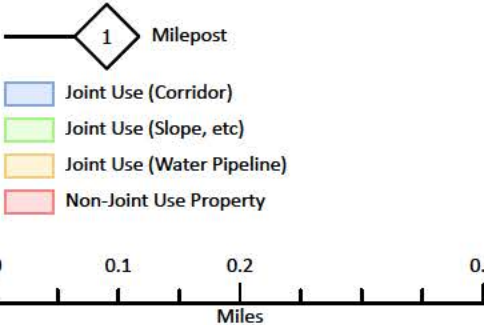
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
45	RURAL RES	RANGELAND	17	13
46	ROAD	RANGELAND	0	13
47	RURAL RES	RANGELAND	17	13
48	RURAL RES	RANGELAND	17	13
49	RURAL RES	RANGELAND	17	13
50	RANGELAND	RURAL RES	15	18
51	RURAL RES	RURAL RES	15	18
109	RANGELAND	RANGELAND	13	13
110	RURAL RES	RURAL RES	17	17
111	RURAL RES	RURAL RES	17	17



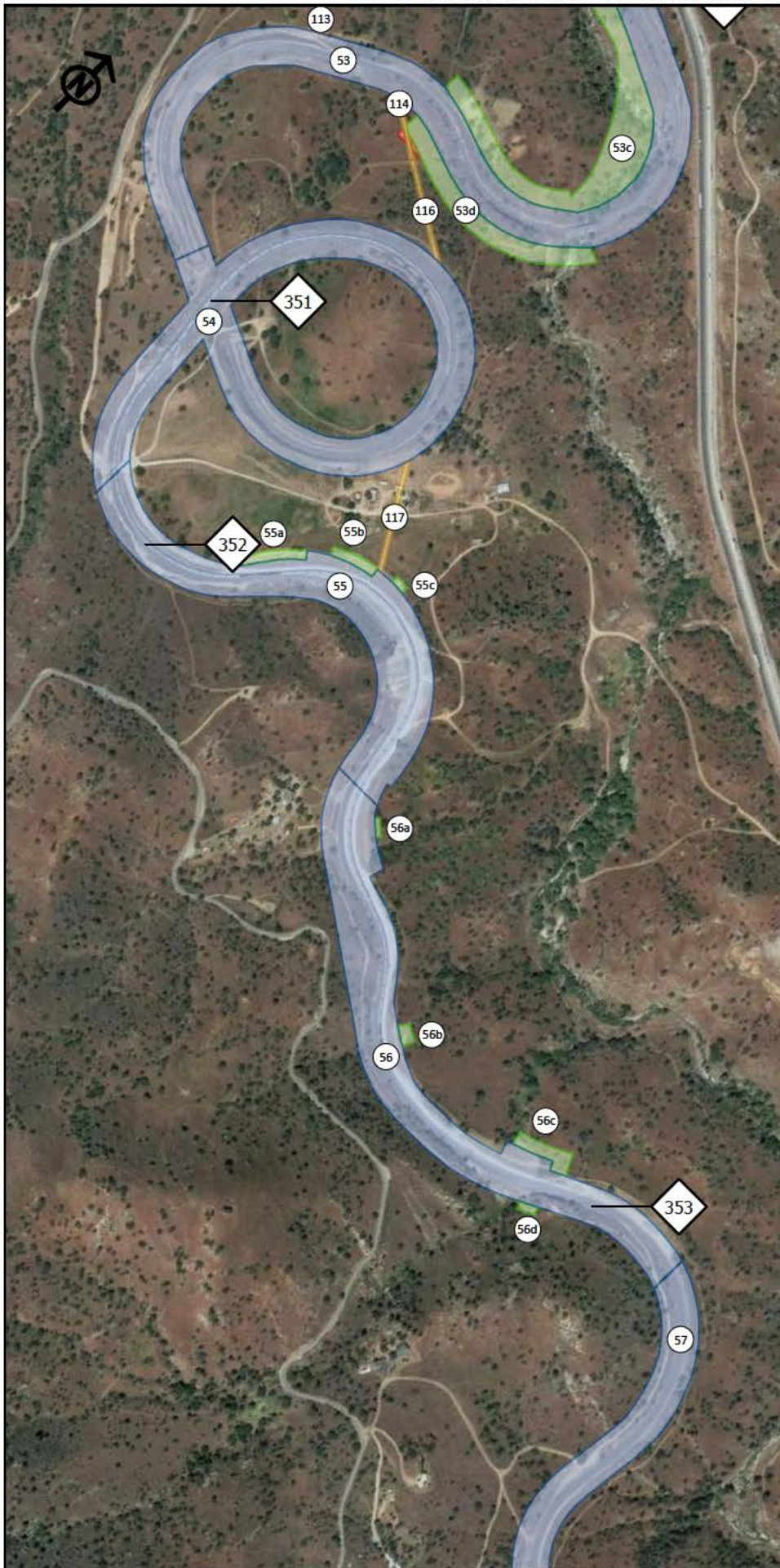
Subject Detailed Segment Map 21 of 40



Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
50	RANGELAND	RURAL RES	15	18
51	RURAL RES	RURAL RES	15	18
52	RANGELAND	RANGELAND	13	13
53	RANGELAND	RANGELAND	13	13
54	RANGELAND	RANGELAND	13	13
112	RANGELAND	RANGELAND	13	13
113	RANGELAND	RANGELAND	13	13
114	RANGELAND	RANGELAND	13	13
115	RANGELAND	RANGELAND	13	13



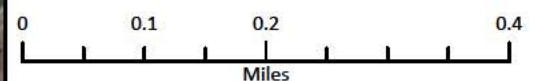
Subject Detailed Segment Map 22 of 40



Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
53	RANGELAND	RANGELAND	13	13
54	RANGELAND	RANGELAND	13	13
55	RURAL RES	RANGELAND	17	13
56	RURAL RES	RANGELAND	17	13
57	RURAL RES	RANGELAND	17	13
113	RANGELAND	RANGELAND	13	13
114	RANGELAND	RANGELAND	13	13
115	RANGELAND	RANGELAND	13	13
116	RANGELAND	RANGELAND	13	13

1 Milepost

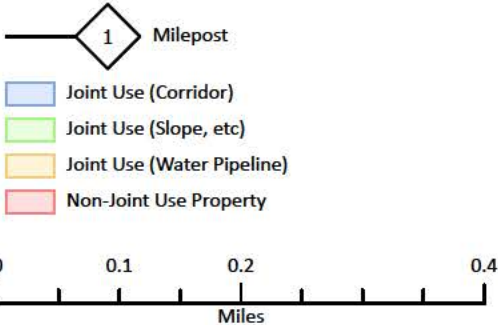
- Joint Use (Corridor)
- Joint Use (Slope, etc)
- Joint Use (Water Pipeline)
- Non-Joint Use Property



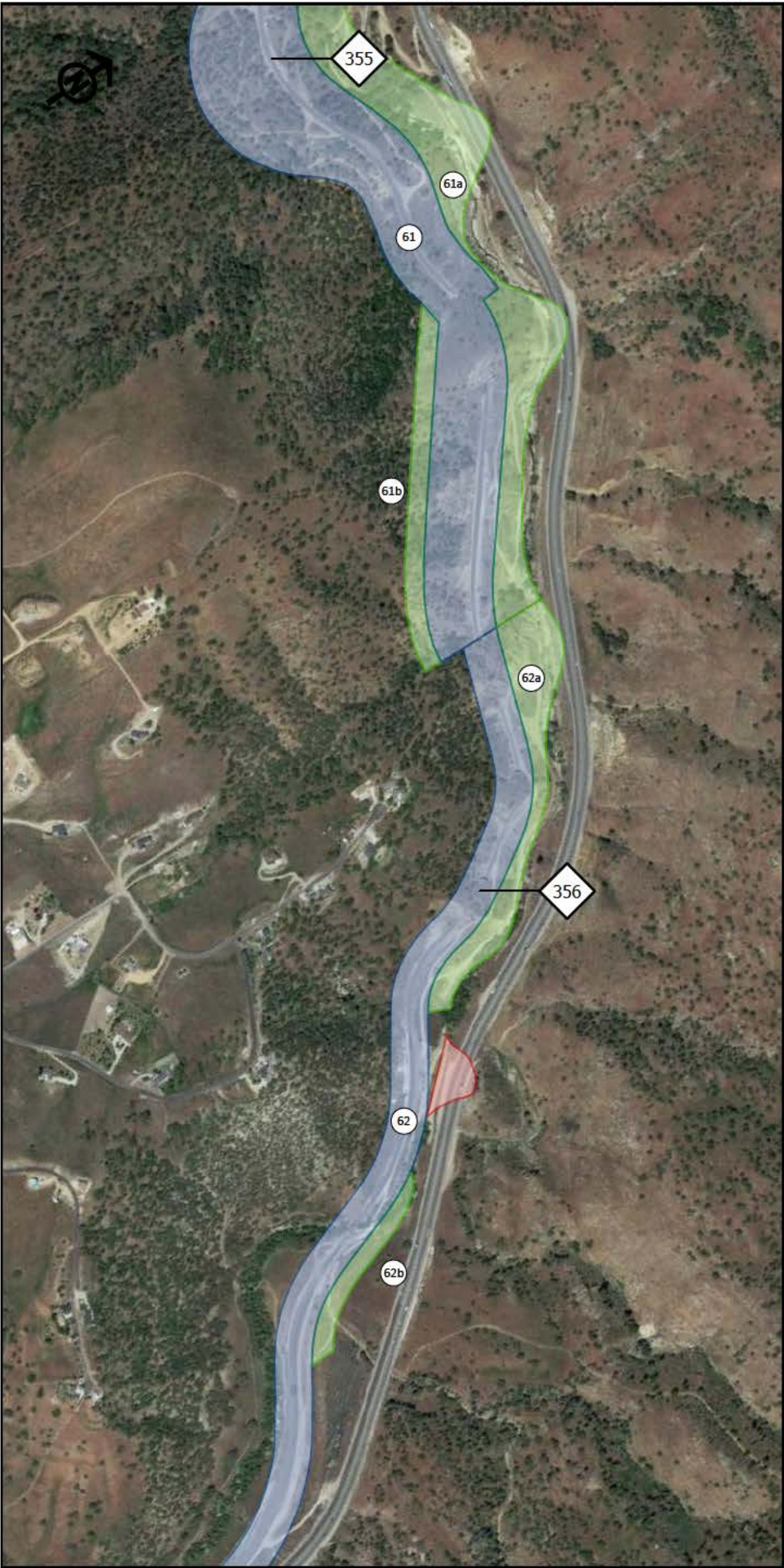
Subject Detailed Segment Map 23 of 40



Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
57	RURAL RES	RANGELAND	17	13
58	RURAL RES	RANGELAND	17	13
59	RURAL RES	RANGELAND	17	13
60	RURAL RES	RANGELAND	17	13
61	RURAL RES	RANGELAND	17	13



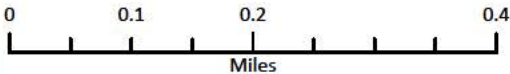
Subject Detailed Segment Map 24 of 40



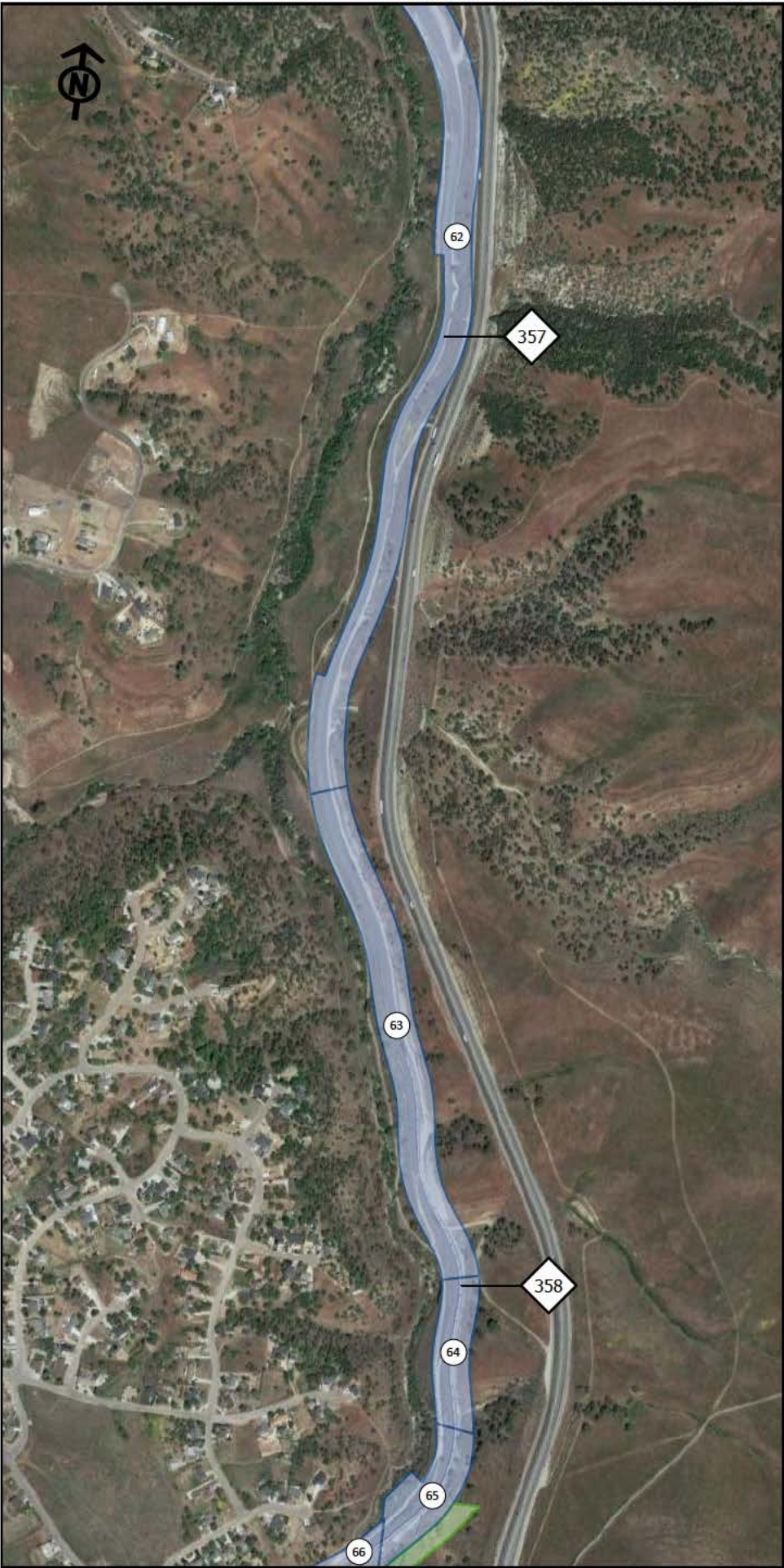
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
61	RURAL RES	RANGELAND	17	13
62	RANGELAND	ROAD	13	0

1 Milepost

- Joint Use (Corridor)
- Joint Use (Slope, etc)
- Joint Use (Water Pipeline)
- Non-Joint Use Property

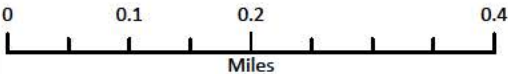


Subject Detailed Segment Map 25 of 40



Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
62	RANGELAND	ROAD	13	0
63	RANGELAND	ROAD	13	0
64	RANGELAND	ROAD	13	0
65	RANGELAND	RANGELAND	13	13
66	RES	RANGELAND	15	13

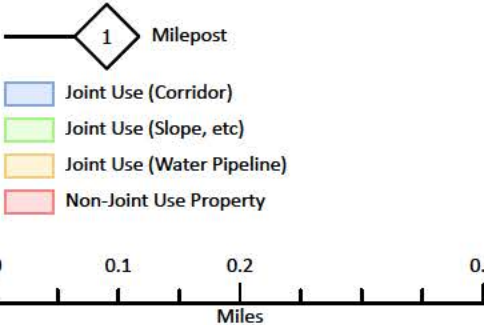
- Milepost
- Joint Use (Corridor)
- Joint Use (Slope, etc)
- Joint Use (Water Pipeline)
- Non-Joint Use Property



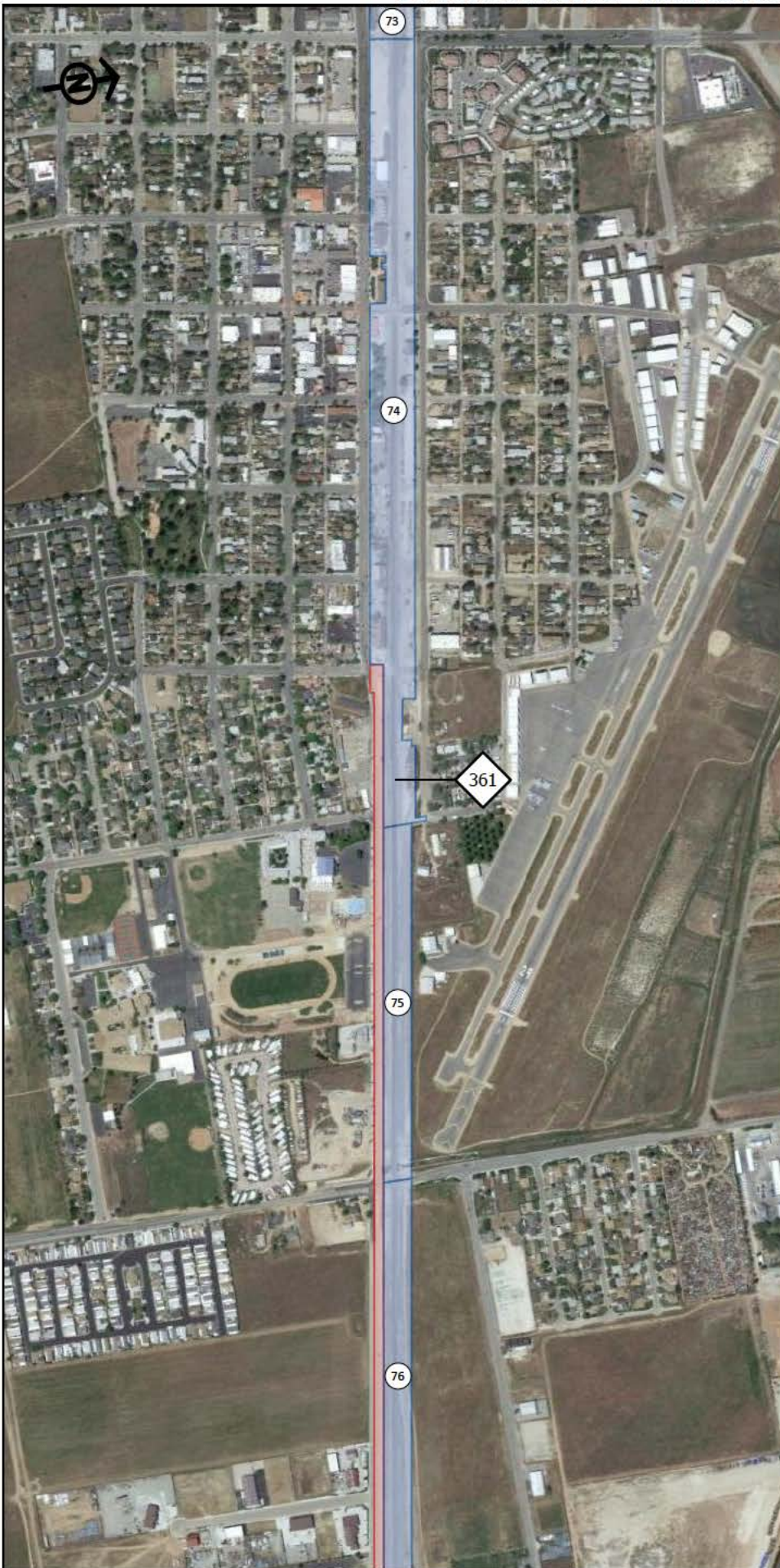
Subject Detailed
Segment Map
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Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
64	RANGELAND	ROAD	13	0
65	RANGELAND	RANGELAND	13	13
66	RES	RANGELAND	15	13
67	RURAL RES	RANGELAND	19	13
68	RESDEV/ACR	RANGELAND	19	13
69	COM	IND	27	20
70	IND	IND	23	21
71	IND	IND	24	22
72	ROAD	IND	0	23
73	ROAD	COM	0	28
74	COM	COM	27	27



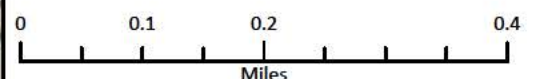
Subject Detailed Segment Map 27 of 40



Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
73	ROAD	COM	0	28
74	COM	COM	27	27
75	ROAD	IND	0	21
76	ROAD	IND	0	22



- Joint Use (Corridor)
- Joint Use (Slope, etc)
- Joint Use (Water Pipeline)
- Non-Joint Use Property



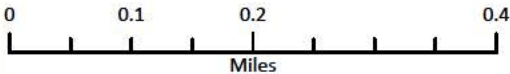
Subject Detailed Segment Map 28 of 40



Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
76	ROAD	IND	0	22
77	ROAD	IND	0	22
78	ROAD	IND	0	25
79	ROAD	IND	0	26
80	ROAD	IND	0	26
81	ROAD	RANGELAND	0	13

1 Milepost

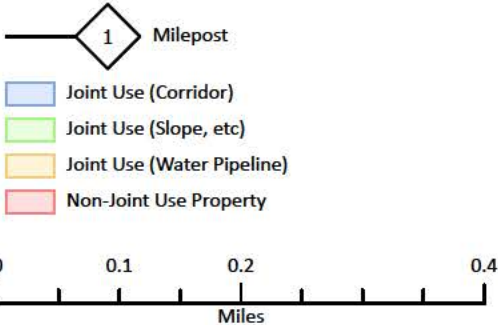
- Joint Use (Corridor)
- Joint Use (Slope, etc)
- Joint Use (Water Pipeline)
- Non-Joint Use Property



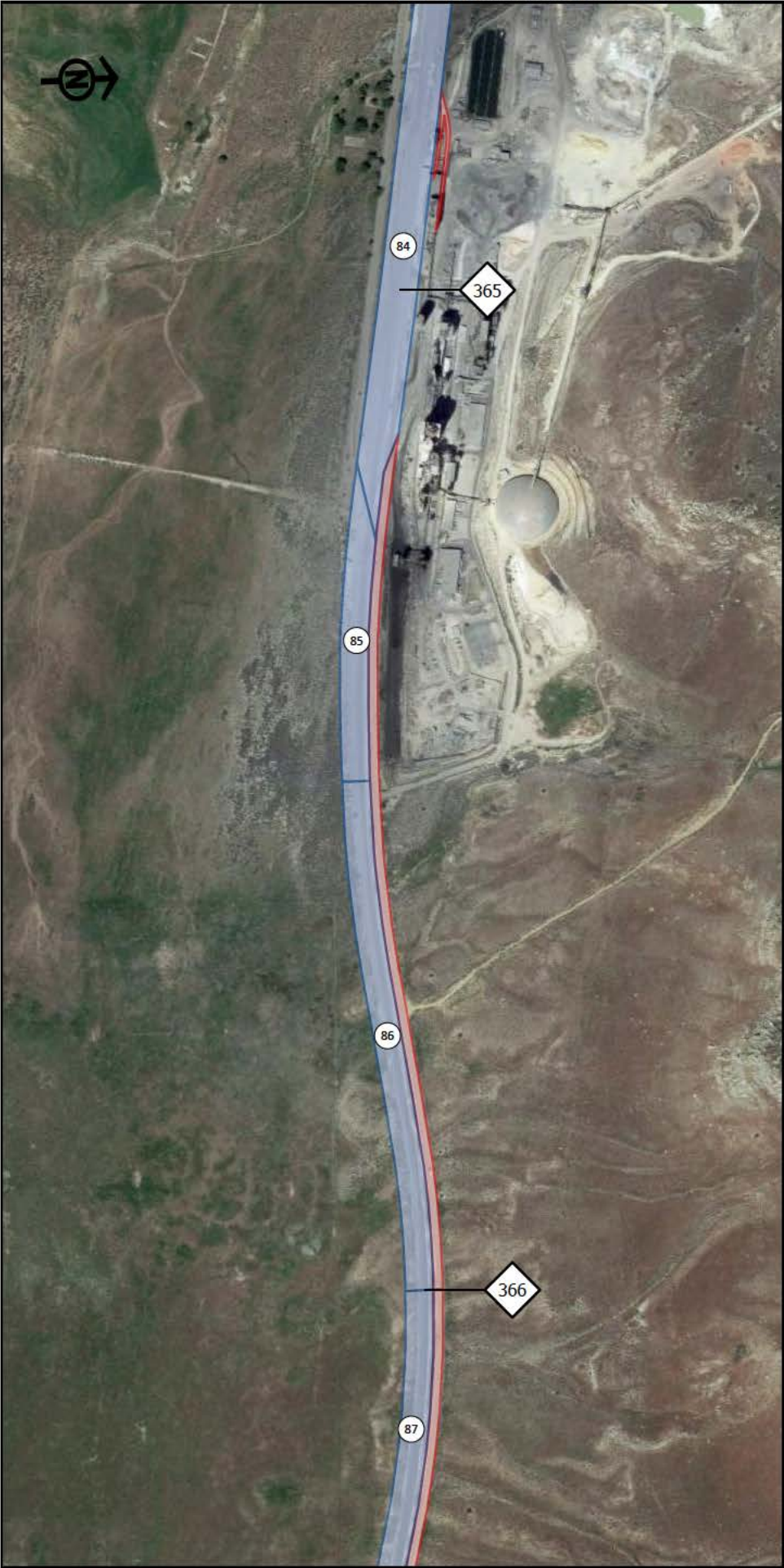
Subject Detailed Segment Map 29 of 40



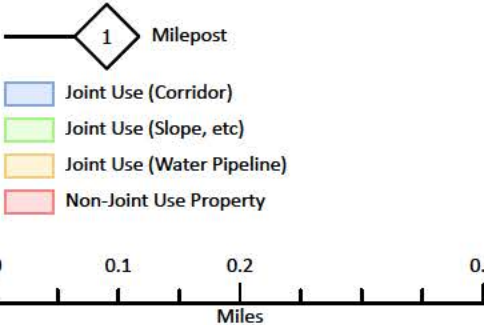
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
81	ROAD	RANGELAND	0	13
82	ROAD	RANGELAND	0	13
83	ROAD	RANGELAND	0	13
84	ROAD	IND	0	21



Subject Detailed Segment Map 30 of 40



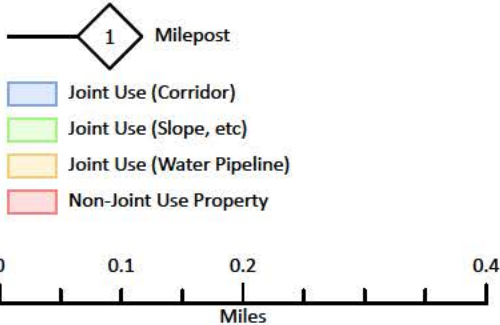
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
84	ROAD	IND	0	21
85	RANGELAND	ROAD	13	0
86	RANGELAND	ROAD	13	0
87	RANGELAND	ROAD	13	0



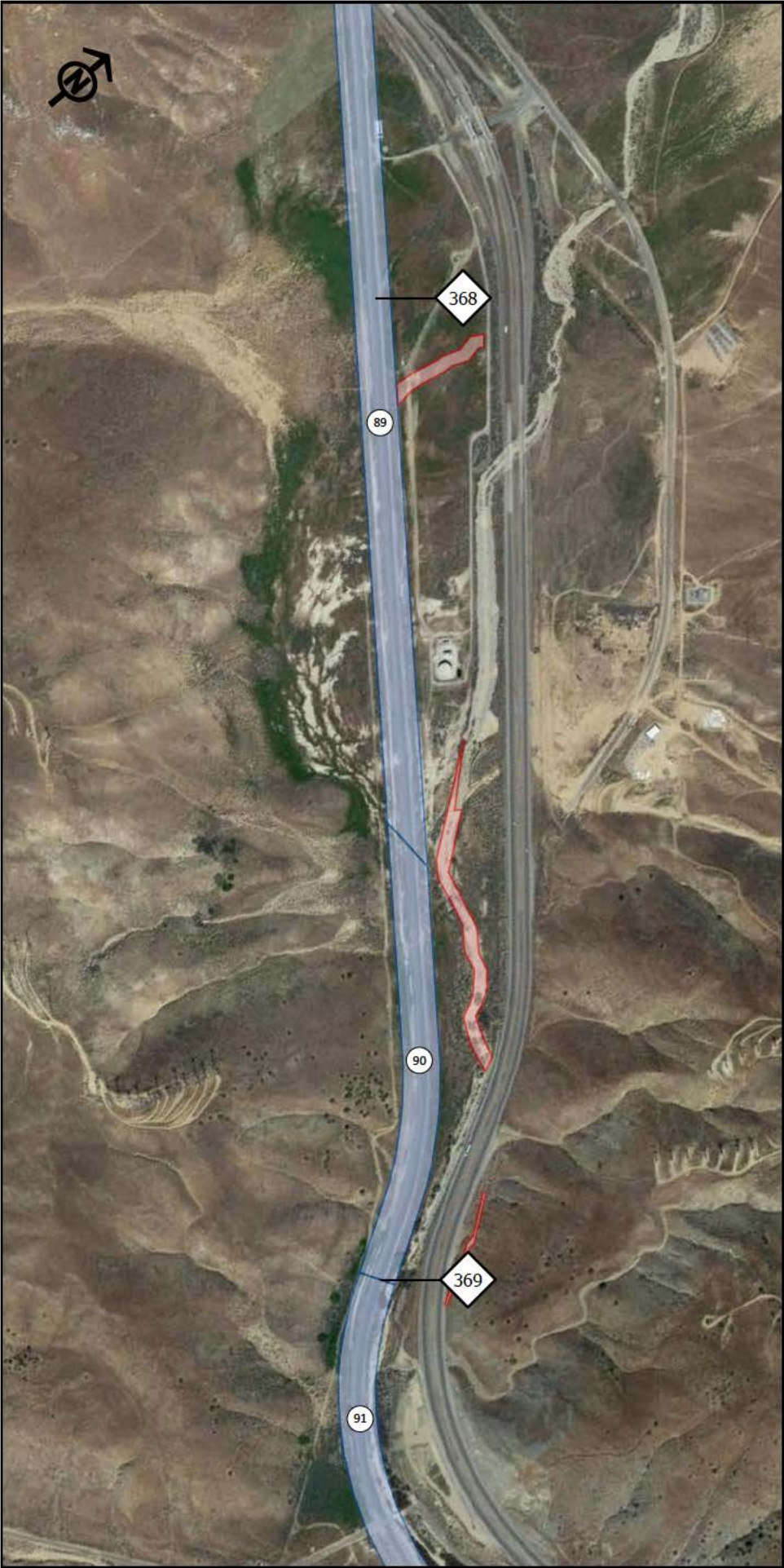
Subject Detailed Segment Map 31 of 40



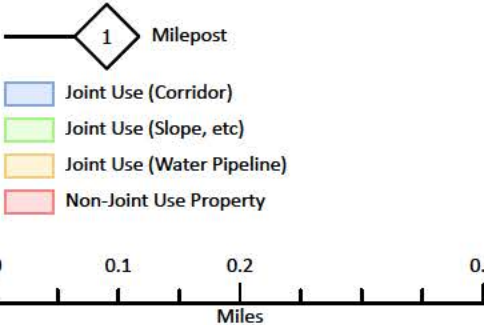
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
87	RANGELAND	ROAD	13	0
88	RANGELAND	RANGELAND	13	13
89	RANGELAND	RANGELAND	13	13



Subject Detailed
Segment Map
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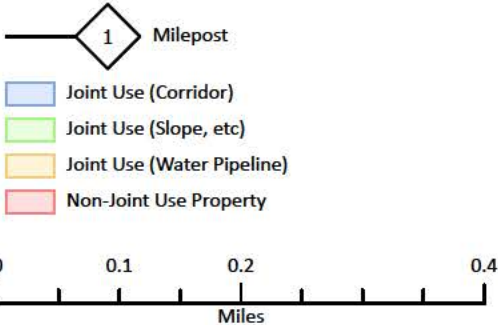
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
89	RANGELAND	RANGELAND	13	13
90	RANGELAND	RANGELAND	13	13
91	DESERT ACR	ROAD	29	0



Subject Detailed
Segment Map
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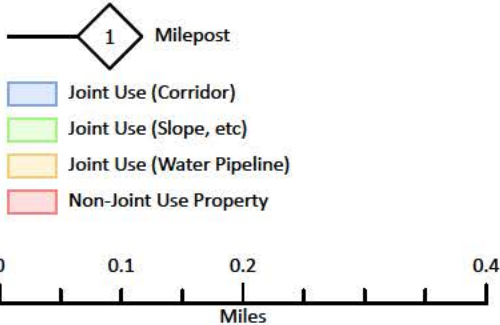
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
91	DESERT ACR	ROAD	29	0



Subject Detailed Segment Map 34 of 40



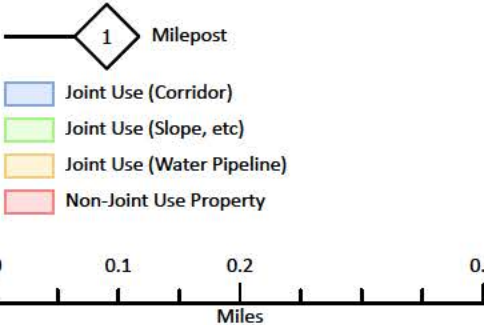
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
91	DESERT ACR	ROAD	29	0



Subject Detailed Segment Map 35 of 40



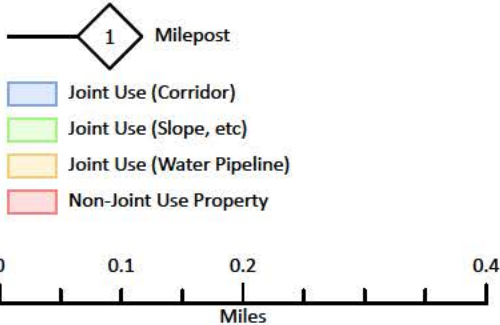
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
91	DESERT ACR	ROAD	29	0
92	DESERT ACR	DESERT ACR	29	29



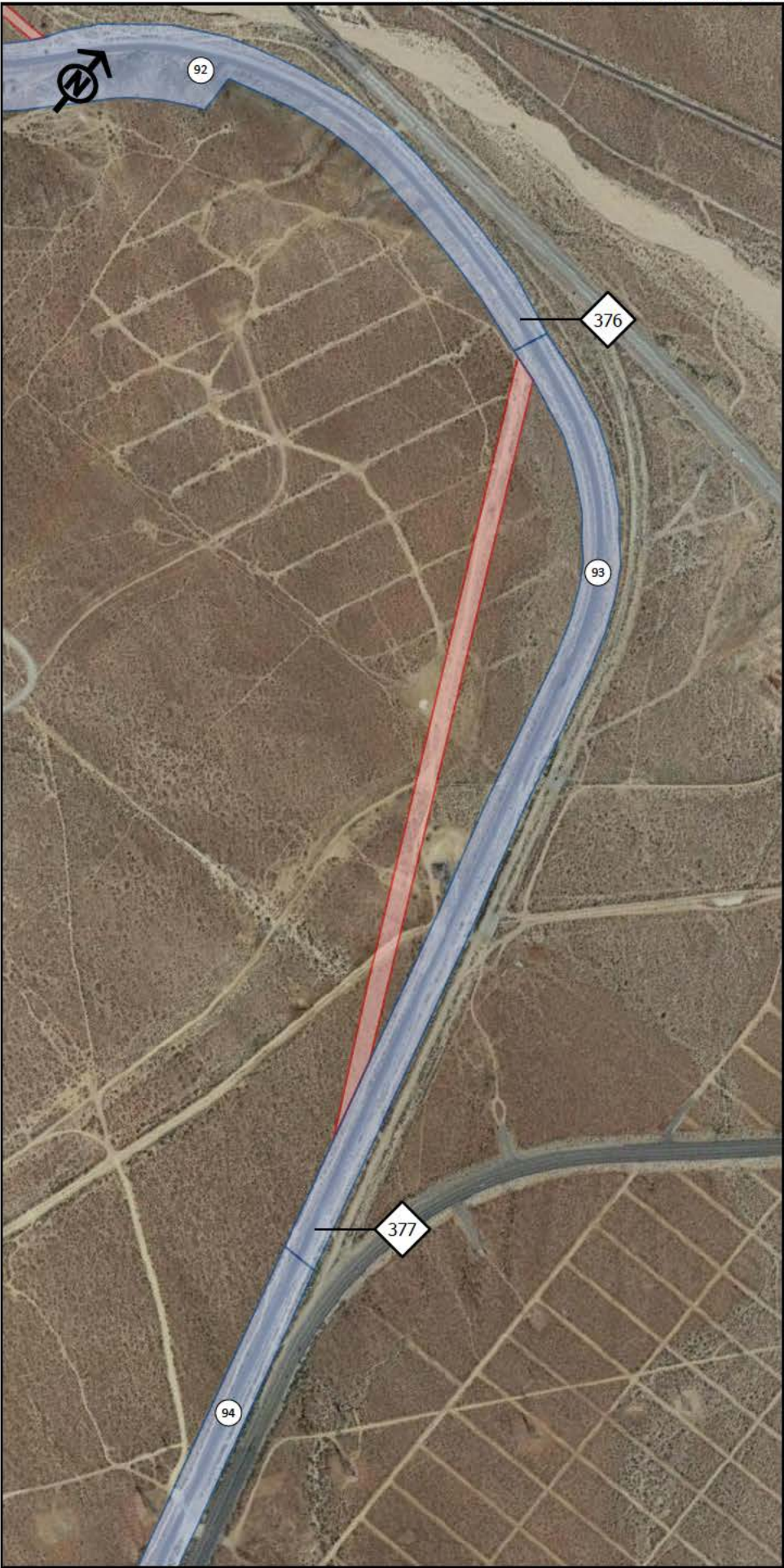
Subject Detailed
Segment Map
36 of 40



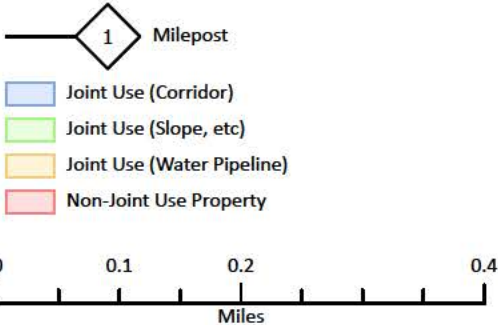
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
92	DESERT ACR	DESERT ACR	29	29



Subject Detailed Segment Map 37 of 40



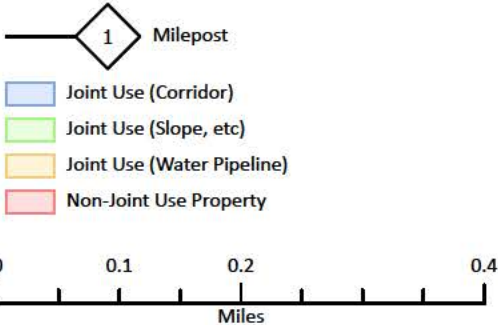
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
92	DESERT ACR	DESERT ACR	29	29
93	DESERT ACR	DESERT ACR	29	29
94	DESERT ACR	ROAD	29	0



Subject Detailed Segment Map 38 of 40



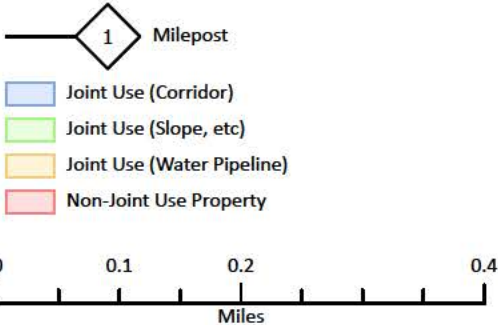
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
94	DESERT ACR	ROAD	29	0
95	DESERT ACR	DESERT ACR	29	29



Subject Detailed Segment Map 39 of 40



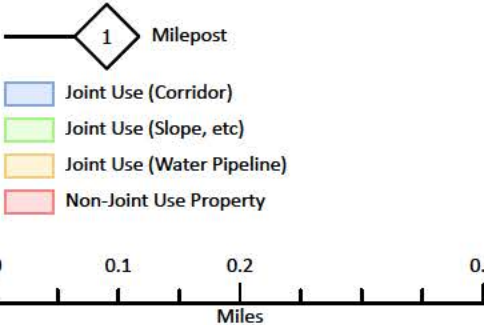
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
95	DESERT ACR	DESERT ACR	29	29
96	DESERT ACR	ROAD	29	0
97	DESERT ACR	ROAD	29	0
98	RESDEV	ROAD	30	0
99	RESDEV	ROAD	30	0
100	IND	ROAD	31	0
101	IND	ROAD	31	0



Subject Detailed Segment Map 40 of 40



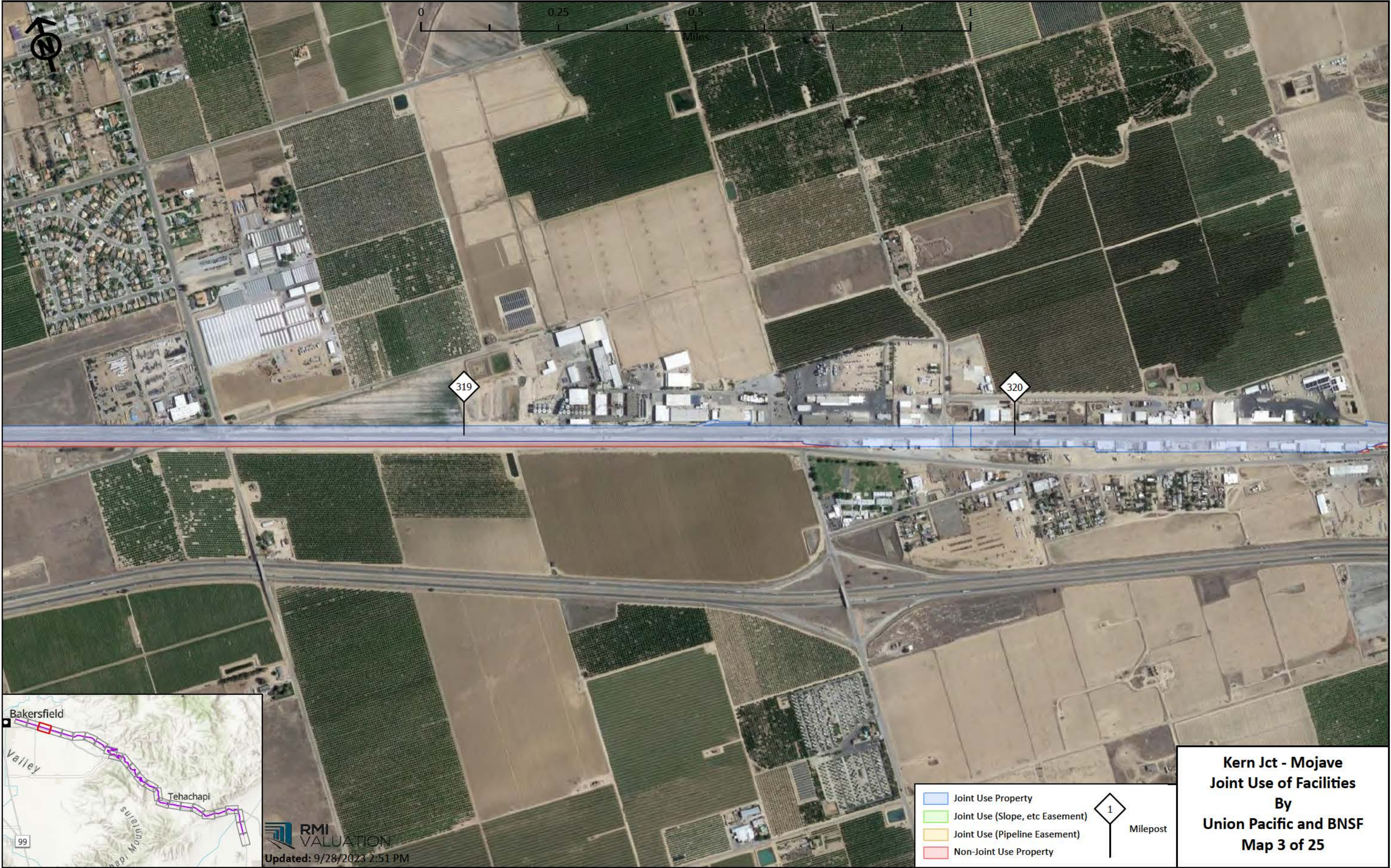
Segment	Landuse (SW)	Landuse (NE)	UVID (SW)	UVID (NE)
101	IND	ROAD	31	0
102	IND	ROAD	31	0
103	IND	ROAD	31	0
104	ROAD	MH	0	30



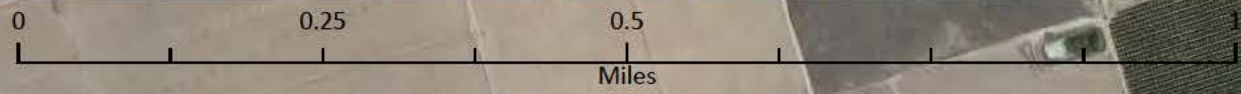
***KERN JCT – MOJAVE JOINT USE OF FACILITIES BY UNION PACIFIC AND BNSF
BY RMI VALUATION , DATED SEPTEMBER 28, 2023***



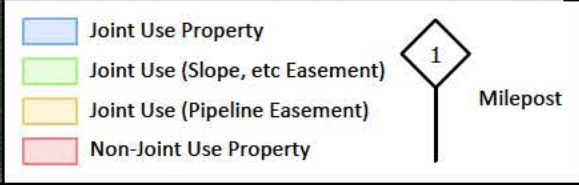








RMI
VALUATION
Updated: 9/28/2023 2:51 PM



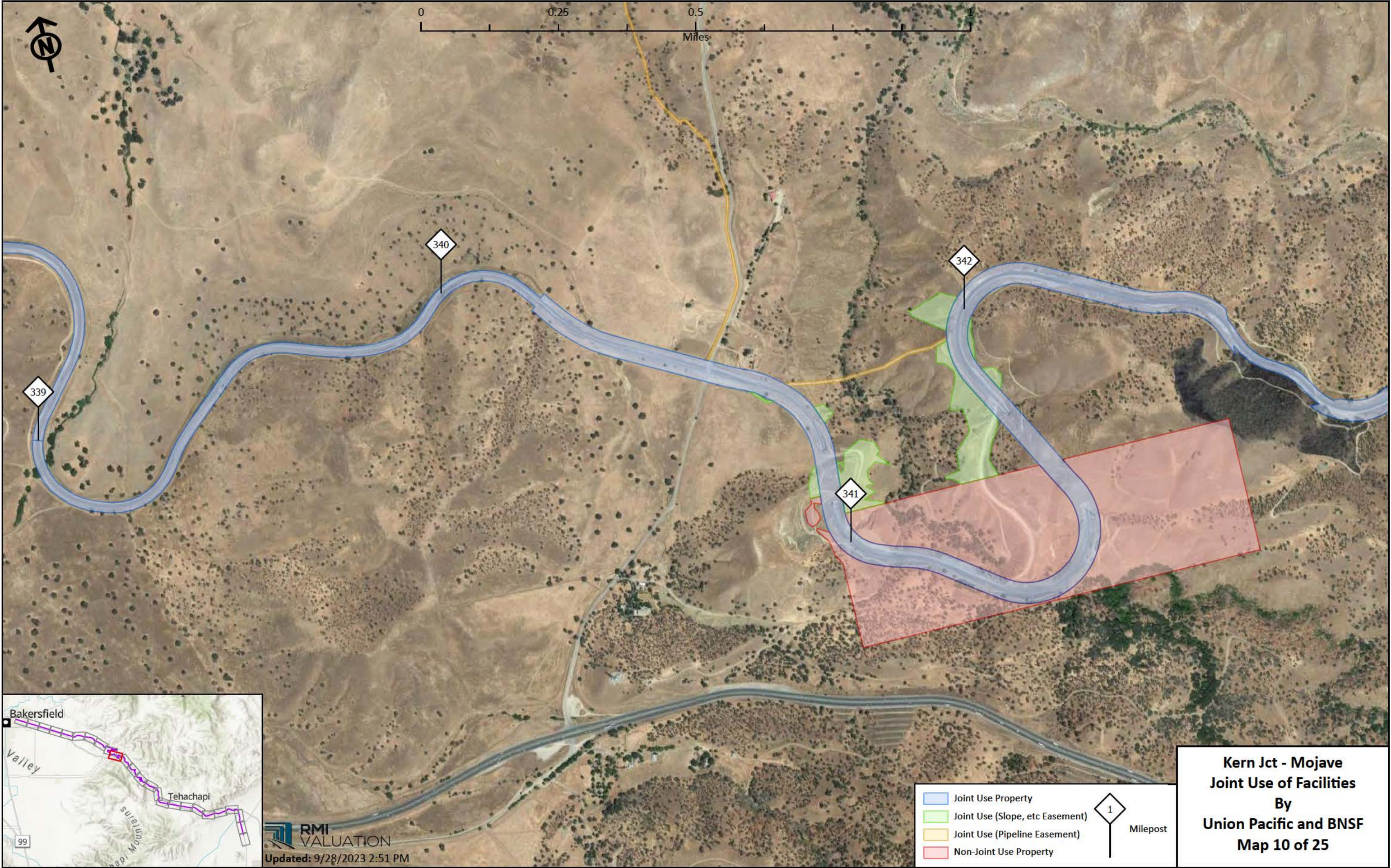
Kern Jct - Mojave
Joint Use of Facilities
By
Union Pacific and BNSF
Map 5 of 25







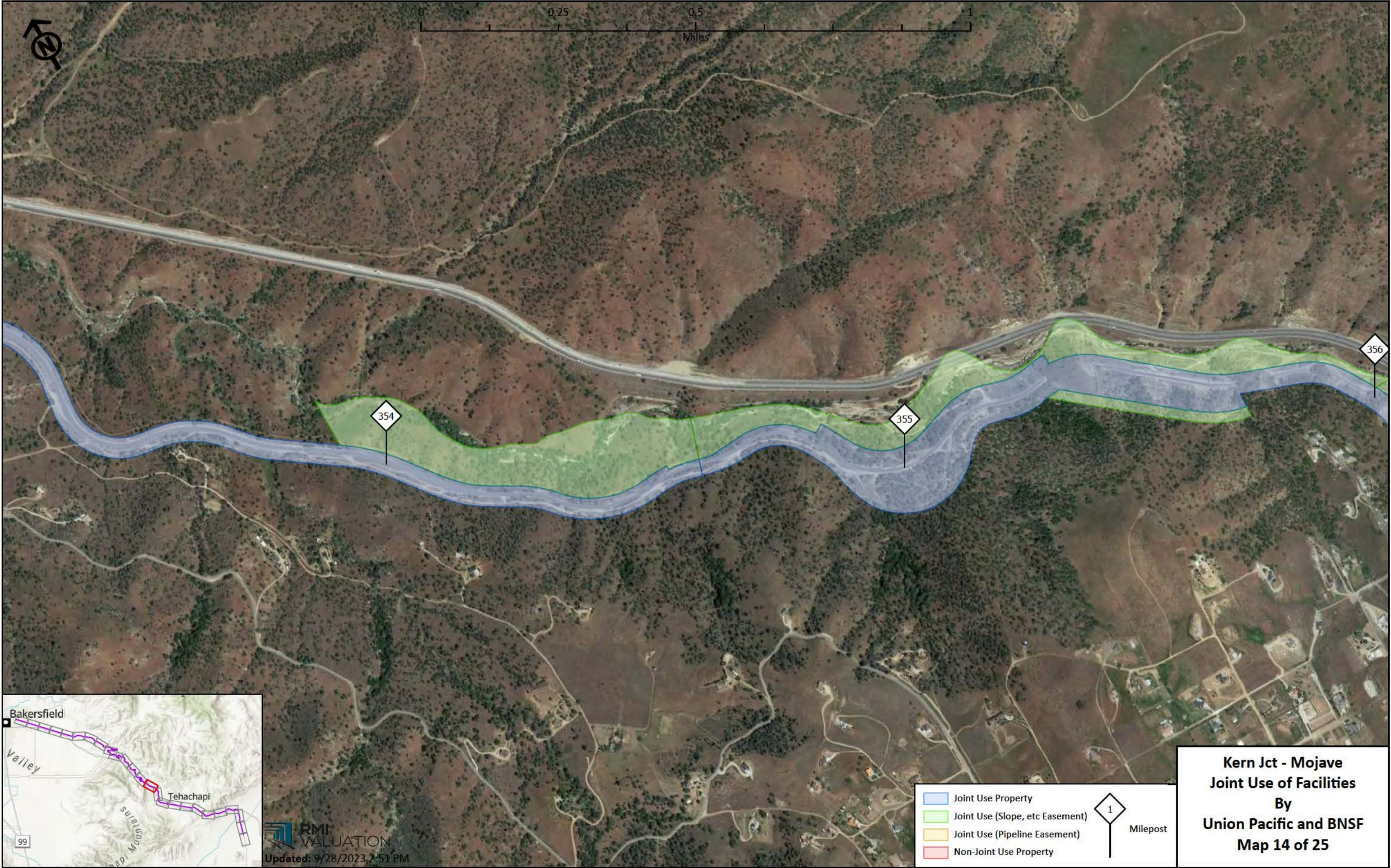




















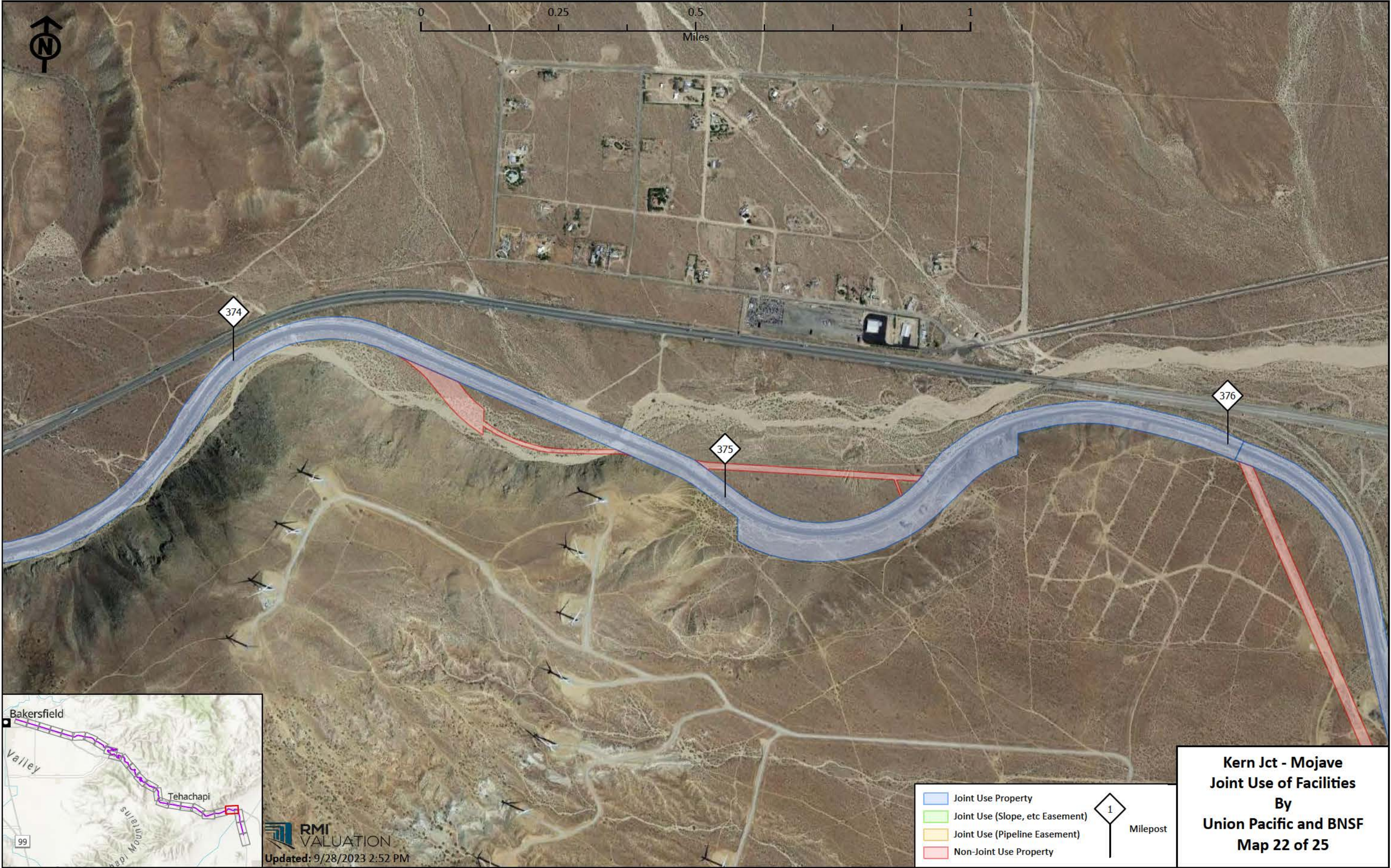


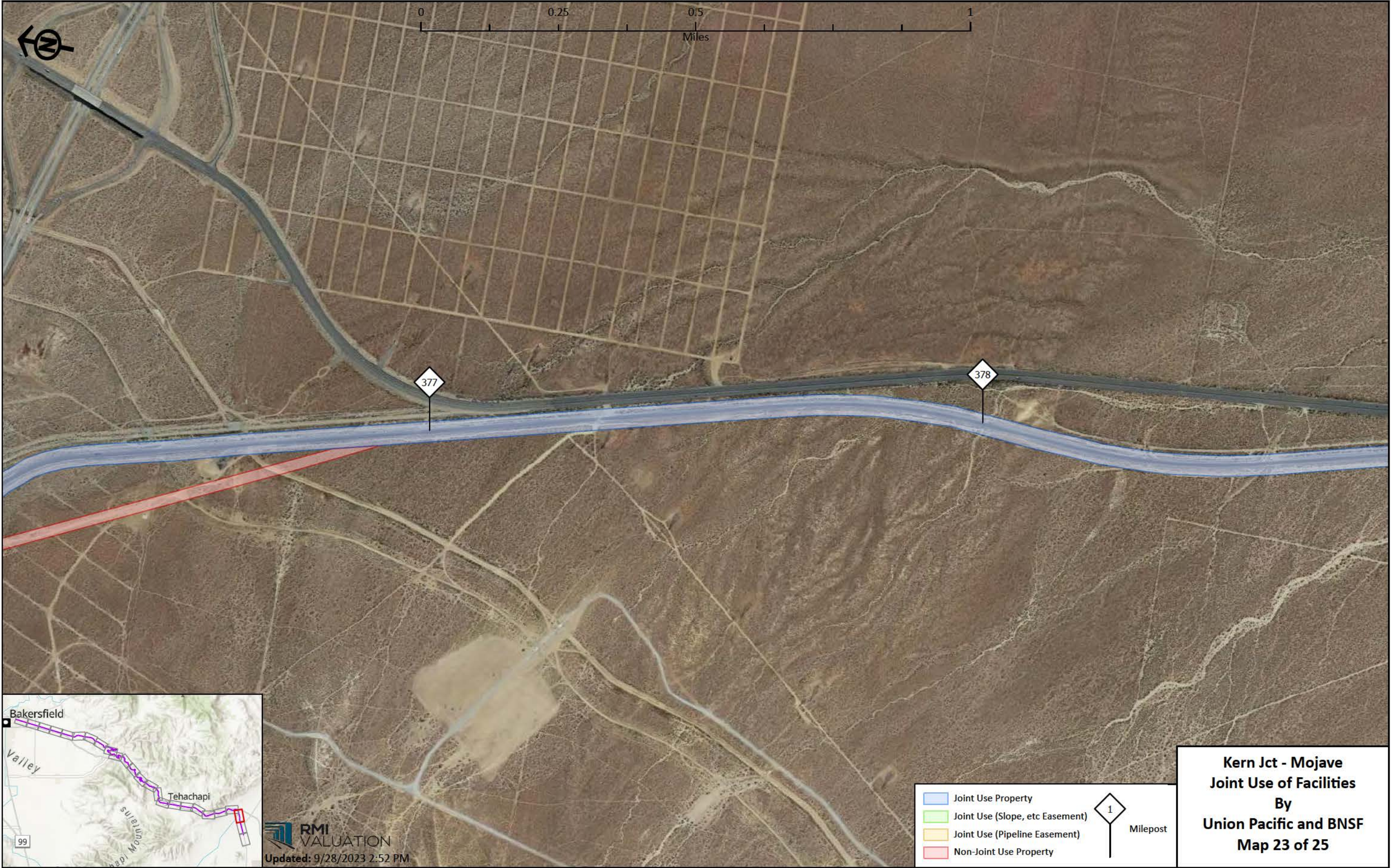




Kern Jct - Mojave
Joint Use of Facilities
By
Union Pacific and BNSF
Map 21 of 25

RMI
VALUATION
Updated: 9/28/2023 2:52 PM







RMI
VALUATION
Updated: 9/28/2023 2:52 PM

-  Joint Use Property
 -  Joint Use (Slope, etc Easement)
 -  Joint Use (Pipeline Easement)
 -  Non-Joint Use Property
-  Milepost

Kern Jct - Mojave
Joint Use of Facilities
By
Union Pacific and BNSF
Map 24 of 25



QUALIFICATIONS

Charles W. (Sandy) Rex III, MAI

BUSINESS

ADDRESS

RMI Valuation, LLC
38 Foxglove Road
Hendersonville, North Carolina 28739
Telephone: 847-920-9033
Mobile: 847-507-7212
e-mail: cwrexiii@rmimidwest.com

PROFESSIONAL

ORGANIZATIONS

Member of the Appraisal Institute; MAI designation, Certificate No. 6853

EXPERIENCE

Appraiser with RMI Valuation, LLC, 2019-present

Partner & co-owner of RMI Midwest, 1992-2018

Education consultant, Appraisal Institute, 1992-1993

President of Rex-McGill, Inc., 1987-1992

President of Pinel, Rex & Carpenter, Inc., 1986 to 1987

Appraiser with "Rex-McGill," beginning in 1971

Specializing in the valuation and analysis of corridors and other railroad properties, as well as conservation easements and development lands.

Primary assignments also include the valuation of large land tracts (including development land, agricultural properties, timberlands, multi-use developments, and environmentally sensitive lands) and partial interests.

Valuing partnership interests, conservation easements, lease fee interests, leasehold interests, air rights, transferable development rights, joint ventures, as well as fee simple rights.

Clients include government agencies (federal and state), corporations, pension funds, investment bankers, financial institutions, insurance companies, nonprofit conservancy groups, attorneys, and individuals.

Qualified as an expert witness in the Federal District Courts in Florida and Illinois; US Court of Claims; US Bankruptcy Court; Florida and Illinois Circuit Courts.

Approved appraiser for the Florida Department of Environmental Protection.

CERTIFICATIONS	California Certified General Real Estate Appraiser, No. 3003323 Georgia Certified General Real Property Appraiser, No. 285622 Illinois Certified General Real Estate Appraiser, No. 553-000785 Indiana Certified General Real Estate Appraiser, No. CG40300403 New Jersey Certified General Appraiser, No. 42RG00194200 North Carolina Certified General Real Estate Appraiser, No. A8372 Pennsylvania Certified General Appraiser, No. GA004607
EDUCATION	Virginia Military Institute, Bachelor of Arts in Economics, 1972 Completed and passed all courses for the MAI designation under the direction of the former American Institute of Real Estate Appraisers (now the Appraisal Institute). Certified under the Appraisal Institute's voluntary program of continuing education for its designated members. MAIs who meet the minimum standards of this program are awarded periodic educational certification.
PROFESSIONAL TEACHING	Approved Appraisal Institute instructor for the following: <i>Valuation of Conservation Easements</i> course; <i>Case Studies in Highest and Best Use</i>, <i>Partial Interest Valuation — Divided</i>, <i>Partial Interest Valuation — Undivided</i> seminars. Appraiser continuing education instructor for the Ohio Association of REALTORS® (1995) and for the Wisconsin Association of REALTORS® (2000): Market Analysis and Highest and Best Use; Transitional Properties. Instructor for Reporting the Results of Forestland Appraisals course, Duke University School of the Environment, 1993; co-instructor for Valuation of Timberlands seminar, Duke University School of the Environment, 1987; panel member at the Fourth Timberland Marketplace Conference, Duke University, 1985.
EDUCATIONAL PROGRAM DEVELOPMENT	Course co-developer of the Appraisal Institute's Conservation Easement Professional Development Program. Developer of Appraisal Institute seminars: <i>Partial Interest Valuation — Divided</i>, <i>Partial Interest Valuation — Undivided</i> (1999); <i>Highest and Best Applications</i> (1995); <i>Subdivision Analysis</i> (1993).

Developer of the Appraisal Institute's Report Writing and Valuation Analysis course (1986) and of AIREA's Real Estate Appraisal Applications state-certification module (1989).

Co-developer of the Appraisal Institute's *Timberland Valuation* seminar (1988).

PRESENTATIONS

Panel speaker, "The Rails to Trails Program and the CSX High Line Project" at the American Railway Development Association annual meeting; San Francisco, 2013.

Conservation easement valuation presentation at International Right-of-Way Association Annual International Education Conference; Austin, Texas, 2008.

Corridor valuation presentation at American Railway Development Association annual meeting; Sante Fe, 2008.

Conservation easement valuation presentations at Land Trust Alliance conferences; Nashville, 2006; Madison, Wisconsin, 2005.

"Corridors and Rights-of-Way: Valuation & Policy," sponsored by The Centre for Advanced Property Economics and International Right of Way Association, 2002; "Linear Rights of Way: Federal Agency Rent Schedules Reforged," sponsored by the Appraisal Institute for the US Bureau of Land Management and US Forest Service, 2001.

Southwest Florida Land Trust's conservation easement seminar, 1997; Coastal Georgia Land Trust, Inc.'s conservation easement seminar, 1994; Red Hills Conservation Association's Conservation Easements and Estate Planning program, 1993.

PROFESSIONAL
SERVICE

Member, *Appraisal Journal* Review Panel, 2006 – 2008.

Member, Region III Nominating Committee, Appraisal Institute, 2001.

Chair, Education Committee; Chicago Chapter of the Appraisal Institute, 1997-2000.

Member, General Appraiser Board Education Committee and Body of Knowledge Committee; Appraisal Institute, 1994.

Vice President and President-elect, 1991, Greater Florida Chapter of the Appraisal Institute; Chair, Education Committee, AIREA Florida Chapter 2, 1988-91.

Coordinator, Level II Curriculum Development, 1990-1991; Member, Division of Curriculum, Appraisal Institute, 1985-1991; Chair, Development Subcommittee, Appraisal Institute, 1989-1991; Appraisal Institute.

RECOGNITIONS

Chicago Chapter of the Appraisal Institute's Distinguished Service Award, 1999.

Appraisal Institute's George L. Schmutz Award in recognition of contributions to the advancement of appraisal knowledge, 1991.

Cameron R. Rex, MAI, R/W-AC, GISP

BUSINESS

ADDRESS

RMI Valuation, LLC
643 Landwehr Road
Northbrook, Illinois 60062
Telephone: 847-920-9033
Mobile: 847-347-4567
E-mail: camrex@rmivaluation.com

PROFESSIONAL

ORGANIZATIONS

Designated Member of the Appraisal Institute
Member of the International Right-of-Way Association
Member of the Urban and Regional Information Systems Association
Member of the American Railway Development Association
Member of the Illinois GIS Association

EXPERIENCE

Owner - Appraiser/GIS; RMI Valuation, LLC, 2019-present

Appraiser/GIS Analyst; RMI Midwest, 2001–2018

GIS Technician, Facilities Management; Northeastern Illinois University,
2004–2005

GIS Project Manager/Technical Assistant; Department of Geography &
Environmental Studies, Northeastern Illinois University, 2004

Provides appraisal and GIS support in real estate valuation assignments,
which includes:

- Research and analysis of comparable sales
- Creation of complex valuation spreadsheets
- Problem solving of multi-faceted valuation issues
- Project-specific implementation of Geographic Information Systems for use in valuation
- Inventory and valuation of railroad improvements
- Use of GPS devices and digital planimeters; familiarity with Metes & Bounds and Public Land Survey System legal descriptions
- Interpretation of aerial and satellite imagery

Specializing in the implementation, operation, and maintenance of Geographic Information Systems, providing GIS database and application development assistance and coordinating/performing computer software service, support, and installation; use of ESRI's ArcGIS Desktop and Enterprise software.

CERTIFICATIONS

Illinois Certified General Real Estate Appraiser, No. 553-002328

Certified Geographic Information Systems Professional (GISP), No. 55541

Right of Way Appraisal Certification (R/W-AC) – International Right-of-Way Association

PROFESSIONAL
TRAINING

Attended courses offered by the University of Wisconsin – Madison, College of Engineering:

- *Introduction to Railroad Engineering*, October 2009
- *Design and Construction of Rail Freight Terminals, Yards and Intermodal Facilities*, November 2009

Completed the following courses under the direction of the Appraisal Institute:

- *Business Practices and Ethics*
- *National Uniform Standards of Professional Appraisal Practice*
- *Basic Appraisal Procedures*
- *Basic Income Capitalization*
- *Non-Residential Report Writing*
- *General Applications*
- *Residential Sales Comparison and Income Approaches*
- *General Appraiser Market Analysis and Highest & Best Use*
- *Real Estate Finance, Statistics and Valuation Modeling*
- *General Appraiser Sales Comparison Approach*
- *General Appraiser Report Writing and Case Studies*
- *General Appraiser Site Valuation & Cost Approach*
- *General Appraiser Income Approach*
- *Advanced Income Capitalization*
- *Advanced Concepts & Case Studies*
- *General Demonstration Report - Capstone Program*
- *Uniform Appraisal Standards for Federal Land Acquisitions*

Completed the following courses under the direction of the International Right of Way Association:

- *Standards of Practice for the Right of Way Professional*
- *Problems in the Valuation of Partial Acquisitions*

EDUCATION

Northeastern Illinois University, Chicago, Bachelor of Arts in Geography, 2004

PRESENTATIONS

“Generative AI: Pioneering Technological Advancements in the Railroad Industry” for the Technology Section of the American Railway Development Association: October 2023 Tech Talk.

“GIS for Land and Track Valuation in Rail” at the ESRI Rail Summit: Atlanta, 2022.

“Mobile Data Collection for Real Property & Track Asset Inventory & Inspection” for the Technology Section of the American Railway Development Association: August 2022 Tech Talk.

“Mobile Solutions within Rail” at the American Railway Development Association Virtual Annual Meeting: 2020.

“Mobile Data Collection for Railroad Industry Professionals” at the American Railway Development Association Annual Meeting: Calgary, 2014.

“How to Value Corridors: Understanding Improper and Proper Corridor Valuation Methodologies” at the Norfolk Southern Real Estate, Facilities & Corporate Sustainability Department Meeting: Brosnan Forest, 2015.

PUBLICATIONS

“Taking GIS into the Field: Smartphones and Tablets”, American Railway Development Association Newsletter, December 2013.

“Comments on ‘Appraising Railroad Corridors for Recreational Trail Use’”, *The Appraisal Journal*, Winter 2015.

“Comments on ‘Is Across the Fence Methodology Consistent with Professional Standards?’”, *The Appraisal Journal*, Spring 2015.

PROFESSIONAL
SERVICE

Immediate Past President, Chicago Chapter of the Appraisal Institute, 2024; President, 2023; Vice President, 2022; Treasurer, 2021; Secretary, 2020; Director 2019

Second Vice President, American Railway Development Association, 2023-24; Treasurer, 2022-23; Secretary, 2021-22

Chair, Technology Section, American Railway Development Association, 2017-18, 2014-15, Vice-Chair 2013-14, 2016-17

Region Representative, Appraisal Institute Region III – Chicago Chapter of the Appraisal Institute, 2023; Region Representative, 2017-2018, Alternate Region Representative, 2016 and 2022

RECOGNITIONS

Chicago Chapter of the Appraisal Institute’s Scipio “Skip” Del Campo Award, 2023.

Chicago Chapter of the Appraisal Institute’s Distinguished Service Award, 2021.

Appraisal Institute’s Volunteer of Distinction, 4th Quarter 2020.

Illinois GIS Association, Outstanding Achievements in the GIS Field of Study, 2004

Charles W. Rex IV, MAI, AI-GRS

BUSINESS

ADDRESS RMI Valuation, LLC
5315 Diamondleaf Drive
Edgewater, Florida 32141
Telephone: 847-906-1798
Mobile: 304-305-0401
e-mail: cwrexiv@rmivaluation.com

**PROFESSIONAL
ORGANIZATIONS**

MAI Designation, Appraisal Institute
AI-GRS Designation, Appraisal Institute
Member of the American Railway Development Association

**PROFESSIONAL
REGISTRIES**

Litigation Professional Development Program, Appraisal Institute
Valuation of Conservation Easements, Appraisal Institute

EXPERIENCE

Appraiser/Remote Pilot, RMI Valuation, LLC, 2019-present

Principal Appraiser/Sole Proprietor, CRI Valuation, 2017-2019

Review Appraiser/Remote Pilot, Land Buy Back Program, Appraisal and
Valuation Services Office, U.S. Department of the Interior, 2014-2019

Principal Appraiser/Co-Owner, CRI Valuation, LLC, 2014-2017

Appraiser, Bonneville Power Administration, U.S. Department of Energy,
2010-2014

Principal Appraiser/Sole Proprietor, RMI East, 2009-2010

Associate Appraiser/Valuation Associate, RMI Midwest, 2005-2009

Specialize in the appraisal valuation, appraisal review and consultation for various real property concerns including corridors (electrical transmission, railroad, and other longitudinal occupancies), conservation easements, fractional and partial interests, large acreage land tracts, rural properties, and timberlands on a nationwide basis. Focus on the use of geographic information systems, data analytics, mass appraisal modeling and UAS aerial data collection, photogrammetry, and inspections.

CERTIFICATIONS

State of Florida, Certified General Appraiser, License No. RZ4318 (Expires 11/30/2024)

State of Oregon, Certified General Appraiser, License No. C001092 (Expires 04/30/2026)

Commonwealth of Virginia, Certified General Real Estate Appraiser, License No. 4001-013863 (Expires 01/31/2025)

State of Washington, Certified General Real Estate Appraiser, License No. 1102434 (Expires 04/01/2026)

EDUCATION

Information Resources Management College, National Defense University, *Information Assurance Certificate Program (NSTISSI No. 4011)*, 2003

Information Resources Management College, National Defense University, *Chief Information Officer Certificate Program*, 2003

University of Phoenix, *Master of Business Administration*, 2000

Virginia Military Institute, *Bachelor of Arts in Biology/Minor in English*, 1995

PROFESSIONAL
EDUCATION

Completed the following courses under the direction of the Appraisal Institute:

- *Basic Appraisal Principles*
- *Basic Appraisal Procedures*
- *15-Hour National USPAP Course*
- *Business Practices and Ethics*
- *Real Estate Finance, Statistics, and Valuation Modeling*
- *General Market Analysis and Highest & Best Use*
- *General Appraiser Income Approach – Part I*
- *General Appraiser Site Valuation & Cost Approach*
- *General Appraiser Income Approach – Part II*
- *Advanced Income Capitalization*
- *General Appraiser Sales Comparison Approach*
- *Advanced Sales Comparison and Cost Approaches*
- *Advanced Applications*
- *General Appraiser Report Writing and Case Studies*
- *Report Writing and Valuation Analysis*
- *Conservation Easements Seminar*
- *General Demonstration Appraisal Report Writing Seminar*
- *7-Hour National USPAP Update Course: 2010-2011*
- *Valuation of Conservation Easements Certificate Program*
- *Uniform Appraisal Standards for Federal Land Acquisitions: Practical Applications – 2000*
- *Water Rights Seminar*
- *Corridor Valuation Seminar*
- *Appraising the Appraisal: Appraisal Review – General Seminar*
- *General Demonstration Report – Capstone Program*
- *Litigation Appraising: Specialized Topics and Applications*
- *The Appraiser as an Expert Witness: Preparation & Testimony*
- *7-Hour National USPAP Update Course: 2014-2015*
- *Condemnation Appraising: Principles & Applications*

- *Candidate for Designation Advisor Orientation Seminar*
- *Wind Turbine Effects on Value*
- *Review Theory – General*
- *7-Hour National USPAP Update Course: 2016-2017*
- *Instructor Qualification Conference: 2016*
- *Yellow Book Changes: Overview for Appraisers*
- *Advanced Land Valuation: Sound Solutions to Perplexing Problems*
- *Uniform Appraisal Standards for Federal Land Acquisitions: Practical Applications – 2016*
- *7-Hour National USPAP Update Course: 2018-2019*
- *7-Hour National USPAP Update Course: 2020-2021*
- *Quantitative Analysis*
- *Rapid Response: Market Analysis in Volatile Markets*
- *7-Hour National USPAP Update Course: 2022-2023*
- *3-Hour Florida Law*
- *7-Hour National USPAP Update Course: 2024-2025*
- *Expand Your Practice: Arbitration Do's and Don'ts*

Completed and passed the following professional courses and seminars under the direction of the American Society of Farm Managers and Rural Appraisers (ASFMRA):

- *7-Hour National USPAP Update Course: 2012-2013*
- *Integrated Approaches to Value*

Completed the following real estate appraisal seminars and courses:

- *Comprehensive Appraisal Workshop, Ted Whitmore Seminars*
- *A Comprehensive Review of Appraisal Concepts, John H. Urubek Appraisal*
- *Supervisor-Trainee Course for Oregon, McKissock*
- *Supervisor-Trainee Course for Washington, McKissock*
- *Introduction & Fundamentals of Modeling with SPSS, Thimgan & Associates*
- *Intermediate Residential Modeling with SPSS, Thimgan & Associates*

Certified under the Appraisal Institute's voluntary program of continuing education for its designated members. MAIs who meet the minimum standards of this program are awarded periodic educational certification.

PROFESSIONAL TEACHING

Approved Appraisal Institute instructor for the following: *Uniform Appraisal Standards for Federal Land Acquisitions: Practical Applications*, *Quantitative Analysis*, and *Rapid Response: Market Analysis in Volatile Markets*.

RECOGNITIONS

2007 Crommelin Scholarship Award, Chicago Chapter of the Appraisal Institute

AVIATION

RATINGS

Federal Aviation Administration, Private Pilot License, Certificate No. 4439678, (Issued 6/3/2022)

Federal Aviation Administration, Remote Pilot Rating, Certificate No. 4164102 (Recurrency Expires 07/31/2024)

AVIATION

ORGANIZATIONS

Member and Airport Support Network (ASN) volunteer, Aircraft Owners and Pilots Association (AOPA)

AVIATION

TRAINING

Completed and passed the following aviation courses, seminars and workshops:

- *A-116: General Awareness Security Training*
- *A-200: Mishap Review*
- *A-100: Basic Aviation Safety*
- *A-110: Aviation Transportation of Hazardous Materials*
- *A-103: FAA NOTAM System*
- *A-203: Basic Airspace*
- *M-3: DOI Aviation Management Training for Supervisors*
- *A-450: Small Unmanned Aircraft System (sUAS) Basic Remote Pilot Course*
- *A-454: Small Unmanned Aircraft System (sUAS) Add-on Course*
- *A-452R: Small Unmanned Aircraft System (sUAS) Remote Pilot Refresher*
- *Agisoft Metashape Photogrammetry Course*
- *WP01101885: Understanding Airspace*
- *WP01101970: Intro to Weather Briefings*
- *CRS-PVT: Complete Learn to Fly Course (Private Path)*
- *NM09102586: Safety Issues near the Deschutes VOR*
- *GL05104026: ForeFlight Advanced Tips and New Features Update*
- *WP01106255: ForeFlight VFR Flight Planning 101*
- *WP01106256: ForeFlight VFR Flight Planning 201*
- *WP01107695: Setting Up Your Airplane in ForeFlight*
- *ALC-784: NAFI – Pilot Training from a Mechanic*
- *CRS-G1K: Garmin G1000 Checkout Course*
- *ALC-515: Part 107 Small UAS Recurrent – Part 61 Pilots*
- *Aircraft Performance Calculations*
- *Wax On Wax Off – Techniques to Spotless Landings*
- *Daytona Beach Special Focus Runway Safety Action Team Meeting*
- *CRS-VFRCOM: VFR Communications Course*
- *Flight Planning with EFB – A ForeFlight Workshop*
- *Aviation Emergencies First Responder Training: Phase I*

VERIFICATION

I, Charles W. Rex III, MAI, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this verified statement.

Executed on May 2, 2024.

A handwritten signature in black ink, appearing to read 'Charles W. Rex III', written in a cursive style.

Charles W. Rex III, MAI