

**CITY OF GALLUP  
AND  
McKINLEY COUNTY  
NEWMEXICO**

**PRELIMINARY ENGINEERING REPORT**

**FOR  
CITY OF GALLUP  
SEWER SERVICE**

**PROPOSAL OF  
THE KACHINA SEWER LINE  
FOR  
40 ACRE CARBON COAL ROAD DEVELOPMENT  
WITHIN SECTION 5, T15N R18W N.M.P.M.  
MCKINLEY COUNTY, NEW MEXICO**



**MAY 2021**

**DePauli Engineering & Surveying, LLC.  
307 S. 4<sup>th</sup> St.  
Gallup, New Mexico 87301**



A handwritten signature in blue ink, appearing to read 'Tyler K.G. Scott Payton', written over the professional engineer seal.

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## **I. Introduction**

DePauli Engineering and Surveying, LLC (DES) considered the feasibility of providing City of Gallup sewer service to the proposed 40-Acre Carbon Coal Road Development located north of Gallup, in Section 5 T15N R18W. The sewer project is proposed as part of a 40-acre economic development project to utilize Carbon Coal Road.

Development of the proposed project included considering the City of Gallup's aging sewer infrastructure, completeness of planned sewer infrastructure projects, type of sewer service to provide, and cost.

DES utilized SewerCAD<sup>®</sup> sewer system modelling software to simulate the entirety of the City of Gallup's current sewer collection and treatment systems. SewerCAD<sup>®</sup> provided a means to predict the impact of the 40-acre Carbon Coal Road Development on City of Gallup sewer infrastructure.

Several alternatives were selected based on the available sewer capacity of an improved City of Gallup sewer system. Planned improvements include northern interceptor, western trunk sewer line, and upgrades to the wastewater treatment plant (WWTP).

Utilizing the results from SewerCAD<sup>®</sup>, DES proposes to the City of Gallup that a lateral gravity sewer line, known as the Kachina Sewer Line, be constructed for the proposed 40-Acre Carbon Coal Road Development. The proposed Kachina Sewer Line will include other potential developments.

## **II. Project Planning and Development**

The area considered for the 40-Acre Carbon Coal Road Development and the proposed Kachina Sewer Line is mostly undeveloped. Appendix A provides a map of the 40-acre area and proposed Kachina Sewer Line alignment. The proposed Kachina Sewer Line will be approximately 2 miles in length and will end at Carbon Coal Road. The capability of the proposed sewer line is dependent on the City of Gallup upgrading its northern interceptor and WWTP. With planned and proposed infrastructure upgrades the City of Gallup's sewer system can take up to an excess of 150,000 gallons per day (GPD).

DES estimated anticipated sewer flow to be 235 gallons per day per acre (GPDPA) for all proposed development. The sewer flow was extrapolated based on current sewer usage measured at the City of Gallup WWTP and existing developed areas. Current wastewater treatment is approximately 2.3 to 2.5 million gallons per day. The WWTP is located approximately 4 miles away from the 40-Acre Carbon Coal Road Development.

DES utilized SewerCAD<sup>®</sup> sewer system modelling software to predict various sewer system scenarios to propose the most viable option for the City of Gallup to provide sewer service to the 40-Acre Carbon Coal Road Development. Proposed sewer discharge from the 40-Acre Carbon Coal Road Development was included in the model to assess its impact on existing and planned City of Gallup sewer systems.

Model inputs included current, anticipated, and proposed sewer flows into existing and planned City of Gallup sewer infrastructure. The model is based on the previous modelling

effort completed in 2009 with planned and updated sewer infrastructure including lift-stations and gravity sewer lines. The model was updated to include anticipated sewer flows from currently undeveloped areas within and adjacent to the City of Gallup.

### III. Existing Facilities

The 40-Acre Carbon Coal Road Development would impact the existing, ageing, sewer system. The proposed Kachina Sewer Line is planned to have a normal capacity of 450,000 GPD. The impact of the development would be less severe with an improved headworks facility at the WWTP and planned western trunk sewer line. The proposed Kachina Sewer Line cannot be built without the construction of the planned northern interceptor.

The City of Gallup sewer system, as modelled, is depicted in Figure 1A. Important sewer infrastructure is labelled in Figure 1B. Figure 1 shows planned infrastructure, including replacement of the city’s northern interceptor and western trunk sewer line, upgrades to the WWTP, and proposed Kachina Sewer Line for the 40-Acre Carbon Coal Road Development.

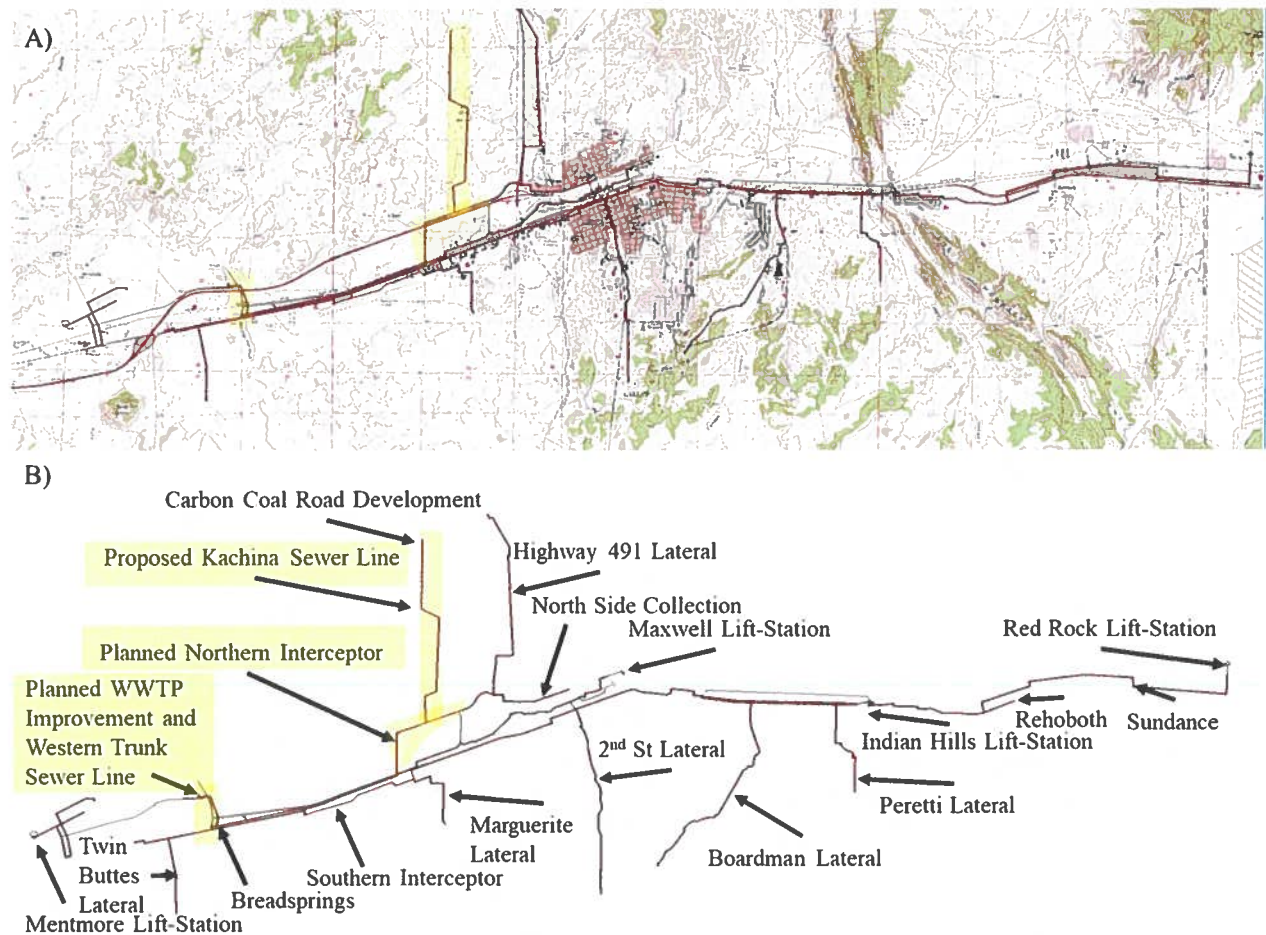


Figure 1: A) City of Gallup sewer system overview and B) major sewer infrastructure components. Planned and proposed projects are highlighted in yellow.

#### **IV. Alternatives Selection**

Three alternatives were considered for the 40-Acre Carbon Coal Road Development and were modelled in SewerCAD<sup>®</sup>. The alternatives differed only in the amount of sewer flow at the 40-Acre Carbon Coal Road Development location depicted in figure 1.

Software inputs for each alternative included ground elevations, manhole rim elevations, pipe inverts, and lift (pumping) station pump curves. Pipe material and diameter and lift station vault geometry were also included in the analysis. Sewer collection flows were simulated as fixed or with diurnal patterns.

Alternative 1- Includes anticipated sewer loads for existing, planned, and proposed sewer infrastructure improvements. Infrastructure improvements included planned northern interceptor sewer line, western trunk sewer line to the WWTP, WWTP intake, and proposed Kachina Sewer Line. This alternative only considered the normal estimate of 9,400 GPD sewer flow at the 40-Acre Carbon Coal Road Development. This alternative did not represent additional sewer flow at the 40-acre Carbon Coal Road Development.

Alternative 2- Greater than 150,000 GPD Scenario- Predicting surcharging if an excess 150,000 GPD fixed sewer flow was included as part of the 40-Acre Carbon Coal Road Development. This sewer flow was applied to the model as an addition to Alternative 1 planned loading conditions described in Alternative 1.

Alternative 3- 150,000 GPD or less Scenario- Predicting surcharging if 150,000 GPD or less fixed sewer flow was included as part of the 40-Acre Carbon Coal Road Development. This sewer flow was applied to the model as an addition to Alternative 1 planned loading conditions described in Alternative 1.

In summary, Alternative 1 and 3 will not surcharge the planned City of Gallup Sewer System. Additional simulation predicted a surcharged sewer system with any flow greater than 150,000 GPD from the 40-Acre Carbon Coal Road Development.

Using the results from DES's sewer system modelling effort it is determined that the planned City of Gallup sewer system will have an excess of 150,000 GPD sewer capacity. If additional sewer capacity is required two alternatives could involve replacement or slip-lining of existing sewer line lying with the B.N.S.F right of way. Further analysis is required to consider the best alternative for increasing the City of Gallup Sewer System capacity.

## V. Proposed Project

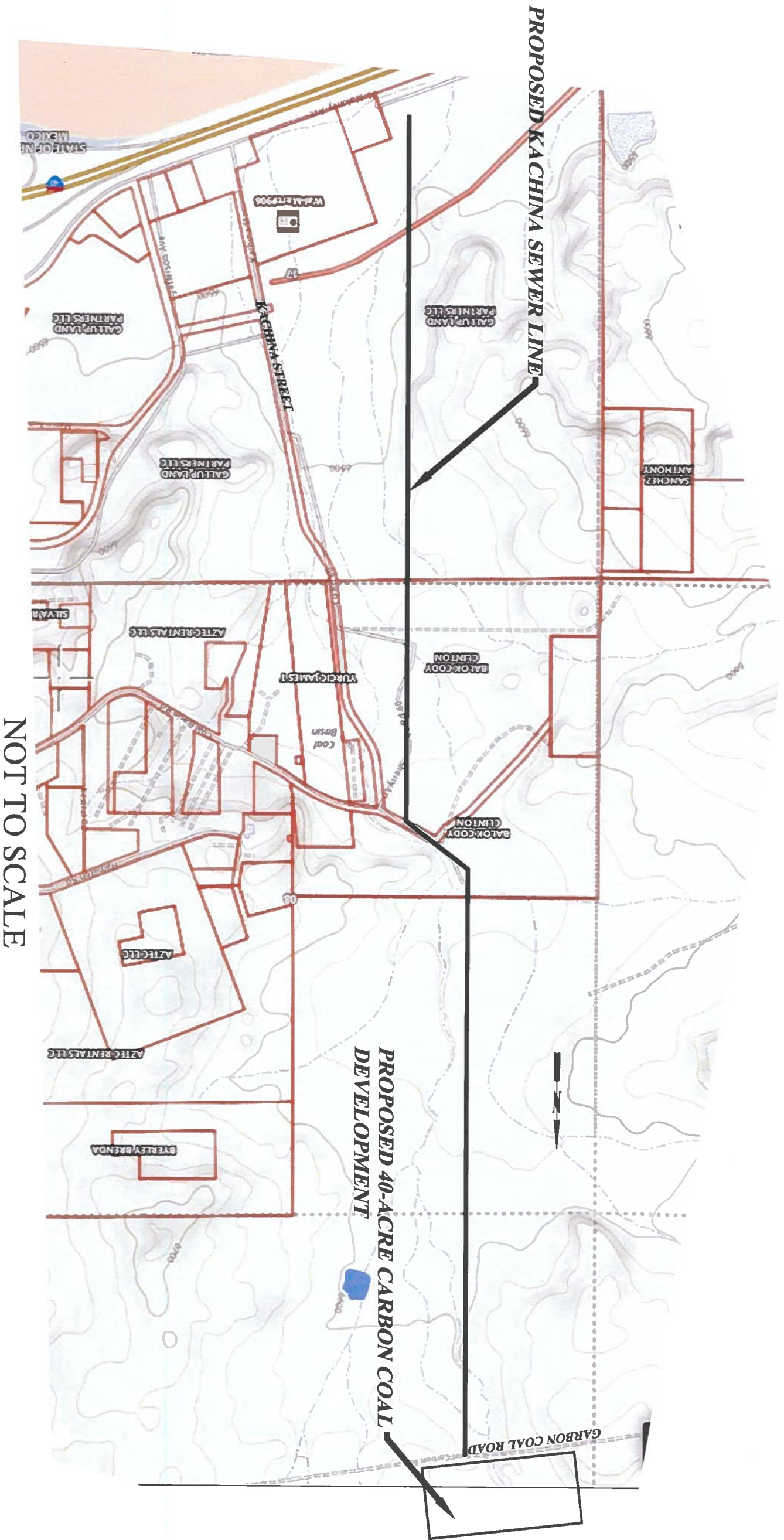
DES proposes to the City of Gallup that the Kachina Sewer Line be designed and constructed to provide sewer service for the 40-Acre Carbon Coal Road Development. The proposed Kachina Sewer Line will be designed to handle approximately 600,000 gallons of wastewater per day. The sewer line will consist of manholes spaced at 300 feet and a combination of 12-in., 10-in., and 8-in. PVC sewer pipe. The estimated cost of the proposed project is \$2,538,000.00. Appendix B includes Preliminary Engineer's Estimates for the Probable Project Cost, included as sheet 1 of Appendix B, and Construction Cost, included as sheet 2 of Appendix B, for the Kachina Sewer Line.

## **Appendix A**

**Proposed Alignment for Kachina Sewer Line  
for the  
40- Acre Carbon Coal Road Development  
within Section 5, T15N R18W N.M.P.M.  
McKinley County, New Mexico**



# CITY OF GALLUP, NEW MEXICO KACHINA SEWER LINE



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for the  
**CITY OF GALLUP**  
 MCKINLEY COUNTY, NEW MEXICO

NO.	BY	DATE

CITY OF GALLUP  
 KACHINA SEWER LINE

SCALE:	SHOWN
DATE:	MAY 2021
DESIGN BY:	RP
CHECKED BY:	MAP KAS

**SHEET**  
 1 - 1



## **Appendix B**

**Preliminary Engineer's Estimates of Probable Project  
Cost, sheet 1, and Construction Cost, sheet 2,  
for the  
Proposed Kachina Sewer Line  
for the  
40- Acre Carbon Coal Road Development  
within Section 5, T15N R18W N.M.P.M.  
McKinley County, New Mexico**

DePauli Engineering and Surveying LLC.  
 307 S. 4th St.  
 Gallup NM, 87301

**ENGINEER'S ESTIMATE OF PROBABLE PROJECT COST  
 FOR A NEW SEWERLINE TO CARBON COAL ROAD DEVELOPMENT  
 FROM THE CITY OF GALLUP  
 SHEET 1**

May 2021

ITEM	DESCRIPTION			AMOUNT
1	Archaeology Study			\$35,000.00
2	Biological Study			\$30,000.00
3	Environmental Assessment			\$30,000.00
4	Easement and Right of Way Survey			\$15,000.00
5	Engineering Design			\$183,000.00
6	Construction Management and QA/QC			\$183,000.00
7	Construction			\$1,830,000.00
8	Contingency 10%			\$232,000.00

**Total: \$2,538,000.00**

DePauli Engineering and Surveying LLC.  
 307 S. 4th St.  
 Gallup NM, 87301

**ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST  
 FOR A NEW SEWERLINE TO CARBON COAL ROAD DEVELOPMENT  
 FROM THE CITY OF GALLUP  
 SHEET 2**

May 2021

ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
1	For PVC sewer line with granular bedding and rock free backfill complete and in place for the <b>Unit Price per Linear Foot of:</b>	11500 LF	\$100.00	\$1,150,000.00
2	For 4'-0" diameter Type "A" manholes with all appurtenances, tie-ins, frame and cover, and protective coating system complete and in place for the <b>Unit Price per Each of:</b>	42 EA	\$12,125.00	\$509,250.00
3	For materials testing by an independent lab (soil, concrete, base course and PMBP). This amount to be used for totaling bid. <b>Payment will be made on actual amount of approved invoice.</b>	Allowance	\$30,000.00	\$30,000.00

Subtotal: \$1,689,250.00

Tax @ 8.3125%: \$140,418.91

Construction Total: \$1,829,668.91

Engineering Design: \$182,966.89

Construction Management and QA/QC: \$182,966.89

**Total: \$2,195,602.69**

Note:  
 Costs for Environmental Clearances and Rights of Way acquisition are included on sheet 1 of Appendix B.