TECHNICAL REPORT SUMMARY
PROPPANT SAND RESOURCES AND RESERVES
LAMESA OPERATION

Dawson County, Texas

Prepared For

U.S. SILICA COMPANY

Katy, Texas

By

John T. Boyd Company

Mining And Geological Consultants

Pittsburgh, Pennsylvania

Report No. 3076.018

FEBRUARY 2023

JOHN T. BOYD COMPANY

Mining and Geological Consultants

Chairman
James W. Boyd

President and CEO
John T. Boyd II

Managing Director and COO
Ronald L. Lewis

Vice Presidents
Robert J. Farmer
John L. Weiss
Michael F. Wick
William P. Wolf

Managing Director - Australia
Jacques G. Steenekamp

Managing Director - China
Jisheng (Jason) Han

Managing Director – South America

Carlos F. Barrera

Managing Director – Metals
Gregory B. Sparks

Pittsburgh
4000 Town Center Boulevard, Suite 300

Canonsburg, PA 15317
(724) 873-4400
(724) 873-4401 Fax
jtboydp@jtboyd.com

Denver
(303) 293-8988
jtboydd@jtboyd.com

Brisbane
61 7 3232-5000
jtboydau@jtboyd.com

Beijing
86 10 6500-5854
jtboydcn@jtboyd.com

Bogota
+57-3115382113
jtboydcol@jtboyd.com

www.jtboyd.com

February 22, 2023

JOHN T. BOYD COMPANY

Mining and Geological Consultants

File: 3076.018

U.S. Silica Company
24275 Katy Freeway, Suite 600
Katy, TX 77494-7271

Attention: Mr. Terry Lackey
Mining Director

Subject: Technical Report Summary
Proppant Sand Resources and Reserves
Lamesa Operation
Dawson County, Texas

Ladies and Gentlemen:

The John T. Boyd Company (BOYD) was retained by U.S. Silica Company (U.S. Silica) to complete an independent technical assessment of the proppant sand resource and reserve estimates for the Lamesa Operation as of December 31, 2022.

This technical report summary: (1) summarizes material technical and geoscientific information for the subject mining property, (2) provides the conclusions of our technical assessment, and (3) provides a statement of proppant sand resources and reserves for the Lamesa Operation.

Respectfully submitted,

JOHN T. BOYD COMPANY

By:

John T. Boyd II
President and CEO

q:\eng_wp\3076.018 u.s. silica - lamesa\wp\cover letter.docx

TABLE OF CONTENTS

Page

LETTER OF TRANSMITTAL

TABLE OF CONTENTS

GLOSSARY AND ABBREVIATIONS

1.0 EXECUTIVE SUMMARY 1-1
1.1 Introduction 1-1
1.2 Property Description 1-1
1.3 Geology 1-3
1.4 Exploration 1-3
1.5 Proppant Sand Resources and Reserves 1-4
1.6 Operations 1-5
1.6.1 Mining 1-5
1.6.2 Processing 1-5
1.6.3 Other Infrastructure 1-6
1.7 Financial Analysis 1-7
1.7.1 Market Analysis 1-7
1.7.2 Capital and Operating Cost Estimates 1-7
1.7.3 Economic Analysis 1-8
1.8 Permitting Requirements 1-10
1.9 Conclusions 1-10

2.0 INTRODUCTION 2-1
2.1 Registrant 2-1
2.2 Terms of Reference and Purpose 2-1
2.3 Expert Qualifications 2-2
2.4 Principal Sources of Information 2-3
2.5 Personal Inspections 2-3
2.6 Report Version 2-4
2.7 Units of Measure 2-4

3.0 PROPERTY DESCRIPTION 3-1
3.1 Location 3-1
3.2 Property Rights 3-1
3.3 Encumbrances 3-1
3.3.1 Fees and Royalties 3-1
3.3.2 Permitting Requirements 3-3
3.3.3 Mining Restrictions 3-3
3.3.4 Other Significant Factors or Risks 3-3

4.0 PHYSIOGRAPHY, ACCESSIBILITY, AND INFRASTRUCTURE 4-1
4.1 Topography, Elevation, and Vegetation 4-1
4.2 Accessibility 4-1
4.3 Climate 4-1
4.4 Infrastructure Availability and Sources 4-2

TABLE OF CONTENTS - Continued

Page

5.0 HISTORY 5-1
5.1 Reserve Acquisition 5-1
5.2 Mine Development 5-1

6.0 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT 6-1
6.1 Regional Geology 6-1
6.2 Local Geology 6-1
6.2.1 General Stratigraphy 6-1
6.2.2 Structural Geology 6-2
6.3 Property Geology 6-3

7.0 EXPLORATION DATA 7-1
7.1 Background 7-1
7.2 Exploration Procedures 7-1
7.2.1 Drilling 7-1
7.2.2 Sampling Procedures 7-2
7.2.3 Sand Testing 7-3
7.2.4 Other Exploration Methods 7-4
7.3 Exploration Results 7-4
7.3.1 Summary of Exploration 7-4
7.3.2 Sand Quality 7-4
7.3.3 Grain Size Distribution 7-6
7.3.4 Proppant Sand Quality 7-6
7.4 Data Verification 7-7
7.5 Adequacy of Exploration and Sampling 7-8

8.0 SAMPLE PREPARATION, ANALYSIS, AND SECURITY 8-1

9.0 DATA VERIFICATION 9-1

10.0 MINERAL PROCESSING AND METALLURGICAL TESTING 10-1

11.0 PROPPANT SAND RESOURCE ESTIMATE 11-1
11.1 Applicable Standards and Definitions 11-1
11.2 Proppant Sand Resources 11-2
11.2.1 Methodology 11-2
11.2.2 Estimation Criteria 11-2
11.2.3 Classification 11-3
11.2.4 Proppant Sand Resource Estimate 11-5
11.2.5 Validation 11-5

12.0 PROPPANT SAND RESERVE ESTIMATE 12-1
12.1 Applicable Standards and Definitions 12-1
12.2 Proppant Sand Reserves 12-2
12.2.1 Methodology 12-2
12.2.2 Classification 12-3
12.2.3 Proppant Sand Reserve Estimate 12-5
12.2.4 Reconciliation with Previous Estimates 12-6

TABLE OF CONTENTS - Continued

Page

13.0 MINING METHODS 13-1
13.1 Mining Operation 13-1
13.2 Mine Equipment and Staffing 13-2
13.2.1 Mine Equipment 13-2
13.2.2 Staffing 13-2
13.3 Engineering and Planning 13-3
13.4 Mining Sequence and Production 13-3

14.0 PROCESSING OPERATIONS 14-1
14.1 Overview 14-1
14.1.1 Wet Processing Plant 14-1
14.1.2 Dry Processing Plant 14-3
14.2 Production 14-3
14.3 Conclusion 14-3

15.0 MINE INFRASTRUCTURE 15-1
15.1 Overview 15-1
15.2 Transportation 15-1
15.3 Utilities 15-1
15.4 Tailings Disposal 15-2
15.5 Other Structures 15-2

16.0 MARKET STUDIES 16-1
16.1 Market Overview 16-1
16.2 Historical Sales 16-2
16.3 Market Outlook 16-2

17.0 PERMITTING AND COMPLIANCE 17-1
17.1 Permitting 17-1
17.2 Compliance 17-2
17.3 Post-Mining Land Use and Reclamation 17-3
17.4 Community Engagement 17-3

18.0 CAPITAL AND OPERATING COSTS 18-1
18.1 Historical Financial 18-1
18.2 Estimated Costs 18-2
18.2.1 Projected Capital Expenditures 18-2
18.2.2 Projected Operating Costs 18-3

19.0 ECONOMIC ANALYSIS 19-1
19.1 Approach 19-1
19.2 Assumptions and Limitations 19-2
19.3 Financial Model Results 19-2
19.4 Sensitivity Analysis 19-5

20.0 ADJACENT PROPERTIES 20-1

Page

21.0 OTHER RELEVANT DATA AND INFORMATION 21-1

22.0 INTERPRETATION AND CONCLUSIONS 22-1
22.1 Audit Findings 22-1
22.2 Significant Risks and Uncertainties 22-1

23.0 RECOMMENDATIONS 23-1

24.0 REFERENCES 24-1

25.0 RELIANCE ON INFORMATION PROVIDED BY REGISTRANT 25-1

Page

List of Tables

1.1 Lamesa Operation Proppant Sand Resources (as of December 31, 2022) 1-4
1.2 Lamesa Operation Proppant Sand Reserves (as of December 31, 2022) 1-4
1.3 Financial Results 1-9
1.4 DCF-NPV Analysis 1-9
7.1 Weighted Average Particle Size Distribution 7-6
7.2 Lamesa Operation Proppant Sand Characteristics 7-7
11.1 Proppant Sand Resource Classification Criteria 11-4
11.2 Lamesa Operation Proppant Sand Resources (as of December 31, 2022) 11-5
12.1 Lamesa Operation Proppant Sand Reserves (as of December 31, 2022) 12-5
13.1 Employees by Classification 13-2
16.1 Historical Sales Data 16-2
18.1 Historical Financials 18-1
18.2 Projected Capital Costs 18-2
19.1 Annual Production and Cash Flow Forecast Lamesa Operation 19-3
19.2 Financial Results 19-4
19.3 DCF-NPV Analysis 19-4
19.4 After-Tax $NPV_{12.5}$ Sensitivity Analysis ($ millions) 19-5
25.1 Information Relied Upon from Registrant 25-1

Page

List of Figures

1.1 General Location Map 1-2
3.1 Map Showing Site Layout Lamesa Operation 3-2
6.1 Generalized Stratigraphic Chart Surficial Deposits of Dawson County, Texas 6-1
6.2 Map Showing Proppant Sand Thickness Isopaches Lamesa Operation 6-4
6.3 Cross-Section A – A' Lamesa Operation 6-5
7.1 Map Showing Drill Hole Locations Lamesa Operation 7-5
12.1 Relationship Between Mineral Resources and Mineral Reserves 12-2
12.2 Map Showing Mineral Reserve Classification Lamesa Operation 12-4
13.1 Loading Operations at the Lamesa Operation 13-1
13.2 Recent Historical and LOM Forecasted Mining Production 13-3
13.3 Map Showing Life-of-Mine Plan Lamesa Operation 13-5
14.1 Simplified Flow Sheet Lamesa Operation 14-2
14.2 Recent Historical and LOM Forecasted Processing Plant Production 14-3

GLOSSARY OF ABBREVIATIONS AND DEFINITIONS

000	:	Thousand(s)
$	:	US dollar(s)
%	:	Percent or percentage
AEI	:	Associated Environmental Industries, Corp.
AMSL	:	Above mean sea level
API	:	American Petroleum Institute
ARO	:	Asset Retirement Obligation(s)
ASP	:	Average Selling Price
ASTM	:	ASTM International (formerly American Society for Testing and Materials)
BNSF	:	BNSF Railway Company
BOYD	:	John T. Boyd Company
CapEx	:	Capital expenditures
Constant Dollar	:	A monetary measure that is not influenced by inflation and used to compare time periods. Sometimes referred to as “real dollars”.
CSX	:	CSX Transportation
DCF	:	Discounted Cash Flow
Discount Rate	:	A rate of return used to discount future cash flows based on the return investors expect to receive from their investment.
E&P	:	Exploration and Production
EBIT	:	Earnings before interest and taxes
EBITDA	:	Earnings before interest, taxes, depreciation, and amortization
ESA	:	Environmental Site Assessment
Frac Sand	:	*See “Proppant Sand”*

ft	:	Foot/feet
Indicated Proppant Sand Resource	:	That part of a proppant sand resource for which quantity and quality are estimated based on adequate geological evidence and sampling. The level of geological certainty associated with an indicated proppant sand resource is sufficient to allow a qualified person to apply modifying factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Because an indicated proppant sand resource has a lower level of confidence than the level of confidence of a measured proppant sand resource, an indicated proppant sand resource may only be converted to a probable proppant sand reserve.
Inferred Proppant Sand Resource	:	That part of a proppant sand resource for which quantity and quality are estimated based on limited geological evidence and sampling. The level of geological uncertainty associated with an inferred proppant sand resource is too high to apply relevant technical and economic factors likely to influence the prospects of economic extraction in a manner useful for evaluation of economic viability. Because an inferred proppant sand resource has the lowest level of geological confidence of all proppant sand resources, which prevents the application of the modifying factors in a manner useful for evaluation of economic viability, an inferred proppant sand resource may not be considered when assessing the economic viability of a mining project, and may not be converted to a proppant sand reserve.
IRR	:	Internal rate-of-return
ISO		International Organization for Standardization
ISP	:	Industrial and Specialty Products
lb	:	Pound
LOM	:	Life-of-Mine
Lyntegar	:	Lyntegar Electric Cooperative, Inc.

Measured Proppant Sand Resource	:	That part of a proppant sand resource for which quantity and quality are estimated based on conclusive geological evidence and sampling. The level of geological certainty associated with a measured proppant sand resource is sufficient to allow a qualified person to apply modifying factors, as defined herein, in sufficient detail to support detailed mine planning and final evaluation of the economic viability of the deposit. Because a measured proppant sand resource has a higher level of confidence than the level of confidence of either an indicated proppant sand resource or an inferred proppant sand resource, a measured proppant sand resource may be converted to a proven proppant sand reserve or to a probable proppant sand reserve
Mesh	:	A measurement of particle size often used in determining the size distribution of granular material.
Mineral Reserve	:	*See "Proppant Sand Reserve"*
Mineral Resource	:	*See "Proppant Sand Resource"*
Modifying Factors		The factors that a qualified person must apply to indicated and measured proppant sand resources and then evaluate to establish the economic viability of proppant sand reserves. A qualified person must apply and evaluate modifying factors to convert measured and indicated proppant sand resources to proven and probable proppant sand reserves. These factors include but are not restricted to: mining; processing; infrastructure; economic; marketing; legal; environmental compliance; plans, negotiations, or agreements with local individuals or groups; and governmental factors. The number, type and specific characteristics of the modifying factors applied will necessarily be a function of and depend upon the mineral, mine, property, or project.
MSHA	:	Mine Safety and Health Administration. A division of the U.S. Department of Labor
MSGP	:	Multi-Sector General Permit
NTU	:	Nephelometric turbidity units.
NPV	:	Net Present Value
O&G	:	Oil and Gas

GLOSSARY OF ABBREVIATIONS AND DEFINITIONS - Continued

Probable Proppant Sand Reserve	:	The economically mineable part of an indicated and, in some cases, a measured proppant sand resource.
Production Stage Property	:	A property with material extraction of proppant sand reserves.
Proppant Sand	:	Proppant (frac) sand is a naturally occurring, high silica content quartz sand, with grains that are generally well rounded and exhibit high compressive strength characteristics relative to other proppant sand. It is utilized as a prop or “proppant” in unconventional shale frac well completions.
Proppant Sand Reserve	:	Proppant sand reserve is an estimate of tonnage and grade or quality of indicated and measured proppant sand resources that, in the opinion of the qualified person, can be the basis of an economically viable project. More specifically, it is the economically mineable part of a measured or indicated Proppant sand resource, which includes diluting materials and allowances for losses that may occur when the material is mined or extracted.
Proppant Sand Resource	:	Proppant sand resource is a concentration or occurrence of material of economic interest in or on the Earth's crust in such form, grade or quality, and quantity that there are reasonable prospects for economic extraction. A proppant sand resource is a reasonable estimate of mineralization, taking into account relevant factors such as cut-off grade, likely mining dimensions, location or continuity, that, with the assumed and justifiable technical and economic conditions, is likely to, in whole or in part, become economically extractable. It is not merely an inventory of all mineralization drilled or sampled.
Proven Proppant Sand Reserve	:	The economically mineable part of a measured proppant sand resource which can only result from conversion of a measured proppant sand resource.
PSI	:	Pounds per square inch
PST	:	Petroleum Storage Tank
QP	:	Qualified Person

Qualified Person	:	An individual who is: 1. A mineral industry professional with at least five years of relevant experience in the type of mineralization and type of deposit under consideration and in the specific type of activity that person is undertaking on behalf of the registrant; and 2. An eligible member or licensee in good standing of a recognized professional organization at the time the technical report is prepared. For an organization to be a recognized professional organization, it must: a. Be either: i. An organization recognized within the mining industry as a reputable professional association; or ii. A board authorized by U.S. federal, state, or foreign statute to regulate professionals in the mining, geoscience, or related field; b. Admit eligible members primarily based on their academic qualifications and experience; c. Establish and require compliance with professional standards of competence and ethics; d. Require or encourage continuing professional development; e. Have and apply disciplinary powers, including the power to suspend or expel a member regardless of where the member practices or resides; and f. Provide a public list of members in good standing.
ROM	:	Run-of-Mine. The processing feed material, including proppant sand and any inseparable waste, excavated from the mine.
SEC	:	U.S. Securities and Exchange Commission
S-K 1300	:	Subpart 1300 and Item 601(b)(96) of the U.S. Securities and Exchange Commission's Regulation S-K
SWPPP	:	Stormwater Pollution Prevention Plan
Ton	:	Short Ton. A unit of weight equal to 2,000 pounds
TCEQ	:	Texas Commission on Environmental Quality
U.S. Silica	:	U.S. Silica Company, its parent company (U.S. Silica Holdings, Inc.) and its consolidated subsidiaries as a combined entity.
WIP	:	Work-in-progress

1.0 EXECUTIVE SUMMARY

1.1 Introduction

Commissioned in 2018, U.S. Silica's Lamesa Operation is an active surface mining and processing operation that produces a range of finished proppant (frac) sand products.

BOYD prepared this technical report summary for U.S. Silica in support of their disclosure of proppant sand reserves for the Lamesa Operation in accordance with Subpart 1300 and Item 601(b)(96) of the SEC's Regulation S-K (S-K 1300). The purpose of this report is threefold: (1) to summarize material technical and geoscientific information for the subject mining property, (2) to provide the conclusions of our technical assessment, and (3) to provide a statement of proppant sand resources and/or reserves for the Lamesa Operation.

Information used in our assessment was obtained from: (1) files provided by U.S. Silica, (2) discussions with U.S. Silica personnel, (3) records on file with regulatory agencies, (4) public sources, and (5) nonconfidential information in BOYD's possession.

Unless otherwise noted, the effective date of the information, including estimates of proppant sand resources and reserves, is December 31, 2022.

Weights and measurements are expressed in the US customary measurement system throughout this report.

1.2 Property Description

U.S. Silica's Lamesa Operation is located northwest of the City of Lamesa in Dawson County, Texas. The cities of Lubbock and Dallas, Texas, are located approximately 56 miles northeast and 312 miles east, respectively, of the Lamesa Operation. The general location of the Lamesa Operation is provided in Figure 1.1, following this page.

The property comprises ±3,523 generally contiguous acres of surface and mineral rights wholly owned by U.S. Silica. The Lamesa Operation's mine offices, maintenance facilities, processing plant, loadout facilities, and tailings ponds are located on the northeast corner of the property, while the active and future mining areas are located to the west.

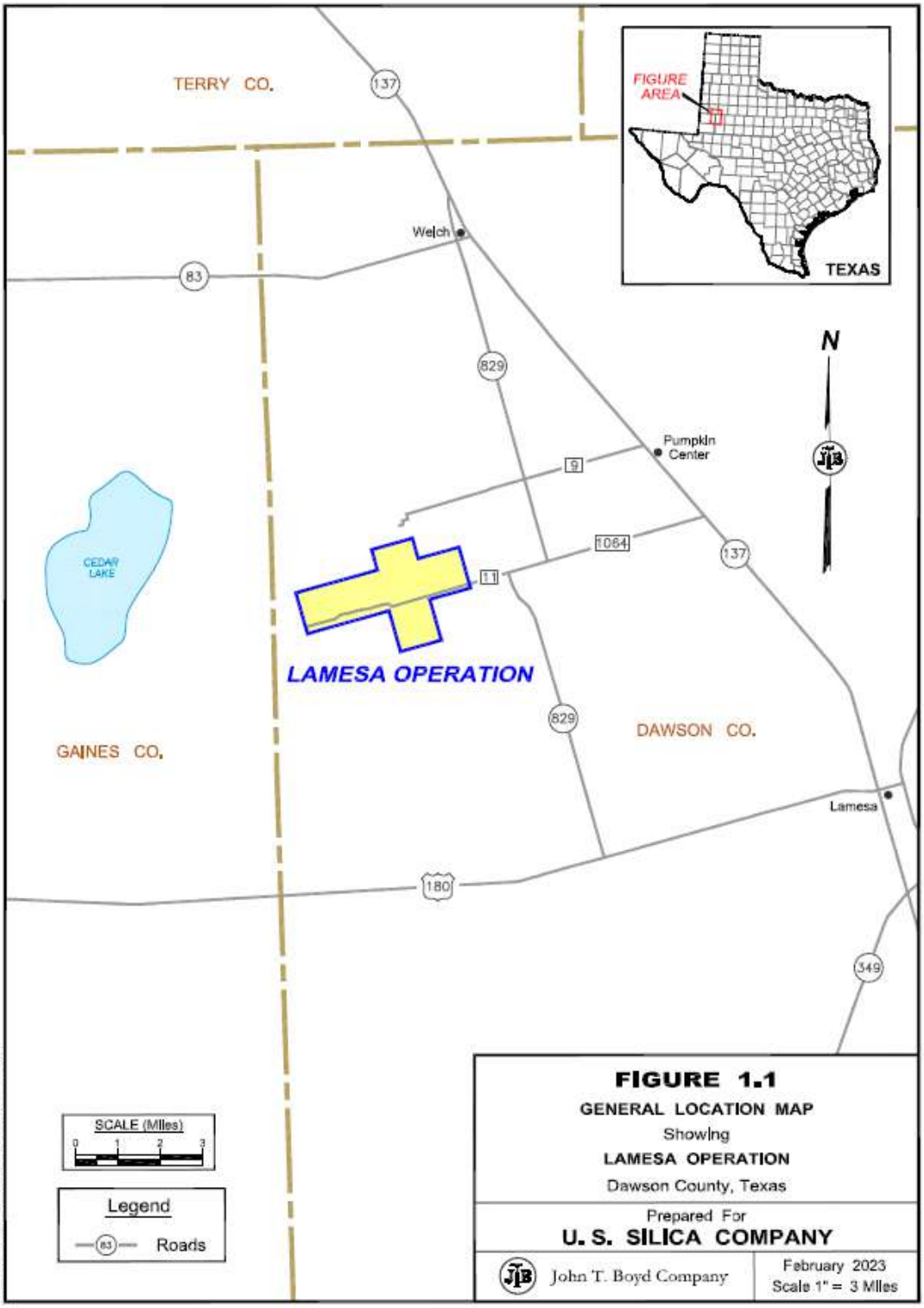


FIGURE 1.1

GENERAL LOCATION MAP

Showing

LAMESA OPERATION

Dawson County, Texas

Prepared For

U. S. SILICA COMPANY

John T. Boyd Company

February 2023

Scale 1" = 3 Miles

1.3 Geology

Most of the Lamesa property is covered by gently rolling Quaternary sheet and dune sands. Two surficial sand units have been targeted for mining—an upper clean sand unit and an underlying clayey cover sand unit.

Exploration data indicate the clean sand unit generally consists of unconsolidated, fine- to medium-grained, well sorted and subangular to rounded sand grains, ranging in thickness from 13 to 46 ft. The clean sand is noted as containing generally less than 10% to 15% of very fine (clay) material. The central and western extents of the Lamesa property exhibit the clean sand unit at the surface, thinning to the east, and the unit is absent over the eastern-most third of the property. The limit of the clean sand deposit is delineated by a clearly visible “dune line” running north to south and bisecting the subject property.

East of the dune line, the cover sand unit is present at the surface. The cover sand is also present and underlies nearly all the clean sand west of the dune line on the Lamesa property. Geologic logs describe this unit as consisting of a clayey, hard sandstone interval, with very fine- to medium-grained, subangular to rounded sand grains, ranging in thickness from 0 to 25 ft. The cover sand is noted as consisting of 15% to 45% fine material due to this unit’s higher clay content.

Where covered, the sand is overlain by a negligible layer of overburden material consisting of vegetation and oversize rock. The two sand units are generally mineable from the ground surface down to the basal red clay unit. Combined thickness of both sand units ranges from 25 to 65 ft across the property.

1.4 Exploration

During 2017 and 2018, U.S. Silica has completed three geologic exploration campaigns in and around the Lamesa property. U.S. Silica provided data collected from 49 drill holes completed in and around the Lamesa property that were utilized to define the lateral extent, thickness, particle size distribution, and proppant sand characteristics of the target sand deposit.

BOYD’s audit indicates that in general: (1) U.S. Silica has performed extensive drilling and sampling work on the subject property, (2) the work completed has been done by competent personnel, and (3) the amount of data available combined with extensive knowledge and recent production of the Llano Estacado deposit are sufficient to confirm the thickness, lateral extents, and quality characteristics of the Lamesa proppant sand reserves.

1.5 Proppant Sand Resources and Reserves

As shown in Table 1.1, below, U.S. Silica owns approximately 5.4 million in place tons of measured and indicated proppant sand resources and 5.0 million in place tons of inferred proppant sand resources, *exclusive* of proppant sand reserves, at the Lamesa Operation, as of December 31, 2022.

Table 1.1: Lamesa Operation Proppant Sand Resources[1] (as of December 31, 2022)

Classification	In-Place Tons (000)
Measured	622
Indicated	4,748
Total Measured + Indicated	5,370
Inferred	5,002

Notes:
1. Proppant sand resources are reported *in addition to* proppant sand reserves.

While these “additional” proppant sand resources have not been included in the Lamesa Operation’s life-of-mine (LOM) plan, they are considered to have prospects for eventual economic extraction by virtue of their similarity—in terms of demonstrated extraction methods and expected finished product qualities—to those converted to proppant sand reserves.

U.S. Silica’s estimated surface mineable proppant sand reserves for the Lamesa Operation total 79.6 million saleable product tons remaining as of December 31, 2022. The proppant sand reserves are fully owned by U.S. Silica and are summarized in Table 1.2, below.

Table 1.2: Lamesa Operation Proppant Sand Reserves (as of December 31, 2022)

	Tons (000)	
Classification	Mineable	Saleable
Proven	93,311	69,983
Probable	12,800	9,600
Total	106,111	79,583

The Lamesa Operation has a well-established commercial history of mining, processing, and selling proppant sand products to a variety of customers. BOYD has concluded that sufficient studies have been undertaken to enable the proppant sand resources to be converted to proppant sand reserves based on proposed operating methods and forecasted costs and revenues.

1.6 Operations

1.6.1 Mining

Contractors are employed to conduct surface mining on the central and western portions of the Lamesa property. The Llano Estacado sand is excavated using conventional truck and excavator methods. The negligibly thin layer of overburden is mined with the unconsolidated sand dunes. The sand does not require drilling or blasting. A front-end loader is used to load articulated haul trucks with disaggregated sand. The haul trucks deliver raw sand material to run-of-mine (ROM) stockpile located near processing facilities.

Over the past four years, the operation has mined almost 20 million tons of raw sand. During late 2019 and 2020, production fell due to the COVID-19 pandemic from roughly 4.8 million ROM tons per year to 4.2 million ROM tons. U.S. Silica's LOM plan forecasts mining 106.1 million ROM tons of sand at a rate of 6.1 million tons in 2023 increasing to 8.0 million by 2037 and ending in 2038.

BOYD reviewed the LOM plans for U.S. Silica's Lamesa Operation to determine whether the plans: (1) utilize generally accepted engineering practices, and (2) align with historical and industry norms. Based on our assessment, it is BOYD's opinion that the forecasted production levels for the Lamesa Operation are reasonable, logical, and consistent with typical sand mining practices in the west Texas region and historical results achieved by U.S. Silica.

1.6.2 Processing

The Lamesa Operation's Wet and Dry Processing Plants are located toward the eastern end of the site.

Mined ROM material from the pit arrives at the Wet Processing Plant by truck, where it is screened and washed to remove vegetation, oversize (> 40-mesh) and fine waste (< 200-mesh) material. The remaining material is mixed with water to create a slurry that is passed through a series of desliming cyclones and attrition scrubbers to remove clay and undersized (very fine) particles. The deslimed material is then processed through a

series of hydrosizers, hydro-cyclones, and vacuum filters to remove excess water. The remaining “work-in-progress” (WIP) material is stockpiled outside on a drain pad to further reduce moisture before it is recovered and enters the Dry Processing Plant. . Within the Dry Processing Plant, the WIP sand is dried, sized and sorted. The 40/70-mesh and 100-mesh dry finished products are stored in silos prior to loading in bulk truck for shipment to customers in the Permian Basin.

The processing operations have a nominal capacity of 6.0 million tons of finished sand per year. Based on our review, it is BOYD’s opinion that the processing methods and existing equipment at the plant will be sufficient for the forecasted production levels over the life of the operation.

1.6.3 Other Infrastructure

The Lamesa Operation is supported by various utilities and transportation networks needed to allow processing and transportation of finished proppant sands.

Electricity to the Lamesa site is delivered through an above-ground network that terminates at a substation at the processing facility, and from there electricity is distributed via several underground and above-ground powerlines.

Industrial water is recovered and recycled for reuse whenever possible. Makeup water is obtained from wells drilled on the Lamesa site and neighboring properties. Potable water is delivered in water jugs and bottles.

Natural gas is supplied via several underground pipelines.

Tailings from processing consist generally of clays, silts, and very fine sands, which are typically disposed of in old mining pit impoundments. The tailings ponds are currently located west of the processing plant and are designed to accommodate rejects produced during the next several years of production. At that time, it is expected that mining will have advanced to the west, and the then available mined pits will be used for tailings disposal.

Transportation needs are met through a well-developed road network on both paved and graded dirt roads. The Lamesa Operation is not served by any railroads.

1.7 Financial Analysis

1.7.1 Market Analysis

U.S. Silica supplies a range of proppant sand products to major Oilfield Services companies and Exploration and Production (E&P) companies operating in the Permian Basin. The Lamesa Operation is U.S. Silica's largest of two proppant sand operations in west Texas. Finished proppant sand products supplied by the Lamesa Operation primarily consist of non-API standard 40/140-mesh and "100-mesh" (50/140-mesh) sized sand, with lesser amounts of API standard 40/70-mesh sized sand.

U.S. Silica operates in a highly competitive market that is characterized by a small number of large, national proppant sand producers and a larger number of small, regional or local, privately-owned producers. Competition in the industry is based on: (1) delivered price; (2) product consistency and quality; (3) supply capacity and reliability; and (4) customer service and technical support. The Lamesa Operation's substantial on-site product storage capacity and its strategic, in-basin location allows shipping finished products to regional customers by truck. Since transportation costs are a significant portion of the total cost to customers of proppant sands, development of the Lamesa, Texas plant as a regional frac sand facility in the Permian Basin allows U.S. Silica to compete against proppant sand products being shipped from regional producers as well as from distant states like Wisconsin, Illinois, and Missouri.

U.S. Silica's product sales were materially impacted by the COVID-19 pandemic, with sales dropping precipitously in 2020. However, their sales volumes and revenues have recovered substantially, and continued growth is expected over the long-term.

1.7.2 Capital and Operating Cost Estimates

The Lamesa Operation's financial performance over the last years is summarized as follows:

- Average realization (selling price) for finished proppant sand products increased significantly from $21.85 per ton sold in 2020 to $31.39 per ton sold in 2022.
- Total cash cost of sales increased from $10.23 per ton sold in 2020 to $13.94 per ton sold in 2022.
- EBITDA margin increased slightly from 53.2% in 2020 to 55.6% in 2022.
- Capital expenditures totaled almost $4.2 million over the last three years, averaging $0.37 per ton sold.

Forward-looking production and unit cost estimates are based on actual past performance and subject to U.S. Silica's customary internal budget review and approvals

process. In BOYD's opinion, operating volumes are well-defined and understood, as are mining and processing productivities.

The Lamesa Operation and related facilities are fully developed and should not require any near-term major capital investment to maintain full commercial production. Historically, the timing and amount of capital expenditures has been largely discretionary and within U.S. Silica's control. Their budgetary allocations for sustaining and discretionary capital expenditures over the next three years totals $2.8 million. Thereafter, capital expenditures are expected to rise yearly at a rate of 3% annually starting in 2026. BOYD considers the near-term detailed capital expenditure schedule as presented by U.S. Silica to be reasonable and representative of the capital necessary to operate the Lamesa Operation.

Operating cost estimates were developed based on recent actual costs and considering specific operational activity levels and cost drivers. In the near-term, U.S. Silica expects their unit operating costs to stay relatively consistent (on an uninflated basis). As such, the projected total cash cost of sales over the life of the mine is $13.94 per ton sold. As the operation is in a steady state, BOYD considers the future operating cost estimates to be reasonable and appropriate.

1.7.3 Economic Analysis

An economic analysis of the Lamesa Operation was prepared in-house by U.S. Silica as part of their annual budgeting process. The financial model forecasts future free cash flow from proppant sand production and sales over the remaining life of the Lamesa Operation using the annual forecasts of production, sales revenues, and operating and capital costs.

Table 1.3, below, provides a summary of the estimated financial results for the remaining life of the Lamesa Operation.

Table 1.3: Financial Results

	Units	Remaining Life of Mine Total
Remaining Life	years	16
Production:		
ROM Production	000 tons	106,111
Product Sales	000 tons	79,583
Total Revenues	$ millions	1,902.0
Total Cash Costs of Sales	$ millions	1,109.4
Capital Expenditures	$ millions	10.9
Pre-Tax:		
Cash Flow	$ millions	778.3
$NPV_{12.5}$	$ millions	349.8
After-tax:		
Cash Flow	$ millions	658.7
$NPV_{12.5}$	$ millions	296.1

Table 1.4 summarizes the results of the pre-tax and after-tax discounted cash flows (DCF) and net present value (NPV) analyses for the Lamesa Operation.

Table 1.4: DCF-NPV Analysis

	NPV ($ millions)		
	10%	12.5%	15%
Pre-Tax	399.6	349.8	309.6
After-Tax	338.2	296.1	262.2

The NPV estimate was made for purposes of confirming the economic viability of the reported proppant sand reserves and not for purposes of valuing U.S. Silica, the Lamesa Operation, or its assets. Internal rate-of-return (IRR) and project payback were not calculated, as there was no initial investment considered in the financial analysis presented herein.

BOYD reviewed the financial model and its inputs in detail, and opined that model provides a reasonable and accurate reflection of the Lamesa Operation’s expected

economic performance based on the assumptions and information available at the time of our review.

1.8 Permitting Requirements

Numerous permits are required by federal and state law for mining, processing, and related activities at the Lamesa Operation, which U.S. Silica reports are in place or pending approval. New permits or permit revisions may be necessary from time to time to facilitate future operations. Given sufficient time and planning, U.S. Silica should be able to secure new permits, as required, to maintain its planned operations within the context of current regulations.

U.S. Silica reports having an extensive environmental management and compliance process designed to follow or to exceed industry standards.

Mine safety is regulated by the U.S. Department of Labor's Mine Safety and Health Administration (MSHA). MSHA inspects the facilities a minimum of twice yearly. U.S. Silica's safety record compares favorably with its regional peers.

BOYD is not aware of any regulatory violation or compliance issue which would materially impact the proppant sand reserve estimate.

1.9 Conclusions

It is BOYD's overall conclusion that U.S. Silica's estimates of proppant sand reserves for the Lamesa Operation, as reported herein: (1) were prepared in conformance with accepted industry standards and practices, and (2) are reasonably and appropriately supported by technical evaluations, which consider all relevant modifying factors.

It is BOYD's opinion that extraction of the proppant sands reported herein is technically, legally, and economically achievable after the consideration of potentially material modifying factors. The ability of U.S. Silica, or any mine operator, to recover all the reported proppant sand reserves is dependent on numerous factors that are beyond the control of, and cannot be anticipated by, BOYD. These factors include mining and geologic conditions, the capabilities of management and employees, the securing of required approvals and permits in a timely manner, future proppant sand prices, etc. Unforeseen changes in regulations could also impact performance.

2.0 INTRODUCTION

2.1 Registrant

U.S. Silica is a US-based mining company headquartered in Katy, Texas. The company's common stock is listed on the New York Stock Exchange (NYSE:SLCA). U.S. Silica is actively engaged in the production and marketing of commercial silica sand and performance materials (diatomaceous earth, calcium bentonite clay, calcium montmorillonite clay, and perlite products). Their whole grain silica products are used as proppant (frac) sand for oil and natural gas recovery, and in the manufacture of glass, foundry, and building products. U.S. Silica's performance materials are used in: (1) filtration for foods and beverages, pharmaceuticals, and swimming pools; (2) as additives in paint and coatings, plastics and rubber, and agriculture products; and (3) for bleaching, catalysis and adsorption in edible oil processing, aromatics purification, and industrial and chemical applications. Additional information regarding U.S. Silica can be found on their website: www.ussilica.com.

2.2 Terms of Reference and Purpose

U.S. Silica retained BOYD to complete an independent technical assessment of their internally-prepared proppant sand resource and reserve estimates and supporting information for the Lamesa Operation.

BOYD prepared this technical report summary for U.S. Silica in support of their disclosure of proppant sand reserves for the Lamesa Operation in accordance with S-K 1300. The purpose of this report is threefold: (1) to summarize material technical and geoscientific information for the subject mining property, (2) to provide the conclusions of our technical assessment, and (3) to provide a statement of proppant sand resources and/or reserves for the Lamesa Operation.

BOYD's findings are based on our detailed examination of the supporting geologic and other scientific, technical, and economic information provided by U.S. Silica, as well as our assessment of the methodology and practices applied by U.S. Silica in formulating the estimates of proppant sand resources and reserves disclosed in this report. We did not independently estimate proppant sand resources or reserves from first principles.

We used standard engineering and geoscience methods, or a combination of methods, that we considered to be appropriate and necessary to establish the conclusions set forth herein. As in all aspects of mining property evaluation, there are uncertainties

inherent in the interpretation of engineering and geoscience data; therefore, our conclusions necessarily represent only informed professional judgment.

The ability of U.S. Silica, or any mine operator, to recover all of the estimated proppant sand reserves presented in this report is dependent on numerous factors that are beyond the control of, and cannot be anticipated by, BOYD. These factors include mining and geologic conditions, the capabilities of management and employees, the securing of required approvals and permits in a timely manner, future sand prices, etc. Unforeseen changes in regulations could also impact performance. Opinions presented in this report apply to the site conditions and features as they existed at the time of BOYD's investigations and those reasonably foreseeable.

This report is intended for use by U.S. Silica, subject to the terms and conditions of its professional services agreement with BOYD. We also consent to U.S. Silica filing this report as a technical report summary with the SEC pursuant to S-K 1300. Except for the purposes legislated under US securities law, any other uses of or reliance on this report by any third party is at that party's sole risk.

2.3 Expert Qualifications

BOYD is an independent consulting firm specializing in mining-related engineering and financial consulting services. Since 1943, BOYD has completed over 4,000 projects in the United States and more than 60 other countries. Our full-time staff comprises mining experts in: civil, environmental, geotechnical, and mining engineering; geology; mineral economics; and market analysis. Our extensive experience in proppant sand resource and reserve estimation combined with our knowledge of the subject property, provides BOYD an informed basis on which to opine on the reasonableness of the estimates provided by U.S. Silica. An overview of BOYD can be found on our website at www.jtboyd.com.

The individuals primarily responsible for completing this technical assessment and the preparation of this report are by virtue of their education, experience, and professional association considered qualified persons (QPs) as defined in S-K 1300.

Neither BOYD nor its staff employed in the preparation of this report have any beneficial interest in U.S. Silica, and are not insiders, associates, or affiliates of U.S. Silica. The results of our assessment were not dependent upon any prior agreements concerning the conclusions to be reached, nor were there any undisclosed understandings concerning any future business dealings between U.S. Silica and BOYD. This report was

prepared in return for fees based upon agreed commercial rates, and the payment for our services was not contingent upon our opinions regarding the project or approval of our work by U.S. Silica and its representatives.

2.4 Principal Sources of Information

Information used in this assignment was obtained from: (1) files provided by U.S. Silica, (2) discussions with U.S. Silica personnel, (3) records on file with regulatory agencies, (4) public sources, and (5) nonconfidential information in BOYD's possession.

The following information was provided by U.S. Silica:

- Year-end reserve statements and reports for 2021 and 2022.
- Exploration records (e.g., drilling logs and lab sheets).
- Geologic databases of lithology and sand quality.
- Computerized geologic models.
- Mapping data, with:
  - Land ownership boundaries.
  - Infrastructure locations.
  - Easement and right-of-way boundaries.
  - Surveyed topography (surface elevation).
- Mine plans, production schedules, and supporting data.
- Overview of processing operations and detailed flow sheets.
- Copies of mining and operating permits.
- Historical information, including:
  - Production reports.
  - Financial statements.
  - Product sales and pricing.

Information from sources external to BOYD and/or U.S. Silica are referenced accordingly.

The data and work papers used in the preparation of this report are on file in our offices.

2.5 Personal Inspections

A site visit and inspection of the Lamesa Operation was completed on October 26, 2022,
by BOYD's QPs responsible for the preparation of this report. The site visit included: (1) observation of the active mining operations, (2) a tour of the mine site's surface infrastructure, and (3) a tour of the process plant and truck loadouts. BOYD's representatives were accompanied by senior U.S. Silica engineering and management

personnel who openly and cooperatively answered questions regarding, but not limited to: site history; deposit geology; mining and processing operations; near- and long-range mining plans; and proppant sand marketing.

2.6 Report Version

The proppant sand resources and reserves presented in this Technical Report Summary are effective as of December 31, 2022. The effective (i.e., “as of”) date of the report is December 31, 2022.

This is the third Technical Report Summary filed by U.S. Silica for the Lamesa Operation and supersedes the following previously filed reports:

Westward Environmental; February 2022; Technical Report Summary Lamesa Site, Dawson County, Texas.

Westward Environmental; September 2022; Technical Report Summary Lamesa Site, Dawson County, Texas.

The user of this document should ensure that this is the most recent disclosure of proppant sand resources and reserves for the Lamesa Operation as it is no longer valid if more recent estimates have been issued.

2.7 Units of Measure

The US customary measurement system has been used throughout this report. Tons are short tons of 2,000 pounds-mass. Unless otherwise stated, currency is expressed in US Dollars ($). Historic prices and costs are presented in nominal (unadjusted) dollars. Future dollars values are expressed on a constant (unescalated) basis.

3.0 PROPERTY DESCRIPTION

3.1 Location

U.S. Silica's Lamesa Operation is a surface proppant sand mining and processing operation located 11 miles northwest of the City of Lamesa in Dawson County, Texas. The cities of Dallas and Lubbock, Texas, are located approximately 312 miles east and 56 miles northeast, respectively, of the Lamesa Operation. Figure 1.1 (page 1-2) provided the general location of the Lamesa Operation.

The property is contiguous with the exception of pre-existing oil production infrastructure easements for roads, storage areas, pipelines and pump jack stations. The mine offices, maintenance facilities, processing plant, loadout facilities, and former mining pits are located on the northeast edge of the property. Figure 3.1, on the following page, illustrates the general layout of the Lamesa Operation.

Geographically, the Lamesa Operation's processing plant is located at approximately 32° 48' 22.522" N latitude and 102° 7' 33.823" W longitude.

3.2 Property Rights

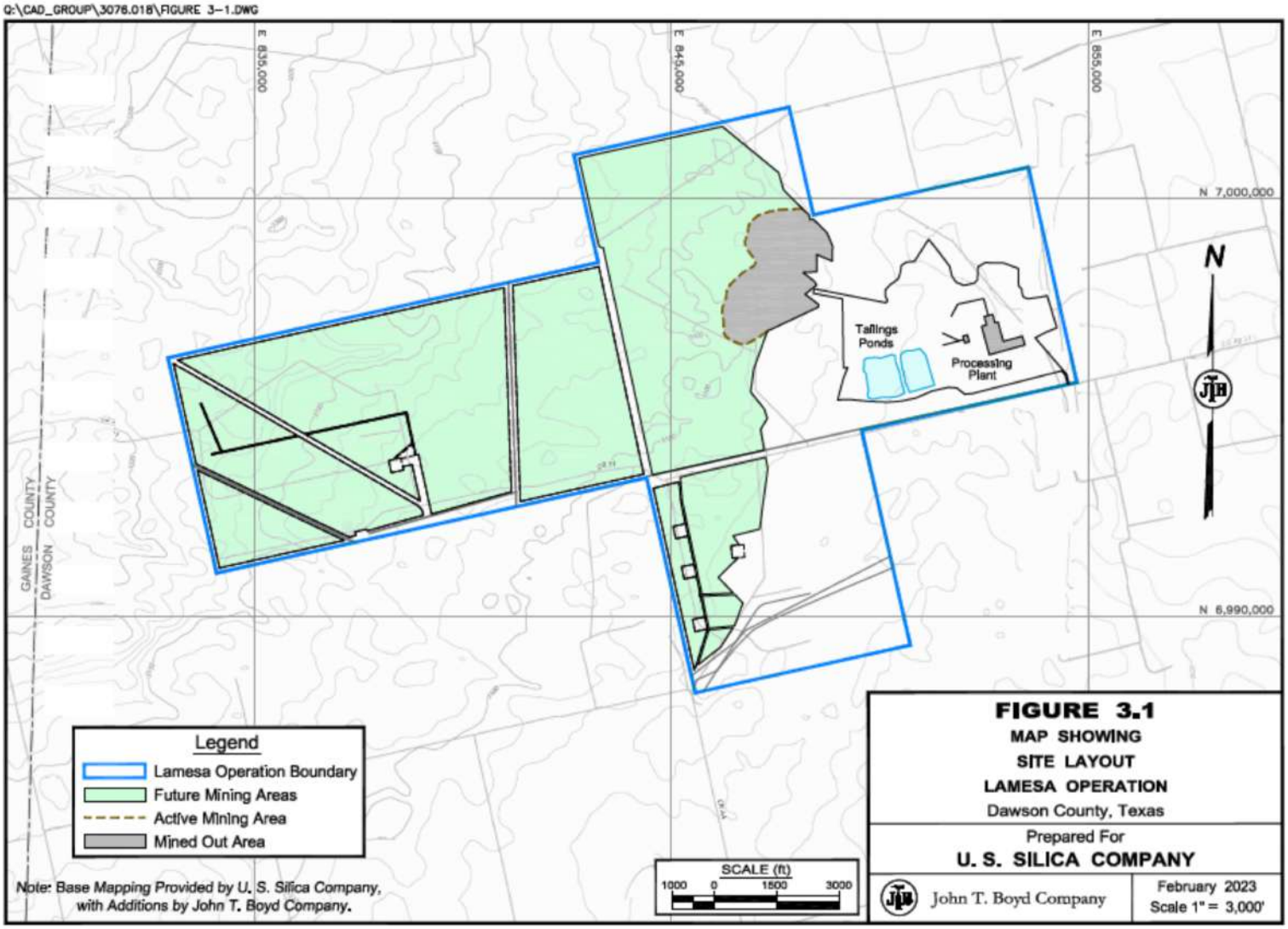
The Lamesa Operation comprises approximately 3,523 acres of surface and minerals rights fully owned by U.S. Silica. The land with mineral rights was purchased by U.S. Silica for the purposes of developing a new proppant sand mine in the Permian Basin.

3.3 Encumbrances

3.3.1 Fees and Royalties

To maintain ownership of the Lamesa Operation property, U.S. Silica must pay property taxes to the local government in Dawson County. To BOYD's knowledge, there are no liens against the properties.

It is BOYD's understanding that there are no royalties, overriding or limited royalties, working interests, production payments, net profit interests, or other mineral interests in the Lamesa Operation properties.


Q:\CAD_GROUP\3076.018\FIGURE 3-1.DWG
E 835,000
E 845,000
E 855,000
N 7,000,000
N 6,990,000
N
Tailings Ponds
Processing Plant
GAINES COUNTY
DAWSON COUNTY
Legend
Lamesa Operation Boundary
Future Mining Areas
Active Mining Area
Mined Out Area
Note: Base Mapping Provided by U. S. Silica Company, with Additions by John T. Boyd Company.
SCALE (ft)
1000 0 1500 3000
FIGURE 3.1
MAP SHOWING
SITE LAYOUT
LAMESA OPERATION
Dawson County, Texas
Prepared For
U. S. SILICA COMPANY
John T. Boyd Company
February 2023
Scale 1" = 3,000'

3.3.2 Permitting Requirements

Mining and processing activities on the Lamesa Operation properties are regulated by several federal and state laws. As mandated by these laws and regulations, numerous permits are required for mining, processing, and other incidental activities. U.S. Silica reports that necessary permits are in place or applied for to support immediate operations. New permits or permit revisions may be necessary from time to time to facilitate future operations. Given sufficient time and planning, U.S. Silica should be able to secure new permits, as required, to maintain its planned operations within the context of the current regulations. Permitting and permitting conditions are discussed further in Chapter 17 of this report.

In BOYD's opinion, U.S. Silica has demonstrated their ability and cooperation to align their operating plans with any permitting requirements that may be encountered during the normal course of business.

BOYD is not aware of any current material violations or fines imposed by regulators on the Lamesa Operation.

3.3.3 Mining Restrictions

Several man-made features have been identified in and around the Lamesa Operation which may limit the mineable areas of the property. As of this report, these features include:

- Setbacks from neighboring properties.
- Setbacks from oil production infrastructure.
- Setbacks from existing utility corridors.

U.S. Silica has included suitable setbacks in their mining plans to avoid disturbing these areas. As such, these areas have been excluded from the estimates of proppant sand resources and reserves presented herein.

There are no designated wetland areas or other environmentally sensitive areas which must be excluded from mining activities on the property.

3.3.4 Other Significant Factors or Risks

To the extent known to BOYD, there are no other significant factors and risks that may affect access, title, or the right or ability to perform work on the Lamesa Operation property that are not discussed in this report. However, the reported proppant sand resources and reserves may be materially impacted by: U.S. Silica's failure to comply

with permit conditions and rules; delays in obtaining required government or other regulatory approvals or permits; U.S. Silica's inability to obtain such required approvals or permits; or unforeseen changes in governmental regulations.

4.0 PHYSIOGRAPHY, ACCESSIBILITY, AND INFRASTRUCTURE

4.1 Topography, Elevation, and Vegetation

The Lamesa Operation lies within the Llano Estacado, a Southern High Plains extension of the Great Plains of North America. This region is relatively flat, with windblown sand dunes in various locations.

Surface elevations in and around the property range from approximately 3,065 ft above mean sea-level (AMSL) near the southeast property corner, to over 3,190 ft AMSL on the western edge of the property.

There are not any surface waters present in and around the Lamesa Operation.

Land cover in the immediate area consists predominantly of a mixture of shinnery oak, grasses, and other various scrub vegetation.

4.2 Accessibility

General access to the Lamesa Operation is via a well-developed network of paved private, county, and state roads. These roads provide direct access to the mine and processing facilities and are generally open year-round.

4.3 Climate

Climate in and around the Lamesa Operation is characteristic for the southwest US, with four seasons ranging from mild winters to very hot and dry summers, with generally moderate falls and springs. The average daily high temperatures typically reach above freezing all 12 months of the year, while the low temperatures can drop below freezing during 4 months of the year. Winter temperatures typically range from 32 degrees Fahrenheit (° F) to 71° F, while summer temperatures usually range from 68° F to 94° F. Average annual precipitation for the area is approximately 15 to 20 inches of rain and less than 4 inches of snow.

In general, the operating season for the Lamesa Operation is year-round. Adverse weather conditions seldom limit mining, processing, and loading operations; however, extreme weather conditions may temporarily impact operations. Periodic flooding is possible during heavy rainfall.

4.4 Infrastructure Availability and Sources

The Lamesa Operation lies within a rural region of western Texas and has been operating in a region dominated by the oil and gas industry and agricultural development. The City of Lamesa has population of 8,674 and 12,456 people live in Dawson County according to 2020 US census data.

Finished proppant sand products from the Lamesa Operation are transported to customers by bulk truck and supported by U.S. Silica's extensive on-site loading, storage, and handling facility.
Several regional airports are located within an hour's drive from the Lamesa Operation, and the Midland International Airport is just over an hour away by car.

Reliable sources of electrical power, water, supplies, and materials are readily available. Electrical power is provided to the operation by regional utility companies. Water is supplied by neighboring private properties, surface impoundments, or water wells. The Lamesa Operation has an abundance of recycled processing water available.

5.0 HISTORY

5.1 Reserve Acquisition

U.S. Silica purchased the property upon which the Lamesa Operation is situated in July 2017 from the Medlin Ranch. U.S. Silica made the purchase after completing an initial reconnaissance-level exploration campaign in March and April 2017.

U.S. Silica is the first owner to explore for and mine proppant sand from the property. Prior to U.S. Silica's purchase, the property remained relatively undeveloped aside from sparse agricultural activity located in the far southeast corner of the property and various oil and gas wells and related infrastructure.

5.2 Mine Development

The Lamesa property was purchased by U.S. Silica as a source of proppant sand to service the booming oil and gas industry in the Permian Basin of west Texas. Prior to the development of proppant sand mining and processing operations in West Texas, nearly all proppant sand was imported from other out-of-state producing regions. In order to lower operational costs, the oil and gas industry began looking for cheaper (i.e., local) sources of proppant sand. U.S. Silica has actively developed several proppant sand operations in west Texas, including the Lamesa Operation, to serve this market.

U.S. Silica began construction of the processing plant shortly after purchasing the property. First sales of finished proppant sand from the Lamesa Operation were made in mid-2018.

6.0 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

6.1 Regional Geology

The Lamesa Operation is located within the Llano Estacado, situated in the Texas High Plains. This region comprises the southern-most portion of the Great Plains, which extends into northeastern New Mexico and northwestern Texas. The Llano Estacado forms a vast elevated plain (high mesa) that is almost completely covered with sand deposits of various types. In the region, the ground surface is covered by windblown sheet sands and active sand dunes reaching heights of almost 45 ft.

The Lamesa Operation is also located near the north-central portion of the Permian Basin, which is well known for its long-producing petroleum and natural gas fields. While the subject of this report concentrates on the surficial geology (sand deposits) of west Texas, the Lamesa Operation currently sells its proppant sand products to the oil and gas producers working in the Permian Basin.

6.2 Local Geology

6.2.1 General Stratigraphy

Surficial geologic units overlying the area in and around the Lamesa Operation are predominantly comprised of undifferentiated Quaternary Age unconsolidated deposits, ranging from aeolian (windblown) sheet sands and dunes to alluvial sands, silts, clays, and caliche. Geologic mapping shows additional surficial stratigraphic units present in the vicinity of the project; however, the surface geology of the Lamesa Property is primarily comprised of these aeolian sand deposits.

A generalized stratigraphic chart of the geologic units in Dawson County, Texas is presented in Figure 6.1.

System	Series	Geologic Unit
Quaternary	Undivided Sand, Silt, Clay, and Gravel; Windblown; Locally Indurated with Calcium Carbonate (Caliche).	
	Holocene	Sheet Sand Deposits
	Pleistocene	Blackwater Draw Formation
Neogene	Pliocene / Miocene	Ogallala Formation

Figure 6.1: Generalized Stratigraphic Chart, Surficial Deposits of Dawson County, Texas

The following text discusses the strata encountered in and around the Lamesa Operation in ascending depositional order.

Ogallala Formation

The Ogallala Formation is predominantly comprised of weakly cemented to unconsolidated fine- to medium-grained sands, which may be silty and calcareous in places. A caliche caprock is frequently exhibited, which resists weathering and forms ledges. Thickness of this formation has been recorded up to 550 ft.

Blackwater Draw Formation

The Blackwater Draw Formation covers a majority of the surface of Dawson County. While not clearly present on the surface at the Lamesa Operation, the Blackwater Draw Formation is predominantly comprised of fine- to medium-grained sand that is silty, calcareous, and locally clayey. Caliche nodules may be present, and deposition is noted as being massive; however, the unit generally is found to be less than 25 ft thick.

Quaternary Sheet and Dune Sands

Most of the subject property is covered by Quaternary sheet and dune sands generally consisting of fine- to medium-grained quartz sand grains, mixed with varying degrees of clays and silts. Exploration completed on the Lamesa Property indicates two surficial sand units being present, an upper clean sand unit and an underlying clayey cover sand unit.

General geologic descriptions from the Dawson County area also indicate that some local Quaternary deposits may include gravel or be locally indurated with calcium carbonate (caliche). These deposits are the result of various geologic processes during deposition, such as the formation of levees, point bars, stream channels, alluvial fans, and terrace or playa deposits.

6.2.2 Structural Geology

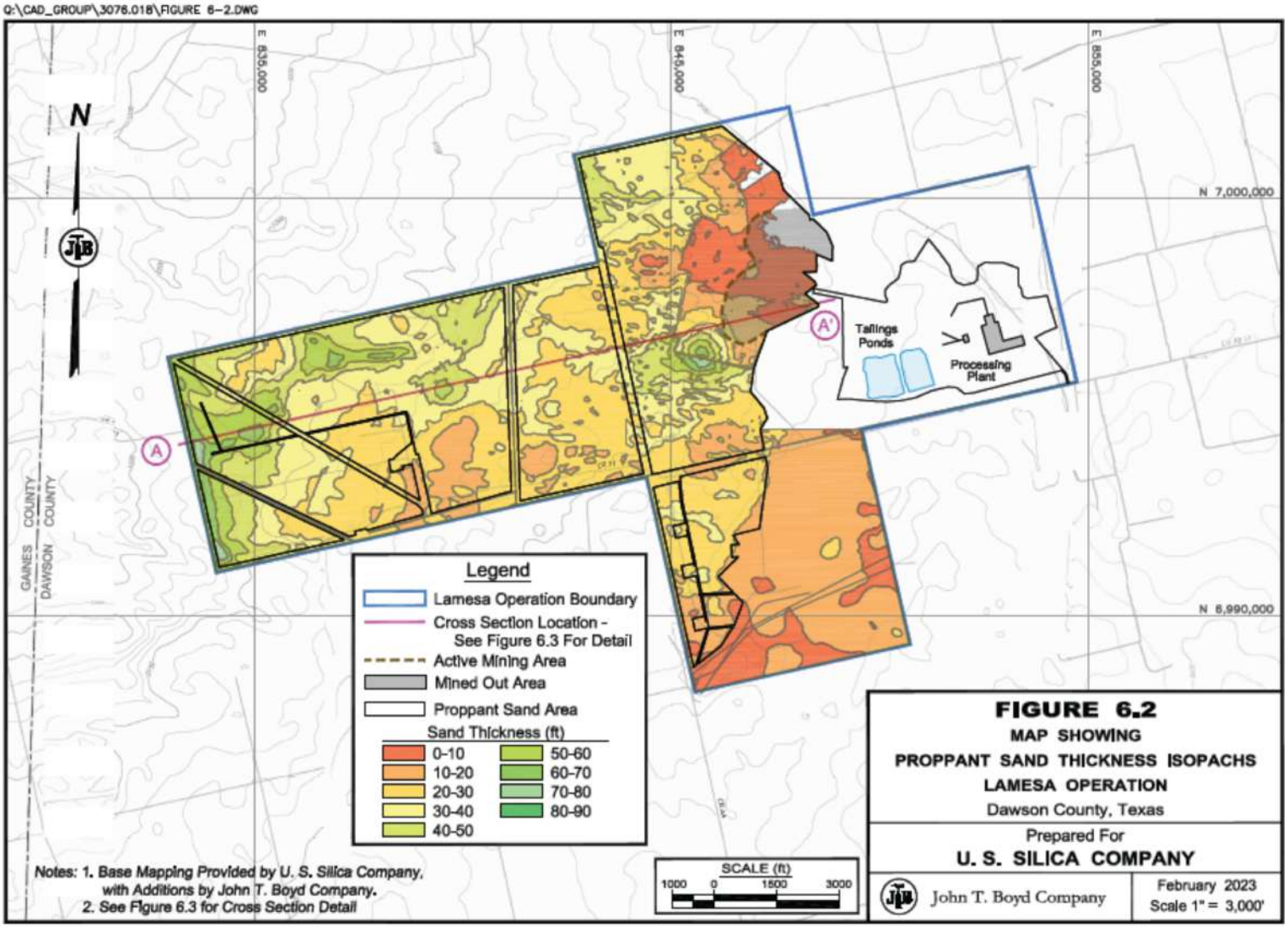
The structural features of the Quaternary sands in and around the Lamesa Operation are relatively non-descript. While the unit exhibits variable thickness over the area, it is unaffected by folding or faulting. Underlying the surficial sand units is a red clay basal unit, which defines the limit of the mineable surface sand deposits. Due to the lack of structural features encountered, there are no know geological features that are believed to materially affect a proppant sand mining operation in the immediate area; as such, the deposit is considered to be of low geologic complexity.

6.3 Property Geology

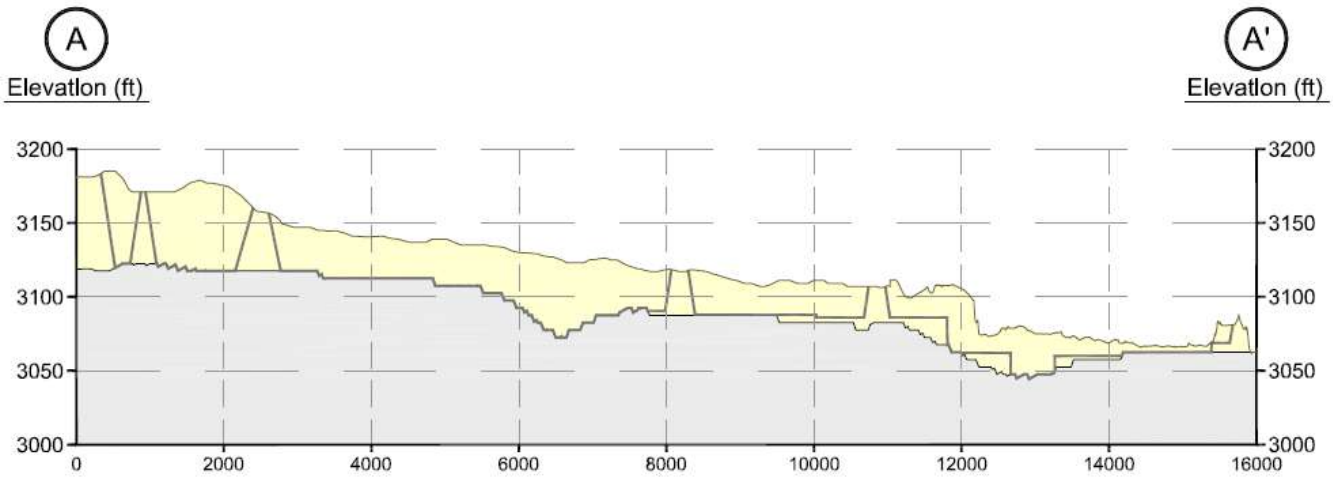
As described above, surficial geologic strata at the Lamesa Operation are predominantly comprised of aeolian (windblown) sand deposits. There is not any discernable overburden material present except for sparse areas of vegetation and roots, which are easily removed during early phases of the processing operations. Figure 6.2, following this page, provides a map of the sand thickness. A cross-section through the deposit is provided in Figure 6.3.

The surface sheet and dune sands deposited on the subject property consist of two distinct intervals of mineable sand: 1) an upper “clean sand” unit, and 2) a lower “cover sand” unit. Underlying the surface sand deposits is a hard, red clay basal unit, commonly referred to as hardpan.

Exploration data suggest the clean sand unit generally consists of unconsolidated, fine- to medium-grained, well sorted and subangular to rounded sand grains. Thickness of this unit ranges from 13 to 46 ft. The clean sand is noted as containing generally less than 10% to 15% very fine (clay) material. The central and western extents of the Lamesa Property exhibit the clean sand unit at the surface, thinning to the east, and is absent over the eastern-most third of the property. The limit of the clean sand deposit is delineated by a clearly visible “dune line” running north to south and bisecting the subject property.


Q:\CAD_GROUP\3076.018\FIGURE 6-2.DWG
N
E 835,000
E 845,000
E 855,000
N 7,000,000
N 6,990,000
A
A'
Tailings Ponds
Processing Plant
GAINES COUNTY
DAWSON COUNTY
Legend
Lamesa Operation Boundary
Cross Section Location - See Figure 6.3 For Detail
Active Mining Area
Mined Out Area
Proppant Sand Area
Sand Thickness (ft)
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
SCALE (ft)
1000 0 1500 3000
Notes: 1. Base Mapping Provided by U. S. Silica Company, with Additions by John T. Boyd Company.
2. See Figure 6.3 for Cross Section Detail
FIGURE 6.2
MAP SHOWING
PROPPANT SAND THICKNESS ISOPACHS
LAMESA OPERATION
Dawson County, Texas
Prepared For
U. S. SILICA COMPANY
John T. Boyd Company
February 2023
Scale 1" = 3,000'

Q:\CAD_GROUP\3076.018\FIGURE 6_3.DWG



Legend
- Plts
- Proppant Sand
- Underburden

FIGURE 6.3
CROSS SECTION A - A'
LAMESA OPERATION
Dawson County, Texas

Prepared For
U. S. SILICA COMPANY

Horizontal 1" = 2,000'
Vertical 1" = 100'
Vertical Exaggeration 20X

John T. Boyd Company

February 2023
Scales As Shown

Note : See Figure 6.2 For Cross Section Location.

East of the dune line, the cover sand unit is present at the surface. The cover sand is also present and underlies nearly all the clean sand west of the dune line on the Lamesa property. Geologic logs describe this unit as consisting of a clayey, hard sandstone interval, with very fine- to medium-grained, subangular to rounded sand grains, and ranging in thickness from 0 to 25 ft. The cover sand is noted as consisting of 15% to 45% fine material due to the higher clay content.

The two sand units are generally mineable from the ground surface down to the basal red clay unit. Combined thickness of both sand units ranges from 25 to 65 ft across the property.

The sand mined at the Lamesa Operation is processed to produce proppant sand. Proppant sand is a naturally occurring, high silica content quartz sand, with grains that are generally well-rounded. The main difference between proppant sand and other sands is that proppant sand grains are relatively pure in composition, consisting almost entirely of quartz; other sands have numerous impurities that may be cemented to the quartz grains. The pure quartz composition of proppant sand grains, along with being well-rounded and spherical in shape, gives these sands the characteristics (crush strength, high acid solubility, low turbidity) that are sought after by oil and gas producers for use in developing wells.

7.0 EXPLORATION DATA

7.1 Background

In developing the Lamesa Operation, U.S. Silica has completed three separate geologic exploration campaigns. Records from these campaigns were provided and comprise the primary data used in the evaluation of the proppant sand resources. A total of 49 drill holes (totaling 2,268 ft of drilling) are distributed across the property and results have been compiled into a database. Maps illustrating the extents of the sand deposit, electronic copies of drilling and sampling logs, as well as laboratory testing summaries, were provided for our review.

7.2 Exploration Procedures

U.S. Silica provided BOYD with various information, including exploration reports and internal guidelines, regarding drilling, sampling, preparing, and testing procedures utilized during the three exploration campaigns conducted on the Lamesa Operation.

7.2.1 Drilling

To date, U.S. Silica has performed three drilling campaigns on the Lamesa property. All of these campaigns were completed by third-party contractors using rotosonic (sonic drilling) equipment. Sonic drilling is an advanced drilling technique that is widely accepted as one of the best methods to recover core when exploring unconsolidated sand deposits.

Phase 1 Exploration Campaign

Prior to purchasing the property, U.S. Silica completed a reconnaissance-level exploration campaign in March 2017 with the aim of evaluating the quantity and quality of the dune sand deposit on the property,

Drilling was planned and supervised by U.S. Silica's Mine Planning Department, who also conducted core logging and sampling in the field. Cascade Environmental, LLC performed the drilling and a total of five rotosonic holes were completed. The drill holes were laid out in a general east to west trending line across an area of the property with visible sand dunes.

Phase 2 Exploration Campaign

An infill drilling campaign, consisting of 11 rotosonic drill holes, was planned and completed in April 2017 on the Lamesa property. The campaign was designed to support detailed mine planning and the estimation proppant sand reserves.

A geologist from Summit Envirosolutions, Inc. was engaged to log and sample core and supervise this phase of exploration work. Associated Environmental Industries, Corp. (AEI) performed the drilling.

After the completion of this exploration campaign, U.S. Silica prepared an initial proppant sand reserve estimate for the Lamesa Operation, and subsequently finalized the purchase of the property in July 2017.

Phase 3 Exploration Campaign

In September 2018, U.S. Silica's Mine Planning Department completed a larger exploration campaign. This exploration campaign was designed to increase confidence in the delineation (i.e., areal extent and thickness) of the sand deposit, and identify areas with preferred sand qualities.

AEI was contracted to complete the 33 rotosonic drill holes. An independent geologic consultant, Geological Consulting Services, Inc., was engaged to supervise drilling activities, and to log and sample the recovered core.

7.2.2 Sampling Procedures

Sampling procedures indicate that after a drill hole's recovered core was measured and geologically logged, the core was boxed and transported to U.S. Silica's Berkeley Springs, West Virginia, laboratory. At the lab, separate homogenous and representative composite samples were taken of the clean sand and cover sand units for analysis.

U.S. Silica maintained control of exploration core samples throughout the entirety of each drilling campaign, which included: (1) logging and boxing of recovered cores in the field, (2) transportation and delivery of core samples to their internal laboratories, and (3) performing preparation and analyses on each of the samples.

Available testing results were reviewed by BOYD during our assessment. Our review of the preceding field and sampling procedures showed that the general description and sampling work were conducted to appropriate standards. Based on the stated standards, both in the field and in the laboratory, BOYD concludes that the sample preparation and

analytical procedures were adequate for the purposes of evaluating and estimating proppant sand resources and reserves at the Lamesa Operation.

7.2.3 Sand Testing

Samples obtained from the exploration campaigns were taken to the company's Berkeley Springs laboratory, where they were inventoried and then prepared for analyses. Samples were split and prepared following standardized company procedures (i.e., U.S. Silica's ISO 9001 Quality System of Corporate Analytical Procedures) to ensure analytical consistency throughout each of the various exploration campaigns. These procedures are designed to closely match the operational capabilities of the Lamesa Operation's processing plant.

Preparation of each sample consisted of initially splitting the recovered core in half. One half of the core is placed back into the core boxes which are then stored for archival purposes, while the other half of the core is further prepared and processed for lab testing purposes.

Analytical samples were crushed, quartered, and mixed to create a uniform and representative composite sample of the core interval, and then the composite sample was divided into appropriately sized samples, depending on the type and amount of testing to be performed. The sample is then run through various crushing techniques to disaggregate the sand grains and fine materials as much as possible before beginning the washing and scrubbing procedures.

After splitting, the sample is dried, and an approximately 1,500-gram split is obtained. The sample split is washed through a 200-mesh sieve to remove slimes, before being dried and reweighed to measure the recovery of plus-200-mesh material. The dried sample is then run through a 16-mesh sieve to simulate the scalping procedure in the plant to remove the "coarse waste" sized particles. The remaining material is then approximately equivalent to the material that would typically be washed in the wet processing plant. This remaining material is weighed and labeled as a prepared "washed sample".

The washed sample is further prepared by simulating the wet processing plant conditions, which consist of placing the sample into scrubbers for three minutes, rinsing and decanting, and then drying to arrive at a "scrubbed sample", which represents material that would be output from the wet processing plant. The scrubbed samples are then dried and prepared for API RP 19C/ISO-13503-2 standard testing for proppant materials.

7.2.4 Other Exploration Methods

There were not any other methods of exploration (such as airborne or ground geophysical surveys) reported for the Lamesa Operation.

7.3 Exploration Results

7.3.1 Summary of Exploration

Exploration work to date includes a total of 49 drill holes completed in and around the Lamesa property, through the course of three separate exploration campaigns. The overall drill hole spacing exhibited across a majority of the Lamesa Operation ranges from approximately 1,000 to 1,500 ft. The distribution of these drill holes is illustrated on Figure 7.1, following this page.

Data collected as a result of completing these drilling campaigns confirm the generally uniform nature of the deposit underlying the Lamesa property and supports the general interpretation of the sand deposit thickness, as illustrated in Figure 6.2 (page 6-4).

Information provided from the exploration campaigns indicates U.S. Silica identified two separate sand intervals at Lamesa: 1) an “upper clean sand” unit, which covers the surface of the western and central portions of the property, and 2) a “lower cover sand” unit, found on the surface of the eastern portion of the property and underlying nearly all of the clean sand unit.

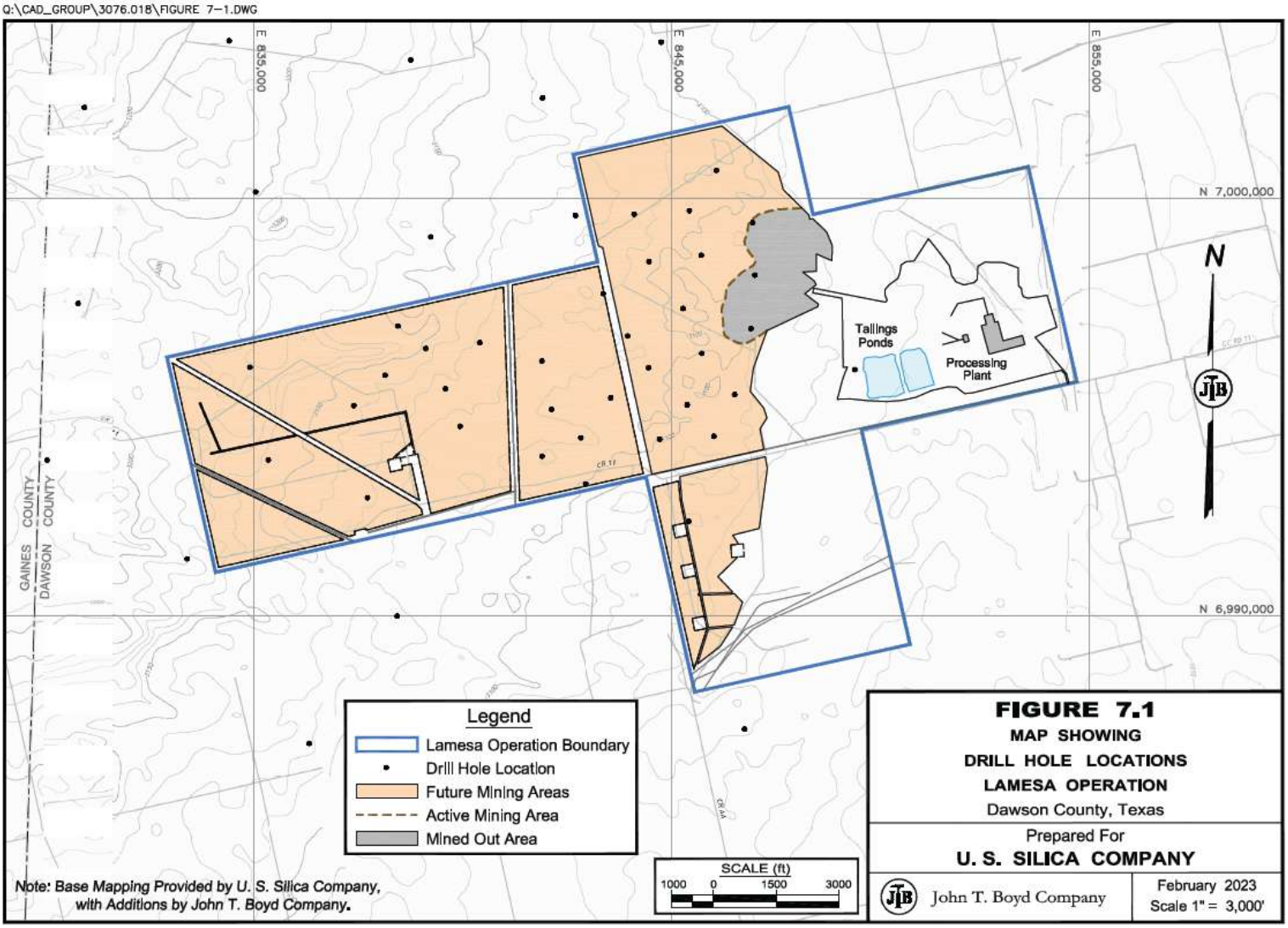
7.3.2 Sand Quality

The Lamesa Operation produces two varieties of proppant sand for use in local oil and gas applications: a 40/70-mesh proppant sand product, and a 100-mesh proppant sand product. U.S. Silica reportedly performs testing at their laboratories for API/ISO specifications.

Historically, API RP 19C/ISO 13503-2 proppant sand characteristics were strictly adhered to in order to determine the suitability of a sand product for use during fracking stages of oil and gas well development. Over time, these specifications have become merely guidelines, and the suitability of a proppant sand product is now ultimately determined by customers, who will typically perform their own sample testing of the products that they purchase to determine if they meet their internal specifications.

BOYD notes that U.S. Silica has demonstrated continued commercial success in producing and marketing the finished proppant sand products; as such, it is BOYD’s

Q:\CAD_GROUP\3076.018\FIGURE 7-1.DWG



opinion that sand quality data provided are representative of the mined deposit and are considered suitable for the estimation of proppant sand resources and reserves.

7.3.3 Grain Size Distribution

Grain size distribution was analyzed according to API RP 19C/ISO 13503-2, Section 6.

A table of weighted average grain size distribution of the in-situ sand deposit, based on laboratory testing results, is shown in Table 7.1, below.

Table 7.1: Weighted Average Particle Size Distribution

% Retained By Mesh Size				% Product	
>40	40/70	70/140	<140	40/70	70/140
1.8	26.6	58.5	13.1	31.2	68.8

The preceding table highlights the relative fineness of the sand found at the Lamesa Operation, indicating a majority of the sand particles are concentrated between the “passing 40-mesh” and “retained 140-mesh” size fraction. Accordingly, the predominant marketable proppant sand product consists of the 40/140-mesh sand.

7.3.4 Proppant Sand Quality

Samples gathered during exploration work were prepared into composite product-size samples by U.S. Silica’s internal laboratory, and sent to an third-party laboratory (Prop Tester, Inc.) in Cyprus, Texas for analysis of the following API RP19C/ ISO 13503-2 proppant sand characteristics.

Grain Shape (Sphericity and Roundness)

Grain shape is defined under API RP19C/ ISO 13503-2, Section 7. Under this standard, recommended sphericity and roundness values for proppants are 0.6 or greater. As part of the grain shape analysis, the presence of grain clusters (weakly cemented grain aggregates) and their approximate proportion in the sample are reported.

Crush Resistance

Crush resistance is a key test that determines the amount of pressure a sand grain can withstand under laboratory conditions for a two-minute duration. It is analyzed according to API RP19C/ ISO 13503-2, Section 11. Under this standard, the highest stress level (psi) in which the proppant produces no more than 10% crushed fine material is rounded down to the nearest 1,000 psi and reported as the “K-value” of the material.

Acid Solubility

Acid solubility was analyzed according to API RP19C/ ISO 13503-2, Section 8. Under this standard, 5 grams of sand is treated with 100 milliliters of 12:3 hydrochloric acid to hydrofluoric acid at 150 ˚F for 30 minutes. The recommended maximum acid solubility for proppants in the 40/70 size range and finer is 3.0%.

Turbidity

Turbidity was analyzed according to API RP19C/ ISO 13503-2, Section 9. Under this standard, the suggested maximum frac sand turbidity should be equal to or less than 250 nephelometric turbidity units (NTU).

Results from these analyses are shown below in Table 7.2:

Table 7.2: Lamesa Operation Proppant Sand Characteristics

	Average API/ISO Test Results By Product Size		
	40/70-mesh		100-mesh[1]
Characteristic	Result	Recommended Specification	Result
Sphericity	0.9	≥0.6	0.7
Roundness	0.8	≥0.6	0.6
Acid Solubility (%)	2.9	≤3.0	2.8
Turbidity (NTU)	62	≤250	79
K-Value (000 psi)	7	-	9

Note:
1. 100-mesh proppant sand material currently does not have an API/ISO specification.

The composite sample testing suggests the Lamesa Operation can produce proppant sands which meet minimum API/ISO recommended specifications. Moreover, U.S. Silica has a demonstrated commercial success producing and selling proppant sand to Permian Basin oil and gas producers, where ultimately the sand has been shown to meet customer specifications.

7.4 Data Verification

For purposes of this report, BOYD did not verify historic drill hole data by conducting independent drilling. It is customary in preparing similar mining resource and reserve estimates to accept basic drilling and sample quality data as provided by the client, subject to the reported results being judged representative and reasonable.

BOYD's efforts to judge the appropriateness and reasonability of the source exploration data included reviewing representative samples of provided drilling logs, sampling procedures, sand quality testing results, and discussing aspects of developing the Lamesa Operation with U.S. Silica personnel during our site visit. Reviewed drilling records were compared with their corresponding database records for transcription errors; of which none were found. Lithologic and sand quality data points were compared via visual and statistical inspection with geologic mapping and cross-sections.

7.5 Adequacy of Exploration and Sampling

BOYD's review of the reported methodologies and procedures indicate the exploration data obtained and utilized by U.S. Silica for the Lamesa site were: (1) carefully and professionally collected, prepared, and documented, (2) conform with general industry standards, and (3) are appropriate for use of evaluating and estimating proppant sand resources and reserves. Similarly, BOYD's review of testing data provided by U.S. Silica suggests that the analyses completed are generally appropriate to determine proppant sand characteristics and determine the subsequent quality of finished proppant sand products. As such, it is BOYD's opinion that the exploration and sampling data are suitable for use in the estimation of proppant sand resources and reserves for the Lamesa Operation.

8.0 SAMPLE PREPARATION, ANALYSIS, AND SECURITY

The reader is referred to Sections 7.3 and 7.4 of this report for details regarding sample preparation, analysis, and security.

9.0 DATA VERIFICATION

BOYD, by way of the data verification processes described in various sections of this report, has used only that data deemed by the QPs to have been generated with proper industry standard procedures, were accurately transcribed from the original source and were suitable to be used for the purpose of preparing estimates of proppant sand resources and reserves.

BOYD's subject-specific data verification efforts and our conclusions arising therefrom are discussed in the following sections of this report:

Topic	Report Section(s)
Exploration Data	Section 7.4
Sample Preparation, Analysis, and Security	Section 7.4
Proppant Sand Resource Estimates	Section 11.2
Operating Plans	Chapters 13 and 1
Capital and Operating Costs	Chapter 18
Economic Analysis Inputs	Chapter 19

Based on our review, it is BOYD's overall conclusion that the information made available to us at the time of this report is representative and reliable for use in estimating the proppant sand resources and reserves of the Lamesa Operation.

BOYD is not aware of any other limitations on nor failure to conduct appropriate data verification.

q:\eng_wp\3076.018 u.s. silica - lamesa\wp\ch-9 -data verification.docx

10.0 MINERAL PROCESSING AND METALLURGICAL TESTING

Please refer to Chapter 7 for information regarding grain size distribution and proppant sand characteristics testing.

q:\eng_wp\3076.018 u.s. silica - lamesa\wp\ch-10 - mineral processing and metallurgical testing.docx

11.0 PROPPANT SAND RESOURCE ESTIMATE

11.1 Applicable Standards and Definitions

Unless noted, proppant sand resource estimates disclosed herein are done so in accordance with the standards and definitions provided by S-K 1300. It should be noted that BOYD considers the terms “mineral” and “proppant sand” to be generally interchangeable within the relevant sections of S-K 1300.

Estimates of mineral resources are always subject to a degree of uncertainty. The level of confidence that can be applied to a particular estimate is a function of, among other things: the amount, quality, and completeness of exploration data; the geological complexity of the deposit; and economic, legal, social, and environmental factors associated with mining the resource. By assignment, BOYD used the definitions provided in S-K 1300 to describe the varying degree of certainty associated with the estimates reported herein.

The definition of mineral resource provided by S-K 1300 is:

> *Mineral resource is a concentration or occurrence of material of economic interest in or on the Earth's crust in such form, grade or quality, and quantity that there are reasonable prospects for economic extraction. A mineral resource is a reasonable estimate of mineralization, taking into account relevant factors such as cut-off grade, likely mining dimensions, location or continuity, that, with the assumed and justifiable technical and economic conditions, is likely to, in whole or in part, become economically extractable. It is not merely an inventory of all mineralization drilled or sampled.*

Estimates of mineral resources are subdivided to reflect different levels of geological confidence into measured (highest geologic assurance), indicated, and inferred (lowest geologic assurance). Please refer to the Glossary of Abbreviations and Definitions for the meanings ascribed to these terms.

11.2 Proppant Sand Resources

11.2.1 Methodology

Based on provided information, U.S. Silica's geologic modeling and proppant sand resource estimation techniques generally consist of following:

1. The top and bottom elevations of the mineable proppant sand interval is interpreted from drill hole records and sand particle size analyses. As the sands mined at the Lamesa Operation are present at the surface, no overburden material is included in the geologic model. Strata below the sand unit—generally, the red clay basal unit, are considered waste.
2. Interpreted drill hole records are compiled and validated. Strata thicknesses are aggregated, and sand particle size analyses of the sand unit are composited for each data point. The compiled drill hole data are imported into GEOVIA Surpac™ geologic modeling and mine planning software.
3. A geologic block model of the deposit is developed using industry standard stratigraphic modeling methods. The geologic model delineates the top and bottom of the mineable sand horizon.
4. Contiguous regions of mineable sand are outlined (applying criteria discussed below in Section 11.2.2), and LOM pit shells are created.
5. Estimates of in-place mineable sand volumes are derived from the LOM pit shells and recent topographic (surface elevation) surveys.
6. An in-place dry density of 100 pounds per cubic foot is used to convert the in-place sand volumes to in-place sand tons.

11.2.2 Estimation Criteria

Development of the proppant sand resource estimate for the Lamesa Operation assumes mining and processing methods and equipment which have been utilized successfully at the site for decades.

The target surface sheet and dune sand mining horizon at U.S. Silica's Lamesa Operation is manifested as continuous, low rolling sand dunes with relatively consistent depth, thickness, and quality. The high-quality sand is easily distinguished from the underlying clay unit, aiding in the interpretation of the mineable horizon. Generally, all of the sand unit is mined and sold under various product specifications. Based on the uniformity of the sand deposit being mined, cut-off grade, strip ratios, and other typical mining factors do not define economic mineability. Production of proppant sand is driven by market demand and production can be modified in response to that demand. As such, the application of minimum mining thicknesses, maximum stripping ratios (the ratio of waste to sand excavated), or cut-off grades is not generally considered in the estimation of proppant sand resources for the Lamesa Operation.

The limits of the proppant sand resources are constrained to those portions of the interpreted sand deposit that:

- Are reasonably defined by available drilling and sampling data.
- Contain products that meet generally accepted specifications.
- Honor any legal mining constraints (e.g., property boundaries, environmental setbacks, utility and infrastructure setbacks, etc.).
- Adhere to physical mining constraints.
- Contain products that can be sold at a profit (i.e., be economic).

U.S. Silica applied the following offsets to define the proppant sand resource boundaries for the Lamesa Operation:

- 300-ft x 300-ft buffer around a single active pumpjack on the property.
- 100-ft offsets from neighboring property boundaries.
- 200-ft right-of-ways around roadways, oil and gas pipelines, and utility corridors.

The pits shells which constrain the estimated proppant sand resources utilized overall wall slope of 3:1 (horizonal to vertical) in unconsolidated sand. There were not any other pit design criteria employed.

Proppant sand resources for the Lamesa Operation are assessed for reasonable prospects for eventual economic extraction by reporting: (1) only those resources which have been subsequently converted to proppant sand reserves after the application of all material modifying factors, or (2) those resources which have similar characteristics (i.e., mining conditions, and expected product yields and qualities) to those converted to proppant sand reserves.

BOYD has reviewed the criteria employed by U.S. Silica in developing their estimates of proppant sand resources. The parameters are supported by historical results and align with those employed at similar operations. As such, it is BOYD's opinion that the stated criteria are reasonable and appropriate for the estimation of proppant sand resources at the Lamesa Operation.

11.2.3 Classification

Geologic assuredness is established by the availability of both structural (thickness and elevation) and particle size distribution for the proppant sand. Classification is generally based on the concentration or spacing of exploration data, geological understanding,

continuity of mineralization relative to the style of mineralization, and uncertainty with the exploration data.

Table 11.1 provides the general criteria employed in the classification of the proppant sand resources.

Table 11.1: Proppant Sand Resource Classification Criteria

Classification (Geologic Confidence)	Data Point Spacing (feet)		
Measured	0	–	2,640
Indicated	2,640	–	5,280
Inferred	5,280	–	10,560

Extrapolation or projection of resources in any category beyond any data point does not exceed half the point spacing distance.

BOYD reviewed the classification criteria employed by U.S. Silica with regards to data density, data quality, geological continuity and/or complexity, and estimation quality. The surficial sand dune deposit on the Lamesa property is of low geologic complexity. We believe these criteria appropriately reflect their implied levels of geologic assurance with respect to the estimation of proppant sand resources..

Mineable sand resources on the property are well-defined throughout all areas of the mine plan. Observed drill hole spacing averages approximately 1,000 ft through a majority of the active mining area, with future mining areas exhibiting a general drill hole spacing averaging approximately 1,000 ft to 2,500 ft.

11.2.4 Proppant Sand Resource Estimate

Resource estimates of in-place proppant sand at the Lamesa Operation as of December 31, 2022, reported by U.S. Silica are shown in Table 11.2 below.

Table 11.2: Lamesa Operation Proppant Sand Resources (as of December 31, 2022)

Classification	In-Place Tons (000)		
	Planned	Additional	Total
Measured	98,222	622	98,844
Indicated	13,473	4,748	18,221
Total Measured + Indicated	111,695	5,370	117,065
Inferred	-	5,002	5,002

Notes:
1. "Planned" resources are those included in the approved LOM plan.
2. "Additional" resources are those reported in addition to proppant sand reser

As shown, U.S. Silica controls approximately 117 million in-place tons of measured and indicated proppant sand resources, *inclusive* of proppant sand reserves. In addition, they control approximately 5 million in-place tons of inferred proppant sand resources. Proppant sand resources are not proppant sand reserves and do not have demonstrated economic viability.

The proppant sand resources shown under the “Planned” column of Table 11.2 include only those in-place tons which are included in U.S. Silica’s LOM plan for the Lamesa Operation and therefore considered for conversion to proppant sand reserves. The proppant sand resources shown under the “Additional” column of Table 11.2 have not been included in the LOM plan and are considered *exclusive* of (i.e., “in addition to”) the reported proppant sand reserves. These “Additional” proppant sand resources are considered to have prospects for eventual economic extraction by virtue of their similarity, in terms of demonstrated extraction methods and expected finished product qualities, to those converted to proppant sand reserves. However, further studies are required to convert the “Additional” proppant sand resources to proppant sand reserves.

11.2.5 Validation

BOYD was provided with U.S. Silica’s exploration data, geologic models, and volumetric estimates. We have reviewed this information, on a representative basis, by:

- Verifying the accuracy of geologic model inputs by comparison with drilling logs and laboratory reports.

- Comparing the geologic model with compiled drilling data.
- Preparing a stratigraphic grid model of the sand unit and independently estimating pit shell volumes.

It is BOYD's opinion that the geologic model is representative of the informing data and that the data are of sufficient quality to support the proppant sand resources estimate provided herein. Furthermore, it is our opinion that the resources estimation methods and criteria employed are both appropriate and reasonable for the deposit type and proposed extraction methods.

BOYD is not aware of any technical, legal, economic, or other relevant factors that could materially affect the silica sand resource estimate. The accuracy of silica sand resource estimate is, in part, a function of the quality and quantity of available data and of engineering and geological interpretation and judgment. Given the data available at the time this report was prepared, the estimates presented herein are considered reasonable. However, they should be accepted with the understanding that additional data and analysis available after the date of the estimate may result in a change to the current estimate. These revisions may be material. There is no guarantee that all or any part of the estimated resources will be recoverable.

12.0 PROPPANT SAND RESERVE ESTIMATE

12.1 Applicable Standards and Definitions

Unless noted, proppant sand reserve estimates disclosed herein are done so in accordance with the standards and definitions provided by S-K 1300. It should be noted that BOYD considers the terms “mineral” and “proppant sand” to be generally interchangeable within the relevant sections of S-K 1300.

Estimates of mineral reserves are always subject to a degree of uncertainty. The level of confidence that can be applied to a particular estimate is a function of, among other things: the amount, quality, and completeness of exploration data; the geological complexity of the deposit; and economic, legal, social, and environmental factors associated with mining the reserve. By assignment, BOYD used the definitions provided in S-K 1300 to describe the varying degree of certainty associated with the estimates reported herein.

The definition of mineral reserve provided by S-K 1300 is:

> *Mineral reserve is an estimate of tonnage and grade or quality of indicated and measured mineral resources that, in the opinion of the qualified person, can be the basis of an economically viable project. More specifically, it is the economically mineable part of a measured or indicated mineral resource, which includes diluting materials and allowances for losses that may occur when the material is mined or extracted.*

Estimates of mineral reserves are subdivided to reflect geologic confidence, and potential uncertainties in the modifying factors, into proven (highest assurance) and probable. Please refer to the Glossary of Abbreviations and Definitions for the meanings ascribed to these terms.

Figure 12.1, below, illustrates the relationship between mineral resources and mineral reserves.

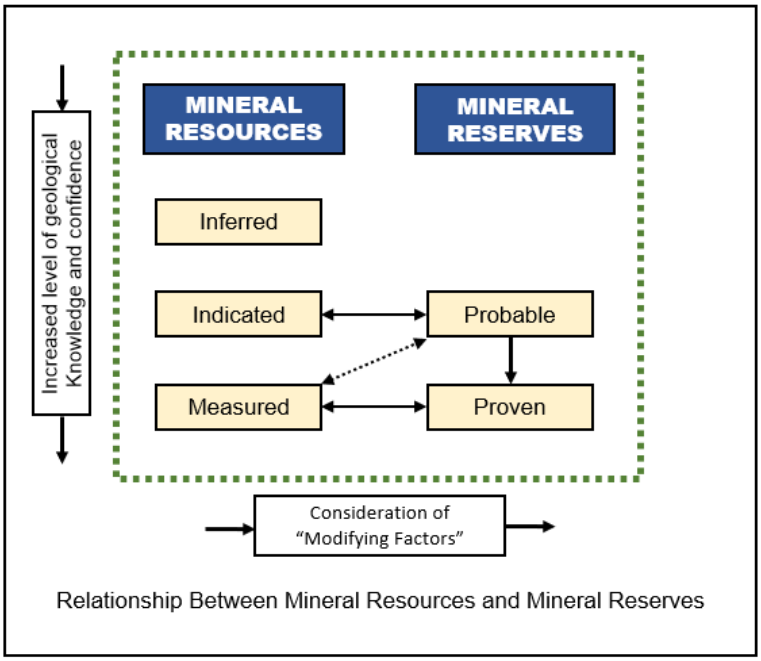


Figure 12.1: Relationship Between Mineral Resources and Mineral Reserves

By industry convention, proppant sand reserves are presented on two bases: mineable and saleable. Mineable reserves represent the ROM tonnage available for excavation and processing. Saleable reserves represent the tonnage of finished proppant sand available for sale after processing the mineable reserves.

12.2 Proppant Sand Reserves

12.2.1 Methodology

Estimates of proppant sand reserves for the Lamesa Operation are derived contemporaneously with estimates of proppant sand resources. The Lamesa Operation utilizes commercially proven mining and processing methods to extract and process proppant sand from the subject property. The operation's production plans are revised periodically to assure that the conversion of in-place sand to saleable product are: (1) in reasonable conformity with present and recent historical operational performance, and (2) reflective of expected mining and processing operations.

To derive estimates of mineable tons and saleable product tons (i.e., proven and probable proppant sand reserves), the following modifying factors were applied to the in-place measured and indicated proppant sand resources underlying the respective mine plan areas:

- A 95% mining recovery factor, which assumes that 5% of the mineable (in-place) proppant sand resource will not be recovered for various reasons. Applying this recovery factor to the in-place resource results in the estimated ROM sand tonnage (i.e., the mineable proppant sand reserves) that will be delivered to the wet process plant.
- An overall 75% processing yield. This factor accounts for removal of out-sized (i.e., larger than 20-mesh and smaller than 140-mesh) sand and losses in the wet and dry processing plants due to minor inefficiencies.

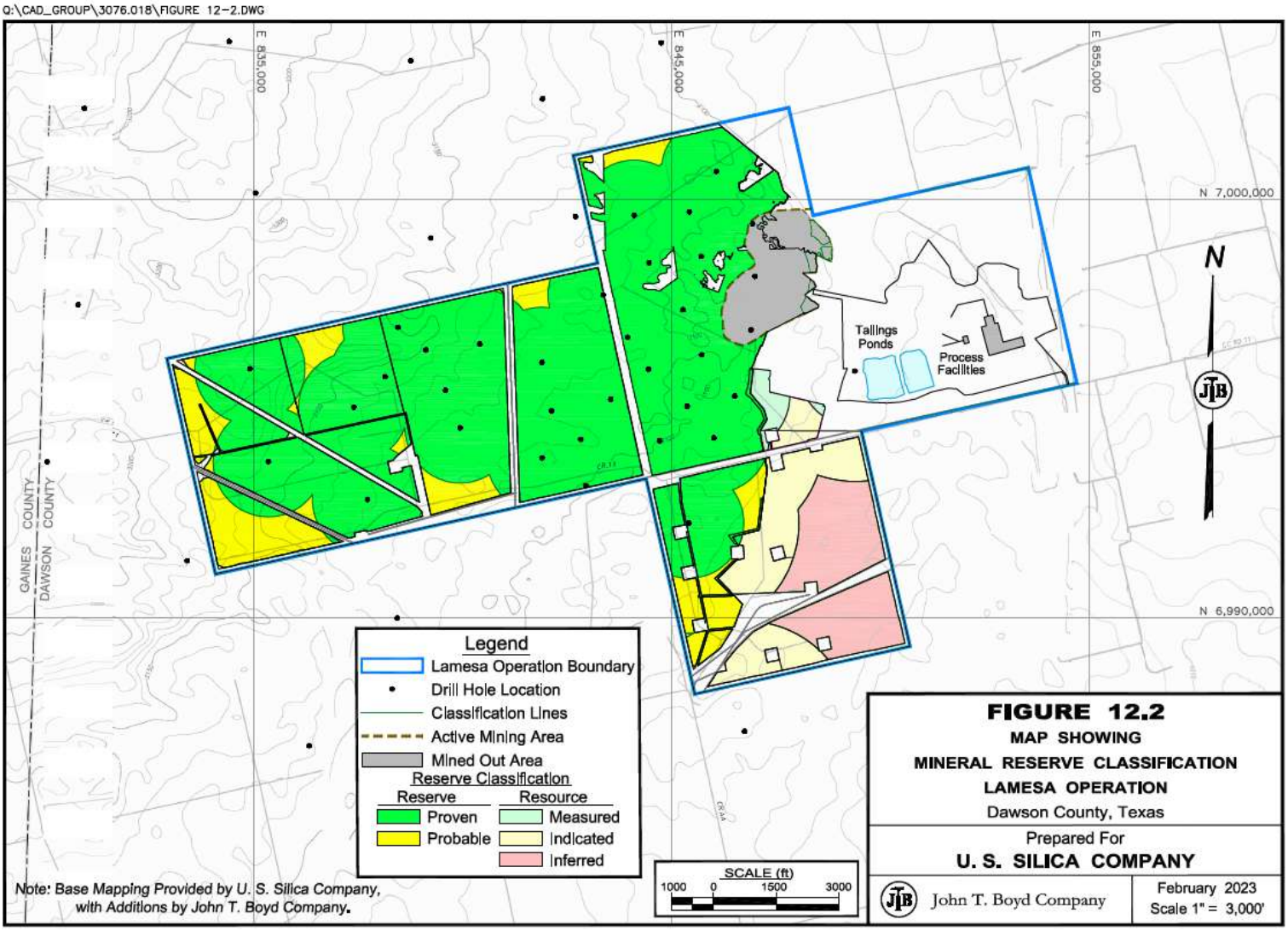
The overall product yield (after mining and processing losses) for the Lamesa Operation is estimated at approximately 71.3%. That is, for every 100 tons of in-place proppant sand, approximately 71 tons will be recovered and sold as product. Mining recovery and processing yield factors are derived from historical operating results.

Economic availability of the proppant sand reserves is established by the financial analysis presented in Chapter 19. A long-range average selling price of $23.90 per product ton has been used to estimate proppant sand reserves for the Lamesa Operation.

12.2.2 Classification

Proven and probable proppant sand reserves are derived from measured and indicated proppant sand resources, respectively, in accordance with S-K 1300. BOYD is satisfied that the stated proppant sand reserve classification reflects the outcome of technical and economic studies. Figure 12.2, on the following page, illustrates the classification of the proppant sand resources and reserves at the Lamesa Operation.

Q:\CAD_GROUP\3076.018\FIGURE 12-2.DWG



12.2.3 Proppant Sand Reserve Estimate

U.S. Silica's estimated surface mineable proppant sand reserves for the Lamesa Operation total 79.6 million saleable product tons, as of December 31, 2022. The proppant sand reserves reported in Table 12.1, below, are based on the approved LOM plan which, in BOYD's opinion, is technically achievable and economically viable after the consideration of all material modifying factors.

Table 12.1: Lamesa Operation Proppant Sand Reserves (as of December 31, 2022)

	Tons (000)	
Classification	Mineable	Saleable
Proven	93,311	69,983
Probable	12,800	9,600
Total	106,111	79,583

All of the reported proppant sand reserves are wholly owned by U.S. Silica.

The proppant sand reserves of the Lamesa Operation are well-explored and defined. It is our conclusion that almost 87% of the stated reserves can be classified in the proven reliability category (the highest level of assurance) with the remainder classified as probable. Given the geologic uniformity and history of mining the proppant sand on the Lamesa Operation properties, it is reasonable to assume that the small portion of probable reserves will be converted to proven reserves upon completion of additional exploration and testing.

The Lamesa Operation has a well-established history of mining, processing, and selling proppant sand products into various markets. BOYD has assessed that sufficient studies have been undertaken to enable the proppant sand resources to be converted to proppant sand reserves based on current and proposed operating methods and practices. Changes in the factors and assumptions employed in these studies may materially affect the silica proppant reserve estimate.

The extent to which the proppant sand reserves may be affected by any known geological, operational, environmental, permitting, legal, title, variation, socio-economic, marketing, political, or other relevant issues has been reviewed as warranted. It is the opinion of BOYD that U.S. Silica has appropriately mitigated, or has the operational acumen to mitigate, the risks associated with these factors. BOYD is not aware of any

additional risks that could materially affect the development of the proppant sand reserves.

Based on our independent review, we have a high degree of confidence that the estimates shown in this report accurately represent the available proppant sand reserves controlled by U.S. Silica, as of December 31, 2022.

12.2.4 Reconciliation with Previous Estimates

When comparing U.S. Silica's proppant sand reserve estimates as of December 31, 2022, with the estimates presented[1] for December 31, 2021, we note a net increase of approximately 13.6 million mineable tons resulting from: (1) depletion due to mining of approximately 5.9 million mineable tons, and (2) revisions to mine plans resulting in increases of approximately 19.5 million mineable tons. BOYD does not consider these adjustments, either individually or combined, to represent material changes to the proppant sand reserves of the Lamesa Operation.

[1] U.S. Silica did not present reserves on a Saleable Tons basis for the 2021 financial year.

13.0 MINING METHODS

13.1 Mining Operations

The sheet sands and sand dunes in and around the Lamesa Operation are loosely consolidated and overlain by minimal overburden; characteristics which favor conventional surface mining techniques. Since the target sands formation does not extend below the water table, the quarry is ‘dry-mined’ using truck and excavator mining methods. Mining occurs in a series of benches arranged in a stair-like fashion to recover sand from the top of the formation (in elevation) down to the lowest practical elevation (generally 1 to 2 ft above the basal red clay unit).

Since the overburden is very thin, it is not stripped prior to sand excavation. Any vegetation, oversize material or clay that is present is removed at the processing plant using screens and scrubbers. Oversize material and vegetation are stored at the dry tailings stockpile for use in future reclamation.

Drilling and blasting are not required for the loosely consolidated sand. A front-end loader is used to load the excavated ROM sand into trucks which transport the sand to a ROM stockpile near the wet process plant. Usually, the sand horizon is mined in a single 25 ft vertical bench. If the depth of the deposit exceeds 25 ft, a second lower bench is mined down to the top of the clay rich zone. The ROM sand recovered from these two benches are blended at the wet feed plant stockpile to maximize sand recovery. Figure 13.1, below, shows the loading operations in the Lamesa mine.

Figure 13.1: Loading Operations at the Lamesa Operation

These surface mining techniques have been utilized at the Lamesa Operation since it began production in 2018. The mining operations are typically conducted year-round.

13.2 Mine Equipment and Staffing

13.2.1 Mine Equipment

An independent contractor conducts the mining operation and owns and operates the mobile equipment fleet, which includes:

- Caterpillar 992 Front End Loader.
- Two Caterpillar 349F Excavators.
- Two Caterpillar static haul trucks and 8 Volvo articulated haul trucks.
- Caterpillar D8T Dozer.
- Water Truck and other ancillary equipment.

Regular and major repair maintenance is the responsibility of the contractor. Currently the contractor is responsible for delivering up to 715,000 tons of ROM sand per month to the plant.

If maintained in good condition, the mobile equipment fleet should be capable of achieving production levels required by the LOM plan.

13.2.2 Staffing

The Lamesa Operation is staffed by 150 hourly and salaried personnel. A breakdown of employees by classification is provided in Table 13.1.

Table 13.1: Employees by Classificatio

Classification	Employee
Mine Operations	15
Plant Operations & Maintenance	121
Salaried	14
Total	150

Except for a drop in employment in 2020 and 2021 (attributed to poor market conditions during the COVID-19 pandemic), the trend in staffing levels across the Lamesa Operation has been increasing. The workforce can be expanded or reduced based on market and seasonal demands.

13.3 Engineering and Planning

The primary mine planning consideration is the safe, economical, and regular supply of raw high-quality sand feed to the processing plant. In commercial mining terms, the quantities of sand mined each year at the Lamesa Operation are considered modest. The sand deposit affords easy access with its shallow depth and large areal extent. As such, mining plans for the Lamesa Mine are relatively simple and very flexible, able to be modified based on demand in a relatively short time frame.

Geotechnically, the sand deposit is relatively competent and the mining depths so shallow such that slumping, or collapsing has not been a detriment to the mining process. The pit design parameters discussed in Section 11.2.2 have been used with success at similar proppant sand operations for decades.

Excessive inflow of groundwater into the pit is not expected. As such, dewatering before or during mining activities should be manageable with drainage ditches and sumps. Flood waters from localized flash floods are a manageable risk. Onsite water ponds can be used to hold any excessive ground or storm water.

13.4 Mining Sequence and Production

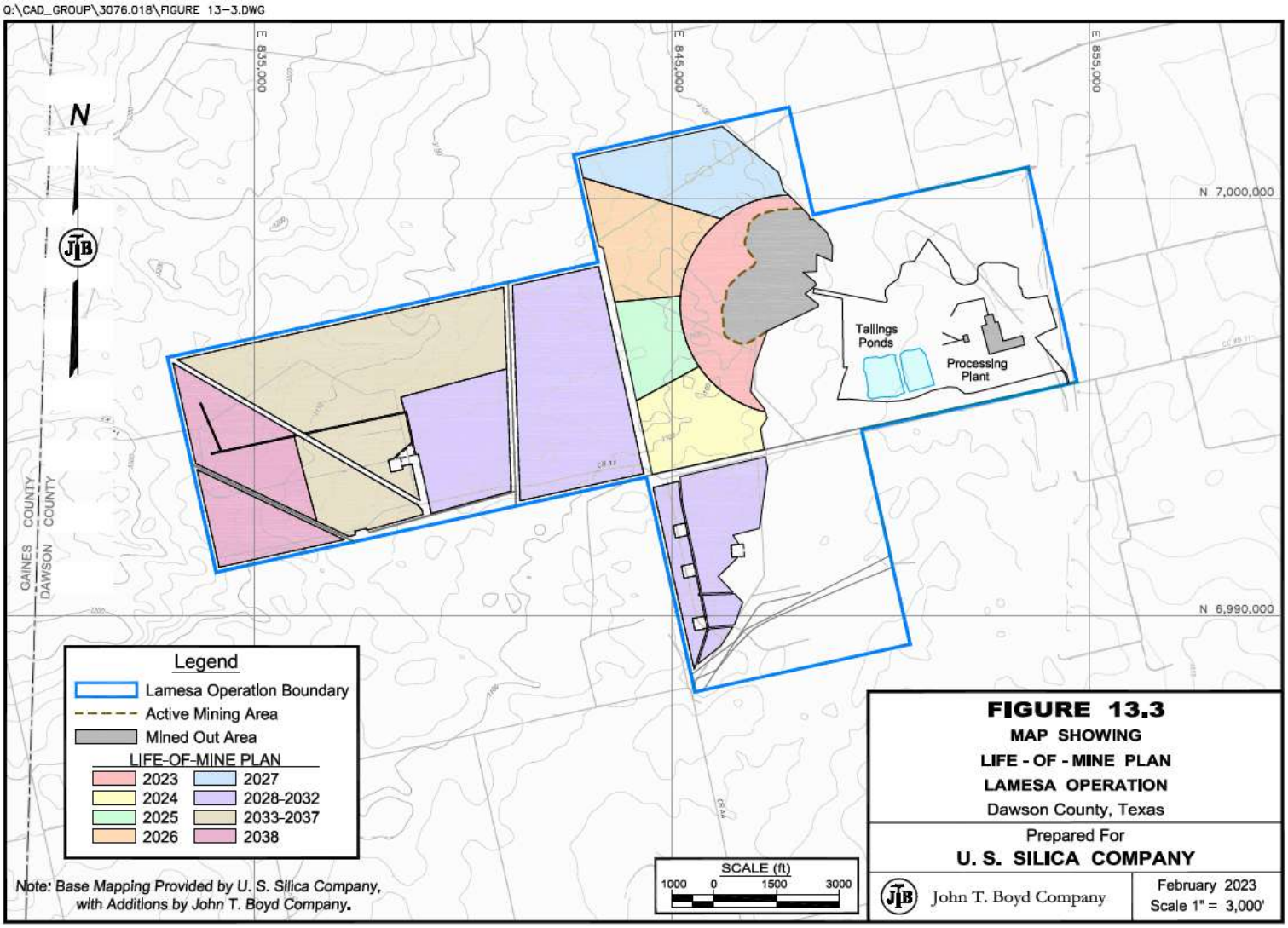
Mining of the sand deposit at the Lamesa Operation commenced in the third quarter of 2018 and have continued to the present day without interruption. Over the past five years, the operation has mined almost 20 million tons of raw sand. During 2020, production was reduced from approximately 4.8 million tons per year to 3.3 million tons in response to decreased customer demand due to the COVID-19 pandemic. Production rebounded in 2021 and 2022 and is forecasted to rise in the LOM plan as illustrated in Figure 13.2, below.

Figure 13.2: Recent Historical and LOM Forecasted Mining Production

The proposed mining sequence is illustrated in Figure 13.3, on the following page. As shown, the proposed mining sequence anticipates that the remaining northeastern quarter of the deposit will be mined out in a series of cuts from south to north (by 2027). Production will then shift to the southern half of the Lamesa Pit and commence in a general north to south direction in 2028. At which point, mining will shift to the western half of the deposit in 2029. Mining will be carried out in an east to west general direction until depletion of the deposit in 2039. Any remaining reserves in the southern half of the deposit will be mined in 2032. Reclamation will occur concurrently with production as depleted mining areas are returned to agreed-upon final design.

BOYD reviewed the LOM plans for U.S. Silica's Lamesa Operation to determine whether the plans: (1) utilize generally accepted engineering practices, and (2) align with historical and industry norms. Based on our assessment, it is BOYD's opinion that the forecasted production levels for the Lamesa Operation are reasonable, logical, and consistent with typical surface sand mining practices in west Texas and historical results achieved by U.S. Silica.

Q:\CAD_GROUP\3076.018\FIGURE 13-3.DWG



14.0 PROCESSING OPERATIONS

14.1 Overview

The Lamesa Operation's processing facilities are located east of the active mining area on the same property as the mine. Construction of the processing facilities and related infrastructure began in early 2018 and the first finished proppant sands were produced in late 2018.

The production of finished proppant sand requires the processing of raw sand from the mine through two plants—the Wet Processing Plant and the Dry Processing Plant. Figure 14.1, following this page, presents a simplified process flow from the mine to the product distribution.

The processing facilities have a nominal capacity of 6.0 million tons of finished sand per year, based on operating 24 hours a day and nearly 365 days per year.

BOYD is unaware of any reported interruptions, outages, shortages, or failures related to processing operations which have materially affected the Lamesa Operation. Given the operation is well-established, we believe the risk of such events materially affecting the estimates of silica sand reserves presented herein is low.

14.1.1 Wet Processing Plant

The Wet Processing Plant receives its raw sand feed from a ROM stockpile supplied by the mine. The raw sand is reclaimed by a front-end loader and passed through a static grizzly to remove any organics and oversize material. After passing the grizzly screen, the sand is washed to remove any material larger than ¼". The remaining material is mixed with water to create a slurry that is passed through a series of desliming cyclones and attrition scrubbers to remove clay and undersized (very fine) particles. The deslimed material is then processed through a series of hydrosizers, hydro-cyclones, and vacuum filters to remove excess water. The remaining WIP material is stockpiled outside on a drain pad to further reduce moisture before it is recovered and enters the Dry Processing Plant.

The oversized and organics waste material produced by the Wet Processing Plant is stored in a dry waste stockpile for use in future reclamation activities. The clay and very fine "slimes", or tailings, are pumped to settling ponds where the water is recovered for

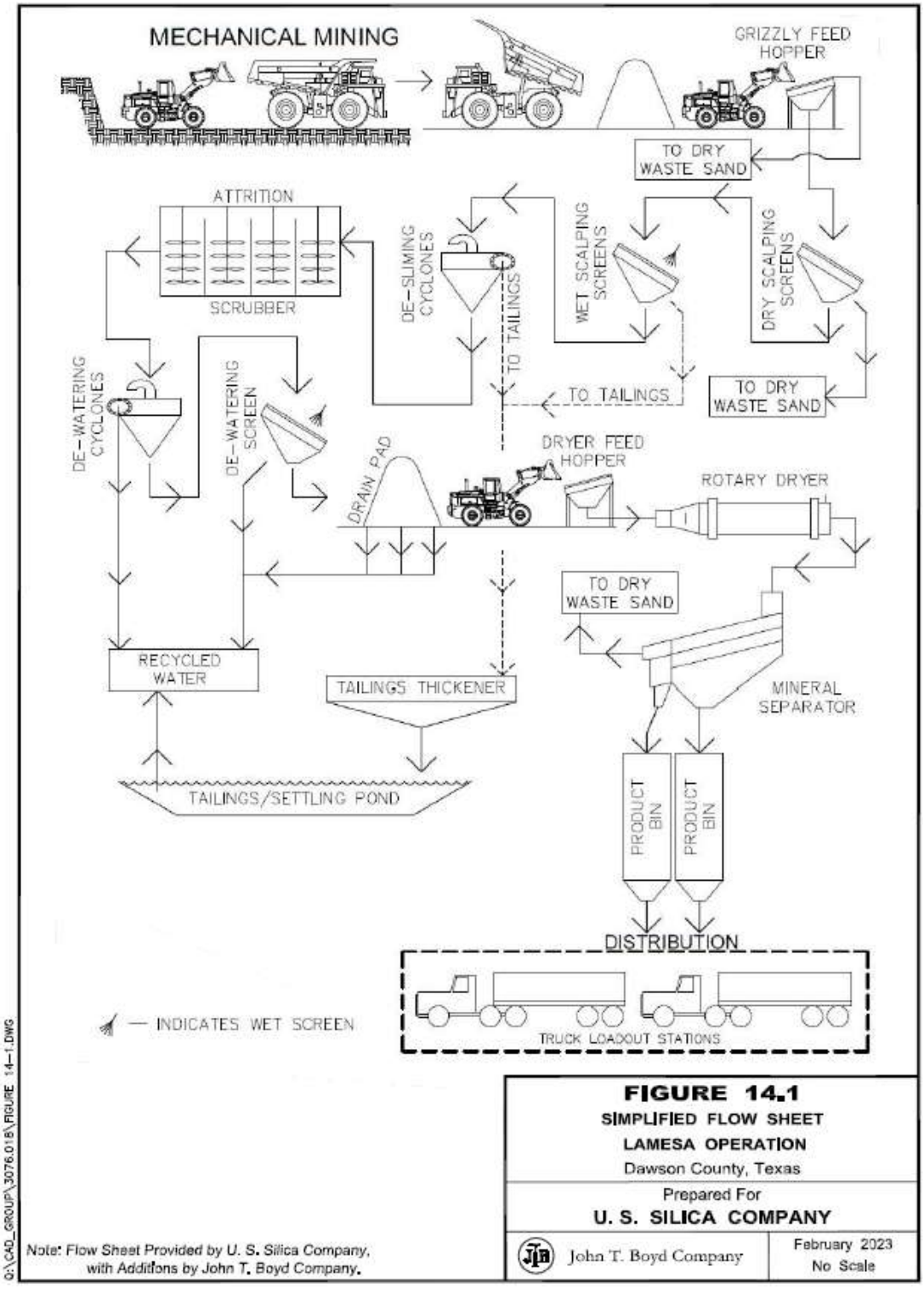


FIGURE 14.1
SIMPLIFIED FLOW SHEET
LAMESA OPERATION
Dawson County, Texas
Prepared For
U. S. SILICA COMPANY
John T. Boyd Company
February 2023
No Scale

Note: Flow Sheet Provided by U. S. Silica Company, with Additions by John T. Boyd Company.

Q:\CAD_GROUP\3076.018\FIGURE 14-1.DWG

future use. The water extracted by the hydrosizers, hydro-cyclones, vacuum filters, and drain pad is also recycled for use in the processing operations.

14.1.2 Dry Processing Plant

A front-end loader is used to recover the WIP material from the drain pad and feed it into one of two dryer feed hoppers in the Dry Processing Plant. The dryer feed hoppers feed sand through one of three rotary dryers. After drying, the sand is sized and sorted using screens into 40/70-mesh, 40/140-mesh, and 100-mesh products. Any remaining oversize material at this point is screened off and deposited in the dry waste stockpile. The final products are stored in truck loadout silos for eventual transfer to bulk trucks for shipment to customers.

14.2 Production

The Lamesa Operation's LOM plan forecasts increased production from the processing plant until the nominal production capacity is reached. Recent annual production results and forecasted production over the expected life of the operation are provided in Figure 14.2.

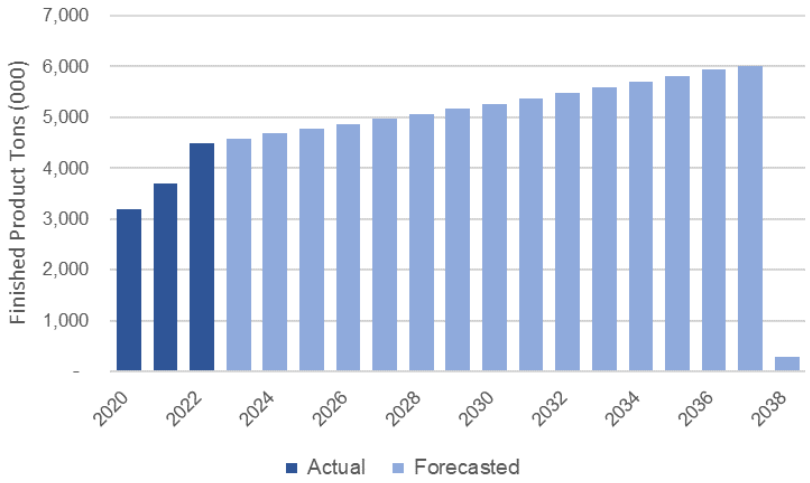


Figure 14.2: Recent Historical and LOM Forecasted Processing Plant Production

14.3 Conclusion

Based on our review, it is BOYD's opinion that the processing methods and existing equipment at the Lamesa Operation are sufficient to achieve the forecasted production of finished proppant sand products.

15.0 MINE INFRASTRUCTURE

15.1 Overview

All of the basic infrastructure required for the ongoing operations is in place at the Lamesa Operation. Figure 3.1 (page 3-2) illustrates the general layout of the infrastructure at the Lamesa Operation.

The surface facilities currently located at the operation are well constructed and have the necessary capacity/capabilities to support the Lamesa Operation's near-term operating plans. Operational preference may lead to the upgrading of some existing facilities if the operation expands in the future.

BOYD is unaware of any reported interruptions, outages, shortages, or failures related to infrastructure requirements which have materially affected the Lamesa Operation. Given the operation is well-established, we believe the risk of such events materially affecting the estimates of silica sand reserves presented herein is low.

15.2 Transportation

The Lamesa Operation is serviced by several roads maintained by the local municipality, county, and state governments. These roads are either paved or well-maintained graded roadways. Road access is available year-round.

There is not any rail infrastructure available at the Lamesa Operation. All products are shipped via bulk trucks. The nearest railhead is the Lubbock and Western in Brownfield, Texas, and the Plainsman Switching Company in Lubbock, Texas. Transloading is required to use existing rail networks and U.S. Silica has no immediate plans to transport their products from the Lamesa Operation using rail.

15.3 Utilities

Electric power for the processing plant is supplied by Lyntegar Electric Cooperative, Inc. (Lyntegar). A substation was built by Lyntegar on the Lamesa site to distribute power to the facility. Power is transmitted by a series of above ground poles running parallel to CR 9, then along CR C to the substation located east of the property. From the substation, power is distributed by a series of overhead lines and buried power cords.

Natural gas used by the processing plant is currently supplied by West Texas Gas Marketing, Inc. The gas is delivered by several underground pipes running parallel to the CR 1064.

Water for industrial purposes is supplied by agreements to purchase with neighboring landowners and two onsite wells. Given the semi-arid climate, recycling of industrial water is a priority. Potable water for consumption is delivered by truck in jugs and bottles. There are no plans for connecting to a water utility network.

15.4 Tailings Disposal

The mining and processing of silica sand at the Lamesa Operation creates a substantial amount of waste tailings, a mixture of clay, very fine sand, and other non-silica minerals. Tailings are typically disposed of in ponds (former mining pits) where the solid materials settle to the bottom and water is decanted for reuse.

Existing tailings ponds are located directly to the west of the Lamesa Processing Plant. As mining progresses west, depleted pits will become new tailing disposal sites. A freshwater pond is maintained on the property so water can be stored after reclaiming from the tailings ponds.

15.5 Other Structures

Several other buildings are located on the property, including:

- Office buildings that house engineering, financial and administrative staff.
- Several support buildings used for machinery and maintenance activities.
- A warehouse for material storage and product bagging.
- Several product loadouts.
- Various pump structures and outbuildings.

16.0 MARKET STUDIES

16.1 Market Overview

The Permian Basin's proppant sand market is driven by unconventional horizontal drilling in the oil and gas industry. In the late 1990s, rapid advances in horizontal drilling and hydraulic fracturing (fracking) in North America ushered in large-scale commercial oil and gas production. This fracking technique has been increasingly successful and modified over time to extract oil and gas held in dense layers of shale rocks, whose low permeability had previously prevented the flow of hydrocarbons.

Hydraulic fracturing uses a mixture of water, chemicals, and proppant (natural sand or man-made sand-like substances) to fracture shale rock and release hydrocarbons such as oil, natural gas and natural gas liquids. The proppant acts to keep the fractures open (prop) while the pressurized fluids flow back up the well piping. Wells have become more productive with the addition of horizontal drilling capabilities, longer lateral lengths, and multi-stage fracks.

To reduce costs, many Oilfield Services companies and E&P companies shifted from using only premium branded proppant sands, which had higher delivered costs, to locally sourced and lower-priced "in-basin" proppant sands. The first in-basin proppant sand deposits mined (late-2017) in the U.S. were located in the Permian Basin of Texas. Permian Basin E&P companies noted favorable results from locally sourced proppant sands, and as such, nearly every other energy basin has experienced a period of exploration to locate suitable local sources of proppant sands.

U.S. Silica operates in a highly competitive market that is characterized by a small number of large, national proppant sand producers and a larger number of small, regional or local, privately-owned producers. Competition in the industry is based on: (1) delivered price; (2) product consistency and quality; (3) supply capacity and reliability; and (4) customer service and technical support. The Lamesa Operation's substantial on-site product storage capacity and its strategic, in-basin location allows shipping finished products to regional customers by truck. Since transportation costs are a significant portion of the total cost to customers of proppant sands, development of the Lamesa, Texas plant as a regional frac sand facility in the Permian Basin allows U.S. Silica to compete against proppant sand products being shipped from distant states like Wisconsin, Illinois, and Missouri.

16.2 Historical Sales

U.S. Silica supplies a range of proppant sand products to major Oilfield Services companies and E&P companies operating in the Permian Basin. The Lamesa Operation is the larger of two U.S. Silica proppant sand operations in west Texas. Finished proppant sand products supplied by the Lamesa Operation primarily consist of non-API standard 40/140-mesh and “100-mesh” (50/140-mesh) sized sand, with lesser amounts of API standard 40/70-mesh sized sand.

Recent historical sales data provided by U.S. Silica for the Lamesa Operation are summarized in Table 16.1, below.

Table 16.1: Historical Sales Data

	Units	2020	2021	2022
Product Sales	000 tons	3,187	3,691	4,499
Average Selling Price	$/ton sold	21.85	18.45	31.39

Proppant sand demand dropped in 2020, as compared to 2019, due to the COVID-19 pandemic. However, recovery began in the fourth quarter of 2020 and continued throughout 2021 and 2022. In 2020, the average selling price (ASP) for the Lamesa Operation’s finished proppant sand products was $21.85 per sold ton. In 2021, the ASP dropped to $18.45 per sold ton; however, the ASP rose to $31.39 per sold ton in 2022.

According to sales information provided by U.S. Silica for the Lamesa Operation:

- Contract sales account for approximately 60% of total product sales.
- The top-five customer by sales revenue account for approximately 76% of total sales. U.S. Silica has a range of minimum purchase supply agreements with customers with initial terms spanning through 2034.

BOYD is not aware of any material contracts for the sale of proppant sand from the Lamesa Operation.

16.3 Market Outlook

Despite rises in production, the Permian Basin’s demand for in-basin proppant sand outstripped supply in 2022. Consequently, prices for in-basin finished proppant sand products rose significantly during the year. Sustained growth in demand for in-basin proppant sand products is expected. Although it operates in a highly competitive market,

it is expected that the Lamesa Operation will experience increased demand for its products due, in part, to its low costs and established customer base.

Having survived the challenging environment of 2019 and 2020, BOYD believes the Lamesa Operation should continue to prove viable into the future notwithstanding a sustained and significant energy price collapse. Their low-cost mining and processing operations, strategic in-basin location, and high-quality products help to create an advantage compared with other regional and national proppant sand producers.

17.0 PERMITTING AND COMPLIANCE

17.1 Permitting

Numerous permits are required by federal, state, and municipal law for mining, processing, and related activities at the Lamesa Operation. U.S. Silica reports that necessary permits to support current and near-term operations are in place or pending approval. New permits or permit revisions may be necessary from time to time to facilitate future operations. Given sufficient time and planning, U.S. Silica should be able to secure new permits, as required, to maintain its planned operations within the context of current regulations.

A description of the salient permitting requirements for the Lamesa Operation follows.

The Texas Commission on Environmental Quality (TCEQ) requires an Industrial Hazardous Waste (IHW) Solid Waste Registration (#97503) which covers cleanup of hydraulic or lubricating oils from mobile equipment, general trash, and other hydrocarbon contaminated materials.

A Phase I Environmental Site Assessment (ESA) was performed prior to construction of the Lamesa Operation. The assessment included observations of oil and gas infrastructure including several gas and crude oil pipelines, one active oil well, several abandoned and plugged oil and gas wells, historic oil and gas water ponds and several active and abandoned water wells. Evidence of past crude oil leaks from pipelines adjacent to the property are also present. There were not any historical or environmentally sensitive habitats found during the assessment.

U.S. Silica maintains a Stormwater Pollution Prevention Plan (SWPPP) at the Lamesa Operation to address requirements of the federal Oil Pollution Prevention Regulations (40 CFR Part 122). The SWPPP outlines the treatment measures and best management practices used on site to maintain stormwater discharges within the permit limitations. Stormwater that leaves the site is authorized and outlined in the Stormwater Multi-Sector General Permit (MSGP) by the TCEQ (TXR05EB75).

A Petroleum Storage Tank (PST) registration (#89889) is held by the third-party contractor (O’Rourke Distribution Company) in charge of mining operations for a double walled fuel tank used to fuel mobile equipment on site.

Air emissions resulting from the processing plant and associated equipment at the Lamesa Operation are authorized by the TCEQ Air Permit Program Permit #151650. Provisions of the permit specify the authorized maximum operating hours at the facility, currently at 8,760 hours per year. The permit also allows for certain visible emissions at specific opacity. Quarterly visible emissions and fugitive emissions determinations are required, as well as ambient air monitoring at the request of the TCEQ.

U.S. Silica maintains an annual Aggregate Production Operation registration with the TCEQ for annual production reporting.

Under current regulations, the State of Texas does not require reclamation or remediation of surface mined lands by aggregate (including proppant sand) operations.

17.2 Compliance

U.S. Silica reports having an extensive environmental management and compliance process designed to follow or to exceed industry standards.

In their 2021 corporate sustainability report, U.S. Silica reports:

- Increasing the use of renewable energy sources.
- Enhancing water conservation and recycling efforts across our footprint, ensuring that drawing, using, and discharging fresh water is done responsibly and in compliance with water management regulations and standards.
- Employing pollution prevention measures, such as increased operational efficiency and the reuse and recycling of materials, to minimize the impact of our activities on the environment.
- Conducting annual evaluations of policies, procedures, and programs related to habitat conservation.

Mine safety is regulated by MSHA. They inspect the facilities a minimum of twice yearly. U.S. Silica’s safety record compares favorably with its regional peers.

Based on our review of information provided by U.S. Silica and available public information, it is BOYD’s opinion that the Lamesa Operation’s record of compliance with applicable mining, water quality, and environmental regulations is generally typical for that of the industry. BOYD is not aware of any regulatory violation or compliance issue which would materially impact the proppant sand reserve estimate.

17.3 Post-Mining Land Use and Reclamation

There are no formal state or federal reclamation plans or permits required for the Lamesa Operation. However, general requirements of U.S. Silica's operating permits and licenses include:

- Stabilization of disturbed areas to prevent exposure of significant materials to stormwater which could discharge off-site.
- Demolition of water wells and septic tanks.
- Disposal of hazardous wastes.

Mine site reclamation costs are funded from U.S. Silica's Asset Retirement Obligations (ARO) account. Funding of the ARO account is included in the Lamesa Operation's capital and operating costs discussed in Chapter 18 and included in the economic analysis presented in Chapter 19. ARO cost estimates are reviewed annually. As a matter of good mining practice, U.S. Silica seeks to conduct progressive reclamation throughout the operation's mining life to minimize risk and costs at closure.

17.4 Community Engagement

BOYD is unaware of any plans, negotiations, agreements with local individuals or groups or commitments to ensure local procurement and hiring.

U.S. Silica's corporate sustainability report outlines the components of its core community engagement initiatives. It's stated priorities include increasing charitable contributions to organization that support the local community and actively seeking opportunities for volunteering and community engagement.

18.0 CAPITAL AND OPERATING COSTS

18.1 Historical Financial Performance

Table 18.1 summarizes the past three years of financial data for the Lamesa Operation. We remind the reader that the COVID-19 pandemic caused severe economic, market, and other disruptions which began to affect U.S. Silica's proppant sand operations in the second quarter of 2020.

Table 18.1: Historical Financials

	Units	2020	2021	2022
Production:				
ROM Production	000 tons	3,271	4,692	5,871
Process Yield	%	97.4	78.7	76.6
Product Sales	000 tons	3,187	3,691	4,499
Gross Revenues	$ 000	69,644	68,108	141,203
Average Selling Price	$/ton sold	21.85	18.45	31.39
Total Cash Costs of Sales	$ 000	32,594	38,061	62,728
Average Cash Cost of Sales	$/ton sold	10.23	10.31	13.94
Capital Expenditures	$ 000	3,510	159	524

Gross revenues include income from product sales and shipping.

Total cash costs of sales include operating costs (i.e., mining, ongoing reclamation, processing, product loadout, and other related costs) in addition to selling, general, and administrative expenses.

Capital expenditures include maintenance (sustaining) expenses and discretionary spending on continuous improvement projects to drive and maintain cost efficiencies.

Based on the financial data presented above:

- Average realization increased from $21.85 per ton sold in 2020 to $31.39 per ton sold in 2022.
- Total cash cost of sales also increased from $10.23 per ton sold in 2020 to $13.94 per ton sold in 2022.
- EBITDA margin increased marginally from 53.2% in 2020 to 55.6% in 2022.
- Capital expenditures totaled almost $4.2 million over the three years, averaging $0.37 per ton sold.

18.2 Estimated Costs

The production and unit cost estimates provided by U.S. Silica are based on actual past performance and their customary internal budget review and approvals process. Operating volumes are well-defined and understood, as are mining and processing productivities. As such, it is BOYD's opinion that the production and financial projections are reasonable and are likely to be within ± 20% accuracy level.

This section contains forward-looking information related to capital and operating cost estimates for the Lamesa Operation.

There are inherent known and unknown risks and uncertainties associated with all mining operations. These risks, uncertainties, and other factors are not quantifiable, but include, but are not limited to, adverse general economic conditions, operating hazards, inherent uncertainties in interpreting engineering and geologic data, fluctuations in commodity prices and prices for operational services, government regulation and political risks, as well as other risks commonly associated with the mining industry.

18.2.1 Projected Capital Expenditures

The Lamesa Operation and related facilities are fully developed and should not require any near-term major capital investment to maintain full commercial production. Historically, the timing and amount of capital expenditures has been largely discretionary and within U.S. Silica's control. Their budgetary allocations for sustaining and discretionary capital expenditures over the next three years is provided in Table 18.2, below.

Table 18.2: Projected Capital Costs

Year	CapEx ($ 000)
2023	540
2024	556
2025	573
Total	1,668

BOYD considers the near-term detailed capital expenditure schedule as presented by U.S. Silica to be reasonable and representative of the capital necessary to operate the Lamesa Operation.

After 2025, capital expenditures are projected to increase 3% annually per year from 2025's expenditures until the end of operation's life. As the Lamesa Operation is in a steady state of production, the projected capital expenditures are considered reasonable and expected.

18.2.2 Projected Operating Costs

Operating cost estimates were developed based on recent actual costs and considering specific operational activity levels and cost drivers. The estimates consider current and expected labor headcount and salaries, major consumables and unit prices, power costs, and equipment and maintenance costs. The total operating cost estimate includes all site costs related to mining, processing, and general and administrative activities.

In the near-term, U.S. Silica expects their unit operating costs to stay relatively consistent (on an uninflated basis). As such, the projected total cash cost of sales over the life of the mine is $13.94 per ton sold. As the operation is in a steady state, BOYD considers the future operating cost estimates to be reasonable and appropriate.

19.0 ECONOMIC ANALYSIS

19.1 Approach

The economic analysis presented in this chapter was made for the purposes of confirming the commercial viability of the Lamesa Operation's reported proppant sand reserves and not for the purposes of valuing U.S. Silica, the Lamesa Operation, or its assets. The economic analysis contains forward-looking information related to the projected operating and financial performance of the Lamesa Operation and therefore involves inherent known and unknown risks and uncertainties, some of which may be outside of U.S. Silica's control. U.S. Silica, as with all mining companies, actively evaluates, changes, and modifies business and operating plans in response to various factors that may affect operational and/or financial results. Actual results, production levels, operating expenses, sales realizations, and all other modifying factors could vary significantly from the assumptions and estimates provided in this analysis. Risk is subjective, as such, BOYD recommends that each reader should evaluate the project based on their own investment criteria.

The financial model used for the purposes of the economic analysis has been prepared in-house by U.S. Silica as part of their annual budgeting process. The model forecasts future free cash flow from proppant sand production and sales over the life cycle of the Lamesa Operation using the annual forecasts of production, sales revenues, and operating and capital costs discussed earlier in this report. A DCF analysis, in which future free cash flows are discounted to present value, is used to derive an NPV for the proppant sand reserves. Use of DCF-NPV analysis is a standard method within the mining industry to assess the economic value of a project after allowing for the cost of capital invested.

The financial evaluation of the Lamesa Operation has been undertaken on a simplified after-tax basis and does not reflect U.S. Silica's corporate tax structure. NPV is calculated using an after-tax discount rate of 12.5% ($NPV_{12.5}$). Cash flows were assumed to occur in the middle of each year and are discounted to mid-year 2022. Cost estimates and other inputs to the cash flow model for the project have been prepared using constant 2022 money terms, i.e., without provision for inflation. Internal rate of return and project payback were not calculated, as there was no initial investment (sunk costs) considered in the financial model provided herein.

A suite of sensitivities was calculated to evaluate the effect of the main drivers of economic performance, including variations in sales prices, operating costs, and capital costs.

BOYD has reviewed the financial model and its inputs in detail. It is our opinion that the financial model provides a reasonable and accurate reflection of the Lamesa Operation's expected economic performance based on the assumptions and information available at the time of our review.

19.2 Assumptions and Limitations

Cash flow projections for the Lamesa Operation have been generated from the annual forecasts of production, sales revenues, and operating and capital costs discussed earlier in this report. A summary of the key assumptions and limitations is provided below:

- Sales volumes of finished proppant sand are expected to increase 2% per annum.
- ROM production requirements are based on an expected processing yield of 75% (the historic average) and are also projected to increase 2% per annum. Forecasted ROM production is at or below the capacity of the existing mining equipment and related infrastructure.
- Forecasted revenues are based on sales of various grades of finished proppant sand with a weighted-average sales price of $23.90 per ton.
- Capital and operating costs are discussed in Chapter 18. Capital expenditures are derived from budgetary allocations for the first three years of the forecast and escalated thereafter at 3% per annum. Unit operating costs are expected to remain relatively constant over the life of the operation at $13.94 per sold ton.
- Taxes are based on combined Federal and State Tax rates totaling 26%
- Buildup of net working capital is equal to 25% of positive cash (operating) margins.
- Depreciation and amortization expenses are estimated as the average of the proceeding three years.
- Asset recovery/salvage values were not included in the valuation.

19.3 Financial Model Results

Estimated LOM pre-tax and after-tax cash flows for proppant sand production from the Lamesa Operation are presented in Table 19.1, on the following page.

Table 19.1

ANNUAL PRODUCTION AND CASH FLOW FORECAST
LAMESA OPERATION
Prepared For
U.S. SILICA COMPANY
By
John T. Boyd Company
Mining and Geological Consultants
February 2023

Description	Units	2023	2024	2025	2026	2027	2028 to 2032	2033 to 2038	Total
Production:									
ROM Production	000 tons	6,118	6,241	6,365	6,493	6,623	35,153	39,119	106,111
Product Sales	000 tons	4,589	4,680	4,774	4,869	4,967	26,365	29,339	79,583
Total Revenues	$ 000	109,668	111,861	114,099	116,381	118,708	630,118	701,204	1,902,040
Average Selling Price	$/ton sold	23.90	23.90	23.90	23.90	23.90	23.90	23.90	23.90
Total Cash Costs of Sales	$ 000	63,965	65,245	66,550	67,881	69,238	367,525	408,987	1,109,391
Average Cash Cost of Sales	$/ton sold	13.94	13.94	13.94	13.94	13.94	13.94	13.94	13.94
EBITDA	$ 000	45,703	46,617	47,549	48,500	49,470	262,593	292,217	792,649
Depreciation & Amortization	$ 000	20,199	20,777	21,112	20,696	20,862	104,258	125,092	332,996
EBIT	$ 000	25,504	25,839	26,437	27,804	28,608	158,335	167,126	459,654
Taxes	$ 000	6,631	6,718	6,874	7,229	7,438	41,167	43,453	119,510
Operating Income	$ 000	18,873	19,121	19,564	20,575	21,170	117,168	123,673	340,144
Capital Expenditures	$ 000	540	556	573	590	607	3,322	4,692	10,879
Net Working Capital Contribution	$ 000	-	229	233	238	243	1,287	1,285	3,514
Net Income	$ 000	18,333	18,337	18,758	19,747	20,320	112,559	117,696	325,750
Pre-tax Cash Flow	$ 000	45,163	45,832	46,743	47,673	48,620	257,984	286,240	778,256
Discounted at 12.5%	$ 000	42,580	38,410	34,821	31,567	28,617	107,635	66,152	349,782
After-tax Cash Flow	$ 000	38,532	39,114	39,870	40,444	41,182	216,817	242,788	658,746
Discounted at 12.5%	$ 000	36,328	32,780	29,700	26,780	24,239	90,513	55,784	296,125

Table 19.2, below, provides a summary of the estimated remaining life of mine financial results for the Lamesa Operation.

Table 19.2: Financial Results

	Units	Remaining Life of Mine Total
Remaining Life	years	16
Production:		
ROM Production	000 tons	106,111
Product Sales	000 tons	79,583
Total Revenues	$ millions	1,902.0
Total Cash Costs of Sales	$ millions	1,109.4
Capital Expenditures	$ millions	10.9
Pre-Tax:		
Cash Flow	$ millions	778.3
$NPV_{12.5}$	$ millions	349.8
After-tax:		
Cash Flow	$ millions	658.7
$NPV_{12.5}$	$ millions	296.1

DCF-NPV on a pre-tax and after-tax basis, using discount rates of 10%, 12.5% (the base case), and 15%, were calculated utilizing the projected cash flows. Table 19.3 summarizes the results of the pre-tax and after-tax DCF-NPV analyses:

Table 19.3: DCF-NPV Analysis

	NPV ($ millions)		
	10%	12.5%	15%
Pre-Tax	399.6	349.8	309.6
After-Tax	338.2	296.1	262.2

As shown, the pre-tax DCF-NPV ranges from approximately $309.6 million to $399.6 million. The after-tax DCF-NPV ranges from approximately $262.2 million to $338.2 million.

The economic analysis confirms that the Lamesa Operation generates positive pre- and after-tax financial results and a real $NPV_{12.5}$ of $296.1 million. As such, it is BOYD's

opinion that the Lamesa Operation's proppant sand reserves have demonstrated economic viability.

19.4 Sensitivity Analysis

Table 19.4, below, shows the sensitivity of the project after-tax for a cash flow discounted at 12.5% ($NPV_{12.5}$) to a variation over a range of 20% above and below the base case in: (1) average selling prices and (2) operating costs.

Table 19.4: After-Tax $NPV_{12.5}$ Sensitivity Analysis ($ millions)

Cash Costs of Sales \ Revenues	-20%	-15%	-10%	-5%	0%	5%	10%	15%	20%
-20%	243.8	275.2	306.6	338.0	369.4	400.8	432.2	463.7	494.6
-15%	225.4	256.9	288.3	319.7	351.1	382.5	413.9	445.3	476.7
-10%	207.1	238.5	269.9	301.4	332.8	364.2	395.6	427.0	458.4
-5%	188.8	220.2	251.6	283.0	314.4	345.9	377.3	408.7	440.1
0%	170.5	201.9	233.3	264.7	**296.1**	327.5	359.0	390.4	421.8
5%	152.2	183.6	215.0	246.4	277.8	309.2	340.6	372.0	403.5
10%	133.8	165.2	196.7	228.1	259.5	290.9	322.3	353.7	385.1
15%	115.5	146.9	178.3	209.7	241.2	272.6	304.0	335.4	366.8
20%	97.2	128.6	160.0	191.4	222.8	254.2	285.7	317.1	348.5

As might be expected, the project is most sensitive to changes in product pricing and operating costs. The project is less sensitive to capital costs. There is little to no impact varying the capital costs from 70% to 130% of the base case.

This analysis demonstrates the project value to be relatively robust, with positive NPVs reported across the range of values assessed.

20.0 ADJACENT PROPERTIES

Exploration data, including the results of drilling and sampling campaigns conducted by U.S. Silica, have been collected from properties located adjacent to the Lamesa Operation (refer to Figure 7.1 on page 7-5) and used in the estimation of proppant sand resources and reserves as reported herein.

A competitor proppant sand producer recently began mining operations on the property located immediately north of the Lamesa Operation. BOYD is unaware of any other mining or exploration activities having occurred on adjacent properties.

q:\eng_wp\3076.018 u.s. silica - lamesa\wp\ch-20 - adjacent properties.docx

21.0 OTHER RELEVANT DATA AND INFORMATION

BOYD is not aware of any additional information which would materially impact the proppant sand resource and reserve estimates reported herein.

22.0 INTERPRETATION AND CONCLUSIONS

22.1 Audit Findings

BOYD's independent technical assessment was conducted in accordance with S-K 1300 and concludes:

- Sufficient data have been obtained through site exploration and sampling programs and mining operations to support the geological interpretations of the sand deposit within the controlled property of the Lamesa Operation. The data are of sufficient quantity and reliability to reasonably support the proppant sand resource and reserve estimates presented in this report.
- BOYD is of the opinion that our data verification efforts: (1) adequately confirm the reasonableness of the geologic interpretations, resource estimation criteria, and economic assumptions; and (2) support the use of the data in proppant sand resource/reserve estimation.
- The 79.6 million saleable product tons of proppant sand reserves (as of December 31, 2022) identified on the property are reasonably and appropriately supported by technical studies, which consider expected geologic conditions, planned mining and processing operations, forecasted product revenues, and operating and capital cost estimates. As such, BOYD is of the opinion that there are reasonable expectations that the stated proppant sand reserves for the Lamesa Operation are technically, economically, and legally extractable as of December 31, 2022.
- In addition to the reported reserves, U.S. Silica controls approximately 5.4 million in-place tons of measured and indicated proppant sand resources and 5.0 million in-place tons of inferred proppant sand resources at the Lamesa Operation. It is BOYD's opinion that the stated proppant sand resources have been reported using economic and mining assumptions to support the reasonable potential for eventual economic extraction.
- There is no other relevant information material to the Lamesa Operation that is necessary to make this technical report summary not misleading.

22.2 Significant Risks and Uncertainties

As a mining operation with an established operating history, the purpose of U.S. Silica's periodic mine planning exercises is to: (1) collect and analyze sufficient data to reduce or to eliminate risk in the technical components of the project, and (2) to refine economic projections based on current data. There is a high degree of certainty for this project under the current and foreseeable operating environment. A general assessment of risk is presented in the relevant sections of this report.

23.0 RECOMMENDATIONS

Based on the scope of our assignment, BOYD has no recommendations regarding the Lamesa Operation. It is our understanding that U.S. Silica continuously reviews and improves operating practices as a matter of course.

q:\eng_wp\3076.018 u.s. silica - lamesa\wp\ch-23 - recommendations.docx

24.0 REFERENCES

A list of supporting information is provided in Section 2.4. Additional references are cited as footnotes in the report as required.

25.0 RELIANCE ON INFORMATION PROVIDED BY REGISTRANT

In the preparation of this report, BOYD has relied, exclusively and without independent verification, upon information furnished by U.S. Silica as presented in Table 25.1, below.

Table 25.1: Information Relied Upon from Registrant

Subject Matter	Information	Report Chapter(s)
Environmental	Permits, bond, and reclamation liability	3, 17
	Sustainability initiatives	17
	Surface tailings management	15
	Mine closure requirements and plans	17
	Monitoring/compliance requirements for protected areas/species	3, 17
Governmental	Income tax rates	19
Legal	Property title and status	3
	Encumbrances, easements, and right-of-ways	3
Macroeconomics	Inflation, interest, and discount rates	19
Markets	Market overview and strategy	16
	Long-term product price projections	11, 12, 16, 19
	Product specifications	16
	Marketing and sales contracts	16
Social	Community relations	17

BOYD exercised due care in reviewing the information provided by U.S. Silica within the scope of our expertise and experience (which is in technical and financial mining issues) and concluded the data are reasonable and appropriate considering the status of the subject properties and the purpose for which this report was prepared. We have no reason to believe that any material facts have been withheld or misstated, or that further analysis may reveal additional material information. However, the accuracy of the results and conclusions of this report are reliant on the accuracy of the information provided by U.S. Silica.